

Technische Universität Dortmund  
Fakultät Erziehungswissenschaft, Psychologie und Bildungsforschung

**Multidimensional School Success in Light of Structural and Process  
Components of Students' Family and Classroom Environment**

Kumulative Dissertation zur Erlangung des akademischen Grades Doktor der Philosophie  
(Dr. phil.)

vorgelegt von Sebastian Nicolas Thomas Vogel, M.Sc.

Erstgutachterin: Prof. Dr. Nele McElvany

Zweitgutachter: Prof. Dr. Philipp Jugert

Juli 2025

Dissertation in der Fakultät Erziehungswissenschaft, Psychologie und Bildungsforschung  
an der Technischen Universität Dortmund

## **Danksagung**

An dieser Stelle möchte ich mich herzlich bei allen Menschen bedanken, die mich auf unterschiedlichste Weise während der Promotionszeit begleitet und unterstützt haben. Zunächst bedanke ich mich herzlich bei Nele McElvany, die die Promotion mit ihrer umfassenden Expertise betreut und diese Arbeit damit erst ermöglicht hat. Ebenso danke ich Philipp Jugert für die Zweitbegutachtung und die produktive Zusammenarbeit im SIGN-Projekt sowie Birgit Heppt für ihre Bereitschaft, die Arbeit als Drittprüferin zu begutachten. Ein besonderer Dank gilt darüber hinaus Justine Stang-Rabrig, die mir sowohl in der Projektarbeit als auch auf dem Weg zur Promotion stets als erfahrene, hilfsbereite und wertschätzende PostDoc-Betreuerin zur Seite stand.

Ein großer Dank gilt darüber hinaus auch allen weiteren Kolleg:innen in der Arbeitsgruppe und am Institut für Schulentwicklungsforschung. Durch den immer offenen, wertschätzenden und produktiven Austausch am Institut habe ich nicht nur viel lernen können, sondern mich auch stets sehr wohl gefühlt. Ebenso möchte ich allen Beteiligten der SIGN-Projektgruppe für die gute und bereichernde Kooperation über drei Universitäten hinweg danken.

Darüber hinaus danke ich allen, die meinen Weg zur Promotion von außen direkt oder indirekt begleitet haben. Mein Dank gilt dabei insbesondere meiner Familie und meinen Eltern sowie allen Freund:innen, die mir während der Promotionszeit nicht nur Unterstützung, sondern auch wichtigen Ausgleich gegeben haben.



## Abstract

The question how all students can be given equal opportunity to succeed in school according to their abilities is central for achieving equity and fairness in education and therefore an important challenge for education systems worldwide. To investigate this question, school success must be understood as a multidimensional construct that comprises multiple goals, such as the acquisition of cognitive competences such as reading competence and vocabulary, the emergence of positive noncognitive outcomes such as motivation and well-being, as well as the achievement of good institutionalized indicators of success such as high grades and track recommendations, in line with the educational goals set forth by national and international educational institutions (e.g., Kultusministerkonferenz, 2022; Organization for Economic Co-operation and Development et al., 2015) and extant frameworks for understanding school and academic success (e.g., Lipowsky, 2020; York et al., 2015). In turn, the factors that determine whether students can succeed in regard to these different dimensions are manifold and socioecological psychological approaches such as Ecological Systems Theory emphasize that, beyond the students themselves, these determinants also lie in their environment, such as their families and classrooms as central microsystems (e.g., Bronfenbrenner, 1979, 1986; Oishi, 2014). Additionally, separating relatively stable structural and malleable process components of these microsystems allows comprehensive insights into the determinants of success as well as the underlying mechanisms, in line with theoretical considerations derived from home learning environment research (e.g., Kluczniok et al., 2013; McElvany et al., 2009) and Supply-Use Models of instruction (e.g., Brühwiler & Blatchford, 2011; Seidel, 2014). In the family microsystem, sociodemographic background variables such as socioeconomic status (e.g., Bourdieu, 1983), language use (e.g., Esser, 2006), and history of immigration (e.g., Suárez-Orozco et al., 2018) represent relevant structural components of the environment, whereas parental involvement (e.g., Boonk et al., 2018) and educational beliefs held in the family (e.g., Dumont et al., 2019) represent core process variables. On the other hand, the classroom structure is in important ways determined by the composition in regard to the aforementioned sociodemographic variables (e.g., Brühwiler & Blatchford, 2011), while differences in teacher's instructional quality and focus act as process variables (e.g., Praetorius et al., 2018; Rjosk, 2022). As shown, this separation of structural and process components of different microsystems has a strong theoretical foundation in the linking of Ecological Systems

Theory with other relevant educational and psychological theories when it comes to regarding their role for and the mechanisms influencing school success of individual students. However, while extant research has investigated many relevant associations within this context (e.g., Bergold et al., 2022; Dumont et al., 2019; Wenger et al., 2020), some proposed links are understudied or not well understood for example due to ambiguous prior findings which can result as a consequence of focusing on singular aspects of the microsystems rather than comprehensive views that account for the confounded nature of the structure variables. Therefore, more research aimed at the role of the family and classroom for school success is needed to understand these complex relations in full.

Taking into account the theoretical background and state of research as outlined above, the dissertation at hand focuses on the association of structure variables of the family and classroom microsystem, respectively, with multidimensional school success as well as the process variables within these microsystems that can act as mediating and moderating factors in different groups of students depending on the structural components of their environment. The studies in this work investigated these complex relations in the context of the COVID-19 pandemic, a collective life event that impacted education globally in unprecedented ways, by focusing on students' experience during emergency remote education as well as shortly after schools were reopened and thereby consider the impact of these unique circumstances that affected students' learning and well-being (e.g., S. Chen et al., 2024; Ludewig et al., 2025) and may similarly have changed the role of the family and classroom for emerging as successful students despite the adverse circumstances in unique ways. Consequently, the studies addressed two overarching research questions and investigated (1) how structure variables of the family and classroom were associated with the different dimensions of school success and (2) to what extent family and classroom process variables predicted school success and acted as mediators and moderators of the associations addressed in the first research question. For this purpose, four empirical studies are included in this dissertation, each of which emphasizes different aspects of the research questions. While Study I provides new insights into the interplay of family structure and process variables and their role for noncognitive outcomes in a sample of socioeconomically disadvantaged students during emergency remote education, Study II fills an important lacuna in regard to multilingual students' development of language-related cognitive competences in the majority language in light of the individual characteristics

of their heritage language and structural components of their family. Study III provides relevant analyses of the role that family structure and process variables play for a variety of central indicators of school success of first-generation and second-generation immigrant as well as non-immigrant students, whereas Study IV offers a comprehensive insight into the association of different family and classroom structure variables with cognitive and noncognitive aspects of school success, separating the influence of confounded characteristics, while also investigating the role of teachers' instructional focus as a classroom process variable for mediating and moderating these associations.

Specifically, *Study I* addressed the role of socioeconomic status and language use at home (as family structure variables) and parental involvement and responsibility for learning (as family process variables) for students' intrinsic and extrinsic motivation as well as participation in learning activities (as noncognitive outcomes) of students with low average socioeconomic status during emergency remote education specifically. Additionally, building on prior structure-process models of the family and home learning environment (e.g., McElvany et al., 2009) a potential mediation of the relation of structure variables to students' outcomes via process variables was investigated. The study utilized questionnaire data regarding the experience during emergency remote education from a sample of  $N = 117$  students from a comprehensive school in North Rhine-Westphalia (Grades 9 to 11). Path models revealed no direct association of structure variables with the outcomes. Demanding-structuring involvement was positively associated with extrinsic learning motivation and participation in learning activities as well as mediating a small negative indirect effect of non-majority language use on extrinsic motivation; responsive-motivational involvement was positively linked to intrinsic motivation and participation in learning activities; and parents' perceived responsibility for learning also related positively to students' participation in learning activities. The study offered new insights into the role of the family during emergency remote education and emphasized the importance of parental involvement and educational beliefs for students' positive noncognitive outcomes during this challenging time. The findings also imply that parents in minority-language families may have found it more difficult to support their children during this time, especially in regard to providing structure, and could have benefited from additional support and resources according to their specific needs.

*Study II* targeted the reading competence and vocabulary (as cognitive competences) of multilingual students specifically, while also including the socioeconomic status and history of immigration (as family structure variables). Based on theoretical models of language learning and transfer (e.g., S. C. Chung et al., 2019; Esser, 2006), linguistic distance between students' heritage language and German was investigated as a specific facet of the language use at home, and its interaction with first-generation immigrant students' age at arrival in Germany was regarded as a potential moderator. In the sample of  $N = 193$  multilingual fourth-grade students in North Rhine-Westphalia, linguistic distance emerged as a significant negative predictor of reading competence but not vocabulary when the frequency of language use and socioeconomic status were included in regression analyses. Additionally, immigrant students' age at arrival was not related to either outcome, nor did it significantly interact with linguistic distance. Results highlight the distinct role of linguistic distance for multilingual students' acquisition of reading competence and show that the inclusion of language-specific measures, such as their distance to the target language German, can facilitate a more accurate understanding of multilingual students' strengths and needs that arise from their family language background.

*Study III* focused on the comparison of first-generation immigrant, second-generation immigrant, and non-immigrant students in regard to reading competence (as cognitive competence), life satisfaction (as noncognitive outcome), as well as grades and track recommendation (as institutionalized indicators). Building on theoretical considerations regarding the adaptation of immigrant-origin students, (e.g., Suárez-Orozco et al., 2018) another focus was a comparison of the role that socioeconomic status and language use (as family structure variables) as well as educational aspirations and parent-child reading (as family process variables) played for the different dimensions of school success depending on students' history of immigration. Regression analyses and multigroup path comparisons of  $N = 271$  fourth-grade students ( $n = 102$  first-generation,  $n = 68$  second-generation,  $n = 101$  non-immigrant) from North Rhine-Westphalia revealed disadvantages of first-generation immigrant students in regard to cognitive competences and institutionalized indicators compared to second-generation and non-immigrant students, but no differences between the latter two. Educational aspirations were positively related to grades and parent-child reading to life satisfaction in all group, but parent-child reading was additionally negatively associated

with reading competence in first- and second-generation immigrant students. Unique positive links of educational aspirations and socioeconomic status to life satisfaction emerged only in first- and second-generation immigrant students, respectively. Findings showed that first-generation immigrant students faced unique disadvantages in primary school – although not in regard to psychological adjustment – but also revealed that beyond the generally beneficial role of family variables, as for example educational aspirations, they can hold a unique positive potential for the adaptation of first-generation immigrant students.

*Study IV* investigated reading competence (as cognitive competence), reading enjoyment, and reading self-concept (as noncognitive outcomes) in light of students' socioeconomic risk, language use at home, and first-generation immigrant status (as family structure variables) and the classroom's composition in regard to these three aspects (as classroom structure variables). Additionally, teacher's focus on reading-related support, support of language-minority students, and cognitive activation (as classroom process variables) was included as a mediator of classroom-level and moderator of individual-level associations. Utilizing a sample of  $N = 3414$  German fourth-graders ( $N = 195$  classrooms), multilevel structural equation models revealed negative associations of socioeconomic risk with all outcomes and language minority status with reading competence, but a positive link of first-generation immigrant status to reading enjoyment among the family structure variables. Regarding the classroom structure variables, socioeconomic risk composition was negatively related to all outcomes, language minority composition positively to self-concept, and immigrant composition negatively to reading competence, whereas the classroom process variables – while partly associated with classroom structure – acted neither as mediators nor moderators. Findings implied that classroom structure was, in different regards, an important factor for school success beyond the role of family structure, but could not decisively show how teachers could adapt their instruction to mitigate the negative effects of disadvantageous classroom composition.

This dissertation builds on and extends the extant literature regarding the role of family and classroom structure and process variables, respectively, for different dimensions of students' school success. By employing a multidimensional framework of school success, the studies facilitated an understanding of success as a complex, comprehensive construct rather than singling out individual aspects. The inclusion of multiple aspects of the family structure

in all studies allowed to regard the role that each of these characteristics played for school success without conflating effects of confounded structure variables – which can equally be said for the classroom structure variables – and revealed complex associations. By including central family and classroom process variables, parental involvement and educational beliefs were shown to be important cornerstones for facilitating school success, whereas the investigation of classroom process variables in this work revealed potential mismatches between teachers' efforts to adapt their instruction to the specific needs of a classroom and the actual beneficial role of these processes. Thereby, the results emerging from this dissertation simultaneously helped identify and laid the groundwork for core avenues for future research as well.

## Zusammenfassung

Die Frage, wie allen Schüler:innen die Möglichkeit gegeben werden kann, gemäß ihrer Fähigkeiten in der Schule erfolgreich zu sein, ist zentral für das Erreichen von Bildungsgerechtigkeit und damit eine wichtige Herausforderung für Bildungssysteme weltweit. Um diese Frage zu untersuchen muss Schulerfolg als mehrdimensionales Konstrukt verstanden werden, welches verschiedene Ziele wie den Erwerb von kognitiven Kompetenzen wie Lesekompetenz und Wortschatz, positiver nicht-kognitiven Outcomes wie Motivation und Wohlbefinden, als auch das Erzielen guter institutionalisierten Indikatoren der Erfolgs wie gute Noten und eine Übergangsempfehlung für einen hohen Schulzweig umfasst, im Einklang mit Bildungszielen die von nationalen und internationalen Bildungsinstitutionen postuliert werden (z.B. Kultusministerkonferenz, 2022; Organization for Economic Co-operation and Development et al., 2015) und bestehenden Konzeptionalisierungen von Schul- und Bildungserfolg (z.B. Lipowsky, 2020; York et al., 2015). Umgekehrt sind die Faktoren, die bestimmen, ob Schüler:innen mit Blick auf diese verschiedenen Dimensionen erfolgreich sein können, vielfältig, und sozioökologisch-psychologische Ansätze wie die Theorie der ökologischen Systeme betonen, dass diese Bedingungsfaktoren, über die einzelnen Schüler:innen selbst hinaus, auch in ihrer Umwelt verortet sind, so beispielsweise in ihren Familien und Schulklassen als zentrale Mikrosysteme (z.B. Bronfenbrenner, 1979, 1986; Oishi, 2014). Darüber hinaus erlaubt die Abgrenzung von relativ stabilen Strukturmerkmale und veränderbaren Prozessmerkmale dieser Mikrosysteme umfassende Einblicke in die Determinanten des Schulerfolgs als auch die zugrunde liegenden Mechanismen, in Anschluss an theoretische Erwägungen, die sich aus der Forschung zur häuslichen Lernumgebung (z.B. Kluczniok et al., 2013; McElvany et al., 2009) und Angebots-Nutzungs-Modelle des Unterrichts (z.B. Brühwiler & Blatchford, 2011; Seidel, 2014) ableiten. Im Mikrosystem Familie sind soziodemografische Hintergrundvariablen wie der sozioökonomische Status (z.B. Bourdieu, 1983), der Sprachgebrauch (z.B. Esser, 2006) und die Migrationsgeschichte (z.B. Suárez-Orozco et al., 2018) relevante Strukturmerkmale, während elterliches Involvement (z.B. Boonk et al., 2018) und bildungsbezogene Überzeugungen in der Familie (z.B. Dumont et al., 2019) zentrale Prozessmerkmale darstellen. Die Struktur der Klasse andererseits ist maßgeblich bestimmt durch die Zusammensetzung der Klasse mit Blick auf die zuvor genannten soziodemografischen Merkmale (z.B. Brühwiler & Blatchford, 2011), wohingegen

Unterschiede in der Qualität und der Ausrichtung des Unterrichts der Lehrkräfte als Prozessvariablen fungieren (z.B. Praetorius et al., 2018; Rjosk, 2022). Diese Trennung von Struktur- und Prozessmerkmalen verschiedener Mikrosysteme hat, wie dargelegt, eine starke theoretische Fundierung in der Verknüpfung der Theorie der ökologischen Systeme mit anderen relevanten Bildungs- und psychologischen Theorien in Bezug auf ihre Rolle für den Schulerfolg einzelner Schüler:innen sowie die dahinterliegenden Mechanismen. Während die bestehende Forschung jedoch verschiedene relevante Zusammenhänge in diesem Kontext untersucht hat (z.B. Bergold et al., 2022; Dumont et al., 2019; Wenger et al., 2020) bleiben andere angenommene Assoziationen bisher unterforscht oder weniger gut verstanden, beispielsweise aufgrund uneindeutiger Befunde, welche auftreten können wenn Studien einzelne Aspekte der Mikrosysteme betrachten anstatt umfängliche Ansätze einzusetzen, die die Konfundierung verschiedener Strukturvariablen berücksichtigen. Daher ist weiterführende Forschung, welche auf die Rolle der Familie und der Klassenumgebung abzielt, notwendig, um diese komplexen Zusammenhänge in Gänze zu verstehen.

Unter Berücksichtigung des dargelegten theoretischen Hintergrunds und aktuellen Forschungsstands fokussiert die vorliegende Dissertation auf die Zusammenhänge von Strukturvariablen der Familie beziehungsweise der Klasse mit dem multidimensionalen Schulerfolg und nimmt darüber hinaus die Prozessvariablen innerhalb dieser Mikrosysteme in den Blick, welche für verschiedene Gruppen von Schüler:innen in Abhängigkeit der strukturellen Komponenten ihrer Umwelt als Mediatoren und Moderatoren dieser Zusammenhänge agieren können. Die Studien in dieser Arbeit untersuchten diese komplexen Zusammenhänge im Kontext der COVID-19-Pandemie, ein kollektives Lebensereignis welches Bildung weltweit in beispielloser Weise beeinflusst hat: Indem die Erfahrungen der Schüler:innen während der sogenannten Emergency Remote Education sowie kurz nach Wiedereröffnung der Schulen für den Präsenzunterricht betrachtet werden, werden die Auswirkungen dieser einzigartigen Umstände berücksichtigt, welche das Lernen und Wohlbefinden der Schüler:innen beeinflusst haben (z.B. S. Chen et al., 2024; Ludewig et al., 2025) und gleichermaßen potenziell die Rolle verändert haben könnten, welche die Familie und der Klassenkontext dafür spielen, dass Schüler:innen trotz der widrigen Umstände erfolgreich aus der Situation hervorgehen konnten. In diesem Sinne waren den Studien zwei Forschungsfragen übergeordnet und es wurde untersucht (1) wie die Strukturvariablen der

Familie und der Klasse mit verschiedenen Dimensionen des Schulerfolgs zusammenhängen und (2) in welchem Ausmaß Prozessvariablen der Familie und der Klasse Schulerfolg vorhersagten und als Mediatoren und Moderatoren der in der ersten Forschungsfrage aufgegriffenen Zusammenhänge wirkten. Um die übergeordneten Forschungsfragen zu beantworten wurden vier Studien in diese Dissertation aufgenommen, welche unterschiedliche Aspekte der Forschungsfragen hervorheben. Während Studie I neue Einblicke in das Zusammenspiel von familiären Struktur- und Prozessmerkmalen und ihre Rolle für nicht-kognitive Outcomes in einer Stichprobe von soziodemographisch benachteiligten Schüler:innen während der Emergency Remote Education bietet, füllt Studie II eine wichtige Lücke mit Blick auf den Erwerb von sprachbezogenen kognitiven Kompetenzen von multilingualen Lernenden in der Mehrheitssprache mit Blick auf individuelle Merkmale ihrer Herkunftssprache und strukturelle Komponenten ihres Familienumfelds. In Studie III werden relevante Analysen der Rolle von familiären Struktur- und Prozessmerkmalen für eine Vielzahl von zentralen Indikatoren des Schulerfolgs von Lernenden der ersten und zweiten Migrationsgeneration sowie ohne Migrationsgeschichte präsentiert, wohingegen Studie IV einen umfassenden Einblick in den Zusammenhang verschiedener Strukturmerkmale der Familie und der Klasse mit kognitiven und nicht-kognitiven Aspekten des Schulerfolgs darbietet, wodurch der Einfluss konfundierter Merkmale separiert wird, während zugleich die mediiierende und moderierende Rolle des Unterrichtsfokus der Lehrkraft als Prozessvariable der Klasse untersucht wird.

Im Detail adressiert *Studie I* die Rolle des sozioökonomischen Status und der Familiensprache (als familiäre Strukturmerkmale) und des elterlichen Involvements und Verantwortung für das Lernen (als familiäre Prozessmerkmale) für die intrinsische und extrinsische Motivation sowie Teilnahme an Lernaktivitäten (als nicht-kognitive Outcomes) von Schüler:innen mit einem geringen durchschnittlichen sozioökonomischen Status, spezifisch während der Emergency Remote Education. Darüber hinaus wurde, aufbauend auf vorherigen Struktur-Prozess-Modellen der Familie und häuslichen Lernumgebung (z.B. McElvany et al., 2009), eine potenzielle Mediation des Zusammenhangs von Strukturvariablen und Outcomes durch die Prozessvariablen untersucht. Die Studie nutzte Fragebogendaten, welche sich auf die Erfahrungen von  $N = 117$  Schüler:innen einer Gesamtschule in Nordrhein-Westfalen (Klassenstufen 9 bis 11) während der Emergency Remote Education beziehen.

Pfadmodelle zeigten keinen direkten Zusammenhang der Strukturmerkmale mit den Outcomes. Fördernd-strukturierendes Involvement war positiv mit extrinsischer Lernmotivation und der Teilnahme an Lernaktivitäten verbunden und wirkte als Mediator für einen kleinen negativen indirekten Effekt von nicht-deutscher Familiensprache auf extrinsische Motivation; responsiv-motivationales Involvement war positiv mit intrinsischer Motivation und der Teilnahme an Lernaktivitäten verbunden; und die wahrgenommene elterliche Verantwortung für das Lernen war ebenfalls positiv mit der Teilnahme an Lernaktivitäten assoziiert. Die Studie lieferte neue Einblicke in die Rolle der Familie während der Emergency Remote Education und hob die Relevanz des elterlichen Involvements und bildungsbezogener Überzeugungen für positive nicht-kognitive Outcomes der Schüler:innen während dieser herausfordernden Zeit hervor. Die Befunde implizieren ebenfalls, dass Eltern in minderheitssprachlichen Familien möglicherweise mehr Schwierigkeiten bei der Unterstützung ihrer Kinder erlebt haben, insbesondere in Bezug auf die Strukturierung von Lernaktivitäten, und von zusätzlicher Unterstützung und der Bereitstellung spezifisch auf ihre Bedürfnisse angepasster Ressourcen hätten profitieren können.

*Studie II* zielte auf die Lesekompetenz und den Wortschatz (als kognitive Kompetenzen) spezifisch von multilingualen Lernenden ab, während der sozioökonomische Status und Migrationsgeschichte (als familiäre Strukturmerkmale) ebenfalls einbezogen wurden. Aufbauend auf theoretischen Modellen der Sprachenlernens und -transfers (z.B. S. C. Chung et al., 2019; Esser, 2006) wurde die linguistische Distanz zwischen der Herkunftssprache der Schüler:innen und dem Deutschen als spezifische Facette des familiären Sprachgebrauchs untersucht, wobei eine Interaktion mit dem Alter bei der Zuwanderung von Schüler:innen der ersten Migrationsgeneration als möglicher Moderator berücksichtigt wurde. In der Stichprobe von  $N = 193$  multilingualen Viertklässler:innen in Nordrhein-Westfalen zeigte sich die linguistische Distanz als signifikanter negativer Prädiktor der Lesekompetenz, aber nicht des Wortschatzes wenn der primäre Sprachgebrauch zu Hause und sozioökonomischer Status als Kontrollvariablen berücksichtigt wurden. Darüber hinaus war das Alter zugewanderter Schüler:innen bei der Ankunft in Deutschland mit keinem der beiden Outcomes signifikant verbunden und interagierte auch nicht mit der linguistischen Distanz. Die Ergebnisse heben die distinkte Rolle der linguistischen Distanz für den Erwerb der Lesekompetenz multilingualer Lernender hervor und zeigen, dass der Einbezug

sprachspezifischer Merkmale, wie beispielsweise der linguistischen Distanz zur Zielsprache Deutsch, ein genaueres Verständnis der Stärken und Bedürfnisse mehrsprachiger Schüler:innen, die sich aus ihrem familiären Sprachhintergrund ergeben, herbeiführen kann.

*Studie III* fokussierte den Vergleich von Lernenden der ersten Migrationsgeneration, der zweiten Migrationsgeneration sowie Lernenden ohne Migrationsgeschichte in Bezug auf Lesekompetenz (als kognitive Kompetenz), Lebenszufriedenheit (als nicht-kognitives Outcome) sowie Noten und die Übergangsempfehlung (als institutionalisierte Indikatoren). Ausgehend von theoretischen Überlegungen zur Adaption von Schüler:innen mit Migrationsgeschichte (z.B. Suárez-Orozco et al., 2018) war ein weiterer Schwerpunkt der Vergleich der Rolle des sozioökonomischen Status und der Familiensprache (als familiäre Strukturmerkmale) sowie Bildungsaspirationen und Eltern-Kind-Lesen (als familiäre Prozessvariablen) für die verschiedenen Dimensionen des Schulerfolgs in Abhängigkeit der Migrationsgeschichte der Lernenden. Regressionsanalysen und Mehrgruppen-Pfadmodelle anhand von  $N = 271$  Schüler:innen der vierten Klasse ( $n = 102$  erste Migrationsgeneration,  $n = 68$  zweite Migrationsgeneration,  $n = 101$  ohne Migrationsgeschichte) aus Nordrhein-Westfalen zeigten Benachteiligungen von Lernenden der ersten Migrationsgeneration in Bezug auf kognitive Kompetenzen und institutionalisierte Indikatoren gegenüber Lernenden der zweiten Migrationsgeneration und solchen ohne Migrationsgeschichte, aber keine Unterschiede zwischen den beiden zuletzt genannten Gruppen. In allen drei Gruppen waren Bildungsaspirationen positiv mit dem Notenschnitt und Eltern-Kind-Lesen mit der Lebenszufriedenheit verbunden, wobei Eltern-Kind-Lesen bei Schüler:innen der ersten und zweiten Migrationsgeneration zusätzlich negativ mit Lesekompetenz assoziiert war. Einzigartige positive Zusammenhänge von Bildungsaspirationen beziehungsweise sozioökonomischem Status mit Lebenszufriedenheit fanden sich in der Gruppe der Lernenden der ersten beziehungsweise zweiten Migrationsgeneration. Die Befunde zeigten, dass Schüler:innen der ersten Migrationsgeneration spezifische Benachteiligungen in der Grundschule erlebten – allerdings nicht in Bezug auf psychologische Anpassung – aber zeigten ebenfalls, dass familiäre Variablen wie beispielsweise Bildungsaspirationen über ihre allgemeine förderliche Rolle für Schulerfolg hinaus ein einzigartig positives Potenzial für die Adaption von Lernenden der ersten Zuwanderungsgeneration darstellen können.

*Studie IV* untersuchte Lesekompetenz (als kognitive Kompetenz), Lesefreude und Leseselbstkonzept (als nicht-kognitive Outcomes) unter Berücksichtigung des sozioökonomischen Risikos, der Familiensprache und des Zuwanderungshintergrunds erster Generation der Schüler:innen (als familiäre Strukturmerkmale) sowie der Klassenkomposition in Bezug auf diese drei Merkmale (als Strukturmerkmale der Klasse). Darüber hinaus wurde der Fokus der Lehrkraft auf lesebezogene Unterstützung, die Unterstützung von minderheitssprachlichen Schüler:innen und kognitive Aktivierung im Unterricht (als Prozessmerkmale der Klasse) als Mediator der Zusammenhänge auf Klassenebene und Moderator der Zusammenhänge auf Individualebene aufgenommen. Anhand einer Stichprobe von  $N = 3414$  Viertklässler:innen in Deutschland ( $N = 195$  Klassen) zeigten Mehrebenen-Strukturgleichungsmodelle mit Blick auf die familiären Strukturmerkmale negative Zusammenhänge des sozioökonomischen Risikos mit allen Outcomes sowie nicht-deutscher Familiensprache mit Lesekompetenz, aber einen positiven Zusammenhang von Migrationsgeschichte der ersten Generation mit Lesefreude. In Bezug auf die Strukturmerkmale der Klasse war die Zusammensetzung nach sozioökonomischem Risiko negativ mit allen Outcomes, die Zusammensetzung mit Blick auf Minderheitssprache positiv mit Leseselbstkonzept und die Zusammensetzung nach Migrationsstatus negativ mit Lesekompetenz verbunden, wohingegen die Prozessvariablen der Klasse – trotz einzelner Zusammenhänge mit den Klassen-Strukturvariablen – weder als Mediatoren noch als Moderatoren wirkten. Die Befunde implizierten, dass die Strukturmerkmale der Klasse in verschiedener Weise ein wichtiger Faktor für den Schulerfolg auch über die Rolle der familiären Strukturmerkmale hinaus darstellten, aber konnten nicht eindeutig zeigen wie Lehrkräfte ihren Unterricht ideal anpassen können, um den negativen Effekten einer ungünstigen Klassenkomposition entgegenzuwirken.

Die vorliegende Dissertation baut auf der bestehenden Literatur auf und erweitert diese in Hinblick auf die Rolle von Struktur- und Prozessmerkmalen der Familie und der Klasse für verschiedene Dimensionen des Schulerfolgs von Lernenden. Durch den Einsatz eines multidimensionalen Rahmenmodells des Schulerfolgs fördern die Studien ein Verständnis von Erfolg als komplexes, umfassendes Konstrukt anstatt selektiv nur einzelne Aspekte in den Blick zu nehmen. Der Einbezug multipler familiärer Strukturmerkmale in allen Studien erlaubte, die Rolle jedes einzelnen dieser Merkmale für den Schulerfolg zu untersuchen ohne dass die

Effekte konfundierter Strukturvariablen in einzelnen Koeffizienten vermengt wurden – was in gleicher Weise auch für die Strukturmerkmale der Klasse gilt – und offenbarte komplexe Zusammenhänge. Durch den Einbezug zentraler Prozessmerkmale der Familie und der Klasse wurde gezeigt, dass elterliches Involvement und bildungsbezogene Überzeugungen wichtige Grundsteine für die Herbeiführung von Schulerfolg darstellten, wohingegen die Betrachtung der Prozessmerkmale der Klasse eine mögliche Diskrepanz zwischen den Versuchen der Lehrkräfte, ihren Unterricht an die spezifischen Bedürfnisse einer Klasse anzupassen und der tatsächlich förderlichen Rolle dieser Prozesse offenlegte. Damit lassen sich aus den in dieser Dissertation präsentierten Befunde ebenfalls zentrale Implikationen für zukünftige Forschung ableiten, für die in dieser Arbeit der Grundstein gelegt wurde.

## Table of Contents

Abstract .....	i
Zusammenfassung .....	vii
List of Tables .....	xvii
List of Figures.....	xx
List of Abbreviations .....	xxii
1. Introduction.....	1
2. Theoretical Background .....	4
2.1 School Success as a Multidimensional Construct.....	4
2.1.1 Cognitive Competences.....	6
2.1.2 Noncognitive Outcomes .....	7
2.1.3 Institutionalized Indicators.....	10
2.2 Important Environments for School Success.....	13
2.3 Students' School Experience in Times of Crisis .....	15
2.4 Structure Variables of the Family Microsystem and Their Relation to School Success. ....	18
2.4.1 Socioeconomic Status.....	18
2.4.2 Language Use at Home .....	20
2.4.3 History of Immigration.....	24
2.5 Process Variables of the Family Microsystem and Their Relation to School Success....	28
2.5.1 Parental Involvement .....	29
2.5.2 Educational Beliefs .....	31
2.6 Structure Variables of the Classroom Microsystem and Their Relation to School Success .....	33
2.7 Process Variables of the Classroom Microsystem and Their Relation to School Success .....	38
2.8 Conclusion of the Theoretical and Research Overview and Central Research Questions .....	43
2.9 Summary of the Studies Forming the Cumulative Dissertation .....	45
2.9.1 Summary of Study I – The Importance of Parents for Key Outcomes Among Socio-Economically Disadvantaged Students: Parents' Role in Emergency Remote Education	45

---

2.9.2 Summary of Study II – Reading Competence and Vocabulary of Students from Diverse Language Backgrounds: Employing a Lexical Distance Measure .....	47
2.9.3 Summary of Study III – The Role of the Family for Succeeding in Late Primary School: Comparing First Generation-, Second Generation-, and Non-Immigrant Students .....	48
2.9.4 Summary of Study IV – Sociodemographic Diversity, Reading Literacy, and Instructional Focus: Disentangling Complex Relations on the Individual and Classroom Level.....	50
2.10 References I .....	51
3. Contributions of the Cumulative Dissertation .....	85
3.1 Study I – The Importance of Parents for Key Outcomes Among Socio-Economically Disadvantaged Students: Parents’ Role in Emergency Remote Education .....	85
3.2 Study II – Reading Competence and Vocabulary of Students from Diverse Language Backgrounds: Employing a Lexical Distance Measure .....	123
3.3 Study III – The Role of the Family for Succeeding in Late Primary School: Comparing First Generation-, Second Generation-, and Non-Immigrant Students .....	149
3.4 Study IV – Sociodemographic Diversity, Reading Literacy, and Instructional Focus: Disentangling Complex Relations on the Individual and Classroom Level.....	173
4. General Discussion.....	209
4.1 Summary and Discussion of the Main Results .....	209
4.1.1 Structure Variables of the Family and Classroom Environment and School Success .....	210
4.1.2 Process Variables of the Family and Classroom Environment and School Success .....	218
4.2 Limitations and Strengths .....	223
4.2.1 Limitations .....	223
4.2.2 Strengths.....	227
4.3 Implications for Research and Practice.....	229
4.3.1 Implications for Future Research .....	229
4.3.2 Implications for Educational Practice .....	234
4.4 Conclusion .....	237
4.5 References II.....	239

---

5. Appendix .....	251
5.1 Supplemental Material for Study I.....	251
5.1.1 Online Resource 1 .....	251
5.1.2 Online Resource 2 .....	252
5.1.3 Online Resource 3 .....	253
5.2 Supplemental Material for Study III .....	255
5.2.1 Electronic Supplement 1: Additional Information Regarding the First- and Second- Generation Student Subsamples .....	255
5.2.2 Electronic Supplement 2: Correlation Tables for All Measures in the Full Sample and Subsamples .....	256
5.2.3 Electronic Supplement 3: Robustness Check Comparing First-Generation Immigrant and Native-Born Students.....	261
5.2.4 Electronic Supplement 4: Tables Depicting Full Results of the Analyses Regarding Research Questions 1 and 2 .....	264
5.3 Supplemental Material for Study IV.....	267
5.3.1 Online Resource 1: Distribution of the Proportion of Students with Socioeconomic Risk, Language Minority Students, and 1st Generation Immigrant Students in Classrooms .....	267
5.3.2 Online Resource 2: Information Regarding the Multiple Imputation of Missing Data .....	270
5.3.3 Online Resource 3: Pre-Analyses of Random Slopes and Cross-Level Interactions of Individual-Level Sociodemographic Factors and Instructional Focus.....	275
5.3.4 Online Resource 4: Mplus syntaxes for analysis Models 1–3.....	284
5.3.5 Online Resource 5: Additional Information Regarding Results of Models 1–3 ....	299
5.4 Contributions of the Doctoral Candidate to the Studies in the Cumulative Dissertation .....	306
5.4.1 Study I .....	306
5.4.2 Study II.....	306
5.4.3 Study III .....	307
5.4.4 Study IV.....	307

## List of Tables

### Chapter 2

Table 1. Dimensions of School Success in This Work, Their Relation to the Components of Academic Success in the Framework of York et al. (2015), and the Specific Outcomes Included in Each Dimension .....	12
Table 2. Overview of the Studies Forming the Cumulative Dissertation.....	46

### Chapter 3.1

Table 1. Descriptive Information, Reliabilities, and Example Items for Measures .....	99
Table 2. Bivariate Correlations of Measures .....	101

### Chapter 3.2

Table 1. Number of Times Languages and Language Families Other than German Were Reported as Being Spoken at Home in the Sample .....	133
Table 2. Correlations and Descriptive Information of All Measures .....	138
Table 3. Results of Regression Analyses for Research Questions 1a, 1b, and 2 .....	139

### Chapter 3.4

Table 1. Descriptive Information, Intraclass Correlations, and Correlations of All Measures Based on the Observed Values .....	185
Table 2. Internal Consistency and Multilevel Model Fit for All Scales Included as Dependent or Mediating/ Moderating Variables .....	186
Table 3. Results of Model 1 Regarding the Association of Demographic Background Factors with Measures of Reading Literacy .....	190
Table 4. Results of Model 2 Regarding the Association of Demographic Background Factors with Measures of Reading Literacy as well as Mediating Variables of Instructional Focus...	191
Table 5. Indirect Associations of Sociodemographic Composition with Measures of Reading Literacy on the Classroom Level via the Mediating Variables in Model 2.....	192
Table 6. Results of Model 3 Regarding the Association of Demographic Background Factors with Measures of Reading Literacy and the Moderating Role of Instructional Focus .....	194

### Chapter 5.1

Table S1. MANOVA Statistics for the Influence of Gender, Grade and Living in a Single Parent Household on Family Process and Structure Variables.....	251
---	-----

### Chapter 5.2

Table S1.1. Composition of the G1IS Subsample.....	255
--	-----

Table S2.1. Item and Scale Information for the Full Sample as well as the G1IS, G2IS, and NIS Subsamples .....	256
Table S2.2. Correlations of All Measures in the Full Sample.....	257
Table S2.3. Correlations of All Measures in the G1IS Subsample.....	258
Table S2.4. Correlations of All Measures in the G2IS Subsample .....	259
Table S2.5. Correlations of All Measures in the NIS Subsample .....	260
Table S3.1. Results of Regression Analyses Regarding RQ1 (Robustness Check) .....	262
Table S3.2. Results of the Multigroup Comparison of the Path Model Regarding RQ2 (Robustness Check).....	263
Table S4.1. Results of Regression Analyses Regarding RQ1 .....	264
Table S4.2. Results of the Multigroup Comparison of the Path Model Regarding RQ2 .....	265

### **Chapter 5.3**

Table S3.1. Results of Pre-analyses Regarding the Association of Socioeconomic Risk with Measures of Reading Literacy and the Moderating Role of Reading-Related Support.....	275
Table S3.2. Results of Pre-analyses Regarding the Association of Socioeconomic Risk with Measures of Reading Literacy and the Moderating Role of Support of Language Minority Students (LMS) .....	276
Table S3.3. Results of Pre-analyses Regarding the Association of Socioeconomic Risk with Measures of Reading Literacy and the Moderating Role of Cognitive Activation .....	277
Table S3.4. Results of Pre-analyses Regarding the Association of Language Minority Status with Measures of Reading Literacy and the Moderating Role of Reading-Related Support.	278
Table S3.5. Results of Pre-analyses Regarding the Association of Language Minority Status with Measures of Reading Literacy and the Moderating Role of Support of Language Minority Students (LMS) .....	279
Table S3.6. Results of Pre-analyses Regarding the Association of Language Minority Status with Measures of Reading Literacy and the Moderating Role of Cognitive Activation.....	280
Table S3.7. Results of Pre-analyses Regarding the Association of Immigrant Status (1 <sup>st</sup> gen.) with Measures of Reading Literacy and the Moderating Role of Reading-Related Support.	281
Table S3.8. Results of Pre-analyses Regarding the Association of Immigrant Status (1 <sup>st</sup> gen.) with Measures of Reading Literacy and the Moderating Role of Support of Language Minority Students (LMS) .....	282

---

Table S3.9. Results of Pre-analyses Regarding the Association of Immigrant Status (1 <sup>st</sup> gen.) with Measures of Reading Literacy and the Moderating Role of Cognitive Activation.....	283
Table S5.1. Association of Control Variables with Measures of Reading Literacy in Model 1 .....	299
Table S5.2. Intercorrelations of Independent and Control Variables as well as Dependent Variables, Respectively, in Model 1.....	300
Table S5.3 Association of Control Variables with Measures of Reading Literacy and Mediating Variables in Model 2 .....	301
Table S5.4 Intercorrelations of Independent and Control Variables, Mediating Variables, and Dependent Variables, Respectively, in Model 2.....	302
Table S5.5 Association of Control Variables with Measures of Reading Literacy in Model 3 .....	303
Table S5.6 Intercorrelations of Independent and Control Variables, Moderating Variables, and Dependent Variables, Respectively, in Model 3.....	304

## List of Figures

### Chapter 2

Figure 1. Theoretical Framework of the Cumulative Dissertation.....16

### Chapter 3.1

Figure 1. Simplified Model of Family Structure and Process Variables' Relations to Individual Student Variables .....91

Figure 2. Relations Between Family Process Variables and Individual Student Outcomes (Model 1) ..... 103

Figure 3. Relations Between Family Structure and Process Variables and Individual Student Outcomes (Model 2)..... 104

### Chapter 3.2

Figure 1. Example for the Calculation of a Levenshtein Distance for the Target Word “We” for Standard German with English and Standard Arabic, Respectively. ....135

Figure 2. Distribution of Lexical Distance to German in the Sample, Differentiated by Language Primarily Spoken in the Student’s Home..... 136

### Chapter 3.3

Figure 1. Simplified Depiction of the Path Model for Research Question 2 .....159

### Chapter 3.4

Figure 1. Simplified Depiction of Variables and Paths Included in Models 1 Through 3 ..... 188

### Chapter 5.1

Figure S1. Relations Between Family Structure Variables and Family Process Variables .... 252

Figure S2. Relations Between Family Structure Variables and Process Variables and Individual Student Outcomes with Bayesian Estimator (Model 2)..... 253

### Chapter 5.3

Figure S1.1. Distribution of classrooms based on the proportion of students with socioeconomic risk..... 267

Figure S1.2. Distribution of classrooms based on the proportion of language minority students .....268

Figure S1.3. Distribution of classrooms based on the proportion of 1st generation immigrant students .....269

Figure S2.1. Pattern of missing data across all variables of interest.....271

---

Figure S2.2. Fluxplot of all variables of interest and auxiliary variables used in the final multilevel multiple imputation model .....	272
Figure S2.3. Convergence plots for the imputation of variables included in the final analyses across ten iterations .....	273
Figure S2.4. Distribution of imputed values compared to observed values for all variables of interest .....	274

**List of Abbreviations**

- CLASS = Classroom Assessment Scoring System
- ERE = Emergency remote education
- EST = Ecological Systems Theory
- EVT = Expectancy Value Theory
- GPA = Grade point average
- HLE = Home Learning Environment
- IRRM = Integrative Risk and Resilience Model for the Adaptation of Immigrant-Origin  
Children and Youth
- KMK = Kultusministerkonferenz
- OECD = Organization for Economic Co-operation and Development
- SDT = Self-Determination Theory
- SUM = Supply-Use Models
- TBD = Three Basic Dimensions Framework

## 1. Introduction

Ensuring that all students can succeed in school is a core challenge for education systems worldwide as school success is influenced by a large variety of factors in students' environment, such as their family and classroom context. Consequently, understanding the factors and mechanisms within these contexts that promote and hinder students' school success beyond their individual abilities is a pivotal factor in explaining educational inequity and has long been a focus of educational psychological research. Within this field, there is a growing awareness that schools fulfil different roles within the education system and aim to achieve a variety of goals such as teaching important skills, fostering motivation and well-being, and preparing students for later occupational success (e.g., Eckhardt, 2021; Kultusministerkonferenz [KMK] 2015; Organization for Economic Co-Operation and Development [OECD] et al., 2015). Consequently, a broad range of cognitive competences (e.g., reading skills), noncognitive outcomes (e.g., motivation), and institutionalized indicators of success (e.g., grades) must equally be regarded to achieve a comprehensive insight into students' school success (e.g., Kleinkorres et al., 2020; Radl et al., 2017; York et al., 2015). That these different dimensions of students' development and school success are shaped by many factors beyond the individual is indicated by central theories: Ecological Systems Theory (EST; e.g., Bronfenbrenner, 1979, 1986), as one of the most influential, proposes that systems on various levels – some more distal, some more proximal – are relevant aspects of students' environment, with the family and classroom being two of the most essential proximal microsystems for students' school success. To understand the influence of these microsystems, socioecological process-context models further distinguish between the structural components of the environment and process variables that are responsible for mediating the relations of structure variables and school success (e.g., Bronfenbrenner, 1986; Oishi, 2014; see also e.g., Kluczniok et al., 2013; McElvany et al., 2009, for the family microsystem; e.g., Brühwiler & Blatchford, 2011; Rjosk, 2022, for the classroom microsystem). As core structure variables of the family environment, different sociodemographic characteristics have been theoretically proposed (e.g., Bourdieu, 1983; Suárez-Orozco et al., 2018) and empirically shown to be of relevance: Structure variables such as socioeconomic status (e.g., M. Becker & McElvany, 2018; Eriksson et al., 2021), language use at home (e.g., Heppt et al., 2022; Segerer et al., 2021), and history of immigration (e.g., Castillo, 2023; Henschel et al., 2023) were associated with various

educational outcomes in the extant literature, although these associations are at times ambiguous across different studies. In turn, among the central family process variables that are assumed to mediate these relations, different aspects of parental involvement (e.g., Dong et al., 2020; Novita & Kluczniok, 2022) and educational beliefs held in the family (e.g., Dumont et al., 2019; X. Guo et al., 2022) take a pivotal role. Similarly, the composition of a classroom in regard to sociodemographic characteristics is an important structural feature of students' classroom environment (e.g., Seidel, 2014) that has been studied in regard to school success (e.g., Bergold et al., 2022; Seuring et al., 2020). Beyond classroom composition, teachers' instructional focus and quality in class has been proposed as a core classroom process variable (e.g., Rjosk, 2022) that is influenced by the structural components of the classroom and in turn shapes students' school success (e.g., Rjosk et al., 2014; Wenger et al., 2020). Additionally, interaction effects of students' structural family background and the process variables in the classroom may arise (e.g., Atlay et al., 2019; Ramazan, Danielson, et al., 2023), meaning that students may benefit differently from various aspects of instructional focus depending on their sociodemographic background.

While theoretical considerations support the importance of the aforementioned structure and process variables of the family and classroom microsystems for various dimensions of students' school success, empirical research has investigated the proposed associations to varying degrees, with some aspects being considerably understudied and not all links being clearly understood to date. Due to the relevance of investigating and comprehending these relations, this dissertation aims to close these gaps in the extant literature and facilitate a deeper insight into the role of the family and classroom microsystem for school success. Moreover, the studies forming the cumulus of the dissertation are intended to shed light on these complex relations in an educational landscape that has seen unprecedented challenges in current times, largely due to the COVID-19 pandemic and concomitant emergency remote education (ERE) as well as the subsequent reinstatement of in-person instruction with students who had experienced significant learning losses and strains to their psychological well-being (e.g., S. Chen et al., 2024; Ludewig et al., 2025).

The work at hand contains several sections. At first, the theoretical background is presented (Chapter 2), beginning with an introduction of the different, relevant dimensions of school success and a categorization of these dimensions (Chapter 2.1). Next, the importance of

different levels of students' environment is elucidated, based largely on EST, and the differentiation of structure and process variables of the family and classroom microsystems is introduced to establish the overarching theoretical framework of this dissertation (Chapter 2.2). The following section briefly discusses the special situation of student populations included in this work due to the COVID-19 pandemic and its influence on the education system (Chapter 2.3). Subsequently, three central sociodemographic variables are identified as core parts of students' family structure, and their relation to the different dimensions of school success in the extant literature is analyzed (Chapter 2.4), before the role of important family process variables argued to be mediators of the associations between family structure and school success based on theoretical considerations and prior empirical findings is discussed (Chapter 2.5). The next chapters focus on the structural components of the classroom microsystem, specifically the sociodemographic composition of the classroom in light of the factors previously identified as important family structure variables (Chapter 2.6), as well as classroom process variables that are derived from theory as essential mediators in the classroom and the extant empirical evidence for their importance (Chapter 2.7). Finally, the theoretical considerations, empirical findings, and research gaps identified in the previous sections are briefly summarized and the overarching research questions of this dissertation are derived (Chapter 2.8), before concluding the chapter with a brief summary of the four empirical studies included in the present work (Chapter 2.9). The next chapter comprises these four individual studies (Chapter 3). This is followed by a summary and general discussion of the main results of these studies (Chapter 4), relating them to the theoretical background and empirical findings presented in Chapter 2 as well as the overarching research questions specifically (Chapters 4.1). Limitations and strengths of the studies and this work at large are discussed (Chapter 4.2) and implications of the results are drawn for future research and educational practice alike (Chapter 4.3). The general discussion is then brought to a close with a general conclusion (Chapter 4.4).

## 2. Theoretical Background

### 2.1 School Success as a Multidimensional Construct

To assess students' success in school, it is imperative to consider that schools and education systems set out multiple educational goals for students (e.g., Eckhardt, 2021; OECD et al., 2015), meaning that students' success can be reflected in different dimensions (e.g., York et al., 2015). Consequently, investigating the aims that are set for schools and in how far students achieve these goals can give vital insights into students' school success. On an international level, the International Standard Classification of Education provides definitions and criteria for different levels of schooling and education that establish central learning goals for each level (OECD et al., 2015). Beyond that, further and more specific aims are usually set in each education system that are more closely aligned to the specific system in place: In the case of Germany, these are set both on the national level, for example by universally established educational standards (e.g., KMK, 2015, 2022), and on the state level of the 16 *Bundesländer* (e.g., Schulgesetz für das Land Nordrhein-Westfalen, 2022). These official guidelines all have in common that they not only set aims for the skills students should achieve in different topics of instruction, but also highlight the importance of noncognitive outcomes, such as the motivation for and enjoyment of learning (e.g., KMK, 2015; Schulgesetz für das Land Nordrhein-Westfalen, 2022) and a positive social and emotional development (e.g., Eckhardt, 2021; OECD et al., 2015).

As the aims defined for schools reflect a variety of outcomes, it can be concluded that traditional indicators of school success like grades and achievement scores (e.g., Mulhall et al., 2002; Oevermann, 1970) are insufficient to capture all relevant dimensions of each individual student's school success. Instead, school success must be understood as a multidimensional construct. Forming the different dimensions that represent school success are the various skills and competences that students acquire in school, including both the learning development and attainment of learning achievements reflecting core *cognitive competences* related to the topics of instruction as well as for example affective, behavioral, and motivational markers representing *noncognitive outcomes* (e.g., Lipowsky, 2020). Beyond these aspects directly reflecting students' acquisition of beneficial skills, competences, and positive outcomes, more traditional markers of successful mastery of school like good grades and attendance of a high educational track that, in contrast, represent an evaluation of students' knowledge, skills, and

noncognitive factors (e.g., Farrington et al., 2012) by a third party – usually teachers – should also be considered. These will be subsumed under the dimension *institutionalized indicators*, to emphasize that these markers do not directly reflect the acquisition of competences or achievement of positive noncognitive outcomes inherent to the student, but that their importance primarily stems from their role as indicators that are used within the system of institutionalized education.

Contemporary conceptualizations of academic success have similarly established the multidimensional nature of success (e.g., York et al., 2015): Building on and extending previous analytical and conceptual works, primarily the influential literature synthesis by Kuh et al. (2006) and the Inputs-Environments-Outcomes Model (Astin, 1990), York et al. (2015) include six components of academic success in their revised model. Among these are students' *achievement* (largely indicated by grades) and *attainment of learning outcomes* (reflected in test scores), constituting the traditional indicators of school success as described above. Furthermore, the model also includes less traditional indicators like students' *acquisition of skills and competencies* beyond the cognitive skills included in the attainment of learning outcomes (e.g., aspects of motivation, critical thinking); *satisfaction* as a proxy for students' perception of institutional fit, climate, and goal achievement; *persistence* in progressing towards their academic goals; and *career success*. While York et al. (2015) relate the model specifically to post-secondary students' academic success, it can also be applied to other school contexts (see e.g., Masud et al., 2019; Stang-Rabrig et al., 2024), as the indicators included in the framework can largely be considered important dimensions of younger students' school success as well and are in line with the various aims set for schools as described above (e.g., Eckhardt, 2021). The only dimension in the model that does not directly translate to primary and secondary education is career success; however, especially in tracked and highly stratified school systems, like in Germany (see e.g., M. Becker et al., 2016; Eckhardt, 2021; Jackson & Jonsson, 2013), this dimension could instead be represented by the educational pathway or chosen track for secondary education, which is related to later attainment and labor market outcomes (e.g., Blossfeld, 2018; Schindler & Bittmann, 2023; Traini et al., 2021). Therefore, and in line with the official guidelines and separation of three dimensions of school success – cognitive competences, noncognitive outcomes, and institutionalized indicators – discussed prior, it can be concluded that the framework of York et al. (2015)

supports an assessment of success in primary and secondary school that comprises different outcomes. An overview how the components of academic success described by York et al. (2015) relate to the three dimensions of school success in this work as well as the specific outcomes subsumed in each dimension will be introduced in more detail in the succeeding sections.

### **2.1.1 Cognitive Competences**

Regarding students' core cognitive competences first, which are part of the attainment of learning outcomes in the framework of York et al. (2015), this work focuses on the reading- and language-related skills students achieve in primary school. It is a central goal of schools at the primary level to equip students with strong basic competences in linguistic as well as mathematical areas, as these lay the foundations for further learning and participation in society (e.g., KMK, 2022; McElvany et al., 2023; OECD et al., 2015). Among these core competences, establishing adequate *reading competence*, meaning students' ability to actively engage with texts, retrieve and evaluate textual information, and draw conclusions from them (Mullis & Martin, 2019), is an especially pivotal skill. Following the stages of reading development model (e.g., Chall, 1983; Kuhn & Stahl, 2022), students are expected to shift from learning to read to using reading as a tool to learn and gain knowledge around Grade 4 (see also R. Lorenz, McElvany, et al., 2023), which marks the final year of elementary education in most German states (e.g., Eckhardt, 2021) as well as select other school systems (e.g., Austria, see Schulorganisationsgesetz Österreich, 1962). A related linguistic skill that is similarly important during this time is students' *vocabulary*, which describes students' ability to understand the meaning of words and the concepts associated with them (Aarnoutse et al., 2001). According to the Simple View of Reading (e.g., Gough & Tunmer, 1986; Hoover & Gough, 1990), students' reading comprehension is determined by their decoding skills and their linguistic comprehension, and vocabulary is an essential part of the latter (e.g., Kirby & Savage, 2008; Lonigan et al., 2018). Beyond that, vocabulary has been linked to other language skills as well, especially in studies regarding second language learners, where it has been associated positively with proficiency in speaking (e.g., Koizumi & In'nami, 2013; Uchihara & Clenton, 2020) and writing (e.g., Qian & Lin, 2019; Yang et al., 2019). The essential importance of achieving good reading competence and language competence, as indicated for example by

vocabulary beyond the former, for students in primary school is further emphasized by models of human development in educational contexts (see e.g., Havighurst, 1972), which frequently include these facets as core psychological development tasks for children during this age as well (e.g., Masten, 2014; McCormick et al., 2011). Moreover, the importance of these factors is additionally highlighted in regard to immigrant-origin students specifically, where the acquisition of language competences in the host country language, like reading and vocabulary, is not only a developmental goal in the sense of achieving adequate academic progress, but also a central acculturative task (Suárez-Orozco et al., 2018).

### **2.1.2 Noncognitive Outcomes**

Beyond the acquisition of cognitive competences, school success is also reflected in motivational, affective, and behavioral aspects of students' experience. These can be subsumed as noncognitive outcomes, in line with the concept of noncognitive skills introduced by Bowles and Gintis (1976). Importantly, the name should not be taken to imply that no cognitive processes are involved in these skills, but rather emphasize a distinction from skills like literacy and numeracy that are usually measured by cognitive ability tests (e.g., Gutman & Schoon, 2016). While there is no single generally accepted definition of the exact factors included in noncognitive skills and outcomes, measures of motivation, perseverance, and well-being are frequently included as core facets because of their dual role as important outcomes in their own right and predictors of future educational success and later life outcomes (e.g., Bertling et al., 2016; Frank, 2020; E. García, 2016).

The important role of motivation in education, which can generally be understood as the explanatory factor driving individuals' behavior (e.g., Graham, 2020) and is included in the component acquisition of skills and competencies following York et al. (2015), is highlighted in various theories. One central framework is the Self-Determination Theory (SDT; e.g., Deci & Ryan, 1985; Ryan & Deci, 2000, 2020), which proposes that motivation – contrasted with *amotivation*, describing a lack of intentionality – can broadly be classified in two categories: *Intrinsic motivation* is present when activities are done out of enjoyment or an inherent interest and is characterized by a high degree of autonomy and perceived internal locus of control. In contrast, doing something in order to achieve consequences that are separable from the activity itself indicates *extrinsic motivation*, which

comprises four major forms of motivation ranging from integration to external regulation that can be differentiated by the relative degree of perceived autonomy versus external control (Ryan et al., 2021; Ryan & Deci, 2020). Meta-studies have shown that intrinsic motivation relates positively to other core educational outcomes, like academic performance or well-being, whereas the role of extrinsic motivation is more ambiguous, which could in part be explained by its positive association with performance quantity, rather than quality (e.g., Cerasoli et al., 2016; Howard et al., 2021; Ryan et al., 2022). Another well-established motivation theory in education is the (Situated) Expectancy-Value Theory (EVT, e.g., Eccles et al., 1983; Eccles & Wigfield, 2020; Wigfield, 1994), which proposes that students' expectancy of success for a given task and the value they ascribe to said task are essential to motivation, as both influence their achievement-related choices and performance. Rather than the broader focus on general learning motivation of SDT as described before, the EVT framework, which is generally understood to be domain-specific, is used in the present work to investigate students' motivation for reading specifically (see e.g., Geng et al., 2023; Wigfield et al., 2016), which can be considered an important part of students' reading literacy towards the end of primary school beyond competence alone (e.g., R. Lorenz, Frey, et al., 2023; Mullis & Martin, 2019). Beside the attainment and utility value as well as perceived costs, students' intrinsic value of reading is an especially pivotal aspect of the value component that is similar in concept to intrinsic motivation in SDT, and is assessed by regarding students' *reading enjoyment* (Eccles & Wigfield, 2020). On the other hand, *reading self-concept*, indicating students' self-appraisal and confidence in their reading ability (Mullis & Martin, 2019), serves as an indicator of students' expectancy of success<sup>1</sup>. Both constructs are important educational outcomes in their own right, but additionally, positive relations with reading competence have extensively been shown for both reading enjoyment and reading self-concept across a wide variety of contexts (e.g., Geng et al., 2023; J. Li et al., 2023; X. Li et al., 2021; Locher et al., 2021; Ma et al., 2022).

---

<sup>1</sup> It should be noted that self-concept and expectancy of success are theoretically distinct constructs in EVT, but the overlap that emerged between the constructs – as well as self-efficacy – in empirical studies was large enough that all three have historically been treated as a single empirical construct (see Eccles & Wigfield, 2020, for an in-depth discussion of these issues and implications for theory and measurement following as a consequence that would go beyond the scope of the work at hand).

As noted, students' perseverance, indicating persistence while performing tasks or mastering skills (Gutman & Schoon, 2016), is another pivotal noncognitive facet of school success and comparable to the component labeled persistence in the framework of York et al. (2015). It represents an important skill in general and can be especially helpful under adverse circumstances, such as the COVID-19 pandemic and the subsequent school closures and ERE (see 2.3 Students' School Experience in Times of Crisis, for more details), which arguably was the largest irregular challenge for education systems and students worldwide in recent times. As learning was moved out of the structured school environment and into students' homes, often with little guidance from teachers, students' average time spent on learning and subsequently perceived learning success was lower during ERE compared to in-person instruction (e.g., Grewenig et al., 2021; Stang-Rabrig et al., 2024; Werner & Woessmann, 2023). Therefore, students' *participation in learning activities during ERE* despite the adverse circumstances is an indicator for perseverance during these challenging times, a central outcome itself whose importance is heightened by the positive association of engagement in different learning activities with students' achievement and motivation found in pre-pandemic studies (e.g., Fung et al., 2018; Putwain et al., 2018; Suárez et al., 2019).

Finally, students' subjective well-being is regarded as a third core indicator of noncognitive outcomes. Following the theory of subjective well-being established by Diener (1984) and its subsequent updates, well-being is a multifaceted construct comprising affective components – differentiated further as positive and negative affect – as well as cognitive components, which include general life satisfaction and domain-specific aspects of satisfaction (e.g., Diener et al., 1999; Schimmack, 2008). In line with York et al.'s (2015) component satisfaction, the focus in the work at hand will be on *life satisfaction* specifically, which describes a self-assessed, global evaluation of students' satisfaction with their life in general (e.g., Diener, 1984; Diener & Ryan, 2009) and is associated with many aspects of positive psychological functioning and development (Proctor et al., 2009). Beyond its important role as a central indicator of well-being, it is also positively associated with other indicators of school success, such as cognitive (e.g., achievement: Bücker et al., 2018; Kaya & Erdem, 2021) and noncognitive outcomes (e.g., motivation: C. Chen et al., 2023; Howard et al., 2021) as well as institutionalized indicators (e.g., grades: Schnell et al., 2025), which will be discussed as the final dimension of school success in the next section.

### **2.1.3 Institutionalized Indicators**

The third dimension of school success regarded in this work are institutionalized indicators, markers of third-party evaluations of students that are primarily relevant within the context of educational institutions and are meant to reflect successful participation in education. The most commonly investigated and arguably one of the most important indicators in this regard are students' *grades*, or grade point averages (GPA), which are part of the achievement component in York et al.'s (2015) model and reflect teachers' assessments of students' learning, performance, and participation in school (e.g., Eckhardt, 2021). While grading in school has long been a topic of debate and valid criticisms can be made about the practice (see e.g., Brookhart et al., 2016; Schwab et al., 2018), especially grades given with students' report cards and school leaving certificates still take on a central role in most education systems such as the German one, where they are known to be important determinants of the chosen secondary school track (e.g., Dumont et al., 2019; Walper & Gniewosz, 2019; and the choice of specific, desirable schools, see Klinge, 2016) as well as later choices regarding tertiary education (e.g., Bachsleitner et al., 2020; Lörz, 2017). Grades are also related to other measures of school success: As an evaluation of students' learning and performance, they are positively associated with cognitive competences, as indicated by achievement tests (e.g., Arens et al., 2017; Lotz et al., 2018). Beyond that, they are also linked positively to noncognitive outcomes such as life satisfaction (e.g., Heffner & Antaramian, 2016; Lettau, 2021), whereas relations with motivation appear to be more complex, as self-concept consistently positively predicts grades (e.g., Klapp, 2018; Lotz et al., 2018) while positive associations with intrinsic motivation appear in most studies (e.g., Affuso et al., 2023; Howard et al., 2021; Taylor et al., 2014), but not always consistently (e.g., Weidinger et al., 2017).

Another central institutionalized indicator for school success regarded in this dissertation is the *track recommendation* for secondary school that students receive at the end of primary school in Germany<sup>2</sup>, which is most closely aligned with the component career

---

<sup>2</sup> As education is primarily regulated at the state level in Germany, the exact structure of the school systems varies between each of the 16 states. Therefore, describing the school system and the specific regulations in each state in exhaustive detail would go far beyond the scope of this work, and a simplified description of the general, common mechanisms is instead given here to emphasize the importance of

success in the framework for academic success (York et al., 2015), as explained above. In Germany, primary education traditionally consists of four years of comprehensive education, with students entering the tracked secondary school system after finishing primary education (Klemm, 2022), although in Berlin and Brandenburg, tracking regularly begins only after Grade 6 (with the option to transition to the academic secondary track after Grade 4 under specific circumstances in Berlin; KMK, 2024). Secondary education is traditionally divided into three tracks: The vocational track, which provides basic general education and prepares students for subsequent vocational qualification; the intermediate track, offering more extensive general education while also preparing students for courses where they can obtain vocational qualification; and the academic track, providing intensified general education and offering a school leaving certificate that allows students to study at university without obtaining further qualifications (Eckhardt, 2021). In all German states, students can visit the *Gymnasium*, a type of secondary school that provides only academic track education, whereas most states have either abolished schools offering only vocational or intermediate education, respectively, in favor of comprehensive schools offering the two lower or even all three tracks, or have maintained vocational and intermediate track schools in addition to comprehensive schools (see e.g., M. Becker et al., 2016; Eckhardt, 2021 for more details). To determine which tracks students visit in secondary school, they receive a track recommendation during the final year of elementary school – usually with the mid-year report card – which is meant to serve as a general assessment of each student’s aptitude for the different school tracks based on students’ grades, skills, and their teachers’ evaluations thereof (e.g., Eckhardt, 2021; Schwerter et al., 2024). In some states, the recommendation is binding, meaning that parents cannot regularly enroll their child in a higher track than recommended, whereas in others it is only meant to guide parents’ decisions, but research has shown the track recommendation to be a strong determinant of parents’ chosen secondary track even if the recommendation is not binding (e.g., Dumont et al., 2019; Gresch, 2012). Due to the nature of what the recommendation should reflect, it is positively associated with students’ cognitive competences (e.g., Lüdemann & Schwerdt, 2013; Niklas & Schneider, 2017) as well as grades

---

the track recommendation for students’ educational pathways. For a more in-depth description of the school system, readers are instead referred to the more comprehensive works of Eckhardt (2021) and, for secondary school specifically, M. Becker et al. (2016).

(e.g., Dumont et al., 2019; Lintorf et al., 2021), while associations with noncognitive outcomes like aspects of students' motivation – or teachers' perception of students' motivation – emerge only inconsistently in previous research (e.g., Paulus et al., 2021; Trautwein & Baeriswyl, 2007).

**Table 1**

*Dimensions of School Success in This Work, Their Relation to the Components of Academic Success in the Framework of York et al. (2015), and the Specific Outcomes Included in Each Dimension*

<b>Dimension of school success</b>	<b>Corresponding components of academic success following York et al. (2015)</b>	<b>Measured outcomes</b>
Cognitive competences	Attainment of learning outcomes	Reading competence Vocabulary
Noncognitive outcomes	Acquisition of skills and competencies	Intrinsic & extrinsic motivation Reading enjoyment Reading self-concept
	Persistence	Participation in learning activities during ERE
	Satisfaction	Life satisfaction
Institutionalized indicators	Achievement	GPA
	Career success	Track recommendation

*Note.* ERE = Emergency remote education. GPA = Grade point average.

As discussed in this chapter, school success should be understood as a multidimensional construct that comprises cognitive competences students acquire in school as well as noncognitive outcomes and external evaluations of their educational achievement in the form of institutionalized indicators of school success. These three dimensions can be related to existing frameworks of academic success, such as the model proposed by York et al. (2015), which includes six components of success. Additionally, the importance of considering that each dimension of school success subsumes a variety of different outcomes that all reflect different facets of succeeding in school was demonstrated. For a concise overview, Table 1

depicts the three dimensions of school success in this work, how these can be related to the six components of academic success in the framework of York et al. (2015), and which specific outcomes are included for each dimension of success in the studies included in this dissertation.

## **2.2 Important Environments for School Success**

When regarding school success, it must be considered that, beyond individual characteristics of each student such as their cognitive abilities (e.g., Kriegbaum et al., 2018; Lavrijsen et al., 2022; Peng et al., 2019), factors situated in their environment – for example, their family and the classroom context – equally can be crucial for shaping their outcomes in school. This is reflected in socioecological approaches in theory and research – in general and in educational psychology specifically – which highlight the different ways in which an individual’s proximal and distal environment can shape their development (e.g., Brutzman et al., 2022; Oishi, 2014). One of the most foundational socioecological theories is EST (e.g., Bronfenbrenner, 1979, 1986; Bronfenbrenner & Morris, 2006; see Rosa & Tudge, 2013, for an overview of the different stages of the theory’s development) which proposes a framework of nested systems that describe different levels of a person’s environment. Microsystems, the most proximal systems, are characterized by the specific physical features of a setting and allow the developing student to experience interactions and interpersonal relationships with others directly and over time, such as in students’ families and schools (Bronfenbrenner, 1979). Since both the family and school microsystem are central to student’s development (e.g., Bronfenbrenner, 1986; Neal & Neal, 2013; Vedder & Motti-Stefanidi, 2016), the focus of the work at hand is on these two microsystems. However, to paint a comprehensive picture, the other levels included in the EST (Bronfenbrenner, 1979) will briefly be described, but not elaborated on in detail: The mesosystem refers to the interaction of any number of relevant microsystems, for example interactions of parents and teachers. More distal, the exosystem refers to settings where events occur that can influence, or be influenced by, systems which contain the student in question, while they are not being involved in the exosystem directly; this can refer to systems like parents’ workplaces. The final ecological system originally included in the EST (Bronfenbrenner, 1979) is the macrosystem, which refers to institutional systems at a (sub-)cultural level and the overarching belief systems and ideologies associated

with them, which could for example, in the context of students' development, include educational policies and values at a societal level. During later stages of EST, the chronosystem was added as a fifth system that reflects the influence of changes in students' environments over time on their development (e.g., Bronfenbrenner, 1986). The multiple systems included in the EST allow to both investigate large, complex frameworks of developmental conditions as well as focus on specific systems and the mechanisms shaping students' outcomes in these systems, respectively. Additionally, the breadth of the EST allows to account for a large variety of developmental contexts, which also makes it applicable when considering specific groups of students, such as those of immigrant-origin (e.g., Paat, 2013; Suárez-Orozco et al., 2015). This is especially reflected in the Integrative Risk and Resilience Model for the Adaptation of Immigrant-Origin Children and Youth (IRRM; Suárez-Orozco et al., 2018), which employs a socioecological framework with nested systems adapted from EST and applies it to the situation of immigrant-origin children and youth specifically. Beyond the individual level, Suárez-Orozco et al. (2018) highlight the importance of microsystems (such as family and school), the political and social contexts of reception (such as a state's immigration policies or societal attitudes towards immigrants, comparable to the EST's macrosystem) and, as the most distal level, global forces (such as push and pull conditions for migration or so-called ideas-without-borders, e.g., xenophobia).

As described above, the different systems in Bronfenbrenner's (1979) EST as well as later frameworks built on his model are understood to be nested within each other, with the most proximal systems (i.e., microsystems) having the most direct influence on students' development, whereas more distal systems act more indirectly. To investigate important proximal factors that are directly relevant to students' experience, this dissertation will focus on the role of two microsystems for their school success specifically: Students' families and students' school environment, regarding the classroom environment specifically as this is where students usually experience most relevant interactions in school (see e.g., van Ewijk & Slegers, 2010a). When investigating the role of these microsystems for students' development and, more specifically, school success, it is of interest to gain insights not only about the association of structural components of students' environments with different outcomes, but beyond that also the underlying processes that are responsible for shaping these associations. Such models, known as *process-context models* (Bronfenbrenner, 1986) or simply *process*

*studies* in a more recent categorization of socioecological psychology research by Oishi (2014), are focused on understanding why, rather than simply demonstrating how, differences in environmental features are related to students' school success and can thereby shape educational inequalities. In regard to the family microsystem, the distinction between structural components of students' environment, such as sociodemographic variables, that influence different outcomes on the one hand and the processes that, influenced by the structural components, mediate these relations on the other are commonly reflected in models investigating the role of students' Home Learning Environment (HLE) for their development and learning (e.g., Kluczniok et al., 2013; Lehl, Evangelou, et al., 2020; McElvany et al., 2009). Similarly, when regarding students' school environment and classroom microsystem, the importance to not only consider the structural components of the classroom context, largely reflected in its composition, but also the processes through which these can influence students' outcomes have been highlighted in theoretical considerations and extant research (e.g., Brühwiler & Blatchford, 2011; Rjosk, 2022; Wenger et al., 2020). Thus, a deeper understanding of the role of the family and classroom, two central microsystems in which students' development takes place, for their school success can only be achieved if the structural components of these environments and their association with different student outcomes, but also the processes through which structure variables' influence manifests and operates, are investigated. Following an EST perspective, the work at hand will therefore include both structural components, reflected in sociodemographic background variables, and processes of the family and classroom microsystem, respectively, and investigate how these components shape students' multidimensional school success, considering cognitive competences, noncognitive outcomes, as well as institutionalized indicators, as depicted in Figure 1.

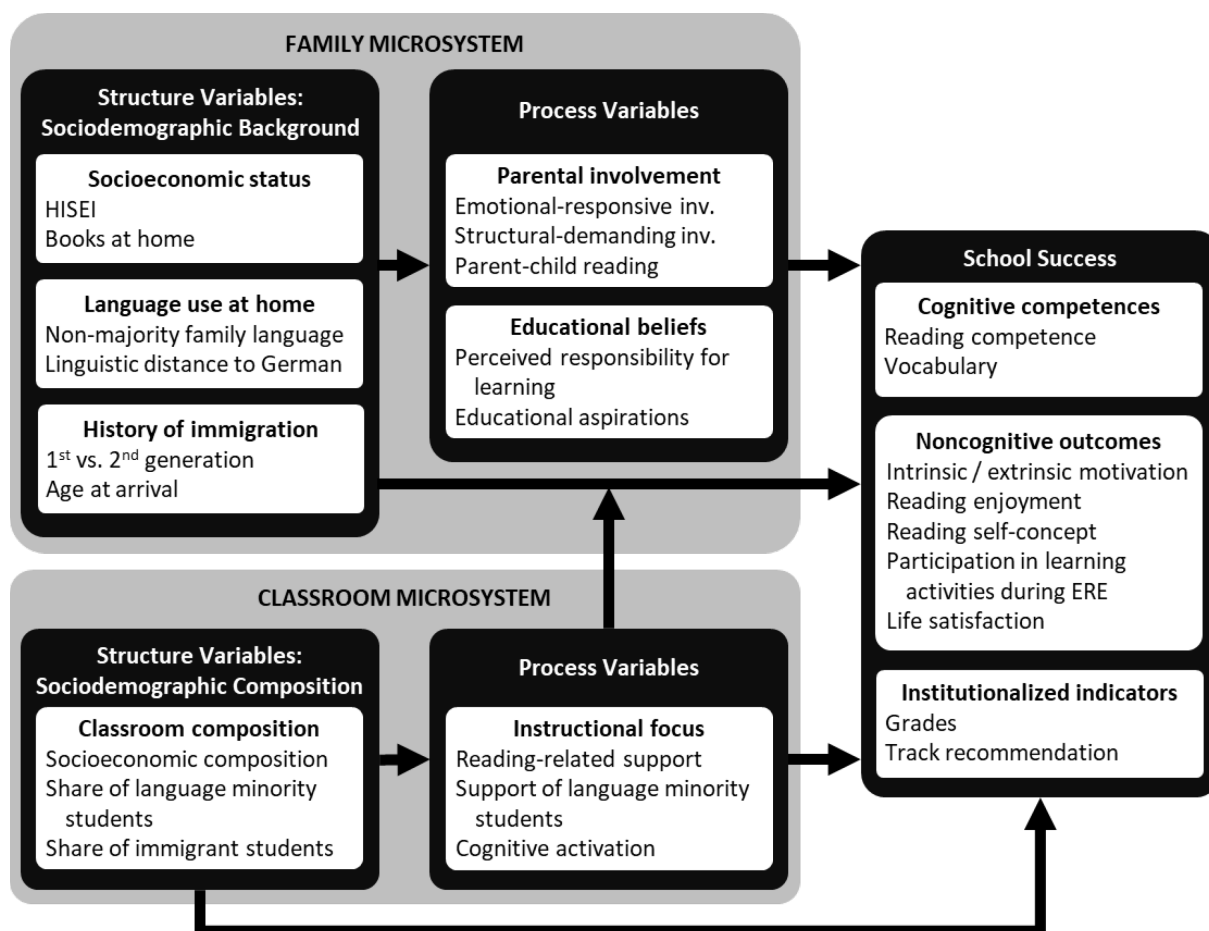
### **2.3 Students' School Experience in Times of Crisis**

As stated in the preceding section, the focus of this work lies first and foremost on the role that the family and classroom microsystems play for students' school success. Nonetheless, even if the studies in the present dissertation do not directly investigate developments throughout a period of time, it is important to consider the chronosystem as a pivotal aspect shaping students' experiences of schooling and education in these studies as well, due to the time-specific circumstances under which they were conducted. In the context

of EST, the chronosystem is important, as developmental processes and changes can occur as a consequence of life events that originate either in the individual, or in their external environment (e.g., Bronfenbrenner, 1986, 1992). These events are characterized by initiating a change in the established relationship between a person and their environment (e.g., Bronfenbrenner, 1992), and entail both normative transitions during the life course (such as transitions into and within formal education or puberty) and non-normative events (e.g., Bronfenbrenner, 1986; Rosa & Tudge, 2013). Such developmental conceptions form one major branch of understanding and investigating life events, with the other building on a perspective based in stress theory (e.g., Filipp & Aymanns, 2018), and recent works in this field have employed a view of critical life events that combines both perspectives, understanding them as

**Figure 1**

*Theoretical Framework of the Cumulative Dissertation*



*Note.* ERE = Emergency remote education during the COVID-19 pandemic. HISEI = Highest International Socio-Economic Index of occupational status.

transitions that are clearly timed and relate to a specific status with at least two possible levels, marking either the beginning or the end of said status (Luhmann et al., 2012; see also e.g., Bleidorn et al., 2018; Bühler et al., 2024). In the context of the work at hand, this gains specific importance as all students included in the studies presented in this work had recently been exposed to what can be described as a collective life event of a global scale: The onset of the COVID-19 pandemic and the subsequent effects on education (e.g., de Vries et al., 2023; Wundrack et al., 2021).

Especially during the early stages of the COVID-19 pandemic, most countries resorted to school closures in an attempt to slow down the spread of the virus, peaking at over 80% of students worldwide that were affected by school closures simultaneously during the spring of 2020 (United Nations Educational, Scientific and Cultural Organization, 2022), subjecting students to ERE instead of in-person instruction (Bozkurt et al., 2020). In Germany specifically, school closures amounted to 14 weeks of full closure and 24 weeks of partial closure in the timeframe between the first school closures in March 2020 and the end of the following school year in the summer of 2021. As a result, a total drop of learning time in schools of close to 45% was estimated for this period (Fuchs-Schündeln, 2022), and school closures continued into the subsequent school year 2021/2022 as well, although to a considerably lower degree (Statista, 2024). Since data collection for the different studies included in this work took place between August 2020 and June 2022, all students in these studies were either reporting data directly on their experience of ERE (Study I), or had been exposed to massively restricted schooling and ERE in the years and months prior (Studies II–IV). As a consequence, these students' school experience diverges from that of students in pre-pandemic times, as it stood under the tremendous influence of the COVID-19 pandemic as a collective life event that not only changed how schooling was conducted on a fundamental level, but also went along with significant learning losses compared to a normative schooling experience (e.g., Donnelly & Patrinos, 2022; Ludewig et al., 2022, 2025) as well as putting immense strain on students' psychological well-being and mental health (e.g., S. Chen et al., 2024; Elharake et al., 2023; Ravens-Sieberer et al., 2022). This unique situation makes it all the more important to investigate the role of students' families, during and after ERE, as well as the school and classroom environment, especially after returning to in-person instruction, as the two central

microsystems for students during this time to understand how they could support students in being successful in school despite the irregular circumstances.

## **2.4 Structure Variables of the Family Microsystem and Their Relation to School Success**

The structural components of students' family environment are reflected in relatively stable characteristics, including for example family size or composition but especially the family's sociodemographic background as well (e.g., Kluczniok et al., 2013). Historically, investigating the associations of these structural family background characteristics with educational outcomes was a main focus of research (see e.g., Bronfenbrenner, 1986; Lareau, 1987). While the importance of understanding the underlying processes that shape these associations – rather than simply describing differences in outcomes – has since been acknowledged and received growing attention, it is still essential to understand how educational outcomes in general, and school success specifically, are related to different structural components of the family background as a first step. Therefore, this chapter will introduce relevant structure variables of the family microsystem, focusing on three important sociodemographic indicators specifically, and show how they are related to the different central aspects of students' school success.

### **2.4.1 Socioeconomic Status**

One core background variable representing an important aspect of the family structure for school success is *socioeconomic status* (e.g., Brown & Mann, 1990; Lehl, Ebert, et al., 2020; Niklas & Schneider, 2013). Families' socioeconomic status has long been an important part of family research frameworks, for example in the Chicago school of family environment research (for an overview, see Marjoribanks, 1979) as well as theoretical considerations, such as the forms of capital introduced by Bourdieu (1983). According to Bourdieu (1983), the focus on economic capital and investment alone is insufficient when investigating educational outcomes and disparities, a criticism directed specifically against prevalent human capital theories at the time (e.g., G. S. Becker, 1964). Instead, Bourdieu proposes two additional, distinct forms of capital – although a transformation into economic capital is possible, given certain circumstances – of importance: cultural capital, which can be embodied (e.g., specific

knowledge a person has acquired), objectified (e.g., cultural goods like books), or institutionalized (e.g., school leaving certificates); and social capital, which describes the potential resources an individual has access to through their membership in groups and social connections (Bourdieu, 1983). Consequently, school success depends not only on the investment of economic capital, but also the family's cultural and social capital, in the form of transmission of cultural capital and the use of social relations to achieve better conditions and outcomes for the child. Following this argument, socioeconomic status is often assessed in ways that cover not only economic aspects of the family structure such as wealth or income, but also relate to the cultural and social capital. Among the measures used to achieve this, parents' occupational status, education, and the number of books at home are common indicators, with books at home and occupational status usually showing the strongest associations with educational outcomes (e.g., Eriksson et al., 2021; Heppt et al., 2022). While the assessment of books at home is sometimes understood to be an indicator of cultural capital specifically rather than a broader measure of socioeconomic status (see e.g., Engzell, 2021), a distinction that can be useful in some contexts and is therefore worth acknowledging, the present work follows the well-established tradition of using books at home as an indicator of socioeconomic status (e.g., Eriksson et al., 2019; Hanushek & Woessmann, 2011).

Due to the long tradition of investigating socioeconomic background in educational contexts, its relations to many dimensions of school success are well understood today. A positive association of socioeconomic status with students' cognitive competences across domains and grade levels is well-established not only by meta-analytic studies (e.g., Korous et al., 2022; Liu et al., 2022; Selvitopu & Kaya, 2023), but also consistently emerges in international and national large-scale assessment studies such as PIRLS (e.g., Mullis et al., 2023; Stubbe et al., 2023), PISA (e.g., Mang et al., 2023; OECD, 2023), and the IQB Trends in Student Achievement (e.g., Niemitz et al., 2023; Sachse et al., 2022) as well as in-depth secondary data analyses (e.g., Eriksson et al., 2021; G. Lorenz et al., 2023; Michael & Kyriakides, 2023) and individual studies across a variety of contexts (e.g., Kanonire et al., 2022; Nennstiel, 2023; Workman, 2022) when regarding students' reading ability specifically. Studies focusing on vocabulary as another aspect of students' cognitive competences similarly show positive associations with socioeconomic status (e.g., Cangelosi et al., 2024; Kigel et al., 2015; van der Kleij et al., 2023). In regard to noncognitive outcomes, socioeconomic status

positively relates to different motivational measures such as intrinsic motivation (e.g., Manganelli et al., 2021; Miyamoto, Murayama, et al., 2020) as well as reading enjoyment (e.g., Michael & Kyriakides, 2023; Rogiers et al., 2020) and self-concept (e.g., M. Becker & McElvany, 2018; Ma et al., 2023), and some studies suggest that participation in learning activities may on average have been higher in families with higher socioeconomic status during ERE (e.g., Dietrich et al., 2021; Treviño et al., 2021). Moreover, the association of socioeconomic status with students' well-being, as well as life satisfaction more specifically, appears to be positive as well, although somewhat small (e.g., Alivernini et al., 2020; H. Chung et al., 2022; Obermeier et al., 2021). Finally, with regard to institutionalized indicators of school success, positive associations of socioeconomic status with grades emerge (e.g., Bergold et al., 2022; Lauermann et al., 2020) that cannot fully be explained by the aforementioned achievement differences (e.g., Dumont et al., 2019; Westphal et al., 2016). Furthermore, socioeconomic status is also positively related to the probability of receiving a high track recommendation towards the end of primary school (e.g., Lintorf et al., 2021; Niklas & Schneider, 2017; Paulus et al., 2021), an effect that is similarly not fully explained by differences in achievement (e.g., Bergold et al., 2022; Brändle & Weirich, 2023; Dumont et al., 2019) and has been established in other education systems that similarly feature tracked secondary schools as well (e.g., Sneyers et al., 2018, for Belgium; Timmermans et al., 2018, for the Netherlands). In conclusion, socioeconomic status is positively related to different school outcomes, including cognitive competences, noncognitive outcomes, and institutionalized indicators and therefore an important structural component of students' family environment to be considered when investigating school success.

#### **2.4.2 Language Use at Home**

Another important structural component of the family microsystem is the *language use at home* (e.g., Junge et al., 2021; Lehl, Ebert, et al., 2020). While the common language of instruction in Germany is German, many students grow up in multilingual family environments, speaking one or more other languages either in addition to, or instead of German in the home. The share of students who do not exclusively speak German at home varies somewhat with the level of schooling, falling between slightly below two fifths of students in Grade 4 (Henschel et al., 2022) and almost one third of students in Grade 9

(Henschel et al., 2023). Multilingualism is, in itself, frequently named as a desirable goal (e.g., Katsarova, 2022; KMK, 2015)<sup>3</sup> and can have positive consequences in other areas as well, for example for executive functioning (e.g., Bialystok, 2009; Greve et al., 2024) or when it indicates a positive heritage culture orientation (e.g., Dewaele et al., 2020; Tsai et al., 2012) which in turn can be positively linked to well-being (e.g., Baumert et al., 2024; te Lindert et al., 2022). Nonetheless, multilingual students often face challenges in a monolingual school environment. This can be explained when considering the importance of different conditions for acquiring a new language emphasized by language learning theories drawing influence from various disciplines such as (socio-)linguistics, psychology, and economics (e.g., Chiswick & Miller, 1995, 2007; Spolsky, 1989; VanPatten & Benati, 2015). In a framework that aims to integrate different theories of language learning from these disciplines, Esser (2006) identifies sufficient opportunities for learning the language as one central precondition for language acquisition. If students grow up in multilingual households with a non-majority family language, it follows that they experience less exposure on average to each language than a monolingual child would. Therefore, they have fewer opportunities for learning as well, leading to lower average language abilities (e.g., Hoff, 2018; Matusевич et al., 2017) that leave them less prepared to succeed in the monolingual school environment. However, not only the amount of exposure, indicated by the frequency of speaking German in the home, is essential to language learning: Another key factor is the efficiency of language acquisition (Esser, 2006). While many different factors on the individual level, such as intelligence, influence the efficiency of language learning, it is also dependent on the features of the language in question. Crucially, skills language learners already possess in one language can help with learning a new language in a process known as cross-language transfer, and thereby increase the efficiency of language learning. To explain the conditions under which cross-language transfer happens, S. C. Chung et al. (2019) propose an integrative framework building on previous influential theoretical considerations, namely the Contrastive Typological Framework (Lado, 1957), the

---

<sup>3</sup> Given that multilingualism is often explicitly stated as a goal for students (and the general population), it is worth debating whether schools should place a stronger focus on using the multilingual potential many students already bring to schools from their homes. As this would go beyond the scope of the work at hand, readers are instead referred to the extant literature (e.g., Cummins, 2019; Duarte, 2019; Fürstenau, 2011; O. García et al., 2006; O. García & Menken, 2015).

Linguistic Interdependence Hypothesis (Cummins, 1979, 1981; as well as its variant, the Common Underlying Cognitive Processes model, Geva & Ryan, 1993), and the Transfer Facilitation Model (Koda, 2008). Beyond addressing methodological issues, the authors identify the educational setting, language complexity, proficiency in both languages, and the linguistic distance between the heritage language and the target language – that is, the dissimilarity of the two languages based on, for example, lexical and morphological features – as influential determinants of transfer (S. C. Chung et al., 2019). While the language complexity of the target language German and, in large parts, the educational setting are constants for all students in German schools equally, there is large variability in students' language proficiency as well as the linguistic distance, due to the large variety of heritage languages spoken in their families (Statistisches Bundesamt, 2024). Despite these theoretical considerations, the role of linguistic distance of students' heritage language to German, especially in learners prior to secondary school, has received little attention in research and will therefore be regarded as another important aspect of the language use at home.

Regarding empirical findings concerning family language use and school success, large-scale assessment studies have shown disadvantages for students speaking primarily another language than German at home in regards to reading competence (e.g., Henschel et al., 2022, 2023; Stubbe et al., 2023; Weis et al., 2019), even when controlling for the influence of socioeconomic status as a confounded family structure variable, a finding that individual studies in the German context largely replicate as well (e.g., Novita et al., 2022; Seuring et al., 2020; the former finding a significant difference between monolingual students and bilinguals learning German as a second, but not as their first language). Language minority students also appear to be disadvantaged in the acquisition of vocabulary in the majority language (e.g., Marx et al., 2015; Novita et al., 2022; Persici et al., 2022; see also e.g., Heppt et al., 2023; Volodina et al., 2020, 2021, for academic vocabulary specifically). Similarly, among these students, those whose heritage language has a higher linguistic distance to the target language show lower average language proficiency (e.g., Ispording & Otten, 2011; Schepens et al., 2013), which is reflected in lower average reading competence as well (e.g., Borgonovi & Ferrara, 2020) and may similarly translate to vocabulary (see Mulder et al., 2019, for vocabulary learning based on linguistic distance of single words, rather than languages as a whole). Concerning noncognitive outcomes, findings are more ambiguous. Some studies have

shown intrinsic and extrinsic motivational advantages for language minority and bilingual students (e.g., Greenwald et al., 2023), especially regarding intrinsic motivation and enjoyment in the reading and language domain (e.g., Kigel et al., 2015; Michels, 2023; Rjosk et al., 2015, with the association turning insignificant when classroom characteristics were included in the latter), whereas others found negative associations (e.g., McElvany et al., 2009; Rogiers et al., 2020). Moreover, complex relations with reading self-concept emerge from extant research as well: Segerer et al. (2021) find self-concept advantages of language minority students in Germany in the first two grades of primary school, but not Grade 3 and 4. This finding is supported in an investigation of a sample of third-grade multilingual students, who equally showed average reading self-concept comparable to monolinguals (Festman & Schwieter, 2019), although in a study in the US-American context, students of similar age with Spanish (but not an Asian language) as their primary home language still showed significantly higher reading self-concept than majority language students (Niehaus & Adelson, 2013). In total, these studies suggest that even if language minority students may possess higher average reading self-concept upon school entry, these advantages tend to disappear during the course of the first years of primary school. Furthermore, the use of a heritage language at home in multilingual families has been linked positively to children's life satisfaction as well as other indicators of well-being, especially concerning the parent-child relationship as well (e.g., Humeau et al., 2025; Müller et al., 2020), potentially indicating that most children in these families experience what has been labeled harmonious bilingualism (i.e., the absence of conflict or dissonance emerging from the bilingual setting; see e.g., De Houwer, 2017, 2020). Lastly, institutionalized indicators of school success are also associated with students' language use at home, as language minority students on average receive worse grades than their majority-language peers (e.g., Bonefeld et al., 2017; Brändle & Pohlmann, 2021; Lauermaun et al., 2020), which is partly explained through differences in competences. Similarly, while language minority students have a reduced probability for a high track recommendation, these findings are explained by achievement differences in most studies (e.g., Brändle & Weirich, 2023; Lintorf et al., 2021; Wagner et al., 2009; but see Bergold et al., 2022). All in all, students' school success is associated with their language use at home: Language minority students, especially those whose heritage language has a greater linguistic distance to German, are disadvantaged in terms of language-related cognitive outcomes and, at least partly as a direct

consequence, institutionalized markers of school success, whereas they may show advantages in noncognitive outcomes under some circumstances.

### **2.4.3 History of Immigration**

The third central structural aspect of the family environment regarded in this work is the family's *history of immigration* (e.g., Baumert et al., 2003; Niklas & Schneider, 2017). Immigrant-origin students' school experiences and outcomes can vary from those of their non-immigrant peers as they face not only universal developmental and psychological adjustment tasks, but also acculturative challenges as part of their adaptation process (e.g., Jugert & Titzmann, 2020; Motti-Stefanidi & Masten, 2017). This is considered in the IRRM (Suárez-Orozco et al., 2018), which focuses on the processes and dimensions of adaptation that are important for immigrant-origin children and youth, as well as the determinants that influence these processes and are situated on different levels (see also 2.2 Important Environments for School Success). For immigrant-origin children and youth, the important proximal microsystems family and school are generally closely tied to their culture of origin and the majority culture, respectively, and positive outcomes in schools consequently reflect not only mastery of developmental and psychological adjustment tasks, but oftentimes acculturative tasks as well, as these are strongly intertwined with each other (e.g., Motti-Stefanidi et al., 2012; Vedder & Motti-Stefanidi, 2016). This is obvious in the achievement of good cognitive competences in the form of reading abilities and vocabulary in the language of instruction, which are simultaneously indicators of acquiring important majority language skills for participation in the majority culture, but also extends to other dimensions of school success. For example, the attainment of a positive well-being can indicate that students have acquired the necessary skills to navigate the context of both the heritage and the majority culture, thereby mitigating acculturative stress that results from cultural clashes in the home – as described by the Acculturation Gap-Distress Model (e.g., Shukla et al., 2025; Telzer, 2010) – or in schools (e.g., Bayram Özdemir et al., 2021; Sirin et al., 2013)<sup>4</sup>. While these considerations

---

<sup>4</sup> Extant research has shown that acculturation into the majority culture coincides with less perceived discrimination as a relevant indicator of acculturative stress, but it should be noted that the exact mechanisms have not conclusively been exposed. It is plausible that immigrant-origin students with higher acculturation into the majority culture experience less discrimination, but for example also

apply to all immigrant-origin studies, it is important to consider differences based on immigrant generation as well. Especially first-generation immigrant students are in a unique position due to factors directly related to the experience of migration. Differences in other structural components of the family environment exist not only between immigrant-origin and non-immigrant students, but are often especially marked for first-generation immigrant students, indicated by lower average socioeconomic status and a more frequent use of the heritage language at home (e.g., Henschel et al., 2022, 2023), and they may have experiences of interrupted or delayed schooling (e.g., Juang et al., 2018). On the one hand, this can mean that first-generation immigrants may struggle more in school, for example due to a heightened language barrier and the fact that their parents possess fewer resources to support their school success and counteract barriers; however, on the other hand, a shared use of the heritage language with parents, new opportunities for education and positive life outlooks compared to the pre-migration context (especially in refugee children), and high motivation to use these opportunities may be beneficial for their adaptation and school success (e.g., Juang et al., 2018; Leyendecker et al., 2018; Suárez-Orozco et al., 2018). This is reflected in the phenomenon known as the Immigrant Paradox, where first-generation immigrant students primarily in the US-American context are better adapted in some regards than their second-generation, and sometimes even non-immigrant, peers (e.g., García Coll & Marks, 2012; Marks et al., 2014), although subsequent research found no consistent support for this in countries beyond the United States, nor for all ethnic groups (e.g., Dimitrova et al., 2016; Sam et al., 2008, 2022). Nonetheless, it is of specific interest to understand how the processes underlying first-generation immigrants' adaptation may differ from native-born students in general, and second-generation immigrant students more specifically.

Regarding school success as indicated by cognitive competences first, large-scale assessments have shown that first-generation immigrant students are disadvantaged in regard to reading competence even when the family structure variables discussed previously, socioeconomic status and language use at home, are considered simultaneously (e.g., Henschel

---

possible that students who experience less discrimination also have more opportunities (or are more willing) for majority culture acculturation, or that students with higher acculturation into the majority culture experience the same amount of discrimination but perceive it to a lesser extent (see e.g., Motti-Stefanidi et al., 2018; Phinney et al., 2023; te Lindert et al., 2022).

et al., 2022, 2023; OECD, 2019; Weis et al., 2019). However, individual studies from different contexts imply that these additional disadvantages may especially manifest in primary school and diminish or fade as students progress through secondary school (e.g., Hillmert, 2013; Miyamoto, Seuring, et al., 2020; Triventi et al., 2022; but see also Ham et al., 2020). Studies regarding vocabulary as another important indicator of cognitive competences have primarily focused on the development up to entering formal schooling and found significantly lower average scores for immigrant-origin children (e.g., Niklas & Schneider, 2013, 2017; Novita & Kluczniok, 2022). Although these studies did not further differentiate between immigrant generations, findings from bilingual language learners in the United States imply that the development of vocabulary in the majority language may be slower in first-generation than in second- or third-generation students (Leider et al., 2021). When taking into account the considerations regarding language learning as described above, it becomes clear that differences in language-related cognitive competences may also emerge within first-generation immigrant students due to their age at immigration, as migrating at a younger age implies a longer stay in the host country and consequently more exposure to the majority language (e.g., Chiswick & Miller, 2007; Esser, 2006). Turning to noncognitive outcomes next, complex patterns of findings emerge: Regarding motivation, studies in Germany suggest no general motivational advantage of immigrant-origin students in the reading domain, although this may vary with students' ethnic background (e.g., Miyamoto et al., 2018; Miyamoto, Seuring, et al., 2020) and these studies did not regard first- and second-generation immigrants separately. Taking studies that differentiated between immigrant generations in other contexts into account as well, findings indicate that first-generation immigrant students may show general motivational advantages (but see Manganelli et al., 2021), which however do not extend to reading motivation specifically (e.g., Alivernini et al., 2018; Areepattamannil & Freeman, 2008; Castillo, 2023). With regard to self-concept, the extant literature is similarly ambiguous, suggesting comparable German language self-concept in immigrant-origin students in Germany, again with slight discrepancies potentially present in specific origin groups (e.g., Miyamoto, Seuring, et al., 2020; Schöber et al., 2015), while research in other contexts found that first-generation immigrants specifically may possess higher average self-concepts in other domains, such as mathematics (e.g., Areepattamannil & Freeman, 2008; Basarkod et al., 2022). Concerning well-being, some studies imply that especially affective aspects of well-

being may on average be lower in immigrant-origin students (e.g., Alivernini et al., 2018; Guerra et al., 2019; but see Eckert et al., 2025), but students' life satisfaction does not seem to differ depending on students' immigrant status in Germany (e.g., Sam et al., 2022; Tang, 2019). Finally, when regarding institutionalized markers of school success, lower average grades are often found for immigrant-origin students, but these discrepancies usually can fully be explained by considering differences in socioeconomic status and achievement (e.g., Dumont et al., 2019; Kristen, 2006; Neumeyer et al., 2022; but see Bonefeld et al., 2017, who consistently found lower average grades even when considering socioeconomic status, family language, and achievement in 5th and 6th grade mathematics)<sup>5</sup>. Moreover, immigrant-origin students less often receive recommendations for the academic track, but when other, related variables like socioeconomic status, grades, and achievement are included as well, these differences tend to disappear (e.g., Kristen, 2006; Niklas & Schneider, 2017) or even turn positive, albeit small (e.g., Caro et al., 2009; Dumont et al., 2019). However, as extant studies have either regarded all immigrant-origin students indiscriminately or used other indicators such as nationality, it is largely unclear whether grades and track recommendations for first-generation immigrant origin students are comparable to those of their second-generation and non-immigrant peers. In conclusion, first-generation immigrant students' school success has been explored considerably less than the respective roles of socioeconomic status and family language use and needs to be taken into account more when investigating the effect of students' family structure variables as the mechanisms influencing school success may differ from second-generation and non-immigrant students.

Taking all reported findings and theoretical considerations into account, it can be concluded that the three family structure variables socioeconomic status, family language use, and history of immigration are all relevant in shaping students' school success in different areas. While these sociodemographic variables are interrelated in many cases, it has been shown that they have distinct associations with school outcomes and should therefore be considered as separate constructs that, ideally, should all be investigated simultaneously to circumvent issues of conflating their respective influences. However, while investigating

---

<sup>5</sup> Grade differences reported by Neumeyer et al. (2022) were not tested for statistical significance, but confirmed to be statistically significant in analyses conducted by the author of this dissertation, based on the descriptive values reported in the study.

differences in school success based on family structure variables can be useful for exposing and describing educational inequity, it is especially important to also understand the mechanisms that drive these discrepancies, which are reflected in family process variables that mediate the associations of family structure variables and school success.

### **2.5 Process Variables of the Family Microsystem and Their Relation to School Success**

While family structure variables, such as sociodemographic background characteristics of the family microsystem, are relatively static and often cannot be changed easily, family process variables represent more flexible aspects of the family environment. These process variables ideally have beneficial effects for students' school success and while they can be influenced by structural components of the family microsystem and therefore act as (partial) mediators of structure variable effects on school success (e.g., Kluczniok et al., 2013; McElvany et al., 2009), the fact that they are more malleable makes them a central leverage point for supporting success of students in all families. In line with this reasoning and socioecological-psychological perspectives as laid out above (see 2.2 Important Environments for School Success; Bronfenbrenner, 1986; Oishi, 2014), family process variables in the context of the work at hand comprise those factors of the family microsystem that are shaped by the structural aspects of said system and in turn influence important indicators of school success in the child. This is similarly reflected in models of students' HLE which, drawing from EST, argue that these process variables represent proximal features of student's learning environment in the home, in contrast to the more distal structural features of the family microsystem, and act as mediators of the association between structure variables and children's outcomes (e.g., Kluczniok et al., 2013; Niklas & Schneider, 2017). While there is a lacking consensus on the exact theoretical conceptualization of HLE, the majority of models include parent-child interactions as important family processes (Wirth et al., 2023), whereas educational beliefs and orientations in the family are also frequently included, sometimes viewed as a separate component of the HLE as they are less focused on direct interactions, have a comparably higher stability, and can in turn further influence parent-child interactions (see especially the HLE framework proposed by Kluczniok et al., 2013; e.g., Junge et al., 2021; S. Li et al., 2023). In addition to their central role in HLE models and influenced by sociological

theory, these processes may also be regarded as part of habitus (e.g., Bourdieu, 1985). For example, Brake and Büchner (2006) argue that educational strategies within families, including educational goals and convictions (i.e., educational beliefs) as well as the ways families attempt to achieve these goals (e.g., through beneficial parental involvement and interactions), should not be seen as fully rational, explicit strategies and instead as implicit consequences of habitus within the family (see also e.g., Lareau, 2011; Rohlfs, 2011). According to these theoretical considerations, family processes are further specified to fall into one of two categories: *Parental involvement* includes all indicators of direct interaction between parents and children in educational and developmental contexts, whereas *educational beliefs* reflect components of the family environment that are more closely related to attitudes towards specific aspects of education and the value placed on education and educational attainment.

### **2.5.1 Parental Involvement**

Parents' involvement in their children's development in education has been focused in research for a long time and its importance has conclusively been shown (see e.g., the extensive meta-synthesis by Hattie, 2008); yet, there exist no consensus in what exactly the construct should entail, and a multitude of concurrent definitions are in use to date (e.g., Wilder, 2014; Yulianti et al., 2022). Commonly, parental involvement is further divided into two aspects: Parents' involvement in schools and parents' involvement in the home (e.g., Kaplan Toren & Seginer, 2015; Tan, 2019). While the former, as an interaction of the family and school microsystem, is situated in the mesosystem in the sense of EST (see e.g., Bronfenbrenner, 1986), the latter comprises processes in the family microsystem and will be in the focus of the current work. Nonetheless, even within parental involvement in the home alone, many different areas of involvement can be regarded, including those focused mostly on structuring their child's learning, being responsive to the child's needs, and more indirectly supporting their learning through activities such as shared reading (e.g., Dong et al., 2020; Dumont et al., 2014; Froiland, 2021). Extant research supports theoretical considerations that family structure variables can shape parental involvement in these different dimensions, as is especially clear with regard to socioeconomic status: Most studies show that parents in families from higher socioeconomic backgrounds are not only more involved on average, but tend to show more beneficial forms of involvement as well (e.g., X. Li et al., 2020; Tan, 2019; Zhang et

al., 2021), potentially due to a variety of reasons such as higher availability of time and material resources for involvement, stronger endorsement of the education system, or higher aspirations for their child (Tan et al., 2020). The role of family language use and history of immigration has been studied less, but parents in non-majority language and immigrant families can face additional barriers to involvement, for example due to the language barrier, a lack of familiarity with the school system, or diminished social support as a consequence of the migration process (Antony-Newman, 2019). Empirical findings have shown that immigrant parents may show less responsive or supportive involvement, but similar amounts of structural or controlling involvement as non-immigrant parents (e.g., Dumont et al., 2012, 2014). However, parents' majority-language skills, specifically in immigrant families, may conversely contribute positively to more controlling involvement at home (Jung & Zhang, 2016). Additionally, research regarding pre-school children has found evidence that immigrant and language minority parents may on average be more involved in activities directly related to students learning, but show lower indirectly supporting behaviors such as shared reading (e.g., Niklas et al., 2015; Novita & Kluczniok, 2022). However, experiences of parental involvement in the family environment of language minority and immigrant-origin students, especially first-generation in comparison to second-generation immigrant students, should be investigated more to gain a better understanding of these relations and how they may be used to mitigate disadvantages these students face in their education.

In turn, aspects of parental involvement can influence the different dimensions of students' school success. Meta-studies have shown that different forms of parental involvement are positively related to students' cognitive competences, such as competences and achievement in the reading and language domain (e.g., Boonk et al., 2018; Dong et al., 2020; Tan et al., 2020), and specific forms of involvement such as parent-child reading have been shown to be beneficial for the development of language-related cognitive competencies such as vocabulary even before school entry (e.g., Attig & Weinert, 2020; Linberg et al., 2020; Prevoo et al., 2014). Parental involvement has additionally been linked positively to noncognitive outcomes such as intrinsic and self-concept facets of motivation (e.g., Barger et al., 2019; Liou et al., 2019; Núñez et al., 2019), although controlling forms of involvement can be detrimental for students' motivation as well (e.g., Silinskas & Kikas, 2019). Additionally, supportive parental involvement has been shown to be positively associated with different

indicators of students' well-being (e.g., Dettmers et al., 2019; C. Wang et al., 2019). Finally, higher involvement also coincides with better average institutionalized indicators of students' school success, although the association with grades is relatively small (e.g., G. Chung et al., 2020; Wilder, 2014) and may even turn negative when parents' involvement results in conflict in the family (Dumont et al., 2012). Moreover, parents' involvement in schools, rather than at home, has been in the focus of research regarding track recommendations and been identified as a positive predictor of higher track recommendations (e.g., Geven, 2025; van Leest et al., 2024; see also Dumont et al., 2019, for qualitative insights how parents may get involved in schools and interact with teachers to achieve higher track recommendations for their children).

### **2.5.2 Educational Beliefs**

The second dimension of family processes regarded in the present work are educational beliefs held in the family. This includes the perception of parents' responsibility for students' success in learning as well as the educational aspirations that parents and their children hold in regard to the students' prospective educational attainment. Parents' perceived responsibility for the participation in learning and education was especially important during the time of ERE, where students' learning environment was fully shifted into the home rather than schools. As a consequence, large parts of the responsibility for maintaining students' education was now transferred to parents (e.g., Garbe et al., 2020; Rousoulioti et al., 2022), as indicated by drastically increased learning times spent with students in comparison not only to before the onset of ERE, but also to the time students spent learning with their teachers and peers during ERE (e.g., Thorell et al., 2022; Werner & Woessmann, 2023). However, as many parents reported struggling to adequately support their children during ERE, especially those from lower socioeconomic backgrounds who may lack the necessary resources to offer comprehensive learning support (e.g., Cullinane & Montacute, 2020; T. Haller & Novita, 2021; Treviño et al., 2021), it remained largely unclear whether these parents were able to fully accept said responsibility that had been attributed to them, and to what extent parents' acceptance or rejection of the additional educational responsibility may have been reflected in students' outcomes during ERE.

Aspirations, on the other hand, have a long history in psychological research to describe an individual's orientation towards a goal, including both realistic and idealistic goals (e.g., A.

O. Haller, 1968; Lewin, 1939) and educational aspirations have come to commonly be used in empirical research to refer to the aspired school leaving certificate or educational degree (e.g., Dollmann, 2021; Dumont et al., 2019). Educational aspirations are a prominent process variable to explain how discrepancies in educational outcomes depending on families' sociodemographic background form beyond the influence of differences in competences. Boudon (1974) proposed that beyond the primary effects of the family background, which refers to differences in students' skills as a direct result of their upbringing, secondary effects of different patterns of educational choice are of importance as well to explain inequality in educational outcomes, as families from higher socioeconomic backgrounds often hold higher aspirations for their children and would therefore make more ambitious educational choices. Since the original framework was proposed, it has widely been applied in empirical research (e.g., Jackson, 2013; Maaz et al., 2009) and while some modifications have been proposed since its original inception (e.g., Esser, 2016, introducing tertiary teacher effects), the distinction between competence-driven primary effects and secondary effects going beyond ability differences has proven invaluable for understanding social inequity in education. Moreover, the central role of educational aspirations for shaping secondary effects in Boudon's (1974) sociological model is similarly reflected in psychological frameworks as well: Taking an EVT perspective, educational aspirations translate to both higher expectations (realistic aspirations) for, as well as a higher value (idealistic aspirations) of educational attainment and school success, which in turn positively relates to educational choices and outcomes (e.g., Eccles & Wigfield, 2020). In line with these theoretical considerations, empirical research has conclusively shown a positive association between families' socioeconomic status and educational aspirations (e.g., Agasisti & Maragkou, 2023; Dumont et al., 2019; Raudenská & Hamplová, 2022). Another consistent finding that has emerged from the literature, often labelled as immigrant optimism (e.g., Neumeyer et al., 2022), is the notion that after controlling for differences in socioeconomic status and achievement, average educational aspirations tend to be higher in immigrant-origin families, especially those from countries or ethnic immigrant groups with a lower average socioeconomic status (e.g., Basarkod et al., 2022; Salikutluk, 2016; Teltemann et al., 2022), although extant research provides little insight whether this phenomenon manifests differently in families with first- or second-generation immigrant children.

In turn, educational aspirations have been positively linked to students' cognitive competences, such as their academic achievement in general and reading competence specifically (e.g., Boonk et al., 2018; Miyamoto, Seuring, et al., 2020). Regarding noncognitive outcomes, students' motivation has primarily been studied as a positive predecessor to educational aspiration in the extant literature (e.g., Lazarides et al., 2016; Widlund et al., 2020). Additionally, studies suggest that high educational aspirations, especially if they are congruent between children and parents within the family, may be positively associated with different facets of students' well-being (e.g., Almroth et al., 2019; Cao et al., 2023; X. Guo et al., 2022). Lastly, educational aspirations are positively associated with institutionalized indicators of school success as well: While most research has focused on the association with students' grades (e.g., Khattab et al., 2022; Raudenská & Hamplová, 2022), qualitative and quantitative studies have similarly implied that a positive relation with the track recommendation towards the end of primary school exists as well because parents with higher aspirations may negotiate with teachers to achieve higher recommendations for their child (e.g., Dumont et al., 2019; Pohlmann-Rother, 2010). All in all, extant findings support the theoretical considerations that parental involvement at home as well as educational beliefs held in the family mark relevant process variables influencing students' school success – in general, but potentially even more so in at-home learning situations that arose from ERE – while simultaneously being shaped by the structural components of the family microsystem.

## **2.6 Structure Variables of the Classroom Microsystem and Their Relation to School Success**

Another central microsystem for students' development and school success beside the family is the school itself (e.g., Bronfenbrenner, 1986; Suárez-Orozco et al., 2018), and especially the classroom environment, which is where students spend most of the time in schools and most relevant interactions take place (see e.g., van Ewijk & Slegers, 2010a). Analogous to the family microsystem, the way the classroom environment shapes students' success can be understood best by separating structural and process components of the environment. This distinction is in line with frameworks of school effectiveness research, which differentiate input aspects or contextual and antecedent conditions (i.e., structural

components) from process aspects on different levels of the education system, including the classroom (Klieme & Rakoczy, 2008; Scheerens, 2016), as well as subsequent theoretical Supply-Use Models of student learning (SUM; see e.g., Brühwiler & Blatchford, 2011; Fend, 2002; Helmke, 2017). While different specifications of these models exist, the common denominator between these models is the aim to explain the effectiveness of learning in instruction based on the two eponymous components Supply and Use, which in turn include structural and processual aspects regarding different levels and actors in the complex environment that is the education system (e.g., Vieluf et al., 2020). In the multilevel SUM introduced by Brühwiler and Blatchford (2011), the Supply-component of the model comprises three hierarchical levels: The characteristics of the education system itself as the highest level (comparable to the macrosystem in EST, e.g., Bronfenbrenner, 1979); the context of the school and subject; and the level of the classroom. Within this latter level, it is stated that both characteristics of the teacher and, importantly, the composition and context of the classroom in regard to features like students' socioeconomic, language and immigrant backgrounds – that is, the structural components of the classroom – influence classroom processes, which are reflected in the design, focus, and quality of instruction (Brühwiler & Blatchford, 2011; see also e.g., Helmke, 2007, 2017). In turn, the classroom process variables then take an influence on each individual student's learning process, which is also influenced by their individual learning preconditions and learning environments including the structural components of their family environment, and together form the Use-component of the model<sup>6</sup>. Finally, the learning outcomes are determined by the students' individual learning preconditions and learning processes (Brühwiler & Blatchford, 2011; Seidel, 2014).

Within this context, classroom structure variables should be regarded first to understand how they are related to different educational outcomes, and classroom process variables second to then investigate which mechanisms may be responsible for transferring the influence of the classroom's structural components to the individual student's school success. The classroom's structure is shaped primarily by the sum of individual students attending it,

---

<sup>6</sup> It should be noted that all relations below the level of the education system are assumed to be reciprocal in the SUMs defined by Brühwiler and Blatchford (2011) and Seidel (2014), but not necessarily other variations of the SUM (see Vieluf et al., 2020). However, since only unidirectional assumptions are included in this work, the matter of reciprocity is not discussed in detail here.

that is, the *classroom composition*, and different aspects of the composition can be relevant for the outcomes of each individual within the microsystem. For example, one major strand of classroom composition research has focused on investigating how achievement composition impacts motivational outcomes – especially self-concept – in individual students, and found wide acclaim under the name Big-Fish-Little-Pond Effect (Marsh, 1987; see also e.g., Fang et al., 2018; Nagengast & Marsh, 2012; Televantou et al., 2021). Another essential aspect of the student body's composition which, at least in part, can be seen as a precursor to the achievement composition as well, is the sociodemographic composition of the classroom. One of the earliest and most influential studies that included systematic insights into sociodemographic composition has come to be known as the Coleman report, investigating the racial-ethnic segregation in US-American schools in the 1960s as well as the extent to which equal educational opportunities are given in these schools (Coleman et al., 1966). In the wake of the Coleman report, empirical research has investigated more in depth and with steadily evolving, increasingly complex methodology the role that the sociodemographic composition of schools and classrooms plays for students' school success and thus revealed important insights into how students' socioeconomic background, language use, and history of immigration act not only as structural components of individual students' family microsystem, but beyond that as structural components of the classroom microsystem, through their contribution to the student composition.

Comparable to the family microsystem, the composition of the student body in a classroom with regard to their socioeconomic status has been researched the most and is best understood among the sociodemographic background variables. Regarding students' cognitive competences first, extant studies usually find a positive association of a classroom's socioeconomic composition with reading competence that goes beyond individual level effects (e.g., Mok et al., 2016; Rjosk et al., 2017; Seuring et al., 2020), in line with findings in other achievement domains and educational contexts (e.g., Atlay et al., 2019; Hornstra et al., 2015; Toropova et al., 2019). Students' noncognitive outcomes have mostly been investigated in light of the socioeconomic composition of schools, not classrooms, where positive associations emerged with more general motivational outcomes (e.g., Berger & Archer, 2016; Yang Hansen et al., 2022; however, the latter found no significant associations in some Northern European countries) and reading self-concept specifically (e.g., Ma et al., 2022; Ramazan, Dai, et al.,

2023). In contrast, findings tend to differ when the classroom environment is regarded: For example, Kocaj et al. (2020) found no effect of the socioeconomic composition beyond that of achievement composition on interest or self-concept in language instruction in German schools. Likewise, in a Dutch sample no significant associations of socioeconomic composition emerged with either self-efficacy, comparable to self-concept, or task orientation, as a measure similar to intrinsic motivation, although in this case socioeconomic composition was positively related to the development of motivation over time (Hornstra et al., 2015). All in all, more investigation is needed to conclusively understand how socioeconomic composition relates to noncognitive outcomes in general, and motivational constructs specifically, to determine in turn whether supporting students' motivation in socioeconomically disadvantaged schools and classrooms may be necessary to facilitate school success according to their potential. Finally, socioeconomic composition has also been linked positively to both students' grades and track recommendations as institutionalized indicators of their school success (e.g., Bergold et al., 2022; Neumann et al., 2010; Westphal et al., 2016), although it is noteworthy that the positive association with grades only emerged in the math, but not German language domain in one study (Bergold et al., 2022).

Studies that have investigated the language composition have shown somewhat ambiguous results in regard to cognitive competences, with most finding no significant effects on achievement in reading or other subjects (e.g., Blömeke et al., 2022; Gottfried, 2014; Rjosk et al., 2014) and even those that do being inconsistent in regard to the role that socioeconomic composition takes in explaining these findings (e.g., Bellin, 2009; Seuring et al., 2020). Associations with noncognitive outcomes are less well researched, but attending a classroom with a higher share of language minority students may be beneficial for students' motivation (Rjosk et al., 2015). Regarding institutionalized indicators, Bergold et al. (2022) have shown negative associations of the share of language minority students with grades in German, but not mathematics – contrasting their findings for socioeconomic composition – and no significant effect on individual students' track recommendation, comparable to earlier studies (e.g., Wagner et al., 2009).

Finally, the impact of the share of first-generation immigrant students has been researched insufficiently in the extant literature, although some implications may be drawn from studies investigating classroom composition in regard to ethnic minority and immigrant-

origin students. Studies in German schools have largely found negative associations with reading abilities as an indicator of students' cognitive competences (e.g., Mok et al., 2016; Rjosk et al., 2017), although this finding does not consistently emerge when socioeconomic or language composition effects are included as well (e.g., Heppt et al., 2025; Seuring et al., 2020). Research that has regarded the composition of classrooms including the share of ethnic minority students in other national contexts has shown inconsistent results, with studies comprising primary school samples finding a negative association with reading achievement in the United States (Gaskins et al., 2012), a negative relation to listening comprehension as well as a negative trend on a 10%  $\alpha$ -error level for reading comprehension in highly segregated schools in Belgium (Dewulf et al., 2017), but a positive association with reading comprehension in the Netherlands (Hornstra et al., 2015). The latter study also suggested a positive effect of ethnic composition on certain aspects of motivation, as students in classrooms with higher shares of ethnic minority students on average reported higher self-efficacy, although not task orientation (Hornstra et al., 2015), and a study with secondary school students in Germany has similarly shown higher average intrinsic reading motivation in classrooms with larger proportions of ethnically minoritized students (Heppt et al., 2025). Furthermore, findings have implied that higher shares of ethnic minority or immigrant-origin students in a classroom may lead to more positive school-related well-being (e.g., Scharenberg, 2016; van Vemde et al., 2023, for a positive trend). However, results from Italian schools that regarded the share of first-generation immigrant students specifically showed a small negative classroom-level effect on positive affect (Alivernini et al., 2020), in line with one study conducted in Germany that indicated that the share of immigrant-origin students in the classroom itself may relate negatively, but the diversity of these students positively to students' well-being (Schachner et al., 2019). A higher share of immigrant-origin students in the classroom has also been related positively to the probability of receiving a high track recommendation in Germany (Caro et al., 2009), although these results were not similarly found for the share of ethnic minority students in the Netherlands (Driessen et al., 2008) or Belgium (Boone et al., 2018), where students were no more or less likely to receive a high track recommendations depending on the share of ethnic minority students in their classes. However, it must be noted again that these studies did not include the share of first-generation immigrant students specifically, meaning that findings may differ if this specific group were regarded.

Altogether, classroom composition in regard to different sociodemographic background variables as important aspects of the classroom structure and its associations with various indicators of school success are mostly not understood as well as the relations of school success to those same sociodemographic background variables on the individual level, that is, as indicators of the family structure. This is in part due to the fact that only some studies consider the confounded nature of the different facets of sociodemographic composition, which can lead to biased estimates for one aspect when the others are not included as well. However, as with the family microsystem, to truly understand how the classroom microsystem influences students' school success, it is insufficient to regard classroom structure variables alone, but important to also investigate which classroom process variables mediate these associations and thereby shape school success in light of said structure variables.

### **2.7 Process Variables of the Classroom Microsystem and Their Relation to School Success**

When discussing the processes that shape students' school success in light of the composition of the classroom and school, three mechanisms are commonly identified in theoretical considerations (e.g., Harker & Tymms, 2004; Rjosk, 2022; Thrupp et al., 2002). First are differences in schools' availability and use of resources as well as organizational processes that result from the composition of their student body: Thrupp et al. (2002) argue that schools with higher socioeconomic composition have fewer problems with aspects such as fundraising and staffing, and that these schools usually devote more time to planning and efficiently implementing daily routines. Adding to this, Harker and Tymms (2004) point out that a schools' composition may be beneficial for recruiting highly skilled teachers (as well as retaining them – see Rjosk, 2022), and that beyond direct effects of funding, additional facilities that the local communities provide for the school may differ based on the composition of the community, which in turn is reflected in the schools' and classrooms' composition. This ties into considerations regarding parental involvement in schools, as the literature has shown that parents are usually less involved in schools if they face barriers to involvement due to their socioeconomic status, language and cultural background, or immigrant origin (e.g., Hornby & Lafaele, 2011; Jung & Zhang, 2016; Malone, 2017). The second mechanism that is frequently discussed are peer processes. As students' academic socialization and internalization processes

are largely shaped by the interactions with other students at school, peers that are academically motivated or alienated to various degrees, depending in some part on the sociodemographic structure of their families (see 2.4 Structure Variables of the Family Microsystem and Their Relation to School Success), may in turn result in beneficial or obstructive peer spillover effects, role models, and shared beliefs (Rjosk, 2022; Thrupp et al., 2002). Peer processes are also argued to directly affect the learning environment during instruction, as peers may either attempt to disrupt instruction, thereby preventing others from learning, or actively try to support others' learning experience (Harker & Tymms, 2004; van Ewijk & Slegers, 2010b). The third and final mechanism are effects of teaching and instructional quality. The way that teachers implement instruction in the classroom may differ depending on the composition of the student body (Harker & Tymms, 2004), as teachers adapt their teaching style depending on their perception of the students in each class and the subsequent expectations they have for these students (van Ewijk & Slegers, 2010b). If students are more engaged with instruction and complex work, teachers may adapt their use of materials and instruction to be more demanding and support higher learning (Thrupp et al., 2002). However, adapting instruction to the needs of the students may be more difficult in heterogeneous classrooms, and teachers may additionally provide fewer challenging learning opportunities in classes with more disadvantaged students, due to lower expectations for these students (Rjosk, 2022).

Instructional processes as a mediator of structural components of the classroom microsystem can also be situated in the context of SUM (e.g., Fend, 2002; Lipowsky, 2006). As described previously (see 2.6 Structure Variables of the Classroom Microsystem and Their Relation to School Success), the processes within the classroom are influenced by its structural components, such as the sociodemographic composition of the student body (e.g., Brühwiler & Blatchford, 2011; Seidel, 2014). Since the classroom processes in turn shape students' individual learning processes and, by extension, learning outcomes, multilevel SUM support the notion that the structural components of the classroom microsystem, determined by the sociodemographic background of its students, affect students' school success via classroom processes that are reflected in teachers' acting and instruction. Consequently, whether teachers are able to adapt their instruction to the specific composition of each classroom and the different needs of the students is a key element to explaining how the classroom structure affects students' outcomes beyond the individual level. Therefore, the way teachers fashion

their instruction is regarded as a central classroom process that mediates the association between classroom composition and school success in the work at hand. Additionally, as stated by SUM, it is important to consider that not all students may equally be able to use the learning opportunities supplied by teachers (e.g., Brühwiler & Blatchford, 2011). Instead, these models imply an interaction of individual students' individual background variables, which includes the structural components of their family background, and the classroom processes such as teachers' instruction in regard to the learning processes and, in turn, learning outcomes. Consequently, classroom processes in general and the way that teachers implement their instruction specifically can, and should, be understood not only as a mediator on the classroom level, but also as a potential moderator of the association of students' family structure variables and school success.

A variety of frameworks have been proposed to investigate and classify instruction in regard to its quality for facilitating positive outcomes, falling on a continuum between being generically applicable to all instruction and being content- or subject-specific (e.g., Charalambous & Praetorius, 2018; Senden et al., 2022). Generic frameworks of instructional quality, such as the Three Basic Dimensions Framework (TBD), first introduced by Klieme et al. (2001), and the model built on the Classroom Assessment Scoring System (CLASS), developed by Hamre and Pianta (2007), aim to identify aspects of instruction that generally improve the quality of learning in the classroom without including aspects specific to a single domain of instruction. Accordingly, TBD proposes classroom management (strengthening desirable and preventing undesirable student behavior) as an essential precursor to being able to implement high-quality instruction, cognitive activation (building on prior knowledge and encouraging higher-level thinking) as furthering students' understanding through higher depth of processing, and student support (positive student-teacher relationships and supporting students according to their individual needs and strengths) as a positive influence on students' emotions, motivation, and ultimately cognitive competences (e.g., Klieme et al., 2009; Praetorius et al., 2018). Within these three overarching dimensions of instructional quality, several subdimensions and operationalizations of the constructs are proposed in TBD research praxis, with Praetorius et al. (2018) identifying as many as four, ten, and seven common subdimensions for classroom management, student support, and cognitive activation, respectively. Similar to TBD, CLASS – which was originally developed for pre-

Kindergarten classrooms but later extended to other stages of schooling as well – proposes three dimensions with large overlap to TBD: Classroom organization (including behavior management, productivity, and instructional learning formats) is comparable to classroom management, instructional support (including concept development, quality of feedback, and language modeling) comprises various elements of cognitive activation, and emotional support (including positive and negative classroom climate, sensitivity, and regard for student perspective) largely aligns with student support (Pianta & Hamre, 2009; see also Praetorius & Charalambous, 2018; Senden et al., 2022). In contrast, domain-specific or hybrid frameworks, such as the Teaching for Robust Understanding Framework (e.g., Schoenfeld, 2013, 2018) aim to include aspects that are important for high-quality instruction in specific domains as well, for example the content that is taught in class, but also in how far students have equitable access to the content. Hence, frameworks including domain-specific aspects as well imply that it is central that teachers choose content that is not only meaningful for the students to learn, but also developmentally appropriate for the students in the classroom (e.g., Praetorius & Charalambous, 2018; Schoenfeld, 2018). Therefore, a comprehensive investigation and understanding of high-quality instruction can best be reached when both domain-specific and more general aspects of teachers' content, design, and quality of instruction, henceforth subsumed under the term *instructional focus*, are regarded simultaneously.

In language arts instruction, one important domain-specific aspect of instructional focus in light of the sociodemographic structure of classrooms is reading-related support. Lower verbal abilities and precursor skills for reading have been found for socioeconomically disadvantaged (e.g., Skopek & Passaretta, 2021; von Stumm et al., 2020) and language minority students (e.g., Lonigan et al., 2018; Volodina et al., 2020) before school entry and throughout primary school. Following Chall's (1983) stages of reading development, the lack of such basic skills can hinder these students from moving on to higher stages of reading that students from advantageous sociodemographic or language majority backgrounds may already have reached, making it especially important in classrooms with high shares of disadvantaged and language minority students to offer support for developing basic reading-related skills. Similarly, and related to achieving equitable access to the content for all students (e.g., Schoenfeld, 2013), teachers may give additional support to language minority students specifically to account for the potential language barrier to successfully participating in

instruction. In line with these considerations, a higher focus on language learning has been observed in classrooms with higher shares of language minority and socioeconomically disadvantaged students (Rjosk et al., 2014) and subsequently been positively related to both cognitive and noncognitive outcomes, as higher levels of reading achievement and enjoyment emerged in classrooms with more focus on language learning and competencies (e.g., Hochweber & Vieluf, 2018; Rjosk et al., 2014). Lastly, cognitive activation as a generic dimension of instructional quality and indicator of potentially beneficial instructional focus may be especially important to facilitate engagement in classrooms with higher shares of students who may, on average, be more disengaged due to their sociodemographic background (e.g., Ackert, 2018; Y. Guo et al., 2015). In turn, cognitive activation has been positively linked to students' cognitive competences and achievement (e.g., Kemethofer et al., 2025; König et al., 2021; M.-T. Wang et al., 2020), although the positive relation may be confounded with the beneficial influence of other aspects of instruction (Stahns et al., 2020) and does not emerge in some studies (e.g., Atlay et al., 2019; Wenger et al., 2020). Comparably, while studies that regarded noncognitive outcomes mostly consistently show positive associations with students' domain-specific self-concept (e.g., Ramazan, Danielson, et al., 2023; Yi & Lee, 2017), a positive link to intrinsic and enjoyment components of motivation have emerged in some (e.g., Förtsch et al., 2017; Schiepe-Tiska et al., 2016), but not all studies (e.g., Kunter et al., 2013; Lazarides & Raufelder, 2021). In addition to these heterogeneous findings regarding the relation of cognitive activation in instruction and students' school success, extant findings have been inconclusive in showing whether teachers actually adapt their use of cognitively activating instruction to the sociodemographic composition of the classroom (e.g., Fauth et al., 2021; Heinschel et al., 2024; Wenger et al., 2020), and the few studies that have directly investigated mediation effects of these facets of instructional focus have not been able to conclusively confirm their mediating role (e.g., Rjosk et al., 2014, 2015; Wenger et al., 2020). Therefore, further research is needed to comprehensively understand the – theoretically well established – role of instructional focus as an important classroom process variable in the educational praxis. Additionally, it is largely unclear how the process variables of the classroom environment (i.e., the instructional focus) relate not only to the structure of the classroom environment, but also interact with indicators of the individuals' family structure, specifically the sociodemographic background of each individual student. While some studies did not find

significant interaction effects (e.g., Gustafsson et al., 2018; Konstantopoulos & Chung, 2011), others have indicated that specific aspects of instructional focus may be more or less beneficial for students depending on facets of their family structure like socioeconomic status (e.g., Atlay et al., 2019; Caro et al., 2016) or language use (Ramazan, Danielson, et al., 2023), but overall, extant findings are insufficient to conclusively answer whether these interactions consistently emerge and, if so, how they are shaped.

## **2.8 Conclusion of the Theoretical and Research Overview and Central Research Questions**

The theoretical considerations and review of the extant empirical literature in the preceding chapters have introduced the family and classroom as core proximal microsystem in students' environment. Following the notion that school success must be regarded as a multidimensional construct that includes students' cognitive competences, noncognitive outcomes, and institutionalized indicators as important dimensions of measuring success in school and education, regarding different aspects of school success simultaneously can facilitate better understanding of the complex, interconnected nature of students' experiences and success in school. Consequently, a comprehensive understanding of the role of the family and classroom microsystem can also only be reached if different dimensions of school success are considered in empirical research studies. Additionally, systematically separating structural and process components of the family and classroom microsystem is an important step to gain insight regarding the question how students' sociodemographic background and a classroom's sociodemographic composition (i.e., structure variables) are associated with different dimensions of students' school success, but also the question which mechanisms in families and schools (i.e., process variables) are responsible for engendering and mediating these associations. An overview of extant studies has shown that the association of family structure variables with school success is well understood regarding socioeconomic status, with positive relations to all dimensions of school success; that the language use at home is another important aspect of students' background that can go along with disadvantages regarding cognitive competences and institutionalized indicators of school success, but sometimes advantages in noncognitive outcomes; and that the family's history of immigration plays a role beyond the former structure variables, but has not sufficiently been researched yet. Different

family process variables that can be subsumed as parental involvement and educational beliefs were shown to be related to the family structure variables and in turn beneficial for different dimensions of students' school success, but more studies are needed that focus on relatively understudied outcomes such as students' track recommendation, investigate the assumption of mediation directly, and investigate whether the role of specific family processes is comparable for all students, or whether they differ depending on students' background characteristics (e.g., their history immigration). In regard to structure variables of the classroom microsystem, that is, the sociodemographic composition of the classroom, findings have been more heterogeneous compared to the family microsystem. This is in part due to the fact that few studies comprehensively include the different central – confounded but distinct – sociodemographic aspects of classroom composition discussed above to separate their effects, resulting in conflated effects, especially if not considering the influence of the classroom's achievement composition which is additionally linked to its sociodemographic composition. Therefore, different aspects of the classroom structure must be considered simultaneously to fully understand how each component of the classroom's sociodemographic composition relates to different aspects of school success. Similarly, teaching and instructional differences have frequently been proposed as core classroom process variable to explain how classroom composition may affect school success beyond the individual level, but extant findings have been inconclusive in empirically corroborating that claim. Therefore, there is a need for identifying aspects of instructional focus that can be derived from theoretical considerations as important for mediating classroom composition effects to school success – including both domain-specific and general indicators – and investigating their role as classroom process variables, as well as considering them as moderators for each individual student's family background effects. Therefore, the following overarching research questions are investigated in this dissertation:

1. How are (a) sociodemographic factors (socioeconomic status, language use at home, history of immigration) as family structure variables, and (b) sociodemographic composition as classroom structure variables associated with different aspects of school success, specifically cognitive competences (reading competence, vocabulary), noncognitive outcomes (intrinsic and extrinsic motivation, reading enjoyment, reading

self-concept, participation in learning activities during ERE, life satisfaction), and institutionalized indicators (grades, track recommendation)?

2. To what extent do (a) family process variables (parental involvement: emotional-responsive involvement, structural-demanding involvement, parent-child reading; educational beliefs: perceived responsibility for learning, educational aspirations) as well as (b) classroom process variables (reading-related support, support of language minority students, cognitive activation) predict different aspects of school success and mediate/moderate the associations of family and classroom structure variables with different aspects of school success?

## **2.9 Summary of the Studies Forming the Cumulative Dissertation**

The cumulative dissertation comprises four empirical studies (see Table 2). Study I is based on a *Corona Student Survey*, Studies II and III make use of data from the joint research project *School Integration of Newly Immigrated Children* (SIGN), and Study IV investigates data from the German *Progress in International Reading Literacy Study* (PIRLS) survey 2021 (also known as *Internationale Grundschul-Lese-Untersuchung*, IGLU). Study I is focused directly on students' ERE experience, while Studies II–IV investigate samples shortly after the return to (mainly) in-person instruction post-ERE. While all studies include multiple family structure variables and indicators of school success, a focus is laid on socioeconomically disadvantaged students in Study I, multilingual students in Study II, and the comparison of first-generation immigrant students with second-generation and non-immigrant students in Study III. Finally, emphasis is placed on the classroom microsystem in Study IV. The following sections will give a short overview over the four studies, presenting each study's theoretical background and research aims, methods, results, and central conclusions, respectively.

### **2.9.1 Summary of Study I – The Importance of Parents for Key Outcomes Among Socio-Economically Disadvantaged Students: Parents' Role in Emergency Remote Education**

*Theoretical Background and Research Aims.* Investigating students' experience during ERE, Study I builds on early findings that disadvantaged students were especially negatively affected by ERE and investigates a sample of students with a low average socioeconomic status.

**Table 2***Overview of the Studies Forming the Cumulative Dissertation*

<b>Study</b>	<b>Authors</b>	<b>Title</b>	<b>Published in</b>
I	<b>Vogel, S. N. T.,</b> Stang-Rabrig, J., & McElvany, N.	The Importance of Parents for Key Outcomes Among Socio-Economically Disadvantaged Students: Parents' Role in Emergency Remote Education	<i>Social Psychology of Education</i>
II	<b>Vogel, S. N. T., &amp;</b> Stang-Rabrig, J.	Reading Competence and Vocabulary of Students from Diverse Language Backgrounds: Employing a Lexical Distance Measure	McElvany, N., König, S., Schaufelberger, R., Becker, M., Gaspard, H., Heppt, B., & Naumann, A. (Eds.) (2025). <i>Bildungsprozesse und Kompetenzentwicklung im Kontext sprachlicher und sozialer Heterogenität.</i> Beltz Juventa.
III	<b>Vogel, S. N. T.,</b> Stang-Rabrig, J., Jugert, P., Leyendecker, B., & McElvany, N.	The Role of the Family for Succeeding in Late Primary School: Comparing First Generation-, Second Generation-, and Non- Immigrant Students	<i>PsyArXiv</i> (as a preprint); A revised version has now been published in the journal <i>Zeitschrift für Pädagogische Psychologie</i>
IV	<b>Vogel, S. N. T.,</b> Stang-Rabrig, J., & McElvany, N.	Sociodemographic Diversity, Reading Literacy, and Instructional Focus: Disentangling Complex Relations on the Individual and Classroom Level	<i>PsyArXiv</i> (as a preprint); Under review in a peer- reviewed journal

Focusing on noncognitive facets of school success, the study draws from SDT, family structure-process models, and literature on parental involvement to investigate how students' motivation and participation in learning activities was shaped by family structure variables

(socioeconomic status, language use at home<sup>7</sup>) and process variables (parental involvement, educational beliefs) during ERE.

*Methods.* The study investigated  $N = 117$  students in 9<sup>th</sup> to 11<sup>th</sup> grade of comprehensive school in North Rhine-Westphalia ( $M_{\text{age}} = 15.14$  years,  $SD = 0.93$  years; 49.6% female) with a low average socioeconomic status. Students retroactively answered a questionnaire on their experience during ERE in August 2020. Path models were used to investigate the relation of family structure and family process variables with indicators of school success during ERE.

*Results.* Findings showed that demanding-structuring parental involvement was positively related to extrinsic learning motivation, responsive-motivational involvement to intrinsic motivation. Both forms of involvement and parents' perceived responsibility for learning were positively associated with students' participation in learning activities. A significant negative indirect effect of non-majority language use in the family on extrinsic motivation emerged via demanding-structuring parental involvement.

*Central Conclusions.* The study highlights the importance of parental involvement and educational beliefs as central process variables shaping students' noncognitive outcomes during ERE. While findings in this sample of low socioeconomic status-students revealed no further differences in family process variables or student outcomes depending on socioeconomic status, parents in language minority families showed lower structuring-demanding involvement, implying that the specific needs of immigrant-origin families may not have been sufficiently considered when educational processes were transferred from schools into students' homes due to ERE.

### **2.9.2 Summary of Study II – Reading Competence and Vocabulary of Students from Diverse Language Backgrounds: Employing a Lexical Distance Measure**

*Theoretical Background and Research Aims.* Study II investigates central, language-related cognitive competences – reading competence and vocabulary – of multilingual students, aiming to understand the role of linguistic distance between their heritage language

---

<sup>7</sup> In Study I, the language use in the home was used as an indicator for identifying immigrant-origin families (cf., Dubowy et al., 2011) and is therefore referred to as *immigrant background* in the study. However, for consistency between studies in this dissertation and to avoid confusion, the more specific term *language use at home* will be employed in this summary.

and German beyond effects of the primary language use at home, socioeconomic status, and cognitive abilities. Based on theories of second-language learning, the study additionally regards the role of language exposure effects for first-generation immigrant students specifically by including their age at arrival in Germany as a moderator.

*Methods.* A sample of  $N = 193$  multilingual students in Grade 4 of primary school in North Rhine-Westphalia ( $M_{\text{age}} = 10.49$  years,  $SD = 0.58$ ; 58.5% female, 39.9% male) were included in the analysis. The sample was linguistically diverse, reporting 42 different languages spoken at home, and about half of the sample primarily spoke German or the heritage language at home, respectively. Regression analyses were used to investigate the association of linguistic distance with reading competence and vocabulary, with stepwise introduction of control variables and, in a final step, students' age at arrival and its interaction with lexical distance.

*Results.* When the linguistic distance between students' heritage language and German was higher, they showed lower average reading competence but not vocabulary, after controlling for effects of the primary language use at home, cognitive abilities, and socioeconomic status. Neither students' age at arrival nor its interaction with linguistic distance significantly related to either outcome beyond these associations.

*Central Conclusions.* The results show that linguistic distance – and lexical distance, specifically – can be a useful tool to consider the high linguistic diversity among multilingual students. Language minority students' experience and school success can vary based on the characteristics of their heritage language, as shown by the significant association of linguistic distance with reading competence. Additionally, these findings imply that the specific language background of multilingual students should be taken into account in educational settings, as students with more distant heritage languages may face more disadvantages in school and therefore benefit more from additional support that specifically considers the barriers that may arise from their language background.

### ***2.9.3 Summary of Study III – The Role of the Family for Succeeding in Late Primary School: Comparing First Generation-, Second Generation-, and Non-Immigrant Students***

*Theoretical Background and Research Aims.* This study builds on Integrative Risk and Resilience Model for the Adaptation of Immigrant-Origin Children and Youth and theoretical

considerations regarding the adaptation and development of immigrant-origin students from different immigrant generations as well as their non-immigrant peers to investigate the role of the family microsystem – including both structure and process variables – for school success in each of these groups. For a comprehensive understanding, the study regards cognitive competences, noncognitive outcomes, and institutionalized indicators of school success simultaneously, while language use at home and socioeconomic status are included as family structure, parental involvement and educational beliefs as family process variables.

*Methods.* Using data from  $N = 271$  fourth-grade students in North Rhine-Westphalia ( $M_{\text{age}} = 10.47$  years,  $SD = 0.55$ ; 54.2% female, 44.6% male, 0.4% non-binary), regression and multigroup path analyses were employed to investigate discrepancies in school success as well as differences in the relations of family structure variables, family process variables, and indicators of school success between first-generation immigrant students ( $n = 102$ ), second-generation immigrant students ( $n = 68$ ), and non-immigrant students ( $n = 101$ ).

*Results.* First-generation immigrant students were disadvantaged in regard to cognitive competences and institutionalized indicators of school success, whereas no significant differences arose between second-generation and non-immigrant students. While some positive associations between family process variables and school success emerged in all subgroups (aspirations with GPA, parent-child reading with life satisfaction), educational aspirations and socioeconomic status were positively related to life satisfaction only in the first-generation and second-generation immigrant subgroup, respectively. Unexpectedly, parent-child reading was negatively associated with reading competence in first- and second-generation immigrant students, which may indicate a reverse causality from the assumed direction (i.e., more parent-child reading as reaction to lower reading competence).

*Central Conclusions.* The study confirmed that the specific challenges first-generation immigrant students face are especially reflected in disadvantages in cognitive competences and institutionalized indicators of school success, but not noncognitive outcomes, indicating favorable psychological adjustment. Additionally, associations of parent-child reading and educational aspirations with different dimensions of school success independent of students' immigrant status indicated an importance of these processes in all families, but high educational aspirations shared by parents and children were especially important for first-generation immigrant students.

#### **2.9.4 Summary of Study IV – Sociodemographic Diversity, Reading Literacy, and Instructional Focus: Disentangling Complex Relations on the Individual and Classroom Level**

*Theoretical Background and Research Aims.* To understand the role of the classroom microsystem beyond the influence of family structure on an individual student level, this study investigates the associations of cognitive (reading competence) and noncognitive (reading enjoyment, self-concept) indicators of school success with three central sociodemographic background factors – socioeconomic status, language use at home, first-generation immigrant status – on the individual level as well as their composition as structure variables on the classroom level. Additionally, theoretically derived aspects of instructional focus are included as essential classroom process variables, mediating the relations on the classroom level as well as moderating those on the individual level.

*Methods.* The study uses a subsample of the German PIRLS 2021 survey, comprising  $N = 3\,414$  fourth-grade students ( $M_{\text{age}} = 10.44$  years,  $SD = 0.49$ ; 48.0% female, 50.4% male, 1.6% non-binary) in 195 classrooms. To investigate the research questions, latent-manifest multilevel structural equation models with cross-level interactions were utilized.

*Results.* Beyond the individual level, composition effects emerged especially in regard to the share of students with socioeconomic risk, indicating negative associations with cognitive and noncognitive outcomes, whereas composition in terms of language minority students was positively associated with reading self-concept, and the share of first-generation immigrant students negatively related to reading competence. The indicators of instructional focus included in the study were partially positively related to classroom composition, but did neither significantly mediate associations on the classroom level, nor moderate relations on the individual level.

*Central Conclusions.* The study contributes to understanding the role of sociodemographic classroom composition as a structural component of the classroom environment beyond the effect of the same sociodemographic indicators as structure variables of students' family environment on the individual level. Despite some positive relations to composition, the classroom process variables included in the study – different indicators of instructional focus – did not act as significant mediators or moderators of the emerging associations, indicating the need for further investigations.

## 2.10 References I

- Aarnoutse, C., van Leeuwe, J., Voeten, M., & Oud, H. (2001). Development of decoding, reading comprehension, vocabulary and spelling during the elementary school years. *Reading and Writing*, 14(1/2), 61–89. <https://doi.org/10.1023/A:1008128417862>
- Ackert, E. (2018). Segregation paradox? School racial/ethnic and socioeconomic composition and racial/ethnic differences in engagement. *Social Science Research*, 70, 144–162. <https://doi.org/10.1016/j.ssresearch.2017.10.010>
- Affuso, G., Zannone, A., Esposito, C., Pannone, M., Miranda, M. C., De Angelis, G., Aquilar, S., Dragone, M., & Bacchini, D. (2023). The effects of teacher support, parental monitoring, motivation and self-efficacy on academic performance over time. *European Journal of Psychology of Education*, 38(1), 1–23. <https://doi.org/10.1007/s10212-021-00594-6>
- Agasisti, T., & Maragkou, K. (2023). Socio-economic gaps in educational aspirations: Do experiences and attitudes matter? *Education Economics*, 31(4), 471–487. <https://doi.org/10.1080/09645292.2022.2082385>
- Alivernini, F., Cavicchiolo, E., Manganelli, S., Chirico, A., & Lucidi, F. (2020). Students' psychological well-being and its multilevel relationship with immigrant background, gender, socioeconomic status, achievement, and class size. *School Effectiveness and School Improvement*, 31(2), 172–191. <https://doi.org/10.1080/09243453.2019.1642214>
- Alivernini, F., Manganelli, S., Cavicchiolo, E., Girelli, L., Biasi, V., & Lucidi, F. (2018). Immigrant background and gender differences in primary students' motivations toward studying. *The Journal of Educational Research*, 111(5), 603–611. <https://doi.org/10.1080/00220671.2017.1349073>
- Almroth, M., László, K. D., Kosidou, K., & Galanti, M. R. (2019). Academic expectations and mental health in adolescence: A longitudinal study involving parents' and their children's perspectives. *Journal of Adolescent Health*, 64(6), 783–789. <https://doi.org/10.1016/j.jadohealth.2018.11.015>
- Antony-Newman, M. (2019). Parental involvement of immigrant parents: A meta-synthesis. *Educational Review*, 71(3), 362–381. <https://doi.org/10.1080/00131911.2017.1423278>
- Areepattamannil, S., & Freeman, J. G. (2008). Academic achievement, academic self-concept, and academic motivation of immigrant adolescents in the greater Toronto area secondary schools. *Journal of Advanced Academics*, 19(4), 700–743. <https://doi.org/10.4219/jaa-2008-831>
- Arens, A. K., Marsh, H. W., Pekrun, R., Lichtenfeld, S., Murayama, K., & Vom Hofe, R. (2017). Math self-concept, grades, and achievement test scores: Long-term reciprocal effects across five waves and three achievement tracks. *Journal of Educational Psychology*, 109(5), 621–634. <https://doi.org/10.1037/edu0000163>
- Astin, A. W. (1990). *Assessment for excellence: The philosophy and practice of assessment and evaluation in higher education*. MacMillan.
- Atlay, C., Tieben, N., Hillmert, S., & Fauth, B. (2019). Instructional quality and achievement inequality: How effective is teaching in closing the social achievement gap? *Learning and Instruction*, 63, Article 101211. <https://doi.org/10.1016/j.learninstruc.2019.05.008>

- Attig, M., & Weinert, S. (2020). What impacts early language skills? Effects of social disparities and different process characteristics of the home learning environment in the first 2 years. *Frontiers in Psychology, 11*, Article 557751. <https://doi.org/10.3389/fpsyg.2020.557751>
- Bachsleitner, A., Neumann, M., Becker, M., & Maaz, K. (2020). Soziale Ungleichheit bei den Übergängen ins Studium und in die Promotion: Eine kumulative Betrachtung von sozialen Herkunftseffekten im nachschulischen Bildungsverlauf [Social inequality at the transitions to tertiary education and doctoral studies: A cumulative perspective on social background effects in higher education]. *Soziale Welt, 71*(3), 308–340. <https://doi.org/10.5771/0038-6073-2020-3-308>
- Barger, M. M., Kim, E. M., Kuncel, N. R., & Pomerantz, E. M. (2019). The relation between parents' involvement in children's schooling and children's adjustment: A meta-analysis. *Psychological Bulletin, 145*(9), 855–890. <https://doi.org/10.1037/bul0000201>
- Basarkod, G., Marsh, H. W., Parker, P. D., Dicke, T., & Guo, J. (2022). The immigrant paradox and math self-concept: An SES-of-origin-country hypothesis. *Learning and Instruction, 77*, Article 101539. <https://doi.org/10.1016/j.learninstruc.2021.101539>
- Baumert, J., Becker, M., Jansen, M., & Köller, O. (2024). Cultural identity and the academic, social, and psychological adjustment of adolescents with immigration background. *Journal of Youth and Adolescence, 53*(2), 294–315. <https://doi.org/10.1007/s10964-023-01853-z>
- Baumert, J., Watermann, R., & Schümer, G. (2003). Disparitäten der Bildungsbeteiligung und des Kompetenzerwerbs [Disparities in educational participation and attainment: An institutional and individual mediation model]. *Zeitschrift Für Erziehungswissenschaft, 6*(1), 46–71. <https://doi.org/10.1007/s11618-003-0004-7>
- Bayram Özdemir, S., Özdemir, M., & Kharel, N. (2021). Experiences of cultural clashes at home and ethnic victimization in school: “I live between two cultures, and neither of them understands me.” *New Directions for Child and Adolescent Development, 2021*(177), 179–198. <https://doi.org/10.1002/cad.20416>
- Becker, G. S. (1964). *Human capital*. Columbia University Press.
- Becker, M., & McElvany, N. (2018). The interplay of gender and social background: A longitudinal study of interaction effects in reading attitudes and behaviour. *British Journal of Educational Psychology, 88*(4), 529–549. <https://doi.org/10.1111/bjep.12199>
- Becker, M., Neumann, M., & Dumont, H. (2016). Recent developments in school tracking practices in Germany: An overview and outlook on future trends. *ORBIS SCHOLAE, 10*(3), 9–25. <https://doi.org/10.14712/23363177.2017.8>
- Bellin, N. (2009). *Klassenkomposition, Migrationshintergrund und Leistung: Mehrebenenanalysen zum Sprach- und Leseverständnis von Grundschulern*. VS Verlag für Sozialwissenschaften.
- Berger, N., & Archer, J. (2016). School socio-economic status and student socio-academic achievement goals in upper secondary contexts. *Social Psychology of Education, 19*(1), 175–194. <https://doi.org/10.1007/s11218-015-9324-8>
- Bergold, S., Weidinger, A. F., & Steinmayr, R. (2022). The “big fish” from the teacher's perspective: A closer look at reference group effects on teacher judgments. *Journal of Educational Psychology, 114*(3), 656–680. <https://doi.org/10.1037/edu0000559>

- Bertling, J. P., Marksteiner, T., & Kyllonen, P. C. (2016). General noncognitive outcomes. In S. Kuger, E. Klieme, N. Jude, & D. Kaplan (Eds.), *Assessing contexts of learning: An international perspective*. Springer International Publishing. [https://doi.org/10.1007/978-3-319-45357-6\\_10](https://doi.org/10.1007/978-3-319-45357-6_10)
- Bialystok, E. (2009). Bilingualism: The good, the bad, and the indifferent. *Bilingualism: Language and Cognition*, 12(1), 3–11. <https://doi.org/10.1017/S1366728908003477>
- Bleidorn, W., Hopwood, C. J., & Lucas, R. E. (2018). Life events and personality trait change. *Journal of Personality*, 86(1), 83–96. <https://doi.org/10.1111/jopy.12286>
- Blömeke, S., Jentsch, A., Ross, N., Kaiser, G., & König, J. (2022). Opening up the black box: Teacher competence, instructional quality, and students' learning progress. *Learning and Instruction*, 79, Article 101600. <https://doi.org/10.1016/j.learninstruc.2022.101600>
- Blossfeld, P. N. (2018). *Changes in inequality of educational opportunity*. Springer Fachmedien Wiesbaden. <https://doi.org/10.1007/978-3-658-22522-3>
- Bonefeld, M., Dickhäuser, O., Janke, S., Praetorius, A.-K., & Dresel, M. (2017). Migrationsbedingte Disparitäten in der Notenvergabe nach dem Übergang auf das Gymnasium [Student grading according to migration background]. *Zeitschrift Für Entwicklungspsychologie Und Pädagogische Psychologie*, 49(1), 11–23. <https://doi.org/10.1026/0049-8637/a000163>
- Boone, S., Thys, S., Van Avermaet, P., & Van Houtte, M. (2018). Class composition as a frame of reference for teachers? The influence of class context on teacher recommendations. *British Educational Research Journal*, 44(2), 274–293. <https://doi.org/10.1002/berj.3328>
- Boonk, L., Gijssels, H. J. M., Ritzen, H., & Brand-Gruwel, S. (2018). A review of the relationship between parental involvement indicators and academic achievement. *Educational Research Review*, 24, 10–30. <https://doi.org/10.1016/j.edurev.2018.02.001>
- Borgonovi, F., & Ferrara, A. (2020). Academic achievement and sense of belonging among non-native-speaking immigrant students: The role of linguistic distance. *Learning and Individual Differences*, 81, Article 101911. <https://doi.org/10.1016/j.lindif.2020.101911>
- Boudon, R. (1974). *Education, opportunity, and social inequality: Changing prospects in Western society*. Wiley.
- Bourdieu, P. (1983). Ökonomisches Kapital, kulturelles Kapital, soziales Kapital [Economic capital, cultural capital, social capital]. In R. Kreckel (Ed.), *Soziale Ungleichheiten* (pp. 183–198). Nomos Verlagsgesellschaft mbH.
- Bourdieu, P. (1985). The genesis of the concepts of habitus and of field (C. Newman, Trans.). *Sociocriticism*, 1(2), 11–24.
- Bowles, S., & Gintis, H. (1976). *Schooling in capitalist America: Educational reform and the contradictions of economic life*. Basic Books.
- Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., Lambert, S. R., Al-Freih, M., Pete, J., Olcott, D., Rodes, V., Aranciaga, I., Alvarez, A. V., Roberts, J., Pazurek, A., Raffaghelli, J. E., de Coëtlogon, P., Shahadu, S., Brown, M., ... Mano, M. (2020). A global outlook to the interruption of education due to COVID-19 Pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1–126.

- Brake, A., & Büchner, P. (2006). Dem familialen Habitus auf der Spur: Bildungsstrategien in Mehrgenerationenfamilien [Tracing family habitus: Educational strategies in multi-generational families]. In B. Friebertshäuser, M. Rieger-Ladich, & L. Wigger, *Reflexive Erziehungswissenschaft: Forschungsperspektiven im Anschluss an Pierre Bourdieu* (pp. 59–80). VS Verlag für Sozialwissenschaften.
- Brändle, T., & Pohlmann, B. (2021). Alles nur eine Frage der Kompetenz? Leistungs- und Chancengerechtigkeit bei der Vergabe von Schulabschlüssen und Abschlussnoten [Only a question of scholastic competence? Equal opportunities and equity of assessment regarding graduation and grades]. *Zeitschrift für Soziologie*, *50*(1), 58–77. <https://doi.org/10.1515/zfsoz-2021-0006>
- Brändle, T., & Weirich, S. (2023). Leistungsunabhängige Urteile? Analysen zur Vergabe der Gymnasialempfehlung und des Übergang von der Grundschule in die Sekundarstufe I in Hamburg [Non-performance-related decisions? Analyses on awarding of recommendation for Gymnasium [academic track] and on transition from elementary school to secondary education in Hamburg]. *Zeitschrift für Grundschulforschung*, *16*(1), 153–172. <https://doi.org/10.1007/s42278-022-00160-z>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.
- Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology*, *22*(6), 723–742. <https://doi.org/10.1037/0012-1649.22.6.723>
- Bronfenbrenner, U. (1992). Ecological systems theory. In R. Vasta (Ed.), *Six theories of child development: Revised formulations and current issues* (pp. 187–249). Jessica Kingsley Publishers Ltd.
- Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology: Theoretical models of human development* (6th ed., Vol. 1, pp. 793–828). John Wiley & Sons.
- Brookhart, S. M., Guskey, T. R., Bowers, A. J., McMillan, J. H., Smith, J. K., Smith, L. F., Stevens, M. T., & Welsh, M. E. (2016). A century of grading research: Meaning and value in the most common educational measure. *Review of Educational Research*, *86*(4), 803–848. <https://doi.org/10.3102/0034654316672069>
- Brown, J. E., & Mann, L. (1990). The relationship between family structure and process variables and adolescent decision making. *Journal of Adolescence*, *13*(1), 25–37. [https://doi.org/10.1016/0140-1971\(90\)90039-A](https://doi.org/10.1016/0140-1971(90)90039-A)
- Brühwiler, C., & Blatchford, P. (2011). Effects of class size and adaptive teaching competency on classroom processes and academic outcome. *Learning and Instruction*, *21*(1), 95–108. <https://doi.org/10.1016/j.learninstruc.2009.11.004>
- Brutzman, B., Bustos, T. E., Hart, M. J., & Neal, J. W. (2022). A new wave of context: Introduction to the special issue on socioecological approaches to psychology. *Translational Issues in Psychological Science*, *8*(2), 177–184. <https://doi.org/10.1037/tps0000337>

- Bücker, S., Nuraydin, S., Simonsmeier, B. A., Schneider, M., & Luhmann, M. (2018). Subjective well-being and academic achievement: A meta-analysis. *Journal of Research in Personality, 74*, 83–94. <https://doi.org/10.1016/j.jrp.2018.02.007>
- Bühler, J. L., Orth, U., Bleidorn, W., Weber, E., Kretzschmar, A., Scheling, L., & Hopwood, C. J. (2024). Life events and personality change: A systematic review and meta-analysis. *European Journal of Personality, 38*(3), 544–568. <https://doi.org/10.1177/08902070231190219>
- Cangelosi, M., Barichello, C., Dijkstra, T., & Palladino, P. (2024). How SES may affect reading comprehension and vocabulary in language minority bilingual and monolingual children. *Reading & Writing Quarterly, 40*(2), 170–190. <https://doi.org/10.1080/10573569.2023.2181246>
- Cao, J., Dai, Y., & Man, X. (2023). The effects of educational aspirations on stability and change in psychological well-being of Chinese adolescents. *Current Psychology, 42*(27), 23607–23618. <https://doi.org/10.1007/s12144-022-03481-5>
- Caro, D. H., Lenkeit, J., & Kyriakides, L. (2016). Teaching strategies and differential effectiveness across learning contexts: Evidence from PISA 2012. *Studies in Educational Evaluation, 49*, 30–41. <https://doi.org/10.1016/j.stueduc.2016.03.005>
- Caro, D. H., Lenkeit, J., Lehmann, R., & Schwippert, K. (2009). The role of academic achievement growth in school track recommendations. *Studies in Educational Evaluation, 35*(4), 183–192. <https://doi.org/10.1016/j.stueduc.2009.12.002>
- Castillo, W. (2023). Do elementary students reading motivation levels differ by racial/ethnic and/or immigrant background? *Journal of Latinos and Education, 22*(2), 669–680. <https://doi.org/10.1080/15348431.2020.1805615>
- Cerasoli, C. P., Nicklin, J. M., & Nassrelgrawi, A. S. (2016). Performance, incentives, and needs for autonomy, competence, and relatedness: A meta-analysis. *Motivation and Emotion, 40*(6), 781–813. <https://doi.org/10.1007/s11031-016-9578-2>
- Chall, J. S. (1983). *Stages of reading development*. McGraw-Hill Book Company.
- Charalambous, C. Y., & Praetorius, A.-K. (2018). Studying mathematics instruction through different lenses: Setting the ground for understanding instructional quality more comprehensively [Editorial]. *ZDM Mathematics Education, 50*(3), 355–366. <https://doi.org/10.1007/s11858-018-0914-8>
- Chen, C., Bian, F., & Zhu, Y. (2023). The relationship between social support and academic engagement among university students: The chain mediating effects of life satisfaction and academic motivation. *BMC Public Health, 23*(1), Article 2368. <https://doi.org/10.1186/s12889-023-17301-3>
- Chen, S., Cárdenas, D., Zhou, H., & Reynolds, K. J. (2024). Positive school climate and strong school identification as protective factors of adolescent mental health and learning engagement: A longitudinal investigation before and during COVID-19. *Social Science & Medicine, 348*, Article 116795. <https://doi.org/10.1016/j.socscimed.2024.116795>
- Chiswick, B. R., & Miller, P. W. (1995). The endogeneity between language and earnings: International analyses. *Journal of Labor Economics, 13*(2), 246–288. <https://doi.org/10.1086/298374>
- Chiswick, B. R., & Miller, P. W. (2007). *The economics of language: International analyses*. Routledge.

- Chung, G., Phillips, J., Jensen, T. M., & Lanier, P. (2020). Parental involvement and adolescents' academic achievement: Latent profiles of mother and father warmth as a moderating influence. *Family Process, 59*(2), 772–788. <https://doi.org/10.1111/famp.12450>
- Chung, H., Kim, J.-I., Jung, E., & Park, S. (2022). An international comparison study exploring the influential variables affecting students' reading literacy and life satisfaction. *International Journal of Educational Psychology, 11*(3), 261–292. <https://doi.org/10.17583/ijep.8924>
- Chung, S. C., Chen, X., & Geva, E. (2019). Deconstructing and reconstructing cross-language transfer in bilingual reading development: An interactive framework. *Journal of Neurolinguistics, 50*, 149–161. <https://doi.org/10.1016/j.jneuroling.2018.01.003>
- Coleman, J. S., Campbel, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, F. D., York, R. L., & National Center for Educational Statistics. (1966). *Equality of educational opportunity*. U.S. Department of Health, Education, and Welfare; Office of Education.
- Cullinane, C., & Montacute, R. (2020). *COVID-19 and social mobility impact brief #1: School shutdown*. The Sutton Trust. <https://www.suttontrust.com/wp-content/uploads/2021/01/School-Shutdown-Covid-19.pdf>
- Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research, 49*(2), 222–251. <https://doi.org/10.3102/00346543049002222>
- Cummins, J. (1981). The role of primary language development in promoting educational success for language minority students. In Office of Bilingual Bicultural Education (Ed.), *Schooling and language minority students: A theoretical framework* (pp. 3–49). Evaluation, Dissemination and Assessment Center.
- Cummins, J. (2019). Should schools undermine or sustain multilingualism? An analysis of theory, research, and pedagogical practice. *Sustainable Multilingualism, 15*(1), 1–26. <https://doi.org/10.2478/sm-2019-0011>
- De Houwer, A. (2017). Minority language parenting in Europe and children's well-being. In N. J. Cabrera & B. Leyendecker (Eds.), *Handbook on positive development of minority children and youth* (pp. 231–246). Springer International Publishing. <https://doi.org/10.1007/978-3-319-43645-6>
- De Houwer, A. (2020). Harmonious Bilingualism: Well-being for families in bilingual settings. In A. C. Schalley & S. A. Eisenclas (Eds.), *Handbook of home language maintenance and development* (pp. 63–83). De Gruyter. <https://doi.org/10.1515/9781501510175-004>
- de Vries, J. H., Horstmann, K. T., & Mussel, P. (2023). Trajectories in life satisfaction before and during COVID-19 with respect to perceived valence and self-efficacy. *Current Psychology, 42*(31), 27110–27126. <https://doi.org/10.1007/s12144-022-03829-x>
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer.
- Dettmers, S., Yotyodying, S., & Jonkmann, K. (2019). Antecedents and outcomes of parental homework involvement: How do family-school partnerships affect parental homework involvement and student outcomes? *Frontiers in Psychology, 10*, Article 1048. <https://doi.org/10.3389/fpsyg.2019.01048>

- Dewaele, J.-M., Heredia, R., & Cieślicka, A. (2020). How childhood languages shape future language use and cultural orientation. *Multicultural Education Review*, 12(2), 117–135. <https://doi.org/10.1080/2005615X.2020.1762306>
- Dewulf, L., van Braak, J., & Van Houtte, M. (2017). Reading and listening progress in segregated primary schools: Does ethnic and socioeconomic classroom composition matter? *British Educational Research Journal*, 43(5), 931–951. <https://doi.org/10.1002/berj.3292>
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin*, 95(3), 542–575.
- Diener, E., & Ryan, K. (2009). Subjective well-being: A general overview. *South African Journal of Psychology*, 39(4), 391–406. <https://doi.org/10.1177/008124630903900402>
- Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125(2), 276–302. <https://doi.org/10.1037/0033-2909.125.2.276>
- Dietrich, H., Patzina, A., & Lerche, A. (2021). Social inequality in the homeschooling efforts of German high school students during a school closing period. *European Societies*, 23(S1), S348–S369. <https://doi.org/10.1080/14616696.2020.1826556>
- Dimitrova, R., Chasiotis, A., & van de Vijver, F. (2016). Adjustment outcomes of immigrant children and youth in Europe: A meta-analysis. *European Psychologist*, 21(2), 150–162. <https://doi.org/10.1027/1016-9040/a000246>
- Dollmann, J. (2021). Ethnic inequality in choice- and performance-driven education systems: A longitudinal study of educational choices in England, Germany, the Netherlands, and Sweden. *The British Journal of Sociology*, 72(4), 974–991. <https://doi.org/10.1111/1468-4446.12854>
- Dong, Y., Wu, S. X.-Y., Dong, W.-Y., & Tang, Y. (2020). The effects of home literacy environment on children's reading comprehension development: A meta-analysis. *Educational Sciences: Theory & Practice*, 20(2), 63–82. <https://doi.org/10.12738/jestp.2020.2.005>
- Donnelly, R., & Patrinos, H. A. (2022). Learning loss during Covid-19: An early systematic review. *Prospects*, 51(4), 601–609. <https://doi.org/10.1007/s1125-021-09582-6>
- Driessen, G., Slegers, P., & Smit, F. (2008). The transition from primary to secondary education: Meritocracy and ethnicity. *European Sociological Review*, 24(4), 527–542. <https://doi.org/10.1093/esr/jcn018>
- Duarte, J. (2019). Translanguaging in mainstream education: A sociocultural approach. *International Journal of Bilingual Education and Bilingualism*, 22(2), 150–164. <https://doi.org/10.1080/13670050.2016.1231774>
- Dubowy, M., Duzy, D., Pröscholdt, M. V., Schneider, W., Souvignier, E., & Gold, A. (2011). Was macht den «Migrationshintergrund» bei Vorschulkindern aus? Ein Vergleich alternativer Klassifikationskriterien und ihr Zusammenhang mit deutschen Sprachkompetenzen [What determines the “migration background” of pre-school children? A comparison of alternative classification criteria and their association with German language competences]. *Swiss Journal of Educational Research*, 33(3), 355–376. <https://doi.org/10.24452/sjer.33.3.4864>
- Dumont, H., Klinge, D., & Maaz, K. (2019). The many (subtle) ways parents game the system: Mixed-method evidence on the transition into secondary-school tracks in Germany. *Sociology of Education*, 92(2), 199–228. <https://doi.org/10.1177/0038040719838223>

- Dumont, H., Trautwein, U., Lüdtke, O., Neumann, M., Niggli, A., & Schnyder, I. (2012). Does parental homework involvement mediate the relationship between family background and educational outcomes? *Contemporary Educational Psychology*, *37*(1), 55–69. <https://doi.org/10.1016/j.cedpsych.2011.09.004>
- Dumont, H., Trautwein, U., Nagy, G., & Nagengast, B. (2014). Quality of parental homework involvement: Predictors and reciprocal relations with academic functioning in the reading domain. *Journal of Educational Psychology*, *106*(1), 144–161. <https://doi.org/10.1037/a0034100>
- Eccles, J. S., Adler, T. F., Futterman, R., Goff, S. B., Kaczala, C. M., Meece, J. L., & Midgley, C. (1983). Expectancies, values, and academic behaviors. In J. T. Spence (Ed.), *Achievement and achievement motives: Psychological and sociological approaches* (pp. 75–146). W. H. Freeman.
- Eccles, J. S., & Wigfield, A. (2020). From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemporary Educational Psychology*, *61*, Article 101859. <https://doi.org/10.1016/j.cedpsych.2020.101859>
- Eckert, H., Steinmayr, R., & Wirthwein, L. (2025). Socioemotional and sociodemographic determinants of subjective well-being in school during childhood and adolescence. *European Journal of Psychology of Education*, *40*(2), Article 54. <https://doi.org/10.1007/s10212-025-00955-5>
- Eckhardt, T. (Ed.). (2021). *The education system in the Federal Republic of Germany 2019/2020: A description of the responsibilities, structures and developments in education policy for the exchange of information in Europe*. Secretariat of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany. [https://www.kmk.org/fileadmin/Dateien/pdf/Eurydice/Bildungswesen-engl-pdfs/dossier\\_en\\_ebook.pdf](https://www.kmk.org/fileadmin/Dateien/pdf/Eurydice/Bildungswesen-engl-pdfs/dossier_en_ebook.pdf)
- Elharake, J. A., Akbar, F., Malik, A. A., Gilliam, W., & Omer, S. B. (2023). Mental health impact of COVID-19 among children and college students: A systematic review. *Child Psychiatry & Human Development*, *54*(3), 913–925. <https://doi.org/10.1007/s10578-021-01297-1>
- Engzell, P. (2021). What do books in the home proxy for? A cautionary tale. *Sociological Methods & Research*, *50*(4), 1487–1514. <https://doi.org/10.1177/0049124119826143>
- Eriksson, K., Helenius, O., & Ryve, A. (2019). Using TIMSS items to evaluate the effectiveness of different instructional practices. *Instructional Science*, *47*(1), 1–18. <https://doi.org/10.1007/s11251-018-9473-1>
- Eriksson, K., Lindvall, J., Helenius, O., & Ryve, A. (2021). Socioeconomic status as a multidimensional predictor of student achievement in 77 Societies. *Frontiers in Education*, *6*, Article 731634. <https://doi.org/10.3389/educ.2021.731634>
- Esser, H. (2006). *Migration, Sprache und Integration* (AKI-Forschungsbilanz, Issue 4) [Migration, language and integration]. Arbeitsstelle Interkulturelle Konflikte und gesellschaftliche Integration and Wissenschaftszentrum Berlin für Sozialforschung. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-113493>

- Esser, H. (2016). Sorting and (much) more: Prior ability, school effects and the impact of ability tracking on educational inequalities in achievement. In A. Hadjar & C. Gross (Eds.), *Education systems and inequalities* (pp. 95–114). Policy Press. <https://doi.org/10.51952/9781447326113.ch005>
- Fang, J., Huang, X., Zhang, M., Huang, F., Li, Z., & Yuan, Q. (2018). The big-fish-little-pond effect on academic self-concept: A meta-analysis. *Frontiers in Psychology, 9*, Article 1569. <https://doi.org/10.3389/fpsyg.2018.01569>
- Farrington, C. A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T. S., Johnson, D. W., & Beechum, N. O. (2012). *Teaching adolescents to become learners: The role of noncognitive factors in shaping school performance: A critical literature review*. University of Chicago Consortium on Chicago School Research.
- Fauth, B., Atlay, C., Dumont, H., & Decristan, J. (2021). Does what you get depend on who you are with? Effects of student composition on teaching quality. *Learning and Instruction, 71*, Article 101355. <https://doi.org/10.1016/j.learninstruc.2020.101355>
- Fend, H. (2002). Mikro- und Makrofaktoren eines Angebot-Nutzungsmodells von Schulleistungen: Zum Stellenwert der Pädagogischen Psychologie bei der Erklärung von Schulleistungsunterschieden verschiedener Länder [Micro- and macro-factors in a Supply-Usage Model of school achievement: The key position of educational psychology in explaining between-country differences in school achievement]. *Zeitschrift Für Pädagogische Psychologie, 16*(3/4), 141–149. <https://doi.org/10.1024//1010-0652.16.34.141>
- Festman, J., & Schwieter, J. W. (2019). Self-concepts in reading and spelling among mono- and multilingual children: Extending the bilingual advantage. *Behavioral Sciences, 9*(4), Article 39. <https://doi.org/10.3390/bs9040039>
- Filipp, S.-H., & Aymanns, P. (2018). *Kritische Lebensereignisse und Lebenskrisen: Vom Umgang mit den Schattenseiten des Lebens* (2nd ed.). W. Kohlhammer GmbH. <https://doi.org/10.17433/978-3-17-032919-5>
- Förtsch, C., Werner, S., Dorfner, T., Kotzebue, L., & Neuhaus, B. J. (2017). Effects of cognitive activation in biology lessons on students' situational interest and achievement. *Research in Science Education, 47*(3), 559–578. <https://doi.org/10.1007/s11165-016-9517-y>
- Frank, J. L. (2020). School-based practices for the 21st century: Noncognitive factors in student learning and psychosocial outcomes. *Policy Insights from the Behavioral and Brain Sciences, 7*(1), 44–51. <https://doi.org/10.1177/2372732219898703>
- Froiland, J. M. (2021). A comprehensive model of preschool through high school parent involvement with emphasis on the psychological facets. *School Psychology International, 42*(2), 103–131. <https://doi.org/10.1177/0143034320981393>
- Fuchs-Schündeln, N. (2022). Covid-induced school closures in the United States and Germany: Long-term distributional effects. *Economic Policy, 37*(112), 609–639. <https://doi.org/10.1093/epolic/eiac052>
- Fung, F., Tan, C. Y., & Chen, G. (2018). Student engagement and mathematics achievement: Unraveling main and interactive effects. *Psychology in the Schools, 55*(7), 815–831. <https://doi.org/10.1002/pits.22139>

- Fürstenau, S. (2011). Mehrsprachigkeit als Voraussetzung und Ziel schulischer Bildung [Multilingualism as a condition and goal of scholastic education]. In S. Fürstenau & M. Gomolla (Eds.), *Migration und schulischer Wandel: Mehrsprachigkeit* (pp. 25–50). VS Verlag für Sozialwissenschaften. [https://doi.org/10.1007/978-3-531-92659-9\\_2](https://doi.org/10.1007/978-3-531-92659-9_2)
- Garbe, A., Ogurlu, U., Logan, N., & Cook, P. (2020). Parents' experiences with remote education during COVID-19 school closures. *American Journal of Qualitative Research*, 4(3), 45–65. <https://doi.org/10.29333/ajqr/8471>
- García Coll, C., & Marks, A. K. (Eds.). (2012). *The immigrant paradox in children and adolescents: Is becoming American a developmental risk?* American Psychological Association.
- García, E. (2016). The need to address non-cognitive skills in the education policy agenda. In M. S. Khine & S. Areepattamannil (Eds.), *Non-cognitive skills and factors in educational attainment* (pp. 31–64). SensePublishers. [https://doi.org/10.1007/978-94-6300-591-3\\_3](https://doi.org/10.1007/978-94-6300-591-3_3)
- García, O., & Menken, K. (2015). Cultivating an ecology of multilingualism in schools. In B. Spolsky, O. Inbar-Lourie, & M. Tannenbaum (Eds.), *Challenges for language education and policy: Making space for people* (pp. 95–108). Routledge.
- García, O., Skutnabb-Kangas, T., & Torres-Guzmán, M. E. (2006). *Imagining multilingual schools: Languages in education and glocalization*. De Gruyter. <https://doi.org/10.21832/9781853598968>
- Gaskins, C. S., Herres, J., & Kobak, R. (2012). Classroom order and student learning in late elementary school: A multilevel transactional model of achievement trajectories. *Journal of Applied Developmental Psychology*, 33(5), 227–235. <https://doi.org/10.1016/j.appdev.2012.06.002>
- Geng, S., Lu, Y., & Shu, H. (2023). Cross-cultural generalizability of expectancy-value theory in reading: A multilevel analysis across 80 societies. *Current Psychology*, 42(22), 18943–18958. <https://doi.org/10.1007/s12144-022-03014-0>
- Geva, E., & Ryan, E. B. (1993). Linguistic and cognitive correlates of academic skills in first and second languages. *Language Learning*, 43(1), 5–42. <https://doi.org/10.1111/j.1467-1770.1993.tb00171.x>
- Geven, S. (2025). Tracking procedures and criteria and the SES bias in teacher track recommendations. *American Educational Research Journal*, 62(2), 271–304. <https://doi.org/10.3102/00028312241288212>
- Gottfried, M. A. (2014). Peer effects in urban schools: Assessing the impact of classroom composition on student achievement. *Educational Policy*, 28(5), 607–647. <https://doi.org/10.1177/0895904812467082>
- Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7(1), 6–10. <https://doi.org/10.1177/074193258600700104>
- Graham, S. (2020). An attributional theory of motivation. *Contemporary Educational Psychology*, 61, Article 101861. <https://doi.org/10.1016/j.cedpsych.2020.101861>
- Greenwald, D. G., Shan, L., Boldt, T. A., Truong, B. B., Gonzalez, G. S., Chen, C. H., & Corpus, J. H. (2023). Comparing intrinsic and extrinsic motivation in bilingual children and their monolingual peers. *Frontiers in Education*, 7, Article 1022729. <https://doi.org/10.3389/feduc.2022.1022729>

- Gresch, C. (2012). *Der Übergang in die Sekundarstufe I: Leistungsbeurteilung, Bildungsaspiration und rechtlicher Kontext bei Kindern mit Migrationshintergrund* [The transition into lower secondary school: Evaluation of achievement, educational aspiration and legal context for children with migration background]. VS Verlag für Sozialwissenschaften. <https://doi.org/10.1007/978-3-531-18660-3>
- Greve, W., Koch, M., Rasche, V., & Kersten, K. (2024). Extending the scope of the ‘cognitive advantage’ hypothesis: Multilingual individuals show higher flexibility of goal adjustment. *Journal of Multilingual and Multicultural Development*, 45(4), 822–838. <https://doi.org/10.1080/01434632.2021.1922420>
- Grewenig, E., Lergetporer, P., Werner, K., Woessmann, L., & Zierow, L. (2021). COVID-19 and educational inequality: How school closures affect low- and high-achieving students. *European Economic Review*, 140, Article 103920. <https://doi.org/10.1016/j.euroecorev.2021.103920>
- Guerra, R., Rodrigues, R. B., Aguiar, C., Carmona, M., Alexandre, J., & Lopes, R. C. (2019). School achievement and well-being of immigrant children: The role of acculturation orientations and perceived discrimination. *Journal of School Psychology*, 75, 104–118. <https://doi.org/10.1016/j.jsp.2019.07.004>
- Guo, X., Qin, H., Jiang, K., & Luo, L. (2022). Parent-child discrepancy in educational aspirations and depressive symptoms in early adolescence: A longitudinal study. *Journal of Youth and Adolescence*, 51(10), 1983–1996. <https://doi.org/10.1007/s10964-022-01644-y>
- Guo, Y., Sun, S., Breit-Smith, A., Morrison, F. J., & Connor, C. M. (2015). Behavioral engagement and reading achievement in elementary-school-age children: A longitudinal cross-lagged analysis. *Journal of Educational Psychology*, 107(2), 332–347. <https://doi.org/10.1037/a0037638>
- Gustafsson, J.-E., Nilsen, T., & Hansen, K. Y. (2018). School characteristics moderating the relation between student socio-economic status and mathematics achievement in grade 8. Evidence from 50 countries in TIMSS 2011. *Studies in Educational Evaluation*, 57, 16–30. <https://doi.org/10.1016/j.stueduc.2016.09.004>
- Gutman, L. M., & Schoon, I. (2016). A synthesis of causal evidence linking non-cognitive skills to later outcomes for children and adolescents. In M. S. Khine & S. Areepattamannil (Eds.), *Non-cognitive skills and factors in educational attainment* (pp. 171–198). SensePublishers. [https://doi.org/10.1007/978-94-6300-591-3\\_9](https://doi.org/10.1007/978-94-6300-591-3_9)
- Haller, A. O. (1968). On the concept of aspiration. *Rural Sociology*, 33(4), 484–488.
- Haller, T., & Novita, S. (2021). Parents’ perceptions of school support during COVID-19: What satisfies parents? *Frontiers in Education*, 6, Article 700441. <https://doi.org/10.3389/feduc.2021.700441>
- Ham, S., Song, H., & Yang, K. (2020). Towards a balanced multiculturalism? Immigrant integration policies and immigrant children’s educational performance. *Social Policy & Administration*, 54(5), 630–645. <https://doi.org/10.1111/spol.12561>
- Hamre, B. K., & Pianta, R. C. (2007). Learning opportunities in preschool and early elementary classrooms. In R. C. Pianta, M. J. Cox, & K. L. Snow (Eds.), *School readiness and the transition to Kindergarten in the era of accountability* (pp. 49–84). Brookes.

- Hanushek, E. A., & Woessmann, L. (2011). The economics of international differences in educational achievement. In E. A. Hanushek, S. Machin, & L. Woessmann (Eds.), *Handbook of the economics of education* (Vol. 3, pp. 89–200). Elsevier. <https://doi.org/10.1016/B978-0-444-53429-3.00002-8>
- Harker, R., & Tymms, P. (2004). The effects of student composition on school outcomes. *School Effectiveness and School Improvement*, 15(2), 177–199. <https://doi.org/10.1076/sesi.15.2.177.30432>
- Hattie, J. A. C. (2008). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Havighurst, R. J. (1972). *Developmental tasks and education* (3rd ed.). David McKay Company, Inc.
- Heffner, A. L., & Antaramian, S. P. (2016). The role of life satisfaction in predicting student engagement and achievement. *Journal of Happiness Studies*, 17, 1681–1701. <https://doi.org/10.1007/s10902-015-9665-1>
- Heinschel, A., Henschel, S., & Rjosk, C. (2024). Links between instructional quality and classroom composition in classes taught by the same teacher. *Learning and Instruction*, 94, Article 102005. <https://doi.org/10.1016/j.learninstruc.2024.102005>
- Helmke, A. (2007). *Unterrichtsqualität erfassen, bewerten, verbessern* (6th ed.) [Assessing, judging, improving instructional quality]. Klett, Kallmeyer.
- Helmke, A. (2017). *Unterrichtsqualität und Lehrerprofessionalität: Diagnose, Evaluation und Verbesserung des Unterrichts* (7th ed.) [Instructional quality and teacher professional competences: Diagnosis, evaluation and improvement of instruction]. Klett, Kallmeyer.
- Henschel, S., Heppt, B., Rjosk, C., & Weirich, S. (2022). Zuwanderungsbezogene Disparitäten [Migration-related disparities]. In P. Stanat, S. Schipolowski, R. Schneider, K. A. Sachse, S. Weirich, & S. Henschel (Eds.), *IQB-Bildungstrend 2021: Kompetenzen in den Fächern Deutsch und Mathematik am Ende der 4. Jahrgangsstufe im dritten Ländervergleich* (pp. 181–219). Waxmann. <https://doi.org/10.31244/9783830996064>
- Henschel, S., Heppt, B., & Weirich, S. (2023). Zuwanderungsbezogene Disparitäten [Migration-related disparities]. In P. Stanat, S. Schipolowski, R. Schneider, S. Weirich, S. Henschel, & K. A. Sachse (Eds.), *IQB-Bildungstrend 2022: Sprachliche Kompetenzen am Ende der 9. Jahrgangsstufe im dritten Ländervergleich* (pp. 299–345). Waxmann Verlag GmbH. <https://doi.org/10.31244/9783830997771>
- Heppt, B., Henschel, S., Hardy, I., & Gabler, K. (2023). Instructional support in inquiry-based elementary school science classes: How does it relate to students' science content knowledge and academic language proficiency? *European Journal of Psychology of Education*, 38(4), 1377–1401. <https://doi.org/10.1007/s10212-022-00653-6>
- Heppt, B., Olczyk, M., & Volodina, A. (2022). Number of books at home as an indicator of socioeconomic status: Examining its extensions and their incremental validity for academic achievement. *Social Psychology of Education*, 25(4), 903–928. <https://doi.org/10.1007/s11218-022-09704-8>
- Heppt, B., Schwarzenhal, M., & Scharf, J. (2025). Discriminatory climate and school adjustment in ethnically minoritized adolescents and majority adolescents: An investigation of the mediating

- role of teaching quality. *Journal of Youth and Adolescence*. Advance online publication. <https://doi.org/10.1007/s10964-025-02147-2>
- Hillmert, S. (2013). Links between immigration and social inequality in education: A comparison among five European countries. *Research in Social Stratification and Mobility*, 32, 7–23. <https://doi.org/10.1016/j.rssm.2013.02.002>
- Hochweber, J., & Vieluf, S. (2018). Gender differences in reading achievement and enjoyment of reading: The role of perceived teaching quality. *The Journal of Educational Research*, 111(3), 268–283. <https://doi.org/10.1080/00220671.2016.1253536>
- Hoff, E. (2018). Bilingual development in children of immigrant families. *Child Development Perspectives*, 12(2), 80–86. <https://doi.org/10.1111/cdep.12262>
- Hoover, W. A., & Gough, P. B. (1990). The simple view of reading. *Reading and Writing*, 2, 127–160.
- Hornby, G., & Lafaele, R. (2011). Barriers to parental involvement in education: An explanatory model. *Educational Review*, 63(1), 37–52. <https://doi.org/10.1080/00131911.2010.488049>
- Hornstra, L., van der Veen, I., Peetsma, T., & Volman, M. (2015). Does classroom composition make a difference: Effects on developments in motivation, sense of classroom belonging, and achievement in upper primary school. *School Effectiveness and School Improvement*, 26(2), 125–152. <https://doi.org/10.1080/09243453.2014.887024>
- Howard, J. L., Bureau, J. S., Guay, F., Chong, J. X. Y., & Ryan, R. M. (2021). Student motivation and associated outcomes: A meta-analysis from self-determination theory. *Perspectives on Psychological Science*, 16(6), 1300–1323. <https://doi.org/10.1177/1745691620966789>
- Humeau, C., Guihard, G., Guimard, P., & Nocus, I. (2025). Life satisfaction of 10-year-olds in a bilingual context in France: The predictive role of parental language practices and children's use of the minority language. *Journal of Multilingual and Multicultural Development*, 46(3), 848–862. <https://doi.org/10.1080/01434632.2023.2216665>
- Isphording, I. E., & Otten, S. (2011). *Linguistic distance and the language fluency of immigrants* (Ruhr Economics Papers, Issue 274). Rheinisch-Westfälisches Institut für Wirtschaftsforschung. <https://hdl.handle.net/10419/61444>
- Jackson, M. (2013). How is inequality of educational opportunity generated? The case for primary and secondary effects. In M. Jackson (Ed.), *Determined to succeed?: Performance versus choice in educational attainment* (pp. 1–33). Stanford University Press.
- Jackson, M., & Jonsson, J. O. (2013). Why does inequality of educational opportunity vary across countries? In M. Jackson (Ed.), *Determined to succeed?: Performance versus choice in educational attainment* (pp. 306–338). Stanford University Press. <https://doi.org/10.11126/stanford/9780804783026.003.0011>
- Juang, L. P., Simpson, J. A., Lee, R. M., Rothman, A. J., Titzmann, P. F., Schachner, M. K., Korn, L., Heinemeier, D., & Betsch, C. (2018). Using attachment and relational perspectives to understand adaptation and resilience among immigrant and refugee youth. *American Psychologist*, 73(6), 797–811. <https://doi.org/10.1037/amp0000286>
- Jugert, P., & Titzmann, P. F. (2020). Developmental tasks and immigrant adolescent's adaptation. In D. Güngör & D. Strohmeier (Eds.), *Contextualizing immigrant and refugee resilience: Cultural and acculturation perspectives* (pp. 33–50). Springer.

- Jung, E., & Zhang, Y. (2016). Parental involvement, children's aspirations, and achievement in new immigrant families. *The Journal of Educational Research*, 109(4), 333–350. <https://doi.org/10.1080/00220671.2014.959112>
- Junge, K., Schmerse, D., Lankes, E.-M., Carstensen, C. H., & Steffensky, M. (2021). How the home learning environment contributes to children's early science knowledge—Associations with parental characteristics and science-related activities. *Early Childhood Research Quarterly*, 56, 294–305. <https://doi.org/10.1016/j.ecresq.2021.04.004>
- Kanonire, T., Lubenko, J., & Kuzmina, Y. (2022). The effects of intrinsic and extrinsic reading motivation on reading performance in elementary school. *Journal of Research in Childhood Education*, 36(1), 1–13. <https://doi.org/10.1080/02568543.2020.1822961>
- Kaplan Toren, N., & Seginer, R. (2015). Classroom climate, parental educational involvement, and student school functioning in early adolescence: A longitudinal study. *Social Psychology of Education*, 18(4), 811–827. <https://doi.org/10.1007/s11218-015-9316-8>
- Katsarova, I. (2022). *Multilingualism: The language of the European Union* (PE 642.207). European Parliament Research Service. [https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/642207/EPRS\\_BRI\(2019\)642\\_207\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2019/642207/EPRS_BRI(2019)642_207_EN.pdf)
- Kaya, M., & Erdem, C. (2021). Students' well-being and academic achievement: A meta-analysis study. *Child Indicators Research*, 14(5), 1743–1767. <https://doi.org/10.1007/s12187-021-09821-4>
- Kemethofer, D., Helm, C., & Warwas, J. (2025). Does educational leadership enhance instructional quality and student achievement? The case of Austrian primary school leaders. *International Journal of Leadership in Education*, 28(3), 461–485. <https://doi.org/10.1080/13603124.2021.2021294>
- Khattab, N., Madeeha, M., Samara, M., Modood, T., & Barham, A. (2022). Do educational aspirations and expectations matter in improving school achievement? *Social Psychology of Education*, 25(1), 33–53. <https://doi.org/10.1007/s11218-021-09670-7>
- Kigel, R. M., McElvany, N., & Becker, M. (2015). Effects of immigrant background on text comprehension, vocabulary, and reading motivation: A longitudinal study. *Learning and Instruction*, 35, 73–84. <https://doi.org/10.1016/j.learninstruc.2014.10.001>
- Kirby, J. R., & Savage, R. S. (2008). Can the simple view deal with the complexities of reading? *Literacy*, 42(2), 75–82. <https://doi.org/10.1111/j.1741-4369.2008.00487.x>
- Klapp, A. (2018). Does academic and social self-concept and motivation explain the effect of grading on students' achievement? *European Journal of Psychology of Education*, 33(2), 355–376. <https://doi.org/10.1007/s10212-017-0331-3>
- Kleinkorres, R., Stang, J., & McElvany, N. (2020). A longitudinal analysis of reciprocal relations between students' well-being and academic achievement. *Journal for Educational Research Online*, 12(2), 114–165.
- Klemm, K. (2022). Das Bildungssystem Deutschlands: Strukturen und Strukturreformen [The education system of Germany: Structures and structural reform]. In H. Reinders, D. Bergs-Winkels, A. Prochnow, & I. Post (Eds.), *Empirische Bildungsforschung: Eine elementare*

- Einführung* (pp. 75–86). Springer Fachmedien Wiesbaden. [https://doi.org/10.1007/978-3-658-27277-7\\_5](https://doi.org/10.1007/978-3-658-27277-7_5)
- Klieme, E., Pauli, C., & Reusser, K. (2009). The Pythagoras Study: Investigating effects of teaching and learning in Swiss and German mathematics classrooms. In T. Janík & T. Seidel (Eds.), *The power of video studies in investigating teaching and learning in the classroom* (pp. 137–160). Waxmann.
- Klieme, E., & Rakoczy, K. (2008). Empirische Unterrichtsforschung und Fachdidaktik: Outcome-orientierte Messung und Prozessqualität des Unterrichts [Empirical instruction research and subject didactics: Outcome-oriented measurement and process quality of instruction]. *Zeitschrift für Pädagogik*, *54*(2), 222–237. <https://doi.org/10.25656/01:4348>
- Klieme, E., Schümer, G., & Knoll, S. (2001). Mathematikunterricht in der Sekundarstufe I: “Aufgabenkultur” und Unterrichtsgestaltung [Mathematics instruction in lower secondary school: “Task culture” and instructional design]. In E. Klieme & J. Baumert (Eds.), *TIMMS - Impulse für Schule und Unterricht: Forschungsbefunde, Reforminitiativen, Praxisberichte und Video-Dokumente* (pp. 43–57). Bundesministerium für Bildung und Forschung (BMBF) Referat Öffentlichkeitsarbeit.
- Klinge, D. (2016). *Die elterliche Übergangentscheidung nach der Grundschule* [The parental track decision after primary school]. Springer Fachmedien Wiesbaden. <https://doi.org/10.1007/978-3-658-14351-0>
- Kluczniok, K., Lehl, S., Kuger, S., & Rossbach, H.-G. (2013). Quality of the home learning environment during preschool age – domains and contextual conditions. *European Early Childhood Education Research Journal*, *21*(3), 420–438. <https://doi.org/10.1080/1350293X.2013.814356>
- Kocaj, A., Jansen, M., Kuhl, P., & Stanat, P. (2020). Zusammenhänge der Klassenkomposition an Förderschulen und allgemeinen Schulen mit schulischen Kompetenzen, akademischem Selbstkonzept und Interesse [Associations of classroom composition in special-needs schools and general schools with school competences, academic self-concept and interest]. In C. Gresch, P. Kuhl, M. Grosche, C. Sälzer, & P. Stanat (Eds.), *Schüler\*innen mit sonderpädagogischem Förderbedarf in Schulleistungserhebungen: Einblicke und Entwicklungen* (pp. 213–262). Springer Fachmedien Wiesbaden. [https://doi.org/10.1007/978-3-658-27608-9\\_8](https://doi.org/10.1007/978-3-658-27608-9_8)
- Koda, K. (2008). Impacts of prior literacy experience on second language learning to read. In K. Koda & A. M. Zehler (Eds.), *Learning to read across languages: Cross-linguistic relationships in first- and second-language literacy development* (pp. 68–96). Routledge. <https://doi.org/10.4324/9780203935668>
- Koizumi, R., & In'nami, Y. (2013). Vocabulary knowledge and speaking proficiency among second language learners from novice to intermediate levels. *Journal of Language Teaching and Research*, *4*(5), 900–913. <https://doi.org/10.4304/jltr.4.5.900-913>
- König, J., Blömeke, S., Jentsch, A., Schlesinger, L., Felske née Nehls, C., Musekamp, F., & Kaiser, G. (2021). The links between pedagogical competence, instructional quality, and mathematics achievement in the lower secondary classroom. *Educational Studies in Mathematics*, *107*(1), 189–212. <https://doi.org/10.1007/s10649-020-10021-0>

- Konstantopoulos, S., & Chung, V. (2011). Teacher effects on minority and disadvantaged students' Grade 4 achievement. *The Journal of Educational Research*, 104(2), 73–86. <https://doi.org/10.1080/00220670903567349>
- Korous, K. M., Causadias, J. M., Bradley, R. H., Luthar, S. S., & Levy, R. (2022). A systematic overview of meta-analyses on socioeconomic status, cognitive ability, and achievement: The need to focus on specific pathways. *Psychological Reports*, 125(1), 55–97. <https://doi.org/10.1177/0033294120984127>
- Kriegbaum, K., Becker, N., & Spinath, D. B. (2018). The relative importance of intelligence and motivation as predictors of school achievement: A meta-analysis. *Educational Research Review*, 25, 120–148. <https://doi.org/10.1016/j.edurev.2018.10.001>
- Kristen, C. (2006). Ethnische Diskriminierung in der Grundschule: Die Vergabe von Noten und Bildungsempfehlungen [Ethnic discrimination in primary school: Awarding of grades and educational recommendations]. *Kölner Zeitschrift für Soziologie und Sozialpsychologie*, 58(1), 79–97. <https://doi.org/10.1007/s11575-006-0004-y>
- Kuh, G. D., Kinzie, J., Buckley, J. A., Bridges, B. K., & Hayek, J. C. (2006). *What matters to student success: A review of the literature*. National Postsecondary Education Cooperative.
- Kuhn, M. R., & Stahl, K. A. D. (2022). Teaching reading: Development and differentiation. *Phi Delta Kappan*, 103(8), 25–31. <https://doi.org/10.1177/00317217221100007>
- Kultusministerkonferenz. (2015). *Empfehlungen zur Arbeit in der Grundschule (Beschluss der Kultusministerkonferenz vom 02.07.1970 i. D. F. vom 11.06.2015)* [Recommendations for work in primary school]. Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland. [https://www.kmk.org/fileadmin/Dateien/veroeffentlichungen\\_beschluesse/1970/1970\\_07\\_02\\_Empfehlungen\\_Grundschule.pdf](https://www.kmk.org/fileadmin/Dateien/veroeffentlichungen_beschluesse/1970/1970_07_02_Empfehlungen_Grundschule.pdf)
- Kultusministerkonferenz. (2022, June 23). *Bildungsstandards für das Fach Deutsch: Primarbereich (Beschluss der Kultusministerkonferenz vom 15.10.2004, i.d.F. vom 23.06.2022)* [Education standards for the subject German: Primary school]. Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland. [https://www.kmk.org/fileadmin/veroeffentlichungen\\_beschluesse/2022/2022\\_06\\_23-Bista-Primarbereich-Deutsch.pdf](https://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2022/2022_06_23-Bista-Primarbereich-Deutsch.pdf)
- Kultusministerkonferenz. (2024, June). *Definintionenkatalog zur Schulstatistik 2024 (gültig ab dem Schuljahr 2024/2025)* [Catalogue of definitions for the 2024 School Statistic]. Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland: Kommission für Statistik. <https://www.kmk.org/fileadmin/Dateien/pdf/Statistik/Dokumentationen/Defkat-2024.pdf>
- Kunter, M., Klusmann, U., Baumert, J., Richter, D., Voss, T., & Hachfeld, A. (2013). Professional competence of teachers: Effects on instructional quality and student development. *Journal of Educational Psychology*, 105(3), 805–820. <https://doi.org/10.1037/a0032583>
- Lado, R. (1957). *Linguistics across cultures: Applied linguistics for language teachers*. University of Michigan Press.

- Lareau, A. (1987). Social class differences in family-school relationships: The importance of cultural capital. *Sociology of Education*, *60*(2), 73–85. <https://doi.org/10.2307/2112583>
- Lareau, A. (2011). *Unequal childhoods: Class, race, and family life* (2nd ed.). University of California Press. <https://ebookcentral.proquest.com/lib/dortmundtech/detail.action?docID=740304>
- Lauermaun, F., Meißner, A., & Steinmayr, R. (2020). Relative importance of intelligence and ability self-concept in predicting test performance and school grades in the math and language arts domains. *Journal of Educational Psychology*, *112*(2), 364–383. <https://doi.org/10.1037/edu0000377>
- Lavrijsen, J., Vansteenkiste, M., Boncquet, M., & Verschueren, K. (2022). Does motivation predict changes in academic achievement beyond intelligence and personality? A multitheoretical perspective. *Journal of Educational Psychology*, *114*(4), 772–790. <https://doi.org/10.1037/edu0000666>
- Lazarides, R., & Raufelder, D. (2021). Control-value theory in the context of teaching: Does teaching quality moderate relations between academic self-concept and achievement emotions? *The British Journal of Educational Psychology*, *91*(1), 127–147. <https://doi.org/10.1111/bjep.12352>
- Lazarides, R., Viljaranta, J., Aunola, K., Pesu, L., & Nurmi, J.-E. (2016). The role of parental expectations and students' motivational profiles for educational aspirations. *Learning and Individual Differences*, *51*, 29–36. <https://doi.org/10.1016/j.lindif.2016.08.024>
- Lehrl, S., Ebert, S., Blaurock, S., Rossbach, H.-G., & Weinert, S. (2020). Long-term and domain-specific relations between the early years home learning environment and students' academic outcomes in secondary school. *School Effectiveness and School Improvement*, *31*(1), 102–124. <https://doi.org/10.1080/09243453.2019.1618346>
- Lehrl, S., Evangelou, M., & Sammons, P. (2020). The home learning environment and its role in shaping children's educational development [Editorial]. *School Effectiveness and School Improvement*, *31*(1), 1–6. <https://doi.org/10.1080/09243453.2020.1693487>
- Leider, C. M., Proctor, C. P., & Silverman, R. D. (2021). Language growth trajectories: Does immigrant generation status moderate linguistic interdependence? *International Journal of Bilingual Education and Bilingualism*, *24*(5), 605–621. <https://doi.org/10.1080/13670050.2018.1500998>
- Lettau, J. (2021). The impact of children's academic competencies and school grades on their life satisfaction: What really matters? *Child Indicators Research*, *14*(6), 2171–2195. <https://doi.org/10.1007/s12187-021-09830-3>
- Lewin, K. (1939). Field theory and experiment in social psychology: Concepts and methods. *American Journal of Sociology*, *44*(6), 868–896. <https://doi.org/10.1086/218177>
- Leyendecker, B., Cabrera, N., Lembcke, H., Willard, J., Kohl, K., & Spiegler, O. (2018). Parenting in a new land: Immigrant parents and positive development of their children and youth. *European Psychologist*, *23*(1), 57–71. <https://doi.org/10.1027/1016-9040/a000316>
- Li, J., King, R. B., Wang, Y., Leung, S. O., & Wang, C. (2023). Students' and schools' expectancy-value beliefs are associated with reading achievement: A cross-cultural study. *Learning and Individual Differences*, *106*, Article 102344. <https://doi.org/10.1016/j.lindif.2023.102344>

- Li, S., Tang, Y., & Zheng, Y. (2023). How the home learning environment contributes to children's social-emotional competence: A moderated mediation model. *Frontiers in Psychology, 14*, Article 1065978. <https://doi.org/10.3389/fpsyg.2023.1065978>
- Li, X., Han, M., Cohen, G. L., & Markus, H. R. (2021). Passion matters but not equally everywhere: Predicting achievement from interest, enjoyment, and efficacy in 59 societies. *Proceedings of the National Academy of Sciences, 118*(11), Article e2016964118. <https://doi.org/10.1073/pnas.2016964118>
- Li, X., Yang, H., Wang, H., & Jia, J. (2020). Family socioeconomic status and home-based parental involvement: A mediation analysis of parental attitudes and expectations. *Children and Youth Services Review, 116*, Article 105111. <https://doi.org/10.1016/j.chilyouth.2020.105111>
- Linberg, A., Lehl, S., & Weinert, S. (2020). The early years home learning environment – Associations with parent-child-course attendance and children's vocabulary at age 3. *Frontiers in Psychology, 11*, Article 1425. <https://doi.org/10.3389/fpsyg.2020.01425>
- Lintorf, K., van Ophuysen, S., & Osipov, I. (2021). Comparing assessment methods of attribute importance in teachers' decisions: The importance of different criteria for tracking recommendations after primary school. *Education Sciences, 11*(10), Article 566. <https://doi.org/10.3390/educsci11100566>
- Liou, P.-Y., Wang, C.-L., & Lin, J. J. H. (2019). Pathways of parental involvement through students' motivational beliefs to science achievement. *Educational Psychology, 39*(7), 960–980. <https://doi.org/10.1080/01443410.2019.1617410>
- Lipowsky, F. (2006). Auf den Lehrer kommt es an: Empirische Evidenzen für Zusammenhänge zwischen Lehrerkompetenzen, Lehrerhandeln und dem Lernen der Schüler [It depends on the teacher: Empirical evidence for associations of teacher competences, teacher acting and student learning]. In C. Allemann-Ghionda & E. Terhart (Eds.), *Kompetenzen und Kompetenzentwicklung von Lehrerinnen und Lehrern*. (pp. 47–70). Beltz. <https://doi.org/10.25656/01:7370>
- Lipowsky, F. (2020). Unterricht [Instruction]. In E. Wild & J. Möller (Eds.), *Pädagogische Psychologie* (pp. 69–118). Springer. [https://doi.org/10.1007/978-3-662-61403-7\\_4](https://doi.org/10.1007/978-3-662-61403-7_4)
- Liu, J., Peng, P., Zhao, B., & Luo, L. (2022). Socioeconomic status and academic achievement in primary and secondary education: A meta-analytic review. *Educational Psychology Review, 34*(4), 2867–2896. <https://doi.org/10.1007/s10648-022-09689-y>
- Locher, F. M., Becker, S., Schiefer, I., & Pfof, M. (2021). Mechanisms mediating the relation between reading self-concept and reading comprehension. *European Journal of Psychology of Education, 36*(1), 1–20. <https://doi.org/10.1007/s10212-020-00463-8>
- Lonigan, C. J., Burgess, S. R., & Schatschneider, C. (2018). Examining the simple view of reading with elementary school children: Still simple after all these years. *Remedial and Special Education, 39*(5), 260–273. <https://doi.org/10.1177/0741932518764833>
- Lorenz, G., Lenz, S., & Rjosk, C. (2023). Effizienz und soziale Ungleichheit in strikt leistungsdifferenzierenden Bildungssystemen: Eine kritische Betrachtung des Model of Ability Tracking (MoAbiT) [Achievement and social inequality in education systems with strict ability

- tracking: A critical examination of the Model of Ability Tracking (MoAbiT)]. *Zeitschrift für Soziologie*, 52(4), 404–424. <https://doi.org/10.1515/zfsoz-2023-2028>
- Lorenz, R., Frey, A., Trendtel, M., Ludewig, U., Schilcher, A., & McElvany, N. (2023). Ziele, Design, Instrumente und Durchführung der Internationalen Grundschul-Lese-Untersuchung (IGLU 2021) [Aims, design, instruments and implementation of the Progress in International Reading Literacy Study (PIRLS 2021)]. In N. McElvany, R. Lorenz, A. Frey, F. Goldhammer, A. Schilcher, & T. C. Stubbe (Eds.), *IGLU 2021. Lesekompetenz von Grundschulkindern im internationalen Vergleich und im Trend über 20 Jahre* (pp. 27–52). Waxmann Verlag GmbH. <https://doi.org/10.31244/9783830997009>
- Lorenz, R., McElvany, N., Schilcher, A., & Ludewig, U. (2023). Lesekompetenz von Viertklässlerinnen und Viertklässlern im internationalen Vergleich: Testkonzeption und Ergebnisse von IGLU 2021 [Reading competence of fourth-grade students in international comparison: Test conceptualization and results of PIRLS 2021]. In N. McElvany, R. Lorenz, A. Frey, F. Goldhammer, A. Schilcher, & T. C. Stubbe (Eds.), *IGLU 2021. Lesekompetenz von Grundschulkindern im internationalen Vergleich und im Trend über 20 Jahre* (pp. 53–87). Waxmann Verlag GmbH.
- Lörz, M. (2017). Soziale Ungleichheiten beim Übergang ins Studium und im Studienverlauf [Social inequalities at the transition to and course of higher education]. In M. S. Baader & T. Freytag (Eds.), *Bildung und Ungleichheit in Deutschland* (pp. 311–338). Springer Fachmedien Wiesbaden. [https://doi.org/10.1007/978-3-658-14999-4\\_16](https://doi.org/10.1007/978-3-658-14999-4_16)
- Lotz, C., Schneider, R., & Sparfeldt, J. R. (2018). Differential relevance of intelligence and motivation for grades and competence tests in mathematics. *Learning and Individual Differences*, 65, 30–40. <https://doi.org/10.1016/j.lindif.2018.03.005>
- Lüdemann, E., & Schwerdt, G. (2013). Migration background and educational tracking: Is there a double disadvantage for second-generation immigrants? *Journal of Population Economics*, 26(2), 455–481. <https://doi.org/10.1007/s00148-012-0414-z>
- Ludewig, U., Kleinkorres, R., Schaufelberger, R., Schlitter, T., Lorenz, R., König, C., Frey, A., & McElvany, N. (2022). COVID-19 pandemic and student reading achievement: Findings from a school panel study. *Frontiers in Psychology*, 13, Article 876485. <https://doi.org/10.3389/fpsyg.2022.876485>
- Ludewig, U., Strietholt, R., & McElvany, N. (2025). Reading literacy decline in Europe: Disentangling school closures and out-of-school learning conditions during the COVID-19 pandemic. *Learning and Instruction*, 98, Article 102150. <https://doi.org/10.1016/j.learninstruc.2025.102150>
- Luhmann, M., Hofmann, W., Eid, M., & Lucas, R. E. (2012). Subjective well-being and adaptation to life events: A meta-analysis. *Journal of Personality and Social Psychology*, 102(3), 592–615. <https://doi.org/10.1037/a0025948>
- Ma, L., Xiao, L., & Hau, K.-T. (2022). Teacher feedback, disciplinary climate, student self-concept, and reading achievement: A multilevel moderated mediation model. *Learning and Instruction*, 79, Article 101602. <https://doi.org/10.1016/j.learninstruc.2022.101602>

- Ma, L., Xiao, L., & Li, Q. (2023). Mediation of self-concept and moderation of teacher support between SES and reading achievement: Evidence from China and the United States. *The British Journal of Educational Psychology*, 93(4), 921–940. <https://doi.org/10.1111/bjep.12607>
- Maaz, K., Baumert, J., & Trautwein, U. (2009). Genese sozialer Ungleichheit im institutionellen Kontext der Schule: Wo entsteht und vergrößert sich soziale Ungleichheit? [Emergence of social inequality in the institutional context of school: Where does social inequality emerge and grow?]. *Zeitschrift für Erziehungswissenschaft, Sonderheft 12*, 11–46. [https://doi.org/10.1007/978-3-531-92216-4\\_2](https://doi.org/10.1007/978-3-531-92216-4_2)
- Malone, D. (2017). Socioeconomic status: A potential challenge for parental involvement in schools. *The Delta Kappa Gamma Bulletin: International Journal for Professional Educators*, 83(3), 58–62.
- Mang, J., Müller, K., Lewalter, D., Kastorff, T., Müller, M., Ziernwald, L., Tupac-Yupanqui, A., Heine, J.-H., & Köller, O. (2023). Herkunftsbezogene Ungleichheiten im Kompetenzerwerb [Inequalities in competence acquisition based on origin]. In D. Lewalter, J. Diedrich, F. Goldhammer, O. Köller, & K. Reiss (Eds.), *PISA 2022: Analyse der Bildungsergebnisse in Deutschland* (pp. 163–197). Waxmann Verlag GmbH. <https://doi.org/10.31244/9783830998488>
- Manganelli, S., Cavicchiolo, E., Lucidi, F., Galli, F., Cozzolino, M., Chirico, A., & Alivernini, F. (2021). Differences and similarities in adolescents' academic motivation across socioeconomic and immigrant backgrounds. *Personality and Individual Differences*, 182, Article 111077. <https://doi.org/10.1016/j.paid.2021.111077>
- Marjoribanks, K. (1979). *Families and their learning environments*. Routledge & Kegan Paul.
- Marks, A. K., Ejesi, K., & García Coll, C. (2014). Understanding the U.S. immigrant paradox in childhood and adolescence. *Child Development Perspectives*, 8(2), 59–64. <https://doi.org/10.1111/cdep.12071>
- Marsh, H. W. (1987). The big-fish-little-pond effect on academic self-concept. *Journal of Educational Psychology*, 79(3), 280–295. <https://doi.org/10.1037/0022-0663.79.3.280>
- Marx, A., Stanat, P., Roick, T., Segerer, R., Marx, P., & Schneider, W. (2015). Components of reading comprehension in adolescent first-language and second-language students from low-track schools. *Reading and Writing*, 28(6), 891–914. <https://doi.org/10.1007/s11145-015-9554-3>
- Masten, A. S. (2014). *Ordinary magic: Resilience in development*. Guilford Press.
- Masud, S., Mufarrih, S. H., Qureshi, N. Q., Khan, F., Khan, S., & Khan, M. N. (2019). Academic performance in adolescent students: The role of parenting styles and socio-demographic factors – a cross sectional study from Peshawar, Pakistan. *Frontiers in Psychology*, 10, Article 2497. <https://doi.org/10.3389/fpsyg.2019.02497>
- Matusevych, Y., Alishahi, A., & Backus, A. (2017). The impact of first and second language exposure on learning second language constructions. *Bilingualism: Language and Cognition*, 20(1), 128–149. <https://doi.org/10.1017/S1366728915000607>
- McCormick, C. M., Kuo, S. I.-C., & Masten, A. S. (2011). Developmental tasks across the life span. In K. L. Fingerman, C. Berg, J. Smith, & T. C. Antonucci (Eds.), *Handbook of life-span development* (pp. 117–140). Springer Publishing Company.

- McElvany, N., Becker, M., & Lüdtke, O. (2009). Die Bedeutung familiärer Merkmale für Lesekompetenz, Wortschatz, Lesemotivation und Leseverhalten [The role of family variables in reading literacy, vocabulary, reading motivation, and reading behavior]. *Zeitschrift Für Entwicklungspsychologie Und Pädagogische Psychologie*, *41*(3), 121–131. <https://doi.org/10.1026/0049-8637.41.3.121>
- McElvany, N., Lorenz, R., Frey, A., Goldhammer, F., Schilcher, A., & Stubbe, T. C. (2023). IGLU 2021: Zentrale Befunde im Überblick [PIRLS 2021: Overview of core findings]. In N. McElvany, R. Lorenz, A. Frey, F. Goldhammer, A. Schilcher, & T. C. Stubbe (Eds.), *IGLU 2021: Lesekompetenz von Grundschulkindern im internationalen Vergleich und im Trend über 20 Jahre* (pp. 13–25). Waxmann Verlag GmbH. <https://doi.org/10.31244/9783830997009>
- Michael, D., & Kyriakides, L. (2023). Mediating effects of motivation and socioeconomic status on reading achievement: A secondary analysis of PISA 2018. *Large-Scale Assessments in Education*, *11*(1), Article 31. <https://doi.org/10.1186/s40536-023-00181-9>
- Michels, J. (2023). *Reziproke Zusammenhänge zwischen elterlichen Bildungserwartungen, schulischer Motivation und Leistung bei Schüler\*innen mit Migrationshintergrund* [Doctoral dissertation, Technische Universität Dortmund; Reciprocal relationships between parental educational expectations, achievement motivation, and performance among immigrant students]. Eldorado. <https://doi.org/10.17877/DE290R-23938>
- Miyamoto, A., Murayama, K., & Lechner, C. M. (2020). The developmental trajectory of intrinsic reading motivation: Measurement invariance, group variations, and implications for reading proficiency. *Contemporary Educational Psychology*, *63*, Article 101921. <https://doi.org/10.1016/j.cedpsych.2020.101921>
- Miyamoto, A., Pfost, M., & Artelt, C. (2018). Reciprocal relations between intrinsic reading motivation and reading competence: A comparison between native and immigrant students in Germany. *Journal of Research in Reading*, *41*(1), 176–196. <https://doi.org/10.1111/1467-9817.12113>
- Miyamoto, A., Seuring, J., & Kristen, C. (2020). Immigrant students' achievements in light of their educational aspirations and academic motivation. *Journal of Ethnic and Migration Studies*, *46*(7), 1348–1370. <https://doi.org/10.1080/1369183X.2018.1538772>
- Mok, S. Y., Martiny, S. E., Gleibs, I. H., Keller, M. M., & Froehlich, L. (2016). The relationship between ethnic classroom composition and Turkish-origin and German students' reading performance and sense of belonging. *Frontiers in Psychology*, *7*, Article 1071. <https://doi.org/10.3389/fpsyg.2016.01071>
- Motti-Stefanidi, F., Berry, J., Chryssochoou, X., Sam, D. L., & Phinney, J. (2012). Positive immigrant youth adaptation in context: Developmental, acculturation, and social-psychological perspectives. In A. S. Masten, K. Liebkind, & D. J. Hernandez (Eds.), *Realizing the potential of immigrant youth* (pp. 117–158). Cambridge University Press.
- Motti-Stefanidi, F., & Masten, A. S. (2017). A resilience perspective on immigrant youth adaptation and development. In N. J. Cabrera & B. Leyendecker (Eds.), *Handbook on positive development of minority children and youth* (pp. 19–34). Springer International Publishing.
- Motti-Stefanidi, F., Pavlopoulos, V., & Asendorpf, J. B. (2018). Immigrant youth acculturation and perceived discrimination: Longitudinal mediation by immigrant peers' acceptance/rejection.

- Journal of Applied Developmental Psychology*, 59, 36–45.  
<https://doi.org/10.1016/j.appdev.2018.03.001>
- Mulder, E., van de Ven, M., Segers, E., & Verhoeven, L. (2019). Context, word, and student predictors in second language vocabulary learning. *Applied Psycholinguistics*, 40(1), 137–166.  
<https://doi.org/10.1017/S0142716418000504>
- Mulhall, P. F., Flowers, N., & Mertens, S. B. (2002). Understanding indicators related to academic performance. *Middle School Journal*, 34(2), 56–61.  
<https://doi.org/10.1080/00940771.2002.11495355>
- Müller, L.-M., Howard, K., Wilson, E., Gibson, J., & Katsos, N. (2020). Bilingualism in the family and child well-being: A scoping review. *International Journal of Bilingualism*, 24(5–6), 1049–1070.  
<https://doi.org/10.1177/1367006920920939>
- Mullis, I. V. S., & Martin, M. O. (2019). PIRLS 2021: Reading assessment framework. In I. V. S. Mullis & M. O. Martin (Eds.), *PIRLS 2021: Assessment frameworks* (pp. 5–26).
- Mullis, I. V. S., von Davier, M., Foy, P., Fishbein, B., Reynolds, K. A., & Wry, E. (Eds.). (2023). *PIRLS 2021: International results in reading*. Boston College, TIMSS & PIRLS International Study Center. <https://doi.org/10.6017/lse.tpisc.tr2103.kb5342>
- Nagengast, B., & Marsh, H. W. (2012). Big fish in little ponds aspire more: Mediation and cross-cultural generalizability of school-average ability effects on self-concept and career aspirations in science. *Journal of Educational Psychology*, 104(4), 1033–1053.  
<https://doi.org/10.1037/a0027697>
- Neal, J. W., & Neal, Z. P. (2013). Nested or networked? Future directions for ecological systems theory. *Social Development*, 22(4), 722–737. <https://doi.org/10.1111/sode.12018>
- Nennstiel, R. (2023). No Matthew effects and stable SES gaps in math and language achievement growth throughout schooling: Evidence from Germany. *European Sociological Review*, 39(5), 724–740. <https://doi.org/10.1093/esr/jcac062>
- Neumann, M., Milek, A., Maaz, K., & Gresch, C. (2010). Zum Einfluss der Klassenzusammensetzung auf den Übergang von der Grundschule in die weiterführenden Schulen [Regarding the influence of classroom composition on the transition from primary to secondary school]. In K. Maaz, J. Baumert, C. Gresch, & N. McElvany (Eds.), *Der Übergang von der Grundschule in die weiterführende Schule: Leistungsgerechtigkeit und regionale, soziale und ethnisch-kulturelle Disparitäten* (Vol. 34, pp. 229–252). Bundesministerium für Bildung und Forschung (BMBF) Referat Bildungsforschung.
- Neumeyer, S., Olczyk, M., Schmaus, M., & Will, G. (2022). Reducing or widening the gap? How the educational aspirations and expectations of Turkish and majority families develop during lower secondary education in Germany. *KZfSS Kölner Zeitschrift Für Soziologie Und Sozialpsychologie*, 74(2), 259–285. <https://doi.org/10.1007/s11577-022-00844-5>
- Niehaus, K., & Adelson, J. L. (2013). Self-concept and native language background: A study of measurement invariance and cross-group comparisons in third grade. *Journal of Educational Psychology*, 105(1), 226–240. <https://doi.org/10.1037/a0030556>
- Niemitz, J., Jindra, C., Schneider, R., Schumann, K., Schipolowski, S., & Sachse, K. A. (2023). Soziale Disparitäten [Social disparities]. In P. Stanat, S. Schipolowski, R. Schneider, S. Weirich, S.

- Henschel, & K. A. Sachse (Eds.), *IQB-Bildungstrend 2022: Sprachliche Kompetenzen am Ende der 9. Jahrgangsstufe im dritten Ländervergleich* (pp. 261–298). Waxmann Verlag GmbH. <https://doi.org/10.31244/9783830997771>
- Niklas, F., & Schneider, W. (2013). Home literacy environment and the beginning of reading and spelling. *Contemporary Educational Psychology*, 38(1), 40–50. <https://doi.org/10.1016/j.cedpsych.2012.10.001>
- Niklas, F., & Schneider, W. (2017). Home learning environment and development of child competencies from kindergarten until the end of elementary school. *Contemporary Educational Psychology*, 49, 263–274. <https://doi.org/10.1016/j.cedpsych.2017.03.006>
- Niklas, F., Tayler, C., & Schneider, W. (2015). Home-based literacy activities and children's cognitive outcomes: A comparison between Australia and Germany. *International Journal of Educational Research*, 71, 75–85. <https://doi.org/10.1016/j.ijer.2015.04.001>
- Novita, S., & Klucznik, K. (2022). Receptive vocabulary of preschool children with migration backgrounds: The effect of home literacy activities. *Early Child Development and Care*, 192(11), 1728–1743. <https://doi.org/10.1080/03004430.2021.1932861>
- Novita, S., Lockl, K., & Gnambs, T. (2022). Reading comprehension of monolingual and bilingual children in primary school: The role of linguistic abilities and phonological processing skills. *European Journal of Psychology of Education*, 37(4), 993–1013. <https://doi.org/10.1007/s10212-021-00587-5>
- Núñez, J. C., Regueiro, B., Suárez, N., Piñeiro, I., Rodicio, M. L., & Valle, A. (2019). Student perception of teacher and parent involvement in homework and student engagement: The mediating role of motivation. *Frontiers in Psychology*, 10, Article 1384. <https://doi.org/10.3389/fpsyg.2019.01384>
- Obermeier, R., Schlesier, J., & Gläser-Zikuda, M. (2021). Differences in students' scholastic well-being induced by familial and scholastic context. *The British Journal of Educational Psychology*, 92(3), 994–1010. <https://doi.org/10.1111/bjep.12484>
- Oevermann, U. (1970). *Sprache und soziale Herkunft: Ein Beitrag zur Analyse schichtenspezifischer Sozialisationsprozesse und ihrer Bedeutung für den Schulerfolg* [Language and social background: A contribution to the analysis of stratum-specific socialisation processes and their importance for school success]. Max-Planck-Institut für Bildungsforschung.
- Oishi, S. (2014). Socioecological psychology. *Annual Review of Psychology*, 65(1), 581–609. <https://doi.org/10.1146/annurev-psych-030413-152156>
- Organization for Economic Co-operation and Development. (2019). *PISA 2018 Results (Volume II): Where all students can succeed*. OECD Publishing. <https://doi.org/10.1787/b5fd1b8f-en>
- Organization for Economic Co-operation and Development. (2023). *PISA 2022 results (Volume I): The state of learning and equity in education*. OECD Publishing. <https://doi.org/10.1787/53f23881-en>
- Organization for Economic Co-operation and Development, European Union, & UNESCO Institute for Statistics. (2015). *ISCED 2011 Operational Manual: Guidelines for classifying national education programmes and related qualifications*. OECD Publishing. <https://doi.org/10.1787/9789264228368-en>

- Paat, Y.-F. (2013). Working with immigrant children and their families: An application of Bronfenbrenner's ecological systems theory. *Journal of Human Behavior in the Social Environment*, 23(8), 954–966. <https://doi.org/10.1080/10911359.2013.800007>
- Paulus, L., Spinath, F. M., & Hahn, E. (2021). How do educational inequalities develop? The role of socioeconomic status, cognitive ability, home environment, and self-efficacy along the educational path. *Intelligence*, 86, Article 101528. <https://doi.org/10.1016/j.intell.2021.101528>
- Peng, P., Wang, T., Wang, C., & Lin, X. (2019). A meta-analysis on the relation between fluid intelligence and reading/mathematics: Effects of tasks, age, and social economics status. *Psychological Bulletin*, 145(2), 189–236. <https://doi.org/10.1037/bul0000182>
- Persici, V., Majorano, M., Bastianello, T., & Hoff, E. (2022). Vocabulary and reading speed in the majority language are affected by maternal language proficiency and language exposure at home: A study of language minority bilingual children in Italy. *International Journal of Bilingual Education and Bilingualism*, 25(10), 3729–3744. <https://doi.org/10.1080/13670050.2022.2076552>
- Phinney, J. S., Berry, J. W., Vedder, P., & Liebkind, K. (2023). The acculturation experience: Attitudes, identities, and behaviors of immigrant youth. In J. W. Berry, J. S. Phinney, D. L. Sam, & P. Vedder (Eds.), *Immigrant youth in cultural transition: Acculturation, identity, and adaptation across national contexts* (1st ed., pp. 71–118). Routledge. <https://doi.org/10.4324/9781003309192>
- Pianta, R. C., & Hamre, B. K. (2009). Conceptualization, measurement, and improvement of classroom processes: Standardized observation can leverage capacity. *Educational Researcher*, 38(2), 109–119. <https://doi.org/10.3102/0013189X09332374>
- Pohlmann-Rother, S. (2010). Die Herausbildung der Übergangsempfehlung am Ende der Grundschulzeit [The emergence of the track recommendation at the end of primary school]. *Zeitschrift für Grundschulforschung*, 3, 136–148.
- Praetorius, A.-K., & Charalambous, C. Y. (2018). Classroom observation frameworks for studying instructional quality: Looking back and looking forward. *ZDM Mathematics Education*, 50(3), 535–553. <https://doi.org/10.1007/s11858-018-0946-0>
- Praetorius, A.-K., Klieme, E., Herbert, B., & Pinger, P. (2018). Generic dimensions of teaching quality: The German framework of Three Basic Dimensions. *ZDM Mathematics Education*, 50(3), 407–426. <https://doi.org/10.1007/s11858-018-0918-4>
- Prevo, M. J. L., Malda, M., Mesman, J., Emmen, R. A. G., Yeniad, N., van IJzendoorn, M. H., & Linting, M. (2014). Predicting ethnic minority children's vocabulary from socioeconomic status, maternal language and home reading input: Different pathways for host and ethnic language. *Journal of Child Language*, 41(5), 963–984. <https://doi.org/10.1017/S0305000913000299>
- Proctor, C. L., Linley, P. A., & Maltby, J. (2009). Youth Life Satisfaction: A Review of the Literature. *Journal of Happiness Studies*, 10(5), 583–630. <https://doi.org/10.1007/s10902-008-9110-9>
- Putwain, D. W., Symes, W., Nicholson, L. J., & Becker, S. (2018). Achievement goals, behavioural engagement, and mathematics achievement: A mediational analysis. *Learning and Individual Differences*, 68, 12–19. <https://doi.org/10.1016/j.lindif.2018.09.006>

- Qian, D. D., & Lin, L. H. F. (2019). The relationship between vocabulary knowledge and language proficiency. In S. Webb (Ed.), *The Routledge Handbook of Vocabulary Studies* (pp. 66–80). Routledge.
- Radl, J., Salazar, L., & Cebolla-Boado, H. (2017). Does living in a fatherless household compromise educational success? A comparative study of cognitive and non-cognitive skills. *European Journal of Population*, 33(2), 217–242. <https://doi.org/10.1007/s10680-017-9414-8>
- Ramazan, O., Dai, S., Danielson, R. W., Ardasheva, Y., Hao, T., & Austin, B. W. (2023). Students' 2018 PISA reading self-concept: Identifying predictors and examining model generalizability for emergent bilinguals. *Journal of School Psychology*, 101, Article 101254. <https://doi.org/10.1016/j.jsp.2023.101254>
- Ramazan, O., Danielson, R. W., Rougee, A., Ardasheva, Y., & Austin, B. W. (2023). Effects of classroom and school climate on language minority students' PISA mathematics self-concept and achievement scores. *Large-Scale Assessments in Education*, 11(1), Article 11. <https://doi.org/10.1186/s40536-023-00156-w>
- Raudenská, P., & Hamplová, D. (2022). The effect of parents' education and income on children's school performance: The mediating role of the family environment and children's characteristics, and gender differences. *Polish Sociological Review*, 2(218), 247–271. <https://doi.org/10.26412/psr218.06>
- Ravens-Sieberer, U., Kaman, A., Erhart, M., Devine, J., Schlack, R., & Otto, C. (2022). Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. *European Child & Adolescent Psychiatry*, 31(6), 879–889. <https://doi.org/10.1007/s00787-021-01726-5>
- Rjosk, C. (2022). Dispersion of student achievement and classroom composition. In T. Nilsen, A. Stancel-Piątak, & J.-E. Gustafsson (Eds.), *International handbook of comparative large-scale studies in education* (pp. 1399–1431). Springer International Publishing. [https://doi.org/10.1007/978-3-030-88178-8\\_47](https://doi.org/10.1007/978-3-030-88178-8_47)
- Rjosk, C., Richter, D., Hochweber, J., Lüdtke, O., Klieme, E., & Stanat, P. (2014). Socioeconomic and language minority classroom composition and individual reading achievement: The mediating role of instructional quality. *Learning and Instruction*, 32, 63–72. <https://doi.org/10.1016/j.learninstruc.2014.01.007>
- Rjosk, C., Richter, D., Hochweber, J., Lüdtke, O., & Stanat, P. (2015). Classroom composition and language minority students' motivation in language lessons. *Journal of Educational Psychology*, 107(4), 1171–1185. <https://doi.org/10.1037/edu0000035>
- Rjosk, C., Richter, D., Lüdtke, O., & Eccles, J. S. (2017). Ethnic composition and heterogeneity in the classroom: Their measurement and relationship with student outcomes. *Journal of Educational Psychology*, 109(8), 1188–1204. <https://doi.org/10.1037/edu0000185>
- Rogiers, A., van Keer, H., & Merchie, E. (2020). The profile of the skilled reader: An investigation into the role of reading enjoyment and student characteristics. *International Journal of Educational Research*, 99, Article 101512. <https://doi.org/10.1016/j.ijer.2019.101512>

- Rohlfs, C. (2011). *Bildungseinstellungen: Schule und formale Bildung aus der Perspektive von Schülerinnen und Schülern* [Educational attitudes: School and formal education from students' perspective]. VS Verlag für Sozialwissenschaften. <https://doi.org/10.1007/978-3-531-92811-1>
- Rosa, E. M., & Tudge, J. (2013). Urie Bronfenbrenner's Theory of Human Development: Its evolution from ecology to bioecology. *Journal of Family Theory & Review*, 5(4), 243–258. <https://doi.org/10.1111/jftr.12022>
- Rousoulioti, T., Tzagari, D., & Giannikas, C. N. (2022). Parents' new role and needs during the COVID-19 educational emergency. *Interchange*, 53(3–4), 429–455. <https://doi.org/10.1007/s10780-022-09464-6>
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54–67. <https://doi.org/10.1006/ceps.1999.1020>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a Self-Determination Theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, Article 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Ryan, R. M., Deci, E. L., Vansteenkiste, M., & Soenens, B. (2021). Building a science of motivated persons: Self-determination theory's empirical approach to human experience and the regulation of behavior. *Motivation Science*, 7(2), 97–110. <https://doi.org/10.1037/mot0000194>
- Ryan, R. M., Duineveld, J. J., Domenico, S. I. D., Ryan, W. S., Steward, B. A., & Bradshaw, E. L. (2022). We know this much is (meta-analytically) true: A meta-review of meta-analytic findings evaluating Self-Determination Theory. *Psychological Bulletin*, 148(11–12), 813–842. <https://doi.org/10.1037/bul0000385>
- Sachse, K. A., Jindra, C., Schumann, K., & Schipolowski, S. (2022). Soziale Disparitäten [Social disparities]. In P. Stanat, S. Schipolowski, R. Schneider, K. A. Sachse, S. Weirich, & S. Henschel (Eds.), *IQB-Bildungstrend 2021: Kompetenzen in den Fächern Deutsch und Mathematik am Ende der 4. Jahrgangsstufe im dritten Ländervergleich* (pp. 151–180). Waxmann. <https://doi.org/10.31244/9783830996064>
- Salikutluk, Z. (2016). Why do immigrant students aim high? Explaining the aspiration–achievement paradox of immigrants in Germany. *European Sociological Review*, 32(5), 581–592. <https://doi.org/10.1093/esr/jcw004>
- Sam, D. L., Vedder, P., Liebkind, K., Neto, F., & Virta, E. (2008). Immigration, acculturation and the paradox of adaptation in Europe. *European Journal of Developmental Psychology*, 5(2), 138–158. <https://doi.org/10.1080/17405620701563348>
- Sam, D. L., Vedder, P., Ward, C., & Horenczyk, G. (2022). Psychological and sociocultural adaptation of immigrant youth. In J. W. Berry, J. S. Phinney, D. L. Sam, & P. Vedder (Eds.), *Immigrant youth in cultural transition* (pp. 119–143). Routledge. <https://doi.org/10.4324/9781003309192-5>
- Schachner, M. K., Schwarzenthal, M., van de Vijver, F. J. R., & Noack, P. (2019). How all students can belong and achieve: Effects of the cultural diversity climate amongst students of immigrant and nonimmigrant background in Germany. *Journal of Educational Psychology*, 111(4), 703–716. <https://doi.org/10.1037/edu0000303>

- Scharenberg, K. (2016). The interplay of social and ethnic classroom composition, tracking, and gender on students' school satisfaction. *Journal of Cognitive Education and Psychology, 15*(2), 320–346. <https://doi.org/10.1891/1945-8959.15.2.320>
- Scheerens, J. (2016). *Educational effectiveness and ineffectiveness: A critical review of the knowledge base*. Springer. <https://doi.org/10.1007/978-94-017-7459-8>
- Schepens, J., van der Slik, F., & van Hout, R. (2013). The effect of linguistic distance across Indo-European mother tongues on learning Dutch as a second language. In L. Borin & A. Saxena (Eds.), *Approaches to measuring linguistic differences* (pp. 199–229). De Gruyter Mouton.
- Schiepe-Tiska, A., Heine, J.-H., Lüdtke, O., Seidel, T., & Prenzel, M. (2016). Mehrdimensionale Bildungsziele im Mathematikunterricht und ihr Zusammenhang mit den Basisdimensionen der Unterrichtsqualität [Multi-dimensional educational goals in mathematics classrooms and their relationship with instructional quality]. *Unterrichtswissenschaft, 44*(3), 211–225.
- Schimmack, U. (2008). The structure of subjective well-being. In M. Eid & R. J. Larsen (Eds.), *The science of subjective well-being* (pp. 97–123). The Guilford Press.
- Schindler, S., & Bittmann, F. (2023). Alternative routes to higher education eligibility: Inclusion, diversion and social inequality on the way to higher education. In S. Weinert, G. J. Blossfeld, & H.-P. Blossfeld (Eds.), *Education, Competence Development and Career Trajectories* (pp. 205–223). Springer International Publishing. [https://doi.org/10.1007/978-3-031-27007-9\\_9](https://doi.org/10.1007/978-3-031-27007-9_9)
- Schnell, J., Saxer, K., Mori, J., & Hascher, T. (2025). On the longitudinal relationship between Swiss secondary students' well-being, school engagement, and academic achievement: A three-wave random intercept cross-lagged panel analysis. *Education Sciences, 15*(3), 383. <https://doi.org/10.3390/educsci15030383>
- Schöber, C., Retelsdorf, J., & Köller, O. (2015). Verbales schulisches Selbstkonzept und sprachliche Leistungen in Gruppen mit und ohne Migrationshintergrund [Verbal academic self-concept and achievement in groups with and without migration background]. *Psychologie in Erziehung Und Unterricht, 62*(2), 89–105. <https://doi.org/10.2378/peu2015.art10d>
- Schoenfeld, A. H. (2013). Classroom observations in theory and practice. *ZDM Mathematics Education, 45*(4), 607–621. <https://doi.org/10.1007/s11858-012-0483-1>
- Schoenfeld, A. H. (2018). Video analyses for research and professional development: The Teaching for Robust Understanding (TRU) framework. *ZDM Mathematics Education, 50*(3), 491–506. <https://doi.org/10.1007/s11858-017-0908-y>
- Schulgesetz für das Land Nordrhein-Westfalen. (2022). <https://bass.schule.nrw/6043.htm>
- Schulorganisationsgesetz Österreich. (1962). [https://www.ris.bka.gv.at/Dokumente/BgblPdf/1962\\_242\\_0/1962\\_242\\_0.pdf](https://www.ris.bka.gv.at/Dokumente/BgblPdf/1962_242_0/1962_242_0.pdf)
- Schwab, K., Moseley, B., & Dustin, D. (2018). Grading grades as a measure of student learning. *SCHOLE: A Journal of Leisure Studies and Recreation Education, 33*(2), 87–95. <https://doi.org/10.1080/1937156X.2018.1513276>
- Schwerter, J., Stang-Rabrig, J., Kleinkorres, R., Bleher, J., Doeblner, P., & McElvany, N. (2024). Importance of students' social resources for their academic achievement and well-being in elementary school. *European Journal of Psychology of Education, 39*(4), 4515–4552. <https://doi.org/10.1007/s10212-024-00877-8>

- Segerer, R., Niklas, F., Suggate, S., & Schneider, W. (2021). Young minority home-language students' biased reading self-concept and its consequences for reading development. *Reading Research Quarterly*, 56(1), 71–94. <https://doi.org/10.1002/rrq.300>
- Seidel, T. (2014). Angebots-Nutzungs-Modelle in der Unterrichtspsychologie. Integration von Struktur- und Prozessparadigma [Supply-use-models in instructional psychology: Integrating the structure- and process-paradigm]. *Zeitschrift für Pädagogik*, 60(6), 850–866. <https://doi.org/10.25656/01:14686>
- Selvitopu, A., & Kaya, M. (2023). A meta-analytic review of the effect of socioeconomic status on academic performance. *Journal of Education*, 203(4), 768–780. <https://doi.org/10.1177/00220574211031978>
- Senden, B., Nilsen, T., & Blömeke, S. (2022). Instructional quality: A review of conceptualizations, measurement approaches, and research findings. In M. Blikstad-Balas, K. Klette, & M. Tengberg (Eds.), *Ways of analyzing teaching quality: Potentials and pitfalls* (pp. 140–172). Scandinavian University Press. <https://doi.org/10.18261/9788215045054-2021-05>
- Seuring, J., Rjosk, C., & Stanat, P. (2020). Ethnic classroom composition and minority language use among classmates: Do peers matter for students' language achievement? *European Sociological Review*, 36(6), 920–936. <https://doi.org/10.1093/esr/jcaa022>
- Shukla, S., Smith, R. J., Burik, A., Browne, D. T., & Kil, H. (2025). When and how do parent-child acculturation gaps matter? A systematic review and recommendations for research and practice. *Clinical Psychology Review*, 117, Article 102568. <https://doi.org/10.1016/j.cpr.2025.102568>
- Silinskas, G., & Kikas, E. (2019). Parental involvement in math homework: Links to children's performance and motivation. *Scandinavian Journal of Educational Research*, 63(1), 17–37. <https://doi.org/10.1080/00313831.2017.1324901>
- Sirin, S. R., Ryce, P., Gupta, T., & Rogers-Sirin, L. (2013). The role of acculturative stress on mental health symptoms for immigrant adolescents: A longitudinal investigation. *Developmental Psychology*, 49(4), 736–748. <https://doi.org/10.1037/a0028398>
- Skopek, J., & Passaretta, G. (2021). Socioeconomic inequality in children's achievement from infancy to adolescence: The case of Germany. *Social Forces*, 100(1), 86–112. <https://doi.org/10.1093/sf/soaa093>
- Sneyers, E., Vanhoof, J., & Mahieu, P. (2018). Primary teachers' perceptions that impact upon track recommendations regarding pupils' enrolment in secondary education: A path analysis. *Social Psychology of Education*, 21, 1153–1173. <https://doi.org/10.1007/s11218-018-9458-6>
- Spolsky, B. (1989). *Conditions for second language learning: Introduction to a general theory*. Oxford University Press.
- Stahns, R., Rieser, S., & Hußmann, A. (2020). Können Viertklässlerinnen und Viertklässer Unterrichtsqualität valide einschätzen? Ergebnisse zum Fach Deutsch [Are fourth grade students able to rate instructional quality validly? Results from German Language classes]. *Unterrichtswissenschaft*, 48(4), 663–682. <https://doi.org/10.1007/s42010-020-00084-6>
- Stang-Rabrig, J., Vogel, S. N. T., Forciniti, M., & McElvany, N. (2024). Students' school success in challenging times: Importance of central personal and social resources during the COVID-19

- pandemic. *European Journal of Psychology of Education*, 39(2), 1261–1281. <https://doi.org/10.1007/s10212-023-00739-9>
- Statista. (2024). *Anzahl der Schulen ohne Präsenzbetrieb und mit eingeschränktem Präsenzbetrieb bedingt durch die Corona-Pandemie von der 8. Kalenderwoche 2021 bis zur 15. Kalenderwoche 2022* [Number of schools without in-person instruction and with limited in-person instruction due to the COVID-pandemic in the 8th calendar week 2021 to the 15th calendar week 2022]. <https://de.statista.com/statistik/daten/studie/1237878/umfrage/corona-schulschliessungen-geschlossene-und-teilgeschlossene-schulen/>
- Statistisches Bundesamt. (2024). *Mikrozensus – Bevölkerung nach Einwanderungsgeschichte: Erstergebnisse 2023* (EVAS No. 12211) [Microcensus – Population by history of immigration: First results 2023]. Statistisches Bundesamt. [https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Migration-Integration/Publikationen/Downloads-Migration/statistischer-bericht-einwanderungsgeschichte-erst-5122126237005.xlsx?\\_\\_blob=publicationFile&v=5](https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Migration-Integration/Publikationen/Downloads-Migration/statistischer-bericht-einwanderungsgeschichte-erst-5122126237005.xlsx?__blob=publicationFile&v=5)
- Stubbe, T. C., Kleinkorres, R., Krieg, M., Schaufelberger, R., & Schlitter, T. (2023). Soziale und migrationsbedingte Disparitäten in der Lesekompetenz von Viertklässlerinnen und Viertklässlern [Social and migration-related disparities in the reading competence of fourth-graders]. In N. McElvany, R. Lorenz, A. Frey, F. Goldhammer, A. Schilcher, & T. C. Stubbe (Eds.), *IGLU 2021: Lesekompetenz von Grundschulkindern im internationalen Vergleich und im Trend über 20 Jahre* (pp. 151–177). Waxmann. <https://doi.org/10.31244/9783830997009>
- Suárez, N., Regueiro, B., Estévez, I., del Mar Ferradás, M., Guisande, M. A., & Rodríguez, S. (2019). Individual precursors of student homework behavioral engagement: The role of intrinsic motivation, perceived homework utility and homework attitude. *Frontiers in Psychology*, 10, Article 941. <https://doi.org/10.3389/fpsyg.2019.00941>
- Suárez-Orozco, C., Abo-Zena, M. M., & Marks, A. K. (2015). Contexts of development: An ecological framework. In C. Suárez-Orozco, M. M. Abo-Zena, & A. K. Marks (Eds.), *Transitions: The development of children of immigrants*. New York University Press. <https://doi.org/10.18574/nyu/9780814770948.003.0006>
- Suárez-Orozco, C., Motti-Stefanidi, F., Marks, A., & Katsiaficas, D. (2018). An integrative risk and resilience model for understanding the adaptation of immigrant-origin children and youth. *American Psychologist*, 73(6), 781–796. <https://doi.org/10.1037/amp0000265>
- Tan, C. Y. (2019). Involvement practices, socioeconomic status, and student science achievement: Insights from a typology of home and school involvement patterns. *American Educational Research Journal*, 56(3), 899–924. <https://doi.org/10.3102/0002831218807146>
- Tan, C. Y., Lyu, M., & Peng, B. (2020). Academic benefits from parental involvement are stratified by parental socioeconomic status: A meta-analysis. *Parenting*, 20(4), 241–287. <https://doi.org/10.1080/15295192.2019.1694836>
- Tang, Y. (2019). Immigration status and adolescent life satisfaction: An international comparative analysis based on PISA 2015. *Journal of Happiness Studies*, 20(5), 1499–1518. <https://doi.org/10.1007/s10902-018-0010-3>

- Taylor, G., Jungert, T., Mageau, G. A., Schattke, K., Dedic, H., Rosenfield, S., & Koestner, R. (2014). A self-determination theory approach to predicting school achievement over time: The unique role of intrinsic motivation. *Contemporary Educational Psychology, 39*(4), 342–358. <https://doi.org/10.1016/j.cedpsych.2014.08.002>
- te Lindert, A., Korzilius, H. P. L. M., Stupar-Rutenfrans, S., & Van de Vijver, F. J. R. (2022). The role of perceived discrimination, intergroup contact and adoption in acculturation among four Dutch immigrant groups. *International Journal of Intercultural Relations, 91*, 297–310. <https://doi.org/10.1016/j.ijintrel.2021.02.005>
- Televantou, I., Marsh, H. W., Dicke, T., & Nicolaidis, C. (2021). Phantom and big-fish-little-pond-effects on academic self-concept and academic achievement: Evidence from English early primary schools. *Learning and Instruction, 71*, Article 101399. <https://doi.org/10.1016/j.learninstruc.2020.101399>
- Teltemann, J., Brinkmann, M., Huth-Stöckle, N., & Schunck, R. (2022). Immigrant achievement and language use across countries: The role of family background and education systems. In K. Kersten & A. Winsler (Eds.), *Understanding variability in second language acquisition, bilingualism, and cognition* (pp. 185–216). Routledge. <https://doi.org/10.4324/9781003155683-8>
- Telzer, E. H. (2010). Expanding the Acculturation Gap-Distress Model: An integrative review of research. *Human Development, 53*(6), 313–340. <https://doi.org/10.1159/000322476>
- Thorell, L. B., Skoglund, C., De La Peña, A. G., Baeyens, D., Fuermaier, A. B. M., Groom, M. J., Mammarella, I. C., Van Der Oord, S., Van Den Hoofdakker, B. J., Luman, M., De Miranda, D. M., Siu, A. F. Y., Steinmayr, R., Idrees, I., Soares, L. S., Sörlin, M., Luque, J. L., Moscardino, U. M., Roch, M., ... Christiansen, H. (2022). Parental experiences of homeschooling during the COVID-19 pandemic: Differences between seven European countries and between children with and without mental health conditions. *European Child & Adolescent Psychiatry, 31*(4), 649–661. <https://doi.org/10.1007/s00787-020-01706-1>
- Thrupp, M., Lauder, H., & Robinson, T. (2002). School composition and peer effects. *International Journal of Educational Research, 37*(5), 483–504. [https://doi.org/10.1016/S0883-0355\(03\)00016-8](https://doi.org/10.1016/S0883-0355(03)00016-8)
- Timmermans, A. C., de Boer, H., Amsing, H. T. A., & van der Werf, M. P. C. (2018). Track recommendation bias: Gender, migration background and SES bias over a 20-year period in the Dutch context. *British Educational Research Journal, 44*(5), 847–874. <https://doi.org/10.1002/berj.3470>
- Toropova, A., Johansson, S., & Myrberg, E. (2019). The role of teacher characteristics for student achievement in mathematics and student perceptions of instructional quality. *Education Inquiry, 10*(4), 275–299. <https://doi.org/10.1080/20004508.2019.1591844>
- Traini, C., Kleinert, C., & Schindler, S. (2021). Does tracking really affect labour-market outcomes in the long run? Estimating the long-term effects of secondary-school tracking in West Germany. *Longitudinal and Life Course Studies, 12*(3), 389–422. <https://doi.org/10.1332/175795920X16062248132253>

- Trautwein, U., & Baeriswyl, F. (2007). Wenn leistungsstarke Klassenkameraden ein Nachteil sind: Referenzgruppeneffekte bei Übertrittsentscheidungen [When high-achieving classmates put students at a disadvantage: Reference group effects at the transition to secondary schooling]. *Zeitschrift Für Pädagogische Psychologie*, *21*(2), 119–133. <https://doi.org/10.1024/1010-0652.21.2.119>
- Treviño, E., Miranda, C., Hernández, M., & Villalobos, C. (2021). Socioeconomic status, parental involvement and implications for subjective well-being during the global pandemic of COVID-19. *Frontiers in Education*, *6*, Article 762780. <https://doi.org/10.3389/educ.2021.762780>
- Triventi, M., Vlach, E., & Pini, E. (2022). Understanding why immigrant children underperform: Evidence from Italian compulsory education. *Journal of Ethnic and Migration Studies*, *48*(10), 2324–2346. <https://doi.org/10.1080/1369183X.2021.1935656>
- Tsai, K. M., Park, H., Liu, L. L., & Lau, A. S. (2012). Distinct pathways from parental cultural orientation to young children's bilingual development. *Journal of Applied Developmental Psychology*, *33*(5), 219–226. <https://doi.org/10.1016/j.appdev.2012.07.002>
- Uchihara, T., & Clenton, J. (2020). Investigating the role of vocabulary size in second language speaking ability. *Language Teaching Research*, *24*(4), 540–556. <https://doi.org/10.1177/1362168818799371>
- United Nations Educational, Scientific and Cultural Organization. (2022). *Education: From disruption to recovery*. <https://webarchive.unesco.org/web/20220629024039/https://en.unesco.org/covid19/educationresponse/>
- van der Kleij, S. W., Burgess, A. P., Ricketts, J., & Shapiro, L. R. (2023). Tracking vocabulary and reading growth in children from lower and higher socioeconomic backgrounds during the transition from primary to secondary education. *Child Development*, *94*(1), e57–e66. <https://doi.org/10.1111/cdev.13862>
- van Ewijk, R., & Sleegers, P. (2010a). The effect of peer socioeconomic status on student achievement: A meta-analysis. *Educational Research Review*, *5*(2), 134–150. <https://doi.org/10.1016/j.edurev.2010.02.001>
- van Ewijk, R., & Sleegers, P. (2010b). Peer ethnicity and achievement: A meta-analysis into the compositional effect. *School Effectiveness and School Improvement*, *21*(3), 237–265. <https://doi.org/10.1080/09243451003612671>
- van Leest, A., Hornstra, L., van Tartwijk, J., & van de Pol, J. (2024). Teachers taking perceptions of student attributes into consideration when formulating track recommendations? *British Educational Research Journal*, *50*(3), 1127–1171. <https://doi.org/10.1002/berj.3957>
- van Vemde, L., Thijs, J., & Hornstra, L. (2023). The classroom social environment in mixed secondary school classes: The role of ethnic classroom composition and classmates' explicitly and implicitly measured ethnic attitudes. *Social Psychology of Education*, *26*(2), 333–366. <https://doi.org/10.1007/s11218-022-09747-x>
- VanPatten, B., & Benati, A. G. (2015). *Key terms in second language acquisition*. Bloomsbury Academic. <https://doi.org/10.5040/9781474227544>

- Vedder, P., & Motti-Stefanidi, F. (2016). Children, families and schools. In D. L. Sam & J. W. Berry (Eds.), *The Cambridge Handbook of Acculturation Psychology* (2nd ed., pp. 464–482). Cambridge University Press. <https://doi.org/10.1017/CBO9781316219218.027>
- Vieluf, S., Praetorius, A.-K., Rakoczy, K., Kleinknecht, M., & Pietsch, M. (2020). Angebots-Nutzungs-Modelle der Wirkweise des Unterrichts: Ein kritischer Vergleich verschiedener Modellvarianten [Supply-use models of instructional mechanisms: A critical comparison of different model variants]. *Zeitschrift für Pädagogik, Beiheft 66*, 63–80. <https://doi.org/10.25656/01:25864>
- Volodina, A., Heppt, B., & Weinert, S. (2021). Effects of socioeconomic status and language use on academic language proficiency in children with a migration background: An evaluation using quantile regressions. *Contemporary Educational Psychology*, 65, Article 101973. <https://doi.org/10.1016/j.cedpsych.2021.101973>
- Volodina, A., Weinert, S., & Mursin, K. (2020). Development of academic vocabulary across primary school age: Differential growth and influential factors for German monolinguals and language minority learners. *Developmental Psychology*, 56(5), 922–936. <https://doi.org/10.1037/dev0000910>
- von Stumm, S., Rimfeld, K., Dale, P. S., & Plomin, R. (2020). Preschool verbal and nonverbal ability mediate the association between socioeconomic status and school performance. *Child Development*, 91(3), 705–714. <https://doi.org/10.1111/cdev.13364>
- Wagner, W., Helmke, A., & Schrader, F.-W. (2009). Die Rekonstruktion der Übergangsempfehlung für die Sekundarstufe I und der Wahl des Bildungsgangs auf der Basis des Migrationsstatus, der sozialen Herkunft, der Schulleistung und schulklassenspezifischer Merkmale [Reconstruction of recommendations and choices at the transition to secondary education: Ethnic criteria, social background, achievement, and class composition]. *Zeitschrift für Erziehungswissenschaft, Sonderheft 12*, 183–204. [https://doi.org/10.1007/978-3-531-92216-4\\_8](https://doi.org/10.1007/978-3-531-92216-4_8)
- Walper, S., & Gniewosz, G. (2019). Der Übergang von der Grundschule in die weiterführende Schule: Potentiale von Schülerinnen und Schülern aus Zuwanderungsfamilien [The transition from primary to secondary school: students' potentials in migrant families]. *Zeitschrift Für Erziehungswissenschaft*, 22(Suppl 1), 15–45. <https://doi.org/10.1007/s11618-019-00891-3>
- Wang, C., La Salle, T. P., Do, K. A., Wu, C., & Sullivan, K. E. (2019). Does parental involvement matter for students' mental health in middle school? *School Psychology*, 34(2), 222–232. <https://doi.org/10.1037/spq0000300>
- Wang, M.-T., L. Degol, J., Amemiya, J., Parr, A., & Guo, J. (2020). Classroom climate and children's academic and psychological wellbeing: A systematic review and meta-analysis. *Developmental Review*, 57, Article 100912. <https://doi.org/10.1016/j.dr.2020.100912>
- Weidinger, A. F., Steinmayr, R., & Spinath, B. (2017). Math grades and intrinsic motivation in elementary school: A longitudinal investigation of their association. *British Journal of Educational Psychology*, 87(2), 187–204. <https://doi.org/10.1111/bjep.12143>
- Weis, M., Müller, K., Mang, J., Heine, J.-H., Mahler, N., & Reiss, K. (2019). Soziale Herkunft, Zuwanderungshintergrund und Lesekompetenz [Social background, history of immigration, and reading competence]. In K. Reiss, M. Weis, E. Klieme, & O. Köller (Eds.), *PISA 2018*:

- Grundbildung im internationalen Vergleich* (pp. 129–162). Waxmann Verlag GmbH. <https://doi.org/10.31244/9783830991007>
- Wenger, M., Gärtner, H., & Brunner, M. (2020). To what extent are characteristics of a school's student body, instructional quality, school quality, and school achievement interrelated? *School Effectiveness and School Improvement*, 31(4), 548–575. <https://doi.org/10.1080/09243453.2020.1754243>
- Werner, K., & Woessmann, L. (2023). The legacy of Covid-19 in education. *Economic Policy*, 38(115), 609–668. <https://doi.org/10.1093/epolic/eiad016>
- Westphal, A., Becker, M., Vock, M., Maaz, K., Neumann, M., & McElvany, N. (2016). The link between teacher-assigned grades and classroom socioeconomic composition: The role of classroom behavior, motivation, and teacher characteristics. *Contemporary Educational Psychology*, 46, 218–227. <https://doi.org/10.1016/j.cedpsych.2016.06.004>
- Widlund, A., Tuominen, H., Tapola, A., & Korhonen, J. (2020). Gendered pathways from academic performance, motivational beliefs, and school burnout to adolescents' educational and occupational aspirations. *Learning and Instruction*, 66, Article 101299. <https://doi.org/10.1016/j.learninstruc.2019.101299>
- Wigfield, A. (1994). Expectancy-value theory of achievement motivation: A developmental perspective. *Educational Psychology Review*, 6(1), 49–78. <https://doi.org/10.1007/BF02209024>
- Wigfield, A., Gladstone, J., & Turci, L. (2016). Beyond cognition: Reading motivation and reading comprehension. *Child Development Perspectives*, 10(3), 190–195. <https://doi.org/10.1111/cdep.12184>
- Wilder, S. (2014). Effects of parental involvement on academic achievement: A meta-synthesis. *Educational Review*, 66(3), 377–397. <https://doi.org/10.1080/00131911.2013.780009>
- Wirth, A., Stadler, M., Birtwistle, E., & Niklas, F. (2023). New directions in the conceptualization and operationalization of the home learning environment. *Journal of Educational Psychology*, 115(1), 160–172. <https://doi.org/10.1037/edu0000749>
- Workman, J. (2022). Inequality begets inequality: Income inequality and socioeconomic achievement gradients across the United States. *Social Science Research*, 107, Article 102744. <https://doi.org/10.1016/j.ssresearch.2022.102744>
- Wundrack, R., Asselmann, E., & Specht, J. (2021). Personality development in disruptive times: The impact of personal versus collective life events. *Social and Personality Psychology Compass*, 15(9), Article e12635. <https://doi.org/10.1111/spc3.12635>
- Yang Hansen, K., Radišić, J., Ding, Y., & Liu, X. (2022). Contextual effects on students' achievement and academic self-concept in the Nordic and Chinese educational systems. *Large-Scale Assessments in Education*, 10(1), Article 16. <https://doi.org/10.1186/s40536-022-00133-9>
- Yang, Y., Sun, Y., Chang, P., & Li, Y. (2019). Exploring the relationship between language aptitude, vocabulary size, and EFL graduate students' L2 writing performance. *TESOL Quarterly*, 53(3), 845–856. <https://doi.org/10.1002/tesq.510>
- Yi, H. S., & Lee, Y. (2017). A latent profile analysis and structural equation modeling of the instructional quality of mathematics classrooms based on the PISA 2012 results of Korea and Singapore. *Asia Pacific Education Review*, 18(1), 23–39. <https://doi.org/10.1007/s12564-016-9455-4>

- York, T. T., Gibson, C., & Rankin, S. (2015). Defining and measuring academic success. *Practical Assessment, Research & Evaluation*, 20(5), 1–20. <https://doi.org/10.7275/HZ5X-TX03>
- Yulianti, K., Denessen, E., Droop, M., & Veerman, G.-J. (2022). School efforts to promote parental involvement: The contributions of school leaders and teachers. *Educational Studies*, 48(1), 98–113. <https://doi.org/10.1080/03055698.2020.1740978>
- Zhang, F., Jiang, Y., Huang, S., Ming, H., Ren, Y., & Wang, L. (2021). Family socioeconomic status, parental involvement, and academic achievement: The moderating role of adolescents' subjective social mobility. *The Journal of Early Adolescence*, 41(9), 1425–1454. <https://doi.org/10.1177/02724316211002254>

### **3. Contributions of the Cumulative Dissertation**

#### **3.1 Study I – The Importance of Parents for Key Outcomes Among Socio-Economically Disadvantaged Students: Parents’ Role in Emergency Remote Education**

Vogel, S. N. T., Stang-Rabrig, J., & McElvany, N. (2023). The importance of parents for key outcomes among socio-economically disadvantaged students: Parents’ role in emergency remote education. *Social Psychology of Education*, 26(6), 1565–1591. <https://doi.org/10.1007/s11218-023-09801-2>

This article is not a copy of the publication and may not exactly replicate the final, authoritative version of the article published in the journal.

### Abstract

Parents play an important role in shaping behavioral and motivational outcomes in their child's education, presumably even more so during the COVID-19 pandemic, where concomitant school closures forced students worldwide to learn remotely at home, affecting socio-economically disadvantaged students most negatively. However, it remains unclear how different parent-focused family process variables (demanding-structuring and responsive-motivational parental involvement, responsibility for learning) and structure variables (socio-economic status, immigrant background) relate to important learning-related student outcomes, namely extrinsic and intrinsic motivation and actual participation in learning activities, during emergency remote education. Using questionnaire data from  $N = 117$  German secondary school students ( $M_{age} = 15.14$ ,  $SD = 0.93$ ; 49.6% female) with a low average socio-economic status, structural equation models revealed associations between higher parental involvement and responsibility and higher motivational and behavioral student outcomes. Furthermore, immigrant background related negatively to some parent process variables, and indirectly negatively to extrinsic motivation. These results highlight parents' role in learning, particularly during emergency remote education.

**Keywords:** Emergency remote education; Intrinsic motivation; Learning participation; Parental support; Secondary school

## 1 Introduction

The worldwide spread of the Sars-CoV-2 virus in the first months of 2020 had a large impact on educational systems internationally. In late March 2020, over 80% of students worldwide were affected by school closures (UNESCO, 2020). With this sudden shift in students' educational environment from schools to the home, differences in students' family situations influenced students' experience of the home learning situation (e.g., Cullinane & Montacute 2020; Pensiero et al., 2020) and key variables for educational success, such as learning engagement (e.g., Lawrence & Fakuade 2021; Steinmayr et al., 2021).

During emergency remote education (ERE), students' experiences varied greatly. Studies revealed declines for all students on average in many areas, for example learning progress (e.g., Ludewig et al., 2022) and time spent on schoolwork (e.g., Grewenig et al., 2021) but especially disadvantaged students were negatively affected (e.g., Dietrich et al., 2021; Engzell et al., 2021). Overall, students spent significantly more learning time with their parents than with their teachers (Thorell et al., 2021), but levels of parental involvement (PI) differed, with disadvantaged and low-achieving students receiving less support from their parents (e.g., Bol, 2020; Werner & Woessmann, 2021). Theoretical models emphasize family process and structure variables' importance for learning- and achievement-related student variables (e.g., McElvany et al., 2009). Accordingly, previous research showed that family process variables like parents' educational support at home positively influence various student outcomes, such as achievement and academic motivation (e.g., Wilder, 2014; Shukla et al., 2015). Additionally, while the associations of parental involvement with facets of family background are complex, studies suggest a relation of home involvement specifically to family structure variables like socio-economic status (SES; e.g., Tan, 2019; Zhang et al., 2021). These associations might be even more relevant when education takes place in the homes, which requires students to motivate themselves or with help of their parents and pursue learning activities with less or no direct teacher support. Hence, parent and family variables' relation to student outcomes during home learning needs closer investigation. In this study, we specified a model based on the approach by McElvany et al. (2009) to examine how, in a sample of especially vulnerable students from primarily disadvantaged socio-economic backgrounds, family process variables, namely demanding-structuring and responsive-motivational PI, as well as parental perceived responsibility for learning, related to students' intrinsic and extrinsic motivation and

participation in learning activities during ERE. Additionally, we investigated whether family structure variables SES and immigrant background influenced those variables and relations.

## 2 Theory

### 2.1 Lockdown and emergency remote education

In reaction to the rapid spread of the SARS-CoV-2 virus, most countries around the world resorted to school closures, affecting more than 80% of enrolled learners worldwide in late March 2020 (UNESCO, 2020). This forced an unprecedented sudden shift from face-to-face instruction to alternative educational approaches on schools and students internationally, which Bozkurt et al. (2020) summarized under the term *emergency remote education*. Internationally, many schools stayed closed for the remaining school year (UNICEF, 2021) or, as was the case for Germany, implemented strict infection control measures upon reopening, leading to students attending in-person instruction on alternating days. Thus, ERE remained part of most secondary school students' educational experience for the rest of the 2019/2020 school year not only in Germany but also many other countries worldwide.

Examining parents' role during ERE, Thorell et al. (2021) found that students spent considerably more learning time with their parents than their teachers, highlighting the importance of adequate parental support. First studies regarding ERE in secondary school confirmed a positive relation between PI and student commitment (Lawrence & Fakuade, 2021), and parents reported being more involved and spending more time learning for school with their children than before the pandemic (Panaoura, 2021; Werner & Woessmann, 2021). However, research also revealed that some parents felt inadequately prepared to support their children (e.g., Andrew et al., 2020; Haller & Novita, 2021; S. J. Lee et al., 2021), with parents from lower socio-economic backgrounds being less confident overall (Cullinane & Montacute, 2020). Additionally, research on how different PI strategies influenced students' individual learning in ERE is virtually nonexistent. This shows a pressing need for empirical studies examining PI's role for students' motivational and behavioral outcomes during ERE, while simultaneously considering potential influences of family structure variables.

Turning now to the student perspective, considering how changes to students' learning environment wrought by ERE affected their schooling experiences is essential. Students' motivation played an integral role for learning processes in ERE (Baber, 2020; Chiu, 2022);

however, outside the classroom, students could rely less on teachers being the source for motivating them and more than 40% of German secondary school teachers sampled by Schneider et al. (2021) reported that motivating students worked (rather) badly. Additionally, over 60% of teachers in that sample indicated that ensuring equal participation of all students worked (rather) badly, which can only partially be explained by technical aspects and difficulties (Schneider et al., 2021). In line with pre-pandemic research highlighting the importance of students' motivation and self-regulation skills for successful participation in distance education (e.g., Kauffman, 2015), these findings imply that students bore more responsibility to partake in learning activities. Multiple studies focusing on the effect of pandemic-induced school closures on students have been conducted already (for a review, see Zancajo, 2021). First evidence from studies in England (Cattan et al., 2021) and Germany (Grewenig et al., 2021) showed that both primary and secondary school students spent less time doing schoolwork than before, especially students from marginalized and socio-economically disadvantaged families (Bayrakdar & Guveli, 2020; Dietrich et al., 2021). In turn, large-scale studies revealed significant education losses: In Germany, a comparison of fourth graders in 2021, one year after the outbreak of the pandemic, with students of the same grade in 2016 revealed significantly lower reading achievement even after controlling for changes in student composition and other variables, with the former group being estimated to be as much as four to six months of learning behind fourth graders in 2016 (Ludewig et al., 2022). For the initial period of school closures specifically, Engzell et al. (2021) found that Dutch students suffered education losses comparable to the length of school closures across math, spelling, and reading, with losses being even larger for disadvantaged students, implying that students made barely any learning progress during that time. These findings are also in line with results of first literature reviews (e.g., Hammerstein et al., 2021) and meta-analysis (König & Frey, 2022) on an international scale, although some of the studies included might be subject to systematic bias and should thus be interpreted carefully. A cross-national parent survey by Zaccoletti et al. (2020) showed significant motivation losses in primary and lower secondary school students during ERE. Motivation declines were likewise present in higher education students in the United States and Canada (Aguilera-Hermida, 2020; Daniels et al., 2021; Hicks et al., 2021), and Klapproth et al. (2020) found that approximately two-thirds of surveyed German teachers encountered low student motivation as a barrier during ERE.

Research focusing on English families (Andrew et al., 2020) and book checkouts in Danish public libraries (Jæger & Blaabæk, 2020) revealed that underprivileged students were provided with fewer educational resources at home and pre-pandemic studies imply similar patterns for the German context as well (Geis-Thöne, 2020). Additionally, studies from Germany (Werner & Woessmann, 2021), the Netherlands (Bol, 2020) and the United States (Gao et al., 2020) showed that especially low-achieving and disadvantaged students received lower levels of support from their parents during ERE.

## **2.2 Relations between family structure, family process, and individual student variables**

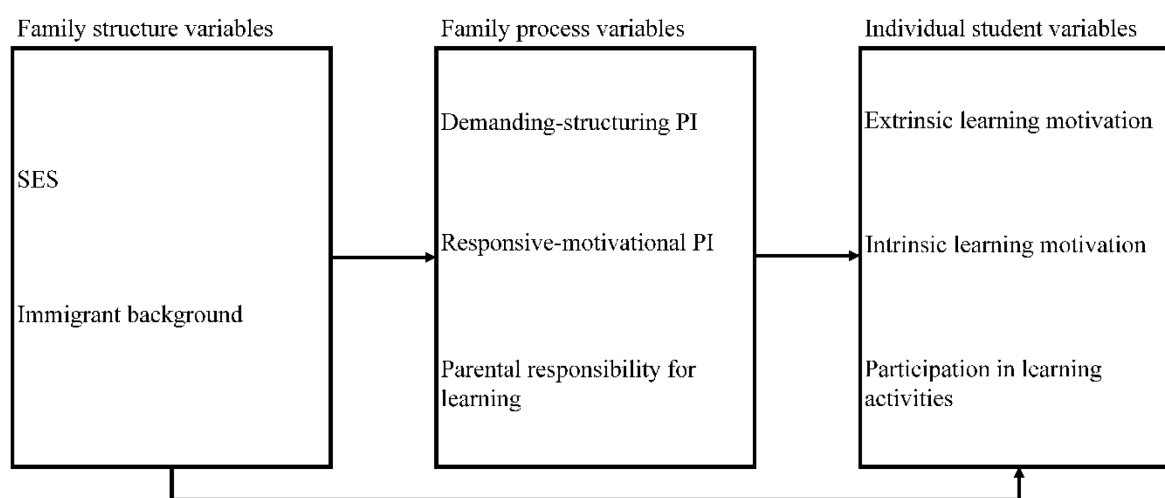
To examine how differences between families influenced students' ERE experience, we considered a theoretical model including *individual student variables* as well as *family structure variables* and *family process variables*. This model allows an investigation of the interrelations of all three groups of variables, while simultaneously maintaining an important distinction between them. Especially the separation of family structure and process variables is necessary to fully understand the underlying processes influencing student outcomes during ERE. On the one hand, family structure variables comprise information about the family's background, such as household size, SES or immigrant background (McElvany et al., 2009; Brown & Mann, 1990). They can influence both family process variables and individual student outcomes and thus need to be considered, but usually cannot be changed easily. Family process variables on the other hand include parents' beliefs, cultural and communicative practices (Baumert et al., 2003; Davis-Kean, 2005), reflecting aspects of the family's cultural and social capital (Bourdieu, 1986). They are also associated with students' individual outcomes, serving as partial mediators for the effects of family structure variables (e.g., Serbin et al., 2013; von Otter, 2014). In contrast to structure variables, parents have more direct control over the process variables. Thus, considering family process variables in ERE is important, especially for identifying factors that allow parents to influence their children's outcomes in a positive way.

This theoretical model has been applied in various educational settings (e.g., McElvany et al., 2009; Baumert et al., 2003; Davis-Kean, 2005) and is similarly applicable to the unique circumstances of ERE. A simplified depiction is provided in Fig. 1. Family structure variables

like SES and immigrant background can influence both family process and student variables and were consequently included in the analyses. Regarding process variables, we focused on parents' role, including measures of PI and responsibility. As student variables, we included variables we deemed especially relevant for the extraordinary situation of ERE.

**Figure 1**

*Simplified Model of Family Structure and Process Variables' Relations to Individual Student Variables*



*Note.* Figure adapted from McElvany et al. (2009). Indirect effects and intercorrelations are not depicted.

### 2.3 Important individual student variables for emergency remote education

Students' ERE experience had many facets, but learning motivation was especially important due to its role within self-regulated learning and strong association with educational outcomes (e.g., Eom, 2019; Kriegbaum et al., 2018; Lim & Yeo, 2021). We included two central dimensions of school-related learning motivation: *Extrinsic motivation* means pursuing activities to achieve some external outcome, while *intrinsic motivation* comprises doing activities for their own sake, out of enjoyment of the activity or the challenge it entails (Ryan & Deci, 2000). The associations between extrinsic motivation and other educational outcomes, like achievement and cognitive engagement, are ambiguous (e.g., Lepper et al., 2005; Taylor et al., 2014; Walker et al., 2006), potentially due to varying levels of internal control in different subtypes of extrinsic motivation (Ryan & Deci, 2020). Intrinsic motivation, in contrast, relates

consistently positively to educational outcomes, including academic achievement (Taylor et al., 2014), classroom engagement and setting challenging learning goals (Froiland & Worrell, 2016), and meaningful cognitive engagement (Walker et al., 2006). While not mutually exclusive (Litalien et al., 2017), direction and significance of intrinsic and extrinsic motivation's relation vary between studies (e.g., Lepper et al., 2005; Lemos & Veríssimo, 2014). To sum up, motivation is an important student outcome itself while also relating to other relevant learning variables. However, findings of reduced learning motivation (e.g., Aguielera-Hermida, 2020; Zaccoletti et al., 2020), as well as reports by students (Means & Neisler, 2021) and teachers (Klapproth et al., 2020) on lack of motivation as a core problem of ERE show the importance of studying students' motivation in this context.

Similarly important for ERE is students' *participation in learning activities* when learning at home, outside of their typical classroom environment. Learning activities are tasks that learners partake in to pursue intended learning outcomes in an educational setting (Conole, 2007). Previous studies found a positive association between active participation in school learning and academic achievement (Finn & Cox, 1992; Schnitzler et al., 2021). Moreover, research focused on online learning demonstrated positive relations between participation in learning activities and course and learning satisfaction (Cheng & Chau, 2016; Im & Kang, 2019). Therefore, students' frequency of participation in learning activities is an important variable for education both inside and outside the regular classroom setting. Due to the importance of these student variables and the unique home learning situation, investigating how family process variables, especially parental variables presumably central to fostering these student outcomes, affected them during ERE is crucial.

#### **2.4 Relevant family process variables**

Theory and empirical research point out that several central student variables are associated with certain family process variables (e.g., Dettmers et al., 2019; J. S. Lee & Bowen, 2006; see also home literacy environment research, e.g., Dong et al., 2020; Niklas & Schneider, 2013). Of all potentially influential family process variables, parents' role in their children's education seems especially important during ERE. Parents had to partially assume the teacher's role (Knopik et al., 2021; Thorell et al., 2021), leading to them assuming the role of a proxy educator (e.g., Davis et al., 2021), and while most parents reported home learning

support from schools (S. J. Lee et al., 2021) to a satisfying extent (Cullinane & Montacute, 2020; Garbe et al., 2020), many still struggled to adequately assist their children (Andrew et al., 2020).

One important aspect to consider is *parental involvement* in their children's ERE. Much interest in PI originated from the Coleman report, which highlighted the importance of family and parental influences for students' school success (Coleman et al., 1966; Jeynes, 2011), but the term still lacks a singular definition (Wilder, 2014). Reynolds (1992) captured this ambiguity by defining PI as "any interactions between a parent and child that may contribute to the child's development or to direct parent participation with a child's school in the interest of the child" (p. 442). This clearly depicts PI as an umbrella term for a multitude of parent behaviors, rather than a singular homogenous construct.

A relevant distinction is commonly made between involvement at home and at school (e.g., Kaplan Toren & Seginer 2015; Reynolds, 1992; Tan, 2019), with the former being especially important for ERE since opportunities for parental school involvement became severely restricted. Previous research showed positive associations between aspects of home involvement and several student outcomes, such as academic achievement (e.g., Y. Li et al., 2019; Wilder, 2014), motivational variables (e.g., Berti et al., 2016; Régner et al., 2009) and learning effort and time (e.g., Dumont et al., 2014; Matsuoka et al., 2015), although negative relations emerged with strongly interfering PI (e.g., Dumont et al., 2012; Gonida & Cortina, 2014). Few studies investigated PI in remote education specifically, but a research synthesis suggested a similarly important role in virtual distance education compared to on-site education in schools (Hasler Waters et al., 2014). Moreover, in Borup's (2016) qualitative research, teachers at a distance education high school identified monitoring performance, motivating the student and organizing learning schedules as the most important forms of parental engagement. However, these studies regarded schools where students voluntarily enrolled in virtual schooling, unlike ERE. Building on the home involvement model by Dumont et al. (2014) as well as findings by Borup (2016), we considered two factors to cover a broad range of different PI strategies. *Demanding-structuring parental involvement* comprises behaviors aimed at providing structure, setting rules and formulating clear expectations regarding the child's schoolwork. In contrast, *responsive-motivational parental involvement*

focuses on parents meeting their children's needs regarding ERE, emotionally supporting, and motivating them.

Another important family process variable is perceived *parental responsibility* for their child's learning during ERE, capturing how much responsibility for their child's learning success parents ascribe to themselves, as opposed to teachers or the students themselves. While research on the association between perceived responsibility and student outcomes is scarce, several studies have found a positive association with PI (e.g., Helker & Wosnitza, 2016; Park & Holloway, 2013). Helker and Wosnitza (2016) additionally found positive relations with students' relatedness, competence and autonomy, which are prerequisites for intrinsic motivation according to self-determination theory (Ryan & Deci, 2000), thus indicating that perceived responsibility affects student outcomes independently of its relation with PI. In ERE, where parents had to compensate for students' reduced teacher contacts (Knopik et al., 2021; Thorell et al., 2021), whether parents felt responsible for their child's learning was presumably of even greater importance and should therefore be considered as a relevant factor affecting students' ERE experience.

## **2.5 Relevant family structure variables**

When examining the relation between family process and individual student variables, it is also important to consider family structure variables that influence family process variables and, indirectly or directly, students' educational outcomes. One structure variable of interest is *socio-economic status*. Specifically, we examine parents' occupations, which not only captures information about the family's economic status but is also closely related to parents' level of education (e.g., Ganzeboom, 2010; J. Lee et al., 2019). Various international studies have shown more negative effects of ERE for socio-economically disadvantaged students at all school levels. During ERE, they spent comparatively less time learning (Dietrich et al., 2021; Bayrakdar & Guveli, 2020), received less support from schools (Cullinane & Montacute, 2020) and had less access to important resources (Gao et al., 2020) than their peers from less disadvantaged families, underlining the importance of investigating socio-economically disadvantaged students specifically.

Extant research on SES's relation to PI is ambiguous. Some studies showed no relations (e.g., Dumont et al., 2014; Yotyodying & Wild, 2014 for German sub-sample), or associations

of lower SES with more home PI (e.g., Park & Holloway, 2013; Sui-Chu & Willms, 1996). Most studies, however, found that higher SES related to more PI (e.g., Çoban, 2020; Tan, 2019; Zhang et al., 2021) as well as more supportive and less interfering involvement strategies (e.g., Cooper et al., 2000; X. Li et al., 2020). Qualitative research pointed out that parents from higher-SES backgrounds get more involved because they are more confident in their educational capabilities and see themselves as teachers' equals (e.g., Lareau, 1987). For ERE, Sari et al. (2021) found a positive association between SES and parents' self-rated ability to help their teenage children with schoolwork. This relation turned insignificant when parents' education was included as mediator, again demonstrating the close association of SES and parents' education. In summary, assuming a positive relation of SES and PI during ERE seems most plausible. Additionally, SES and parents' perceived educational responsibility appear to be unrelated (Curry & Adams, 2014), and qualitative research suggests that low-SES parents see a high responsibility for parents to be involved in their child's educational process (Drummond & Stipek, 2004). Regarding student outcomes, students from low-SES households spent less time on schoolwork during ERE (Dietrich et al., 2021) than students from high-SES households as measured by father's vocational degree, suggesting an overall lower participation in learning activities. Students from lower SES backgrounds also showed reduced levels of motivation in general (Kormos & Kiddle, 2013) and learning motivation in ERE specifically (Poulain et al., 2021).

A second family structure variable of interest is the family's *immigrant background*. Especially when divergent cultural or language backgrounds are given, immigrant students' achievement and psychosocial outcomes in school can be negatively affected (e.g., Marks, 2005; Motti-Stefanidi et al., 2015), depending on factors like cultural identity and orientation, stereotyping and experiences of ethnic discrimination (e.g., Baysu et al., 2011; Frankenberg et al., 2013; Wong et al., 2003). In contrast, both parental psychological engagement and behavioral involvement (Kim et al., 2020) as well as meaningful relationships in school (Suárez-Orozco et al., 2009) can be considered as protective factors countering the aforementioned negative effects. With the shift to remote education, and thus reduced contact to teachers and peers, relationships in school presumably became less relevant, while the importance of sufficient parental support, especially for immigrant students, rose. However, while far from a homogenous group, most immigrant parents face additional challenges

compared to native-born parents, such as language barriers, adjusting to a different culture and the loss of social capital accumulated in the country of origin (e.g., Antony-Newman, 2019). Additionally, immigrant parents often lack experience with the host country's educational system, hampering supporting their children regarding school. Accordingly, most previous research found immigrant background negatively related to aspects of PI like homework support (Dumont et al., 2012; Rønning, 2011). Qualitative studies suggest that cultural differences and language difficulties often cause differences in immigrant parents' PI, leading to more informal strategies of involvement and an impaired ability to help their children with homework directly when compared to their native-born counterparts for example (Pérez Carreón et al., 2005; Sainsbury & Renzaho, 2011), while schools' narrow criteria for judging PI uphold them (López et al., 2001). Therefore, disparities should arise for more formal, structural aspects of involvement. Parents' perceived responsibility for education, however, seems unrelated to immigrant background but instead dependent on parents' own level of experience with the school system (Kohl et al., 2014). With respect to student variables, Steinmayr et al. (2021) showed that immigrant background was not directly related to either students' motivation or participation in learning activities during ERE. However, the research presented earlier suggests a potential indirect negative association with student outcomes mediated by PI.

## **2.6 Research questions and hypotheses**

Important student outcomes like learning motivation and participation in learning activities, which in turn relate to other central facets of students' learning experience and are highly relevant for educational success, are influenced by parent variables, such as PI and perceived responsibility for the child's learning. However, it is unclear how the aforementioned constructs relate to each other under the special circumstances of ERE that became the norm for many students during the COVID-19 pandemic. Additionally, family structure variables need to be considered, and findings that socio-economically disadvantaged students were affected more negatively by ERE underline the importance of examining the aforementioned variables in this particular group. Based on theory and prior empirical findings, we formulated the following research questions and hypotheses:

Research Question 1) How are student outcome variables (extrinsic motivation, intrinsic motivation, participation in learning activities) during ERE related to parent-focused family process variables (demanding-structuring PI, responsive-motivational PI, parental responsibility for learning) in a sample of predominantly socio-economically disadvantaged high school students?

Hypothesis 1) All parent-focused family process variables are positively related to the individual student variables when considered simultaneously.

Research Question 2) What are the relations between parent-focused family process variables (demanding-structuring PI, responsive-motivational PI, parental responsibility for learning) and family structure variables (SES, immigrant background) during ERE in a predominantly socio-economically disadvantaged sample?

Hypothesis 2a) Family SES is positively related to both dimensions of PI, but not statistically significantly related to parental responsibility for learning.

Hypothesis 2b) The family's immigrant background is negatively related to demanding-structuring PI, but not statistically significantly related to responsive-motivational PI and parental responsibility for learning.

Research Question 3) How are the family structure variables (SES, immigrant background) associated with student outcome variables (extrinsic motivation, intrinsic motivation, participation in learning activities) during ERE, directly and indirectly, in a predominantly socio-economically disadvantaged sample?

Hypothesis 3a) Family SES is directly positively related to the student outcomes.

Hypothesis 3b) The family's immigrant background is not directly related to the student outcomes. There is an indirect negative association between immigrant background and the student variables via demanding-structuring PI.

## **3 Methods**

### **3.1 Participants and procedure**

A total of 126 students took part in the study, nine were excluded because of missing values on all outcome variables of interest. Thus, the final sample comprised 117 students from ninth (56 students), 10th (38 students), and 11th grades (23 students). The students' ages ranged from 14 to 18 years, with an average age of 15.14 years ( $SD = 0.93$ ), and 49.6% of the

sample was female (male: 47.0%, diverse: 3.4%). The study was conducted in August 2020 in six classes and, in the 11th grade, learning groups from one school in an urban area with below-average income in North Rhine- Westphalia, Germany. The school was a *Gesamtschule* (comprehensive school), one of several secondary school types students can visit after completing four years of elementary school. Compared with other secondary schools which usually comprise only one of three school tracks (vocational, intermediate, academic), this school type is characterized by the differentiation between school tracks within one school, meaning that students from different secondary school tracks are educated together most of the time (for a more in-depth overview, see for example Becker et al., 2016). Based on the language spoken at home (see 3.2 Measures), 40.2% of students had an immigrant background which is close to the average for comprehensive schools in North Rhine-Westphalia for that school year ( $M = 44.4\%$ ; Information und Technik Nordrhein-Westfalen, 2020). The sample's SES was measured using the *International Socio-Economic Index of Occupational Status* (Ganzeboom, 2010; see 3.2 Measures) and was relatively low ( $M = 38.5$ ,  $SD = 15.2$ ) compared to a representative sample of German comprehensive schools in 2015 ( $M = 46.6$ ; Autorengruppe Bildungsberichterstattung, 2018). All data were gathered in August 2020 using paper-and-pencil self-report student questionnaires to retrospectively assess the students' ERE experiences during the first school closure period due to COVID-19 during the preceding school year. A teacher was trained as test administrator beforehand and administered the questionnaires in the classroom during regular instructional time. Students were given 30 minutes to answer the questionnaire. Participation in the study was voluntary and students provided written consent before participation.

### 3.2 Measures

Descriptive information, reliabilities and example items for all measures can be found in Table 1. As individual student variables, we assessed *extrinsic learning motivation*, or students' motivation based on external incentives, with three items taken from the German version of the PIRLS 2001 survey (Bos et al., 2005) and adapted to assess the specific ERE situation. *Intrinsic learning motivation*, capturing students' joy when learning, was also measured with three items from the German version of the PIRLS 2001 survey (Bos et al., 2005) and adapted for ERE. A confirmatory factor analysis (CFA) supported the assumed two-dimensional factor

**Table 1***Descriptive Information, Reliabilities, and Example Items for Measures*

Measure	<i>n</i>	<i>M</i>	<i>SD</i>	$\alpha$	Example
Extrinsic learning motivation	113	3.47 <sup>a</sup>	1.10	.76	During remote education, I wanted to be praised by my teachers.
Intrinsic learning motivation	112	2.90 <sup>a</sup>	0.98	.67	During remote education, I enjoyed learning more and more new things.
Participation in learning activities	117	2.84 <sup>b</sup>	0.77	.82	How often did you do the following things during remote education: Repeat learning content?
Demanding-structuring PI	117	3.03 <sup>c</sup>	0.72	.86	My parents expected me to really engage with the remote education tasks.
Responsive-motivational PI	117	2.45 <sup>c</sup>	0.78	.88	My parents motivated me to engage the remote education tasks.
Parental responsibility for learning	114	2.69 <sup>c</sup>	0.92	-	My parents felt very much responsible that I learn things during remote education.
SES	117	38.22 <sup>d</sup>	15.90	-	What occupation are your parents currently working in? Mother:
Immigrant background	117	0.40 <sup>e</sup>	-	-	How often do you speak German at home?

<sup>a</sup> 1 = not at all to 5 = exactly right. <sup>b</sup> 1 = never to 5 = all the time. <sup>c</sup> 1 = completely disagree to 4 = completely agree. <sup>d</sup> Coded from free-text answers.

<sup>e</sup> 1 = I always or almost always speak German at home to 4 = I never speak German at home, dummy-coded as 0 = no immigrant background (exclusively/ mostly German at home), 1 = immigrant background (exclusively/ mostly a different language at home).

structure of learning motivation as opposed to a global model (2-factor  $\chi^2(7,113) = 10.52, p = .161$ ; RMSEA = 0.07; CFI = 0.98; AIC = 2090.39; global model:  $\chi^2(9,113) = 42.71, p < .001$ ; RMSEA = 0.18; CFI = 0.81; AIC = 2118.59). Students' frequency of *participation in learning activities* was assessed with nine items developed for the purpose of this study, focusing on a variety of core educational activities like discussing lesson content with the teacher, practicing things learned in ERE, or acquiring knowledge of new learning content.

Regarding family process variables, *parental demanding-structuring involvement* addressed how involved parents were during ERE by setting expectations and providing a clear structure. It was assessed with seven items from the German National Educational Panel Study (NEPS; Blossfeld et al., 2011) and Dumont et al. (2014), adapted for ERE. We assessed *parental responsive-motivational involvement*, capturing parents' emotional and motivational support of their children during ERE, with items from NEPS (Blossfeld et al., 2011), the MARKUS study (Helmke & Jäger, 2002) and one item specifically developed for the study. All seven items were adapted to fit the ERE situation. A CFA supported the two-dimensional factor structure of PI, as opposed to a global model (2-factor model:  $\chi^2(74,117) = 119.05, p < .001$ ; RMSEA = 0.07; CFI = 0.94; AIC = 3882.37; global model:  $\chi^2(77,117) = 272.30, p < .001$ ; RMSEA = 0.15; CFI = 0.73; AIC = 4029.62). Furthermore, we assessed the students' judgement of *parental perceived responsibility for learning* during ERE with one self-constructed item.

As family structure variables, we assessed families' *socio-economic status* with the updated version of the International Socio-Economic Index of Occupational Status (ISEI; Ganzeboom, 2010; see also Ganzeboom et al., 1992). ISEI scores range from 10 to 90, with higher values indicating higher SES. To determine ISEI scores, the participants answered four items about their parents' occupation, and we considered the higher of the two parent scores (HISEI) to determine SES. For  $n = 17$  cases, no meaningful information on parents' occupation was provided; therefore, we estimated values with multiple imputation instead. Finally, we used one item regarding the family's language spoken at home as an indicator of *immigrant background*.

### 3.3 Analytic approach

All statistical analyses were conducted with IBM SPSS Statistics (Version 27.0) and Mplus 8.1 (Muthén & Muthén, 2018). Due to sample composition, we conducted multiple

analyses of variance (MANOVA) to check for potential influences of students' gender, grade in school and living in a single-parent household on the family process variables and student outcomes, including only main effects (Online Resource 1). In consequence, living in a single-parent household was included as a control variable for the family process variables.

**Table 2**

*Bivariate Correlations of Measures*

Measure	1	2	3	4	5	6	7
1. Extrinsic learning motivation	-						
2. Intrinsic learning motivation	.48***	-					
3. Participation in learning activities	.39***	.50***	-				
4. Demanding-structuring PI	.34***	.39***	.43***	-			
5. Responsive-motivational PI	.16 <sup>†</sup>	.50***	.48***	.52***	-		
6. Parental responsibility for learning	.29**	.29**	.38***	.45***	.34***	-	
7. SES	-.09	.00	-.11	.08	.04	-.09	-
8. Immigrant background	-.03	-.04	-.10	-.21*	-.02	-.18 <sup>†</sup>	-.04

<sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Structural equation models were specified in all analyses. Based on the intraclass correlations for family process variables (all  $\leq 0.023$ ) and student outcomes (all  $\leq 0.018$ ), we decided against clustering the data by school classes. Goodness of fit was evaluated with  $\chi^2$ , CFI, RMSEA and its 90% confidence intervals (Hu & Bentler, 1999; Schermelleh-Engel et al., 2003), while the AIC (Akaike, 1974) was used to compare models. Missing data were handled with full information maximum likelihood estimation where applicable. Due to the sample size, all variables were modeled as manifest indicators. To answer our first research question, we specified a model including all family process variables as independent variables and all student outcomes as dependent variables (Model 1). For research questions 2 and 3, we additionally incorporated the family structure variables and regression paths for their relations with all family process variables, as well as direct and indirect associations with all individual student variables (Model 2). Both models included intercorrelations between the family structure, family process, and individual student variables, respectively. We additionally

calculated a model regarding only family structure and process variables to verify the findings of the general model (Online Resource 2).

## 4 Results

### 4.1 Descriptive results

Table 2 displays bivariate correlations for all measures. Students reported significantly more demanding-structuring than responsive-motivational PI on average,  $t(116) = 8.60$ ,  $p < .001$ ,  $d = 0.80$ , and significantly higher extrinsic compared to intrinsic learning motivation,  $t(111) = 5.58$ ,  $p < .001$ ,  $d = 0.53$ . In this mostly low-SES group of students, no relation was found between the family structure variables SES and immigrant background.

### 4.2 Relations between family process variables and individual student variables

The relation between the family process and individual student variables specified in Model 1 is depicted in Fig. 2<sup>1</sup>. The model was saturated. Demanding-structuring PI was statistically significantly positively related to extrinsic learning motivation and marginally statistically significantly positively related to participation in learning activities, meaning that higher levels of demanding-structuring PI were associated with students' higher extrinsic learning motivation and more frequent participation in learning activities. Responsive-motivational PI had a statistically significant positive relation to intrinsic learning motivation as well as participation in learning activities, meaning that students reporting higher levels of responsive-motivational PI also reported being more intrinsically motivated and took part in learning activities more often. Lastly, parental responsibility for learning was positively associated with students' participation in learning activities and marginally significantly with extrinsic learning motivation, indicating that students were more extrinsically motivated and participated in more learning activities when they believed that their parents felt more responsible for their learning. All family process variables, as well as all student outcomes, displayed significant positive correlations with one another.

The data partially support Hypothesis 1 that parent-related family process variables were significantly positively related to students' motivation and participation in learning

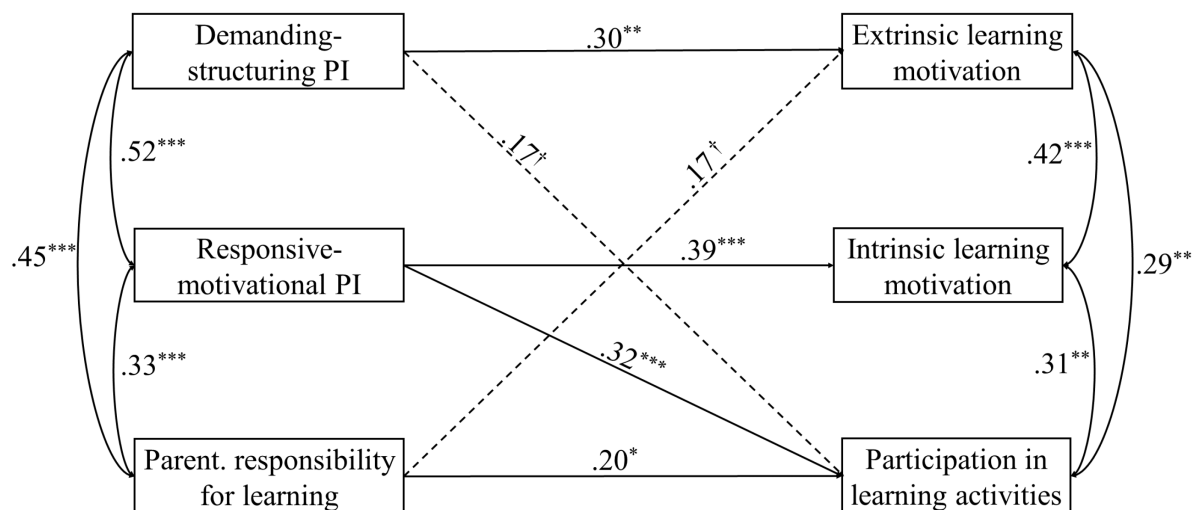
---

<sup>1</sup> To check for potential parameter and standard error bias due to the relatively small sample size, we conducted a post-hoc Monte Carlo analysis which indicated no systematic bias.

activities during ERE, but not all relations between family process variables and individual student outcomes were statistically significant. The model explained 14.4% of the variance in extrinsic learning motivation, 27.0% of the variance in intrinsic learning motivation, and 30.2% of the variance in participation in learning activities. Therefore, variations in student outcome variables during ERE, especially intrinsic motivation and participation in learning activities, could be explained to a substantial extent by differences in parent-focused family process variables.

**Figure 2**

*Relations Between Family Process Variables and Individual Student Outcomes (Model 1)*



*Note.* Regression coefficients are standardized. Non-significant paths are not depicted. Dashed arrows represent paths significant at  $p < .10$ .

†  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

#### 4.3 Complex model of relations between family structure and process variables and individual student variables

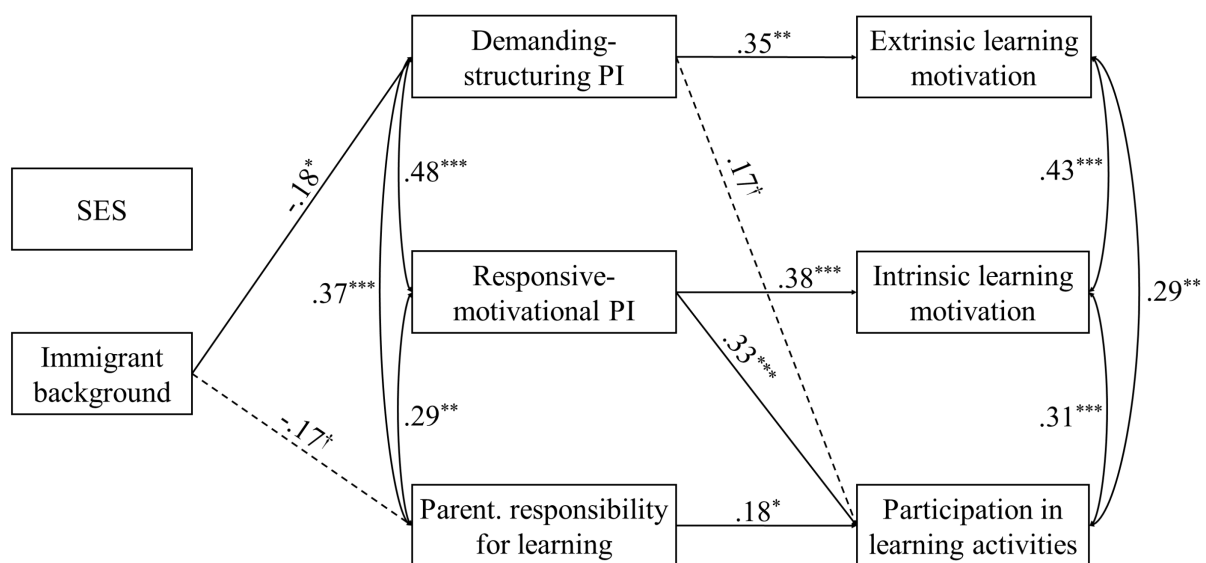
The relations among family structure, family process and individual student variables specified in Model 2 are depicted in Fig. 3<sup>2</sup>. Fit indices indicated an excellent model fit to the

<sup>2</sup> To check for potential parameter and standard error bias due to the relatively small sample size, we conducted a post-hoc Monte Carlo analysis. Since the analysis could not rule out the presence of systematic biases, we further conducted an additional Bayesian model estimation including prior information which is less susceptible to bias in small samples (Smid et al., 2020). Results can be found in Online Resource 3 and were generally similar to the results reported here, implying that potential biases due to sample size were small. Some additional paths reached significance, implying that some

data ( $\chi^2(5,114) = 2.28, p = .81$ ; RMSEA = 0.00, 90% CI [0.00, 0.08]; CFI = 1.00). Relations between family process variables and student variables were similar to Model 1, although effect sizes differed slightly and the association between parental responsibility for learning and extrinsic learning motivation no longer reached statistical significance. A statistically significant negative association between immigrant background and demanding-structuring PI emerged, as did a marginally significant relation with perceived parental responsibility for learning, meaning that students from immigrant backgrounds reported less demanding-structuring involvement and perceived responsibility by their parents on average. Neither SES nor immigrant background were statistically significantly associated with any student variable directly. However, analyses revealed a fully mediated indirect negative influence of immigrant

### Figure 3

*Relations Between Family Structure and Process Variables and Individual Student Outcomes (Model 2)*



*Note.* The influence of living in a single-parent household on family process variables was controlled for. Regression coefficients are standardized. Non-significant paths are not depicted. Dashed arrows represent paths significant at  $p < .10$ .

†  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

smaller effects might have gone undetected or underestimated in our main analyses due to sample size and the statistical power.

background on extrinsic learning motivation,  $\beta = -0.09$ ,  $p = .033$ , mainly via demanding-structuring PI,  $\beta = -0.06$ ,  $p = .089$ . In other words, children from immigrant families showed lower extrinsic learning motivation on average because they experienced less demanding-structuring PI.

Contrary to Hypothesis 2a, we found no statistically significant relation between SES and any family process variable. Immigrant background was significantly negatively related to demanding-structuring PI, but also, unexpectedly, to parental responsibility for learning, thus only partially supporting Hypothesis 2b. Since no statistically significant relation between SES and the student outcomes was found, Hypothesis 3a was not supported. An indirect relation between immigrant background and extrinsic learning motivation partially supported Hypothesis 3b. Overall, the model explained 16.8% of variance in extrinsic learning motivation, 25.0% of the variance in intrinsic learning motivation, and 30.0% of the variance in participation in learning activities, but only small amounts of variance in demanding-structuring (8.7%), responsive-motivational PI (2.9%), and parental responsibility for learning (8.1%), indicating that within this group of students with relatively low SES, family structure variables played only a minor role in education-related family processes during ERE.

## 5 Discussion

### 5.1 Discussion of findings

In light of the relevance of students' learning motivation and learning activities for educational success, this study aimed at determining what role parent-focused family process variables (demanding-structuring and responsive-motivational PI, parental perceived responsibility for learning) played in shaping students' motivational and behavioral outcomes (extrinsic and intrinsic learning motivation, participation in learning activities) in socio-economically disadvantaged school environments during the extraordinary situation of ERE. We also sought to explore how family process and individual student variables related to family structure variables (SES, immigrant background), and the potential mediating role of family process variables for this group of particularly vulnerable students. We applied structural equation modeling to address the posed research questions.

The results confirmed positive associations between process variables and student outcomes in our sample (Hypothesis 1), in line with earlier findings regarding PI at home (e.g.,

Dumont et al., 2014; Shukla et al., 2015) and parental responsibility for learning (Helker & Wosnitza, 2016) in the absence of a worldwide pandemic. Analyses revealed that participation in learning activities had at least marginally statistically significant associations with all parent process variables. Extrinsic motivation was positively associated with demanding-structuring PI and marginally significantly with perceived responsibility, whereas intrinsic motivation was positively related to responsive-motivational PI. Self-determination theory (Ryan & Deci, 2000) explains these results: Responsive-motivational PI meets students' individual needs without restricting their autonomy, a key condition for intrinsic motivation, which is not only an important outcome itself but also positively related to a variety of other school outcomes (e.g., Froiland & Worrell, 2016; Taylor et al., 2014), underlining the importance of responsive-motivational PI especially. Demanding-structuring PI on the other hand limits autonomy by providing clear structures and expectations, thus introducing more external incentives. While this introduction of heteronomy through demanding-structuring PI could, in theory, also be detrimental to intrinsic motivation, the results did not suggest such a relation.

Contrary to our expectations, no statistically significant relation between SES and either dimension of PI emerged (Hypothesis 2a), adding to previous conflicting findings (e.g., Park & Holloway, 2013; Sari et al., 2021; Tan, 2019). Our results are of particular interest, as we focused on a socio-economically disadvantaged school environment with few mid- to high-SES families, which might explain the absent relation between SES and family processes. As expected, immigrant background was negatively associated with demanding-structuring (e.g., Rønning, 2011), but not responsive-motivational PI (Hypothesis 2b). This contradicts findings on responsive PI by Dumont et al. (2014), but not qualitative findings by Kavanagh and Hickey (2013) regarding parents speaking a different language at home than the language of instruction, who often believed home involvement should, similar to lessons in school, occur in the instructional language. Feeling mostly unable to support their children in that way, they instead relied on more informal types of involvement. Therefore, parents with an immigrant background in our sample, which was assessed via family language, might have felt less competent in providing a structure similar to regular schooling (demanding-structuring PI), but not in motivating their child and offering emotional support (responsive-motivational PI). Furthermore, an unexpected negative relation between immigrant background and parental responsibility emerged, contrasting previous research (e.g., Curry & Adams, 2014). Lack of

familiarity with the German school system might explain this relation. Kohl et al. (2014), comparing Turkish immigrant with German native-born mothers, found that the former's perceived responsibility for their children's schooling was lower only when they had attended German schools for less than three years themselves. Other research likewise suggests that differences within the immigrant population, for example culture of origin (Sainsbury & Renzaho, 2011; de Haan, 2011), may further explain varying relations between immigrant background and parent variables.

The expected negative relation between SES and student outcomes, based on theory and previous research (e.g., Dietrich et al., 2021; Kormos & Kiddle, 2013), could not be found (Hypothesis 3a). One possible explanation might again be the sample's low SES overall. Immigrant background was not directly associated with any student outcome, in line with our expectations and findings by Steinmayr et al. (2021), and related indirectly negatively to extrinsic learning motivation (Hypothesis 3b).

To summarize, the model of family structure, family process and individual student variables we adapted from McElvany et al. (2009) based on prior literature proved suitable for examining relations among those variables during ERE, particularly regarding variation in the student variables. Analyses revealed positive relations between parent variables and student outcomes, while underlining the importance of considering family structure variables as potential influences during the unique ERE situation.

## **5.2 Limitations and strengths**

Several points of limitation should be considered for the present study. Due to its cross-sectional design, causal assumptions cannot be verified with the data, and the lack of a second time point of data collection before ERE means that we cannot directly draw comparisons between the situations of regular schooling and ERE, meaning that while our findings are still valid and important for low-SES students in this situation, we cannot say for sure whether they are unique to ERE. Another limitation is the recruitment approach and the resulting relatively small sample size. First, while there were advantages to recruiting the sample from just one school, as discussed below, this in turn also means that appropriate caution needs to be applied when generalizing the results, as the findings might be biased by factors specific to that school. Second, additional post-hoc Monte Carlo analyses showed that the sample provided

insufficient statistical power to reliably reveal smaller effects potentially present in the population. Moreover, for Model 2 we cannot rule out systematic parameter or standard error biases occurring due to sample size. Nonetheless, we found evidence for many of the assumed relations, especially between family process variables and student outcomes, which suggests that our findings are robust and would be found in larger samples as well. Additionally, the similarity of findings regarding the overall model and the partial models (Model 1; Online Resource 2) as well as additional Bayesian model estimation (Online Resource 3) suggest that the full model was not plagued by systematic bias.

Gathering self-reported student data meant relying on students' knowledge of the parent variables of interest. This unfortunately led to a substantial amount of missing information on parents' education, which was in turn excluded from our analyses. Although parental education and SES are strongly related (J. Lee et al., 2019), including the former as well would have been desirable. Other potential problems associated with retrospective self-report measures include misremembering, social desirability or skewed self-perceptions. However, the use of student's assessment is justified since Liu et al. (2021) found only minimal differences in reported PI during ERE between a sample of Chinese middle schoolers and their parents. Additionally, not just for ERE, students' assessment of PI is potentially more important for individual student outcomes than an objective measurement of involvement.

Collecting data at a comprehensive school allowed us to include students from different German secondary school tracks within a single school and ensure comparability with other countries' single-track school systems. Additionally, while coming at the cost of a relatively small sample size, focusing on this particular school enabled us to assess a socio-economically disadvantaged population specifically. Judging from previous research, students from disadvantaged backgrounds are more negatively affected by ERE (e.g., Zancajo, 2021), making it especially important to investigate how family background and parental behavior influence ERE outcomes among these students.

Another strength of the present study is the application of structural equation modeling. While most previous studies regarding ERE utilized descriptive statistics, correlations or regression analyses, SEM allows for a more comprehensive approach of testing complex assumptions about the relations between family structure, process and student variables. Additionally, previous studies investigating family structure and student variables during ERE

rarely also incorporated parent-focused process variables, particularly PI (e.g., Lawrence & Fakuade, 2021).

### **5.3 Directions for future research**

Continued study of the investigated variables with larger sample sizes is needed to confirm our findings and reveal associations previously undiscovered due to limited statistical power. The additional Bayesian estimation of Model 2 presented in Online Resource 3 detected (marginally) significant paths that weren't present in the model based on frequentist estimation presented in the main analyses, giving an indication which relations may have been overlooked. However, if anything, such hidden additional associations would mean that our results somewhat underestimate the importance of parents for adolescents of somewhat lower SES, and the general conclusions that we draw from our findings and present in our discussion would be of even greater importance.

Importantly, while our results are relevant for the ERE situation, the design of our study does not allow to conclude whether they are unique to this special situation. Thus, a comparison with students in face-to-face instruction is needed to give further insights regarding how these relations might differ between regular instruction and the unique ERE situation. Including not just the students', but also the parents' perspective on the ERE situation, for example by conducting interviews about their experience during ERE, could provide important insights extending beyond our findings as well. Future research should additionally cover a broader range of SES, ages and educational levels, but also other vulnerable groups like special education needs students, to investigate whether our findings apply to other populations as well. Additional family structure and process variables should be considered, such as parents' education and educational aspirations for their child. Moreover, variables capturing differences between immigrant families, like parents' experiences with the host country's school system, should be included in future research as well to further investigate the unexpected findings regarding immigrant background. Lastly, while our study focused on a sample of socio-economically disadvantaged students to answer the important question how family and parent variables related to student outcomes in this particularly vulnerable group during ERE, the lack of a comparison group means we cannot be certain whether the found relations are unique for disadvantaged students, or whether similar results

would be found for the general student population. Future studies should therefore include an additional group of students from an average socio-economic environment to allow for the comparison of the relations of family structure and process variables with student outcomes in both groups.

#### **5.4 Implications for practice**

The study results have important practical implications. First and foremost, parents are important for keeping their children motivated and participating in learning activities when investigating these constructs during ERE, possibly compensating the reduced student-teacher interactions. Accordingly, students whose parents felt responsible for their learning success reported more positive outcomes. Schools can encourage this by clearly communicating parents' responsibilities and supporting families in dealing with them. Additionally, both demanding-structuring and responsive-motivational PI were positively associated with desirable student outcomes, revealing the importance of different forms of parental support behaviors. Thus, schools providing information to parents on different ways to support their children at home can bring about more positive student outcomes, which can be important during both ERE and in-person instruction. Further barriers to PI arise from parents lacking confidence in their ability to adequately support their children (e.g., Cullinane & Montacute, 2020), and especially low-SES parents often being unable to work from home (Felstead & Reuschke, 2020), important factors to consider when developing strategies to ensure every parent can appropriately support their child that can be assumed to be especially relevant during ERE. For example, schools might offer online courses or materials informing parents about the importance of being involved while simultaneously imparting strategies for adequate involvement. For such low-threshold informative programs and PI interventions, it is central to consider the circumstances that may prevent parents from participating, not only in ERE situations, to reach as many parents as possible.

Such programs might be especially valuable for immigrant parents, since immigrant background was negatively related to both perceived responsibility and demanding-structuring PI. These negative associations presumably result from parents' lack of experience with the school system (Kohl et al., 2014) as well as cultural and language differences (Pérez Carreón et al., 2005; Sainsbury & Renzaho, 2011). Therefore, these parents, and their children

in turn, would profit from schools providing information on school procedures and PI strategies, ideally offered in multiple languages and an easily accessible format.

## **5.5 Conclusions**

Taken together, this study contributes to current research by examining the importance of parents being involved in their children's learning in different ways, providing structures and clear expectations as well as emotional and motivational support, and their perceived responsibility for their child's learning in a sample of children experiencing ERE. Additionally, PI and perceived responsibility were related to immigrant background, a family structure variable. The findings especially have important implications for future research; furthermore, they can act as first indicators in the complex matter of preparing educational systems for future educational crises. All in all, the present study focused on a situation that was determined by one of the most disruptive events in education globally in recent years, the implementation of emergency remote education measures to counter the COVID-19 pandemic, and helped gain insights into the relation of family and parent variables with individual student outcomes.

## References

- Aguielera-Hermida, A. P. (2020). College students' use and acceptance of emergency online learning due to COVID-19. *International Journal of Educational Research Open*, 1, Article 100011. <https://doi.org/10.1016/j.ijedro.2020.100011>
- Akaike, H. (1974). A new look at the statistical model identification. *IEEE Transactions on Automatic Control*, 19(6), 716–723. <https://doi.org/10.1109/TAC.1974.1100705>
- Andrew, A., Cattan, S., Costa-Dias, M., Farquharson, C., Kraftman, L., Krutikova, S., Phimister, A., & Sevilla, A. (2020). *Family time use and home learning during the COVID-19 lockdown* (IFS Report R178). The Institute for Fiscal Studies. <https://doi.org/10.1920/re.ifs.2020.0178>
- Antony-Newman, M. (2019). Parental involvement of immigrant parents: A meta-synthesis. *Educational Review*, 71(3), 362–381. <https://doi.org/10.1080/00131911.2017.1423278>
- Autorengruppe Bildungsberichterstattung (2018). *Bildung in Deutschland 2018: Ein indikatorengestützter Bericht mit einer Analyse zu Wirkungen und Erträgen von Bildung* [Education in Germany 2018: An indicator supported report with an analysis of impacts and yields of education]. wbv Publikation. <https://doi.org/10.3278/6001820fw>
- Baber, H. (2020). Determinants of students' perceived learning outcome and satisfaction in online learning during the pandemic of COVID19. *Journal of Education and e-Learning Research*, 7(3), 285–292. <https://doi.org/10.20448/journal.509.2020.73.285.292>
- Baumert, J., Watermann, R., & Schümer, G. (2003). Disparitäten der Bildungsbeteiligung und des Kompetenzerwerbs [Disparities in educational participation and attainment]. *Zeitschrift für Erziehungswissenschaft*, 6(1), 46–71. <https://doi.org/10.1007/s11618-003-0004-7>
- Bayrakdar, S., & Guveli, A. (2020). Inequalities in home learning and schools' provision of distance teaching during school closure of COVID-19 lockdown in the UK. EconStor. <https://hdl.handle.net/10419/227790>
- Baysu, G., Phalet, K., & Brown, R. (2011). Dual identity as a two-edged sword: Identity threat and minority school performance. *Social Psychology Quarterly*, 74(2), 121–143. <https://doi.org/10.1177/0190272511407619>
- Becker, M., Neumann, M., & Dumont, H. (2016). Recent developments in school tracking practices in Germany: An overview and outlook on future trends. *Orbis Scholae*, 10(3), 9–25. <https://doi.org/10.14712/23363177.2017.8>
- Berti, C., Mameli, C., Speltini, G., & Molinari, L. (2016). Teacher justice and parent support as predictors of learning motivation and visions of a just world. *Issues in Educational Research*, 26(4), 543–560.
- Blossfeld, H. P., Roßbach, H. G., & von Maurice, J. (2011). Education as a lifelong process: The German National Educational Panel Study (NEPS). *Zeitschrift für Erziehungswissenschaft*, Special issue 14.
- Bol, T. (2020). Inequality in homeschooling during the Corona crisis in the Netherlands. First results from the LISS Panel. <https://doi.org/10.31235/osf.io/hf32q>
- Borup, J. (2016). Teacher perceptions of parental engagement at a cyber high school. *Journal of Research on Technology in Education*, 48(2), 67–83. <https://doi.org/10.1080/15391523.2016.1146560>

- Bos, W., Lankes, E. M., Prenzel, M., Schwippert, K., Valtin, R., Voss, A., & Walther, G. (Eds.). (2005). IGLU: Skalenhandbuch zur Dokumentation der Erhebungsinstrumente. [IGLU: Scale manual for documentation of the survey instruments]. Waxmann.
- Bourdieu, P. (1986). The forms of capital (R. Nice, Trans). In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood Press. (Original work published in 1983).
- Bozkurt, A., Insung, J., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., Lambert, S. R., Al-Freih, M., Pete, J., Olcott, D. Jr., Rodes, V., Aranciaga, I., Bali, M., Alvarez, A. V. Jr., Roberts, J., Pazurek, A., Raffaghelli, J. E., Panagiotou, N., de Coëtlogon, P., & Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. *Asian Journal of Distance Education*, 15(1), 1–126. <https://doi.org/10.5281/zenodo.3878572>
- Brown, J. E., & Mann, L. (1990). The relationship between family structure and process variables and adolescent decision making. *Journal of Adolescence*, 13(1), 25–37. [https://doi.org/10.1016/0140-1971\(90\)90039-A](https://doi.org/10.1016/0140-1971(90)90039-A)
- Cattan, S., Farquharson, C., Krutikova, S., Phimister, A., Salisbury, A., & Sevilla, A. (2021). Inequalities in responses to school closures over the course of the first COVID-19 lockdown (IFS Working paper 21/04). The Institute for Fiscal Studies. <https://doi.org/10.1920/wp.ifs.2021.421>
- Cheng, G., & Chau, J. (2016). Exploring the relationships between learning styles, online participation, learning achievement and course satisfaction: An empirical study of a blended learning course. *British Journal of Educational Technology*, 47(2), 257–278. <https://doi.org/10.1111/bjet.12243>
- Chiu, T. K. F. (2022). Applying the self-determination theory (SDT) to explain student engagement in online learning during the COVID-19 pandemic. *Journal of Research on Technology in Education*, 54(S1), S14–30. <https://doi.org/10.1080/15391523.2021.1891998>
- Çoban, Ö. (2020). Relationships between students' socioeconomic status, parental support, students' hindering, teachers' hindering and students' literacy scores: PISA 2018. *World Journal of Education*, 10(4), 45–59. <https://doi.org/10.5430/wje.v10n4p45>
- Coleman, J. S., Campbell, E. Q., Hobson, C. J., McPartland, J., Mood, A. M., Weinfeld, F. D., & York, R. L. (1966). *Equality of educational opportunity*. US Government Printing Office.
- Conole, G. (2007). Describing learning activities: Tools and resources to guide practice. In E. Beetham, & R. Sharpe (Eds.), *Rethinking pedagogy for a digital age: Designing and delivering e-learning* (pp. 81–91). Routledge.
- Cooper, H., Lindsay, J. J., & Nye, B. (2000). Homework in the home: How student, family, and parenting-style differences relate to the homework process. *Contemporary Educational Psychology*, 25(4), 464–487. <https://doi.org/10.1006/ceps.1999.1036>
- Cullinane, C., & Montacute, R. (2020). COVID-19 and social mobility impact brief #1: School shutdown. The Sutton Trust. <https://www.suttontrust.com/wp-content/uploads/2021/01/School-Shutdown-Covid-19.pdf>
- Curry, K. A., & Adams, C. M. (2014). Parent social networks and parent responsibility: Implications for school leadership. *Journal of School Leadership*, 24, 918–948. <https://doi.org/10.1177/105268461402400504>

- Daniels, L. M., Goegan, L. D., & Parker, P. C. (2021). The impact of COVID-19 triggered changes to instruction and assessment on university students' self-reported motivation, engagement and perceptions. *Social Psychology of Education, 24*(1), 299–318. <https://doi.org/10.1007/s11218-021-09612-3>
- Davis, C. R., Grooms, J., Ortega, A., Rubalcaba, J. A. A., & Vargas, E. (2021). Distance learning and parental mental health during COVID-19. *Educational Researcher, 50*(1), 61–64. <https://doi.org/10.3102/0013189X20978806>
- Davis-Kean, P. (2005). The influence of parent education and family income on child achievement: The indirect role of parental expectations and the home environment. *Journal of Family Psychology, 19*(2), 294–304. <https://doi.org/10.1037/0893-3200.19.2.294>
- de Haan, M. (2011). The reconstruction of parenting after migration: A perspective from cultural translation. *Human Development, 54*(6), 376–399. <https://doi.org/10.1159/000334119>
- Dettmers, S., Yotyodying, S., & Jonkmann, K. (2019). Antecedents and outcomes of parental homework involvement: How do family-school partnerships affect parental homework involvement and student outcomes? *Frontiers in Psychology, 10*, Article 1048. <https://doi.org/10.3389/fpsyg.2019.01048>
- Dietrich, H., Patzina, A., & Lerche, A. (2021). Social inequality in the homeschooling efforts of German high school students during a school closing period. *European Societies, 23*(1), 348–369. <https://doi.org/10.1080/14616696.2020.1826556>
- Dong, Y., Wu, S. X. Y., Dong, W. Y., & Tang, Y. (2020). The effects of home literacy environment on children's reading comprehension development: A meta-analysis. *Educational Sciences: Theory and Praxis, 20*(2), 63–82. <https://doi.org/10.12738/jestp.2020.2.005>
- Drummond, K. V., & Stipek, D. (2004). Low-income parents' beliefs about their role in children's academic learning. *The Elementary School Journal, 104*(3), 197–213. <https://doi.org/10.1086/499749>
- Dumont, H., Trautwein, U., Lüdtke, O., Neumann, M., Niggli, A., & Schnyder, I. (2012). Does parental homework involvement mediate the relationship between family background and educational outcomes? *Contemporary Educational Psychology, 37*(1), 55–69. <https://doi.org/10.1016/j.cedpsych.2011.09.004>
- Dumont, H., Trautwein, U., Nagy, G., & Nagengast, B. (2014). Quality of parental homework involvement: Predictors and reciprocal relations with academic functioning in the reading domain. *Journal of Educational Psychology, 106*(1), 144–161. <https://doi.org/10.1037/a0034100>
- Engzell, P., Frey, A., & Verhagen, M. (2021). Learning loss due to school closures during the COVID-19 pandemic. *Proceedings of the National Academy of Sciences of the United States of America, 118*(17), Article e2022376118. <https://doi.org/10.1073/pnas.2022376118>
- Eom, S. (2019). The effects of student motivation and self-regulated learning strategies on student's perceived e-learning outcomes and satisfaction. *Journal of Higher Education Theory and Practice, 19*(7), 29–42. <https://doi.org/10.33423/jhetp.v19i7.2529>
- Felstead, A., & Reuschke, D. (2020). *Homeworking in the UK: Before and during the 2020 lockdown*. Wales Institute of Social and Economic Research.

- [https://www.cardiff.ac.uk/\\_\\_data/assets/pdf\\_file/0003/2432676/Homeworking-in-the-UK-Before-and-during-the-2020-lockdown.pdf](https://www.cardiff.ac.uk/__data/assets/pdf_file/0003/2432676/Homeworking-in-the-UK-Before-and-during-the-2020-lockdown.pdf)
- Finn, J. D., & Cox, D. (1992). Participation and withdrawal among fourth-grade pupils. *American Educational Research Journal*, 29(1), 141–162. <https://doi.org/10.3102/00028312029001141>
- Frankenberg, E., Kupper, K., Wagner, R., & Bongard, S. (2013). Immigrant youth in Germany: Psychological and sociocultural adaptation. *European Psychologist*, 18(3), 158–168. <https://doi.org/10.1027/1016-9040/a000154>
- Froiland, J. M., & Worrell, F. C. (2016). Intrinsic motivation, learning goals, engagement, and achievement in a diverse high school. *Psychology in the Schools*, 53(3), 321–336. <https://doi.org/10.1002/pits.21901>
- Ganzeboom, H. (2010, May 1). *A new international socio-economic index [ISEI] of occupational status for the international standard classification of occupation 2008 [ISCO-08] constructed with data from the ISSP 2002–2007* [Paper presentation]. Annual Conference of International Social Survey Programme, Lisbon, Portugal.
- Ganzeboom, H. B., De Graaf, P. M., & Treiman, D. J. (1992). A standard international socio-economic index of occupational status. *Social science research*, 21(1), 1–56. [https://doi.org/10.1016/0049-089X\(92\)90017-B](https://doi.org/10.1016/0049-089X(92)90017-B)
- Gao, N., Lafortune, J., & Hill, L. (2020). *Who is losing ground with distance learning in California?* Public Policy Institute of California. <https://www.ppic.org/wp-content/uploads/who-is-losing-ground-with-distance-learning-in-california-october-2020.pdf>
- Garbe, A., Ogurlu, U., Logan, N., & Cook, P. (2020). COVID-19 and remote learning: Experiences of parents with children during the pandemic. *American Journal of Qualitative Research*, 4(3), 45–65. <https://doi.org/10.29333/ajqr/8471>
- Geis-Thöne, W. (2020). *Häusliches Umfeld in der Krise: Ein Teil der Kinder braucht mehr Unterstützung* [Home environment in crisis: A part of the children needs more support] (IW-Report 15/2020). Institut der Deutschen Wirtschaft. <http://hdl.handle.net/10419/216213>
- Gonida, E. N., & Cortina, K. S. (2014). Parental involvement in homework: Relations with parent and student achievement-related motivational beliefs and achievement. *British Journal of Educational Psychology*, 84, 376–396. <https://doi.org/10.1111/bjep.12039>
- Grewenig, E., Lergetporer, P., Werner, K., Woessmann, L., & Zierow, L. (2021). COVID-19 and educational inequality: How school closures affect low- and high-achieving students. *European Economic Review*, 140, Article 103920. <https://doi.org/10.1016/j.eurocorev.2021.103920>
- Haller, T., & Novita, S. (2021). Parents' perception of school support during COVID-19: What satisfies parents? *Frontiers in Education*, 6, Article 700441. <https://doi.org/10.3389/educ.2021.700441>
- Hammerstein, S., König, C., Dreisörner, T., & Frey, A. (2021). Effects of COVID-19-related school closures on student achievement—a systematic review. *Frontiers in Psychology*, Article 4020. <https://doi.org/10.3389/fpsyg.2021.746289>
- Hasler Waters, L., Menchaca, M. P., & Borup, J. (2014). Parental involvement in K-12 online and blended learning. In R. E. Ferdig, & K. Kennedy (Eds.), *Handbook of research on K-12 online and blended learning* (pp. 303–323). ETC Press.

- Helker, K., & Wosnitza, M. (2016). The interplay of students' and parents' responsibility judgements in the school context and their associations with student motivation and achievement. *International Journal of Educational Research*, 76, 34–49. <https://doi.org/10.1016/j.ijer.2016.01.001>
- Helmke, A., & Jäger, R. S. (Eds.). (2002). *Das Projekt MARKUS – Mathematik-cesamterhebung Rheinland-Pfalz: Kompetenzen, unterrichtsmerkmale, schulkontext* [The MARKUS project – Mathematics comprehensive study Rhineland-Palatinate: Competencies, class features, school context]. Verlag Empirische Pädagogik.
- Hicks, L. J., Caron, E. E., & Smilek, D. (2021). SARS-CoV-2 and learning: The impact of a global pandemic on undergraduate learning experiences. *Scholarship of Teaching and Learning in Psychology*. Advance online publication. <https://doi.org/10.1037/stl0000250>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Im, T., & Kang, M. (2019). Structural relationships of factors which impact on learner achievement in online learning environments. *International Review of Research in Open and Distributed Learning*, 20(1). <https://doi.org/10.19173/irrodl.v20i1.4012>
- Information und Technik Nordrhein-Westfalen (2020, October 14). *Anteil der Schülerinnen und Schüler mit Zuwanderungsgeschichte in NRW auf 38,2% gestiegen* (Proportion of students with a history of migration in NRW risen to 38.2%) [Press release]. <https://www.it.nrw/node/101241/pdf>
- Jeynes, W. H. (2011). *Parental involvement and academic success*. Routledge. <https://doi.org/10.4324/9780203843444>
- Jæger, M. M., & Blaabæk, E. H. (2020). Inequality in learning opportunities during Covid-19: Evidence from library takeout. *Research in Social Stratification and Mobility*, 68, Article 100524. <https://doi.org/10.1016/j.rssm.2020.100524>
- Kaplan Toren, N., & Seginer, R. (2015). Classroom climate, parental educational involvement, and student school functioning in early adolescence: A longitudinal study. *Social Psychology of Education*, 18(4), 811–827. <https://doi.org/10.1007/s11218-015-9316-8>
- Kauffman, H. (2015). A review of predictive factors of student success in and satisfaction with online learning. *Research in Learning Technology*, 23, Article 26507. <https://doi.org/10.3402/rlt.v23.26507>
- Kavanagh, L., & Hickey, T. M. (2013). “You’re looking at this different language and it freezes you out straight away”: Identifying challenges to parental involvement among immersion parents. *Language and Education*, 27(5), 432–450. <https://doi.org/10.1080/09500782.2012.714388>
- Kim, Y., Mok, S. Y., & Seidel, T. (2020). Parental influences on immigrant students' achievement-related motivation and achievement: A meta-analysis. *Educational Research Review*, 30, Article 100327. <https://doi.org/10.1016/j.edurev.2020.100327>
- Klapproth, F., Federkeil, L., Heinschke, F., & Jungmann, T. (2020). Teachers' experiences of stress and their coping strategies during COVID-19 induced distance teaching. *Journal of Pedagogical Research*, 4(4), 444–452. <https://doi.org/10.33902/JPR.2020062805>

- König, C., & Frey, A. (2022). The impact of COVID-19-related school closures on student achievement – A meta-analysis. *Educational Measurement: Issues and Practice*, 41(1), 16–22. <https://doi.org/10.1111/emip.12495>
- Knopik, T., Błaszczak, A., Maksymiuk, R., & Oszwa, U. (2021). Parental involvement in remote learning during the COVID-19 pandemic – Dominant approaches and their diverse implications. *European Journal of Education*, 56(4), 623–640. <https://doi.org/10.1111/ejed.12474>
- Kohl, K., Jäkel, J., Spiegler, O., Willard, J. A., & Leyendecker, B. (2014). Eltern und Schule – Wie beurteilen türkischstämmige und deutsche Mütter sowie deutsche Lehrkräfte elterliche Verantwortung und Beteiligung? [Parents and school – how do mothers of turkish and german descent as well as german teachers judge parent responsibility and involvement?] *Psychologie in Erziehung und Unterricht*, 61(2), 96–111. <https://doi.org/10.2378/peu2013.art21d>
- Kormos, J., & Kiddle, T. (2013). The role of socio-economic factors in motivation to learn English as a foreign language: The case of Chile. *System*, 41(2), 399–412. <https://doi.org/10.1016/j.system.2013.03.006>
- Kriegbaum, K., Becker, N., & Spinath, B. (2018). The relative importance of intelligence and motivation as predictors of school achievement: A meta-analysis. *Educational Research Review*, 25, 120–148. <https://doi.org/10.1016/j.edurev.2018.10.001>
- Lareau, A. (1987). Social class differences in family-school relationships: The importance of cultural capital. *Sociology of Education*, 60(2), 73–85. <https://doi.org/10.2307/2112583>
- Lawrence, K. C., & Fakuade, O. V. (2021). Parental involvement, learning participation and online learning commitment of adolescent learners during the COVID-19 lockdown. *Research in Learning Technology*, 29, Article 2544. <https://doi.org/10.25304/rlt.v29.2544>
- Lee, J. S., & Bowen, N. K. (2006). Parent involvement, cultural capital, and the achievement gap among elementary school children. *American Educational Research Journal*, 43(2), 193–218. <https://doi.org/10.3102/00028312043002193>
- Lee, J., Zhang, Y., & Stankov, L. (2019). Predictive validity of SES measures for student achievement. *Educational Assessment*, 24(4), 305–326. <https://doi.org/10.1080/10627197.2019.1645590>
- Lee, S. J., Ward, K. P., Chang, O. D., & Downing, K. M. (2021). Parenting activities and the transition to home-based education during the COVID-19 pandemic. *Children and Youth Services Review*, 122, Article 105585. <https://doi.org/10.1016/j.childyouth.2020.105585>
- Lemos, M. S., & Veríssimo, L. (2014). The relationships between intrinsic motivation, extrinsic motivation, and achievement, along elementary school. *Procedia – Social and Behavioral Sciences*, 112, 930–938. <https://doi.org/10.1016/j.sbspro.2014.01.1251>
- Lepper, M. R., Corpus, J. H., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology*, 97(2), 184–196. <https://doi.org/10.1037/0022-0663.97.2.184>
- Li, X., Yang, H., Wang, H., & Jia, J. (2020). Family socioeconomic status and home-based parental involvement: A mediation analysis of parental attitudes and expectations. *Children and Youth Services Review*, 116, Article 105111. <https://doi.org/10.1016/j.childyouth.2020.105111>
- Li, Y., Hu, T., Ge, T., & Auden, E. (2019). The relationship between home-based parental involvement, parental educational expectation and academic performance of middle school students in

- mainland China: A mediation analysis of cognitive ability. *International Journal of Educational Research*, 97, 139–153. <https://doi.org/10.1016/j.ijer.2019.08.003>
- Lim, S. L., & Yeo, K. J. (2021). The relationship between motivational constructs and self-regulated learning: A review of literature. *International Journal of Evaluation and Research in Education*, 10(1), 330–335. <https://doi.org/10.11591/ijere.v10i1.21006>
- Litalien, D., Morin, A. J. S., Gagné, M., Vallerand, R. J., Losier, G. F., & Ryan, R. M. (2017). Evidence of a continuum structure of academic self-determination: A two-study test using a bifactor-ESEM representation of academic motivation. *Contemporary Educational Psychology*, 51, 67–82. <https://doi.org/10.1016/j.cedpsych.2017.06.010>
- Liu, K., Yang, Y., Li, M., Li, S., Sun, K., & Zhao, Y. (2021). Parents' and adolescents' perception of parental involvement and their relationship with depression among Chinese middle school students during the COVID-19 pandemic. *Children and Youth Services Review*, 129, Article 106190. <https://doi.org/10.1016/j.childyouth.2021.106190>
- López, G. R., Scribner, J. D., & Mahitivanichcha, K. (2001). Redefining parental involvement: Lessons from high-performing migrant-impacted schools. *American Educational Research Journal*, 38(2), 253–288. <https://doi.org/10.3102/00028312038002253>
- Ludewig, U., Kleinkorres, R., Schaufelberger, R., Schlitter, T., Lorenz, R., König, C., Frey, A., & McElvany, N. (2022). COVID-19 pandemic and student reading achievement: Findings from a school panel study. *Frontiers in Psychology*, 13, Article 876485. <https://doi.org/10.3389/fpsyg.2022.876485>
- Marks, G. N. (2005). Accounting for immigrant non-immigrant differences in reading and mathematics in twenty countries. *Ethnic and Racial Studies*, 28(5), 925–946. <https://doi.org/10.1080/01419870500158943>
- Matsuoka, R., Nakamuro, M., & Inui, T. (2015). Emerging inequality in effort: A longitudinal investigation of parental involvement and early elementary school-aged children's learning time in Japan. *Social Science Research*, 54, 159–176. <https://doi.org/10.1016/j.ssresearch.2015.06.009>
- McElvany, N., Becker, M., & Lüdtke, O. (2009). Die Bedeutung familiärer Merkmale für Lesekompetenz, Wortschatz, Lesemotivation und Leseverhalten [The role of family variables in reading literacy, vocabulary, reading motivation, and reading behavior]. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie*, 41(3), 121–131. <https://doi.org/10.1026/0049-8637.41.3.121>
- Means, B., & Neisler, J. (2021). Teaching and learning in the time of COVID: The student perspective. *Online Learning*, 25(1), 8–27. <https://doi.org/10.24059/olj.v25i1.2496>
- Motti-Stefanidi, F., Masten, A., & Asendorpf, J. B. (2015). School engagement trajectories of immigrant youth: Risks and longitudinal interplay with academic success. *International Journal of Behavioral Development*, 39(1), 32–42. <https://doi.org/10.1177/0165025414533428>
- Muthén, L. K., & Muthén, B. O. (2018). *Mplus* (Version 8.1) [Computer software]. Muthén & Muthén. <https://www.statmodel.com>

- Niklas, F., & Schneider, W. (2013). Home literacy environment and the beginning of reading and spelling. *Contemporary Educational Psychology, 38*(1), 40–50. <https://doi.org/10.1016/j.cedpsych.2012.10.001>
- Panaoura, R. (2021). Parental involvement in children's mathematics learning before and during the period of the COVID-19. *Social Education Research, 2*(1), 65–74. <https://doi.org/10.37256/ser.212021547>
- Park, S., & Holloway, S. D. (2013). No parent left behind: Predicting parental involvement in adolescents' education within a sociodemographically diverse population. *The Journal of Educational Research, 106*(2), 105–119. <https://doi.org/10.1080/00220671.2012.667012>
- Pensiero, N., Kelly, T., & Bokhove, C. (2020). *Learning inequalities during the Covid-19 pandemic: How families cope with home-schooling*. University of Southampton research report. <https://doi.org/10.5258/SOTON/P0025>
- Pérez Carreón, G. P., Drake, C., & Barton, A. C. (2005). The importance of presence: Immigrant parents' school engagement experiences. *American Educational Research Journal, 42*(3), 465–498. <https://doi.org/10.3102/00028312042003465>
- Poulain, T., Meigen, C., Sobek, C., Ober, P., Igel, U., Körner, A., Kiess, W., & Vogel, M. (2021). Loss of childcare and classroom teaching during the Covid-19-related lockdown in spring 2020: A longitudinal study on consequences on leisure behavior and schoolwork at home. *Plos One, 16*(3), Article e0247959. <https://doi.org/10.1371/journal.pone.0247949>
- Reynolds, A. J. (1992). Comparing measures of parental involvement and their effects on academic achievement. *Early Childhood Research Quarterly, 7*(3), 441–462. [https://doi.org/10.1016/0885-2006\(92\)90031-S](https://doi.org/10.1016/0885-2006(92)90031-S)
- Régner, I., Loose, F., & Dumas, F. (2009). Students' perceptions of parental and teacher academic involvement: Consequences on achievement goals. *European Journal of Psychology of Education, 24*(2), 263–277. <https://doi.org/10.1007/BF03173016>
- Rønning, M. (2011). Who benefits from homework assignments? *Economics of Education Review, 30*(1), 55–64. <https://doi.org/10.1016/j.econedurev.2010.07.001>
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54–67. <https://doi.org/10.1006/ceps.1999.1020>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology, 61*, Article 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Sainsbury, W. J., & Renzaho, A. M. N. (2011). Educational concerns of Arabic speaking migrants from Sudan and Iraq to Melbourne: Expectations on migrant parents in Australia. *International Journal of Educational Research, 50*(5-6), 291–300. <https://doi.org/10.1016/j.ijer.2011.10.001>
- Sari, E., Bittmann, F., & Homuth, C. (2021). *Explaining inequalities of homeschooling in Germany during the first COVID-10 lockdown*. SocArXiv. <https://doi.org/10.31235/osf.io/vsdq4>

- Schermelleh-Engel, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, 8(2), 23–74.
- Schneider, R., Sachse, K. A., Schipolowski, S., & Enke, F. (2021). Teaching in times of COVID-19: The evaluation of distance teaching in elementary and secondary schools in Germany. *Frontiers in Education*, 6, Article 702406. <https://doi.org/10.3389/educ.2021.702406>
- Schnitzler, K., Holzberger, D., & Seidel, T. (2021). All better than being disengaged: Student engagement patterns and their relations to academic self-concept and achievement. *European Journal of Psychology of Education*, 36(3), 627–652. <https://doi.org/10.1007/s10212-020-00500-6>
- Serbin, L. A., Stack, D. M., & Kindon, D. (2013). Academic success across the transition from primary to secondary schooling among lower-income adolescents: Understanding the effects of family resources and gender. *Journal of Youth and Adolescence*, 42(9), 1331–1347. <https://doi.org/10.1007/s10964-013-9987-4>
- Shukla, S. Y., Tombari, A. K., Toland, M. D., & Danner, F. W. (2015). Parental support for learning and high school students' academic motivation and persistence in mathematics. *Journal of Educational and Developmental Psychology*, 5(1), 44–56. <https://doi.org/10.5539/jedp.v5n1p44>
- Smid, S. C., McNeish, D., Miočević, M., & van de Schoot, R. (2020). Bayesian versus frequentist estimation for structural equation models in small sample contexts: A systematic review. *Structural Equation Modeling: A Multidisciplinary Journal*, 27(1), 131–161. <https://doi.org/10.1080/10705511.2019.1577140>
- Steinmayr, R., Lazarides, R., Weidinger, A. F., & Christiansen, H. (2021). Teaching and learning during the first COVID-19 school lockdown: Realization and associations with parent-perceived students' academic outcomes. *Zeitschrift für Pädagogische Psychologie*, 35(2–3), 1–22. <https://doi.org/10.1024/1010-0652/a000306>
- Sui-Chu, E. H., & Willms, J. D. (1996). Effects of parental involvement on eight-grade achievement. *Sociology of Education*, 69(2), 126–141. <https://doi.org/10.2307/2112802>
- Suárez-Orozco, C., Rhodes, J., & Milburn, M. (2009). Unraveling the immigrant paradox: Academic engagement and disengagement among recently arrived immigrant youth. *Youth & Society*, 41(2), 151–185. <https://doi.org/10.1177/0044118X09333647>
- Tan, C. Y. (2019). Involvement practices, socio-economic status, and student science achievement: Insights from a typology of home and school involvement patterns. *American Educational Research Journal*, 56(3), 899–924. <https://doi.org/10.3102/0002831218807146>
- Taylor, G., Jungert, T., Mageau, G. A., Schattke, K., Dedic, H., Rosenfield, S., & Koestner, R. (2014). A self-determination theory approach to predicting school achievement over time: The unique role of intrinsic motivation. *Contemporary Educational Psychology*, 39(4), 342–358. <https://doi.org/10.1016/j.cedpsych.2014.08.002>
- Thorell, L. B., Skoglund, C., de la Peña, A. G., Baeyens, D., Fuermaler, A. B. M., Groom, M. J., Mammarella, I. C., van der Oord, S., van den Hoofdakker, B. J., Luman, M., de Miranda, D. M., Siu, A. F. Y., Steinmayr, R., Idrees, I., Soares, L. S., Sörlin, M., Luque, J. L., Moscardino, U. M., Roch, M., & Christiansen, H. (2021). Parental experiences of homeschooling during the COVID-19

- pandemic: Differences between seven European countries and between children with and without mental health conditions. *European Child & Adolescent Psychiatry*, 31, 649–661. <https://doi.org/10.1007/s00787-020-01706-1>
- UNESCO. (2020, March 4). *Education: From disruption to recovery*. Retrieved April 15, 2021, from <https://en.unesco.org/covid19/educationresponse>
- UNICEF. (2021). *COVID-19 and school closures: One year of education disruption*. <https://data.unicef.org/wp-content/uploads/2021/03/COVID19-and-school-closures-report.pdf>
- von Otter, C. (2014). Family resources and mid-life level of education: A longitudinal study of the mediating influence of childhood parental involvement. *British Educational Research Journal*, 40(3), 555–574. <https://doi.org/10.1002/berj.3111>
- Walker, C. O., Greene, B. A., & Mansell, R. A. (2006). Identification with academics, intrinsic/ extrinsic motivation, and self-efficacy as predictors of cognitive engagement. *Learning and Individual Differences*, 16(1), 1–12. <https://doi.org/10.1016/j.lindif.2005.06.004>
- Werner, K., & Woessmann, W. (2021). *The legacy of Covid-19 in education* (CESifo Working Paper 9358). Munich Society for the Promotion of Economic Research. <https://doi.org/10.2139/ssrn.3945280>
- Wilder, S. (2014). Effects of parental involvement on academic achievement: A meta-synthesis. *Educational Review*, 66(3), 377–397. <https://doi.org/10.1080/00131911.2013.780009>
- Wong, C. A., Eccles, J. C., & Sameroff, A. (2003). The influence of ethnic discrimination and ethnic identification on african american adolescents' school and socioemotional adjustment. *Journal of Personality*, 71(6), 1197–1232. <https://doi.org/10.1111/1467-6494.7106012>
- Yotyodying, S., & Wild, E. (2014). Antecedents of different qualities of home-based parental involvement: Findings from a cross-cultural study in Germany and Thailand. *Learning Culture and Social Interaction*, 3(2), 98–110. <https://doi.org/10.1016/j.lcsi.2014.02.002>
- Zaccoletti, S., Camacho, A., Correia, N., Aguiar, C., Mason, L., Alves, R. A., & Daniel, J. R. (2020). Parents' perceptions of student academic motivation during the COVID-19 lockdown: A cross-country comparison. *Frontiers in Psychology*, 11, Article 592670. <https://doi.org/10.3389/fpsyg.2020.592670>
- Zancajo, A. (2021). *The impact of the Covid-19 pandemic on education: Rapid review of the literature*. The British Academy. <https://www.thebritishacademy.ac.uk/documents/3226/COVID-decade-The-impact-on-education-Rapid-review-Adrian-Zancajo-Glasgow.pdf>
- Zhang, F., Jiang, Y., Huang, S., Ming, H., Ren, Y., & Wang, L. (2021). Family socioeconomic status, parental involvement and academic achievement: The moderating role of adolescents' subjective social mobility. *Journal of Early Adolescence*, 41(9), 1425–1454. <https://doi.org/10.1177/02724316211002254>



### **3.2 Study II – Reading Competence and Vocabulary of Students from Diverse Language Backgrounds: Employing a Lexical Distance Measure**

Vogel, S. N. T., & Stang-Rabrig, J. (2025). Reading competence and vocabulary of students from diverse language backgrounds: Employing a lexical distance measure. In N. McElvany, S. König, R. Schaufelberger, M. Becker, H. Gaspard, B. Heppt, & A. Naumann (Eds.), *Bildungsprozesse und Kompetenzentwicklung im Kontext sprachlicher und sozialer Heterogenität*. Beltz Juventa.

This article is not a copy of the publication and may not exactly replicate the final, authoritative version of the article published in the edited book.

### **Zusammenfassung**

Mit Blick auf die wachsende sprachliche Heterogenität fokussiert dieser Beitrag auf ein Maß lexikalischer Distanz zwischen der Herkunftssprache von multilingualen Lernenden und der Zielsprache Deutsch, welche Verkehrs- und Unterrichtssprache zugleich ist. Lexikalische Distanz wird als Prädiktor von Lesekompetenz und Wortschatz, zentrale Indikatoren des Spracherwerbs im Deutschen, genutzt. Darüber hinaus wird das Alter zugewanderter Lernender bei der Ankunft in Deutschland als möglicher Moderator von Effekten lexikalischer Distanz auf den Spracherwerb im Deutschen berücksichtigt. Anhand einer sprachlich heterogenen Stichprobe von  $N = 193$  multilingualen Vierklässler:innen mit einem hohen Anteil zugewanderter Lernender zeigten Regressionsanalysen signifikant negative Zusammenhänge der lexikalischen Distanz mit Lesekompetenz, aber nicht Wortschatz, wenn für die Sprache, die die Lernenden primär zuhause sprechen (Deutsch vs. Herkunftssprache), die generellen kognitiven Fähigkeiten und den sozioökonomischen Status kontrolliert wurde. Das Alter zugewanderter Lernender bei der Ankunft war weder als Moderator der lexikalischen Distanz noch direkt mit Lesekompetenz oder Wortschatz verbunden. Die Ergebnisse konnten also zeigen, dass lexikalische Distanz unabhängig von Zuwanderungserfahrungen der Lernenden negativ mit der Entwicklung von Lesekompetenz im Deutschen assoziiert war, während es keinen Zusammenhang mit der Herausbildung des Wortschatzes über den Einfluss der primär gesprochenen Sprache und der allgemeinen kognitiven Fähigkeiten hinaus gab.

**Schlagworte:** Grundschule; Lesekompetenz; lexikalische Distanz; sprachliche Heterogenität; Wortschatz; Zugewanderte Lernende

### Abstract

In light of growing linguistic heterogeneity, this contribution focuses on a measure of lexical distance between multilingual students' heritage language and German as a predictor of reading competence and vocabulary, indicators of the acquisition of language skills in the target language German, the common language and language of instruction in German schools. Additionally, first-generation immigrant students' age at arrival in Germany is considered as a potential moderator of lexical distance effects for language acquisition in the target language. Using a sample of  $N = 193$  multilingual fourth-grade students with a large share of first-generation immigrant students and high linguistic diversity, regression analyses showed that lexical distance was significantly negatively related to reading competence, but not vocabulary when considering whether students primarily spoke German or the heritage language at home, general cognitive abilities, and socioeconomic status as important control variables. Including immigrant students' age at arrival and its interaction with lexical distance to check moderation effects revealed no additional significant associations. Therefore, independent of immigration experiences, lexical distance was detrimental to developing reading comprehension in German but did not affect vocabulary learning beyond the effects of general cognitive abilities and primarily speaking the heritage language rather than German at home.

**Keywords:** Immigrant students; lexical distance; linguistic diversity; primary school; reading competence; vocabulary

## Introduction

Global migration movements cause classrooms to become increasingly heterogeneous in terms of cultures and languages. This especially applies to Germany as well, a popular destination for immigration, where 21.0% of fourth grade students now primarily speak another language than the common language German at home (Stubbe et al., 2023). Studies have shown that these students are often disadvantaged regarding the development of reading competence and acquisition of vocabulary in German (e.g., Henschel et al., 2022; Novita et al., 2022). However, most studies compared students based on dichotomized measures of primarily speaking German at home or not, but did not consider the large heterogeneity of languages spoken by the students who do not exclusively speak German (e.g., Stubbe et al., 2023). Although such approaches have advantages, they artificially reduce variance in the group of multilingual students, despite theoretical frameworks suggesting that specific aspects of language learning might be helped or hindered when students' first language is more or less similar to the target language (e.g., Chung et al., 2019). Furthermore, another crucial individual aspect when learning a new language is age, which might be of particular importance for immigrant students learning the common language in their new country of residence as it directly relates to their exposure to the new language. Nevertheless, the role of immigrant students' age at arrival has rarely been studied in regard of its potential moderating role for language learning when considering the linguistic variety of heritage languages (e.g., Schepens et al., 2013a). To address these research desiderates, we employed a measurement of lexical distance to assess the heterogeneity in multilingual students' backgrounds and its role for reading competence and vocabulary in the common language German as two indicators of language learning. We investigated these questions in a multilingual sample surveyed in the fourth year of primary school which is not only an important time in the development of central language competences, especially reading (Chall, 1983), but a central point for shaping educational trajectories in the German school system as well (e.g., Maaz & Nagy, 2010). Finally, we also considered the role of immigrant students' age at arrival in Germany as a potential moderator of linguistic distance's effects on language learning.

## Theory

### Immigrant-Origin Students and Language Diversity in German Schools

As one of the most sought-out destinations for immigration worldwide (International Organization for Migration [IOM], 2021), society and by extension schools in Germany are continuously becoming more diverse. The share of immigrant-origin students in Grade 4 throughout Germany was 38.3% in 2021, marking an increase of more than 50% in ten years, with the proportion of first-generation immigrant students growing disproportionately, from making up less than one tenth to now representing more than one quarter of all immigrant-origin students (Henschel et al., 2022). Since immigrant families move to Germany from a large variety of different regions and countries of origin (Statistisches Bundesamt, 2022) and the vast majority of immigrant-origin students grows up speaking at least one heritage language next to German at home (Henschel et al., 2022), the language diversity among German students is at an unprecedented high, especially in primary schools.

### Language-Related Outcomes in Primary School

Theoretical models regarding the stages of reading development (Chall, 1983) and central developmental tasks (McCormick et al., 2011) as well as international educational guidelines (Organization for Economic Co-operation and Development [OECD] et al., 2015) emphasize the importance of students developing adequate reading competence during the first years of primary school that allows them to use reading as a means to learn new information in later years of education and life. For this shift from learning to read to learning through reading (see Chall, 1983) to happen by the end of primary school, the development of good *reading competence*, describing students' ability to engage with texts in a way that allows them to generate meaning (McElvany et al., 2009), is crucial. Other closely related measures like the formation of an adequate *vocabulary*, which allows students to understand the lexical meaning of words and the concepts related to them (Aarnoutse et al., 2001), can also be understood to be indicators of achieving good language skills.

For multilingual students, who in Germany usually are of immigrant origin (Henschel et al., 2022), acquiring language skills in the country's primary language is of special importance as it represents a core acculturative task for these students (Suárez-Orozco et al., 2018). Accordingly, reading competence and vocabulary in the language of instruction have

been understood and studied frequently as important indicators of language proficiency of multilingual and language-minority students. Studies focusing on these constructs tend to find disadvantages of language-minority students compared to students speaking German as their primary language in terms of both reading competence (e.g., Segerer et al., 2021; Seuring et al., 2020; Stubbe et al., 2023) and vocabulary (e.g., Kigel et al., 2015; Marx et al., 2015; Novita et al., 2022). However, empirically investigating language-minority students inevitably means that the large heterogeneity of language backgrounds has to be operationalized in a way that still allows for meaningful statistical analyses. In consequence, studies frequently do not distinguish between different language backgrounds at all (e.g., Kigel et al., 2015; Stubbe et al., 2023) or only include large language-minority groups on their own (in the German context, often Turkish-language background students, e.g., Marx et al., 2015; Segerer et al., 2021) and subsume all other language-minority students in a single group. While the advantages of this method are apparent, it makes a compromise of sacrificing variance in students' language backgrounds to enable statistical comparison of the groups. Crucially, analyzing language effects in this way implicitly assumes that differences in multilingual students' reading competence or vocabulary when compared to other students will only be found if German is not their primary language, and that this is the only explanatory factor. That is not to say that meaningful results cannot still be attained with this method; however, it does by design largely or entirely negate the role of individual characteristics of multilingual students' heritage language for language learning and often excludes multilingual students who speak German as the primary language.

### **Language Diversity and Language Learning**

Theories of cross-language transfer have recognized the role of the similarity of the target language that is to be learned and the language – or languages – that speakers have already achieved some degree of fluency in for language learning. This aspect of language similarity, reversely framed as language distance (i.e., the dissimilarity of two languages' linguistic features), is identified as one key factor of the interactive language transfer framework by Chung et al. (2019) which combines features of four influential cross-language transfer frameworks. While some skills, like phonological awareness, appear largely unaffected by language distance, the authors emphasize that shared linguistic features can help with the

transfer of others, for example morphological and cognate awareness as well as orthographic processing to the second language. Similarly, the established model of Chiswick and Miller (1995, 2007), which focuses on the economics of language learning among immigrants and other language minorities, includes linguistic distance as part of the efficiency of language acquisition and one of the core determinants of language proficiency in second language learning.

Different studies have investigated the role of linguistic distance for language learning, and more specifically reading competence and vocabulary acquisition as central indicators of language proficiency. Common ways to operationalize linguistic distance measures utilize either morphological features, which are a result of the languages' systems of forming words and reflected in their internal structure (Aronoff & Fudeman, 2023), or lexical distance between languages, describing dissimilarities based on languages' basic vocabularies and shared lexical forms (Schepens et al., 2016). Between these two attempts, lexical distance appears to be better suited to explain differences in language proficiency (e.g., Schepens et al., 2013b, 2016). Therefore, we will focus on lexical distance as an indicator for linguistic distance in this study.

Investigating lexical distance, a series of studies using large databases of second language learners' Dutch proficiency tests has shown negative associations with language proficiency for learners with Indo-European (Schepens et al., 2013a) as well as non-Indo-European first languages (Schepens et al., 2013b). Additionally, lexical distance of both the first and second language was found to explain differences in language proficiency when Dutch was learned as a third language (Schepens et al., 2016). Similarly, using a German dataset, a negative association of lexical distance with German proficiency could be shown in a sample of immigrants over the age of 17, even when controlling for multiple other relevant constructs (Isphording & Otten, 2011). Investigating reading proficiency specifically rather than language proficiency more broadly, Borgonovi and Ferrara (2020) showed a significant negative association with lexical distance in adolescent language-minority students even when multiple control variables were considered. Finally, a study focused on Dutch adolescents learning English as a second language showed that vocabulary gains were higher when the lexical distance of English target words and their Dutch counterparts was small (Mulder et al., 2019),

implying that building a vocabulary should be relatively harder the more distant the target language is to other languages the learner is already speaking.

### **Language Learning and Age of Immigration**

Another aspect that theoretical models deem crucial for learning a new language is exposure to that language (e.g., Chiswick & Miller, 2007; Esser, 2006). This factor can be considered especially important for first-generation immigrants. Due to the strong prevalence of German as a language in public spaces in Germany, native-born multilingual speakers will usually have some exposure to German in their every-day life even if it is not the primary language spoken in their family. In contrast, first-generation immigrants will usually have little to no exposure to German before immigration, as indicated by low average self-reported German skills upon immigration among different immigrant groups (e.g., Kristen & Seuring, 2021) and the low number of immigrants from German-speaking countries (Statistisches Bundesamt, 2022). Therefore, meaningful exposure to the German language often begins upon the arrival in Germany, especially for young immigrants who lack the resources to begin learning German on their own prior to migration.

The role of lexical distance for language learning can arguably be more important for students who have less exposure to the language they are striving to learn. If language-learners have had sufficient opportunities to gain a core understanding of the language, lexical distance to their heritage language might be less relevant to learning the new language as they can draw from the knowledge about said language they already have developed through exposure. However, if they have had little exposure to the new language, they can only relate it to their heritage language in their learning process, meaning that students with a more dissimilar heritage language would be additionally disadvantaged in such scenarios. Therefore, theoretical models of second language learning include the efficiency of language learning, which is influenced by linguistic distance, and the exposure to the target language not only as relevant factors in their own right, but also their interaction as another important contributor (e.g., Esser, 2006). Extant research appears to back these theoretical considerations: Schepens et al. (2013a) found a significant negative interaction of lexical distance and age at arrival in the host country, implying that lexical distance hindered language acquisition more the older subjects were upon their immigration. A similar interaction was present among adolescent

immigrant students who had participated in the PISA study, where a positive interaction of lexical distance and early arrival (i.e., before the age of 12) emerged (Borgonovi & Ferrara, 2020). This again implied a stronger negative impact of lexical distance for language learning when students' later arrival in the host country had largely prevented earlier exposure to the new language.

### **Aims of the Study and Research Questions**

The reported theoretical considerations and extant research clearly show that the individual features of students' heritage language, indicated by lexical distance, have an influence on the acquisition of a second language, and reading competence and vocabulary in that language specifically. The role of lexical distance might be even more pronounced for first-generation immigrant students with little exposure to the target language before migration. However, previous studies were focused on either adolescent students (Borgonovi & Ferrara, 2020; Mulder et al., 2019) or largely adult immigrants (Isphording & Otten, 2011; Schepens et al., 2013a, 2013b, 2016) whereas students in primary school have not been focused, despite its status as a critical phase in language learning and the development of reading competence. Additionally, to our knowledge no study has attempted to investigate lexical distance in the context of German primary schools specifically, where students speaking a large variety of first languages face the task of becoming proficient in German. Therefore, we investigated the following research questions:

Research Question 1a: How is lexical distance of multilingual students' heritage language to German related to their reading competence and vocabulary in German?

Hypothesis 1a: The lexical distance of multilingual students' heritage language to German is significantly negatively related to students' reading competence and vocabulary in German.

Research Question 1b: Do the associations identified in Research Question 1a remain when controlling for which language (German vs. heritage language) students primarily speak at home?

Hypothesis 1b: The negative association between lexical distance of students' heritage language to German and students' reading competence and vocabulary in German is lowered but remains significant when controlling for which language students primarily speak at home.

Research Question 1c: Do the relations identified in Research Question 1b change when controlling for other significant contributors to students' reading competence and vocabulary (general cognitive abilities, socioeconomic status)?

Hypothesis 1c: The negative association between lexical distance of students' heritage language to German and students' reading competence and vocabulary in German remains stable when additionally controlling for general cognitive abilities and socioeconomic status.

Research Question 2: Is the relation of lexical distance with reading competence and vocabulary moderated by first-generation immigrant students' age at arrival in Germany?

Hypothesis 2: Age at arrival in Germany significantly negatively moderates the association of lexical distance with reading competence and vocabulary.

## Methods

### Participants and Procedure

The analysis sample consisted of  $N = 193$  multilingual fourth-grade students from 47 classes in the Ruhr metropolitan area of North-Rhine Westphalia, Germany, after all students who exclusively spoke German at home ( $n = 74$ ), for whom insufficient information on the language spoken at home was available ( $n = 10$ ), or whose data were unfit for analyses ( $n = 2$ ) had been excluded. Students were 10.49 years old on average ( $SD = 0.58$ ), and the sample was skewed towards female students (58.5% female, 39.9% male). Of the participants, 50.8% primarily spoke a heritage language and never or only sometimes German at home, whereas 49.2% mostly or almost always spoke German at home, and only sometimes a heritage language. Students reported a total of 42 different languages, detailed information on the languages is depicted in Table 1. The majority of the sample were immigrant-origin students with at least one parent born abroad (89.1%), including a comparably large amount of first-generation immigrant students born outside of Germany ( $n = 85$ ), who on average were 10.63 years old ( $SD = 0.63$ ) at the time of the study and had been 4.74 years old ( $SD = 2.50$ ) upon their arrival in Germany. The share of students primarily speaking a heritage language at home was significantly higher in first-generation immigrant students (74.1%) than in the native-born student subsample (32.4%),  $\chi^2(1) = 31.5, p < .001$ . Data was collected towards the end of the 2021/2022 school year in the context of the MERCUR-funded study *School Integration of Newly Immigrated Children (SIGN)*, a joint research project by the University of

**Table 1**

*Number of Times Languages and Language Families Other than German Were Reported as Being Spoken at Home in the Sample*

Language	<i>n</i>	%
<b>Afro-Asiatic languages</b>	<b>59</b>	<b>30.6</b>
Arabic (incl. different dialects)	53	27.5
<i>Other Afro-Asiatic languages</i>	6	3.1
<b>Dravidian languages</b>	<b>2</b>	<b>1.0</b>
<b>Indo-European languages</b>	<b>123</b>	<b>63.7</b>
English	28	14.5
Kurdish	14	7.3
Polish	17	8.8
Romanian	7	3.6
Russian	6	3.1
Spanish	8	4.1
<i>Indo-Aryan languages</i>	8	4.1
<i>Italo-Western Romance languages</i>	9	4.6
<i>Persian languages</i>	7	3.6
<i>South Slavic languages</i>	10	5.2
<i>Other Indo-European languages</i>	9	4.6
<b>Niger-Congo languages</b>	<b>12</b>	<b>6.2</b>
<i>Volta-Congo languages</i>	10	5.2
<i>Other Niger-Congo languages</i>	2	1.0
<b>Turkic languages</b>	<b>35</b>	<b>18.1</b>
Turkish	34	17.6
<i>Other Turkic languages</i>	1	0.5

*Notes.* Students could name multiple languages spoken at home. Only languages reported by more than five children are depicted separately. All other languages were grouped into the next higher subgroup (indicated by *italics*) following classification by Eberhard et al. (2024) until a group comprising more than five students was reached.

Duisburg-Essen, Ruhr University Bochum, and the Center for Research on Education and School Development at TU Dortmund University. During the study, which took part in the classroom context or small groups during regular instruction time, students filled in well-established, standardized tests and self-report questionnaires in paper-pencil form. The study was conducted by two or three trained research administrators per class, depending on class size, and took 90 minutes. Participation in the study required parents' consent and was voluntary, with students who did not participate being given alternative tasks by their teachers. The study met ethical standards and was approved by the ethics committee of the Department of Psychology, University of Duisburg-Essen.

### Measures

An overview of descriptive information for all measures included in the study is given in Table 2. To assess *lexical distance* between students' heritage languages and German, we used the Automated Similarity Judgment Program (ASJP; Wichmann et al., 2022), which encompasses information on 5590 distinct languages following the ISO 639-3 classification (International Organization for Standardization, 2023). ASJP makes use of wordlists of these different languages containing 40 words (Holman et al., 2008), a subset of a 100-word list developed by Swadesh (1955) for lexicostatistic dating. These words are transcribed into a standardized orthography featuring seven vowel and 34 consonant symbols (Holman et al., 2008). With these wordlists, a Levenshtein distance is calculated (Levenshtein, 1966), an indicator of the smallest possible number of substitutions, additions, or deletions of symbols necessary to transform the target word in one language into the word with the same meaning in the other (for an example, see Figure 1).

The distance index is then modified in two steps to take into account coincidental similarities, for example introduced by a general overlap of the phoneme inventories of two languages, and better reflect actual relation between languages (for a detailed description, see Wichmann et al., 2010). We calculated the lexical distance to German<sup>1</sup> for each language reported by students, then transformed values so they would fall on a scale ranging from 1 (lowest distance, in our sample: English) to 10 (highest lexical distance to German, in our

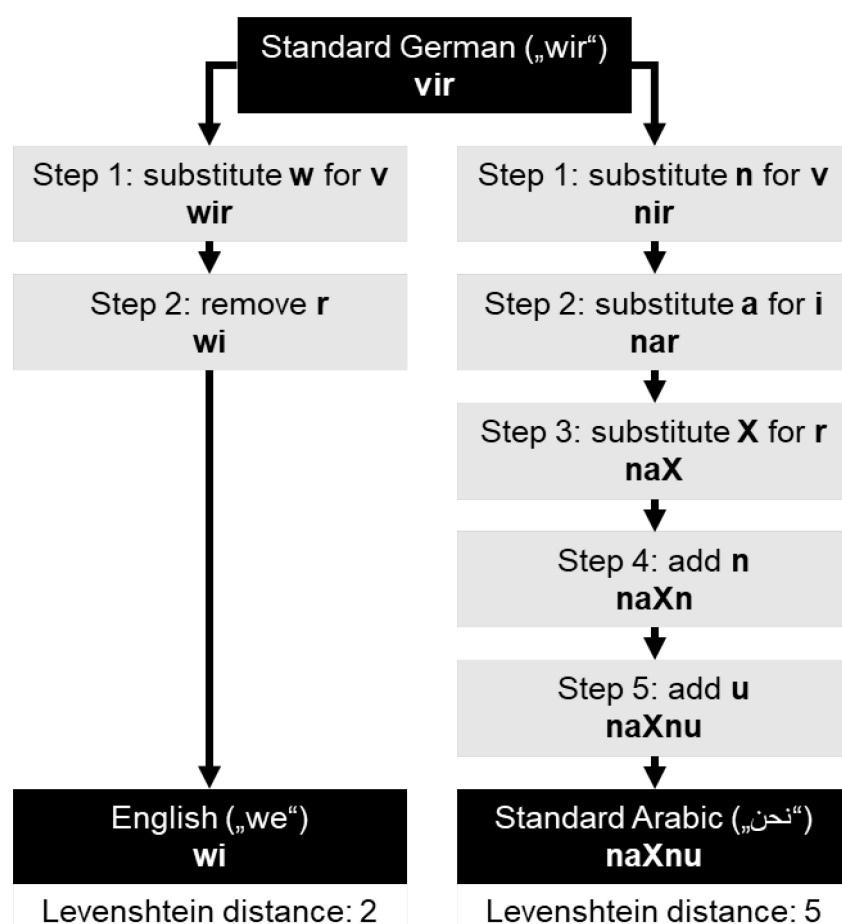
---

<sup>1</sup> ASJP offers two wordlists for Standard German, the results reported here use wordlist "Standard German". We also replicated analyses using wordlist "Standard German 2", and results remained stable.

sample: Fula). Students who reported speaking multiple languages other than German at home were appointed the value of the language with the smallest lexical distance to German. The distribution of lexical distance in the sample, differentiated by the language students primarily spoke at home, is depicted in Figure 2. The language families depicted in Table 1 are roughly reflected in the distribution of linguistic distance: While Germanic languages, mostly English in our sample, have a value equal or close to 1, other Indo-European languages tend to fall in the range between 6 and 9, whereas languages from other language families mostly are assigned values between 9 and 10.

**Figure 1**

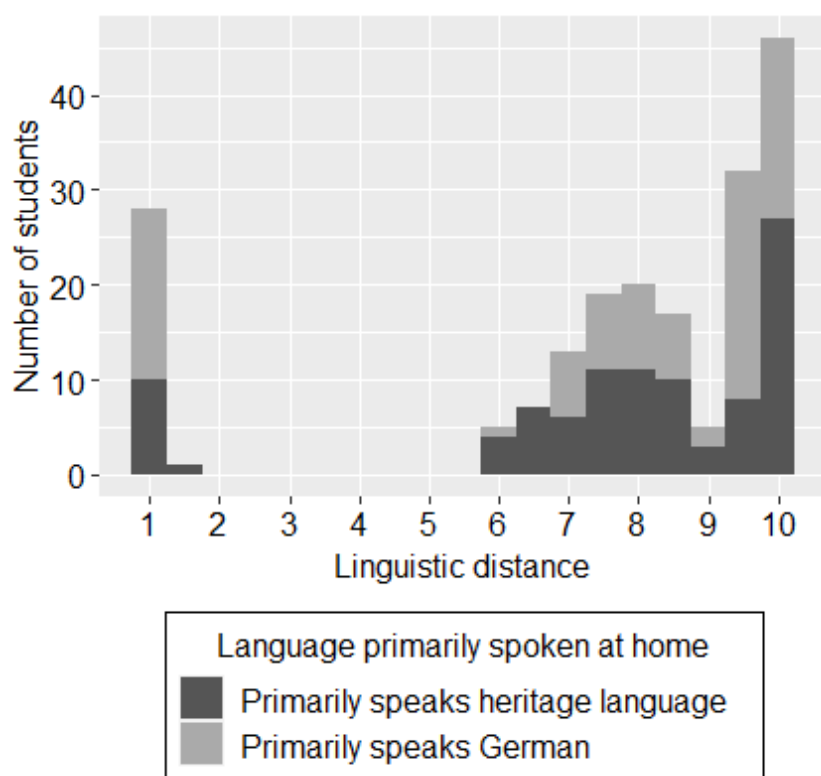
*Example for the Calculation of a Levenshtein Distance for the Target Word “We” for Standard German with English and Standard Arabic, Respectively.*



*Note.* ASJP standardized orthography transcriptions of the words that are used in the calculation of the Levenshtein distance are printed bold.

**Figure 2**

*Distribution of Lexical Distance to German in the Sample, Differentiated by Language Primarily Spoken in the Student's Home*



As dependent variables, we assessed *reading competence*, a measure of students' ability to understand information presented in short texts, with 26 items from the standardized ELFE II-instrument (Lenhard et al., 2017). Additionally, we utilized 16 items taken from the German PIRLS 2021 study to measure students' passive *vocabulary* (Schaufelberger et al., 2024). In this test, students had to pick a synonym for each target word among four options offered (e.g., "room" – "view/ chamber/ meal/ music"). Both instruments showed good internal consistency,  $\alpha = .86$  for reading competence and  $\alpha = .68$  for vocabulary, respectively. As control variables, we used a dichotomized index of the frequency of speaking German at home as an indicator whether the primary language each student spoke at home was German or the heritage language (0 = *primarily speaks heritage language [never or sometimes German]*, 1 = *primarily speaks German [mostly or almost always German]*). We further included students' general *cognitive abilities*, assessed with a 25-item figural subtest of the well-established KFT 4-12+R test (Heller & Perleth, 2000), which showed excellent internal consistency,  $\alpha = .90$ . Regarding *socioeconomic status*, we utilized student-reported number of

books at home (Schaufelberger et al., 2024) to form a dichotomous indicator of socioeconomic status (0 = *below or average number of books [0–10 books, 11–25 books]*, 1 = *above average number of books [26–100 books, 101–200 books, more than 200 books]*). Finally, for Research Question 2, we also assessed immigrant students' *age at arrival* in Germany, which was calculated as the difference between students' age at the time of the study and their self-reported number of years of living in Germany. For students who had been born in Germany, age at arrival was set to zero.

### **Analytic Approach**

All analyses were conducted with R 4.3.1 (R Core Team, 2023), run in the RStudio environment (Posit team, 2023). For all research questions, we specified (multiple) regression models with reading competence and vocabulary, respectively, as dependent variables. To make results more easily comparable, reading competence and vocabulary were standardized for the analyses. For Research Question 1a, we included lexical distance as a predictor. To assess Research Question 1b, we added information about students' primary language at home as a control variable. Similarly, for Research Question 1c, cognitive abilities and socioeconomic status were included in the models as additional control variables. Finally, to answer Research Question 2, we additionally included students' age at arrival in Germany as well as the interaction of age at arrival and lexical distance as predictors.

Power analyses revealed that, assuming mid-sized effects, an  $\alpha$ -error rate of 5%, and a power of 95%, a sample of  $N = 146$  students was required, meaning that the sample of  $N = 193$  students was sufficient for analyses.

## **Results**

### **Descriptive Results**

Intercorrelations among all variables included in the study are depicted in Table 2, alongside descriptive information. Correlations indicated a large positive association of the two dependent variables, reading competence and vocabulary. The positive correlation found between lexical distance and age at arrival must be interpreted with the coding of the variables in mind (i.e., native-born students' age at arrival being coded as 0). Among the subsample of first-generation immigrant students, the correlation between the two variables was no longer

significant ( $r = -.01$ , not depicted). Due to these findings in the subsample and the coding of the variables, we can infer that the correlation of lexical distance with age at arrival indicates that multilingual students who were born in Germany on average spoke languages more similar to German at home than immigrant students.

**Table 2**

*Correlations and Descriptive Information of All Measures*

Measure	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lexical distance	—	-.05	-.27*	-.13	-.03	-.16	.11*
Primary lang. <sup>a</sup>		—	.13	.29*	.13	.06	-.41*
Reading comp.			—	.51*	.18	.11	-.26*
Vocabulary				—	.24*	.15	-.30*
Cognitive ability					—	.10	-.06
SES <sup>a</sup>						—	-.21 <sup>†</sup>
Age at arrival <sup>b</sup>							—
<i>M</i>	7.46	0.49	11.32	7.01	12.86	0.40	2.02
<i>SD</i>	2.92	—	4.63	3.12	6.46	—	2.85
% missing	0.0	0.0	1.0	0.0	0.5	5.2	2.6

<sup>a</sup> Dummy-coded binary variable (primary language: 0 = heritage language, 1 = German; SES: 0 = below- or average number of books, 1 = above-average number of books).

<sup>b</sup> Reported for the whole sample. Among the immigrant-student subsample, the mean age at arrival was  $M = 4.74$  ( $SD = 2.50$ ).

\*  $p < .05$ . <sup>†</sup>  $p < .10$ .

### **Associations of Lexical Distance with Reading Competence and Vocabulary**

Results of the regression models for Research Questions 1a, 1b, and 1c, respectively, are reported in Table 3. All specified regression models significantly predicted reading competence,  $F_{RQ1a}(1, 189) = 14.70, p < .001$ ;  $F_{RQ1b}(2, 188) = 8.76, p < .001$ ;  $F_{RQ1c}(4, 175) = 5.63, p < .001$ . Regarding vocabulary, all models were significant, although Model 1a only at the 10%-level,  $F_{RQ1a}(1, 191) = 3.16, p = 0.077$ ;  $F_{RQ1b}(2, 190) = 9.94, p < .001$ ;  $F_{RQ1c}(4, 177) = 7.32, p < .001$ .

**Table 3***Results of Regression Analyses for Research Questions 1a, 1b, and 2*

Predictors	Reading compet.		Vocabulary	
	<i>b</i>	<i>p</i>	<i>b</i>	<i>p</i>
<i>Research Question 1a</i>				
Lexical distance	-0.09*	<.001	-0.04 <sup>†</sup>	.077
<i>R</i> <sup>2</sup>	.07		.01	
<i>Research Question 1b</i>				
Lexical distance	-0.09*	<.001	-0.04	.103
Primary lang.	0.23	.103	0.56*	<.001
<i>R</i> <sup>2</sup> <sub>adjusted</sub>	.08		.09	
<i>Research Question 1c</i>				
Lexical distance	-0.09*	<.001	-0.03	.196
Primary lang.	0.15	.297	0.48*	<.001
Cognitive abilities	0.02*	.042	0.03*	.005
SES	0.10	.477	0.22	.133
<i>R</i> <sup>2</sup> <sub>adjusted</sub>	.09		.12	
<i>Research Question 2</i>				
Lexical distance	-0.08*	.492	-0.03	.320
Primary lang.	-0.04	.792	0.28 <sup>†</sup>	.072
Cognitive abilities	0.02*	.037	0.03*	.005
SES	-0.01	.960	0.09	.540
Age at arrival	-0.07	.394	-0.10	.202
Lexical distance × Age at arrival	-0.00	.902	0.00	.739
<i>R</i> <sup>2</sup> <sub>adjusted</sub>	.12		.14	

*Note.* Regression coefficients are unstandardized, but dependent variables were standardized before analyses.

\*  $p < .05$ . <sup>†</sup>  $p < .10$ .

Specifically, analyses showed that lexical distance was negatively related to both reading competence and vocabulary. For reading competence, these relations remained stable

when information about students' primary language, cognitive abilities, and socioeconomic status were included as control variables. This indicates that even under control of other central predictors, multilingual children's average reading competence was lower when their heritage language's lexical distance to German was higher. For example, when control variables are included, a child speaking Arabic at home, receiving a value of 9.86 for lexical distance in our sample, would on average score 0.87 standard deviations lower on the reading competence test.

Regarding vocabulary, the small negative association between lexical distance and test score found in Model 1a was no longer significant once information regarding students' primary language was included, as speaking German rather than the heritage language as the primary language at home was strongly positively associated with students' vocabulary. These findings remained stable when the additional control variables were included as well.

The amount of variance explained by these models, following conventions by Cohen (1988), was small to medium. Moreover, Hypotheses 1a, 1b, and 1c were supported by the analyses regarding reading competence, but only Hypothesis 1a was supported for vocabulary.

### **Moderation of the Influence of Lexical Distance by Age at Arrival**

Results of the moderation analyses described in Research Question 2 are also depicted in Table 3, with the overall regression models again being significant for predicting reading competence,  $F(6, 170) = 4.83, p < .001$ , and vocabulary,  $F(6, 171) = 5.72, p < .001$ . Neither immigrant students' age at arrival nor its interaction with lexical distance were significant predictors of students' reading competence or vocabulary in German. The models explained a medium amount of variance (Cohen, 1988). Hypothesis 2 could not be confirmed for either reading competence or vocabulary.

## **Discussion**

### **Discussion of Findings**

The aim of this study was to investigate the role of the lexical distance of multilingual elementary school students' heritage language to the target language German when regarding reading competence and vocabulary in German. Lexical distance was proposed as an alternative measure that reflects the heterogeneity of students' languages, in contrast to

common approaches that subsume multilingual students from a variety of different language backgrounds in one group and, to our knowledge, implemented in the context of German elementary school for the first time.

Analyses regarding Research Question 1a showed significant negative associations of lexical distance with both reading competence and vocabulary. When information whether German or a heritage language was spoken as the primary language at home (Research Question 1b), general cognitive abilities, and socioeconomic status (Research Question 1c) were included as control variables in the analyses, lexical distance remained a significant predictor of reading competence, but not vocabulary. These findings imply that multilingual students on average had lower German-language reading competence the more dissimilar their heritage language was to German, whereas speaking German as primary language at home rather than the heritage language, but not lexical distance was significantly related to the formation of students' vocabulary. Confirming the assumptions made in Hypotheses 1a and, for reading competence, Hypotheses 1b and 1c, these results are in line with previous findings regarding the role of lexical distance for language competence in general (e.g., Isphording & Otten, 2011) as well as reading competence (e.g., Borgonovi & Ferrara, 2020), but not vocabulary (e.g., Mulder et al., 2019) in older students.

For Research Question 2, first-generation immigrant students' age at arrival and its interaction with lexical distance were additionally included in the analyses. Contrary to our expectations and previous findings, neither immigrant students' age of arrival itself nor its interaction with lexical distance were significantly related to either reading competence or vocabulary in German (e.g., Borgonovi & Ferrara, 2020; Schepens et al., 2013a). This indicates that the effects of lexical distance on acquiring reading competence and vocabulary in German were similar for all students, independent of whether they were born in Germany and, if they were not, their age upon their arrival in Germany. Therefore, Hypothesis 2 could not be confirmed.

### **Limitations and Strengths**

Some limitations must be considered when discussing the results of the study. As data were acquired in a cross-sectional design, we cannot draw causal inferences from the analyses. Therefore, we also could not include reciprocal effects of students' language abilities in German

and their heritage language used at home. For our analyses, we assumed that students' heritage language usage at home and its lexical distance to German affected their reading competence and vocabulary in German. While this assumption is plausible, it is possible that effects in the opposite direction exist as well: If students' language ability in German are higher, indicated by better reading competence and a larger vocabulary, there might also be a higher probability that they speak German at home as a consequence. Some additional limitations arise from the way students' languages spoken at home were assessed: First, because students only provided concrete information about how often they spoke German at home and merely listed all additional languages, we could not determine which language was spoken most frequently in cases where more than one additional language was listed. Second, this also means that we could not consider the implication of earlier studies that, when learning German as a third language, the lexical distance to both the first and second language may influence students' language acquisition in German to varying degrees (Schepens et al., 2016). Third, while the free-text method of entry offered the possibility to do so, only few students in the largest heritage-language group, Arabic speakers, indicated the dialect they spoke at home (e.g., "Syrian (Arabic)"). Therefore, we classified all Arabic speaking students as if they spoke Modern Standard Arabic, meaning that the considerable variance between the different Arabic dialects (see e.g., Abu Kwaik et al., 2018) was not represented in full in our analyses. The measurement approach in the study also poses a limitation regarding socioeconomic status, as the number of books at home can be used as an informative indicator of socioeconomic status but should ideally be reported by parents rather than students and used in combination with other indicators like information regarding parents' occupation (see e.g., Heppt et al., 2022). Finally, the sample was comparably small and only small shares of students from each class participated in the study on average which prohibited a multilevel analysis of the associations under consideration of the data clustering in classrooms. Additionally, due to the overrepresentation of multilingual and immigrant students, the sample was not representative for the German student body and results cannot necessarily be generalized for all students.

Nevertheless, the sample composition also poses a strength of the study. Since comparably diverse schools were recruited for the study, the sample included students from a wide variety of language backgrounds and many first-generation immigrant students, allowing a robust analysis of our research questions with a somewhat smaller sample. Another strength

is the use of the ASJP database to assess lexical distance of the languages. The large number of languages already implemented in the ASJP database means that reliable information for all relevant languages in our study could be found, but also that the program can easily be used in future studies to assess lexical distance. Although not needed for our analyses, entering information for new languages into the program is easy on a technical level, meaning that the tool can flexibly be adapted as long as reliable information about the 40 words the distance measure is based on can be provided for all languages required. Moreover, including first-generation immigrant students' age at arrival in Germany as well as its interaction with lexical distance allowed us to separate age- and exposure-effects from the influence of lexical distance, but also consider their interplay when it comes to immigrant students' reading competence and vocabulary formation. Finally, in contrast to the majority of studies investigating lexical distance effects, rather than investigating adolescents or adult second-language learners, we focused on students in the last year of primary school, which marks the end of a crucially important period in language learning in general and the development of reading competence specifically.

### **Implications for Research and Practice**

Several implications for future research can be drawn from the results of our study. First, we included a variable to distinguish whether German or a heritage language was the primary language spoken in students' home. While this reflects students' current language situation, future studies should also investigate how lexical distance affects language learning depending on which language, German or the heritage language, students learned first. Additionally, the role of proficiency in the heritage language should be included in future investigations of lexical distance effects as well to gain a better understanding which areas of language learning are affected by lexical distance specifically as opposed to more general spillover effects of a high proficiency in another language, but also how these two aspects may interact. Furthermore, by including other aspects of linguistic distance besides lexical distance, for example considering (dis-)similarities in morphology and orthography between languages, future research can investigate whether these can substantially improve the measurement of linguistic distance and help understand how its various aspects affect different indicators of language learning. In a similar way, other important factors for language learning as

highlighted by theoretical models, for example incentives to learn the new language (e.g., Chiswick & Miller, 2007; Esser, 2006), can be included and related to lexical distance in future research. Finally, lexical distance has great potential to investigate associations with language learning beyond the individual level in terms of classroom composition, as the distance between the heritage languages of each pair of students within a classroom can be calculated with relative ease and in turn be used to aggregate a precise indicator of language heterogeneity in the classrooms.

Similarly, implications for educational practice can be deduced from the study at hand. In light of growing multilingualism and increasing linguistic heterogeneity in society in general and in school classes in particular (e.g., Henschel et al., 2022; Statistisches Bundesamt, 2022) and the repeatedly shown disadvantages of language-minority students regarding school performances such as reading competence (OECD, 2023; Stubbe et al., 2023), it is extremely relevant to provide pedagogical staff with sufficient training in dealing with multilingualism and to advertise existing extracurricular language promotion offers in the respective language of instruction. Corresponding offers in school could include, for example, providing lessons in foreign languages (Mediendienst Integration, 2024). However, this should also be viewed critically in light of the possible separation of these children from their majority-language classmates (see also e.g., Höckel & Schilling, 2022). In any case, it seems advisable to adapt the school system more effectively to multilingualism and to introduce established multilingualism concepts, which already exist in some federal states (Mediendienst Integration, 2024), more widely. Understanding how different aspects of linguistic distance influence the acquisition of language competence in the target language German can help with identifying means how students' existing skills in their heritage language can be used for language learning and areas where they might profit most from additional support as well. For newly immigrated students, a direct and intensive language support in German is essential so that they can catch up with the mainstream class as early as possible (Mediendienst Integration, 2024). This is especially important considering that well-marked reading competence and vocabulary in German are immensely important not only for German lessons, but also for learning in other subjects and for societal participation. Ultimately, however, it is important to value the existing linguistic diversity and view it as a resource (e.g., Edele et al., 2023; Illman & Pietilä, 2018).

## References

- Aarnoutse, C., van Leeuwe, J., Voeten, M., & Oud, H. (2001). Development of decoding, reading comprehension, vocabulary and spelling during the elementary school years. *Reading and Writing, 14*(1/2), 61–89. <https://doi.org/10.1023/A:1008128417862>
- Abu Kwaik, K., Saad, M., Chatzikyriakidis, S., & Dobnik, S. (2018). A lexical distance study of Arabic dialects. *Procedia Computer Science, 142*, 2–13. <https://doi.org/10.1016/j.procs.2018.10.456>
- Aronoff, M., & Fudeman, K. (2023). *What is morphology?* (3<sup>rd</sup> ed.). John Wiley & Sons Inc.
- Borgonovi, F., & Ferrara, A. (2020). Academic achievement and sense of belonging among non-native-speaking immigrant students: The role of linguistic distance. *Learning and Individual Differences, 81*, 101911. <https://doi.org/10.1016/j.lindif.2020.101911>
- Chall, J. S. (1983). *Stages of reading development*. McGraw-Hill Book Company.
- Chiswick, B. R., & Miller, P. W. (1995). The endogeneity between language and earnings: International analyses. *Journal of Labor Economics, 13*(2), 246–288. <https://doi.org/10.1086/298374>
- Chiswick, B. R., & Miller, P. W. (2007). *The economics of language: International analyses*. Routledge.
- Chung, S. C., Chen, X., & Geva, E. (2019). Deconstructing and reconstructing cross-language transfer in bilingual reading development: An interactive framework. *Journal of Neurolinguistics, 50*, 149–161. <https://doi.org/10.1016/j.jneuroling.2018.01.003>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed.). Erlbaum.
- Eberhard, D. M., Simons, G. F., & Fennig, C. D. (Eds.). (2024). *Ethnologue: Languages of the world* (27<sup>th</sup> ed.). SIL International. <https://www.ethnologue.com>
- Edele, A., Seuring, J., Schotte, K., Kristen, C., & Stanat, P. (2023). Is the first language a resource, an obstacle, or irrelevant for language minority students' education? In S. Weinert, G. J. Blossfeld, & H.-P. Blossfeld (Eds.), *Education, competence development and career trajectories: Analysing data of the National Educational Panel Study (NEPS)* (pp. 349–367). Springer International Publishing. [https://doi.org/10.1007/978-3-031-27007-9\\_16](https://doi.org/10.1007/978-3-031-27007-9_16)
- Esser, H. (2006). *Migration, Sprache und Integration* (AKI-Forschungsbilanz 4). Arbeitsstelle Interkulturelle Konflikte und gesellschaftliche Integration, Wissenschaftszentrum Berlin für Sozialforschung. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-113493>
- Heller, K. A., & Perleth, C. (2000). *KFT 4-12+R: Kognitiver Fähigkeitstest für 4. bis 12. Klassen, Revision* [KFT 4-12+R: Cognitive ability test for Grades 4 to 12]. Beltz.
- Henschel, S., Heppt, B., Rjosk, C., & Weirich, S. (2022). Zuwanderungsbezogene Disparitäten [Immigration-related disparities]. In P. Stanat, S. Schipolowski, R. Schneider, K. A. Sachse, S. Weirich, & S. Henschel (Eds.), *IQB-Bildungstrend 2021: Kompetenzen in den Fächern Deutsch und Mathematik am Ende der 4. Jahrgangsstufe im dritten Ländervergleich* (pp. 181–219). Waxmann.
- Heppt, B., Olczyk, M., & Volodina, A. (2022). Number of books at home as an indicator of socioeconomic status: Examining its extensions and their incremental validity for academic achievement. *Social Psychology of Education, 25*(4), 903–928. <https://doi.org/10.1007/s11218-022-09704-8>

- Höckel, L. S., & Schilling, P. (2022). *Starting off on the right foot - Language learning classes and the educational success of immigrant children* (Ruhr Economics Paper No. 983). RWI - Leibniz-Institut für Wirtschaftsforschung. <https://doi.org/10.4419/96973148>
- Holman, E. W., Wichmann, S., Brown, C. H., Velupillai, V., Müller, A., & Bakker, D. (2008). Explorations in automated language classification. *Folia Linguistica*, 42(2), 331–354.
- Illman, V., & Pietilä, P. (2018). Multilingualism as a resource in the foreign language classroom. *ELT Journal*, 72(3), 237–248. <https://doi.org/10.1093/elt/ccx073>
- International Organization for Migration. (2021). *World migration report 2022*. United Nations. <https://www.un-ilibrary.org/content/books/9789292680763>
- International Organization for Standardization (2023). *Code for individual languages and language groups* (ISO Standard No. 639:2023). <https://www.iso.org/standard/74575.html>
- Isphording, I. E., & Otten, S. (2011). *Linguistic distance and the language fluency of immigrants* (Ruhr Economics Papers No. 274). Rheinisch-Westfälisches Institut für Wirtschaftsforschung. <https://hdl.handle.net/10419/61444>
- Kigel, R. M., McElvany, N., & Becker, M. (2015). Effects of immigrant background on text comprehension, vocabulary, and reading motivation: A longitudinal study. *Learning and Instruction*, 35, 73–84. <https://doi.org/10.1016/j.learninstruc.2014.10.001>
- Kristen, C., & Seuring, J. (2021). Destination-language acquisition of recently arrived immigrants: Do refugees differ from other immigrants? *Journal for Educational Research Online*, 13(1), 128–156. <https://doi.org/10.31244/jero.2021.01.05>
- Lenhard, W., Lenhard, A., & Schneider, W. (2017). *ELFE II: Ein Leseverständnistest für Erst- bis Siebtklässler* [ELFE II: A reading comprehension test for Grades 1 to 7]. Hogrefe.
- Levenshtein, V. I. (1966). Binary codes capable of correcting deletions, insertions, and reversals. *Soviet Physics-Doklady*, 10(8), 707–710.
- Maaz, K., & Nagy, G. (2010). Der Übergang von der Grundschule in die weiterführenden Schulen des Sekundarschulsystems: Definitionen, Spezifikationen und Quantifizierung primärer und sekundärer Herkunftseffekte. In K. Maaz, J. Baumert, C. Gresch, & N. McElvany (Eds.), *Der Übergang von der Grundschule in die weiterführende Schule: Leistungsgerechtigkeit und regionale, soziale und ethnisch-kulturelle Disparitäten* (pp. 151–180). Bundesministerium für Bildung und Forschung (BMBF) Referat Bildungsforschung.
- Marx, A., Stanat, P., Roick, T., Segerer, R., Marx, P., & Schneider, W. (2015). Components of reading comprehension in adolescent first-language and second-language students from low-track schools. *Reading and Writing*, 28(6), 891–914. <https://doi.org/10.1007/s11145-015-9554-3>
- McCormick, C. M., Kuo, S. I.-C., & Masten, A. S. (2011). Developmental tasks across the life span. In K. L. Fingerman, C. Berg, J. Smith, & T. C. Antonucci (Eds.), *Handbook of life-span development* (pp. 117–140). Springer Publishing Company.
- McElvany, N., Becker, M., & Lüdtke, O. (2009). Die Bedeutung familiärer Merkmale für Lesekompetenz, Wortschatz, Lesemotivation und Leseverhalten [The relevance of family characteristics for reading competence, vocabulary, reading motivation and reading behavior]. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie*, 41(3), 121–131. <https://doi.org/10.1026/0049-8637.41.3.121>

- Mediendienst Integration. (2024). *Mehrsprachigkeit* [Multilingualism]. Rat für Migration. <https://mediendienst-integration.de/integration/mehrsprachigkeit.html>
- Mulder, E., van de Ven, M., Segers, E., & Verhoeven, L. (2019). Context, word, and student predictors in second language vocabulary learning. *Applied Psycholinguistics*, *40*(1), 137–166. <https://doi.org/10.1017/S0142716418000504>
- Novita, S., Lockl, K., & Gnambs, T. (2022). Reading comprehension of monolingual and bilingual children in primary school: The role of linguistic abilities and phonological processing skills. *European Journal of Psychology of Education*, *37*(4), 993–1013. <https://doi.org/10.1007/s10212-021-00587-5>
- Organization for Economic Co-operation and Development. (2023). *Pisa 2022 results (Volume I): The state of learning and equity in education*. OECD Publishing. <https://doi.org/10.1787/53f23881-en>
- Organization for Economic Co-operation and Development, European Union, & UNESCO Institute for Statistics. (2015). *Isced 2011 Operational Manual: Guidelines for classifying national education programmes and related qualifications*. OECD Publishing. <https://doi.org/10.1787/9789264228368-en>
- Posit team. (2023). *RStudio: Integrated development environment for R* (Version 2023.6.1.524) [Computer software]. Posit Software, PBC. <https://www.posit.co>
- R Core Team. (2023). *R: A language and environment for statistical computing* (Version 4.3.1) [Computer software]. R Foundation for Statistical Computing. <https://www.R-project.org>
- Schaufelberger, R., Kleinkorres, R., Becher, L., Ludewig, U., Lorenz, R., & McElvany, N. (2024). *IGLU 2021. Skalenhandbuch zur Dokumentation der Erhebungsinstrumente und Arbeit mit den Datensätzen* [PIRLS 2021. Handbook for the documentation of measurement instruments and working with the datasets]. Waxmann Verlag GmbH. <https://doi.org/10.31244/9783830998990>
- Schepens, J., van der Slik, F., & van Hout, R. (2013a). The effect of linguistic distance across Indo-European mother tongues on learning Dutch as a second language. In L. Borin & A. Saxena (Eds.), *Trends in Linguistics: Studies and monographs: Vol. 265. Approaches to measuring linguistic differences* (pp. 199–229). De Gruyter Mouton.
- Schepens, J., van der Slik, F., & van Hout, R. (2013b). Learning complex features: A morphological account of L2 learnability. *Language Dynamics and Change*, *3*(2), 218–244. <https://doi.org/10.1163/22105832-13030203>
- Schepens, J., van der Slik, F., & van Hout, R. (2016). L1 and L2 distance effects in learning L3 Dutch. *Language Learning*, *66*(1), 224–256. <https://doi.org/10.1111/lang.12150>
- Segeer, R., Niklas, F., Suggate, S., & Schneider, W. (2021). Young minority home-language students' biased reading self-concept and its consequences for reading development. *Reading Research Quarterly*, *56*(1), 71–94. <https://doi.org/10.1002/rrq.300>
- Seuring, J., Rjosk, C., & Stanat, P. (2020). Ethnic classroom composition and minority language use among classmates: Do peers matter for students' language achievement? *European Sociological Review*, *36*(6), 920–936. <https://doi.org/10.1093/esr/jcaa022>

- Statistisches Bundesamt. (2022). *Bevölkerung und Erwerbstätigkeit: Bevölkerung mit Migrationshintergrund - Ergebnisse des Mikrozensus 2021* [Population and occupation: Population with migration background - Results of the Mikrozensus 2021]. [https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Migration-Integration/Publicationen/Downloads-Migration/migrationshintergrund-endergebnisse-2010220217004.pdf?\\_\\_blob=publicationFile](https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Migration-Integration/Publicationen/Downloads-Migration/migrationshintergrund-endergebnisse-2010220217004.pdf?__blob=publicationFile)
- Stubbe, T. C., Kleinkorres, R., Krieg, M., Schaufelberger, R., & Schlitter, T. (2023). Soziale und migrationsbedingte Disparitäten in der Lesekompetenz von Viertklässlerinnen und Viertklässlern [Social and migration-related disparities in fourth graders' reading competence]. In N. McElvany, R. Lorenz, A. Frey, F. Goldhammer, A. Schilcher, & T. C. Stubbe (Eds.), *IGLU 2021: Lesekompetenz von Grundschulkindern im internationalen Vergleich und im Trend über 20 Jahre* (pp. 151–177). Waxmann Verlag GmbH.
- Suárez-Orozco, C., Motti-Stefanidi, F., Marks, A., & Katsiaficas, D. (2018). An integrative risk and resilience model for understanding the adaptation of immigrant-origin children and youth. *American Psychologist*, *73*(6), 781–796. <https://doi.org/10.1037/amp0000265>
- Swadesh, M. (1955). Towards greater accuracy in lexicostatistic dating. *International Journal of American Linguistics*, *21*(2), 121–137.
- Wichmann, S., Holman, E. W., Bakker, D., & Brown, C. H. (2010). Evaluating linguistic distance measures. *Physica a: Statistical Mechanics and Its Applications*, *389*(17), 3632–3639. <https://doi.org/10.1016/j.physa.2010.05.011>
- Wichmann, S., Holman, E. W., & Brown, C. H. (2022). *The ASJP database* (Version 20) [Computer software]. <https://asjp.clld.org/>

### 3.3 Study III – The Role of the Family for Succeeding in Late Primary School: Comparing First Generation-, Second Generation-, and Non-Immigrant Students

Vogel, S. N. T., Stang-Rabrig, J., Jugert, P., Leyendecker, B., & McElvany, N. (2025). *The role of the family for succeeding in late primary school: Comparing first generation-, second generation-, and non-immigrant students.* PsyArXiv. [https://doi.org/10.31234/osf.io/fg96j\\_v3](https://doi.org/10.31234/osf.io/fg96j_v3)

A revised version of this manuscript has in the meantime been published in the journal *Zeitschrift für Pädagogische Psychologie*:

Vogel, S. N. T., Stang-Rabrig, J., Jugert, P., Leyendecker, B., & McElvany, N. (2025). The role of the family for succeeding in late primary school: Comparing first generation-, second generation-, and non-immigrant students. *Zeitschrift für Pädagogische Psychologie*. Advance online publication. <https://doi.org/10.1024/1010-0652/a000403>

This article reflects the version of the manuscript that was under review at the journal *Zeitschrift für Pädagogische Psychologie* and has additionally been published as a preprint.

It does not exactly replicate the final, authoritative version of the article published in the journal *Zeitschrift für Pädagogische Psychologie*.

### Abstract

A steady rise in global migration has led to a growing share of immigrant-origin children in schools, who face manifold challenges. Primary schools are a key environment for students' development and adaptation, and normative developmental, psychological adjustment, and acculturative tasks shaping their adaptation are reflected in different measures of school success. Additionally, students' families can support their development, but the specific mechanisms may vary between first-, second-generation, and non-immigrant students. Thus, there is a need to investigate adaptation processes of first- and second-generation immigrant students separately and in comparison to their non-immigrant peers. For a comprehensive view, we investigated several central measures of school success (reading competence, grade point average, track recommendation, life satisfaction), as well as the role of the family, including structure variables (majority language use, socio-economic status), educational beliefs (educational aspirations), and processes (parent-child reading). Based on  $N = 271$  German fourth-graders ( $M_{\text{age}} = 10.47$  years,  $SD = 0.55$ ;  $n = 102$  first-generation,  $n = 68$  second-generation,  $n = 101$  non-immigrants), we found disadvantages regarding first-generation students' reading competence, grades, and likelihood of receiving a high track recommendation compared to second-generation and/or non-immigrant students. No significant differences emerged between second-generation and non-immigrant students. Multigroup analyses revealed that educational aspirations were positively associated with grades and parent-child reading with higher life satisfaction in general. Further, life satisfaction was positively linked to educational aspirations in first-generation immigrant students only, and to socioeconomic status among second-generation immigrant students. The results highlight families as a source of valuable resources to protect students against educational disadvantages, but specific mechanisms may differ depending on students' immigrant status. This is especially important for first-generation immigrant students, who showed significant educational discrepancies compared to second-generation and non-immigrant students.

**Keywords:** Adaptation, home learning environment, immigrant students, reading competence, school success

## Zusammenfassung

Der stetige Anstieg globaler Migration führt zu einem wachsenden Anteil an Lernenden mit Migrationsgeschichte in Schulen, die vielseitige Herausforderungen erleben. Schulen sind eine wichtige Umgebung für ihre Entwicklung und Adaption: Normative Entwicklungsaufgaben, psychologische Anpassung sowie akkultorative Aufgaben, die die Adaption maßgeblich formen, werden in verschiedenen Maßen des Schulerfolgs widergespiegelt. Die Familie der Lernenden kann ihre Entwicklung unterstützen, wobei spezifische Wirkmechanismen sich nach Migrationsstatus der Lernenden unterscheiden können. Adaptionsprozesse von Lernenden der ersten und zweiten Migrationsgeneration sollten daher separat untersucht und im Vergleich mit Lernenden ohne Migrationsgeschichte betrachtet werden. Für einen umfassenden Einblick wurden verschiedene Schulerfolgsmaße (Lesekompetenz, Notenschnitt, Übergangsempfehlung, Lebenszufriedenheit) sowie die Rolle der Familie, spezifisch familiäre Strukturvariablen (Sprachgebrauch, sozioökonomischer Status), bildungsbezogene Überzeugungen (Bildungsaspirationen) und Prozessvariablen (Eltern-Kind-Lesen), berücksichtigt. Anhand von  $N = 271$  Lernenden vierter Klassen in Deutschland ( $M_{\text{Alter}} = 10,47$  Jahre,  $SD = 0,55$ ;  $n = 102$  erste Generation,  $n = 68$  zweite Generation,  $n = 101$  ohne Migrationsgeschichte) zeigte sich, dass Lernende der ersten Generation in Bezug auf Lesekompetenz, Notenschnitt und die Übergangsempfehlung für das Gymnasium gegenüber Lernenden der zweiten Generation und/oder ohne Migrationsgeschichte benachteiligt waren. Es konnten keine signifikanten Unterschiede zwischen Lernenden der zweiten Generation und Lernenden ohne Migrationsgeschichte festgestellt werden. Mehrgruppenvergleiche zeigten, dass hohe Bildungsaspirationen generell positiv mit Notenschnitt und Eltern-Kind-Lesen positiv mit Lebenszufriedenheit zusammenhängen. Ferner wurde Lebenszufriedenheit nur bei Lernenden der ersten Generation positiv durch Bildungsaspirationen vorhergesagt und nur bei Lernenden der zweiten Generation durch sozioökonomischen Status. Die Ergebnisse heben die wichtige Rolle familiärer Ressourcen hervor, um Lernende vor Bildungsbenachteiligung zu schützen, wobei sich die spezifischen Mechanismen zwischen Lernenden je nach Migrationsstatus unterscheiden können. Die Befunde haben besondere Relevanz für Lernende der ersten Generation, die im Hinblick auf verschiedene Schulerfolgsindikatoren im Vergleich zu Lernenden der zweiten Generation und ohne Migrationsgeschichte benachteiligt waren.

**Schlüsselwörter:** Adaption, Familiäre Lernumgebung, Migrationshintergrund, Lesekompetenz, Schulerfolg

## Introduction

The school integration of immigrant-origin students is a topic of concern in education systems worldwide, especially as many countries such as Germany have seen sharp rises in immigrant population share and young first-generation immigrant students (G1IS; i.e., students born outside of Germany) in the last decade (Henschel et al., 2022). Immigrant-origin students face the same developmental and psychological adjustment tasks as their peers, but also acculturative tasks that can add barriers to adaptation and school success (Suárez-Orozco et al., 2018), making schools a central environment for all, but especially immigrant-origin students' adjustment processes. In addition, students' families are an important agent for their adaptation and development. Therefore, whether young immigrants' school success matches their potential is influenced by resilience and risk factors situated in the family, like high educational aspirations (e.g., Boonk et al., 2018), socioeconomic disadvantages, and growing up with non-majority languages (e.g., Organization for Economic Co-operation and Development [OECD], 2019). The importance of these factors can differ between immigrant-origin and non-immigrant students (NIS; i.e., native-born students with at least one parent born in Germany), but also between G1IS and second-generation immigrant students (G2IS) who have immigrant parents but were born in their country of residence, as students' experiences and mechanisms at work may differ due to factors such as interrupted schooling or learning a new language (e.g., Juang et al., 2018). Consequently, beyond assessing whether G1IS and G2IS succeed in primary school, investigating protective family factors for school success allows to identify pathways for supporting them and their families according to their specific needs. However, extant research has often neglected to differentiate between different immigrant generations; especially in the German context the category *Migrationshintergrund* (migration background) often subsumes all immigrant-origin students indiscriminately. Central prior studies that distinguished between generations made use of data collected before recent migration movements and the strong rise in the number of G1IS (e.g., Olczyk et al., 2016) whereas more recent studies have often focused on specific groups, such as refugee G1IS (e.g., Seuring & Will, 2022). Therefore, there is a need to compare G1IS, G2IS, and NIS in more recent samples for comprehensive insights into their unique experiences.

Consequently, we first investigated differences between G1IS, G2IS, and NIS at the end of Grade 4 in various aspects of school success (reading competence, grade point average [GPA], track recommendation, life satisfaction) which capture different developmental and psychological adjustment tasks influenced by acculturative challenges. Second, we examined how family structure variables (language use, socioeconomic status [SES]), educational beliefs (shared high educational aspirations), and family processes (parent-child reading) relate to aspects of school success in G1IS, G2IS, and NIS, respectively, to identify their protective potential against educational disadvantages especially for newly immigrated and immigrant-origin students.

## Theory

### Immigrants in the School System

The long-standing research interest in immigrant students' adaptation in schools has only gained importance in recent years, with the number of international migrants steadily growing over 50 years (IOM, 2024). In Germany, where worker migration, often from EU countries, and refugee and asylum migration, including family reunification, mark the most common forms of immigration in recent years (Edele & Stanat, 2022), the share of immigrant-origin students in Grade 4 is close to 40%, its latest rise largely driven by the share of G1IS more than quadrupling to 10.7% in just ten years (Henschel et al., 2022). The integrative risk and resilience model for the adaptation of immigrant-origin children and youth (Suárez-Orozco et al., 2018) names three dimensions of immigrant adaptation: First, children face *developmental tasks* considered to be universal, although expectations set by parents, teachers, and society can be conflicting for immigrant students (Motti-Stefanidi & Masten, 2017). Among these, academic achievement (e.g., learning how to read) is central in primary school (McCormick et al., 2011). Second are equally universal tasks of *psychological adjustment*, reflected in well-being and the absence of psychological and behavioral problems (Schachner et al., 2018). Third, and unique to immigrant-origin children, are *acculturative tasks* related to developing cultural competence in the culture of origin and the receiving society, for example learning the latter's language (Motti-Stefanidi & Masten, 2017). These tasks are not always clearly separable and the same outcome can reflect multiple tasks – for example, achieving good reading competence in German is a central developmental task, but

also represents a mainstream cultural competence and thereby acculturative tasks. The model highlights the complexity of adaptation processes by acknowledging influences beyond the individual (e.g., microsystems like the family; Suárez-Orozco et al., 2018). Many developmental, psychological adjustment, and acculturative tasks shaping adaptation processes can be observed in schools, indicated by different markers of school success.

### **Central Aspects of School Success**

We consider important facets of school success reflecting developmental, psychological adjustment, and acculturative tasks for immigrant-origin students whose achievement, especially for G1IS, might be hindered by the circumstances of their immigration experiences, for example due to interrupted schooling or having to learn a new language (Juang et al., 2018).

First, good *reading competence* in the language of instruction, being able to understand, use, and reflect on textual information (McElvany et al., 2023), is a central developmental task for primary school children (McCormick et al., 2011) and failure to achieve fundamental reading skills can have lasting consequences for later reading (e.g., Stanley et al., 2018). While studies encompassing primary school generally found lower reading competence of G1IS and G2IS compared to NIS, the effect was stronger for G1IS (e.g., Hillmert, 2013; Henschel et al., 2022).

Teachers' evaluation of students' achievement in the form of *grades* can also indicate positive adaptation. Evidence exists that immigrant-origin students in German primary school receive worse average grades (e.g., Dumont et al., 2019), and a meta-study of US-American schools (Duong et al., 2016) implies no further grade differences between G1IS and G2IS.

*Life satisfaction* is a key aspect of students' well-being comprising a global evaluation of their life (Sam et al., 2022). Attaining positive well-being is an important educational outcome and positively related to achievement (e.g., Kaya & Erdem, 2021). In Germany, some studies found no difference in life satisfaction between adolescent immigrant-origin students and NIS (Sam et al., 2022) or G1IS and either G2IS or NIS (Tang, 2019), whereas others have shown advantages of G1IS compared to G2IS and NIS in a largely adult sample (Safi, 2010)

and the specific domain of school satisfaction among fourth-graders (Henschel et al., 2022), which might indicate additional resources these students possess.

A final indicator of success in late primary school in Germany specifically is the *track recommendation*. Students in most German states are sorted into three tracks after four years of primary school, and only the highest, academic track school leaving certificate (*Abitur*) allows direct university enrolment. Importantly, teachers' track recommendations strongly predict students' chosen secondary track (Dumont et al., 2019) and thereby their future school leaving certificate, as upward track changes later on are rare (P. N. Blossfeld, 2018). Immigrant-origin students' lower probabilities of receiving a high track recommendation are usually explained by SES and achievement differences (e.g., Lüdemann & Schwerdt, 2013) but it remains unclear whether differences occur between G1IS and G2IS.

### **Relevant Family Variables for School Success**

When regarding school success, students' families are an important microsystem influencing students' development and adaptation in general, and specifically for immigrant-origin students (Suárez-Orozco et al., 2018). This is reflected in structural, educational belief, and process components of the home learning environment (e.g., Kluczniok et al., 2013), although their importance and specific ways of shaping school success may differ depending on students' immigrant generation. As immigration is often associated with additional stress and reduced resources compared to native families, parents offsetting these challenging factors may be especially important to foster positive development in immigrant families (e.g., Leyendecker et al., 2018). For example, achieving majority language proficiency can be more challenging for G1IS than G2IS (and NIS), so language-related aspects of the family environment may be most important for these students (e.g., Suárez-Orozco et al., 2018). Similarly, a positive parent-child relationship offsetting additional stress coinciding with recent immigration may be especially beneficial for the well-being of G1IS (e.g., Juang et al., 2018). Therefore, it is pivotal to regard how different family structure, educational belief, and process variables relate to school success among G1IS, G2IS, and NIS, respectively.

Immigration, especially in Germany, is often confounded with two relatively static family structure variables: Using a non-majority primary *family language* and a comparably low *SES* (Henschel et al., 2022). Speaking the dominant language at home or as the first

language positively relates to reading competence and grades (e.g., Kigel et al., 2015; Lauermaun et al., 2020) and positive associations of SES emerge with reading and grades (e.g., Dumont et al., 2019; Eriksson et al., 2021), the probability of an academic track recommendation (e.g., Paulus et al., 2021), and well-being (e.g., Tang, 2019). Regarding group differences, a meta-analysis suggested high SES was more beneficial for school achievement in G2IS than G1IS (Duong et al., 2016), although the role of SES for grades was similar for Norwegian adolescent G1IS, G2IS, and NIS (Ulriksen et al., 2015). Additionally, majority language use may be more beneficial for reading competence in German in G1IS than native-born students, as the latter usually had more environmental exposure to German growing up, an important predictor of language-related skills (e.g., Chiswick & Miller, 2007).

*Educational aspirations* indicate mostly stable educational beliefs, especially when parents and students share high aspirations (Dräger & Burger, 2024). They are positively linked to students' achievement (e.g., Boonk et al., 2018) and track recommendation even beyond the influence of achievement and grades (e.g., Dumont et al., 2019). Specifically, investigating the match of parents' and students' aspirations is of interest, as incongruent aspirations between parent and child may act as stressors, whereas matching high aspirations relate to positive psychological functioning and potentially well-being more generally (Cao et al., 2023; Guo et al., 2022). When controlling for SES, aspirations tend to be higher in immigrant than non-immigrant families, especially in lower grades, a phenomenon known as immigrant optimism (e.g., Neumeyer et al., 2022; Raleigh & Kao, 2010). However, the benefit of high aspirations may be less pronounced in some immigrant families (e.g., Miyamoto et al., 2020). It is unclear whether this varies between G1IS and G2IS.

Finally, as an important family process variable, home-based literacy activities like *parent-child reading* are positively related to children's reading competence (e.g., Boonk et al., 2018) but apparently less common in immigrant families (e.g., Niklas et al., 2015), although this may be driven by differences in SES. Results regarding preschool children imply that shared reading in German may be less beneficial for immigrant-origin students' language skills unless parents' German language skills are high (Klein et al., 2014) but shared reading activities in the heritage language still relate to higher German language skills (Eisenwort et al., 2018), both of which may extend to reading competence. Further, beneficial psychosocial effects of parent-child reading, for example on children's well-being (e.g., Xie et al., 2018),

may be especially relevant for G1IS to offset the stress of the comparably recent immigration and intense acculturation process.

As reported, findings regarding school success of G1IS, G2IS, and NIS are at times ambiguous, and only few studies distinguished between G1IS and G2IS. Additionally, most studies focused on select aspects of school success, making it hard to paint a comprehensive picture and neglecting the interconnected nature of the outcomes. Finally, differences in school success between G1IS, G2IS, and NIS may result from differences in their home environment, partly as a consequence of their families' immigration history. Therefore, assessing differences in school success between G1IS, G2IS, and NIS is not sufficient, but factors which can explain these differences depending on students' immigrant status must also be explored.

### **Research Questions and Hypotheses**

For immigrant-origin children's adaptation, primary school is an important environment entailing central developmental, psychological adjustment, and acculturative tasks. Mastery of these tasks is reflected in central school outcomes (reading competence, GPA, track recommendation, life satisfaction). Moreover, students' families are important microsystems that can foster school success and adaptation, but how family variables relate to students' outcomes can vary between immigrant students and NIS, as well as between G1IS and G2IS, mainly due to differences in their own experiences and the more recent immigration process in G1IS families. To accurately determine differences in school success of G1IS, G2IS, and NIS as well as the role students' family plays depending on students' immigrant status, it is necessary to study family structure variables, educational beliefs, and process variables and their predictive role in the three groups separately. Understanding these relations in detail marks a central first step to identify leverage points for interventions targeting educational inequalities. Thus, we investigated the following research questions (RQ) and hypotheses (H):

RQ1: Do G1IS, G2IS, and NIS differ in regard to important indicators of school success (reading competence, GPA, life satisfaction, track recommendation) by the end of primary school?

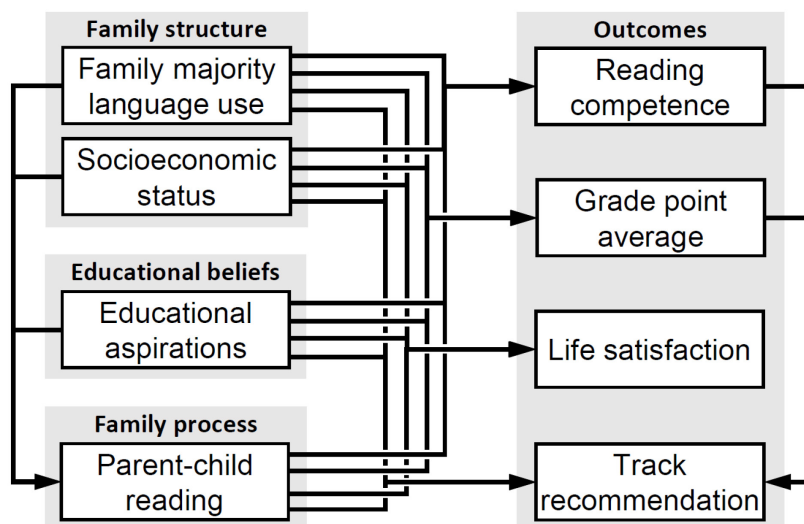
H1: (a) NIS have a higher average reading competence than G2IS, who in turn have a higher average reading competence than G1IS. (b) NIS have a higher average GPA than G2IS and G1IS. (c) Life satisfaction does not significantly differ between NIS, G2IS, and G1IS. (d) NIS have a higher average probability to receive an academic track recommendation than G2IS, who in turn have a higher average probability than G1IS.

RQ2: How are central family structure variables (family language use, SES), educational beliefs (educational aspirations), and family processes (parent-child reading) related to indicators of school success in the G1IS, G2IS, and NIS subgroup, respectively?

A simplified depiction of this model can be found in Figure 1. We expect that SES will have a stronger positive relation to reading competence and GPA in G2IS than G1IS, whereas family language use should relate more strongly to reading competence in G1IS than in G2IS and NIS. We also expect stronger positive associations of aspirations with GPA and track recommendation, and parent-child reading with reading competence in the NIS compared to the G1IS and G2IS groups, but a stronger positive relation of parent-child reading with life satisfaction for G1IS than G2IS and NIS.

**Figure 1**

*Simplified Depiction of the Path Model for Research Question 2*



*Notes.* Parent-child reading and all outcomes were regressed on students' age as a control variable (not depicted here). Intercorrelations among the family variables (except parent-child reading) and outcome variables (except track recommendation), respectively, are also not depicted.

## Methods

### Participants and Procedure

The sample comprised  $N = 271$  students from 47 classes in the final, fourth grade of primary school in North Rhine-Westphalia, Germany, after excluding  $n = 8$  students with unclear immigrant status. Students were 10.47 years old on average ( $SD = 0.55$ ) and 54.2% female (44.6% male, 0.4% non-binary). Of these,  $n = 102$  were G1IS ( $M_{age} = 10.65$  years,  $SD = 0.61$ ; 56.9% female),  $n = 68$  G2IS ( $M_{age} = 10.37$  years,  $SD = 0.53$ ; 50.0% female), and  $n = 101$  NIS ( $M_{age} = 10.36$  years,  $SD = 0.46$ ; 54.5% female, 1.0% non-binary). Groups differed significantly in regard to age,  $F(2, 265) = 8.72, p < .001, \eta^2_p = .06$  (with G1IS older than G2IS,  $p = .006$ , and NIS,  $p < .001$ ), but not gender,  $\chi^2(4) = 2.40, p = .663$ . For a detailed description of G1IS' countries of origin and years of residence in Germany, see Electronic Supplement 1.

Data was collected during the final quarter of the 2021/22 school year in the context of the MERCUR-funded joint research project *School Integration of Newly Immigrated Children (SIGN)* by the University Alliance Ruhr universities. Schools were recruited from the Ruhr metropolitan area in North Rhine-Westphalia, which, barring city-states, has the second highest share of immigrant students in Grade 4 among the German states (Henschel et al., 2022). The study encompassed standardized tests and self-report student questionnaires in German, took 90 minutes and was conducted by two to three trained test administrators during regular instructional time, either in the classroom or in small groups. Teachers provided additional information about students' grades and track recommendations. Participation in the study was voluntary and required parents' written consent. Non-participating students were given alternative tasks by their teachers. The study met ethical standards and was approved by the ethics committee of the Department of Psychology, University of Duisburg-Essen.

### Measures

Descriptive information and reliability for all measures is provided in Electronic Supplement 2. Following PISA (OECD, 2019), we defined *immigrant status* by student-reported country of birth of themselves and their parents: G1IS were born outside of Germany, G2IS had two parents (or their primary caretaker, in single-parent households) born outside of Germany, NIS had at least one parent born in Germany. As family structure

variables, *family majority language use* was assessed with one item adapted from the German PIRLS 2021 survey (McElvany et al., 2023) asking how often German was spoken at home, and subsequently dichotomized (0 = *never/sometimes*, 1 = *mostly/(almost) always*). Student-reported number of books at home (McElvany et al., 2023) was used to form a binary indicator of *SES* by performing a median split (0 = *(below) average number of books [0–25 books]*, 1 = *above average number of books [26–200+ books]*). To assess perceived shared high *educational aspirations* as an indicator for students' perception of family educational values, students reported which school leaving certificate they wished to achieve, and which they thought their parents want them to achieve. If students answered the highest option *Abitur* for both questions, high shared educational aspirations were assumed (0 = *low or incongruent aspirations*, 1 = *congruent high aspirations*). We further included *parent-child reading* as a family process variable, assessed with one item (Kohl et al., 2000; “My parents read with me”, 1 = *never* to 5 = *daily*).

As dependent variables, *reading competence* captured students' ability to understand and answer questions about short texts. Measured with 26 items from the standardized and well-established *ELFE II*-instrument (Lenhard et al., 2017), the test showed good internal consistency ( $\alpha = .88$ ). Students' grades in German, mathematics, and *Sachkunde*, a general studies course, on their fourth-grade mid-year report card formed the *GPA* and were recoded to range from 1 (insufficient) to 6 (very good). *Life satisfaction*, an important aspect of well-being, was aggregated from five domains (health, family, friends, school, general satisfaction) with items adapted from the German National Educational Panel Study (H.-P. Blossfeld & Roßbach, 2019; e.g., “How satisfied are you with your school?”, 1 = *very unsatisfied* to 6 = *very satisfied*). Internal consistency was acceptable ( $\alpha = .65$ ). Lastly, teachers' *track recommendation* for secondary education, issued alongside the aforementioned report card, was dichotomized to reflect whether students received an academic track recommendation (0 = *academic track not recommended*, 1 = *academic track recommended*).

### **Analytic Approach**

We used IBM SPSS Statistics 29.0 for data preparation and descriptive analyses and *Mplus* 8.11 to analyze the research questions. Missing data were handled with multiple imputation using 50 imputed datasets.

For RQ1, we conducted regression analyses with immigrant status (dummy coded) as independent variable for each indicator of school success (reading competence, GPA, track recommendation, life satisfaction). For RQ2, we performed multigroup analysis grouping by immigrant status with WLSMV estimation to handle continuous and categorical outcome, adjusting standard errors for the clustered nature of data (type = complex in *Mplus*). We used manifest indicators due to sample size. Goodness of fit was evaluated with CFI, RMSEA, and SRMR (Hu & Bentler, 1999). To investigate the associations, we specified a path model as depicted in Figure 1. As students' age may vary within each group due to a variety of reasons – such as delayed school entry, grade retention, or interrupted schooling – that we could not distinguish and thereby conflate other effects, we controlled for age within each group in this model. Finally, we performed Wald Tests to compare whether the path coefficients for different associations were significantly different between groups. We performed a robustness check (see Electronic Supplement 3) comparing the G1IS group with a combined group of G2IS and NIS (i.e., native-born students) as results suggested the latter two groups were comparable in terms of school success.

## Results

### Descriptive Results

For descriptive information and intercorrelations for the full sample and the subsamples, see Electronic Supplement 2. Correlations regarding family variables revealed no significant associations except a negative correlation of German as primary family language and parent-child reading in the full sample. Among the indicators of school success, reading competence was consistently positively associated with GPA (exception: G2IS subsample) and track recommendation (exception: NIS subsample), and GPA was positively related to track recommendation.

### Immigrant Status and School Success

The results of regression analyses regarding associations of immigrant status with different measures of school success are depicted in Electronic Supplement 4. G1IS showed significantly lower reading competence and GPA than NIS ( $b = -0.63/-0.52$ ) and G2IS ( $b = -0.42/-0.41$ ). G1IS also had a reduced probability of receiving a Gymnasium recommendation

compared to G2IS ( $b = -0.63$ ). There were no significant differences between NIS and G2IS. Therefore, G1IS on average showed lower reading abilities and received lower grades compared to both NIS and G2IS and less often got a recommendation for the Gymnasium than G2IS.

The findings fully supported H1c, and partly H1a, H1b, and H1d. Following guidelines by Cohen (1988), small amounts of variance in all outcome variables were explained.

### **Group Differences in Family Predictors of School Success**

The results of the multigroup comparison for RQ2 are depicted in Electronic Supplement 4. The proposed model fit the data well, CFI = .998; RMSEA = .017; SRMR = .010. In all three groups, parent-child reading was positively associated with life satisfaction ( $b = 0.26-0.42$ ), high educational aspirations were positively associated with GPA ( $b = 0.56-0.93$ ), and GPA in turn strongly positively associated with the track recommendation ( $b = 0.72-0.89$ ). Additionally, a positive indirect effect of educational aspirations on track recommendation via GPA was present in all groups (G1IS:  $\beta = .19-.41$ ). However, some differences in associations occurred between groups. Reading competence was positively predicted by SES in the NIS group ( $b = 0.41$ ) and educational aspirations in the G1IS group ( $b = 0.41$ ), whereas a negative association with parent-child reading occurred in the G1IS ( $b = -0.30$ ) and G2IS groups ( $b = -0.23$ ). In the G2IS group, GPA was positively related to the use of German as a family language ( $b = 0.43$ ), but also negatively to parent-child reading ( $b = -0.24$ ). Finally, life satisfaction was positively associated with SES in the G2IS group ( $b = 0.43$ ), and with educational aspirations in the G1IS group ( $b = 0.47$ ). Wald tests showed that the association between educational aspirations and life satisfaction were statistically different between the G1IS and NIS groups, and that the relation of SES and life satisfaction was statistically different between the G2IS and the G1IS and NIS groups at the 10% level.

The model explained medium amounts of variance in reading competence and life satisfaction, and large amounts of variance in GPA and especially track recommendation in all groups, with the largest amount of variance explained in the G1IS subgroup for all outcomes.

## Discussion

### Discussion of Findings

We compared G1IS, G2IS, and NIS on various indicators of adaptation and school success in the important final grade of primary school. Additionally, focusing on the central family microsystem, we investigated family structure variables, educational beliefs, and family processes as predictors of school success and compared their specific role for G1IS, G2IS, and NIS.

The results regarding measures of school success mostly matched expectations in regard to the comparison of G1IS with G2IS and NIS. Findings regarding G1IS' reading competence (H1a) and grades (H1b) aligned with previous study results (e.g., Dumont et al., 2019), as did the absence of significant differences in life satisfaction (H1c; e.g., Tang, 2019). Unexpectedly, we found disadvantages of G1IS in regard to track recommendation only compared to G2IS, not NIS (H1d). Similarly, no significant differences emerged between G2IS and NIS in any outcome (H1a–d), contrary to expectations based on previous results and theoretical considerations (e.g., Dumont et al., 2019). Thus, G1IS differed from their G2IS and NIS peers mostly in regard to achievement-related measures but G2IS and NIS did not differ in our sample. This could be a result of recruiting schools with high levels of immigrant-origin students, which may be better adapted to the specific needs of G2IS but not G1IS, whose number has risen sharply over a short time, giving schools less time to gather experience and adapt to their needs.

Regarding RQ2, in all three groups educational aspirations were positively associated with GPA which in turn significantly positively predicted track recommendation (e.g., Dumont et al., 2019), and parent-child reading was positively related to life satisfaction. Thus, student's grades were the most important predictor of their track recommendation, and grades in turn strongly positively predicted by high shared educational aspirations in the family independent of immigrant status. While the study design does not allow to draw causal inference and the effect may be reversed (i.e., high GPA causing high aspirations) or reciprocal, these findings generally do not support our assumption of an especially beneficial role of educational aspirations for NIS in regard to grades and track recommendation (Miyamoto et al., 2020). Additionally, parents reading with their children was beneficial for

all students' well-being (e.g., Xie et al., 2018), and while the association was strongest in G1IS, we found no statistical evidence for the assumed especially protective role for G1IS.

In terms of subgroup-specific results, a positive association of shared high aspirations with life satisfaction emerged in the G1IS group only. This positive association has been implied by earlier research (Guo et al., 2022), arguing that incongruent aspirations act as stressors whereas congruent high aspirations of students and parents act as motivators and take on a protective role against, for example, depressive symptoms. There was a group-specific positive effect of G2IS' SES on life satisfaction, but not achievement, contrary to prior results (Duong et al., 2016). Findings did not support theoretical considerations that speaking German at home was more beneficial for G1IS' reading competence than for other students (e.g., Chiswick & Miller, 2007). Our expectation that parent-child reading would relate more positively to reading competence in NIS than G1IS and G2IS (Klein et al., 2014) was not confirmed, although a significant negative association of the two variables found for G1IS and G2IS but not NIS implied a trend in the assumed direction. However, the difference between the groups was not statistically significant and these findings could also indicate a reverse causality: Parents may read more with their children to compensate their lower reading competence.

In summary, G1IS experienced disadvantages in some areas of school success compared to G2IS and NIS, specifically in reading achievement, GPA, and the track recommendation. On a positive note, students reported similar life satisfaction independent of immigrant status. Furthermore, we found that family educational beliefs and processes, and structure variables to a lesser degree, were important for school success, with some differences emerging depending on students' immigrant status. For example, SES was related to life satisfaction in the G2IS subsample, while high educational aspirations were not only related to good grades, but also life satisfaction among G1IS students.

### **Limitations and Strengths**

Some limitations must be considered when interpreting the results. First, due to the cross-sectional study design, the causality of the associations cannot be ascertained. Although it is plausible that especially relatively stable family structure variables and educational beliefs influenced measures of school success, especially aspirations may also be influenced

by students' achievement instead. Additionally, we could not investigate long-term effects of factors like aspirations, which some research suggests may be negligible for achievement (Dochow & Neumeyer, 2021). Moreover, due to low parent response rates, we relied on student responses for most variables, which can be less accurate than parents' answers for some measures (e.g., SES), and while number of books has been shown to be a central indicator of SES, it would have been preferable to include information about parents' education and occupation as well (e.g., Eriksson et al., 2021). Similarly, measuring parent-child reading with a single item may have biased assessment, as it is unclear whether students could reliably estimate the frequency of shared reading and no indication was given in which language parents read with their children. Additionally, offering student questionnaires in German only potentially lead to biased results due to non-participation of students with very low German reading competence. Beyond this, many classes struggled with long-term consequences of the COVID-19 pandemic, lagging behind on the curriculum, and recruiting schools with high proportions of immigrant-origin students limited the number of suitable schools, leading to a relatively small overall sample skewed towards a below-average SES and consequently relatively small subgroups (especially G2IS), which may have affected the statistical power of analyses. Thus, the results cannot necessarily be generalized to other schools and instruction during non-pandemic times.

However, the large share of immigrant-origin students in the sample is equally an important strength, as it enabled meaningful comparisons between G1IS, G2IS, and NIS. Students in our sample reflect well the highly heterogeneous group of G1IS that is shaped by recent patterns of international migration, offering current insights into diverse students' school experiences. Multigroup comparisons allowed investigating the unique role the family plays for students depending on their immigrant status in more detail than previous studies. Another analytical strength is the inclusion of multiple concurrent facets of school success, instead of examining single measures in isolation. This allowed controlling for shared variance between these variables, thus preventing biased estimations of associations. Additionally, a broad understanding of school success beyond achievement (e.g., York et al., 2015) is key to gaining accurate, comprehensive insight into students' schooling experience, especially given that central developmental, psychological adjustment, and acculturative tasks are reflected in different school outcomes (Suárez-Orozco et al., 2018).

## Implications for Future Research and Practice

Our findings indicate several directions for future research to achieve a better understanding of immigrant-origin students' school success. Findings should be replicated in a longitudinal design to confirm the assumed causality. It would be especially interesting to investigate the long-term development of immigrant-origin students throughout all four years of primary school, as the regular, formalized exposure to the majority culture in school presumably shapes and accelerates the development of adaptation processes throughout this entire period. Beyond that, regarding students before and after the transition to secondary school would similarly be of core interest, as this would allow to investigate challenges that arise in the new context of secondary school, and both designs would allow to study immigrant-origin students' acculturation in more detail, with regard to acculturative timing, tempo, pace, and synchronicity (e.g., Lee et al., 2019) and how experiences vary depending on, for example, majority members' different acculturation expectations for G1IS and G2IS (e.g., Kunst & Sam, 2014). Additionally, future research should include other vital microsystems and more distal levels of influence, such as country-level migration policies to more accurately capture the immense complexity of immigration and integration processes. For example, studies could employ three-level designs including factors on the level of the country (e.g., anti-discrimination legislation), schools (e.g., culturally responsive teaching), and individual (e.g., identification with the heritage and majority culture) to investigate how these factors influence adaptation on their own as well as interact with each other. Lastly, as large shares of G1IS in Germany come from refugee families, analyses differentiating between refugees and other G1IS may provide further insights. While basic adaptation processes are often argued to be universal (e.g., Kogan & Kalter, 2020), the additional strain and trauma refugees often face could mean that some factors are of higher importance than for other immigrants.

Similarly, implications for educational practice arise. We found educational inequalities especially for G1IS, indicating a need to offer more support for these students in and outside of schools. Schools can make use of existing resources in G1IS families but also support them in overcoming hurdles to educational success, for example by making efforts to more actively involve these families (e.g., Jung & Zhang, 2016). Further, a specific focus should be placed on fostering a positive home literacy environment, which is beneficial for all

students' psychological adjustment. However, parent-child reading being negatively associated with reading competence in both immigrant-origin subgroups may indicate shared reading in their heritage language, which may not necessarily translate to better German reading skills (but see Eisenwort et al., 2018), or imply a reciprocal effect, where parents read more with their children if they were weaker readers. In either case, G1IS' parents' high involvement in the form of shared reading can be used as a cornerstone for developing programs designed to support parent-child reading independent of students' and, ideally, parents' pre-existing German reading skills to promote reading competence and positive psychological adjustment, aiming to reduce educational inequalities in the long run.

## References

- Blossfeld, H.-P., & Roßbach, H.-G. (2019). *Education as a lifelong process: The German National Education Panel Study (NEPS)*. Springer VS. <https://doi.org/10.1007/978-3-658-23162-0>
- Blossfeld, P. N. (2018). *Changes in inequality of educational opportunity: The long-term development in Germany*. Springer Fachmedien. <https://doi.org/10.1007/978-3-658-22522-3>
- Boonk, L., Gijsselaers, H. J., Ritzen, H., & Brand-Gruwel, S. (2018). A review of the relationship between parental involvement indicators and academic achievement. *Educational Research Review*, 24, 10–30. <https://doi.org/10.1016/j.edurev.2018.02.001>
- Cao, J., Dai, Y., & Man, X. (2023). The effects of educational aspirations on stability and change in psychological well-being of Chinese adolescents. *Current Psychology*, 42(27), 23607–23618. <https://doi.org/10.1007/s12144-022-03481-5>
- Chiswick, B. R., & Miller, P. W. (2007). *The economics of language: International analyses*. Routledge.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed.). Erlbaum.
- Dochow, S., & Neumeyer, S. (2021). An investigation of the causal effect of educational expectations on school performance. Behavioral consequences, time-stable confounding, or reciprocal causality? *Research in Social Stratification and Mobility*, 71, 100579. <https://doi.org/10.1016/j.rssm.2020.100579>
- Dräger, J., & Burger, K. (2024). *Parent-child mismatches in educational aspirations: Prevalence, stability, and convergence over time*. PsyArXiv. <https://doi.org/10.31234/osf.io/6cuyx>
- Dumont, H., Klinge, D., & Maaz, K. (2019). The many (subtle) ways parents game the system: Mixed-method evidence on the transition into secondary-school tracks in Germany. *Sociology of Education*, 92(2), 199–228. <https://doi.org/10.1177/0038040719838223>
- Duong, M. T., Badaly, D., Liu, F. F., Schwartz, D., & McCarty, C. A. (2016). Generational differences in academic achievement among immigrant youths. *Review of Educational Research*, 86(1), 3–41. <https://doi.org/10.3102/0034654315577680>
- Edele, A., & Stanat, P. (2022). Zuwanderung und soziale Ungleichheit [Migration and social inequality]. In H. Reinders, D. Bergs-Winkels, A. Prochnow, & I. Post (Eds.), *Empirische Bildungsforschung* (pp. 1105–1126). Springer Fachmedien. [https://doi.org/10.1007/978-3-658-27277-7\\_58](https://doi.org/10.1007/978-3-658-27277-7_58)
- Eisenwort, B., Aslan, H., Yesilyurt, S. N., Till, B., & Klier, C. M. (2018). Sprachentwicklung bei Kindern mit Migrationshintergrund und elterliches Vorlesen [Language development in children with migration background and parental reading to children]. *Zeitschrift für Kinder- und Jugendpsychiatrie und Psychotherapie*, 46(2), 99–106. <https://doi.org/10.1024/1422-4917/a000500>
- Eriksson, K., Lindvall, J., Helenius, O., & Ryve, A. (2021). Socioeconomic status as a multidimensional predictor of student achievement in 77 societies. *Frontiers in Education*, 6, Article 731634. <https://doi.org/10.3389/feduc.2021.731634>
- Guo, X., Qin, H., Jiang, K., & Luo, L. (2022). Parent-child discrepancy in educational aspirations and depressive symptoms in early adolescence: A longitudinal study. *Journal of Youth and Adolescence*, 51(10), 1983–1996. <https://doi.org/10.1007/s10964-022-01644-y>

- Henschel, S., Heppt, B., Rjosk, C., & Weirich, S. (2022). Zuwanderungsbezogene Disparitäten [Immigration-related disparities]. In P. Stanat, S. Schipolowski, R. Schneider, K. A. Sachse, S. Weirich, & S. Henschel (Eds.), *IQB-Bildungstrend 2021* (pp. 181–219). Waxmann.
- Hillmert, S. (2013). Links between immigration and social inequality in education: A comparison among five European countries. *Research in Social Stratification and Mobility*, 32, 7–23. <https://doi.org/10.1016/j.rssm.2013.02.002>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- International Organization for Migration. (2024). *World migration report 2024*. UN Research Institute for Social Development.
- Juang, L. P., Simpson, J. A., Lee, R. M., Rothman, A. J., Titzmann, P. F., Schachner, M. K., Korn, L., Heinemeier, D., & Betsch, C. (2018). Using attachment and relational perspectives to understand adaptation and resilience among immigrant and refugee youth. *American Psychologist*, 73(6), 797–811. <https://doi.org/10.1037/amp0000286>
- Jung, E., & Zhang, Y. (2016). Parental involvement, children's aspirations, and achievement in new immigrant families. *The Journal of Educational Research*, 109(4), 333–350. <https://doi.org/10.1080/00220671.2014.959112>
- Kaya, M., & Erdem, C. (2021). Students' well-being and academic achievement: A meta-analysis study. *Child Indicators Research*, 14(5), 1743–1767. <https://doi.org/10.1007/s12187-021-09821-4>
- Kigel, R. M., McElvany, N., & Becker, M. (2015). Effects of immigrant background on text comprehension, vocabulary, and reading motivation: A longitudinal study. *Learning and Instruction*, 35, 73–84. <https://doi.org/10.1016/j.learninstruc.2014.10.001>
- Klein, O., Biedinger, N., & Becker, B. (2014). The effect of reading aloud daily—Differential effects of reading to native-born German and Turkish-origin immigrant children. *Research in Social Stratification and Mobility*, 38, 43–56. <https://doi.org/10.1016/j.rssm.2014.06.001>
- Kluczniok, K., Lehl, S., Kuger, S., & Rossbach, H.-G. (2013). Quality of the home learning environment during preschool age – domains and contextual conditions. *European Early Childhood Education Research Journal*, 21(3), 420–438. <https://doi.org/10.1080/1350293X.2013.814356>
- Kogan, I., & Kalter, F. (2020). An empirical–analytical approach to the study of recent refugee migrants in Germany. *Soziale Welt*, 71(1-2), 3–23. <https://doi.org/10.5771/0038-6073-2020-1-2-3>
- Kohl, G. O., Lengua, L. J., & McMahon, R. J. (2000). Parent involvement in school conceptualizing multiple dimensions and their relations with family and demographic risk factors. *Journal of School Psychology*, 38(6), 501–523. [https://doi.org/10.1016/S0022-4405\(00\)00050-9](https://doi.org/10.1016/S0022-4405(00)00050-9)
- Lauermann, F., Meißner, A., & Steinmayr, R. (2020). Relative importance of intelligence and ability self-concept in predicting test performance and school grades in the math and language arts domains. *Journal of Educational Psychology*, 112(2), 364–383. <https://doi.org/10.1037/edu0000377>

- Lee, R. M., Titzmann, P. F., & Jugert, P. (2019). Towards a more dynamic perspective on acculturation research. In P. F. Titzmann & P. Jugert (Eds.), *Youth in superdiverse societies: Growing up with globalization, diversity, and acculturation* (pp. 74–91). Routledge.
- Lenhard, W., Lenhard, A., & Schneider, W. (2017). *ELFE II: Ein Leseverständnistest für Erst- bis Siebtklässler* [ELFE II: A reading comprehension test for Grades 1 to 7]. Hogrefe.
- Leyendecker, B., Cabrera, N., Lembcke, H., Willard, J., Kohl, K., & Spiegler, O. (2018). Parenting in a new land: Immigrant parents and positive development of their children and youth. *European Psychologist*, 23(1), 57–71. <https://doi.org/10.1027/1016-9040/a000316>
- Lüdemann, E., & Schwerdt, G. (2013). Migration background and educational tracking: Is there a double disadvantage for second-generation immigrants? *Journal of Population Economics*, 26(2), 455–481. <https://doi.org/10.1007/s00148-012-0414-z>
- McCormick, C. M., Kuo, S. I.-C., & Masten, A. S. (2011). Developmental tasks across the life span. In K. L. Fingerman, C. Berg, J. Smith, & T. C. Antonucci (Eds.), *Handbook of life-span development* (pp. 117–140). Springer Publishing.
- McElvany, N., Lorenz, R., Frey, A., Goldhammer, F., Schilcher, A., & Stubbe, T. C. (Eds.). (2023). *IGLU 2021: Lesekompetenz von Grundschulkindern im internationalen Vergleich und im Trend über 20 Jahre* [PIRLS 2021: Reading competence of primary school children in international comparison and the 20 year trend]. Waxmann. <https://doi.org/10.31244/9783830997009>
- Miyamoto, A., Seuring, J., & Kristen, C. (2020). Immigrant students' achievements in light of their educational aspirations and academic motivation. *Journal of Ethnic and Migration Studies*, 46(7), 1348–1370. <https://doi.org/10.1080/1369183X.2018.1538772>
- Motti-Stefanidi, F., & Masten, A. S. (2017). A resilience perspective on immigrant youth adaptation and development. In N. J. Cabrera & B. Leyendecker (Eds.), *Handbook on positive development of minority children and youth* (pp. 19–34). Springer International Publishing.
- Neumeyer, S., Olczyk, M., Schmaus, M., & Will, G. (2022). Reducing or widening the gap? How the educational aspirations and expectations of Turkish and majority families develop during lower secondary education in Germany. *Kölner Zeitschrift Für Soziologie Und Sozialpsychologie*, 74(2), 259–285. <https://doi.org/10.1007/s11577-022-00844-5>
- Niklas, F., Tayler, C., & Schneider, W. (2015). Home-based literacy activities and children's cognitive outcomes: A comparison between Australia and Germany. *International Journal of Educational Research*, 71, 75–85. <https://doi.org/10.1016/j.ijer.2015.04.001>
- Olczyk, M., Seuring, J., Will, G., & Zinn, S. (2016). Migranten und ihre Nachkommen im deutschen Bildungssystem: Ein aktueller Überblick. In C. Diehl, C. Hunkler, & C. Kristen (Eds.), *Ethnische Ungleichheiten im Bildungsverlauf* (pp. 33–70). Springer Fachmedien. [https://doi.org/10.1007/978-3-658-04322-3\\_2](https://doi.org/10.1007/978-3-658-04322-3_2)
- Organization for Economic Co-operation and Development. (2019). *Pisa 2018 Results (Volume II): Where all students can succeed*. OECD Publishing. <https://doi.org/10.1787/b5fd1b8f-en>
- Paulus, L., Spinath, F. M., & Hahn, E. (2021). How do educational inequalities develop? The role of socioeconomic status, cognitive ability, home environment, and self-efficacy along the educational path. *Intelligence*, 86, 101528. <https://doi.org/10.1016/j.intell.2021.101528>

- Raleigh, E., & Kao, G. (2010). Do immigrant minority parents have more consistent college aspirations for their children? *Social Science Quarterly*, *91*(4), 1083–1102. <https://doi.org/10.1111/j.1540-6237.2010.00750.x>
- Safi, M. (2010). Immigrants' life satisfaction in Europe: Between assimilation and discrimination. *European Sociological Review*, *26*(2), 159–176. <https://doi.org/10.1093/esr/jcp013>
- Sam, D. L., Vedder, P., Ward, C., & Horenczyk, G. (2022). Psychological and sociocultural adaptation of immigrant youth. In J. W. Berry, J. S. Phinney, D. L. Sam, & P. Vedder (Eds.), *Immigrant youth in cultural transition* (pp. 119–143). Routledge. <https://doi.org/10.4324/9781003309192-5>
- Schachner, M. K., van de Vijver, F. J. R., & Noack, P. (2018). Acculturation and school adjustment of early-adolescent immigrant boys and girls in Germany: Conditions in school, family, and ethnic group. *The Journal of Early Adolescence*, *38*(3), 352–384. <https://doi.org/10.1177/0272431616670991>
- Seuring, J., & Will, G. (2022). German language acquisition of refugee children - The role of preschools and language instruction. *Frontiers in Sociology*, *7*, Article 840696. <https://doi.org/10.3389/fsoc.2022.840696>
- Stanley, C. T., Petscher, Y., & Catts, H. (2018). A longitudinal investigation of direct and indirect links between reading skills in kindergarten and reading comprehension in tenth grade. *Reading and Writing*, *31*(1), 133–153. <https://doi.org/10.1007/s11145-017-9777-6>
- Suárez-Orozco, C., Motti-Stefanidi, F., Marks, A., & Katsiaficas, D. (2018). An integrative risk and resilience model for understanding the adaptation of immigrant-origin children and youth. *American Psychologist*, *73*(6), 781–796. <https://doi.org/10.1037/amp0000265>
- Tang, Y. (2019). Immigration status and adolescent life satisfaction: An international comparative analysis based on PISA 2015. *Journal of Happiness Studies*, *20*(5), 1499–1518. <https://doi.org/10.1007/s10902-018-0010-3>
- Ulriksen, R., Sagatun, Å., Zachrisson, H. D., Waaktaar, T., & Lervåg, A. O. (2015). Social support and socioeconomic status predict secondary students' grades and educational plans indifferently across immigrant group and gender. *Scandinavian Journal of Educational Research*, *59*(3), 357–376. <https://doi.org/10.1080/00313831.2014.965792>
- Xie, Q.-W., Chan, C. H. Y., Ji, Q., & Chan, C. L. W. (2018). Psychosocial effects of parent-child book reading interventions: A meta-analysis. *Pediatrics*, *141*(4). <https://doi.org/10.1542/peds.2017-2675>
- York, T. T., Gibson, C., & Rankin, S. (2015). Defining and measuring academic success. *Practical Assessment, Research, and Evaluation*, *20*, Article 5. <https://doi.org/10.7275/hz5x-tx03>

### **3.4 Study IV – Sociodemographic Diversity, Reading Literacy, and Instructional Focus: Disentangling Complex Relations on the Individual and Classroom Level**

Vogel, S. N. T., Stang-Rabrig, J., & McElvany, N. (2025). *Sociodemographic diversity, reading literacy, and instructional focus: Disentangling complex relations on the individual and classroom level*. PsyArXiv. [https://doi.org/10.31234/osf.io/ckae3\\_v2](https://doi.org/10.31234/osf.io/ckae3_v2)

This article reflects the version of the manuscript that is under review at a scientific journal and has additionally been published as a preprint. It may not exactly replicate the final, authoritative version of the article published in a scientific journal in the future.

### Abstract

A main goal of primary school is teaching students to be successful readers. However, reading literacy is influenced by a variety of sociodemographic background variables and, beyond these individual-level effects, the sociodemographic classroom composition. Teachers' instruction has been proposed as one important mediator of these associations in theoretical models, but its role as a mediator of classroom-level and more importantly moderator of individual-level effects, has not been conclusively studied. Moreover, different confounded sociodemographic background variables have often been conflated in the extant literature. Therefore, we analyzed the role of central sociodemographic background variables (socioeconomic risk, language minority, first-generation immigrant) for core indicators of reading literacy (reading competence, reading enjoyment, reading self-concept) on the individual and classroom level, as well as the mediating and moderating role of instructional focus (reading-related support, support of language-minority students, cognitive activation). Multilevel structural equation models based on German PIRLS 2021 data ( $N = 3414$  fourth-grade students, 195 classrooms) revealed negative associations of individual socioeconomic risk and language minority status with aspects of reading literacy, but motivational advantages among first-generation immigrant students. Negative classroom effects were found for socioeconomic and immigrant composition, positive classroom effects on self-concepts for share of language minority students. Instructional focus did not significantly mediate or moderate these associations. The results emphasize that especially socioeconomic risk threatens reading literacy on the individual and classroom level and suggest that while teachers adapt their instructional focus based on classroom composition, this in turn does not mediate or moderate associations on either level.

**Keywords:** Classroom composition, instructional quality, reading literacy, reading motivation, sociodemographic background

## Introduction

Emerging from the first grades of primary school as successful readers is a central developmental goal for young students, shaping further educational pathways (e.g., Rabiner et al., 2016) and laying a foundation for participation in society as a whole. However, sociodemographic factors can act as obstacles to or facilitators of different aspects of reading literacy (e.g., Rogiers et al., 2020; Seuring et al., 2020). Schools and teachers play an important role in supporting students from vulnerable groups, like socioeconomically at-risk, language-minority, and immigrant students, for example by adjusting their instruction to the specific needs of their students. However, the relations between sociodemographic background, instructional focus, and reading literacy are complex, and while extant research has revealed important insights (e.g., Wang et al., 2020; Wenger et al., 2020), it has not yet assembled a comprehensive picture of associations among these constructs on the individual and classroom level.

On the individual level, the aforementioned sociodemographic background characteristics negatively affect the acquisition of reading competence, but are partially positively related to motivational aspects of reading (e.g., Kigel et al., 2015). However, sociodemographic characteristics are often confounded, meaning that their individual contributions to students' success are easily conflated if their overlap is not properly considered in analyses. Additionally, students may profit differently from instructional support depending on their sociodemographic background (e.g., Hamre & Pianta, 2005), implying a moderating role of instructional focus. Beyond the individual level, associations between sociodemographic classroom composition and reading literacy have also been shown (e.g., Rjosk et al., 2017; Seuring et al., 2020), in line with theoretical models emphasizing the importance of students' environment (e.g., Bronfenbrenner & Morris, 2006). Extant findings regarding these associations are ambiguous, indicating that more exploration of the mechanisms behind how classroom composition affects reading literacy is needed. One explanation may be instructional effects (Rjosk, 2022), but few studies have directly investigated their mediating role, and with ambiguous results (e.g., Rjosk et al., 2015; Wenger et al., 2020). However, understanding instructional focus as both a mediator of classroom-level and a moderator of individual-level effects is a crucial step to comprehend how teachers

can mitigate detrimental effects and promote all students' reading literacy, and can be a basis for developing measures to support teachers in best fulfilling that role.

Therefore, we identified research questions vital to disentangling the complex relations of sociodemographic background, reading literacy, and instructional focus. First, we investigated the associations of three sociodemographic factors (socioeconomic risk, language minority, first-generation immigrant) with measures of reading literacy (reading competence, reading enjoyment, reading self-concept) on the individual level and classroom composition effects of these sociodemographic variables. Since previous reading achievement and gender can explain differences in aspects of literacy (e.g., Kanonire et al., 2022; Schwabe et al., 2015), we controlled for these factors on both levels. Next, we included instructional focus (reading-related support, support of language minority students, cognitive activation) as a mediator of classroom-level effects and, lastly, investigated its role as a cross-level moderator of individual-level associations.

## **Theory**

### **Reading Literacy in Primary School**

Acquiring fundamental reading skills is a central goal of primary school and core developmental tasks for students (Masten, 2014; Organization for Economic Co-operation and Development [OECD] et al., 2015). Following the stages of reading development (e.g., Chall, 1983; Kuhn & Stahl, 2022), students should pivot from learning to read towards reading to learn new things around Grade 4, the final grade of primary school in different educational systems (e.g., Germany, Austria), making good reading literacy a key primary-level achievement. Following the Progress in International Reading Literacy Study (PIRLS), good reading literacy includes that “[r]eaders can construct meaning from texts in a variety of forms. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment” (Mullis & Martin, 2019, p. 6). Consequently, students' *reading competence*, the ability to retrieve information, make inferences, interpret and integrate information from texts, and evaluate textual elements, is a core aspect of reading literacy (Mullis et al., 2023). Due to its relevance for all academic domains (Wigfield et al., 2016), it is a building block for further education, linked to educational attainment (e.g., Rabiner et al., 2016; Sparks et al., 2014) and participation in society.

Beyond competence, PIRLS emphasizes reading for enjoyment, and more generally reading motivation, as core aspects of reading literacy (McElvany et al., 2023; Mullis & Martin, 2019). Instilling motivation is especially important in the domain of reading, where motivational declines over the course of schooling are common and more pronounced in weaker readers (e.g., Miyamoto, Murayama, & Lechner, 2020; Vaknin-Nusbaum et al., 2018). The expectancy-value framework (Eccles & Wigfield, 2002, 2020) distinguishes two eponymous components of motivation: Students' expectancies for success and the value they ascribe to the behavior in question. In line with the PIRLS definition of reading literacy, a central aspect of the value component is students' *reading enjoyment*, measuring the intrinsic value attributed to reading (Eccles & Wigfield, 2002). Similarly, *reading self-concept*, reflecting self-beliefs about strengths and weaknesses in reading (Trautwein & Möller, 2016), is vital to the expectancy component. As pivotal facets of motivation, both components are important in their own right, and their relevance is heightened by their positive link to reading achievement found across different international contexts (e.g., Geng et al., 2023; Toste et al., 2020; Vu et al., 2022).

However, research has shown that systematic disadvantages can hinder the achievement of these aspects of reading literacy for some students. These disadvantages often result from individual and environmental factors tied to students' sociodemographic background, which should thus be considered influential in the context of reading literacy.

### **Sociodemographic Influences on and Disparities in Reading Literacy**

Educational research has consistently identified three sociodemographic factors that are important for reading: *Socioeconomic risk*, *language minority*, and *first-generation immigrant status*. In line with theoretical considerations (Bourdieu, 1986), students from socioeconomically disadvantaged backgrounds attain lower average reading competence than more privileged peers (e.g., Eriksson et al., 2021; Rolfe & Yang Hansen, 2021). Additionally, they may display lower reading enjoyment (e.g., Michael & Kyriakides, 2023; Rogiers et al., 2020) and self-concept (e.g., Ma et al., 2023; Yang Hansen et al., 2022), although this was shown mostly for secondary school students and less for younger learners. Minority language speakers show lower German reading competence on average as well (e.g., Segerer et al., 2021; Seuring et al., 2020), but findings regarding motivation vary greatly. Negative (e.g., Rogiers et

al., 2020), non-significant (e.g., Rjosk et al., 2015), and positive (e.g., Kigel et al., 2015; Villiger et al., 2014) associations of language minority status have been found with reading enjoyment and intrinsic reading motivation, whereas reading self-concept appears similar compared to (monolingual) majority language students in late elementary school (e.g., Festman & Schwieter, 2019; Segerer et al., 2021). Furthermore, first-generation immigrant students face additional acculturative challenges compared to native-born peers (Suárez-Orozco et al., 2018), even those with immigrant parents. These can lead to additional disadvantages with respect to reading competence (e.g., Andon et al., 2014; Borgonovi & Ferrara, 2020), although this pattern does not emerge in all studies (e.g., Seuring et al., 2020). Moreover, studies have shown motivational advantages of first-generation immigrants (e.g., Alivernini et al., 2018; Thijs & Fleischmann, 2015), although not for reading motivation specifically (Castillo, 2023; Miyamoto et al., 2018). Similarly, the verbal self-concept of immigrant students in Germany appears mostly comparable to their native peers (e.g., Miyamoto, Seuring, & Kristen, 2020; Schöber et al., 2015). Importantly, many studies regarding motivational outcomes did not differentiate by immigrant generation and examined secondary school students, so more research is needed to determine the role of students' own immigration experiences and how these constructs are shaped in primary school environments.

These findings illustrate how students' demographic background can affect their reading literacy. However, effects of background characteristics go beyond the individual level, as they also influence school success through classroom composition effects.

### **Beyond the Individual: Classroom Composition**

Theoretical models emphasize the importance of environmental contexts for a person's development in general (Bronfenbrenner & Morris, 2006), but also processes in specific groups, like immigrant-origin children and youth (Suárez-Orozco et al., 2018). These models highlight that proximal systems like the school and especially classroom environment (van Ewijk & Slegers, 2010) take a central role in shaping students' development. Historically, research has often focused on achievement composition (e.g., Marsh, 1987; Vasalampi et al., 2020) but composition regarding students' background characteristics has received growing attention.

Studies consistently show links between lower socioeconomic classroom composition and lower reading achievement (e.g., Gottfried, 2014; Seuring et al., 2020). Fewer studies have investigated motivational outcomes, but suggest negative associations of lower school-level socioeconomic composition with motivation (Berger & Archer, 2016) and reading self-concept specifically (Ma et al., 2023; Ramazan, Dai, et al., 2023). For classroom composition in terms of language minority students, some studies find negative associations with reading-related measures (e.g., Bergold et al., 2022; Seuring et al., 2020), whereas others find no significant relations (e.g., Wenger et al., 2020). Associations with motivation remain largely unexplored, although one study with secondary school students suggests a positive relation (Rjosk et al., 2015). Finally, studies focusing on the share of immigrant-origin students have largely shown negative relations to reading abilities (e.g., Mok et al., 2016; Rjosk et al., 2017; but see Hornstra et al., 2015), although these findings might partially be explained by language composition effects (Seuring et al., 2020). Again, motivational aspects have not been in the focus of research and need exploration.

### **Instructional Focus as Mediator of Classroom Composition Effects**

Theoretical models commonly discuss three mechanisms to explain how composition affects school-related outcomes (Rjosk, 2022). First, organizational and structural school resources are influenced by student body composition. Second, peer processes, such as social interactions, comparisons, and shared values and activities between students, can play a role. Third, and in the focus of this study, are teaching effects, comprising various dimensions of teaching style and teacher behavior. A high share of disadvantaged students may result in additional barriers to high-quality instruction, for example due to lower teacher expectations or a higher need for individualized student support (see Rjosk, 2022), but teachers may equally adapt their instruction to the specific needs of their classrooms. Findings are inconsistent, with some studies suggesting higher levels of support when the share of socioeconomically disadvantaged or language minority students is higher (e.g., Holzberger & Schiepe-Tiska, 2021; Rjosk et al., 2014), while others found no associations (e.g., Fauth et al., 2021; Wenger et al., 2020). Consequently, we focus on three specific instructional aspects deemed important for the reading literacy of students from diverse backgrounds based on theoretical considerations and research evidence.

First, teachers may focus on basic *reading-related support*. Students from advantageous sociodemographic backgrounds more easily master earlier stages of reading development (Chall, 1983; Jacobs, 2008) and discrepancies by socioeconomic status regarding verbal abilities that influence reading literacy development exist before school entry and are stable throughout primary school (e.g., Skopek & Passaretta, 2021; von Stumm et al., 2020). Similar discrepancies exist for language minority students (e.g., Lonigan et al., 2013; Volodina et al., 2020), and immigrant students may face further disadvantages, for example due to interrupted schooling (e.g., Potochnick, 2018). Thus, teachers might put a strong focus on supporting basic but essential reading-related abilities to bridge these initial gaps.

Similarly, teachers might focus on *supporting language minority students* during instruction in classrooms with many students speaking German as a second language, taking their specific needs into account even more than general reading-related support could. Rjosk et al. (2014) have shown that a focus on language learning was more common in ninth grade classrooms with higher shares of language minority, but also socioeconomically disadvantaged students. In turn, the authors also report a positive relation to reading achievement, which Hochweber and Vieluf (2018) replicated and expanded by showing an additional positive association with reading enjoyment.

Finally, *cognitive activation* comprises techniques that facilitate deeper understanding by activating higher-level thinking and metacognition, for example through building on prior knowledge or posing challenging problems (Praetorius et al., 2018). Since students with adverse sociodemographic background traits can be less engaged (e.g., Ackert, 2018; Guo et al., 2015), teachers may use cognitively activating techniques to improve engagement in classrooms with higher shares of such students. However, studies investigating composition effects on cognitive activation in primary schools do not consistently find such links (e.g., Fauth et al., 2021; Wenger et al., 2020), sometimes even implying lower average cognitive activation in classrooms with higher shares of ethnic minority students (Grossman et al., 2015). In turn, a meta-analysis suggested that various cognitively activating aspects of instruction are generally positively associated with achievement and motivation (Wang et al., 2020). Individual studies, mostly investigating mathematics instruction, confirm positive links to achievement (e.g., Kemethofer et al., 2022; König et al., 2021), although this association sometimes disappears upon inclusion of other measures of instructional quality (Stahns et al.,

2020) or does not emerge at all (e.g., Atlay et al., 2019). Positive associations with motivational interest-enjoyment components have been found in primary and secondary school (e.g., Fauth et al., 2014; Förtsch et al., 2017), but not consistently replicated (e.g., Lazarides & Raufelder, 2021), whereas a positive link to domain-specific self-concept appears consistently (e.g., Ramazan, Danielson, et al., 2023; Yi & Lee, 2017). However, few studies focused on reading specifically and most regarded secondary schools.

Although theoretical models highlight instructional aspects as central explanatory factors for mediating classroom composition effects on educational outcomes, only few studies have explicitly investigated mediation. Select findings indicate a positive mediating role of general instructional climate for associations between classroom language minority composition and motivation (Rjosk et al., 2015) and that focus on language-related competencies mediates the link between socioeconomic composition and reading achievement (Rjosk et al., 2014), but both effects were small and only marginally statistically significant. Moreover, investigating mathematics, cognitive activation did not mediate the relation of either socioeconomic or language minority composition with achievement (Wenger et al., 2020), contradicting theoretically derived expectations. Consequently, more research including instructional focus as mediator is necessary for a comprehensive insight, especially for the reading domain and students in primary school. Additionally, theoretical considerations suggest interindividual differences in how instructional focus shapes each student's reading literacy beyond classroom-level effects, at least partially depending on their individual sociodemographic background. Therefore, instructional focus' moderating role for associations on the individual student level must also be regarded to adequately investigate these complex relations.

### **Instructional Focus as Moderator of Individual Student Background Effects**

Considering instructional focus as a moderator is especially important given the assumption that it is influenced by classroom composition. If changes in instructional focus in classrooms with high concentrations of students with certain sociodemographic characteristics positively moderate associations with school success among students with these characteristics, this would imply a corrective role of teachers to counteract students'

sociodemographic disadvantages. These students then may still benefit from the specific instructional focus even in absence of classroom level mediation, as some studies suggest.

However, few studies have regarded differential effects of instruction depending on students' sociodemographic background factors. Investigating reading achievement, Konstantopoulos and Chung (2011) found no moderation effect of general teacher effectiveness for ethnic minority or low socioeconomic status students. However, Hamre and Pianta (2005), measuring socioeconomic risk via maternal education, showed positive interaction effects of instructional support, including aspects of supporting reading basics and cognitive activation, on first-grade achievement. In contrast, general instructional quality did not moderate the influence of socioeconomic status on secondary school mathematics achievement in most school systems (Gustafsson et al., 2018). Cognitive activation specifically was more beneficial for German students from higher socioeconomic backgrounds (Atlay et al., 2019), which Caro et al. (2016) similarly showed for various countries, but not Germany. Furthermore, no interactions of socioeconomic status and cognitive activation, regarded on the individual and classroom level separately, were found for Chinese fourth-grade students' mathematics achievement (Li et al., 2021). However, the study revealed higher benefits of cognitive activation for the self-efficacy of students from lower socioeconomic backgrounds, implying potentially similar associations with students' self-concept. For language minority students, Ramazan, Danielson, et al. (2023) showed a positive trend of cognitive activation's influence on mathematics achievement, whereas the trend for majority students was negative. While implying moderation, neither effect reached statistical significance and should therefore be interpreted carefully. The same study also reported positive effects of cognitive activation on self-concept in language minority and majority students, implying no interactions. To our knowledge, no studies have compared differential effects of these aspects of instructional focus for first-generation immigrant and native-born students.

### **Aims of the Present Study**

Preparing students to be successful readers is a central goal of primary education. Beyond reading competence as a core skill, motivational aspects of students' reading experience are equally important, as reflected in their reading enjoyment, an indicator of the value placed on reading, and reading self-concept, their self-image as successful readers which

determines expectancies regarding future reading-related challenges. These components of reading literacy are influenced by relatively static sociodemographic factors, but results regarding these associations are not always uniform in size or even direction of effects. Studies also frequently neglect to consider the confounded nature of different sociodemographic variables: Being related but distinct constructs, failure to regard them separately can lead to conflated effects, obscuring rather than exposing the underlying mechanisms. Additionally, the influence of sociodemographic classroom composition, especially language minority and immigrant student composition, on motivational outcomes as well as the role of classroom factors that mediate and moderate these associations have not been investigated conclusively. Theoretical models describe instructional aspects as a central mediator of classroom composition effects, but studies tend to investigate models that are not comprehensive, show ambiguous results, and rarely directly investigate mediation. Finally, most research has neglected to consider the potential moderating role of instructional focus for associations between demographic background characteristics and reading literacy on the individual level, especially for language minority and immigrant students. Therefore, we investigated the following research questions (RQ):

RQ1: How are sociodemographic background factors (socioeconomic risk, language minority status, immigrant status) related to reading literacy (reading competence, reading enjoyment, reading self-concept) through (a) individual-level and (b) classroom-composition effects, when controlling for previous achievement and gender?

RQ2: Are classroom-level associations between sociodemographic composition and reading literacy mediated by instructional focus (reading-related support, support of language minority students, cognitive activation)?

RQ3: Are individual-level associations between sociodemographic background and reading literacy moderated by instructional focus (reading-related support, support of language minority students, cognitive activation)?

## **Method**

### **Participants and Procedure**

The sample originally comprised 4,611 students in 259 classrooms chosen to participate in the German PIRLS 2021 survey, following criteria on the student, school, and regional level

to achieve a nationally representative sample of fourth-grade students (see McElvany et al., 2023). The procedure of PIRLS 2021 was internationally standardized and conducted in Germany by trained test administrators between 19 April and 02 July 2021. For our analyses, we excluded all students who did not fill out the additional questionnaires containing central information ( $n = 580$ ) and all classes without teacher questionnaire data (30 classrooms,  $n = 390$  students). Following common procedure (e.g., Felson & Reed, 1986; Lüdtke et al., 2005), we also excluded classrooms with fewer than ten remaining participants (33 classrooms,  $n = 227$  students), leading to a final sample of 3,414 students in 195 classrooms that showed a significantly higher reading competence than the excluded students,  $t(4609) = 9.24, p < .001, d = 0.31$ . Students were 10.44 years old on average ( $SD = 0.49$ ) and 48.0% of the sample were female (male: 50.4%; non-binary: 1.6%). Based on the classifications described in the Measures section, 33.7% were students with socioeconomic risk, 21.6% were language minority students, and 9.2% were first-generation immigrant students (see Online Resource 1 for information on their distribution on the classroom level).

The PIRLS 2021 survey was part of the national educational monitoring system in Germany, therefore student participation in the achievement test and, in some states, the student questionnaire was compulsory. The study was approved by the Standing Conference of the Ministers of Education and Cultural Affairs (KMK) and conducted in accordance with human research standards and local law. The International Association for the Evaluation of Educational Achievement (IEA), which conducts PIRLS, has standardized quality control procedures to ensure appropriate study administration. In addition, all federal states in Germany have subjected the materials and proceedings to a data protection appraisal.

## **Measures**

Descriptive information for the individual level (L1) and classroom level (L2) is depicted in Table 1. Detailed information on all scales is provided in the scale documentation of the German PIRLS 2021 survey (Schaufelberger et al., 2024). All variables were recoded so that higher values indicate higher agreement. McDonald's Omega (Flora, 2020) and multilevel confirmatory factor analyses (DiStefano & Zhang, 2022) indicated good internal consistency and model fit for all scales (see Table 2).

**Table 1**

*Descriptive Information, Intraclass Correlations, and Correlations of All Measures Based on the Observed Values*

Measure	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1) Socioeconomic risk	—	.59*	.68*	-.80*	-.64*	-.77*	-.57*	-.42*	.16*	.33*	-.14
2) Language minority	.13*	—	.58*	-.42*	-.29*	-.07	-.52*	-.24*	-.03	.42*	-.11
3) Immigrant status (1 <sup>st</sup> gen.)	.14*	.34*	—	-.55*	-.11	-.41*	-.41*	-.16*	.04	.43*	-.14
4) Reading competence	-.30*	-.18*	-.17*	—	.56*	.88*	.54*	.53*	-.13	-.34*	.04
5) Reading enjoyment	-.25*	-.03	-.01	.22*	—	.65*	.28*	.51*	-.08	-.21*	-.03
6) Reading self-concept	-.21*	-.12*	-.11*	.46*	.30*	—	.36*	.54*	-.24*	-.22*	.04
7) Previous achievement	-.29*	-.19*	-.22*	.60*	.23*	.41*	—	.60*	.10	-.28*	.15*
8) Gender (female)	-.01	.03	.01	.08*	.15*	.07*	.14*	—	-.34*	-.72*	-.04
9) Reading-related support <sup>a</sup>	—	—	—	—	—	—	—	—	—	.17*	.43*
10) Support of LMS <sup>a</sup>	—	—	—	—	—	—	—	—	—	—	.04
11) Cognitive activation <sup>a</sup>	—	—	—	—	—	—	—	—	—	—	—
$M_{L1}$	0.34	0.22	0.09	0.00	3.07	3.26	9.66	0.48	—	—	—
$SD_{L1}$	—	—	—	1.00	0.75	0.69	2.70	—	—	—	—
% missing <sub>L1</sub>	1.5	0.9	1.3	0.0	5.6–8.1	6.9–9.8	6.2	0.0	—	—	—
$M_{L2}$	0.34	0.22	0.09	-0.03	3.08	3.26	9.56	0.47	2.90	2.30	3.09
$SD_{L2}$	0.18	0.16	0.12	0.49	0.26	0.22	1.22	0.12	0.49	1.01	0.63
% missing <sub>L2</sub>	0.0	0.0	1.5	0.0	0.0	0.0	4.6	0.0	1.0–2.1	3.6	0.0–1.0
ICC <sub>1</sub>	.09	.10	.10	.18	.06	.04	.13	—	—	—	—
ICC <sub>2</sub>	.62	.67	.67	.79	.53	.41	.74	—	—	—	—

*Note.* Correlations on L1 are depicted in the lower triangle, correlations on L2 in the upper triangle. Correlation coefficients were calculated under consideration of the multilevel data structure using the *misty* package in R (Yanagida, 2024), z-standardized, pooled, and back-transformed for all imputed datasets (see Heymans & Eekhout, 2019; van Buuren, 2018). For scales, the range of percentage of missing values across all items of the scale is reported.

<sup>a</sup> Assessed on the classroom level only.

\* $p < .05$ .

**Table 2**

*Internal Consistency and Multilevel Model Fit for All Scales Included as Dependent or Mediating/ Moderating Variables*

Measure	$N_{\text{items}}$	$\omega_u$	RMSEA	CFI	SRMR <sub>L1</sub>	SRMR <sub>L2</sub>
Reading enjoyment	6	.85	.06	.97	.03	.11
Reading self-concept	5	.81	.07	.96	.03	.07
Reading-related support <sup>a</sup>	5	.73	.00	1.00	—	.02
Cognitive activation <sup>a</sup>	4	.78	.04	.95	—	.04

*Note.*  $\omega_u$  = McDonald's Omega.

<sup>a</sup> Assessed on the classroom level only.

We coded binary indicators for each sociodemographic background characteristic. Following Fauth et al. (2021), *socioeconomic risk* was assumed for students reporting 25 or fewer books at home (0 = *no socioeconomic risk*, 1 = *socioeconomic risk*). *Language minority status* refers to students never or only sometimes (as opposed to almost always or always) speaking German at home (0 = *language majority student*, 1 = *language minority student*). Finally, teachers provided information about students' *first-generation immigrant status*, including students who had moved to Germany as immigrants or refugees (0 = *native-born*, 1 = *first-generation immigrant*).

Regarding outcome variables, *reading competence* in the German PIRLS 2021 survey was measured with nine informative and nine narrative texts, each followed by 12 to 17 text-related tasks covering different literacy skills. Each participating students received one testlet including two texts, chosen with a conditionally random procedure. Based on all results, item response theory and information from background questionnaires were used to calculate five plausible values of every student's true reading competence (see McElvany et al., 2023). *Reading enjoyment* assesses students' self-reported enjoyment and positive evaluation of reading-related activities, measured with six items (e.g., "I would like to have more time for reading.", 1 = *strongly disagree* to 4 = *strongly agree*). Finally, *reading self-concept* describes students' mental representation of their own reading competence, assessed with five items (e.g., "Reading is easy for me.", 1 = *strongly disagree* to 4 = *strongly agree*).

The features of instructional focus were assessed via questionnaires answered by the classes' German teachers. Teachers indicated a focus on *reading-related support*, including vocabulary, reading fluency, weak-reader-support, reading comprehension, and reading strategies, via five items (e.g., "How often does the following happen in your German lessons? Targeted support of reading fluency.", 1 = *in no lesson* to 4 = *in almost every lesson*). Next, *support of language minority students* was measured with a single item (e.g., "How often does the following happen in your German lessons? Targeted support of students who speak German as a second or foreign language.", 1 = *in no lesson* to 4 = *in almost every lesson*). Lastly, *cognitive activation*, the use of cognitively challenging instruction and strategies that promote learning, was assessed with four items (e.g., "How often do you do the following when teaching reading in this class: Encourage students to discuss texts.", 1 = *never* to 4 = *in every or almost every lesson*).

As control variables, students' *German grade* from the Grade 4 midterm report card indicated previous achievement. To reflect the nuances of given grades, we transformed the common six-point grading scale (1 = *very good* to 6 = *insufficient*, with additional qualifiers + and -) to the more detailed scale of upper secondary school, which numerically transforms grade modifiers (0 = *insufficient* to 15 = *very good+*). We also included students' *gender*, which was dichotomized to reflect whether students self-identified as female (0 = *male/non-binary*, 1 = *female*).

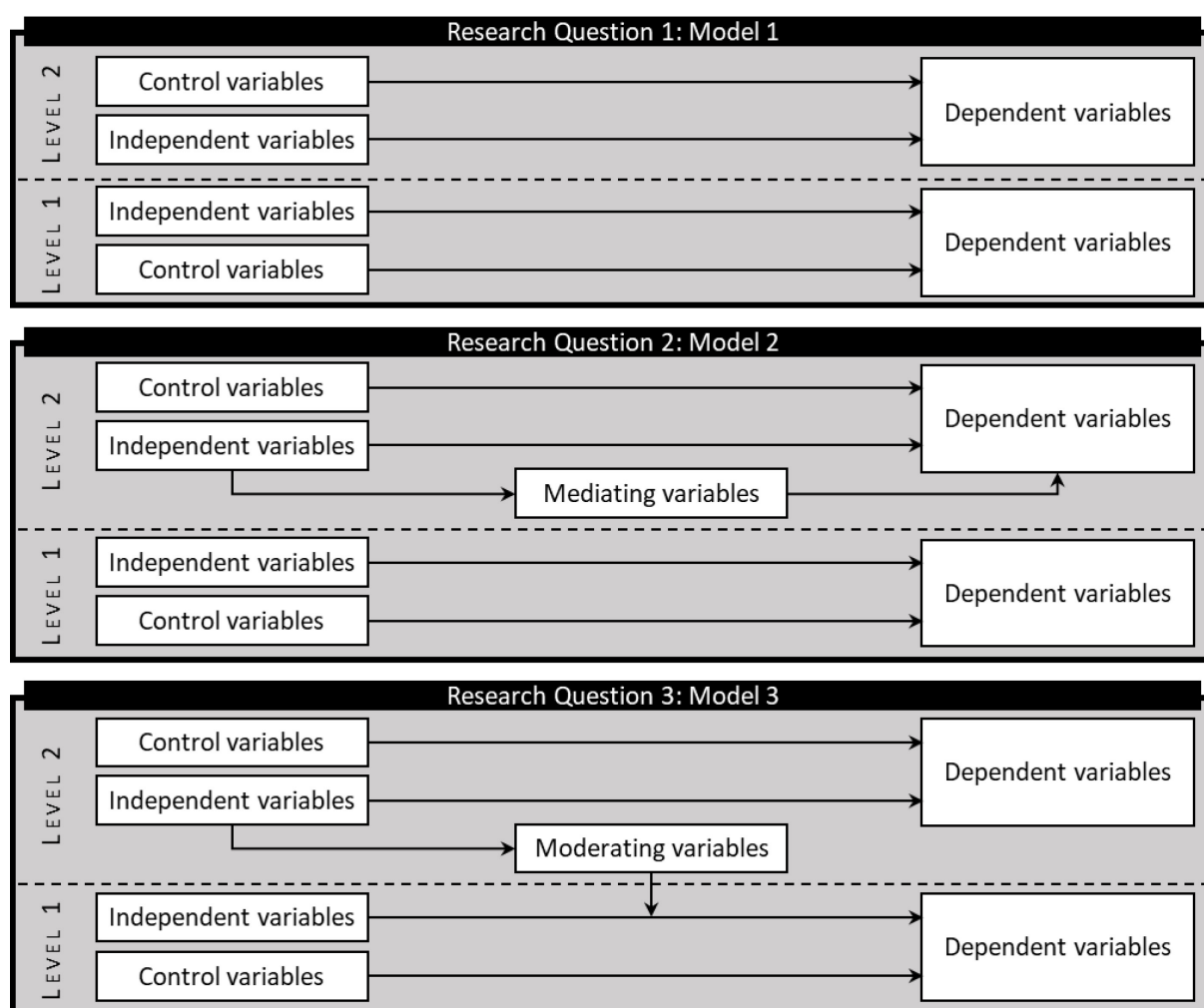
### **Analytic Approach**

We used R 4.3.1, run in the RStudio environment, for multiple imputation and descriptive analyses and *Mplus* 8.6 for analyzing our research questions. Multiple imputation of missing data was performed with the *mice* package for R (van Buuren & Groothuis-Oudshoorn, 2011) and specified to account for the two-level structure of the data (see Online Resource 2 for more information regarding the imputation). We utilized a total of 20 imputed datasets in the main analyses and repeated model estimation with each of the five plausible values of reading competence for every imputation (i.e., 100 replications per model in total). We specified three multilevel structural equation models to answer the three research questions. A simplified depiction of the models is provided in Figure 1. All models considered L1 and L2 using a latent-manifest approach (see e.g., Becker et al., 2022). Demographic

variables were group mean-centered (Enders & Tofghi, 2007), and all mediating and outcome variables were standardized. Following Hu and Bentler (1999), model fit was evaluated with CFI, RMSEA, and SRMR. For RQ1, the model included socioeconomic risk, language minority status, and first-generation immigrant status on L1 and the share of students with the respective sociodemographic marker on L2 as independent variables, and reading competence, reading enjoyment, and reading self-concept as outcome variables (Model 1). To answer RQ2,

**Figure 1**

*Simplified Depiction of Variables and Paths Included in Models 1 Through 3*



*Note.* Independent variables are socioeconomic risk, language minority status, and 1<sup>st</sup> generation immigrant status. Dependent variables are reading competence, reading enjoyment, and reading self-concept. Control variables are previous achievement and gender. Mediating/ moderating variables are teacher's focus on essential basics of reading, support of language minority students, and (in Model 2 only) cognitive activation.

the three aspects of instructional focus were added as mediating variables on L2 (Model 2) to investigate mediation between classroom composition and reading literacy outcomes on the classroom level. Before specifying the model for RQ3, we conducted pre-analyses including random slopes and cross-level interactions for only one sociodemographic factor and instructional focus variable at a time to avoid over-parameterization and keep demands on processing power and time to a reasonable amount (see Online Resource 3). Pre-analyses indicated no significant cross-level interactions on the 5% alpha error-level. However, three trends significant on the 10% level emerged, two for reading competence (language minority status with reading-related support; first-generation immigrant status with reading-related support) and one for reading self-concept (first-generation immigrant status with support of language minority students). Therefore, we specified a comprehensive model for RQ3 (Model 3) including these three interactions. Cognitive activation had not been identified as a potential moderator and was excluded from the model. Additionally, based on results from Model 2, paths between instructional focus and L2 outcome variables were also excluded in Model 3<sup>1</sup>. Analysis code for Models 1–3 is available in Online Resource 4.

## Results

### Descriptive Results

Bivariate correlations of all measures are depicted in Table 1. Strong positive bivariate associations emerged among the three outcome measures on L2, and moderate positive associations on L1. Similarly, bivariate correlations among the sociodemographic background variables were strongly positive on L2 and weak to moderate on L1. The correlation between language minority status and immigrant status should be noted in particular: While substantial on L1 and L2, its size supported our assumption that the two constructs should be treated as distinct. Regarding facets of instructional focus, reading-related support was positively related to support of language minority students and cognitive activation, but the latter two were not significantly associated with each other.

---

<sup>1</sup> Despite these attempts to reduce model complexity, this model specification still required too many points of integration to successfully run frequentist analysis in *Mplus*, so Bayesian estimation was used for Model 3 instead. Moreover, since we encountered issues of non-convergence in a small number of replications, we utilized 25 imputed datasets (125 replications total) in the analyses for Model 3.

### Demographic Variables and School Success

The results of Model 1 regarding associations of the three demographic factors with reading literacy measures on L1 and L2 are depicted in Table 3. Model fit was acceptable, CFI = .91; RMSEA = .05; SRMR = .06. On L1, socioeconomic risk was significantly negatively related to students' reading competence, reading enjoyment, and reading self-concept. Language minority status was negatively associated with reading competence, while first-generation immigrant status was positively related to reading enjoyment. This means that students who were either socioeconomically disadvantaged or language minority students were less skilled readers on average, and students with socioeconomic risk also reported less enjoyment of reading and a lower estimation of their own reading ability. In contrast, immigrant students enjoyed reading more on average than their native-born counterparts.

**Table 3**

*Results of Model 1 Regarding the Association of Demographic Background Factors with Measures of Reading Literacy*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual-level effects</i>						
Socioeconomic risk	-0.20*	0.05	-0.38*	0.04	-0.09*	0.03
Language minority	-0.11*	0.04	0.04	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.02	0.07	0.15*	0.06	0.05	0.05
<i>R</i> <sup>2</sup> <sub>within</sub>	.42		.13		.24	
<i>Composition effects</i>						
[P] Socioeconomic risk	-0.97*	0.18	-0.27	0.19	-0.37*	0.14
[P] Language minority	0.20	0.18	-0.18	0.14	0.31*	0.15
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.68*	0.27	0.10	0.27	-0.30	0.20
<i>R</i> <sup>2</sup> <sub>between</sub>	.60		.46		.55	

*Note.* Coefficients for control variables and intercorrelations among the independent and dependent variables, respectively, are depicted separately in Online Resource 5.

[P] = Proportion of students with this marker in the classroom.

\**p* < .05.

**Table 4**

*Results of Model 2 Regarding the Association of Demographic Background Factors with Measures of Reading Literacy as well as Mediating Variables of Instructional Focus*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.20*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.11*	0.04	0.04	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.02	0.07	0.15*	0.06	0.05	0.05
$R^2_{\text{within}}$	.42		.13		.24	
<i>Composition &amp; classroom-level direct effects</i>						
[P] Socioeconomic risk	-0.92*	0.19	-0.31	0.20	-0.34*	0.14
[P] Language minority	0.22	0.18	-0.18	0.14	0.30*	0.15
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.65*	0.27	0.07	0.27	-0.30	0.20
Reading related support	-0.06	0.06	0.03	0.05	-0.05	0.04
Support of LMS	-0.02	0.03	0.00	0.02	0.00	0.02
Cognitive activation	-0.02	0.07	-0.06	0.06	0.00	0.04
$R^2_{\text{between}}$	.61		.49		.58	
<i>Classroom level – Predicting mediating variables</i>						
	Reading-related support		Support of language minority students		Cognitive activation	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
[P] Socioeconomic risk	0.72*	0.34	0.51	0.48	-0.06	0.26
[P] Language minority	-0.23	0.39	1.05	0.55	0.13	0.29
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.07	0.56	1.72*	0.64	-0.47	0.43
$R^2_{\text{between}}$	.04		.16		.03	

*Note.* Coefficients for indirect effects are depicted in Appendix B. Coefficients for control variables and intercorrelations among the independent, mediating, and dependent variables, respectively, are depicted separately in Online Resource 5.

[P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

Classroom composition effects net of relations on L1 showed that the share of students with socioeconomic risk and share of first-generation immigrant students were negatively related to average reading competence. Socioeconomic risk composition was additionally negatively, but share of language minority students positively associated with reading self-

concept. Thus, beyond individual level associations, students in classrooms with higher shares of students with socioeconomic risk or first-generation immigrant students showed additional lower average reading competence, while individual students' reading self-concept was lower in classrooms with more students with socioeconomic risk, but higher in classrooms with a larger share of language minority students.

**Table 5**

*Indirect Associations of Sociodemographic Composition with Measures of Reading Literacy on the Classroom Level via the Mediating Variables in Model 2*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Socioeconomic risk, indirect via:</i>						
Reading-related support	-0.04	0.05	0.02	0.03	-0.03	0.02
Support of language minority students	-0.01	0.02	0.00	0.01	0.00	0.01
Cognitive activation	0.00	0.01	0.00	0.02	0.00	0.00
<i>Language minority status, indirect via:</i>						
Reading-related support	0.01	0.03	-0.01	0.02	0.01	0.02
Support of language minority students	-0.02	0.03	0.01	0.02	0.00	0.01
Cognitive activation	-0.00	0.01	-0.01	0.02	0.00	0.00
<i>First-generation immigrant, indirect via:</i>						
Reading-related support	0.00	0.03	-0.00	0.02	0.00	0.02
Support of language minority students	-0.04	0.05	0.01	0.03	0.00	0.02
Cognitive activation	0.01	0.04	0.03	0.04	-0.00	0.01

### **Instructional Focus as Mediator**

Findings for Model 2, which included three aspects of teachers' instructional focus, are reported in Tables 4 and 5. The associations found in Model 1 for both L1 and compositional effects remained, with only small changes in coefficient sizes. Regarding L2 associations between sociodemographic composition and aspects of instructional focus, the share of students with socioeconomic risk was positively associated with a focus on reading-related support. Additionally, the share of first-generation immigrant students was positively related

to a focus on supporting language minority students. Therefore, teachers on average focused more on reading-related support in classrooms with more socioeconomically disadvantaged students, while more often employing techniques to support language minority students when the share of immigrant students in their classroom was higher. However, neither measure of instructional focus was significantly associated with the measures of reading literacy at the classroom level, nor did they mediate the L2 effects on reading literacy (see Table 5).

### **Instructional Focus as Moderator**

As depicted in Table 6, findings for Model 3, which included cross-level interactions identified in pre-analyses (see Online Resource 3), were largely comparable with relations found in the previous models, except for a now statistically significant negative composition effect of socioeconomic risk composition on reading enjoyment. Both cross-level interaction effects on students' reading competence in the model, individual students' language minority status' and first-generation immigrant status' interactions with classroom focus on reading-related support, were positive, but did not reach statistical significance. The cross-level interaction of individual students' first-generation immigrant status with teacher's support of language minority students in the classroom was not significantly associated with reading self-concept either. Thus, in regard to acquiring reading literacy, language minority students and first-generation immigrant students did not benefit more from an instructional focus on reading-related support or language minority support than their peers.

## **Discussion**

### **Discussion of Findings**

One core goal of primary school is teaching students to be successful readers, which includes attaining good reading competence but also establishing positive reading motivation. Previous research and theoretical considerations have acknowledged that students' sociodemographic characteristics such as socioeconomic risk, language minority, and first-generation immigrant status can shape reading literacy, but not always taken into account that they are confounded and should be studied simultaneously to avoid conflating their specific contributions. Additionally, less research has investigated how sociodemographic composition of classrooms affects students' reading literacy in primary school, especially regarding

**Table 6**

*Results of Model 3 Regarding the Association of Demographic Background Factors with Measures of Reading Literacy and the Moderating Role of Instructional Focus*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.20*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.11*	0.05	0.04	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.01	0.08	0.15*	0.06	0.08	0.05
<i>Cross-level interactions</i>						
Language minority <sub>(L1)</sub> × Reading-related support	0.05	0.10	—	—	—	—
Immigrant status (1 <sup>st</sup> gen.) <sub>(L1)</sub> × Reading-related support	0.13	0.15	—	—	—	—
Immigrant status (1 <sup>st</sup> gen.) <sub>(L1)</sub> × Support of LMS	—	—	—	—	-0.07	0.05
<i>Composition effects</i>						
[P] Socioeconomic risk	-1.00*	0.20	-0.34*	0.15	-0.39*	0.12
[P] Language minority	0.23	0.22	-0.19	0.15	0.35*	0.14
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.72*	0.32	0.19	0.23	-0.35	0.20
<i>Classroom level – Predicting moderating variables</i>						
	Reading-related support		Support of language minority students			
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>		
[P] Socioeconomic risk	0.32	0.30	—	—		
[P] Language minority	—	—	1.20*	0.55		
[P] Immigrant status (1 <sup>st</sup> gen.)	—	—	2.30*	0.77		

*Note.* Coefficients for control variables and intercorrelations among independent, moderating, and dependent variables, respectively, are depicted separately in Online Resource 5.

[P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

motivation, and similar problems of conflating confounded compositional effects exist. Finally, instructional focus as a proposed mechanism to explain how classroom composition affects students' literacy needs further investigation, and it is largely unclear how students are differentially affected by instructional aspects based on their individual background characteristics. We investigated these questions in a sample of fourth-grade students, regarding competence and motivational aspects of their reading literacy dependent on three core sociodemographic background characteristics on the individual level as well as their classroom's sociodemographic composition while including important control variables. We further investigated the role of teachers' instructional focus as a mediator for classroom-level effects and moderator for individual-level effects on reading literacy.

On the individual level, results were largely congruent with theoretical expectations and findings in the extant literature. Socioeconomic risk was negatively associated with reading competence, enjoyment, and self-concept in fourth grade (e.g., Rogiers et al., 2020; Yang Hansen et al., 2022), whereas language minority status was negatively related to reading competence (e.g., Segerer et al., 2021). In contrast, first-generation immigrant status positively related to reading enjoyment (e.g., Miyamoto, Seuring, & Kristen, 2020), and all associations were found while controlling for previous achievement and gender effects (RQ1a). Therefore, we conclude that for individual students, socioeconomic risk is the most substantial threat to reading literacy among the sociodemographic background variables investigated. Language minority students also experience disadvantages in terms of reading competence, whereas first-generation immigrant students report motivational advantages over their peers, specifically regarding reading enjoyment.

Investigating composition effects (RQ1b), we found negative associations between the share of socioeconomically at-risk students and reading competence (e.g., Seuring et al., 2020) as well as self-concept (e.g., Ma et al., 2023), while a higher share of language minority students was positively associated with reading self-concept and a higher share of first-generation immigrant students negatively related to reading competence (Rjosk et al., 2017). Again, the findings imply that socioeconomic classroom composition has the largest impact on students' reading literacy, with lower reading competence also prevalent in classrooms with higher shares of immigrant students. Composition with regard to language minority speakers, however, appears to be motivationally advantageous, evident by higher reading self-concept.

Including instructional focus variables as mediators revealed that teachers adapted instruction to the composition of their classroom, focusing more on reading-related support when the share of socioeconomically disadvantaged students was higher, and supporting language minority students specifically in classrooms with more first-generation immigrant learners (e.g., Rjosk et al., 2014). However, neither instructional focus variable was associated with measures of reading literacy (RQ2), contrary to our expectations (e.g., Hochweber & Vieluf, 2018; Wang et al., 2020), implying that teachers endeavor to adapt their instruction to classroom-specific needs based on its sociodemographic composition, but lack the necessary tools to do so in a way that leads to better average outcomes for students.

Similarly, investigating instructional focus as a moderator of association on the individual level revealed no significant effects (RQ3), adding to the existing heterogeneous findings (e.g., Caro et al., 2016; Hamre & Pianta, 2005). While preliminary analyses hinted at potential specific effects of a focus on reading-related support for language minority students' and immigrant students' reading competence, as well as support of language minority students for immigrant students' self-concept, these findings were statistically insignificant in the final model. This indicates that students did not differentially benefit from any of the included instructional focus variables depending on their sociodemographic background, expanding the implications of results regarding RQ2. Even if teachers adapt their instruction to the classrooms' sociodemographic composition, students fail to benefit individually or collectively from these adaptations. This raises the question whether teachers are sufficiently equipped to adapt their instruction to students' specific needs based on their sociodemographic backgrounds. More positively, however, this result also contradicts findings showing that teachers focus instruction in a way that adversely affects students from disadvantageous sociodemographic backgrounds (e.g., Atlay et al., 2019).

### **Limitations and Strengths**

When interpreting the results, some limitations must be considered. First, although data stems from a representative sample of German fourth-graders, we excluded some students from the original sample, meaning that results are no longer fully generalizable, especially since the average reading competence was significantly lower in excluded than the included students. We recognize that exclusion of disproportionately more weak readers,

possibly due to their sociodemographic background, may have led to some bias in the associations. Second, operationalizing the sociodemographic factors as binary categories marks a trade-off: It made composition effects easily interpretable, basing them on simple shares of students, while at the same time losing some variance in the specific answers due to dichotomization. Also regarding operationalization, some measures, especially socioeconomic risk and instructional focus, could be improved by including more information from other sources. The number of books at home is a central indicator of socioeconomic status when predicting achievement and highly correlated with other socioeconomic measures (e.g., Eriksson et al., 2021; Strietholt & Strello, 2021), but ideally, multiple indicators of socioeconomic risk, especially parents' occupational status, and information provided by parents rather than students (Heppt et al., 2022) should be included for a comprehensive, reliable assessment. Regarding instruction, teachers indicated the quantity of different techniques and behaviors, but the quality of implementation could not be inferred. Similarly, teacher and student assessments of instruction and its quality can vary substantially (e.g., Fauth et al., 2020). Thus, relating teacher-reported to student-perceived aspects of instruction instead of considering only the former might have provided further insights. Unfortunately, neither aspect could be considered with the available data. Finally, as PIRLS gathers cross-sectional data, causality cannot be inferred from our analyses. Relations between reading literacy measures and teachers' instructional focus might be reciprocal, and while a measure of previous achievement was included as a control variable, this could not fully be modelled in the analyses.

On the other hand, including socioeconomic risk, language minority status, and first-generation immigrant status as well as important control variables is a major strength of this study. This allowed us to distinguish the role of each socioeconomic background variable without conflating their individual contributions towards reading literacy, a common problem of studies investigating sociodemographic effects, and net of potential effects of previous achievement and gender. Similarly, including reading competence as well as motivational aspects of reading allowed for a more nuanced investigation of reading literacy in late primary school. While the attainment of good reading competence is a central aspect of students' primary education, their motivation to read is equally important. Since different background variables are heterogeneously associated with all outcomes, including multiple indicators of

reading literacy facilitates understanding of these complex relations. Additionally, including classroom composition effects of the background variables as well allowed us to investigate the important role of students' learning environment in forming their reading literacy. Finally, another strength of the study is the inclusion of aspects of instructional focus that could be impactful for students' reading literacy depending on sociodemographic background based on theoretical reasoning, but had not been sufficiently investigated in previous studies, especially since we investigated not only classroom level mediation effects, but also assessed their role as moderators for associations on the individual level.

### **Implications for Future Research and Practice**

The results raise further questions that should be investigated by future research. We found no evidence for a mediating or a moderating effect of instructional focus, and why these effects were not present should be investigated in detail. Potentially, these specific aspects of instructional focus are less relevant for students' reading outcomes than expected based on theoretical assumptions, but the results might also suggest that teachers lacked the necessary tools to either choose an optimal focus for classrooms based on their composition, or to implement it in a way that affects students as intended. For example, strategies teachers perceive as cognitively activating are only effective if the students actually feel cognitively activated as well. Thus, including teacher and student measurements of instructional focus could offer more insight into the mechanisms at work. Furthermore, a focus on the intersectionality of the different background variables can improve our understanding of the complex relations between sociodemographic background and reading literacy. While one important contribution of our study is the differentiation of the three sociodemographic background variables, we did not consider interactions between them. However, such interactions might reveal additional disadvantages and represent the complex nuances of sociodemographic background effects even better. For example, a high socioeconomic status might offset certain disadvantages resulting from immigration, as parents could afford private tutoring to help close the learning gap associated with integration into a new school system and potentially interrupted schooling. Similarly, interactions of different aspects of sociodemographic classroom composition might reveal effects of intersectionality on the classroom level and should be studied as well. Finally, our study included central aspects of

reading literacy, considering motivational aspects beyond just students' competences, but more outcomes should be investigated in future research. In particular, psychosocial outcomes like students' social integration into classrooms and well-being also need closer investigation when it comes to the role of sociodemographic variables on the individual, but especially also the classroom level.

Implications for instruction in classrooms with students from diverse sociodemographic backgrounds must be formulated with some caution. While our results show that especially students with socioeconomic risk are disadvantaged in terms of reading literacy in late primary school, the lack of significant moderation effects implies that neither instructional focus included in our study is particularly well suited to counter these disadvantages. A positive trend implied that focusing on reading-related support may facilitate reading competence among language minority and first-generation immigrant students especially, but these associations were not statistically significant in the final model and need further investigation. Additionally, the most consistently negative classroom-level influence stems from socioeconomic composition, potentially indicating lower school resources as well, which is frequently discussed as an important mediator of compositional effects (e.g., Rjosk, 2022). Therefore, identifying schools with high shares of students with socioeconomic risk and developing specific programs to improve the resources of these schools could be an important step to diminish these effects, for example by investing in better equipment and materials, offering specific training programs for teachers, or hiring additional staff to unburden teachers.

## **Conclusion**

Our study contributes to the understanding of the complex relations between students' sociodemographic background characteristics and reading literacy in primary school. By including multiple background variables, our results reflect the individual influence of each sociodemographic factor. On average, reading competence was lower in language minority students, whereas immigrant students showed motivational advantages, but socioeconomic risk coincided with the most disadvantages regarding reading competence and motivation. Therefore, socioeconomic risk is the most important demographic indicator to assess which students may benefit from targeted support to achieve good reading literacy. Analyses of

classroom composition showed additional effects, again revealing a high concentration of students with socioeconomic risk to be most detrimental for reading literacy. Investigations of instructional focus could not confirm our assumptions of a mediating or moderating role of these aspects of instruction for associations found on the classroom or individual level, necessitating further investigation in the future.

## References

- Ackert, E. (2018). Segregation paradox? School racial/ethnic and socioeconomic composition and racial/ethnic differences in engagement. *Social Science Research, 70*, 144–162. <https://doi.org/10.1016/j.ssresearch.2017.10.010>
- Alivernini, F., Manganelli, S., Cavicchiolo, E., Girelli, L., Biasi, V., & Lucidi, F. (2018). Immigrant background and gender differences in primary students' motivations toward studying. *The Journal of Educational Research, 111*(5), 603–611. <https://doi.org/10.1080/00220671.2017.1349073>
- Andon, A., Thompson, C. G., & Becker, B. J. (2014). A quantitative synthesis of the immigrant achievement gap across OECD countries. *Large-Scale Assessments in Education, 2*(1), Article 7. <https://doi.org/10.1186/s40536-014-0007-2>
- Atlay, C., Tieben, N., Hillmert, S., & Fauth, B. (2019). Instructional quality and achievement inequality: How effective is teaching in closing the social achievement gap? *Learning and Instruction, 63*, Article 101211. <https://doi.org/10.1016/j.learninstruc.2019.05.008>
- Becker, M., Kocaj, A., Jansen, M., Dumont, H., & Lüdtke, O. (2022). Class-average achievement and individual achievement development: Testing achievement composition and peer spillover effects using five German longitudinal studies. *Journal of Educational Psychology, 114*(1), 177–197. <https://doi.org/10.1037/edu0000519>
- Berger, N., & Archer, J. (2016). School socio-economic status and student socio-academic achievement goals in upper secondary contexts. *Social Psychology of Education, 19*(1), 175–194. <https://doi.org/10.1007/s11218-015-9324-8>
- Bergold, S., Weidinger, A. F., & Steinmayr, R. (2022). The “big fish” from the teacher’s perspective: A closer look at reference group effects on teacher judgments. *Journal of Educational Psychology, 114*(3), 656–680. <https://doi.org/10.1037/edu0000559>
- Borgonovi, F., & Ferrara, A. (2020). Academic achievement and sense of belonging among non-native-speaking immigrant students: The role of linguistic distance. *Learning and Individual Differences, 81*, Article 101911. <https://doi.org/10.1016/j.lindif.2020.101911>
- Bourdieu, P. (1986). The forms of capital (R. Nice, Trans.). In J. G. Richardson (Ed.), *Handbook of theory and research for the sociology of education* (pp. 241–258). Greenwood Press.
- Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology: Theoretical models of human development* (6<sup>th</sup> ed., pp. 793–828). John Wiley & Sons.
- Caro, D. H., Lenkeit, J., & Kyriakides, L. (2016). Teaching strategies and differential effectiveness across learning contexts: Evidence from PISA 2012. *Studies in Educational Evaluation, 49*, 30–41. <https://doi.org/10.1016/j.stueduc.2016.03.005>
- Castillo, W. (2023). Do elementary students reading motivation levels differ by racial/ethnic and/or immigrant background? *Journal of Latinos and Education, 22*(2), 669–680. <https://doi.org/10.1080/15348431.2020.1805615>
- Chall, J. S. (1983). *Stages of reading development*. McGraw-Hill Book Company.
- DiStefano, C., & Zhang, T. (2022). A primer for using Multilevel Confirmatory Factor Analysis models in educational research. In M. S. Khine (Ed.), *Methodology for multilevel modeling in*

- educational research* (pp. 11–28). Springer Singapore. [https://doi.org/10.1007/978-981-16-9142-3\\_2](https://doi.org/10.1007/978-981-16-9142-3_2)
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review of Psychology*, *53*, 109–132. <https://doi.org/10.1146/annurev.psych.53.100901.135153>
- Eccles, J. S., & Wigfield, A. (2020). From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemporary Educational Psychology*, *61*, Article 101859. <https://doi.org/10.1016/j.cedpsych.2020.101859>
- Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods*, *12*(2), 121–138. <https://doi.org/10.1037/1082-989X.12.2.121>
- Eriksson, K., Lindvall, J., Helenius, O., & Ryve, A. (2021). Socioeconomic status as a multidimensional predictor of student achievement in 77 Societies. *Frontiers in Education*, *6*, Article 731634. <https://doi.org/10.3389/educ.2021.731634>
- Fauth, B., Atlay, C., Dumont, H., & Decristan, J. (2021). Does what you get depend on who you are with? Effects of student composition on teaching quality. *Learning and Instruction*, *71*, Article 101355. <https://doi.org/10.1016/j.learninstruc.2020.101355>
- Fauth, B., Decristan, J., Rieser, S., Klieme, E., & Büttner, G. (2014). Student ratings of teaching quality in primary school: Dimensions and prediction of student outcomes. *Learning and Instruction*, *29*, 1–9. <https://doi.org/10.1016/j.learninstruc.2013.07.001>
- Fauth, B., Göllner, R., Lenske, G., Praetorius, A.-K., & Wagner, W. (2020). Who sees what? Conceptual considerations on the measurement of teaching quality from different perspectives. In A.-K. Praetorius, J. Grünkorn, & E. Klieme (Eds.), *Empirische Forschung zu Unterrichtsqualität: Theoretische Grundfragen und quantitative Modellierungen. Zeitschrift für Pädagogik, 66. Beiheft* (pp. 138–155). Beltz Juventa. <https://doi.org/10.25656/01:25870>
- Felson, R. B., & Reed, M. D. (1986). Reference groups and self-appraisals of academic ability and performance. *Social Psychology Quarterly*, *49*(2), 103. <https://doi.org/10.2307/2786722>
- Festman, J., & Schwieter, J. W. (2019). Self-concepts in reading and spelling among mono- and multilingual children: Extending the bilingual advantage. *Behavioral Sciences*, *9*(4), Article 39. <https://doi.org/10.3390/bs9040039>
- Flora, D. B. (2020). Your coefficient alpha is probably wrong, but which coefficient omega is right? A tutorial on using R to obtain better reliability estimates. *Advances in Methods and Practices in Psychological Science*, *3*(4), 484–501. <https://doi.org/10.1177/2515245920951747>
- Förtsch, C., Werner, S., Dorfner, T., Kotzebue, L. von, & Neuhaus, B. J. (2017). Effects of cognitive activation in biology lessons on students' situational interest and achievement. *Research in Science Education*, *47*(3), 559–578. <https://doi.org/10.1007/s11165-016-9517-y>
- Geng, S., Lu, Y., & Shu, H. (2023). Cross-cultural generalizability of expectancy-value theory in reading: A multilevel analysis across 80 societies. *Current Psychology*, *42*(22), 18943–18958. <https://doi.org/10.1007/s12144-022-03014-0>
- Gottfried, M. A. (2014). Peer effects in urban schools: Assessing the impact of classroom composition on student achievement. *Educational Policy*, *28*(5), 607–647. <https://doi.org/10.1177/0895904812467082>

- Grossman, P., Cohen, J., & Brown, L. (2015). Understanding instructional quality in English Language Arts: Variations in PLATO scores by content and context. In T. J. Kane, K. A. Kerr, & R. C. Pianta (Eds.), *Designing teacher evaluation systems* (pp. 303–331). John Wiley & Sons, Inc. <https://doi.org/10.1002/9781119210856.ch10>
- Guo, Y., Sun, S., Breit-Smith, A., Morrison, F. J., & Connor, C. M. (2015). Behavioral engagement and reading achievement in elementary-school-age children: A longitudinal cross-lagged analysis. *Journal of Educational Psychology, 107*(2), 332–347. <https://doi.org/10.1037/a0037638>
- Gustafsson, J.-E., Nilsson, T., & Hansen, K. Y. (2018). School characteristics moderating the relation between student socio-economic status and mathematics achievement in grade 8. Evidence from 50 countries in TIMSS 2011. *Studies in Educational Evaluation, 57*, 16–30. <https://doi.org/10.1016/j.stueduc.2016.09.004>
- Hamre, B. K., & Pianta, R. C. (2005). Can instructional and emotional support in the first-grade classroom make a difference for children at risk of school failure? *Child Development, 76*(5), 949–967. <https://doi.org/10.1111/j.1467-8624.2005.00889.x>
- Heppt, B., Olczyk, M., & Volodina, A. (2022). Number of books at home as an indicator of socioeconomic status: Examining its extensions and their incremental validity for academic achievement. *Social Psychology of Education, 25*(4), 903–928. <https://doi.org/10.1007/s11218-022-09704-8>
- Heymans, M. W., & Eekhout, I. (2019). *Applied missing data analysis with SPSS and @Studio*. <https://bookdown.org/mwheymans/bookmi/>
- Hochweber, J., & Vieluf, S. (2018). Gender differences in reading achievement and enjoyment of reading: The role of perceived teaching quality. *The Journal of Educational Research, 111*(3), 268–283. <https://doi.org/10.1080/00220671.2016.1253536>
- Holzberger, D., & Schiepe-Tiska, A. (2021). Is the school context associated with instructional quality? The effects of social composition, leadership, teacher collaboration, and school climate. *School Effectiveness and School Improvement, 32*(3), 465–485. <https://doi.org/10.1080/09243453.2021.1913190>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Jacobs, V. (2008). Adolescent literacy: Putting the crisis in context. *Harvard Educational Review, 78*(1), 7–39. <https://doi.org/10.17763/haer.78.1.c577751kq7803857>
- Kanonire, T., Lubenko, J., & Kuzmina, Y. (2022). The effects of intrinsic and extrinsic reading motivation on reading performance in elementary school. *Journal of Research in Childhood Education, 36*(1), 1–13. <https://doi.org/10.1080/02568543.2020.1822961>
- Kemethofer, D., Helm, C., & Warwas, J. (2022). Does educational leadership enhance instructional quality and student achievement? The case of Austrian primary school leaders. *International Journal of Leadership in Education*. Advance online publication. <https://doi.org/10.1080/13603124.2021.2021294>

- Kigel, R. M., McElvany, N., & Becker, M. (2015). Effects of immigrant background on text comprehension, vocabulary, and reading motivation: A longitudinal study. *Learning and Instruction, 35*, 73–84. <https://doi.org/10.1016/j.learninstruc.2014.10.001>
- König, J., Blömeke, S., Jentsch, A., Schlesinger, L., Felske née Nehls, C., Musekamp, F., & Kaiser, G. (2021). The links between pedagogical competence, instructional quality, and mathematics achievement in the lower secondary classroom. *Educational Studies in Mathematics, 107*(1), 189–212. <https://doi.org/10.1007/s10649-020-10021-0>
- Konstantopoulos, S., & Chung, V. (2011). Teacher effects on minority and disadvantaged students' grade 4 achievement. *The Journal of Educational Research, 104*(2), 73–86. <https://doi.org/10.1080/00220670903567349>
- Kuhn, M. R., & Stahl, K. A. D. (2022). Teaching reading: Development and differentiation. *Phi Delta Kappan, 103*(8), 25–31. <https://doi.org/10.1177/00317217221100007>
- Lazarides, R., & Raufelder, D. (2021). Control-value theory in the context of teaching: Does teaching quality moderate relations between academic self-concept and achievement emotions? *The British Journal of Educational Psychology, 91*(1), 127–147. <https://doi.org/10.1111/bjep.12352>
- Li, H., Liu, J., Zhang, D., & Liu, H. (2021). Examining the relationships between cognitive activation, self-efficacy, socioeconomic status, and achievement in mathematics: A multi-level analysis. *The British Journal of Educational Psychology, 91*(1), 101–126. <https://doi.org/10.1111/bjep.12351>
- Lonigan, C. J., Farver, J. M., Nakamoto, J., & Eppe, S. (2013). Developmental trajectories of preschool early literacy skills: A comparison of language-minority and monolingual-English children. *Developmental Psychology, 49*(10), 1943–1957. <https://doi.org/10.1037/a0031408>
- Lüdtke, O., Köller, O., Marsh, H. W., & Trautwein, U. (2005). Teacher frame of reference and the big-fish–little-pond effect. *Contemporary Educational Psychology, 30*(3), 263–285. <https://doi.org/10.1016/j.cedpsych.2004.10.002>
- Ma, L., Xiao, L., & Li, Q. (2023). Mediation of self-concept and moderation of teacher support between SES and reading achievement: Evidence from China and the United States. *The British Journal of Educational Psychology, 93*(4), 921–940. <https://doi.org/10.1111/bjep.12607>
- Marsh, H. W. (1987). The big-fish-little-pond effect on academic self-concept. *Journal of Educational Psychology, 79*(3), 280–295. <https://doi.org/10.1037/0022-0663.79.3.280>
- Masten, A. S. (2014). *Ordinary magic: Resilience in development*. Guilford Press.
- McElvany, N., Lorenz, R., Frey, A., Goldhammer, F., Schilcher, A., & Stubbe, T. C. (Eds.). (2023). *IGLU 2021. Lesekompetenz von Grundschulkindern im internationalen Vergleich und im Trend über 20 Jahre* [PIRLS 2021. Reading competence of primary school students in international comparison and in the 20 year trend]. Waxmann Verlag GmbH. <https://doi.org/10.31244/9783830997009>
- Michael, D., & Kyriakides, L. (2023). Mediating effects of motivation and socioeconomic status on reading achievement: A secondary analysis of PISA 2018. *Large-Scale Assessments in Education, 11*(1), Article 31. <https://doi.org/10.1186/s40536-023-00181-9>
- Miyamoto, A., Murayama, K., & Lechner, C. M. (2020). The developmental trajectory of intrinsic reading motivation: Measurement invariance, group variations, and implications for reading

- proficiency. *Contemporary Educational Psychology*, 63, Article 101921. <https://doi.org/10.1016/j.cedpsych.2020.101921>
- Miyamoto, A., Pfost, M., & Artelt, C. (2018). Reciprocal relations between intrinsic reading motivation and reading competence: A comparison between native and immigrant students in Germany. *Journal of Research in Reading*, 41(1), 176–196. <https://doi.org/10.1111/1467-9817.12113>
- Miyamoto, A., Seuring, J., & Kristen, C. (2020). Immigrant students' achievements in light of their educational aspirations and academic motivation. *Journal of Ethnic and Migration Studies*, 46(7), 1348–1370. <https://doi.org/10.1080/1369183X.2018.1538772>
- Mok, S. Y., Martiny, S. E., Gleibs, I. H., Keller, M. M., & Froehlich, L. (2016). The relationship between ethnic classroom composition and Turkish-origin and German students' reading performance and sense of belonging. *Frontiers in Psychology*, 7, Article 1071. <https://doi.org/10.3389/fpsyg.2016.01071>
- Mullis, I. V. S., & Martin, M. O. (2019). PIRLS 2021: Reading assessment framework. In I. V. S. Mullis & M. O. Martin (Eds.), *PIRLS 2021: Assessment frameworks* (pp. 5–26).
- Mullis, I. V. S., von Davier, M., Foy, P., Fishbein, B., Reynolds, K. A., & Wry, E. (Eds.). (2023). *PIRLS 2021: International results in reading*. Boston College, TIMSS & PIRLS International Study Center. <https://doi.org/10.6017/lse.tpisc.tr2103.kb5342>
- Organization for Economic Co-operation and Development, European Union, & UNESCO Institute for Statistics. (2015). *Isced 2011 Operational Manual: Guidelines for classifying national education programmes and related qualifications*. OECD Publishing. <https://doi.org/10.1787/9789264228368-en>
- Potochnick, S. (2018). The academic adaptation of immigrant students with interrupted schooling. *American Educational Research Journal*, 55(4), 859–892. <https://doi.org/10.3102/0002831218761026>
- Rabiner, D. L., Godwin, J., & Dodge, K. A. (2016). Predicting academic achievement and attainment: The contribution of early academic skills, attention difficulties, and social competence. *School Psychology Review*, 45(2), 250–267. <https://doi.org/10.17105/SPR45-2.250-267>
- Ramazan, O., Dai, S., Danielson, R. W., Ardasheva, Y., Hao, T., & Austin, B. W. (2023). Students' 2018 PISA reading self-concept: Identifying predictors and examining model generalizability for emergent bilinguals. *Journal of School Psychology*, 101, 101254. <https://doi.org/10.1016/j.jsp.2023.101254>
- Ramazan, O., Danielson, R. W., Rougee, A., Ardasheva, Y., & Austin, B. W. (2023). Effects of classroom and school climate on language minority students' PISA mathematics self-concept and achievement scores. *Large-Scale Assessments in Education*, 11(1), Article 11. <https://doi.org/10.1186/s40536-023-00156-w>
- Rjosk, C. (2022). Dispersion of student achievement and classroom composition. In T. Nilsen, A. Stancel-Piątak, & J.-E. Gustafsson (Eds.), *International handbook of comparative large-scale studies in education* (pp. 1399–1431). Springer International Publishing. [https://doi.org/10.1007/978-3-030-88178-8\\_47](https://doi.org/10.1007/978-3-030-88178-8_47)
- Rjosk, C., Richter, D., Hochweber, J., Lüdtke, O., Klieme, E., & Stanat, P. (2014). Socioeconomic and language minority classroom composition and individual reading achievement: The mediating

- role of instructional quality. *Learning and Instruction*, 32, 63–72. <https://doi.org/10.1016/j.learninstruc.2014.01.007>
- Rjosk, C., Richter, D., Hochweber, J., Lüdtke, O., & Stanat, P. (2015). Classroom composition and language minority students' motivation in language lessons. *Journal of Educational Psychology*, 107(4), 1171–1185. <https://doi.org/10.1037/edu0000035>
- Rjosk, C., Richter, D., Lüdtke, O., & Eccles, J. S. (2017). Ethnic composition and heterogeneity in the classroom: Their measurement and relationship with student outcomes. *Journal of Educational Psychology*, 109(8), 1188–1204. <https://doi.org/10.1037/edu0000185>
- Rogiers, A., van Keer, H., & Merchie, E. (2020). The profile of the skilled reader: An investigation into the role of reading enjoyment and student characteristics. *International Journal of Educational Research*, 99, Article 101512. <https://doi.org/10.1016/j.ijer.2019.101512>
- Rolfe, V., & Yang Hansen, K. (2021). Family socioeconomic and migration background mitigating educational-relevant inequalities. In T. Nilssen, A. Stancel-Piątak, & J.-E. Gustafsson (Eds.), *International handbook of comparative large-scale studies in education* (pp. 1459–1492). Springer International Publishing. [https://doi.org/10.1007/978-3-030-88178-8\\_50](https://doi.org/10.1007/978-3-030-88178-8_50)
- Schaufelberger, R., Kleinkorres, R., Becher, L., Ludewig, U., Lorenz, R., & McElvany, N. (2024). *IGLU 2021. Skalenhandbuch zur Dokumentation der Erhebungsinstrumente und Arbeit mit den Datensätzen* [PIRLS 2021. Handbook for the documentation of measurement instruments and working with the datasets]. Waxmann Verlag GmbH. <https://doi.org/10.31244/9783830998990>
- Schöber, C., Retelsdorf, J., & Köller, O. (2015). Verbales schulisches Selbstkonzept und sprachliche Leistungen in Gruppen mit und ohne Migrationshintergrund [Verbal academic self-concept and achievement in groups with and without migration background]. *Psychologie in Erziehung und Unterricht*, 62(2), 89–105. <https://doi.org/10.2378/peu2015.art10d>
- Schwabe, F., McElvany, N., & Trendtel, M. (2015). The school age gender gap in reading achievement: Examining the influences of item format and intrinsic reading motivation. *Reading Research Quarterly*, 50(2), 219–232. <https://doi.org/10.1002/rrq.92>
- Segeer, R., Niklas, F., Suggate, S., & Schneider, W. (2021). Young minority home-language students' biased reading self-concept and its consequences for reading development. *Reading Research Quarterly*, 56(1), 71–94. <https://doi.org/10.1002/rrq.300>
- Seuring, J., Rjosk, C., & Stanat, P. (2020). Ethnic classroom composition and minority language use among classmates: Do peers matter for students' language achievement? *European Sociological Review*, 36(6), 920–936. <https://doi.org/10.1093/esr/jcaa022>
- Skopek, J., & Passaretta, G. (2021). Socioeconomic inequality in children's achievement from infancy to adolescence: The case of Germany. *Social Forces*, 100(1), 86–112. <https://doi.org/10.1093/sf/soaa093>
- Sparks, R. L., Patton, J., & Murdoch, A. (2014). Early reading success and its relationship to reading achievement and reading volume: Replication of '10 years later'. *Reading and Writing*, 27(1), 189–211. <https://doi.org/10.1007/s11145-013-9439-2>
- Stahns, R., Rieser, S., & Hußmann, A. (2020). Können Viertklässlerinnen und Viertklässer Unterrichtsqualität valide einschätzen? Ergebnisse zum Fach Deutsch [Are fourth grade

- students able to rate instructional quality validly? Results from German Language classes]. *Unterrichtswissenschaft*, 48(4), 663–682. <https://doi.org/10.1007/s42010-020-00084-6>
- Strietholt, R., & Strello, A. (2021). Socioeconomic inequality in achievement. In T. Nilsen, A. Stancel-Piątak, & J.-E. Gustafsson (Eds.), *International handbook of comparative large-scale studies in education* (pp. 1–20). Springer International Publishing. [https://doi.org/10.1007/978-3-030-38298-8\\_11-1](https://doi.org/10.1007/978-3-030-38298-8_11-1)
- Suárez-Orozco, C., Motti-Stefanidi, F., Marks, A., & Katsiaficas, D. (2018). An integrative risk and resilience model for understanding the adaptation of immigrant-origin children and youth. *American Psychologist*, 73(6), 781–796. <https://doi.org/10.1037/amp0000265>
- Thijs, J., & Fleischmann, F. (2015). Student–teacher relationships and achievement goal orientations: Examining student perceptions in an ethnically diverse sample. *Learning and Individual Differences*, 42, 53–63. <https://doi.org/10.1016/j.lindif.2015.08.014>
- Toste, J. R., Didion, L., Peng, P., Filderman, M. J., & McClelland, A. M. (2020). A meta-analytic review of the relations between motivation and reading achievement for K–12 students. *Review of Educational Research*, 90(3), 420–456. <https://doi.org/10.3102/0034654320919352>
- Trautwein, U., & Möller, J. (2016). Self-Concept: Determinants and consequences of academic self-concept in school contexts. In A. A. Lipnevich, F. Preckel, & R. D. Roberts (Eds.), *Psychosocial skills and school systems in the 21<sup>st</sup> century* (pp. 187–214). Springer International Publishing. [https://doi.org/10.1007/978-3-319-28606-8\\_8](https://doi.org/10.1007/978-3-319-28606-8_8)
- Vaknin-Nusbaum, V., Nevo, E., Brande, S., & Gambrell, L. (2018). Developmental aspects of reading motivation and reading achievement among second grade low achievers and typical readers. *Journal of Research in Reading*, 41(3), 438–454. <https://doi.org/10.1111/1467-9817.12117>
- van Buuren, S. (2018). *Flexible imputation of missing data* (2<sup>nd</sup> ed.). CRC Press.
- van Buuren, S., & Groothuis-Oudshoorn, K. (2011). Mice : Multivariate Imputation by Chained Equations in R. *Journal of Statistical Software*, 45(3), 1–67. <https://doi.org/10.18637/jss.v045.i03>
- van Ewijk, R., & Slegers, P. (2010). The effect of peer socioeconomic status on student achievement: A meta-analysis. *Educational Research Review*, 5(2), 134–150. <https://doi.org/10.1016/j.edurev.2010.02.001>
- Vasalampi, K., Pakarinen, E., Torppa, M., Viljaranta, J., Lerkkanen, M.-K., & Poikkeus, A.-M. (2020). Classroom effect on primary school students' self-concept in literacy and mathematics. *European Journal of Psychology of Education*, 35(3), 625–646. <https://doi.org/10.1007/s10212-019-00439-3>
- Villiger, C., Wandeler, C., & Niggli, A. (2014). Explaining differences in reading motivation between immigrant and native students: The role of parental involvement. *International Journal of Educational Research*, 64, 12–25. <https://doi.org/10.1016/j.ijer.2013.10.004>
- Volodina, A., Weinert, S., & Mursin, K. (2020). Development of academic vocabulary across primary school age: Differential growth and influential factors for German monolinguals and language minority learners. *Developmental Psychology*, 56(5), 922–936. <https://doi.org/10.1037/dev0000910>

- von Stumm, S., Rimfeld, K., Dale, P. S., & Plomin, R. (2020). Preschool verbal and nonverbal ability mediate the association between socioeconomic status and school performance. *Child Development, 91*(3), 705–714. <https://doi.org/10.1111/cdev.13364>
- Vu, T., Magis-Weinberg, L., Jansen, B. R. J., van Attevelde, N., Janssen, T. W. P., Lee, N. C., van der Maas, H. L. J., Raijmakers, M. E. J., Sachisthal, M. S. M., & Meeter, M. (2022). Motivation-achievement cycles in learning: A literature review and research agenda. *Educational Psychology Review, 34*(1), 39–71. <https://doi.org/10.1007/s10648-021-09616-7>
- Wang, M.-T., L. Degol, J., Amemiya, J., Parr, A., & Guo, J. (2020). Classroom climate and children's academic and psychological wellbeing: A systematic review and meta-analysis. *Developmental Review, 57*, Article 100912. <https://doi.org/10.1016/j.dr.2020.100912>
- Wenger, M., Gärtner, H., & Brunner, M. (2020). To what extent are characteristics of a school's student body, instructional quality, school quality, and school achievement interrelated? *School Effectiveness and School Improvement, 31*(4), 548–575. <https://doi.org/10.1080/09243453.2020.1754243>
- Wigfield, A., Gladstone, J., & Turci, L. (2016). Beyond cognition: Reading motivation and reading comprehension. *Child Development Perspectives, 10*(3), 190–195. <https://doi.org/10.1111/cdep.12184>
- Yanagida, T. (2024). *misty: Miscellaneous functions 'T. Yanagida'* (Version 0.6.2) [Computer software]. <https://cran.r-project.org/package=misty>
- Yang Hansen, K., Radišić, J., Ding, Y., & Liu, X. (2022). Contextual effects on students' achievement and academic self-concept in the Nordic and Chinese educational systems. *Large-Scale Assessments in Education, 10*(1), Article 16. <https://doi.org/10.1186/s40536-022-00133-9>
- Yi, H. S., & Lee, Y. (2017). A latent profile analysis and structural equation modeling of the instructional quality of mathematics classrooms based on the PISA 2012 results of Korea and Singapore. *Asia Pacific Education Review, 18*(1), 23–39. <https://doi.org/10.1007/s12564-016-9455-4>

## 4. General Discussion

To understand whether and how all students can succeed in schools according to their individual potential, it is important to consider that factors situated in their environment play a core part in shaping their educational outcomes. Therefore, this dissertation investigated students' multidimensional school success in light of structure and process variables of the family and classroom microsystem, respectively, as two core proximal components of students' environment in light of central theories (e.g., Bronfenbrenner, 1979; Brühwiler & Blatchford, 2011; Kluczniok et al., 2013) and prior empirical findings (e.g., Bergold et al., 2022; Dumont et al., 2019; Wenger et al., 2020). A variety of facets of students' school success reflecting cognitive competences, noncognitive outcomes, and institutionalized indicators were included in the studies to facilitate a comprehensive insight that takes into account core aspects of school success proposed by theoretical frameworks and aligns with official education goals (e.g., OECD et al., 2015; Schulgesetz für das Land Nordrhein-Westfalen, 2022; York et al., 2015). Additionally, following established theoretical models to differentiate structure and process variables of the family and classroom environment (e.g., Brühwiler & Blatchford, 2011; Kluczniok et al., 2013; McElvany et al., 2009) allows to understand how relatively static structural aspects such as the sociodemographic background of students' families and, likewise, sociodemographic composition of their classrooms are associated with school success, but also which malleable processes mediate these relations. By investigating these associations, hindrances and facilitators of school success situated in students' environment can be identified as well as potential points of leverage situated in these microsystems to promote the success of all students in regard to cognitive competences, noncognitive outcomes, and institutionalized indicators according to their potential. With these considerations in mind, the findings of the studies included in the work at hand will be summarized and discussed in light of the overarching research questions regarding the role of structural and process components of the family and classroom environment for students' multidimensional school success.

### 4.1 Summary and Discussion of the Main Results

The results of the studies forming the cumulus of this dissertation are embedded in the context of the two overarching research questions:

1. How are (a) sociodemographic factors (socioeconomic status, language use at home, history of immigration) as family structure variables, and (b) sociodemographic composition as classroom structure variables associated with different aspects of school success, specifically cognitive competences (reading competence, vocabulary), noncognitive outcomes (intrinsic and extrinsic motivation, reading enjoyment, reading self-concept, participation in learning activities during ERE, life satisfaction), and institutionalized indicators (grades, track recommendation)?
2. To what extent do (a) family process variables (parental involvement: emotional-responsive involvement, structural-demanding involvement, parent-child reading; educational beliefs: perceived responsibility for learning, educational aspirations) as well as (b) classroom process variables (reading-related support, support of language minority students, cognitive activation) predict different aspects of school success and mediate/ moderate the associations of family and classroom structure variables with different aspects of school success?

#### ***4.1.1 Structure Variables of the Family and Classroom Environment and School Success***

Regarding the association of structure variables of central microsystems, such as the family and classroom, with school success allows to understand how educational inequalities are shaped by the comparably static characteristics of students' environment. This is an important step in determining which factors may promote students' school success or contribute to preventing them from succeeding in school according to their individual potential, and serves as a base for then investigating the mechanisms that can facilitate but also be used to mitigate these differences in success, in the form of process variables of the respective microsystem which can be useful as points for intervention and promoting success as they are more malleable than structural components. Therefore, the associations of structure variables of the family and classroom environment, namely socioeconomic status, language use at home, and history of immigration of the family as well as the socioeconomic composition, language composition, and immigrant composition of the classroom, respectively, with cognitive competences, noncognitive outcomes, and institutionalized indicators of school success will be discussed first.

Focusing on family structure variables first (Research Question 1a), students in families with lower socioeconomic status were at risk of achieving lower average reading competence (Study IV; non-immigrant students in Study III), in line with the well-established association of socioeconomic status with cognitive competences found in large-scale assessments (e.g., Sachse et al., 2022; Stubbe et al., 2023) and individual studies (e.g., Nennstiel, 2023; Workman, 2022). However, similar associations did not emerge for multilingual students (Study II) as well as first-generation (and second-generation) immigrant students (Study III) specifically, where the effect of socioeconomic status on reading competence and – in Study II – vocabulary was not statistically significant. This may in part be a consequence of the sample composition, as both studies made use of the SIGN study data that included an above-average share of socioeconomically disadvantaged students and, consequently, somewhat low variance of socioeconomic status in the aforementioned subgroups specifically, but at its core aligns with findings of previous studies. For example, in a study that regarded academic language competences specifically, Volodina et al. (2021) found a positive interaction of socioeconomic status and majority language use in the family for the comprehension of texts and connectives as well as academic vocabulary, indicating that the beneficial effect of socioeconomic status for language competences may be less pronounced in language minority students. Similarly, in an analysis comparing PISA data for groups of countries, some indicators of socioeconomic status were only positively associated with reading competences in non-immigrant students, but not immigrant-origin students in Austria and Germany (Entorf & Lauk, 2006). Therefore, the findings of this dissertation extend the current literature on the role of socioeconomic status for cognitive competences in interaction with other structure variables and offer new support that, while socioeconomic status can to a degree explain disadvantages of language-minority and immigrant-origin students regarding cognitive competences, and especially language-related achievement (e.g., Henschel et al., 2023; Seuring et al., 2020), it is less important for explaining differences within these specific groups of students. However, it should be noted that these findings may vary depending on the national context and context of the education system (see e.g., Ulriksen et al., 2015 for conflicting results for Norway). Moreover, the findings in the work at hand regarding socioeconomic status and noncognitive outcomes were partly consistent with expectations derived from theory and prior research, indicating a positive association of socioeconomic

status with facets of reading motivation in primary school (Study IV; see e.g., Becker & McElvany, 2018; Rogiers et al., 2020) and life satisfaction (e.g., Alivernini et al., 2020; Obermeier et al., 2021), although the latter finding only emerged in second-generation immigrant students (Study III). However, findings deviated from the expected results in Study I, where socioeconomic status was associated neither with intrinsic and extrinsic motivation for learning in general nor with participation in learning activities for secondary school students during the COVID-19 pandemic (e.g., Dietrich et al., 2021; Manganelli et al., 2021). Again, this may in part be a result of the sampling for the study, as the sample was composed primarily of students from families with somewhat low socioeconomic status, which could explain why results diverged from the aforementioned studies. Additionally, the comparably low sample size could mean that the statistical power was insufficient to find effects on motivation, which were implied to be comparably small in some studies (e.g., Steinmayr et al., 2021). In an exemplary similar case, Lockl et al. (2021) found only small association of socioeconomic status with parents' perceived difficulty to motivate their child during ERE, which did not reach statistical significance. Finally, with regard to institutionalized indicators, socioeconomic status did not relate to either GPA or students' track recommendation in Study III, contrary to expectations and previous findings (e.g., Dumont et al., 2019; Paulus et al., 2021), which may again at least in part result from the specific composition of the sample used in said study. However, mirroring the findings regarding cognitive competences, this also emphasizes once more that socioeconomic status may be more important for explaining differences between students of different immigrant generations, rather than within the groups of first- and second-generation immigrants, and non-immigrants, respectively, as was the focus of the analyses in that study. Thus, the studies of this work confirm socioeconomic status as an essential family structure variable related to school success, especially in regard to cognitive competences and noncognitive outcomes, but also imply that its specific role potentially varies in light of other structure variables such as the history of immigration, as socioeconomic status may explain differences between students depending on their immigrant background in regard to cognitive competences and institutionalized indicators of success, but not between different students from families with comparable immigration histories.

Regarding language use at home, findings were ambiguous, as the expected negative link of non-majority language use to reading competence (e.g., Seuring et al., 2020; Stubbe et

al., 2023) emerged in Study IV, but not in any subgroup in Study III, although a bivariate correlation between the two variables in the full sample was present in the latter study as well. These differences in findings may in part be explained when taking extant research into account suggesting that, beyond the quantity of majority language input in the home, the quality of input is also an important factor in determining children's developing skills in the majority language (e.g., Paradis, 2023; Persici et al., 2022) and that input from native speakers may be especially valuable for language development (e.g., Hoff, 2018; Place & Hoff, 2016). The large majority of parents of first- and second-generation immigrant students in Study III – all being immigrants themselves – were presumably not native German speakers, and many of them had only immigrated to Germany relatively recently which may have affected the quality of language input they were able to provide in German. Consequently, the deciding factor within these groups, rather than quantity of majority language input in the home, may have been the quality of said input at home but importantly also the quantity and quality of input in other contexts that were not considered in the study, such as early childhood education and care in preschools. In the non-immigrant group, on the other hand, only a fraction of students reported not primarily speaking German at home, meaning that the lack of variance in this subgroup may be responsible for the absence of a significant relation. Additionally, within the group of multilingual students, the lexical distance between the heritage language and majority language German was linked negatively to reading competence (e.g., Borgonovi & Ferrara, 2020), but not vocabulary (Study II), contradicting expectations based on theory and prior findings (e.g., S. C. Chung et al., 2019; Mulder et al., 2019). These findings target a core lacuna in understanding the role of the features of students diverse heritage languages for acquiring the majority language German, showing that students with more dissimilar heritage languages may struggle more with achieving good reading competence in German and can in turn benefit from targeted support, while simultaneously implying that the amount of exposure to the majority language could be more important for building students' vocabulary than the similarity to their heritage language. However, it should be noted that the way that vocabulary was assessed in the study – using a synonym test, which required students to recognize both the target word and its synonym – may have influenced results as well, and more research assessing vocabulary in other ways is needed to determine which potential explanation is the more decisive factor. Regarding motivational outcomes, the studies in this work add to the

extant, ambiguous findings (e.g., Greenwald et al., 2023; Kigel et al., 2015) as associations of the language use at home with motivational outcomes emerged only indirectly (Study I), if at all (Study IV). Specifically, they support prior findings that advantages in language minority or multilingual students' reading self-concept that may exist in early primary school adjust to the levels of their monolingual majority-language peers by the end of primary school in Grade 4 (e.g., Festman & Schwieter, 2019; Segerer et al., 2021). Moreover, and in line with expectations, no link to students' life satisfaction was found (Study III). Lastly, among the institutionalized indicators of school success (Study III), language use at home was only associated with GPA in second-generation immigrant students (e.g., Bonefeld et al., 2017) but not with track recommendation when differences in achievement and grades were also considered as predictors, in line with expectations (e.g., Brändle & Weirich, 2023; Lintorf et al., 2021). The studies included in the dissertation at hand thereby contribute to the literature regarding associations of the language use at home, showing that students who do not grow up speaking primarily the majority language at home may face additional barriers acquiring especially language-related cognitive competences in that majority language, but also that the factors that contribute to these associations are complex and considering only the quantity of majority language input at home can only offer an approximation of understanding these associations. Additionally, among the ambiguous findings in prior research, this dissertation offers results that support the assumption that the language use at home is not strongly linked to noncognitive outcomes in students in late primary school and beyond, as well as implying that specifically among second-generation students from immigrant families, their language use may be a contributing factor to teachers' grading, which can lead to disadvantages in that regard for these students.

Regarding the history of immigration as the final family structure variable, first-generation immigrant students experienced disadvantages concerning reading competence as a core cognitive competence towards the end of primary school (Studies III and IV), confirming expectations and prior findings (e.g., Henschel et al., 2022; Hillmert, 2013). However, immigrant students' age at the family's arrival in Germany was not associated with multilingual students' reading competence or vocabulary, nor did it significantly interact with the lexical distance between the heritage and majority language German (Study II), contradicting theoretically derived assumptions (e.g., S. C. Chung et al., 2019; Esser, 2006). Potentially, this

can be attributed to the relatively young age at which the students in the sample had immigrated, as most of them had arrived in Germany before entering school and therefore had presumably comparable schooling experience in the majority language German. Additionally, students' relatively young age at arrival may generally be beneficial to their language acquisition. In one of the few studies to regard the interaction of age at arrival and lexical distance, Borgonovi and Ferrara (2020) did find that among secondary school students, an early arrival mitigated the negative influence of lexical distance; however, an early arrival in that study was defined as immigrating before the age of 12, as the authors argued that before that age, children were especially successful at learning new languages. Since all students in Study II were younger than 12 years old upon immigration, the exact age at arrival may not have been as important in this group. Beyond cognitive competences, first-generation immigrant students were shown to possess advantages in select noncognitive outcomes, specifically in terms of reading enjoyment (Study IV), contradicting prior findings for reading motivation specifically (e.g., Castillo, 2023; Miyamoto et al., 2018) but in line with a general motivational advantage of first-generation immigrant students found in some studies (e.g., Alivernini et al., 2018). These findings expand the extant literature, as it is plausible to assume that they result from the sophisticated study design, which allowed to separate the role of immigrant status from that of the confounded family structure variables socioeconomic status and language use. In most prior studies regarding reading motivation, these effects were conflated as the variables were not included separately, meaning that for first-generation immigrants, the negative association of motivation with low socioeconomic status – which is frequently linked to immigrant status – may have cancelled out the positive effect of being an immigrant student on reading enjoyment. In this regard, the work at hand makes a vital contribution to understanding the true associations of the different structure variables for reading motivation. Additionally, setting the positive link of first-generation immigrant status to reading motivation in relation to the negative link to reading competence, as described above, opens up the question to what degree the education system is able to translate these motivational advantages into promoting higher reading competence in immigrant students and how this may be improved in the future. As a final noncognitive outcome, the findings concerning life satisfaction mirrored those of most previous studies (e.g., Sam et al., 2022; Tang, 2019), showing no differences for first-generation immigrant students from second-

generation or non-immigrant students (Study III). Moving further, findings regarding the institutionalized markers of school success aligned with expectations grounded in theory and prior research regarding immigrant-origin students (e.g., Bonefeld et al., 2017; Dumont et al., 2019) as first-generation immigrant students on average received lower grades than non-immigrant students and similarly were given a recommendation for the highest, academic secondary school track less often than their second-generation immigrant peers (Study III), revealing disadvantages these students faced when it came to teachers' evaluations of their achievement in school. With regard to immigrant status as the third family structure variable, the studies therefore largely confirmed prior findings and expectations in regard to language-related cognitive competences while also expanding insights about especially first-generation immigrant students in central ways, showing for example motivational advantages of these students in terms of reading enjoyment and confirming assumed disadvantages in regard to institutionalized indicators of school success in study designs that improved on and extended extant research.

Beyond students' families, another central aspect of their environment, especially when regarding their school success, is the classroom microsystem. As the structure variables of the classroom – in the form of sociodemographic composition – determine the characteristics of students' learning environment, focusing on the relation of structure variables of the classroom microsystem to school success next (Research Question 1b) can reveal important insights into these associations, and the results of Study IV allow to draw conclusions in this regard. Comparably to prior findings, the socioeconomic composition of a classroom was associated with cognitive competences beyond individual-level effects, in such a way that a higher share of socioeconomically disadvantaged students was related to lower reading competence (e.g., Rjosk et al., 2017; Seuring et al., 2020). Regarding noncognitive outcomes, the results aligned with extant literature on schools' socioeconomic composition (e.g., Berger & Archer, 2016; Ramazan, Dai, et al., 2023), as higher shares of socioeconomically at-risk students were associated with lower reading enjoyment and self-concept in individual students. However, a central prior study regarding socioeconomic classroom composition by Kocaj et al. (2020) found no effect on interest or self-concept in German language instruction beyond that of achievement composition, in contrast to the findings in Study IV. As both studies used comparable samples of Grade 4-students in Germany and similar associations would be

expected, a potential contributor to explaining these diverging findings could be the lack of an inclusion of other sociodemographic composition variables in the study by Kocaj et al. (2020). As Study IV found a positive association of non-majority language composition with reading enjoyment and socioeconomic composition and language composition are confounded, the coefficient for the effect of sociodemographic composition in Kocaj et al.'s (2020) study may actually represent a conflation of the influence of socioeconomic and language composition that, due to their opposing valence, cancel each other out. This again emphasizes the importance of separating the effects of different confounded composition variables by including them in analyses simultaneously, demonstrating the relevant contribution of the present work to understand these complex associations. Finally, the association of the composition in regard to the share of first-generation immigrant students was regarded and a negative association with reading competence but not with any noncognitive outcome emerged from the analyses, expanding the results of prior studies who had mostly regarded the composition in terms of all immigrant-origin students regardless of immigrant generation as a predictor of cognitive competences and rarely focused on noncognitive outcomes (e.g., Mok et al., 2016; Rjosk et al., 2017; Seuring et al., 2020).

All in all, the findings included in the dissertation at hand largely supported assumptions and prior findings regarding the associations of family structure as indicated by sociodemographic background variables and different dimensions of school success, further establishing their importance for students' educational experience and outcomes. Additionally, the studies included in this dissertation generated new insights into these associations going beyond the extant literature by including multiple sociodemographic variables in context with each other, focusing on previously understudied aspects of these variables such as lexical distance, and studying these relations in complex designs that allow to clearly separate their contributions to school success in the family microsystem and as composition variables in the classroom microsystem. Next, the several family and classroom process variables included in this work and their relation to both school success and structure variables of the respective microsystem will be discussed to investigate how these variables affect students' school success in light of the structural components of their environment.

#### ***4.1.2 Process Variables of the Family and Classroom Environment and School Success***

Moving beyond the findings regarding family and classroom structure variables' associations with school success, the role of process variables in these microsystems was another focus of this dissertation to determine how they relate to students' school success and may act as mediators and moderators of the associations described previously, thereby identifying potential leverage points for supporting students and families according to their specific needs. The family process variables (Research Question 2a) will be discussed first, following the differentiation of parental involvement and educational beliefs. Regarding indicators of parental involvement in the home and cognitive competences, parent-child reading was negatively related to reading competence in first-generation, second-generation, and non-immigrant students, although only reaching statistical significance in the prior two groups (Study III). This finding contradicts expectations (e.g., Boonk et al., 2018; Dong et al., 2020) as it implies that more shared reading activities in the home are associated with lower reading competences. However, if the shared reading activities are interpreted as parents' reaction to their child's lower reading competence, this finding indicates that parents try to support children who are struggling with reading by providing a richer literacy environment. Unfortunately, the causality and direction of the effect could not be tested directly, as cross-sectional data were used for the analyses. Focusing on noncognitive outcomes, demanding-structuring involvement was positively associated with extrinsic learning motivation and responsive-motivational involvement with intrinsic learning motivation during the COVID-19 pandemic, meaning that students who perceived their parents to be more involved in these manners also experienced higher degrees of extrinsic and intrinsic motivation, respectively (Study I). These findings largely align with expectations (e.g., Barger et al., 2019; Liou et al., 2019) but had not been studied in the context of ERE before and therefore revealed important insights into parents' role during this challenging period of schooling. Additionally, finding that demanding-structuring involvement was positively associated with motivation, rather than affecting it negatively as may be expected from some pre-pandemic findings (e.g., Silinskas & Kikas, 2019), can be seen as a sign that students during ERE benefitted if their parents provided the structure that they would usually experience through regular instruction. Both forms of involvement were also positively related to students' participation in learning

activities during ERE (demanding-structuring involvement on a 10% alpha error-level only), another important noncognitive outcome, supporting the assumption that a higher involvement of parents during ERE was an essential contributor to students' education and learning experience in the absence of regular in-person instruction. Moreover, parent-child reading as a specific form of involvement was positively linked to fourth grade-students' life satisfaction, independent of the family's history of immigration (Study III), confirming and expanding theoretical considerations and prior findings concerning parental involvement and students' well-being (e.g., Dettmers et al., 2019; C. Wang et al., 2019). Considering parent-child reading's associations with institutionalized indicators of success last, findings indicated no significant relation to either grades (except for a small negative coefficient for second-generation immigrant students only that was not confirmed to be statistically significantly different from the null findings in the first-generation immigrant and non-immigrant subsamples by Wald-tests) or track recommendation (Study III). This deviation from prior studies – which suggested small but positive associations (e.g., G. Chung et al., 2020; Wilder, 2014) – may be explained by the focus on parent-child reading as a specific aspect of involvement, rather than more generalized or academically oriented indicators, such as homework support or discussing schoolwork, and expands the extant literature in that regard. Therefore, the findings of the studies overall showed that parental involvement was primarily beneficial for students noncognitive outcomes, as different forms of involvement were positively associated with aspects of students' motivation, learning behavior, and well-being. In contrast, the involvement of parents at home appeared to be less relevant for cognitive competences and institutionalized markers of success, for which forms of involvement more directly related to students' schooling might be more impactful. In turn, the only statistically significant link between family structure variables and parental involvement was a small negative association of non-majority language use and demanding-structuring parental involvement (Study I), which aligns with expectations and prior findings that lower parental majority-language skills went along with less controlling and monitoring home involvement (e.g., Jung & Zhang, 2016). Subsequently, demanding-structuring involvement was the only mediator of associations between family structure variables and school success that emerged from the studies in the present work, indicated by a negative indirect effect of non-majority family language use on extrinsic motivation mediated by demanding-structuring involvement

(Study I). This important finding sheds light on the role that the family microsystem played for students' school success during ERE, as it implies that some parents may not have been able to structure their children's learning during this period as well due to language barriers they may have experienced – for example in communication with teachers, engaging with students' learning materials, or in accessing information on how to support their children during ERE – which in turn led to lower motivational outcomes in their children. On the other hand, the studies included in this work did not confirm a link of socioeconomic status to parental involvement (Studies I and III), which thus did not mediate effects of socioeconomic status on school success either, contrary to expectations (e.g., Li et al., 2020; Zhang et al., 2021). This can be seen as a positive finding, showing that – at least in this sample of families with relatively low average socioeconomic status – all parents were similarly committed and able to support their children's education in different ways during the unique situation of ERE, independent of their socioeconomic backgrounds.

The other facet of family process variables regarded in the dissertation at hand were educational beliefs held in the family. With regard to cognitive competences, high educational aspirations were positively associated with the reading competence of first-generation immigrant students (with coefficients in the second-generation and non-immigrant groups reaching similar positive size, but not statistical significance; Study III), supporting prior findings on their positive relation in general and for immigrant students specifically (e.g., Boonk et al., 2018; Miyamoto et al., 2020). Moving to noncognitive outcomes next, parents' beliefs about their responsibility for students' learning success during ERE was not related to extrinsic or intrinsic learning motivation, but did positively relate to students' participation in learning activities (Study I), meaning that students engaged with different tasks and activities as part of ERE more frequently when their parents felt more responsible for their learning success. This once more emphasizes the vital role of parents during ERE and may be seen as a further reflection of the substantial shift in the responsibility for students' school success from educational institutions towards parents during this unique situation. Moreover, congruently high educational aspirations were positively related to the life satisfaction of first-generation immigrant students, statistically significantly deviating from the null effect in the non-immigrant student subgroup (Study III). This association matches expectations deducted from prior studies focusing on different aspects of well-being and psychological functioning (e.g.,

Almroth et al., 2019; Guo et al., 2022), but it is unclear why it only emerged in the subgroup of first-generation immigrant students. One possible explanation might be that an immigrant optimism indicated by these aspirations (see e.g., Neumeyer et al., 2022) may also extend to higher optimism in areas beyond education, which in turn have been shown to positively relate to well-being and the absence of depression and anxiety in adult immigrants (e.g., Bak-Klimek et al., 2015; Camacho de Anda & Becerra, 2023). However, this cannot fully explain why similar associations were not found in second-generation immigrant students and further research should expand these important findings to facilitate a deeper understanding of their implications. Finally, results regarding institutionalized indicators revealed strong positive associations of educational aspirations with students' GPA, independent of immigrant status (Study III), aligning with theoretical considerations and prior findings (e.g., Khattab et al., 2022; Raudenská & Hamplová, 2022). While no direct relation of aspirations to the track recommendation emerged beyond this, a positive indirect link of aspirations to track recommendation mediated by students' GPA was found, in line with prior findings which implied that this indirect path via students' grades was more impactful for the track recommendation than the direct effect of educational aspirations (e.g., Dumont et al., 2019). Thus, the results showed that educational beliefs held in the family could positively influence both cognitive competences and select noncognitive outcomes, especially among first-generation immigrant students, thereby contributing new insights to the research literature as well as confirming prior findings, such as the positive link of educational aspirations to grades as an institutionalized indicator of success that also emerged from the studies. Relating educational beliefs to the family structure variables in turn did not support the assumption of mediating the latter's relations to indicators of school success, as parental responsibility was only associated negatively with non-majority language use at the 10% alpha error-level and no significant indirect effect on any outcome in the study emerged (Study I). While educational aspirations were not directly tested as a mediator, they were not significantly correlated with either socioeconomic status or language use at home in Study III. However, there was some support for a moderating role of educational aspirations for the link of history of immigration to school success, as findings showed that aspirations were positively associated with reading competence and life satisfaction in first-generation immigrant students as discussed above. Consequently, these results imply that high educational aspirations shared in the family may

be especially beneficial for first-generation immigrant students' and should be considered as potential enablers of academic and psychological adaptation in these students.

Turning from family process variables to classroom process variables (Research Question 2b), three aspects of teachers' instructional focus during German language instruction – reading-related support, support of language minority students, and cognitive activation – were in the focus of the work at hand. However, findings were in opposition to expectations based on theoretical considerations (e.g., Brühwiler & Blatchford, 2011; Praetorius & Charalambous, 2018) and results in the extant literature (e.g., Hochweber & Vieluf, 2018; M.-T. Wang et al., 2020) as the facets of instructional focus were associated neither with cognitive competences, as indicated by students' reading competence specifically, nor with noncognitive, motivational outcomes in the form of reading enjoyment and self-concept (Study IV). While some associations between the classroom structure and process variables emerged, with higher shares of socioeconomically disadvantaged students being linked to more reading-related support in a classroom and higher proportions of first-generation immigrant – and, in the final analysis model of the study, language minority students – to more frequent support of language minority students specifically, the presumed mediating role of instructional focus could not be confirmed due to the lack of significant relations between instructional focus and school success. These findings therefore add to the conflicting empirical literature regarding instructional focus and quality as a mediator of classroom composition effects (e.g., Rjosk et al., 2014, 2015; Wenger et al., 2020) and further emphasize the necessity to investigate why these findings do not mirror the theoretically grounded assumptions in this regard (e.g., Harker & Tymms, 2004; Rjosk, 2022). Potentially contributing to the absence of mediation effects in the studies included in this dissertation may be methodological aspects, namely the measurement of quantity, rather than quality, of the three aspects of instructional focus as well as the sole reliance on teacher data for assessing information regarding instruction without considering students' perspective as well, as the assessment of different aspects of instructional quality can vary substantially between teachers and students (e.g., Fauth et al., 2014). Subsequently, changes in instructional focus by the teacher may not result in the desired effect if these do not lead to more or better learning opportunities from the students' perspectives. This may similarly explain why no moderating effect of teachers' instructional focus on the association of students' individual

sociodemographic background – indicating family structure variables – and school success emerged either (Study IV) despite some prior findings suggesting such interactions (e.g., Caro et al., 2016; Ramazan, Danielson, et al., 2023). However, while the absence of mediating and moderating effects of instructional focus contradicted expectations and raises the question whether teachers are adequately equipped to adapt their instruction to the specific needs of heterogeneously composed classrooms, it also suggests that teachers did not design their instruction in a way that specifically benefitted students who were already privileged due to their sociodemographic background as some extant findings indicate (e.g., Atlay et al., 2019). In total, the investigation of instructional focus as a classroom process variable showed that teachers adapted their instruction to the composition of their classroom in some dimensions, but that a different focus of instruction did not in turn relate to improved school success in terms of reading competence or motivation in the classroom as a whole, nor for individual students depending on their sociodemographic background traits.

## **4.2 Limitations and Strengths**

To promote a nuanced interpretation of the findings presented in this work, the following sections will discuss overarching limitations and strengths, taking into account the limitations and strengths of the individual studies as well. Both conceptual and methodological aspects of the individual studies and the work at large will be considered and evaluated.

### **4.2.1 Limitations**

Some limitations of the work at hand and the studies included in it should be considered when interpreting the findings. First, while this dissertation at large successfully investigates students' school success as a multidimensional construct that includes cognitive competences, noncognitive outcomes, and institutionalized indicators (see e.g., York et al., 2015), only Study III directly included indicators of all three dimensions of school success simultaneously, while the other studies focused on one or two dimensions. This allowed a detailed, in-depth investigation of specific aspects of school success in each of the latter studies which in turn facilitated the synthesis of these findings into a multidimensional framework of school success in the broader context of this dissertation. However, as the dimensions of success are associated with each other (e.g., Geng et al., 2023; Howard et al., 2021), including

outcomes from all three dimensions in these studies as well may have led to more nuanced findings that better represent to complex relations among the indicators of school success. Additional conceptual limitations arise from the use of the overarching EST framework (e.g., Bronfenbrenner, 1979): While the model provides a strong theoretical foundation for the process-context approach in the work at hand, regarding families and classrooms as two central developmental contexts and the processes within these contexts to understand how they shape school success, the broad scope of EST led to the omission of some aspects of the theory in favor of a stronger focus on the aforementioned aspects. For one, individual characteristics of each student may influence the way they interact with the structure and processes of their environmental contexts (e.g., Bronfenbrenner, 1986), potentially leading to different outcomes between students even given the same circumstances, but individual characteristics were not included as explanatory variables in the studies of this dissertation and instead only considered as select control variables in some studies (e.g., Study II: cognitive abilities; Study IV: gender). Moreover, the separation of family structure variables and individual student characteristics is neither trivial nor always unambiguously possible when regarding sociodemographic background variables, as is the case in this work. For example, language use at home was included as a family structure variable, as the language spoken in the family environment marks an important feature of this microsystem. However, if a student's family primarily uses a language other than German in the home, this simultaneously marks the student as bilingual, which arguably can – and, depending on the context, should – rather be seen as an individual characteristic of the student. Beyond the individual characteristics, another central aspect of students' development lies in the chronosystem (e.g., Bronfenbrenner, 1992) and especially in late stages of EST development (framed as the third and final phase of EST by Rosa & Tudge, 2013), process-person-context-time models that include all four of these aspects are argued to be suited best to investigate their complex relations and importance for development (e.g., Bronfenbrenner & Morris, 2006). Due to their broad scope and complexity, these models are challenging for empirical investigation and implementation and similar to the person characteristics, the chronosystem and especially the development of student outcomes over time was not specifically included in the studies of the work at hand beyond the considerations outlined in section 2.3 Students' School Experience in Times of Crisis. Similarly, as this dissertation focused on the role of two central microsystems

specifically, more distal exo- and macrosystems (e.g., Bronfenbrenner, 1979) were not included in the conceptual model and individual studies, and other potentially important microsystems such as students' neighborhoods or distal systems that may have specific importance for the adaptation of some groups, such as immigrant-origin students (e.g., Suárez-Orozco et al., 2018), were equally not considered. A final conceptual limitation is that theoretical assumptions of reciprocity were not included in the studies at hand. Especially later iterations of the EST framework point towards a reciprocal relation of the developing individual and their environment (e.g., Bronfenbrenner & Morris, 2006; Rosa & Tudge, 2013), meaning that not only the student and, in the context of this work, their school success is influenced by the structural and process components of the family and classroom, but that the actors within these microsystems also adapt their behavior and interaction depending on the student's development (see also e.g., Brühwiler & Blatchford, 2011, for a similar argument in SUM). However, the studies presented here employed models that included only unidirectional associations between processes and student outcomes, proposing that school success was influenced by the family and classroom process variables but not including the theoretically plausible opposite effects (e.g., parents reading more with children with lower reading competence to support the development of their reading skills).

Beyond these conceptual limitations, there are further methodological restrictions that should be noted and, in part, directly tie in with the conceptual aspects mentioned in the preceding paragraph. As discussed, reciprocal paths were not conceptualized in the models used in the individual studies, which is a direct consequence of the data used for analyses. The three different surveys from which data was used in the dissertation at hand, the *Corona Student Survey* (Study I), *School Integration of Newly Immigrated Children* joint research project (Studies II and III), and the German *Progress in International Reading Literacy Study* 2021 survey (Study IV) all collected cross-sectional data whereas models investigating reciprocity, such as cross-lagged panel models, require longitudinal data (e.g., Usami et al., 2019). Similarly, as another consequence of the use of non-experimental cross-sectional data, the causality of the associations between structure, process, and school success variables that was implied in the conceptual model could not directly be statistically tested. Other methodological limitations primarily concern the operationalization of variables in the studies. Studies II through IV utilized data collected from primary school students, whose reports of

socioeconomic information concerning their parents, such as education levels or occupation, is presumably less accurate than that of older adolescents, who appear able to report these information with relatively high accuracy (e.g., Lien et al., 2001; Ridolfo & Maitland, 2011). Therefore, information regarding education and occupation should be acquired from the parents themselves, rather than using children's proxy reports, in order to form valid indicators of socioeconomic status. Unfortunately, as a consequence of low return rates of the parent questionnaires in both surveys used for these studies, parent data could not be used. As an alternative indicator of socioeconomic status, the number of books at home as reported by the children was used in line with the operationalization in prior research (e.g., Eriksson et al., 2019; Hanushek & Woessmann, 2011) and studies that have shown it to be a central indicator for socioeconomic status when investigating educational outcomes (e.g., Eriksson et al., 2021; Heppt et al., 2022), but it would have been preferable to use it not as a standalone indicator, but rather in addition to other indicators such as parents' education and occupation to gain more nuanced insight into the complex role of different facets of socioeconomic status for school success. Similarly, the lack of information gathered from parents means that the family processes were only assessed from the perspective of the students. While students' perceived frequency and quality of these process variables, such as parent-child reading or parental involvement, is arguably central when investigating their associations with school success, the direct involvement of parents in these activities means that additional insights could have been obtained from multi-informant approaches that include parents' perspective alongside that of their children. A final methodological limitation concerning the operationalization of variables in the work at hand must be considered in regard to the language use at home. In the studies, the frequency of speaking German versus the students' heritage language (or languages) in the home serves an indicator for the quantity of language input in these languages in the family. However, not only the quantity of exposure is important for developing language skills, but also the quality of the exposure (e.g., Hoff, 2018; Persici et al., 2022) and thus, a measurement of parents' language proficiency in each spoken language in addition to the measure of relative quantitative language use in the home would have facilitated a better, more detailed representation of the exposure students experience in their families.

#### **4.2.2 Strengths**

Beyond the limitations discussed in the previous section, this dissertation and the individual studies included in it also exhibit a set of unique strengths. Among the conceptual strengths is the theoretical foundation of the work at hand that integrates different key theories under an EST framework (e.g., Bronfenbrenner, 1979, 1986) to enable the investigation of school success in light of two central microsystems, the family and the classroom. While the broad scope of EST, covering proximal and distal systems alike, makes it near impossible to investigate it in empirical studies in full, the theory also provides an overarching framework for focusing on the role of specific systems, especially proximal systems such as the family and classroom. Following the approach of process-context models in ecological systems research (e.g., Bronfenbrenner, 1986; Oishi, 2014), the separation of structural components of the microsystem (i.e., the context) and processes in the microsystem offers key linking points to other theoretical models concerned with the specific microsystems family and classroom, respectively, rather than students' environment as a whole. Regarding the family, distinguishing structural components of the environment from process variables that act as mediators is a core feature of prominent HLE models (e.g., Kluczniok et al., 2013; Lehrl et al., 2020), which were integrated to identify relevant family processes. For the classroom environment, especially SUM feature a similar distinction of structure and process components of the environment (e.g., Brühwiler & Blatchford, 2011; Seidel, 2014), in line with theoretical considerations regarding the mediation of school and classroom composition effects specifically (e.g., Rjosk, 2022), and could therefore similarly be integrated into the overarching EST perspective. This synthesis of theories represents a conceptual strength and importantly also allowed accurate insights into the specific processes responsible for facilitating and mediating the associations of different structural variables, specifically sociodemographic background variables, with the diverse aspects of school success. Another strength is the simultaneous consideration of multiple, different structure components that are clearly separable but often confounded. As socioeconomic status, the language use at home, and history of immigration are significantly associated with each other on the family level (e.g., Henschel et al., 2022) but also in terms of classroom composition (e.g., Wenger et al., 2020), including only one of these structure variables without the others bears the risk of conflating their relations with different measures of school success and therefore finding effects that over-

or underestimate the true associations. Including multiple background characteristics as structure variables simultaneously on the other hand, as was the case in the studies presented in this work, allows to include the confounded nature of these variables in statistical modelling and thereby investigate the true effects of each variable more precisely. Additionally, since different studies in this work utilized samples that focused on students from specific groups, based on their family structure – that is, socioeconomically disadvantaged students in Study I, multilingual students in Study II, first- and second-generation immigrant compared to non-immigrant students in Study III – while also including other structure variables, these studies were especially suited to investigate processes in each of these groups under consideration of other, confounded structure variables. Similarly, while only Study III included indicators of school success from all three dimensions, all studies did include multiple indicators of success nonetheless in line with theoretical considerations of existing models (e.g., York et al., 2015) and practical considerations of official learning goals (e.g., KMK, 2022; Schulgesetz für das Land Nordrhein-Westfalen, 2022), which can help to understand the individual aspects of success in relation to other dimensions and aspects rather than in isolation. Moreover, in the context of the present dissertation at large, the inclusion of a variety of indicators of school success, comprising cognitive competences, noncognitive outcomes, and institutionalized indicators, in the individual studies facilitated a comprehensive insight into the highly complex construct that is school success through the synthetization of the findings of these studies. To investigate the theoretically proposed associations, the studies in this work used appropriate, state-of-the-art statistical methodology, for example (multi-group) path modeling (Studies I and III), which marks a methodological strength – especially the use of multilevel structural equation modeling with random slopes and cross-level interactions in Study IV to accurately capture the complex relations between family and classroom structure and process variables in regard to school success. Finally, the use of current data reflects another strength of the study, as it allows to capture students' school success during (Study I) and in the aftermath (Studies II through IV) of the COVID-19 pandemic and concomitant school closures, which can be classified as a collective life event of global scale (e.g., Wundrack et al., 2021). Due to the unprecedented scale of disruption of in-person education and the subsequent challenges to students' learning and psychological well-being (e.g., Chen et al., 2024; Ludewig et al., 2025), the situation of students during and following the school closures differs from that of students

before the COVID-19 pandemic and, consequently, only recently acquired data can accurately reflect the current situation of students.

### **4.3 Implications for Research and Practice**

The work at hand and the studies comprised within it make an important contribution to understanding the complex role of the family and classroom microsystem for students' multidimensional school success and implications for future research and educational practice both can be derived from the findings. Additionally, it is essential to consider the lacunae that could not sufficiently be filled due to the limitations of this dissertation, as discussed previously, and those that emerge from the presented results which should be considered in future research as well. The following sections will consider these points in a discussion of the implications for future research and educational practice.

#### ***4.3.1 Implications for Future Research***

One aspect where future research can deepen the understanding of the associations in the focus of the studies included in this dissertation, by improving on the methodological limitations, is the measurement and operationalization of especially family structure variables and, by extension, classroom structure in the form of sociodemographic composition. Generally speaking, it would be preferable for future research to make use of data assessed not only from the students, but also their parents when investigating the family environment, as outlined in section 4.2.1 Limitations. Additionally, it is important that future research acknowledges the complexity of assessing students' family environments in light of a significant number of children and adolescents growing up in alternative family models beyond the traditional family with two married parents and their children (e.g., Alexander et al., 2024; Hochgürtel et al., 2024). For example, in case of separated parents, there are growing trends of fathers being more committed to staying involved in their children's upbringing after the separation than has been observed in earlier studies, as well as a substantial number of parents choosing a shared residence model, where children spend roughly equal time in each parent's household (e.g., Lenz & Schlinzig, 2023; Walper et al., 2020). Consequently, the assumption that students grow up in one singular family environment can – and must – be challenged, and future research needs to address this by adopting alternative ways to accurately determine

family structure and process components in complex family models (see e.g., Whorton et al., 2021, for assessing socioeconomic status with complex family models in mind). In addition to these more general considerations, the assessment of family language use specifically should be refined in future studies as well. As has been mentioned previously, the quality of the language input of each language spoken in the family should be assessed in addition to its quantity, and further insights may be gained from differentiating the language use between the student and each member of the family, respectively, as students in multilingual families may not converse with each family member in the same language to the same degree. Similarly, future research regarding family language use can build on the findings presented in Study II specifically to develop assessments that enable more accurate quantification of the linguistic distance between heritage and target languages, for example by including measures of morphological or orthographic distance as well, and thereby facilitate a nuanced understanding of the role these different aspects may play for the language learning of students from different language backgrounds.

In addition to these implications for the assessment of data, future research should consider conceptual implications as well to generate further insights beyond the findings of the work at hand. As the individual studies included all investigated cross-sectional data (see 4.2.1 Limitations), future research should make use of longitudinal designs to facilitate a deeper understanding of the relations of family and classroom structure and process variables for school success for several reasons. One benefit of longitudinal studies is that the assumed causality of associations can be examined more easily than is the case in (non-experimental) cross-sectional studies. Moreover, designs with multiple points of measurement allow to estimate reciprocal effects, which would be beneficial especially for investigating the relations between process variables and school success (see e.g., Usami et al., 2019). Additionally, longitudinal investigations can help to understand the role of different microsystems not only for school success at a given time, but beyond that for the development of the different cognitive competences and noncognitive skills (and, to a lesser degree, institutionalized indicators that would be impacted by the individual's development more indirectly) over time, in line with the conceptualization of EST as a developmental framework and the inclusion of the chronosystem (e.g., Bronfenbrenner, 1986; Bronfenbrenner & Morris, 2006). While important insights can be generated for all students by applying these developmental,

longitudinal perspectives, they can be especially beneficial for investigating the acculturation experiences of first-generation immigrant and immigrant-origin students. For example, Lee et al. (2019) argue for a dynamic perspective that takes into account different, partially interconnected, components of acculturation processes: Acculturation timing (i.e., the beginning of the acculturation process), tempo (i.e., the duration of the acculturation process), synchrony (i.e., how synchronized acculturation processes are across different domains), and pace (i.e., the speed of acculturation in a given domain). Longitudinal designs integrating developmental and acculturation perspectives to investigate these aspects can be an essential step in investigating acculturation processes in future research and can additionally create insights into the way that acculturation and developmental processes interact in immigrant-origin children and youth (e.g., Jugert & Titzmann, 2017; Titzmann & Jugert, 2024). Another pathway for future research to generate deeper insights into the mechanisms behind the influence of family and classroom structure and process variables can be the implementation of mixed-methods designs that consider qualitative data in addition to quantitative surveys, as the prior can facilitate a deeper understanding of students' individual experiences. Similarly, a better understanding of the way the specific mechanisms that influence children's school success can be achieved by including individual characteristics – for example attitudes, cognitive abilities, or personality – of each child in addition to and interaction with the structural and process components of their environment, creating complex person-process-context models (e.g., Bronfenbrenner, 1986) that consider that, even within comparably structured microsystems, the same processes may affect children with different individual characteristics in different ways.

Other conceptual implications for future research can be derived from the outcomes regarded in this work. While a variety of central indicators of school success were investigated in the studies and embedded in a multidimensional framework separating cognitive competences from noncognitive outcomes and institutionalized indicators of success, the outcomes included are far from exhaustive when it comes to measuring school success, and other indicators should be included in the future. As one example, school absenteeism should be investigated in future research, as the roles of the different components of students' environment have not conclusively been uncovered: Focusing on the family microsystem, a recent review has shown that a link of socioeconomic status to school absenteeism has been

well established, but the processes driving this relation are still poorly understood (Sosu et al., 2021). Even more so, the role of other family structure variables such as immigrant origin and language use is ambiguous (e.g., Fredriksson et al., 2024; Lim et al., 2019; Motti-Stefanidi et al., 2015), and differing results in extant research may be an indicator for complex mechanisms that vary by other features of students' environment and should be investigated in more detail. This example also demonstrates how future research may benefit from including more distal systems as well: For immigrant-origin students, national and state policies regarding immigration are important distal factors concerning their adaptation and success in school (e.g., Schachner et al., 2018; Suárez-Orozco et al., 2018) and should be investigated to understand differences in outcomes – including, but not limited to, school absenteeism – between immigrant student populations in different countries and states, as policies such as anti-discrimination legislations (Yang & Ham, 2017) or deportation arrests of immigrants (Kirksey & Sattin-Bajaj, 2021) can have large impacts on these students.

Similarly, future research can benefit from giving stronger consideration to actors on the school and policy levels to further understand why certain family and classroom structure variables are associated with school success and how processes on a systemic level can be used as motors for change. This can be especially beneficial in line with employing a perspective of quantitative critical race theory (or QuantCrit; e.g., Gillborn et al., 2018), which can offer a valuable perspective for future research to generate insights and investigate findings under consideration of the central role of structural racism as a complex and deeply rooted characteristic of society (e.g., Garcia et al., 2018). For example, the studies included in this dissertation regarded different family structure variables in the form of sociodemographic background characteristics to generate a nuanced understanding of the role of each of these variables – which are often interrelated – as studying these variables in isolation can lead to biased estimates due to the conflation of influences. However, employing a quantitative critical race theory perspective, such a separation of effects can in turn run at risk of obfuscating the role that racism and discrimination play at shaping these characteristics, for example by at least implicitly encouraging the interpretation of socioeconomic status as a construct in isolation rather than one that is influenced by racist discrimination of minoritized families (e.g., Castillo & Gilborn, 2023). Similarly, comparing different students' school success based on characteristics of their family and school environments without considering the overarching

influence of structural racism and other forms of discrimination can – implicitly or explicitly – support interpretations and narratives of potential disadvantages as inherent to marginalized groups rather than considering the societal and historic context that shapes these disadvantages through mechanisms such as structural discrimination. Especially when investigating marginalized groups, such as immigrant-origin and ethnically minoritized students, it is therefore important to consider whether the research serves to highlight the resources these communities possess and unveil the mechanisms behind disadvantages they may face rather than simply ascribing them to these groups as inherent deficits (e.g., Civitillo et al., 2025). Consequently, by employing the principles set forth by quantitative critical race theory throughout the research process, future studies can align themselves more closely with pursuing equity goals.

Additionally, to achieve a more comprehensive picture of students' achievements and competences, it can be beneficial for future research to not strictly focus on school success but also include related outcomes that are not directly associated with to students' education. One important example for this are the language skills of students who speak a language other than the majority language at home. While it is vital to understand whether these students face disadvantages in school, especially in regard to language competences in the majority language as has been investigated in this work, and identify mechanisms that can be used to support them according to their specific needs, the focus on language competence in the majority language alone as a facet of school success undermines the fact that these students have, at least to some degree, achieved competences in a second language – their heritage language spoken at home. This is in itself a desirable skill and may also act as a resource, for example for future language learning (e.g., S. C. Chung et al., 2019), but may be overlooked if the focus is placed on the majority language alone. By including measures of students' competences in their heritage language, future research can more accurately depict these students' skills in a comprehensive way and thereby promote a more holistic understanding of language competence as well as contribute to unveiling the complex mechanisms of language learning and cross-language transfer.

Furthermore, the investigation of how the different dimensions of school success influence each other can be improved in future studies to generate more precise insights into these processes, especially when incorporated in longitudinal designs. Finally, future research

concerned with different aspects of school success – and especially noncognitive outcomes – should carefully consider existing tendencies of siloing in research, as for example regarding motivation research, where the diverging foci of different subdisciplines of psychology, individual researchers' focus on specific, singular aspects of motivation, and strict borders between different theoretical traditions have been identified as hindering the overall progress in the field (Wigfield & Elliot, 2024). Consequently, future research should aim to apply an integrative theoretical approach to assessing indicators of school success where silos might occur due to differing theoretical or historically grown traditions, such as motivation but also for example well-being (e.g., Maddux, 2017).

#### ***4.3.2 Implications for Educational Practice***

Similar to the implications for future research, the findings of the work at hand allow to draw conclusions for educational practice as well that can have important consequences for promoting educational equity for all students in light of their different family and classroom environments. Focusing on the family microsystem first, it was shown that students' school success is associated with each of the different structural components – socioeconomic status, language use, and history of immigration – in unique ways. Therefore, it is essential to consider that different students may benefit more from support aimed at specific dimensions of school success than others, depending on their family background. The complex results regarding family structure variables' association with cognitive competences and especially motivational aspects of students' noncognitive outcomes in primary and secondary school can indicate that it is important to make support for students from socioeconomically deprived family backgrounds accessible early to counteract the disadvantages experienced early in their educational pathway already, and that support for these students should not focus on competences alone but also include measures to increase motivational, noncognitive outcomes. For non-majority family language use, ambiguous findings concerning reading competence and motivational outcomes make it difficult to derive direct recommendations for educational practice, but a negative association of multilingual students' heritage languages' lexical distance to German with reading competence (Study II) indicates that programs to support the development of language competences in the majority language should be constructed with keeping the features of students' heritage languages in mind. Finally, while

disadvantages were found for first-generation immigrant students in terms of reading competence, their high motivation for reading can be used as a cornerstone for programs to support immigrant students' reading development in order to mitigate the aforementioned discrepancies. Considering the family process variables as well, the positive effect of different aspects of parental involvement especially for noncognitive student outcomes (Studies I and III) indicates that parents should play a central role in programs aimed at reducing educational inequity and disadvantages, and providing parents with resources, information, or training on how to best be involved in their children's education can potentially enable them to provide opportunities to promote students' motivation and well-being. For example, meta-studies and reviews of parent-child reading interventions have been shown to be effective in improving different outcomes such as expressive vocabulary (Heidlage et al., 2020) and psychosocial functioning (in both children and parents, Xie et al., 2018) and while these tended to focus on children of pre-school age, individual interventions have successfully been implemented to support competences such as vocabulary and metacognitive skills in late primary school as well (e.g., McElvany & Artelt, 2009). Similarly, parents' educational beliefs and aspirations can be another pathway to promote students school success, as they were shown to be positively related to noncognitive outcomes and institutionalized indicators of success in general (Studies I and III) and may be especially worthwhile to target in families of first-generation immigrant students specifically, where additional positive associations with reading competence and life satisfaction emerged.

Similarly, implications can be drawn from the results regarding structure and process components of the classroom environment in Study IV. The findings implied that a high share of students with sociodemographic risk in the classroom were the largest threat to competence and motivational aspects of reading literacy, and while a high share of first-generation immigrant students was additionally negatively associated with reading competence, more language minority students in the classroom on average was linked to higher self-concepts. For primary education in Germany, students are usually required to attend the school nearest to their home<sup>1</sup> (Eckhardt, 2021), meaning that the sociodemographic composition of classrooms and schools directly reflects neighborhood markers of these aspects as well and major changes

---

<sup>1</sup> With (conditional) exceptions in the states of Berlin, Brandenburg, North Rhine-Westphalia, and Schleswig-Holstein.

in the structure of primary education would be necessary to uncouple these links. Consequently, unequal distribution of students within classrooms depending on their sociodemographic family background will remain a challenge for the German education system, and many others, in the foreseeable future and potential pathways to mitigate the resulting inequalities should be focused in educational practice. As the investigation of central process variables has shown, teachers adapt their instruction to the composition and specific needs arising from it, for example by offering more reading-related support in classrooms with high shares of socioeconomically disadvantaged students and support of language minority students specifically in classrooms with many first-generation immigrant learners. However, these specific foci of instruction did not, in turn, positively affect student outcomes, neither on the classroom level, nor for individual students from these groups specifically. Therefore, it is important to build on teachers' existing competences to recognize the specific needs of a classroom depending on its composition and support teachers in identifying ways in which they can adapt their instruction to fulfil these needs and promote students' school success according to their potential beyond sociodemographic constraints. Additionally, it is central to consider other mechanisms that may contribute to affecting school success depending on classroom and school composition, such as a lack of resources (see e.g., Rjosk, 2022). To offset these inequalities, large scale educational policy programs can play a pivotal role – such as the recently adopted *Startchancenprogramm* (starting opportunities program) in Germany, which aims to support structurally disadvantaged schools by supplying modern educational resources, a budget for school and instruction development, and expand the staff for building multi-professional teams in these schools over an extended period of time (Bundesministerium für Bildung und Forschung, 2024). Such teams can promote multi-professional cooperation, which so far has not been systematically implemented and is not found frequently in German schools (e.g., Böhm-Kasper et al., 2016). While more systematic research is needed to understand the circumstances under which multi-professional cooperation is beneficial, extant findings demonstrate the positive potential of such cooperation, for example for teachers but also specifically for at-risk students (e.g., Bates et al., 2019; Borg & Drange, 2019). Therefore, evaluation of programs like the *Startchancenprogramm* can provide further insights on pathways to handle educational

inequity resulting from sociodemographic composition that may ultimately be extended to other schools and the education system at large.

#### **4.4 Conclusion**

Students' school success should be measured by a variety of different dimensions, including cognitive competences, noncognitive outcomes, and institutionalized indicators of success to adequately capture the complex and multidimensional construct in line with theoretical considerations and learning goals (e.g., KMK, 2022; OECD et al., 2015; York et al., 2015). Additionally, to understand why students may or may not succeed in schools according to their individual potential, it is important to consider that the role of their environment shaping their development and success in various ways. Accordingly, this dissertation at hand built on EST (e.g., Bronfenbrenner, 1979, 1992) to investigate how structure variables of the family and classroom – two central, proximal microsystems for students – were associated with the different dimensions of school success, aiming to disentangle the confounded roles of socioeconomic status, language use, and history of immigration in the family, and the composition of the classroom in regard to these sociodemographic variables, respectively. In addition, relevant process variables of these microsystems were investigated to elevate the understanding of their role in mediating and moderating the associations between structure variables and school success and identify the malleable aspects of these pathways that can be used to facilitate school success in light of the specific characteristics of each students' environment. Consequently, this work offers important insights into the complex associations of aspects of students' family and classroom environment with their multidimensional school success. Regarding the family, the different sociodemographic structure variables were associated with school success in varying ways, implying a generally beneficial role of higher socioeconomic status – though this aspect may be less relevant for language minority and immigrant-origin students – as well as disadvantages experienced by language minority students, especially those speaking heritage languages more dissimilar to the majority language German, and first-generation immigrant students, the latter showing discrepancies especially in regard to language-related cognitive competences and institutionalized indicators, but similar outcomes or advantages in regard to noncognitive outcomes. Parental involvement and educational beliefs as process variables were – with small

exceptions – generally positively related to select aspects of school success and while evidence for a mediating role of these variables was limited, findings implied that educational beliefs and immigrant status may interact, making high congruent educational aspirations especially beneficial for first-generation immigrant students. With focus on the classroom, a high concentration of socioeconomically at-risk students was especially detrimental to students' school success, whereas the share of language minority students was positively, the share of first-generation immigrant students negatively related only to select outcomes. Importantly, the inclusion of aspects of teachers' instructional focus revealed that teachers were adapting their instruction in response to the composition of their classroom, but neither dimension of instructional focus included in this work was in turn acting as a mediator of classroom level effects of the composition, nor suitable to mitigate the negative associations of students' individual sociodemographic background with their school success. The findings show that students' unique environments must be considered when determining factors to promote their school success, while also indicating that different process variables and behaviors in the family can be used as cornerstones for promoting and facilitating school success. Additionally, the findings imply that teachers' expertise in recognizing the specific classroom and adapting their instruction accordingly should be built on to equip them with adequate tools to design instruction in each classroom in a way that makes sure every student – independent of the circumstances of their family background and the composition of their classroom – can achieve school success. In conclusion, by building on central theories, this dissertation extends the extant literature in regard to understanding how structural components of the family and classroom microsystem are associated with students' school success and identifying process variables within these microsystems that may be used both to enhance the strengths students and their proximal environment exhibit as well as to counteract disadvantages students may experience in light of the structure of their family and classroom environment. Thereby, the insights generated in this work offer important implications for educational practice as well as future research to further investigate and promote educational equity and the school success of all students according to their potential, independent of the characteristics of their environment.

## 4.5 References II

- Alexander, A. J., Dufur, M. J., Cope, M. R., Jarvis, J. A., & Read, A. R. (2024). Family structure and youth gender ideologies in Germany and South Korea. *Sage Open*, *14*(3), Article 21582440241262913. <https://doi.org/10.1177/21582440241262913>
- Alivernini, F., Cavicchiolo, E., Manganelli, S., Chirico, A., & Lucidi, F. (2020). Students' psychological well-being and its multilevel relationship with immigrant background, gender, socioeconomic status, achievement, and class size. *School Effectiveness and School Improvement*, *31*(2), 172–191. <https://doi.org/10.1080/09243453.2019.1642214>
- Alivernini, F., Manganelli, S., Cavicchiolo, E., Girelli, L., Biasi, V., & Lucidi, F. (2018). Immigrant background and gender differences in primary students' motivations toward studying. *The Journal of Educational Research*, *111*(5), 603–611. <https://doi.org/10.1080/00220671.2017.1349073>
- Almroth, M., László, K. D., Kosidou, K., & Galanti, M. R. (2019). Academic expectations and mental health in adolescence: A longitudinal study involving parents' and their children's perspectives. *Journal of Adolescent Health*, *64*(6), 783–789. <https://doi.org/10.1016/j.jadohealth.2018.11.015>
- Atlay, C., Tieben, N., Hillmert, S., & Fauth, B. (2019). Instructional quality and achievement inequality: How effective is teaching in closing the social achievement gap? *Learning and Instruction*, *63*, Article 101211. <https://doi.org/10.1016/j.learninstruc.2019.05.008>
- Bak-Klimek, A., Karatzias, T., Elliott, L., & Maclean, R. (2015). The determinants of well-being among international economic immigrants: A systematic literature review and meta-analysis. *Applied Research in Quality of Life*, *10*(1), 161–188. <https://doi.org/10.1007/s11482-013-9297-8>
- Barger, M. M., Kim, E. M., Kuncel, N. R., & Pomerantz, E. M. (2019). The relation between parents' involvement in children's schooling and children's adjustment: A meta-analysis. *Psychological Bulletin*, *145*(9), 855–890. <https://doi.org/10.1037/bul0000201>
- Bates, S. M., Mellin, E., Paluta, L. M., Anderson-Butcher, D., Vogeler, M., & Sterling, K. (2019). Examining the influence of interprofessional team collaboration on student-level outcomes through school-community partnerships. *Children & Schools*, *41*(2), 111–122. <https://doi.org/10.1093/cs/cdz001>
- Becker, M., & McElvany, N. (2018). The interplay of gender and social background: A longitudinal study of interaction effects in reading attitudes and behaviour. *British Journal of Educational Psychology*, *88*(4), 529–549. <https://doi.org/10.1111/bjep.12199>
- Berger, N., & Archer, J. (2016). School socio-economic status and student socio-academic achievement goals in upper secondary contexts. *Social Psychology of Education*, *19*(1), 175–194. <https://doi.org/10.1007/s11218-015-9324-8>
- Bergold, S., Weidinger, A. F., & Steinmayr, R. (2022). The “big fish” from the teacher's perspective: A closer look at reference group effects on teacher judgments. *Journal of Educational Psychology*, *114*(3), 656–680. <https://doi.org/10.1037/edu0000559>
- Böhm-Kasper, O., Dizinger, V., & Gausling, P. (2016). Multiprofessional collaboration between teachers and other educational staff at German all-day schools as a characteristic of today's

- professionalism. *International Journal for Research on Extended Education*, 4(1), 29–51. <https://doi.org/10.3224/ijree.v4i1.24774>
- Bonefeld, M., Dickhäuser, O., Janke, S., Praetorius, A.-K., & Dresel, M. (2017). Migrationsbedingte Disparitäten in der Notenvergabe nach dem Übergang auf das Gymnasium [Student grading according to migration background]. *Zeitschrift Für Entwicklungspsychologie Und Pädagogische Psychologie*, 49(1), 11–23. <https://doi.org/10.1026/0049-8637/a000163>
- Boonk, L., Gijssels, H. J. M., Ritzen, H., & Brand-Gruwel, S. (2018). A review of the relationship between parental involvement indicators and academic achievement. *Educational Research Review*, 24, 10–30. <https://doi.org/10.1016/j.edurev.2018.02.001>
- Borg, E., & Drange, I. (2019). Interprofessional collaboration in school: Effects on teaching and learning. *Improving Schools*, 22(3), 251–266. <https://doi.org/10.1177/1365480219864812>
- Borgonovi, F., & Ferrara, A. (2020). Academic achievement and sense of belonging among non-native-speaking immigrant students: The role of linguistic distance. *Learning and Individual Differences*, 81, Article 101911. <https://doi.org/10.1016/j.lindif.2020.101911>
- Brändle, T., & Weirich, S. (2023). Leistungsunabhängige Urteile? Analysen zur Vergabe der Gymnasialempfehlung und des Übergang von der Grundschule in die Sekundarstufe I in Hamburg [Non-performance-related decisions? Analyses on awarding of recommendation for Gymnasium [academic track] and on transition from elementary school to secondary education in Hamburg]. *Zeitschrift für Grundschulforschung*, 16(1), 153–172. <https://doi.org/10.1007/s42278-022-00160-z>
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Harvard University Press.
- Bronfenbrenner, U. (1986). Ecology of the family as a context for human development: Research perspectives. *Developmental Psychology*, 22(6), 723–742. <https://doi.org/10.1037/0012-1649.22.6.723>
- Bronfenbrenner, U. (1992). Ecological systems theory. In R. Vasta (Ed.), *Six theories of child development: Revised formulations and current issues* (pp. 187–249). Jessica Kingsley Publishers Ltd.
- Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology: Theoretical models of human development* (6th ed., Vol. 1, pp. 793–828). John Wiley & Sons.
- Brühwiler, C., & Blatchford, P. (2011). Effects of class size and adaptive teaching competency on classroom processes and academic outcome. *Learning and Instruction*, 21(1), 95–108. <https://doi.org/10.1016/j.learninstruc.2009.11.004>
- Bundesministerium für Bildung und Forschung. (2024, February 20). *Richtlinie zur Förderung eines Forschungsverbunds für die wissenschaftliche Begleitung des Startchancen-Programms*, *Bundesanzeiger vom 28.02.2024* [Public notice]. <https://www.bmbf.de/SharedDocs/Bekanntmachungen/DE/2024/02/2024-02-28-Bekanntmachung-Startchancen-Programm.html>

- Camacho de Anda, A., & Becerra, D. (2023). Hoping for a better tomorrow: Do hope and optimism serve as protective factors against discrimination in Latinx immigrants? *Journal of Human Behavior in the Social Environment*, 33(2), 143–162. <https://doi.org/10.1080/10911359.2021.2024107>
- Caro, D. H., Lenkeit, J., & Kyriakides, L. (2016). Teaching strategies and differential effectiveness across learning contexts: Evidence from PISA 2012. *Studies in Educational Evaluation*, 49, 30–41. <https://doi.org/10.1016/j.stueduc.2016.03.005>
- Castillo, W. (2023). Do elementary students reading motivation levels differ by racial/ethnic and/or immigrant background? *Journal of Latinos and Education*, 22(2), 669–680. <https://doi.org/10.1080/15348431.2020.1805615>
- Castillo, W., & Gilborn, D. (2023). *How to “QuantCrit:” Practices and questions for education data researchers and users* [EdWorkingPaper No. 22-546]. Annenberg Brown University. <https://doi.org/10.26300/v5kh-dd65>
- Chen, S., Cárdenas, D., Zhou, H., & Reynolds, K. J. (2024). Positive school climate and strong school identification as protective factors of adolescent mental health and learning engagement: A longitudinal investigation before and during COVID-19. *Social Science & Medicine*, 348, Article 116795. <https://doi.org/10.1016/j.socscimed.2024.116795>
- Chung, G., Phillips, J., Jensen, T. M., & Lanier, P. (2020). Parental involvement and adolescents’ academic achievement: Latent profiles of mother and father warmth as a moderating influence. *Family Process*, 59(2), 772–788. <https://doi.org/10.1111/famp.12450>
- Chung, S. C., Chen, X., & Geva, E. (2019). Deconstructing and reconstructing cross-language transfer in bilingual reading development: An interactive framework. *Journal of Neurolinguistics*, 50, 149–161. <https://doi.org/10.1016/j.jneuroling.2018.01.003>
- Civitillo, S., Jugert, P., & Campbell-Bethancourt, E. (2025). A review of QuantCrit-informed approaches to group participants and explore ethno-racial heterogeneity in educational research. *Current Opinion in Behavioral Sciences*, 64, Article 101537. <https://doi.org/10.1016/j.cobeha.2025.101537>
- Dettmers, S., Yotyodying, S., & Jonkmann, K. (2019). Antecedents and outcomes of parental homework involvement: How do family-school partnerships affect parental homework involvement and student outcomes? *Frontiers in Psychology*, 10, Article 1048. <https://doi.org/10.3389/fpsyg.2019.01048>
- Dietrich, H., Patzina, A., & Lerche, A. (2021). Social inequality in the homeschooling efforts of German high school students during a school closing period. *European Societies*, 23(S1), S348–S369. <https://doi.org/10.1080/14616696.2020.1826556>
- Dong, Y., Wu, S. X.-Y., Dong, W.-Y., & Tang, Y. (2020). The effects of home literacy environment on children’s reading comprehension development: A meta-analysis. *Educational Sciences: Theory & Practice*, 20(2), 63–82. <https://doi.org/10.12738/jestp.2020.2.005>
- Dumont, H., Klinge, D., & Maaz, K. (2019). The many (subtle) ways parents game the system: Mixed-method evidence on the transition into secondary-school tracks in Germany. *Sociology of Education*, 92(2), 199–228. <https://doi.org/10.1177/0038040719838223>
- Eckhardt, T. (Ed.). (2021). *The education system in the Federal Republic of Germany 2019/2020: A description of the responsibilities, structures and developments in education policy for the*

- exchange of information in Europe*. Secretariat of the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder in the Federal Republic of Germany. [https://www.kmk.org/fileadmin/Dateien/pdf/Eurydice/Bildungswesen-engl-pdfs/dossier\\_en\\_ebook.pdf](https://www.kmk.org/fileadmin/Dateien/pdf/Eurydice/Bildungswesen-engl-pdfs/dossier_en_ebook.pdf)
- Entorf, H., & Lauk, M. (2006). *Peer effects, social multipliers and migrants at school: An international comparison* (Darmstadt Discussion Papers in Economics No. 164). Technische Universität Darmstadt, Department of Law and Economics. <https://hdl.handle.net/10419/32089>
- Eriksson, K., Helenius, O., & Ryve, A. (2019). Using TIMSS items to evaluate the effectiveness of different instructional practices. *Instructional Science*, 47(1), 1–18. <https://doi.org/10.1007/s11251-018-9473-1>
- Eriksson, K., Lindvall, J., Helenius, O., & Ryve, A. (2021). Socioeconomic status as a multidimensional predictor of student achievement in 77 Societies. *Frontiers in Education*, 6, Article 731634. <https://doi.org/10.3389/educ.2021.731634>
- Esser, H. (2006). *Migration, Sprache und Integration* (AKI-Forschungsbilanz, Issue 4) [Migration, language and integration]. Arbeitsstelle Interkulturelle Konflikte und gesellschaftliche Integration and Wissenschaftszentrum Berlin für Sozialforschung. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-113493>
- Fauth, B., Decristan, J., Rieser, S., Klieme, E., & Büttner, G. (2014). Grundschulunterricht aus Schüler-, Lehrer- und Beobachterperspektive: Zusammenhänge und Vorhersage von Lernerfolg [Teaching quality in primary school from the perspectives of students, teachers, and external observers: Relationships between perspectives and prediction of student achievement]. *Zeitschrift für Pädagogische Psychologie*, 28(3), 127–137. <https://doi.org/10.1024/1010-0652/a000129>
- Festman, J., & Schwieter, J. W. (2019). Self-concepts in reading and spelling among mono- and multilingual children: Extending the bilingual advantage. *Behavioral Sciences*, 9(4), Article 39. <https://doi.org/10.3390/bs9040039>
- Fredriksson, U., Rasmusson, M., Backlund, Å., Isaksson, J., & Kreitz-Sandberg, S. (2024). Which students skip school? A comparative study of sociodemographic factors and student absenteeism using PISA data. *PLOS ONE*, 19(5), Article e0300537. <https://doi.org/10.1371/journal.pone.0300537>
- Garcia, N. M., López, N., & Vélez, V. N. (2018). QuantCrit: Rectifying quantitative methods through critical race theory. *Race Ethnicity and Education*, 21(2), 149–157. <https://doi.org/10.1080/13613324.2017.1377675>
- Geng, S., Lu, Y., & Shu, H. (2023). Cross-cultural generalizability of expectancy-value theory in reading: A multilevel analysis across 80 societies. *Current Psychology*, 42(22), 18943–18958. <https://doi.org/10.1007/s12144-022-03014-0>
- Gillborn, D., Warmington, P., & Demack, S. (2018). QuantCrit: Education, policy, ‘Big Data’ and principles for a critical race theory of statistics. *Race Ethnicity and Education*, 21(2), 158–179. <https://doi.org/10.1080/13613324.2017.1377417>
- Greenwald, D. G., Shan, L., Boldt, T. A., Truong, B. B., Gonzalez, G. S., Chen, C. H., & Corpus, J. H. (2023). Comparing intrinsic and extrinsic motivation in bilingual children and their

- monolingual peers. *Frontiers in Education*, 7, Article 1022729. <https://doi.org/10.3389/feduc.2022.1022729>
- Guo, X., Qin, H., Jiang, K., & Luo, L. (2022). Parent-child discrepancy in educational aspirations and depressive symptoms in early adolescence: A longitudinal study. *Journal of Youth and Adolescence*, 51(10), 1983–1996. <https://doi.org/10.1007/s10964-022-01644-y>
- Hanushek, E. A., & Woessmann, L. (2011). The economics of international differences in educational achievement. In E. A. Hanushek, S. Machin, & L. Woessmann (Eds.), *Handbook of the economics of education* (Vol. 3, pp. 89–200). Elsevier. <https://doi.org/10.1016/B978-0-444-53429-3.00002-8>
- Harker, R., & Tymms, P. (2004). The effects of student composition on school outcomes. *School Effectiveness and School Improvement*, 15(2), 177–199. <https://doi.org/10.1076/sesi.15.2.177.30432>
- Heidlage, J. K., Cunningham, J. E., Kaiser, A. P., Trivette, C. M., Barton, E. E., Frey, J. R., & Roberts, M. Y. (2020). The effects of parent-implemented language interventions on child linguistic outcomes: A meta-analysis. *Early Childhood Research Quarterly*, 50, 6–23. <https://doi.org/10.1016/j.ecresq.2018.12.006>
- Henschel, S., Heppt, B., Rjosk, C., & Weirich, S. (2022). Zuwanderungsbezogene Disparitäten [Migration-related disparities]. In P. Stanat, S. Schipolowski, R. Schneider, K. A. Sachse, S. Weirich, & S. Henschel (Eds.), *IQB-Bildungstrend 2021: Kompetenzen in den Fächern Deutsch und Mathematik am Ende der 4. Jahrgangsstufe im dritten Ländervergleich* (pp. 181–219). Waxmann. <https://doi.org/10.31244/9783830996064>
- Henschel, S., Heppt, B., & Weirich, S. (2023). Zuwanderungsbezogene Disparitäten [Migration-related disparities]. In P. Stanat, S. Schipolowski, R. Schneider, S. Weirich, S. Henschel, & K. A. Sachse (Eds.), *IQB-Bildungstrend 2022: Sprachliche Kompetenzen am Ende der 9. Jahrgangsstufe im dritten Ländervergleich* (pp. 299–345). Waxmann Verlag GmbH. <https://doi.org/10.31244/9783830997771>
- Heppt, B., Olczyk, M., & Volodina, A. (2022). Number of books at home as an indicator of socioeconomic status: Examining its extensions and their incremental validity for academic achievement. *Social Psychology of Education*, 25(4), 903–928. <https://doi.org/10.1007/s11218-022-09704-8>
- Hillmert, S. (2013). Links between immigration and social inequality in education: A comparison among five European countries. *Research in Social Stratification and Mobility*, 32, 7–23. <https://doi.org/10.1016/j.rssm.2013.02.002>
- Hochgürtel, T., Loichinger, E., & Pötzsch, O. (2024). Familie, Lebensformen und Kinder [Family, lifestyles and children]. In Bundeszentrale für politische Bildung, Statistisches Bundesamt, Wissenschaftszentrum Berlin für Sozialforschung, & Bundesinstitut für Bevölkerungsforschung (Eds.), *Sozialbericht 2024: Ein Datenreport für Deutschland* (pp. 53–101). bpb. [https://www.bpb.de/system/files/dokument\\_pdf/Sozialbericht\\_2024\\_bf\\_k2.pdf](https://www.bpb.de/system/files/dokument_pdf/Sozialbericht_2024_bf_k2.pdf)
- Hochweber, J., & Vieluf, S. (2018). Gender differences in reading achievement and enjoyment of reading: The role of perceived teaching quality. *The Journal of Educational Research*, 111(3), 268–283. <https://doi.org/10.1080/00220671.2016.1253536>

- Hoff, E. (2018). Bilingual development in children of immigrant families. *Child Development Perspectives, 12*(2), 80–86. <https://doi.org/10.1111/cdep.12262>
- Howard, J. L., Bureau, J. S., Guay, F., Chong, J. X. Y., & Ryan, R. M. (2021). Student motivation and associated outcomes: A meta-analysis from self-determination theory. *Perspectives on Psychological Science, 16*(6), 1300–1323. <https://doi.org/10.1177/1745691620966789>
- Jugert, P., & Titzmann, P. F. (2017). Trajectories of victimization in ethnic diaspora immigrant and native adolescents: Separating acculturation from development. *Developmental Psychology, 53*(3), 552–566. <https://doi.org/10.1037/dev0000254>
- Jung, E., & Zhang, Y. (2016). Parental involvement, children's aspirations, and achievement in new immigrant families. *The Journal of Educational Research, 109*(4), 333–350. <https://doi.org/10.1080/00220671.2014.959112>
- Khattab, N., Madeeha, M., Samara, M., Modood, T., & Barham, A. (2022). Do educational aspirations and expectations matter in improving school achievement? *Social Psychology of Education, 25*(1), 33–53. <https://doi.org/10.1007/s11218-021-09670-7>
- Kigel, R. M., McElvany, N., & Becker, M. (2015). Effects of immigrant background on text comprehension, vocabulary, and reading motivation: A longitudinal study. *Learning and Instruction, 35*, 73–84. <https://doi.org/10.1016/j.learninstruc.2014.10.001>
- Kirksey, J. J., & Sattin-Bajaj, C. (2021). Immigration arrests and educational impacts: Linking ICE arrests to declines in achievement, attendance, and school climate and safety in California. *AERA Open, 7*(1), Article 23328584211039787. <https://doi.org/10.1177/23328584211039787>
- Kluczniok, K., Lehl, S., Kuger, S., & Rossbach, H.-G. (2013). Quality of the home learning environment during preschool age – domains and contextual conditions. *European Early Childhood Education Research Journal, 21*(3), 420–438. <https://doi.org/10.1080/1350293X.2013.814356>
- Kocaj, A., Jansen, M., Kuhl, P., & Stanat, P. (2020). Zusammenhänge der Klassenkomposition an Förderschulen und allgemeinen Schulen mit schulischen Kompetenzen, akademischem Selbstkonzept und Interesse [Associations of classroom composition in special-needs schools and general schools with school competences, academic self-concept and interest]. In C. Gresch, P. Kuhl, M. Grosche, C. Sälzer, & P. Stanat (Eds.), *Schüler\*innen mit sonderpädagogischem Förderbedarf in Schulleistungserhebungen: Einblicke und Entwicklungen* (pp. 213–262). Springer Fachmedien Wiesbaden. [https://doi.org/10.1007/978-3-658-27608-9\\_8](https://doi.org/10.1007/978-3-658-27608-9_8)
- Kultusministerkonferenz. (2022, June 23). *Bildungsstandards für das Fach Deutsch: Primarbereich (Beschluss der Kultusministerkonferenz vom 15.10.2004, i.d.F. vom 23.06.2022)* [Education standards for the subject German: Primary school]. Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland. [https://www.kmk.org/fileadmin/veroeffentlichungen\\_beschluesse/2022/2022\\_06\\_23-Bista-Primarbereich-Deutsch.pdf](https://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2022/2022_06_23-Bista-Primarbereich-Deutsch.pdf)
- Lee, R. M., Titzmann, P. F., & Jugert, P. (2019). Towards a more dynamic perspective on acculturation research. In P. F. Titzmann & P. Jugert (Eds.), *Youth in superdiverse societies* (pp. 74–91). Routledge.

- Lehrl, S., Evangelou, M., & Sammons, P. (2020). The home learning environment and its role in shaping children's educational development [Editorial]. *School Effectiveness and School Improvement*, 31(1), 1–6. <https://doi.org/10.1080/09243453.2020.1693487>
- Lenz, K., & Schlinzig, T. (2023). German families: East-west differences in diversity. In M. A. Adler & K. Lenz (Eds.), *The changing faces of families: Diverse family forms in various policy contexts* (1st ed., pp. 57–79). Routledge. <https://doi.org/10.4324/9781003193500-4>
- Li, X., Yang, H., Wang, H., & Jia, J. (2020). Family socioeconomic status and home-based parental involvement: A mediation analysis of parental attitudes and expectations. *Children and Youth Services Review*, 116, Article 105111. <https://doi.org/10.1016/j.chilyouth.2020.105111>
- Lien, N., Friestad, C., & Klepp, K.-I. (2001). Adolescents' proxy reports of parents' socioeconomic status: How valid are they? *Journal of Epidemiology & Community Health*, 55(10), 731–737. <https://doi.org/10.1136/jech.55.10.731>
- Lim, E., Davis, J., Choi, S. Y., & Chen, J. J. (2019). Effect of sociodemographics, health-related problems, and family structure on chronic absenteeism among children. *Journal of School Health*, 89(4), 308–318. <https://doi.org/10.1111/josh.12736>
- Lintorf, K., van Ophuysen, S., & Osipov, I. (2021). Comparing assessment methods of attribute importance in teachers' decisions: The importance of different criteria for tracking recommendations after primary school. *Education Sciences*, 11(10), Article 566. <https://doi.org/10.3390/educsci11100566>
- Liou, P.-Y., Wang, C.-L., & Lin, J. J. H. (2019). Pathways of parental involvement through students' motivational beliefs to science achievement. *Educational Psychology*, 39(7), 960–980. <https://doi.org/10.1080/01443410.2019.1617410>
- Lockl, K., Attig, M., Nusser, L., & Wolter, I. (2021). Cognitive and affective-motivational factors as predictors of students' home learning during the school lockdown. *Frontiers in Psychology*, 12, Article 751120. <https://doi.org/10.3389/fpsyg.2021.751120>
- Ludewig, U., Strietholt, R., & McElvany, N. (2025). Reading literacy decline in Europe: Disentangling school closures and out-of-school learning conditions during the COVID-19 pandemic. *Learning and Instruction*, 98, Article 102150. <https://doi.org/10.1016/j.learninstruc.2025.102150>
- Maddux, J. E. (2017). Subjective well-being and life satisfaction. In J. E. Maddux (Ed.), *Subjective well-being and life satisfaction* (pp. 3–31). Routledge. <https://doi.org/10.4324/9781351231879>
- Manganelli, S., Cavicchiolo, E., Lucidi, F., Galli, F., Cozzolino, M., Chirico, A., & Alivernini, F. (2021). Differences and similarities in adolescents' academic motivation across socioeconomic and immigrant backgrounds. *Personality and Individual Differences*, 182, Article 111077. <https://doi.org/10.1016/j.paid.2021.111077>
- McElvany, N., & Artelt, C. (2009). Systematic reading training in the family: Development, implementation, and initial evaluation of the Berlin Parent–Child Reading Program. *Learning and Instruction*, 19(1), 79–95. <https://doi.org/10.1016/j.learninstruc.2008.02.002>
- McElvany, N., Becker, M., & Lüdtke, O. (2009). Die Bedeutung familiärer Merkmale für Lesekompetenz, Wortschatz, Lesemotivation und Leseverhalten [The role of family variables in reading literacy, vocabulary, reading motivation, and reading behavior]. *Zeitschrift Für*

- Entwicklungspsychologie Und Pädagogische Psychologie*, 41(3), 121–131.  
<https://doi.org/10.1026/0049-8637.41.3.121>
- Miyamoto, A., Pfof, M., & Artelt, C. (2018). Reciprocal relations between intrinsic reading motivation and reading competence: A comparison between native and immigrant students in Germany. *Journal of Research in Reading*, 41(1), 176–196. <https://doi.org/10.1111/1467-9817.12113>
- Miyamoto, A., Seuring, J., & Kristen, C. (2020). Immigrant students' achievements in light of their educational aspirations and academic motivation. *Journal of Ethnic and Migration Studies*, 46(7), 1348–1370. <https://doi.org/10.1080/1369183X.2018.1538772>
- Mok, S. Y., Martiny, S. E., Gleibs, I. H., Keller, M. M., & Froehlich, L. (2016). The relationship between ethnic classroom composition and Turkish-origin and German students' reading performance and sense of belonging. *Frontiers in Psychology*, 7, Article 1071. <https://doi.org/10.3389/fpsyg.2016.01071>
- Motti-Stefanidi, F., Masten, A., & Asendorpf, J. B. (2015). School engagement trajectories of immigrant youth: Risks and longitudinal interplay with academic success. *International Journal of Behavioral Development*, 39(1), 32–42. <https://doi.org/10.1177/0165025414533428>
- Mulder, E., van de Ven, M., Segers, E., & Verhoeven, L. (2019). Context, word, and student predictors in second language vocabulary learning. *Applied Psycholinguistics*, 40(1), 137–166. <https://doi.org/10.1017/S0142716418000504>
- Nennstiel, R. (2023). No Matthew effects and stable SES gaps in math and language achievement growth throughout schooling: Evidence from Germany. *European Sociological Review*, 39(5), 724–740. <https://doi.org/10.1093/esr/jcac062>
- Neumeyer, S., Olczyk, M., Schmaus, M., & Will, G. (2022). Reducing or widening the gap? How the educational aspirations and expectations of Turkish and majority families develop during lower secondary education in Germany. *KZfSS Kölner Zeitschrift Für Soziologie Und Sozialpsychologie*, 74(2), 259–285. <https://doi.org/10.1007/s11577-022-00844-5>
- Obermeier, R., Schlesier, J., & Gläser-Zikuda, M. (2021). Differences in students' scholastic well-being induced by familial and scholastic context. *The British Journal of Educational Psychology*, 92(3), 994–1010. <https://doi.org/10.1111/bjep.12484>
- Oishi, S. (2014). Socioecological psychology. *Annual Review of Psychology*, 65(1), 581–609. <https://doi.org/10.1146/annurev-psych-030413-152156>
- Organization for Economic Co-operation and Development, European Union, & UNESCO Institute for Statistics. (2015). *ISCED 2011 Operational Manual: Guidelines for classifying national education programmes and related qualifications*. OECD Publishing. <https://doi.org/10.1787/9789264228368-en>
- Paradis, J. (2023). Sources of individual differences in the dual language development of heritage bilinguals. *Journal of Child Language*, 50(4), 793–817. <https://doi.org/10.1017/S0305000922000708>
- Paulus, L., Spinath, F. M., & Hahn, E. (2021). How do educational inequalities develop? The role of socioeconomic status, cognitive ability, home environment, and self-efficacy along the educational path. *Intelligence*, 86, Article 101528. <https://doi.org/10.1016/j.intell.2021.101528>

- Persici, V., Majorano, M., Bastianello, T., & Hoff, E. (2022). Vocabulary and reading speed in the majority language are affected by maternal language proficiency and language exposure at home: A study of language minority bilingual children in Italy. *International Journal of Bilingual Education and Bilingualism*, 25(10), 3729–3744. <https://doi.org/10.1080/13670050.2022.2076552>
- Place, S., & Hoff, E. (2016). Effects and noneffects of input in bilingual environments on dual language skills in 2 ½-year-olds. *Bilingualism: Language and Cognition*, 19(5), 1023–1041. <https://doi.org/10.1017/S1366728915000322>
- Praetorius, A.-K., & Charalambous, C. Y. (2018). Classroom observation frameworks for studying instructional quality: Looking back and looking forward. *ZDM Mathematics Education*, 50(3), 535–553. <https://doi.org/10.1007/s11858-018-0946-0>
- Ramazan, O., Dai, S., Danielson, R. W., Ardasheva, Y., Hao, T., & Austin, B. W. (2023). Students' 2018 PISA reading self-concept: Identifying predictors and examining model generalizability for emergent bilinguals. *Journal of School Psychology*, 101, Article 101254. <https://doi.org/10.1016/j.jsp.2023.101254>
- Ramazan, O., Danielson, R. W., Rougee, A., Ardasheva, Y., & Austin, B. W. (2023). Effects of classroom and school climate on language minority students' PISA mathematics self-concept and achievement scores. *Large-Scale Assessments in Education*, 11(1), Article 11. <https://doi.org/10.1186/s40536-023-00156-w>
- Raudenská, P., & Hamplová, D. (2022). The effect of parents' education and income on children's school performance: The mediating role of the family environment and children's characteristics, and gender differences. *Polish Sociological Review*, 2(218), 247–271. <https://doi.org/10.26412/psr218.06>
- Ridolfo, H., & Maitland, A. (2011). Factors that influence the accuracy of adolescent proxy reporting of parental characteristics: A research note. *Journal of Adolescence*, 34(1), 95–103. <https://doi.org/10.1016/j.adolescence.2010.01.008>
- Rjosk, C. (2022). Dispersion of student achievement and classroom composition. In T. Nilsen, A. Stancel-Piątak, & J.-E. Gustafsson (Eds.), *International handbook of comparative large-scale studies in education* (pp. 1399–1431). Springer International Publishing. [https://doi.org/10.1007/978-3-030-88178-8\\_47](https://doi.org/10.1007/978-3-030-88178-8_47)
- Rjosk, C., Richter, D., Hochweber, J., Lüdtke, O., Klieme, E., & Stanat, P. (2014). Socioeconomic and language minority classroom composition and individual reading achievement: The mediating role of instructional quality. *Learning and Instruction*, 32, 63–72. <https://doi.org/10.1016/j.learninstruc.2014.01.007>
- Rjosk, C., Richter, D., Hochweber, J., Lüdtke, O., & Stanat, P. (2015). Classroom composition and language minority students' motivation in language lessons. *Journal of Educational Psychology*, 107(4), 1171–1185. <https://doi.org/10.1037/edu0000035>
- Rjosk, C., Richter, D., Lüdtke, O., & Eccles, J. S. (2017). Ethnic composition and heterogeneity in the classroom: Their measurement and relationship with student outcomes. *Journal of Educational Psychology*, 109(8), 1188–1204. <https://doi.org/10.1037/edu0000185>

- Rogiers, A., van Keer, H., & Merchie, E. (2020). The profile of the skilled reader: An investigation into the role of reading enjoyment and student characteristics. *International Journal of Educational Research*, 99, Article 101512. <https://doi.org/10.1016/j.ijer.2019.101512>
- Rosa, E. M., & Tudge, J. (2013). Urie Bronfenbrenner's Theory of Human Development: Its evolution from ecology to bioecology. *Journal of Family Theory & Review*, 5(4), 243–258. <https://doi.org/10.1111/jftr.12022>
- Sachse, K. A., Jindra, C., Schumann, K., & Schipolowski, S. (2022). Soziale Disparitäten [Social disparities]. In P. Stanat, S. Schipolowski, R. Schneider, K. A. Sachse, S. Weirich, & S. Henschel (Eds.), *IQB-Bildungstrend 2021: Kompetenzen in den Fächern Deutsch und Mathematik am Ende der 4. Jahrgangsstufe im dritten Ländervergleich* (pp. 151–180). Waxmann. <https://doi.org/10.31244/9783830996064>
- Sam, D. L., Vedder, P., Ward, C., & Horenczyk, G. (2022). Psychological and sociocultural adaptation of immigrant youth. In J. W. Berry, J. S. Phinney, D. L. Sam, & P. Vedder (Eds.), *Immigrant youth in cultural transition* (pp. 119–143). Routledge. <https://doi.org/10.4324/9781003309192-5>
- Schachner, M. K., Juang, L., Moffitt, U., & van de Vijver, F. J. R. (2018). Schools as acculturative and developmental contexts for youth of immigrant and refugee background. *European Psychologist*, 23(1), 44–56. <https://doi.org/10.1027/1016-9040/a000312>
- Schulgesetz für das Land Nordrhein-Westfalen. (2022). <https://bass.schule.nrw/6043.htm>
- Segerer, R., Niklas, F., Suggate, S., & Schneider, W. (2021). Young minority home-language students' biased reading self-concept and its consequences for reading development. *Reading Research Quarterly*, 56(1), 71–94. <https://doi.org/10.1002/rrq.300>
- Seidel, T. (2014). Angebots-Nutzungs-Modelle in der Unterrichtspsychologie. Integration von Struktur- und Prozessparadigma [Supply-use-models in instructional psychology: Integrating the structure- and process-paradigm]. *Zeitschrift für Pädagogik*, 60(6), 850–866. <https://doi.org/10.25656/01:14686>
- Seuring, J., Rjosk, C., & Stanat, P. (2020). Ethnic classroom composition and minority language use among classmates: Do peers matter for students' language achievement? *European Sociological Review*, 36(6), 920–936. <https://doi.org/10.1093/esr/jcaa022>
- Silinskas, G., & Kikas, E. (2019). Parental involvement in math homework: Links to children's performance and motivation. *Scandinavian Journal of Educational Research*, 63(1), 17–37. <https://doi.org/10.1080/00313831.2017.1324901>
- Sosu, E. M., Dare, S., Goodfellow, C., & Klein, M. (2021). Socioeconomic status and school absenteeism: A systematic review and narrative synthesis. *Review of Education*, 9(3), Article e3291. <https://doi.org/10.1002/rev3.3291>
- Steinmayr, R., Lazarides, R., Weidinger, A. F., & Christiansen, H. (2021). Teaching and learning during the first COVID-19 school lockdown: Realization and associations with parent-perceived students' academic outcomes: A study and preliminary overview. *Zeitschrift Für Pädagogische Psychologie*, 35(2–3), 85–106. <https://doi.org/10.1024/1010-0652/a000306>
- Stubbe, T. C., Kleinkorres, R., Krieg, M., Schaufelberger, R., & Schlitter, T. (2023). Soziale und migrationsbedingte Disparitäten in der Lesekompetenz von Viertklässlerinnen und Viertklässlern [Social and migration-related disparities in the reading competence of fourth-

- graders]. In N. McElvany, R. Lorenz, A. Frey, F. Goldhammer, A. Schilcher, & T. C. Stubbe (Eds.), *IGLU 2021: Lesekompetenz von Grundschulkindern im internationalen Vergleich und im Trend über 20 Jahre* (pp. 151–177). Waxmann. <https://doi.org/10.31244/9783830997009>
- Suárez-Orozco, C., Motti-Stefanidi, F., Marks, A., & Katsiaficas, D. (2018). An integrative risk and resilience model for understanding the adaptation of immigrant-origin children and youth. *American Psychologist, 73*(6), 781–796. <https://doi.org/10.1037/amp0000265>
- Tang, Y. (2019). Immigration status and adolescent life satisfaction: An international comparative analysis based on PISA 2015. *Journal of Happiness Studies, 20*(5), 1499–1518. <https://doi.org/10.1007/s10902-018-0010-3>
- Titzmann, P. F., & Jugert, P. (2024). The dynamics of acculturative change: The potential of a developmental perspective in acculturation science. *Advances in Psychology, 2*(1), Article e553629. <https://doi.org/10.56296/aip00029>
- Ulriksen, R., Sagatun, Å., Zachrisson, H. D., Waaktaar, T., & Lervåg, A. O. (2015). Social support and socioeconomic status predict secondary students' grades and educational plans indifferently across immigrant group and gender. *Scandinavian Journal of Educational Research, 59*(3), 357–376. <https://doi.org/10.1080/00313831.2014.965792>
- Usami, S., Murayama, K., & Hamaker, E. L. (2019). A unified framework of longitudinal models to examine reciprocal relations. *Psychological Methods, 24*(5), 637–657. <https://doi.org/10.1037/met0000210>
- Volodina, A., Heppt, B., & Weinert, S. (2021). Effects of socioeconomic status and language use on academic language proficiency in children with a migration background: An evaluation using quantile regressions. *Contemporary Educational Psychology, 65*, Article 101973. <https://doi.org/10.1016/j.cedpsych.2021.101973>
- Walper, S., Entleitner-Phleps, C., & Langmeyer, A. (2020). Betreuungsmodelle in Trennungsfamilien: Ein Fokus auf das Wechselmodell [Care models in separation families: A focus on shared parenting arrangements]. *ZSE Zeitschrift für Soziologie der Erziehung und Sozialisation, 1*, 62–80. <https://doi.org/10.3262/ZSE2001062>
- Wang, C., La Salle, T. P., Do, K. A., Wu, C., & Sullivan, K. E. (2019). Does parental involvement matter for students' mental health in middle school? *School Psychology, 34*(2), 222–232. <https://doi.org/10.1037/spq0000300>
- Wang, M.-T., L. Degol, J., Amemiya, J., Parr, A., & Guo, J. (2020). Classroom climate and children's academic and psychological wellbeing: A systematic review and meta-analysis. *Developmental Review, 57*, Article 100912. <https://doi.org/10.1016/j.dr.2020.100912>
- Wenger, M., Gärtner, H., & Brunner, M. (2020). To what extent are characteristics of a school's student body, instructional quality, school quality, and school achievement interrelated? *School Effectiveness and School Improvement, 31*(4), 548–575. <https://doi.org/10.1080/09243453.2020.1754243>
- Whorton, R., Almonte, D., Steiger, D., Robins, C., Gentile, C., & Bertling, J. (2021). Beyond nuclear families: Development of inclusive student socioeconomic status survey questions. *ETS Research Report Series, 2021*(1), 1–25. <https://doi.org/10.1002/ets2.12332>

- Wigfield, A., & Elliot, A. J. (2024). Breaking down silos in motivation science. *Motivation Science*, *10*(3), 155–159. <https://doi.org/10.1037/mot0000342>
- Wilder, S. (2014). Effects of parental involvement on academic achievement: A meta-synthesis. *Educational Review*, *66*(3), 377–397. <https://doi.org/10.1080/00131911.2013.780009>
- Workman, J. (2022). Inequality begets inequality: Income inequality and socioeconomic achievement gradients across the United States. *Social Science Research*, *107*, Article 102744. <https://doi.org/10.1016/j.ssresearch.2022.102744>
- Wundrack, R., Asselmann, E., & Specht, J. (2021). Personality development in disruptive times: The impact of personal versus collective life events. *Social and Personality Psychology Compass*, *15*(9), Article e12635. <https://doi.org/10.1111/spc3.12635>
- Xie, Q.-W., Chan, C. H. Y., Ji, Q., & Chan, C. L. W. (2018). Psychosocial effects of parent-child book reading interventions: A meta-analysis. *Pediatrics*, *141*(4), Article e20172675. <https://doi.org/10.1542/peds.2017-2675>
- Yang, K.-E., & Ham, S.-H. (2017). Truancy as systemic discrimination: Anti-discrimination legislation and its effect on school attendance among immigrant children. *The Social Science Journal*, *54*(2), 216–226. <https://doi.org/10.1016/j.soscij.2017.02.001>
- York, T. T., Gibson, C., & Rankin, S. (2015). Defining and measuring academic success. *Practical Assessment, Research & Evaluation*, *20*(5), 1–20. <https://doi.org/10.7275/HZ5X-TX03>
- Zhang, F., Jiang, Y., Huang, S., Ming, H., Ren, Y., & Wang, L. (2021). Family socioeconomic status, parental involvement, and academic achievement: The moderating role of adolescents' subjective social mobility. *The Journal of Early Adolescence*, *41*(9), 1425–1454. <https://doi.org/10.1177/02724316211002254>

## 5. Appendix

### 5.1 Supplemental Material for Study I

#### 5.1.1 Online Resource 1

**Table S1**

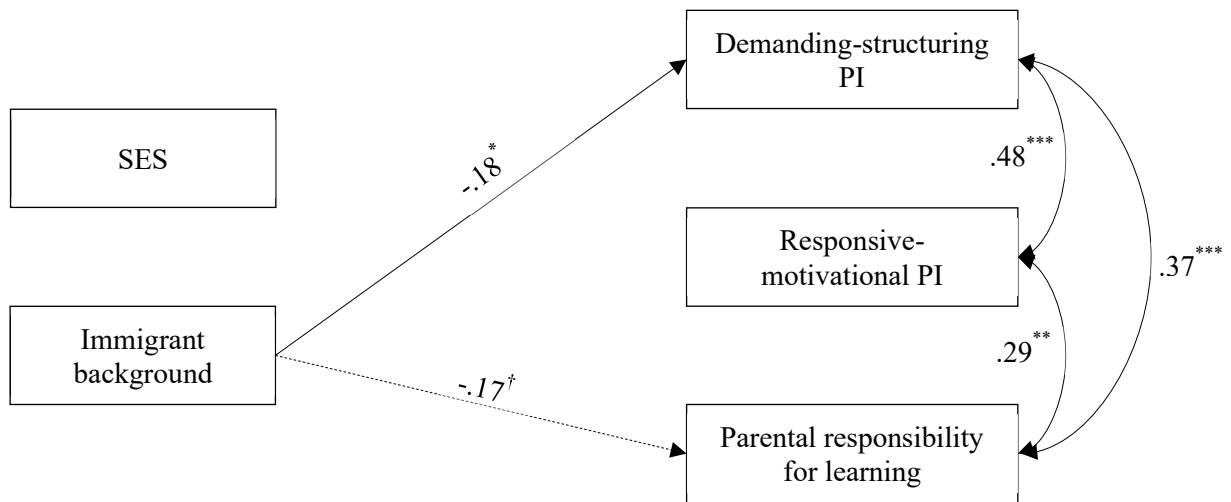
*MANOVA Statistics for the Influence of Gender, Grade and Living in a Single Parent Household on Family Process and Structure Variables*

Measure	<i>V</i>	<i>F</i>	<i>df</i>	<i>p</i>
Family process variables				
Gender	0.02	0.38	6, 208	.893
Grade	0.07	1.30	6, 208	.258
Single parent household	0.09	3.18	3, 103	.027*
Family structure variables				
Gender	0.07	1.27	6, 204	.273
Grade	0.07	1.22	6, 204	.296
Single parent household	0.04	1.32	3, 101	.271

*Note.* MANOVA = Multiple analysis of variance; *V* = Pillai's trace. Operationalization of the measures: Gender (0 = male, 1 = female, 2 = diverse), grade (9 = 9<sup>th</sup> grade, 10 = 10<sup>th</sup> grade, 11 = 11<sup>th</sup> grade), living in a single parent household (0 = living with both parents or other guardians, 1 = living with only one parent)

\*  $p < .05$ .

## 5.1.2 Online Resource 2

**Figure S1***Relations Between Family Structure Variables and Family Process Variables*

*Note.* The influence of living in a single-parent household on family process variables was controlled for. Regression coefficients are standardized. Non-significant paths are not depicted. Dashed arrows represent paths significant at  $p < .10$ .

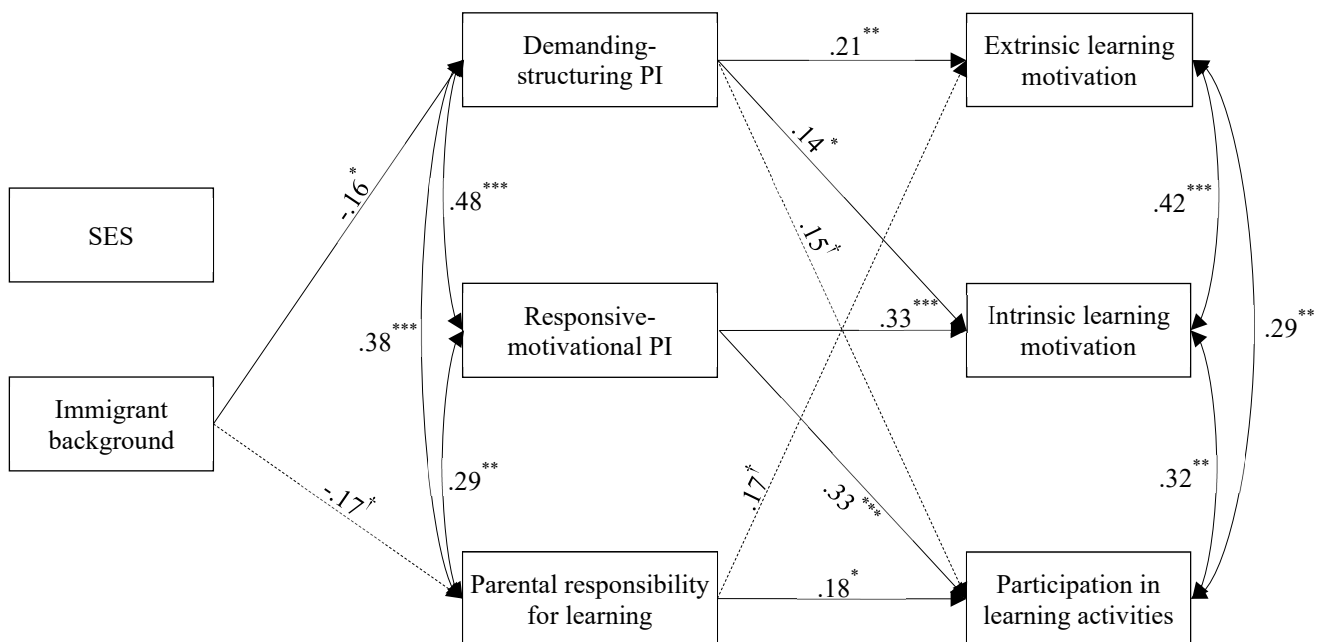
† $p < .10$ . \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### 5.1.3 Online Resource 3

To check whether the potential biases indicated for Model 2 were substantial, we conducted additional analyses using Bayes estimation incorporating prior information for all assumed relations (e.g., Smid et al., 2020) to see whether we could replicate our reported findings. Priors were derived by consulting previous findings in the literature and theoretical assumptions. The posterior predictive p-value ( $PPP = 0.541$ ) indicated good model fit. Results are depicted in Fig. S2. Additionally, we found significant indirect associations of immigrant background with extrinsic ( $\beta = -.06, p = .012$ ) and intrinsic learning motivation ( $\beta = -.06, p = .049$ ), both mainly mediated via demanding-structuring PI.

**Figure S2**

*Relations Between Family Structure Variables and Process Variables and Individual Student Outcomes with Bayesian Estimator (Model 2)*



*Note.* The influence of living in a single-parent household on family process variables was controlled for. Regression coefficients are standardized. Non-significant paths are not depicted. Dashed arrows represent paths significant at  $p < .10$ .

$^\dagger p < .10$ .  $^* p < .05$ .  $^{**} p < .01$ .  $^{***} p < .001$ .



## 5.2 Supplemental Material for Study III

### 5.2.1 Electronic Supplement 1: Additional Information Regarding the First- and Second-Generation Student Subsamples

**Table S1.1**

*Composition of the G1IS Subsample*

Measure	<i>n</i> / <i>M(SD)</i>
Country of origin	
Syria	38
Spain	7
Iraq	6
Romania	6
Poland	5
Türkiye	5
Other European country (EU) <sup>a</sup>	7
Other European country (non-EU) <sup>b</sup>	6
Other non-European country <sup>c</sup>	22
Average years of residence in Germany	6.09 (2.46)

*Notes.* Countries of origin that were reported by at least five students are listed individually.

<sup>a</sup> Including Bulgaria, Croatia, Italy.

<sup>b</sup> Including Bosnia and Herzegovina, Kosovo, North Macedonia, Russia, United Kingdom.

<sup>c</sup> Including Afghanistan, Angola, Cameroon, Eritrea, Ghana, Guinea, India, Iran, Lebanon, Morocco, Nigeria, Somalia, Sudan, Tunisia.

### 5.2.2 Electronic Supplement 2: Correlation Tables for All Measures in the Full Sample and Subsamples

**Table S2.1**

*Item and Scale Information for the Full Sample as well as the G1IS, G2IS, and NIS*

*Subsamples*

Measure	<i>M</i>	<i>SD</i>	$\alpha$	% missing
Family language <sup>a</sup> (1 = mostly German)	<b>0.62</b> 0.34/ 0.64/ 0.88	—	—	<b>1.5</b> 1.0/ 1.5/ 1.0
SES <sup>a</sup> (1 = above-average)	<b>0.41</b> 0.25/ 0.37/ 0.60	—	—	<b>5.9</b> 5.9/ 4.4/ 6.9
Educational aspirations <sup>a</sup> (1 = high aspirations)	<b>0.62</b> 0.61/ 0.71/ 0.57	—	—	<b>9.2</b> 8.8/ 7.4/ 10.9
Parent-child reading	<b>2.82</b> 3.25/ 2.44/ 2.65	<b>1.66</b> 1.57/ 1.64/ 1.70	—	<b>2.6</b> 2.9/ 2.9/ 2.0
Reading competence	<b>11.59</b> 10.01/ 11.93/ 12.95	<b>4.77</b> 4.23/ 4.69/ 4.91	<b>.88</b> .85/ .86/ .90	<b>1.5</b> 2.0/ 0.0/ 2.0
Grade point average	<b>4.37</b> 4.15/ 4.49/ 4.50	<b>0.81</b> 0.78/ 0.77/ 0.82	—	<b>20.7</b> 19.6/ 16.2/ 24.8
Life satisfaction	<b>5.48</b> 5.48/ 5.47/ 5.50	<b>0.59</b> 0.69/ 0.51/ 0.54	<b>.65</b> .70/ .60/ .61	<b>0.4</b> 1.0/ 0.0/ 0.0
Track recommendation <sup>a</sup> (1 = Gymnasium)	<b>0.30</b> 0.19/ 0.42/ 0.32	—	—	<b>16.6</b> 15.7/ 8.8/ 22.8

*Note.* The upper value in each row, printed in bold, depicts the value for the total sample.

Among the lower values in each row, the first refers to the G1IS, the second to the G2IS, and the third to the NIS subsample, respectively.

<sup>a</sup> Dummy-coded binary variable.

**Table S2.2***Correlations of All Measures in the Full Sample*

Measure	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1) Family language <sup>a</sup> (1 = mostly German)	–	.09	.01	-.12*	.17*	.18*	-.00	.06	-.13*
2) SES <sup>a</sup> (1 = above average)		–	-.06	.03	.16*	.15*	.08	.16*	-.14*
3) Educational aspirations <sup>a</sup> (1 = high)			–	-.04	.18*	.41*	.07	.24*	-.07
4) Parent-child reading				–	-.28*	-.13*	.31*	-.12	-.00
5) Reading competence					–	.41*	-.03	.27*	-.18*
6) GPA						–	.11	.64*	-.33*
7) Life satisfaction							–	.01	-.12
8) Track recommendation <sup>a</sup> (1 = Gymnasium)								–	-.26*
9) Age									–

<sup>a</sup> Dummy-coded binary variable.\* $p < .05$ .

**Table S2.3***Correlations of All Measures in the G1IS Subsample*

Measure	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1) Family language <sup>a</sup> (1 = mostly German)	–	-.03	-.05	-.11	.02	.02	-.05	-.02	-.01
2) SES <sup>a</sup> (1 = above average)		–	.06	.03	.05	.14	.03	.23*	-.19
3) Educational aspirations <sup>a</sup> (1 = high)			–	-.03	.25*	.47*	.20	.16	-.09
4) Parent-child reading				–	-.29*	-.11	.32*	-.13	.01
5) Reading competence					–	.43*	.09	.29*	-.27*
6) GPA						–	.12	.59*	-.35*
7) Life satisfaction							–	-.08	-.12
8) Track recommendation <sup>a</sup> (1 = Gymnasium)								–	-.26*
9) Age									–

<sup>a</sup> Dummy-coded binary variable.\* $p < .05$ .

**Table S2.4***Correlations of All Measures in the G2IS Subsample*

Measure	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1) Family language <sup>a</sup> (1 = mostly German)	–	-.04	.11	.07	-.02	.22	.01	.08	-.03
2) SES <sup>a</sup> (1 = above average)		–	-.09	.13	.06	.04	.26*	.10	-.13
3) Educational aspirations <sup>a</sup> (1 = high)			–	-.20	.19	.32*	.04	.30*	.02
4) Parent-child reading				–	-.22	-.24	.32*	-.22	-.09
5) Reading competence					–	.24	-.13	.27*	.02
6) GPA						–	.02	.72*	-.28*
7) Life satisfaction							–	.01	-.18
8) Track recommendation <sup>a</sup> (1 = Gymnasium)								–	-.24
9) Age									–

<sup>a</sup> Dummy-coded binary variable.\* $p < .05$ .

**Table S2.5***Correlations of All Measures in the NIS Subsample*

Measure	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1) Family language <sup>a</sup> (1 = mostly German)	–	-.11	.06	-.10	.16	.07	.05	-.10	-.04
2) SES <sup>a</sup> (1 = above average)		–	-.12	.08	.14	.10	.03	.08	.06
3) Educational aspirations <sup>a</sup> (1 = high)			–	.07	.14	.46*	-.06	.28*	-.09
4) Parent-child reading				–	-.20*	.03	.28*	.04	-.04
5) Reading competence					–	.39*	-.11	.18	-.06
6) GPA						–	.15	.63*	-.23*
7) Life satisfaction							–	.12	-.06
8) Track recommendation <sup>a</sup> (1 = Gymnasium)								–	-.18
9) Age									–

<sup>a</sup> Dummy-coded binary variable.\* $p < .05$ .

### ***5.2.3 Electronic Supplement 3: Robustness Check Comparing First-Generation Immigrant and Native-Born Students***

#### **Interpretation of the Results of the Robustness Check in Comparison to Results of the Main Analyses**

Overall, results of the robustness check comparing G1IS to a combined sample of native-born students (i.e., G2IS and NIS) were comparable to results of the main analyses. Regarding RQ1 (see Table S3.1), we found that G1IS had an on average significantly lower reading competence and GPA, findings that also emerged in the main analyses in comparison to NIS and G2IS. As in the main analysis, no significant group difference emerged in regard to life satisfaction. Finally, G1IS had a significantly lower probability of receiving an academic track recommendation compared to their native-born peers, which was similarly found for G1IS and G2IS in the main analysis. Therefore, results of the robustness check for RQ1 were congruent with the findings reported for the main analyses, which also aligns with the lack of statistically significant differences in all outcomes between G2IS and NIS reported in the manuscript, implying that these students were similar in school success and differences mostly occurred between native-born students and G1IS.

Similarly, model results of the robustness check for RQ2 generally aligned with the main analyses as well (see Table S3.2). Importantly, the unique positive association of educational aspirations and life satisfaction in G1IS was statistically significantly different from the native-born group, where no relation between the two variables emerged, comparable to the main analyses. The largest deviation from the main analyses emerged in the relation of SES and life satisfaction, which had been positive in the G2IS group only and statistically significantly different at the 10% level from associations in the G1IS and NIS groups in the main analyses. In the combined native-born group, the association of the two variables was no longer statistically significantly different from zero, nor from the association found in the G1IS group, as shown by a subsequent Wald test. All in all, we conclude that the results from the robustness check for RQ2 show no strong evidence for a lack of analytic power due to the somewhat smaller subsample sizes in the main analyses, and that the overall benefits of regarding the three groups separately in the main analyses therefore outweigh the potential downsides.

**Table S3.1**

*Results of Regression Analyses Regarding RQ1 (Robustness Check)*

	Reading competence		GPA		Life satisfaction		Track recommendation	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Immigrant status (reference: native-born students)</i>								
First-generation immigrant student	-0.54*	0.14	-0.48*	0.14	-0.02	0.15	-0.51*	0.18
<i>R</i> <sup>2</sup>	.07		.05		.00		.06	

*Note.* Reading competence, GPA, and life satisfaction were standardized before the analyses.

\**p* < 0.05

**Table S3.2**

Results of the Multigroup Comparison of the Path Model Regarding RQ2 (Robustness Check)

	Parent-child reading		Reading competence		GPA		Life satisfaction		Track recommendation	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Family language (1 = mostly German)	-0.31	0.23	-0.04	0.21	0.07	0.19	0.04	0.17	-0.08	0.13
SES (1 = above-average)	0.21	0.32	0.03	0.17	0.12	0.22	-0.13	0.24	0.20	0.13
Educational aspirations (1 = high aspirations)	-0.18	0.23	<b>0.41</b>	0.18	<b>0.91</b>	0.19	<b>0.47<sup>a</sup></b>	0.15	-0.25	0.17
Parent-child reading	-0.02	0.19	<b>0.32</b>	0.15	<b>0.80</b>	0.19	-0.04 <sup>a</sup>	0.17	0.07	0.10
Reading competence	-	-	<b>-0.30</b>	0.09	-0.05	0.11	<b>0.42</b>	0.10	-0.20	0.17
GPA	-	-	<b>-0.22</b>	0.07	-0.11	0.08	<b>0.27</b>	0.08	-0.06	0.11
Control variable: Age	0.08	0.19	-	-	-	-	-	-	0.01	0.21
	-0.16	0.17	-	-	-	-	-	-	-0.01	0.09
	-	-	-	-	-	-	-	-	<b>0.87</b>	0.16
	-	-	-	-	-	-	-	-	<b>0.80</b>	0.08
<i>R</i> <sup>2</sup>	.04 / .02		.22 / .10		.35 / .26		.24 / .10		.83 / .72	

Notes. Statistically significant coefficients are printed in bold.

In each row, the upper value refers to the G1IS group, the lower value to the combined G2IS and NIS (native-born) group. Superscript letters indicate statistically significant different effect sizes between groups (Wald tests) at the 5% error level.

Reading competence, GPA, and life satisfaction were standardized before analyses. Coefficients for track recommendation are also standardized.

Model fit: CFI = 0.995, RMSEA = .046, SRMR = 0.009.

In addition to the results depicted in the table, a significant correlation between reading competence and GPA emerged in the G1IS subgroup ( $r = .23$ ) and in the combined G2IS and NIS (native-born) subgroup ( $r = .22$ ). No other correlations among the independent and dependent variables, respectively, reached statistical significance in any group.

### 5.2.4 Electronic Supplement 4: Tables Depicting Full Results of the Analyses Regarding Research Questions 1 and 2

**Table S4.1**

*Results of Regression Analyses Regarding RQ1*

	Reading				Track			
	competence		GPA		Life satisfaction		recommendation	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<b>Model 1</b>								
<i>Immigrant status (reference: NIS)</i>								
G1IS	<b>-0.63*</b>	0.17	<b>-0.52*</b>	0.15	-0.05	0.17	<b>-0.43</b>	0.23
G2IS	<b>-0.21</b>	0.17	<b>-0.11</b>	0.18	-0.07	0.15	<b>0.19</b>	0.23
<i>R</i> <sup>2</sup>	.08		.06		.00		.06	

*Note.* Reading competence, GPA, and life satisfaction were standardized before the analyses.

Coefficients that are printed bold indicate that differences between first- and second-generation immigrant students were statistically significant.

\* $p < 0.05$ .

**Table S4.2***Results of the Multigroup Comparison of the Path Model Regarding RQ2*

	Sub-group	Parent-child reading		Reading competence		GPA		Life satisfaction		Track recommendation	
		<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Family language (1 = mostly German)	G1IS	-0.31	0.23	-0.04	0.21	0.07	0.19	0.04	0.17	-0.08	0.13
	G2IS	0.21	0.26	-0.02	0.25	<b>0.43</b>	0.22	-0.04	0.22	-0.06	0.12
	NIS	-0.39	0.29	0.43	0.36	0.13	0.31	0.26	0.27	-0.16	0.11
SES (1 = above-average)	G1IS	0.21	0.32	0.03	0.17	0.12	0.22	-0.13 <sup>a</sup>	0.24	0.20	0.13
	G2IS	0.27	0.29	0.22	0.23	0.15	0.24	<b>0.43<sup>a,b</sup></b>	0.18	0.10	0.10
	NIS	0.21	0.28	<b>0.41</b>	0.18	0.37	0.21	0.00 <sup>b</sup>	0.19	0.10	0.12
Educational aspirations (1 = high aspirations)	G1IS	-0.18	0.23	<b>0.41</b>	0.18	<b>0.91</b>	0.19	<b>0.47<sup>c</sup></b>	0.15	-0.25	0.17
	G2IS	-0.41	0.29	0.33	0.26	<b>0.56</b>	0.25	0.24	0.31	0.13	0.12
	NIS	0.23	0.20	0.35	0.22	<b>0.93</b>	0.23	-0.21 <sup>c</sup>	0.19	-0.05	0.15
Parent-child reading	G1IS	-	-	<b>-0.30</b>	0.09	-0.05	0.11	<b>0.42</b>	0.10	-0.20	0.17
	G2IS	-	-	<b>-0.23</b>	0.10	<b>-0.24</b>	0.10	<b>0.26</b>	0.12	-0.11	0.13
	NIS	-	-	-0.20	0.12	-0.05	0.11	<b>0.30</b>	0.10	-0.02	0.14
Reading competence	G1IS	-	-	-	-	-	-	-	-	0.01	0.21
	G2IS	-	-	-	-	-	-	-	-	0.12	0.11
	NIS	-	-	-	-	-	-	-	-	-0.09	0.15
GPA	G1IS	-	-	-	-	-	-	-	-	<b>0.87</b>	0.16
	G2IS	-	-	-	-	-	-	-	-	<b>0.72</b>	0.11
	NIS	-	-	-	-	-	-	-	-	<b>0.89</b>	0.14
Control variable: Age	G1IS	0.08	0.19	<b>-0.40<sup>d</sup></b>	0.13	<b>-0.50</b>	0.16	-0.21	0.16	-0.07	0.15
	G2IS	-0.14	0.24	0.01 <sup>d</sup>	0.21	<b>-0.56</b>	0.23	-0.26	0.28	-0.12	0.13
	NIS	-0.15	0.26	-0.14	0.22	<b>-0.42</b>	0.21	-0.10	0.22	-0.07	0.14
<i>R</i> <sup>2</sup>		.04 / .07 / .04		.22 / .10 / .12		.35 / .28 / .29		.24 / .16 / .10		.83 / .76 / .75	

Notes. Statistically significant coefficients are printed in bold.

[Notes continued on next page]

*Notes [cont.]*. Superscript letters indicate statistically significant different effect sizes between groups (Wald tests) at the 5% error level. Superscript letters printed in italics indicate statistically significant differences at the 10% error level.

Reading competence, GPA, and life satisfaction were standardized before analyses. Coefficients for track recommendation are also standardized.

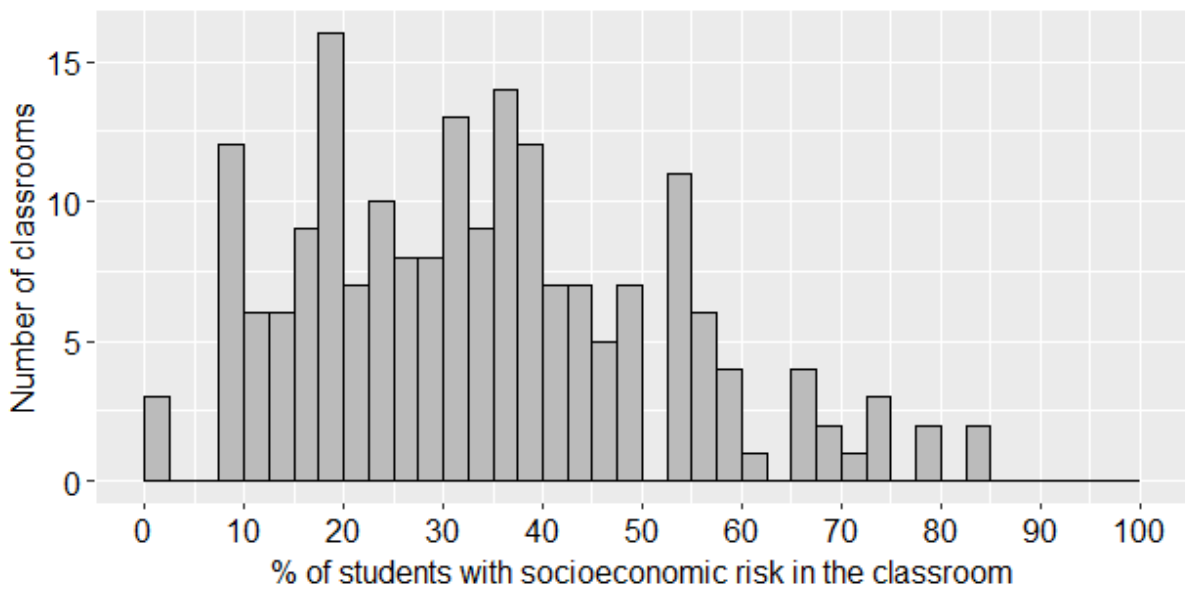
In addition to the results depicted in the table, a significant correlation between reading competence and GPA emerged in the G1IS subgroup ( $r = .23$ ) and in the NIS subgroup ( $r = .27$ ). No other correlations among the independent and dependent variables, respectively, reached statistical significance.

### 5.3 Supplemental Material for Study IV

#### 5.3.1 Online Resource 1: Distribution of the Proportion of Students with Socioeconomic Risk, Language Minority Students, and 1st Generation Immigrant Students in Classrooms

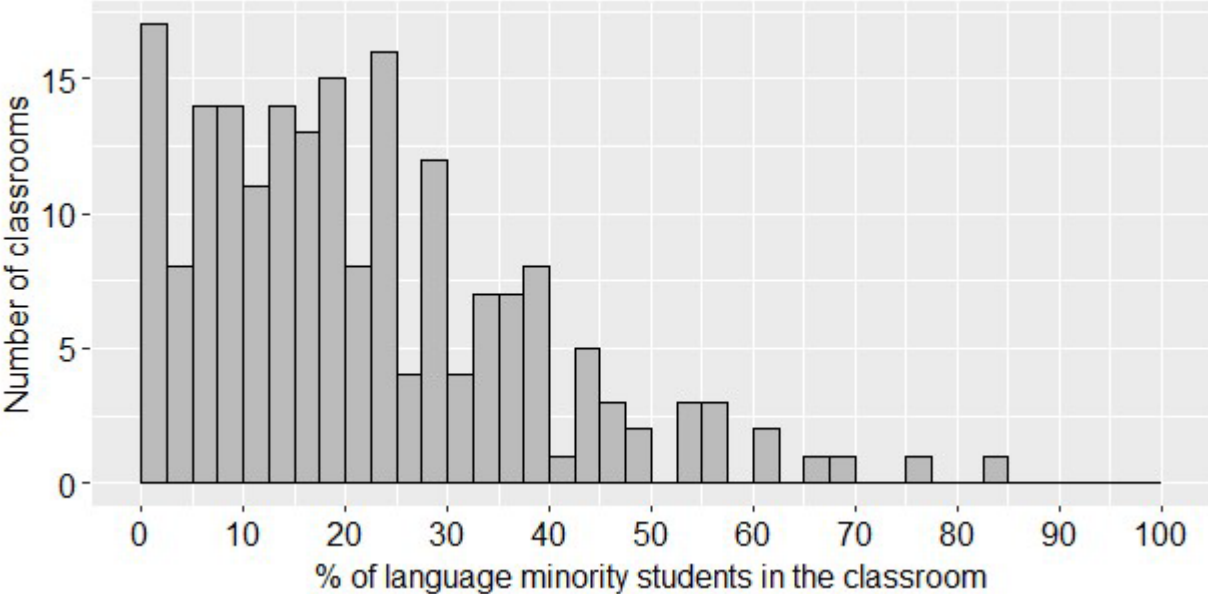
**Figure S1.1**

*Distribution of classrooms based on the proportion of students with socioeconomic risk*



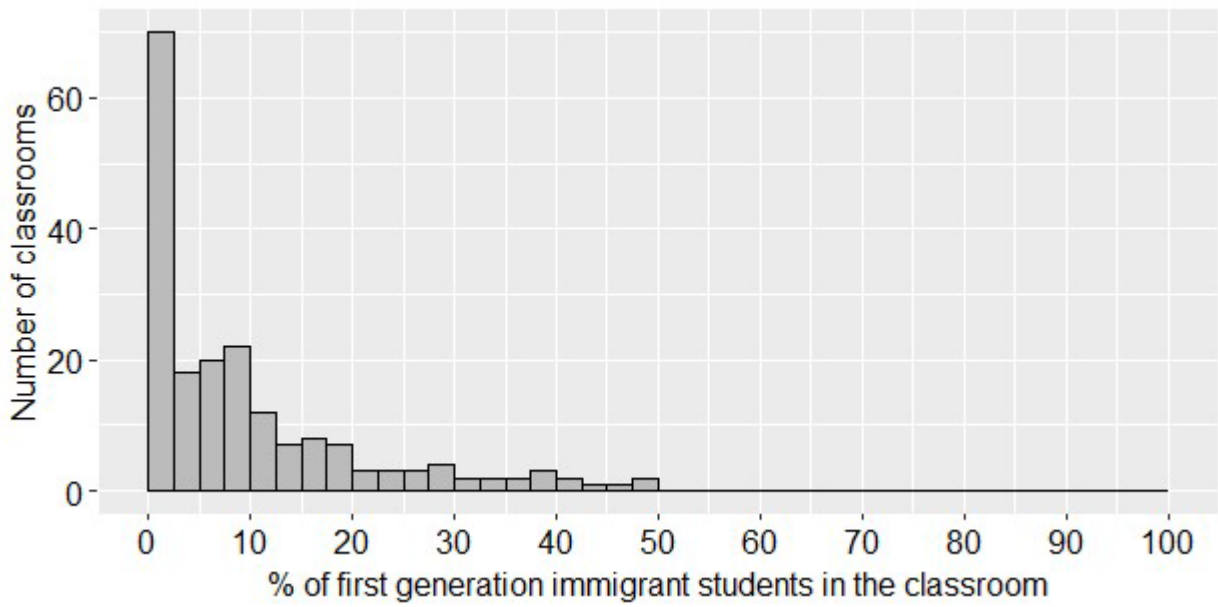
**Figure S1.2**

*Distribution of classrooms based on the proportion of language minority students*



**Figure S1.3**

Distribution of classrooms based on the proportion of 1st generation immigrant students



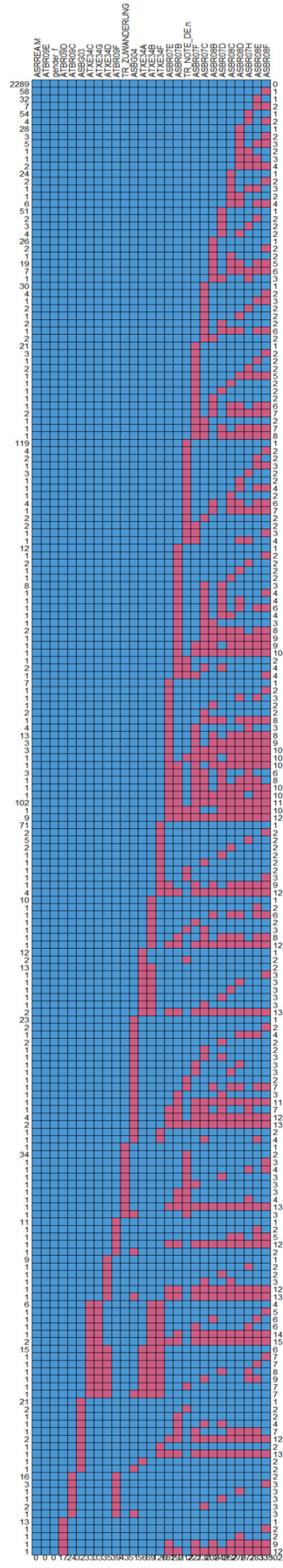
### **5.3.2 Online Resource 2: Information Regarding the Multiple Imputation of Missing Data**

#### **Description of the multilevel multiple imputation**

We used the *mice* package (van Buuren & Groothuis-Oudshoorn, 2011) in R 4.3.1, run in the RStudio environment, to impute missing values (see Figure S2.1 for the missing data pattern) as this allowed us to specify the two-level structure of the dataset in the imputation model. The imputation model also included auxiliary variables that were not part of the analysis models to improve the accuracy of imputation. For each variable that had missing values, we considered appropriate variables from the student, parent, teacher, and principal questionnaires as well as the classroom tracking lists that we expected to relate to the variable in question based on theoretical reasoning and prior empirical findings. The imputation model was built in an iterative process: First, the predictor matrix was built including only the variables of interest. Then, auxiliary variables were included in a stepwise process for each variable of interest to find the best prediction model. The influx-outflux pattern presented in Figure S2.2 shows that a large number of variables with high outflux values, indicating high potential as predictors in imputations of other variables. A number of variables with lower outflux values was kept in the imputation model as well, as these were auxiliary variables that were chosen as predictors for specific variables rather than for their general high predictive potential. Figure S2.3 shows convergence plots for all variables of interest, which imply that healthy convergence was achieved. Finally, density plots of the distribution of observed and imputed values for each variable are depicted in Figure S2.4. Distributions of the imputed values on the variables of interest match the observed distributions well, further indicating that imputation was successful and the imputed data can be used for further analyses.

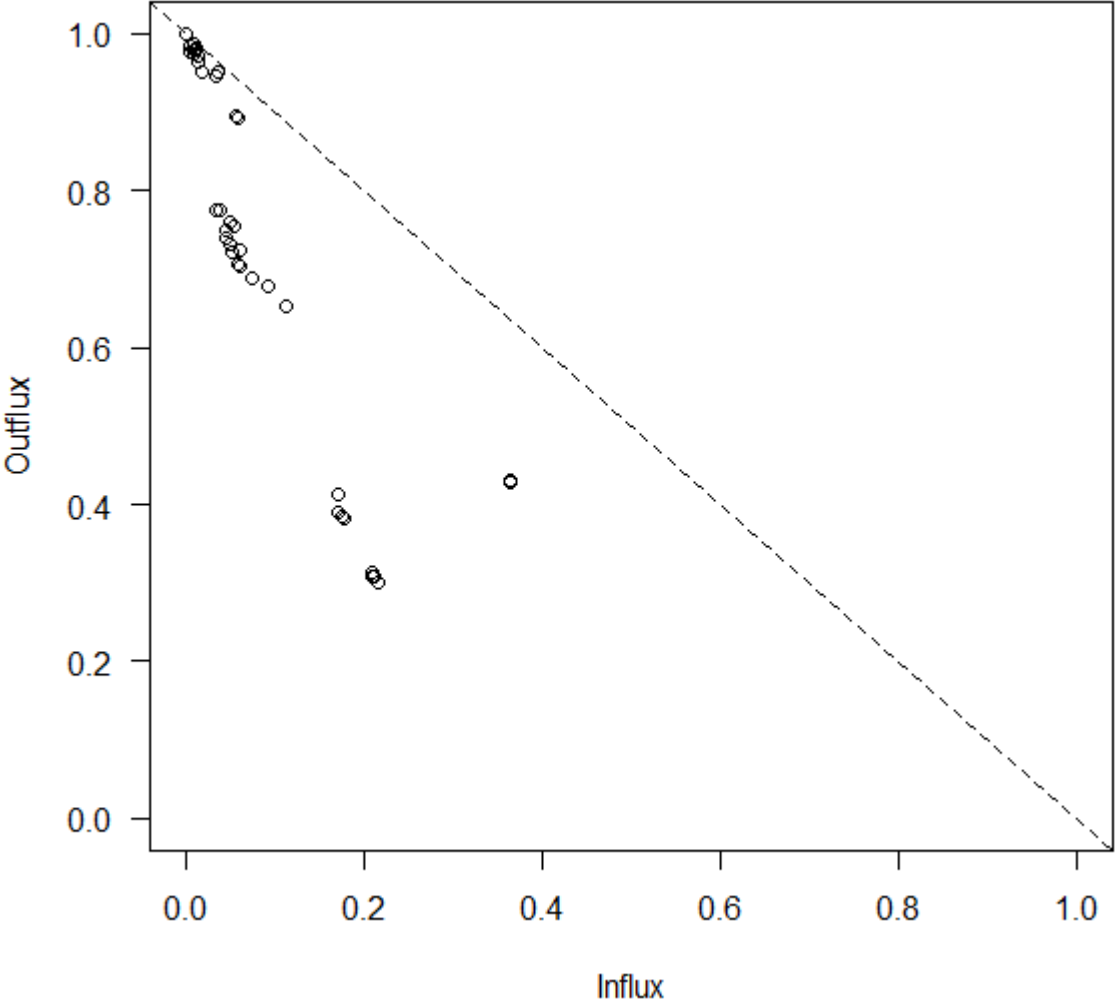
**Figure S2.1**

*Pattern of missing data across all variables of interest*



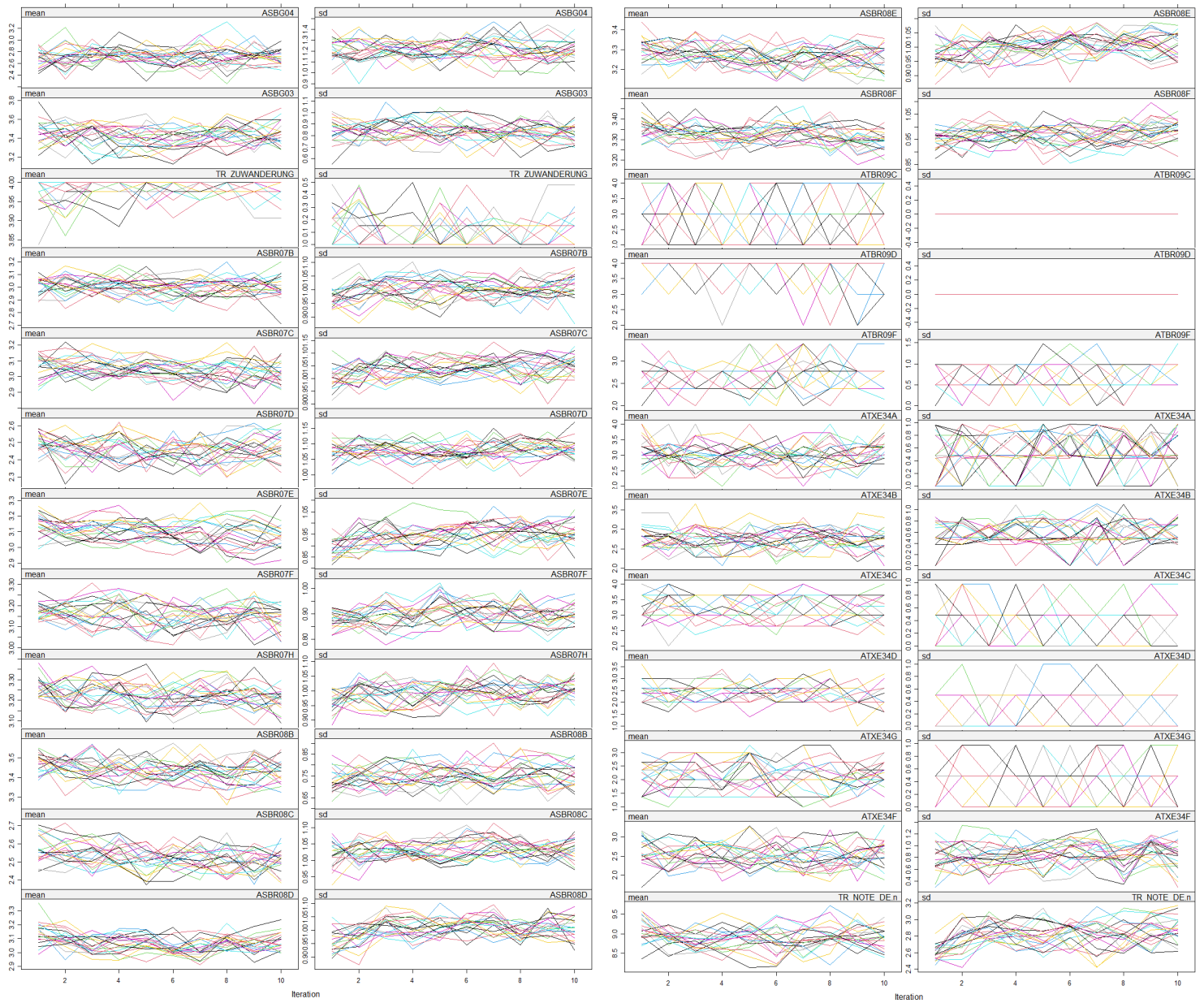
**Figure S2.2**

*Fluxplot of all variables of interest and auxiliary variables used in the final multilevel multiple imputation model*



**Figure S2.3**

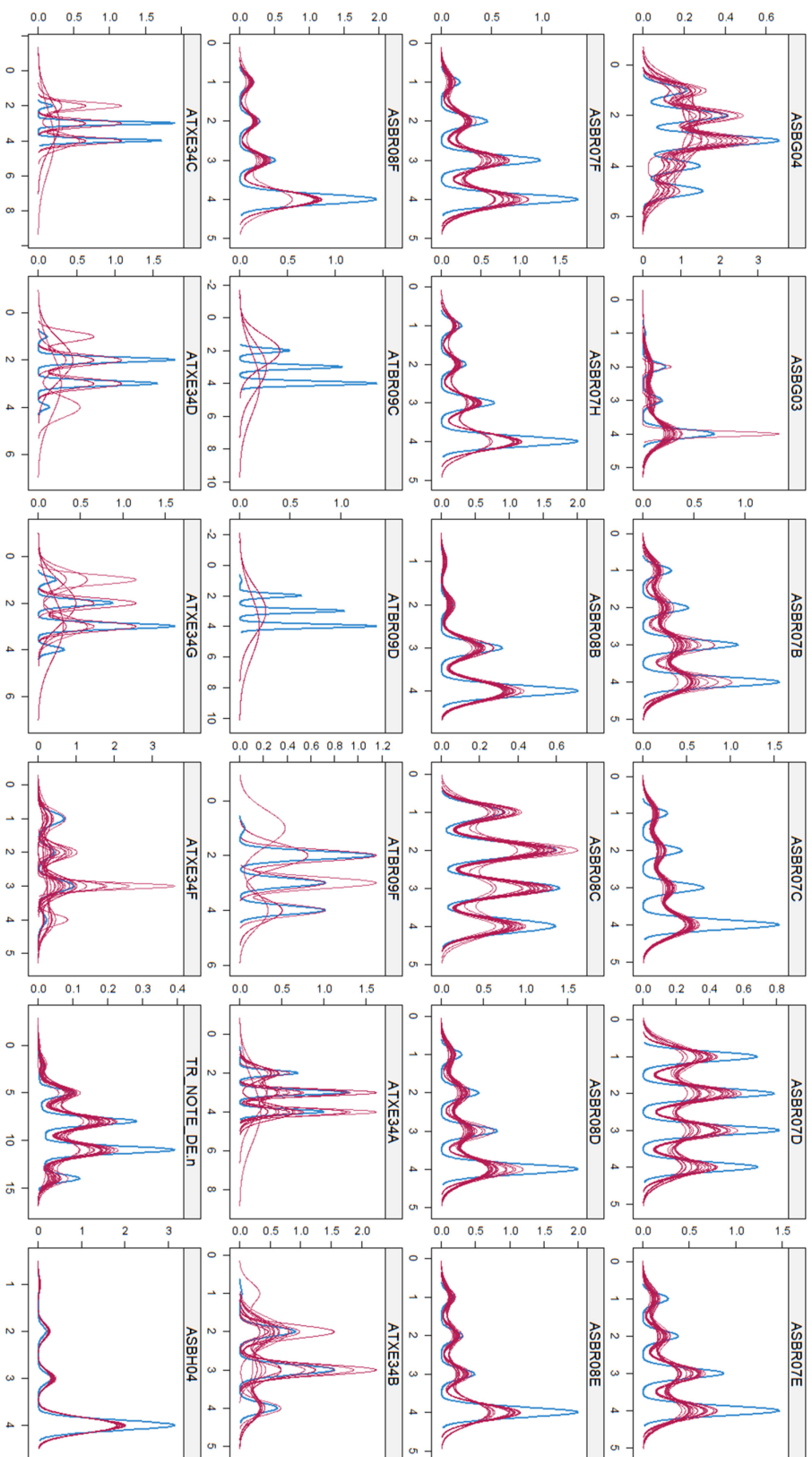
*Convergence plots for the imputation of variables included in the final analyses across ten iterations*



*Note.* Variables with no missing values and auxiliary variables are not shown. Note that variables ATBR09C and ATBR09D only had one missing value on the classroom level each, therefore standard deviation for the imputations of these variables is zero in all iterations.

**Figure S2.4**

*Distribution of imputed values compared to observed values for all variables of interest*



*Note.* Distribution of values in the observed data is depicted as blue line, distribution of imputed values is depicted as red lines, where each line represents one imputed dataset.

### 5.3.3 Online Resource 3: Pre-Analyses of Random Slopes and Cross-Level Interactions of Individual-Level Sociodemographic Factors and Instructional Focus

**Table S3.1**

Results of Pre-analyses Regarding the Association of Socioeconomic Risk with Measures of Reading Literacy and the Moderating Role of Reading-Related Support

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.21*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.11*	0.05	0.04	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.01	0.07	0.15*	0.06	0.05	0.05
<i>Cross-level interactions</i>						
Socioeconomic risk <sub>(L1)</sub> × Reading-related support	-0.06	0.10	0.12	0.10	0.07	0.07
<i>Composition effects</i>						
[P] Socioeconomic risk	-1.00*	0.20	-0.33*	0.15	-0.39*	0.12
[P] Language minority	0.23	0.22	-0.19	0.15	0.34*	0.14
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.72*	0.32	0.20	0.23	-0.31	0.19
<i>Classroom level – Predicting moderating variables</i>						
			Reading-related support			
			<i>b</i>		<i>SE</i>	
[P] Socioeconomic risk			0.51			0.28
[P] Language minority			-0.19			0.30
[P] Immigrant status (1 <sup>st</sup> gen.)			-0.04			0.45

*Note.* To identify all potential interaction effects, the significance of cross-level interactions was tested one-sided and with a significance level of  $\alpha = .10$ .

[P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

**Table S3.2**

*Results of Pre-analyses Regarding the Association of Socioeconomic Risk with Measures of Reading Literacy and the Moderating Role of Support of Language Minority Students (LMS)*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.21*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.11*	0.05	0.03	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.02	0.07	0.15*	0.06	0.06	0.05
<i>Cross-level interactions</i>						
Socioeconomic risk <sub>(L)</sub> × Support of LMS	0.01	0.04	0.00	0.04	0.00	0.03
<i>Composition effects</i>						
[P] Socioeconomic risk	-0.99*	0.20	-0.33*	0.16	-0.39*	0.13
[P] Language minority	0.23	0.22	-0.19	0.15	0.34*	0.14
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.73*	0.32	0.19	0.23	-0.31	0.20
<i>Classroom level – Predicting moderating variables</i>						
	Support of language minority students					
		<i>b</i>			<i>SE</i>	
[P] Socioeconomic risk		0.50			0.50	
[P] Language minority		1.05			0.57	
[P] Immigrant status (1 <sup>st</sup> gen.)		1.90*			0.83	

*Note.* To identify all potential interaction effects, the significance of cross-level interactions was tested one-sided and with a significance level of  $\alpha = .10$ .

[P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

**Table S3.3**

*Results of Pre-analyses Regarding the Association of Socioeconomic Risk with Measures of Reading Literacy and the Moderating Role of Cognitive Activation*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.21*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.11*	0.05	0.03	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.02	0.07	0.15*	0.06	0.05	0.05
<i>Cross-level interactions</i>						
Socioeconomic risk <sub>(L1)</sub> × Cognitive activation	-0.02	0.13	0.13	0.12	-0.03	0.09
<i>Composition effects</i>						
[P] Socioeconomic risk	-1.00*	0.20	-0.34*	0.16	-0.40*	0.13
[P] Language minority	0.23	0.22	-0.19	0.15	0.35*	0.14
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.72*	0.32	0.20	0.23	-0.32	0.20
<i>Classroom level – Predicting moderating variables</i>						
			Cognitive activation			
		<i>b</i>		<i>SE</i>		
[P] Socioeconomic risk		-0.03		0.20		
[P] Language minority		0.11		0.22		
[P] Immigrant status (1 <sup>st</sup> gen.)		-0.35		0.33		

*Note.* To identify all potential interaction effects, the significance of cross-level interactions was tested one-sided and with a significance level of  $\alpha = .10$ .

[P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

**Table S3.4**

*Results of Pre-analyses Regarding the Association of Language Minority Status with Measures of Reading Literacy and the Moderating Role of Reading-Related Support*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.20*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.11*	0.05	0.03	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.02	0.07	0.15*	0.06	0.06	0.05
<i>Cross-level interactions</i>						
Language minority <sub>(L1)</sub> × Reading-related support	0.15 <sup>†</sup>	0.12	0.01	0.11	0.02	0.08
<i>Composition effects</i>						
[P] Socioeconomic risk	-1.00*	0.20	-0.33*	0.16	-0.39*	0.13
[P] Language minority	0.22	0.22	-0.19	0.15	0.34*	0.14
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.72*	0.32	0.19	0.23	-0.32	0.20
<i>Classroom level – Predicting moderating variables</i>						
			Reading-related support			
		<i>b</i>		<i>SE</i>		
[P] Socioeconomic risk		0.52		0.29		
[P] Language minority		-0.18		0.31		
[P] Immigrant status (1 <sup>st</sup> gen.)		-0.04		0.46		

*Note.* To identify all potential interaction effects, the significance of cross-level interactions was tested one-sided and with a significance level of  $\alpha = .10$ .

[P] = Proportion of students with this marker in the classroom.

<sup>†</sup> $p < .10$ . \* $p < .05$ .

**Table S3.5**

*Results of Pre-analyses Regarding the Association of Language Minority Status with Measures of Reading Literacy and the Moderating Role of Support of Language Minority Students (LMS)*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.21*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.12*	0.05	0.03	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.02	0.07	0.15*	0.06	0.06	0.05
<i>Cross-level interactions</i>						
Language minority <sub>(L1)</sub> × Support of LMS	0.03	0.05	0.02	0.04	0.01	0.03
<i>Composition effects</i>						
[P] Socioeconomic risk	-0.99*	0.20	-0.33*	0.16	-0.39*	0.12
[P] Language minority	0.23	0.22	-0.19	0.15	0.34*	0.14
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.72*	0.32	0.19	0.23	-0.32	0.20
<i>Classroom level – Predicting moderating variables</i>						
	Support of language minority students					
	<i>b</i>		<i>SE</i>			
[P] Socioeconomic risk	0.50		0.50			
[P] Language minority	1.05		0.57			
[P] Immigrant status (1 <sup>st</sup> gen.)	1.90*		0.83			

*Note.* To identify all potential interaction effects, the significance of cross-level interactions was tested one-sided and with a significance level of  $\alpha = .10$ .

[P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

**Table S3.6**

*Results of Pre-analyses Regarding the Association of Language Minority Status with Measures of Reading Literacy and the Moderating Role of Cognitive Activation*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.21*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.11*	0.05	0.03	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.02	0.07	0.15*	0.06	0.05	0.05
<i>Cross-level interactions</i>						
Language minority <sub>(LI)</sub> × Cognitive activation	0.16	0.15	-0.00	0.13	-0.04	0.10
<i>Composition effects</i>						
[P] Socioeconomic risk	-1.00*	0.20	-0.33*	0.15	-0.39*	0.13
[P] Language minority	0.23	0.22	-0.19	0.15	0.35*	0.14
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.73*	0.32	0.19	0.23	-0.32	0.20
<i>Classroom level – Predicting moderating variables</i>						
	Cognitive activation					
	<i>b</i>		<i>SE</i>			
[P] Socioeconomic risk	-0.03		0.20			
[P] Language minority	0.12		0.22			
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.36		0.33			

*Note.* To identify all potential interaction effects, the significance of cross-level interactions was tested one-sided and with a significance level of  $\alpha = .10$ .

[P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

**Table S3.7**

*Results of Pre-analyses Regarding the Association of Immigrant Status (1<sup>st</sup> gen.) with Measures of Reading Literacy and the Moderating Role of Reading-Related Support*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.20*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.11*	0.05	0.04	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.01	0.08	0.15*	0.07	0.06	0.05
<i>Cross-level interactions</i>						
Immigrant status (1 <sup>st</sup> gen.) <sub>(L1)</sub> × Reading-related support	0.25 <sup>†</sup>	0.18	0.06	0.15	0.14	0.12
<i>Composition effects</i>						
[P] Socioeconomic risk	-1.00*	0.20	-0.33*	0.16	-0.39*	0.13
[P] Language minority	0.22	0.22	-0.20	0.15	0.34*	0.14
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.71*	0.32	0.19	0.24	-0.32	0.20
<i>Classroom level – Predicting moderating variables</i>						
	Reading-related support					
	<i>b</i>		<i>SE</i>			
[P] Socioeconomic risk	0.52		0.29			
[P] Language minority	-0.18		0.31			
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.04		0.46			

*Note.* To identify all potential interaction effects, the significance of cross-level interactions was tested one-sided and with a significance level of  $\alpha = .10$ .

[P] = Proportion of students with this marker in the classroom.

<sup>†</sup> $p < .10$ . \* $p < .05$ .

**Table S3.8**

*Results of Pre-analyses Regarding the Association of Immigrant Status (1<sup>st</sup> gen.) with Measures of Reading Literacy and the Moderating Role of Support of Language Minority Students (LMS)*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.21*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.11*	0.05	0.04	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	-0.02	0.08	0.17*	0.07	0.08	0.05
<i>Cross-level interactions</i>						
Immigrant status (1 <sup>st</sup> gen.) <sub>(L1)</sub> × Support of LMS	0.07	0.07	-0.06	0.06	-0.07 <sup>†</sup>	0.05
<i>Composition effects</i>						
[P] Socioeconomic risk	-0.99*	0.20	-0.33*	0.16	-0.39*	0.12
[P] Language minority	0.23	0.22	-0.20	0.15	0.34*	0.14
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.69*	0.32	0.17	0.24	-0.34	0.20
<i>Classroom level – Predicting moderating variables</i>						
	Support of language minority students					
	<i>b</i>		<i>SE</i>			
[P] Socioeconomic risk	0.50		0.50			
[P] Language minority	1.05		0.57			
[P] Immigrant status (1 <sup>st</sup> gen.)	1.90*		0.83			

*Note.* To identify all potential interaction effects, the significance of cross-level interactions was tested one-sided and with a significance level of  $\alpha = .10$ .

[P] = Proportion of students with this marker in the classroom.

<sup>†</sup> $p < .10$ . \* $p < .05$ .

**Table S3.9**

*Results of Pre-analyses Regarding the Association of Immigrant Status (1<sup>st</sup> gen.) with Measures of Reading Literacy and the Moderating Role of Cognitive Activation*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level</i>						
Socioeconomic risk	-0.20*	0.05	-0.38*	0.04	-0.10*	0.03
Language minority	-0.11*	0.05	0.04	0.04	-0.02	0.03
Immigrant status (1 <sup>st</sup> gen.)	0.00	0.08	0.15*	0.07	0.06	0.05
<i>Cross-level interactions</i>						
Immigrant status (1 <sup>st</sup> gen.) <sub>(L1)</sub> × Cognitive activation	-0.01	0.26	0.03	0.20	0.05	0.15
<i>Composition effects</i>						
[P] Socioeconomic risk	-1.00*	0.20	-0.33*	0.15	-0.39*	0.13
[P] Language minority	0.23	0.22	-0.20	0.15	0.35*	0.14
[P] Immigrant status (1 <sup>st</sup> gen.)	-0.71*	0.32	0.19	0.23	-0.32	0.20
<i>Classroom level – Predicting moderating variables</i>						
			Cognitive activation			
		<i>b</i>		<i>SE</i>		
[P] Socioeconomic risk		-0.03		0.20		
[P] Language minority		0.12		0.22		
[P] Immigrant status (1 <sup>st</sup> gen.)		-0.36		0.33		

*Note.* To identify all potential interaction effects, the significance of cross-level interactions was tested one-sided and with a significance level of  $\alpha = .10$ .

[P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

### 5.3.4 Online Resource 4: Mplus syntaxes for analysis Models 1–3

#### Annotated Mplus syntax for Model 1

TITLE: DEMOGRAPHIC DIVERSITY, READING LITERACY, AND INSTRUCTIONAL FOCUS

Research Question 1

Independent Variables (classroom & individual level):

Socioeconomic risk [SER],  
Language minority status [LMS],  
First-generation immigrant status [MIG]

Dependent Variables (classroom & individual level):

Reading competence [READ],  
Reading enjoyment [RMOT],  
Reading self-concept [RASC]

Control Variables (classroom & individual level):

Previous achievement [GRADE],  
Female gender [GENDF]

Latent-measurement/manifest-aggregation modelling

DATA:

FILE = implist001100.dat;  
TYPE = imputation;

VARIABLE:

NAMES = IDSTUD IDCLASS  
ASBG04 ASBG03 TR\_MIG  
ASRREA  
ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H  
ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F  
ATBR09C ATBR09D ATBR09E ATBR09F  
ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G ATXE34F  
GRADE GENDF  
ASXE04A ASBH02A ASXE02 ASBH04 ASXE18B ASBR08A  
ASXE25A ASXE25B ASXE25C ASXE25D TR\_ARB  
ASXE20B ASXE20C ASXE20D GRADE\_MA  
TOTWGT TCHWGT  
ASRREA\_M;

USEVAR = ASRREA  
ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H  
ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F  
GRADE GENDF  
SER LMS MIG  
SER\_c1 LMS\_c1 MIG\_c1 GRADE\_c1 GENDF\_c1;

CLUSTER = IDCLASS;

WITHIN = SER LMS MIG GRADE GENDF;

BETWEEN = SER\_c1 LMS\_c1 MIG\_c1 GRADE\_c1 GENDF\_c1;

DEFINE:

```

IF (ASBG04 <= 2) THEN SER = 1;
IF (ASBG04 >= 3) THEN SER = 0;
IF (ASBG03 <= 2) THEN LMS = 1;
IF (ASBG03 >= 3) THEN LMS = 0;
IF (TR_MIG <= 3) THEN MIG = 1;
IF (TR_MIG == 4) THEN MIG = 0;

center SER LMS MIG GRADE GENDF (groupmean);

```

```

SER_cl   = cluster_mean(SER);
LMS_cl   = cluster_mean(LMS);
MIG_cl   = cluster_mean(MIG);
GRADE_cl = cluster_mean(GRADE);
GENDF_cl = cluster_mean(GENDF);

```

```

standardize ASRREA;
standardize ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H;
standardize ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F;

```

ANALYSIS:

```

TYPE           = twolevel;

```

MODEL:

```

!! Measurement error for single indicators:
!!   F by Y@1; Y@theta  -> with theta = (1-reliability)*sample variance
!! Reliability of single indicators in the model is estimated as follows:
!!   For student variables, a standard estimate of .85 is used
!!   Exception: Gender is assumed to be reliably reported, therefore rel =
1
!!   Immigration is rated by teachers who have access to information
regarding
!!   that aspect and therefore assumed to give highly reliable answers
!!   Grades are assumed to be reported with high precision but since there
are
!!   factors beside the actual previous achievement influencing the
grades,
!!   reliability is set lower
!!   For reading competence, plausible values are used instead of
competence
!!   estimates, which is a different way to handle measurement insecurity.
!!   Therefore, reliability is assumed to be 1 to avoid overestimation of
!!   measurement error

!! See Marsh & Lüdtke (2009), Marsh et al. (2012) and
!! Becker et al. (2022) for model specifications

```

%within%

```

SERw  by SER@1;    SER@.031;    ! rel(estimated) = .85, var = 0.205
LMSw  by LMS@1;    LMS@.023;    ! rel(estimated) = .85, var = 0.152
MIGw  by MIG@1;    MIG@.008;    ! rel(estimated) = .95, var = 0.169
GRADEw by GRADE@1; GRADE@.944; ! rel(estimated) = .85, var = 6.296
GENDFw by GENDF@1; GENDF@.00;  ! rel(estimated) = 1

```

```

READw  by ASRREA@1; ASRREA@.00; ! rel(estimated) = 1
RMOTw  by ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H;
RASCw  by ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F;

```

```

SERw   with LMSw MIGw GRADEw;
LMSw   with MIGw GRADEw;
MIGw   with GRADEw;

```

```

READw  with RMOTw RASCw;
RMOTw  with RASCw;

```

```

READw  on SERw   (READSERw);
READw  on LMSw   (READLMSw);
READw  on MIGw   (READMIGw);
READw  on GRADEw (READGRAw);
READw  on GENDFw (READGENw);

```

```

RMOTw  on SERw   (RMOTSERw);
RMOTw  on LMSw   (RMOTLMSw);
RMOTw  on MIGw   (RMOTMIGw);
RMOTw  on GRADEw (RMOTGRAw);
RMOTw  on GENDFw (RMOTGENw);

```

```

RASCw  on SERw   (RASCSEw);
RASCw  on LMSw   (RASCLMSw);
RASCw  on MIGw   (RASC MIGw);
RASCw  on GRADEw (RASC GRAw);
RASCw  on GENDFw (RASC GENw);

```

%between%

```

SERb   by SER_cl@1;   SER_cl@.00;
LMSb   by LMS_cl@1;   LMS_cl@.00;
MIGb   by MIG_cl@1;   MIG_cl@.00;
GRADEb by GRADE_cl@1; GRADE_cl@.00;
GENDFb by GENDF_cl@1; GENDF_cl@.00;

```

```

READb  by ASRREA@1;   ASRREA@.00;
RMOTb  by ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H;
RASCb  by ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F;

```

```

SERb   with LMSb MIGb GRADEb;
LMSb   with MIGb GRADEb;
MIGb   with GRADEb;

```

```

READb  with RMOTb RASCb;
RMOTb  with RASCb;

```

```

READb  on SERb   (READSERb);
READb  on LMSb   (READLMSb);
READb  on MIGb   (READMIGb);
READb  on GRADEb (READGRAb);
READb  on GENDFb (READGENb);

```

```

RMOTb  on SERb   (RMOTSERb);
RMOTb  on LMSb   (RMOTLMSb);

```

```

RMOTb  on MIGb    (RMOTMIGb) ;
RMOTb  on GRADEb (RMOTGRAb) ;
RMOTb  on GENDFb (RMOTGENb) ;

RASCb  on SERb    (RASCSErB) ;
RASCb  on LMSb    (RASCLMSb) ;
RASCb  on MIGb    (RASCMIgB) ;
RASCb  on GRADEb (RASCGRAb) ;
RASCb  on GENDFb (RASCGENb) ;

```

MODEL CONSTRAINT:

```

new (READSERc READLMSc READMIGc) ;
new (RASCSErC RASCLMSc RASCMIgC) ;
new (RMOTSErC RMOTLMSc RMOTMIgC) ;
new (READGRAc RMOTGRAc RASCGRAc) ;
new (READGENc RMOTGENc RASCGENc) ;

READSERc = READSERb-READSERw ;
READLMSc = READLMSb-READLMSw ;
READMIGc = READMIGb-READMIGw ;
READGRAc = READGRAb-READGRAw ;
READGENc = READGENb-READGENw ;

RMOTSErC = RMOTSErB-RMOTSErW ;
RMOTLMSc = RMOTLMSb-RMOTLMSw ;
RMOTMIgC = RMOTMIgB-RMOTMIgW ;
RMOTGRAc = RMOTGRAb-RMOTGRAw ;
RMOTGENc = RMOTGENb-RMOTGENw ;

RASCSErC = RASCSErB-RASCSErW ;
RASCLMSc = RASCLMSb-RASCLMSw ;
RASCMIgC = RASCMIgB-RASCMIgW ;
RASCGRAc = RASCGRAb-RASCGRAw ;
RASCGENc = RASCGENb-RASCGENw ;

```

OUTPUT: stdyx sampstat;

**Annotated Mplus syntax for Model 2**

TITLE: DEMOGRAPHIC DIVERSITY, READING LITERACY, AND INSTRUCTIONAL FOCUS

Research Question 2

Independent Variables (classroom & individual level):

Socioeconomic risk [SER],  
Language minority status [LMS],  
First-generation immigrant status [MIG]

Dependent Variables (classroom & individual level):

Reading competence [READ],  
Reading enjoyment [RMOT],  
Reading self-concept [RASC]

Mediating Variables (classroom level):

Reading-related support [TBAS]  
Support of language-minority students [TLMS]  
Cognitive activation [TCOA]

Control Variables (classroom & individual level):

Previous achievement [GRADE],  
Female gender [gender\_f]

Latent-measurement/manifest-aggregation modelling

DATA:

FILE = implist001100.dat;  
TYPE = imputation;

VARIABLE:

NAMES = IDSTUD IDCLASS  
ASBG04 ASBG03 TR\_MIG  
ASRREA  
ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H  
ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F  
ATBR09C ATBR09D ATBR09E ATBR09F  
ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G ATXE34F  
GRADE GENDF  
ASXE04A ASBH02A ASXE02 ASBH04 ASXE18B ASBR08A  
ASXE25A ASXE25B ASXE25C ASXE25D TR\_ARB  
ASXE20B ASXE20C ASXE20D GRADE\_MA  
TOTWGT TCHWGT  
ASRREA\_M;

USEVAR = ASRREA  
ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H  
ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F  
ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G  
ATBR09C ATBR09D ATBR09E ATBR09F  
ATXE34F  
GRADE GENDF  
SER LMS MIG  
SER\_c1 LMS\_c1 MIG\_c1 GRADE\_c1 GENDF\_c1;

CLUSTER = IDCLASS;

WITHIN = SER LMS MIG GRADE GENDF;

```

BETWEEN = ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G
          ATBR09C ATBR09D ATBR09E ATBR09F
          ATXE34F
          SER_cl LMS_cl MIG_cl GRADE_cl GENDF_cl;

```

DEFINE:

```

IF (ASBG04 <= 2) THEN SER = 1;
IF (ASBG04 >= 3) THEN SER = 0;
IF (ASBG03 <= 2) THEN LMS = 1;
IF (ASBG03 >= 3) THEN LMS = 0;
IF (TR_MIG <= 3) THEN MIG = 1;
IF (TR_MIG == 4) THEN MIG = 0;

```

```

center SER LMS MIG GRADE GENDF (groupmean);
center ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G
        ATBR09C ATBR09D ATBR09E ATBR09F
        ATXE34F (grandmean);

```

```

SER_cl    = cluster_mean(SER);
LMS_cl    = cluster_mean(LMS);
MIG_cl    = cluster_mean(MIG);
GRADE_cl  = cluster_mean(GRADE);
GENDF_cl  = cluster_mean(GENDF);

```

```

standardize ASRREA;
standardize ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H;
standardize ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F;

```

```

standardize ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G;
standardize ATBR09C ATBR09D ATBR09E ATBR09F;
standardize ATXE34F;

```

ANALYSIS:

```

TYPE          = twolevel;

```

MODEL:

```

!! Measurement error for single indicators:
!!   F by Y@1; Y@theta  -> with theta = (1-reliability)*sample variance
!! Reliability of single indicators in the model is estimated as follows:
!!   For student variables, a standard estimate of .85 is used
!!   Exception: Gender is assumed to be reliably reported, therefore rel =
1
!!   Immigration is rated by teachers who have access to information
regarding
!!   that aspect and therefore assumed to give highly reliable answers
!!   Grades are assumed to be reported with high precision but since there
are
!!   factors beside the actual previous achievement influencing the
grades,
!!   reliability is set lower
!!   For reading competence, plausible values are used instead of
competence
!!   estimates, which is a different way to handle measurement insecurity.
!!   Therefore, reliability is assumed to be 1 to avoid overestimation of

```

```
!! measurement error
```

```
!! See Marsh & Lüdtke (2009), Marsh et al. (2012) and
!! Becker et al. (2022) for model specifications
```

```
%within%
```

```
SERw by SER@1; SER@.031; ! rel(estimated) = .85, var = 0.205
LMSw by LMS@1; LMS@.023; ! rel(estimated) = .85, var = 0.152
MIGw by MIG@1; MIG@.008; ! rel(estimated) = .95, var = 0.169
GRADEw by GRADE@1; GRADE@.944; ! rel(estimated) = .85, var = 6.296
GENDFw by GENDF@1; GENDF@.00; ! rel(estimated) = 1
```

```
READw by ASRREA@1; ASRREA@.00; ! rel(estimated) = 1
RMOTw by ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H;
RASCw by ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F;
```

```
SERw with LMSw MIGw GRADEw;
LMSw with MIGw GRADEw;
MIGw with GRADEw;
```

```
READw with RMOTw RASCw;
RMOTw with RASCw;
```

```
READw on SERw (READSERw);
READw on LMSw (READLMSw);
READw on MIGw (READMIGw);
READw on GRADEw (READGRAw);
READw on GENDFw (READGENw);
```

```
RMOTw on SERw (RMOTSERw);
RMOTw on LMSw (RMOTLMSw);
RMOTw on MIGw (RMOTMIGw);
RMOTw on GRADEw (RMOTGRAw);
RMOTw on GENDFw (RMOTGENw);
```

```
RASCw on SERw (RASC SERw);
RASCw on LMSw (RASC LMSw);
RASCw on MIGw (RASC MIGw);
RASCw on GRADEw (RASC GRAw);
RASCw on GENDFw (RASC GENw);
```

```
%between%
```

```
SERb by SER_c1; SER_c1@.00;
LMSb by LMS_c1; LMS_c1@.00;
MIGb by MIG_c1; MIG_c1@.00;
GRADEb by GRADE_c1; GRADE_c1@.00;
GENDFb by GENDF_c1; GENDF_c1@.00;
```

```
READb by ASRREA; ASRREA@.00;
RMOTb by ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H;
RASCb by ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F;
```

```
TBAS by ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G;
TCOA by ATBR09C ATBR09D ATBR09E ATBR09F;
TLMS by ATXE34F; ATXE34F@.00;
```

SERb with LMSb MIGb GRADEb;  
 LMSb with MIGb GRADEb;  
 MIGb with GRADEb;

READb with RMOTb RASCb;  
 RMOTb with RASCb;

TBAS with TCOA TLMS;  
 TCOA with TLMS;

READb on SERb (READSERb);  
 READb on LMSb (READLMSb);  
 READb on MIGb (READMIGb);  
 READb on GRADEb (READGRAb);  
 READb on GENDFb (READGENb);

RMOTb on SERb (RMOTSERb);  
 RMOTb on LMSb (RMOTLMSb);  
 RMOTb on MIGb (RMOTMIGb);  
 RMOTb on GRADEb (RMOTGRAb);  
 RMOTb on GENDFb (RMOTGENb);

RASCb on SERb (RASC SERb);  
 RASCb on LMSb (RASCLMSb);  
 RASCb on MIGb (RASC MIGb);  
 RASCb on GRADEb (RASC GRAb);  
 RASCb on GENDFb (RASC GENb);

!! Mediator effects

TBAS on SERb (SERTBAS);  
 TBAS on LMSb (LMSTBAS);  
 TBAS on MIGb (MIGTBAS);  
 TBAS on GRADEb (GRATBAS);

TCOA on SERb (SERTCOA);  
 TCOA on LMSb (LMSTCOA);  
 TCOA on MIGb (MIGTCOA);  
 TCOA on GRADEb (GRATCOA);

TLMS on SERb (SERTLMS);  
 TLMS on LMSb (LMSTLMS);  
 TLMS on MIGb (MIGTLMS);  
 TLMS on GRADEb (GRATLMS);

READb on TBAS (TBASREAD);  
 RMOTb on TBAS (TBASRMOT);  
 RASCb on TBAS (TBASRASC);

READb on TCOA (TCOAREAD);  
 RMOTb on TCOA (TCOARMOT);  
 RASCb on TCOA (TCOARASC);

READb on TLMS (TLMSREAD);  
 RMOTb on TLMS (TLMSRMOT);  
 RASCb on TLMS (TLMSRASC);

MODEL CONSTRAINT:

!! Defining composition effects  
!! Names are: [DV][IV]c

```
new(READSERc READLMSc READMIGc
    RASCSErc RASCLMSc RASCMIGc
    RMOTSErc RMOTLMSc RMOTMIGc
    READGRac RMOTGRac RASCGRac
    READGENc RMOTGENc RASCGENc);
```

!! Defining mediated effects  
!! Names are: [DV]\_[IV]\_[MV]  
!! with MVs: B = Reading-related support [TBAS]  
!! C = Cognitive activation [TCOA]  
!! L = Support of language-minority students [TLMS]

```
new(REA_SE_B REA_LM_B REA_MI_B
    MOT_SE_B MOT_LM_B MOT_MI_B
    ASC_SE_B ASC_LM_B ASC_MI_B
    REA_SE_C REA_LM_C REA_MI_C
    MOT_SE_C MOT_LM_C MOT_MI_C
    ASC_SE_C ASC_LM_C ASC_MI_C
    REA_SE_L REA_LM_L REA_MI_L
    MOT_SE_L MOT_LM_L MOT_MI_L
    ASC_SE_L ASC_LM_L ASC_MI_L);
```

```
READSERc = READSERb-READSERw;
READLMSc = READLMSb-READLMSw;
READMIGc = READMIGb-READMIGw;
READGRac = READGRAb-READGRAw;
READGENc = READGENb-READGENw;
```

```
RMOTSErc = RMOTSErb-RMOTSERw;
RMOTLMSc = RMOTLMSb-RMOTLMSw;
RMOTMIGc = RMOTMIGb-RMOTMIGw;
RMOTGRac = RMOTGRAb-RMOTGRAw;
RMOTGENc = RMOTGENb-RMOTGENw;
```

```
RASCSErc = RASCSErb-RASCSErw;
RASCLMSc = RASCLMSb-RASCLMSw;
RASCMIGc = RASCMIGb-RASCMIGw;
RASCGRac = RASCGRAb-RASCGRAW;
RASCGENc = RASCGENb-RASCGENw;
```

```
REA_SE_B = SERTBAS*TBASREAD;
REA_LM_B = LMSTBAS*TBASREAD;
REA_MI_B = MIGTBAS*TBASREAD;
```

```
MOT_SE_B = SERTBAS*TBASRMOT;
MOT_LM_B = LMSTBAS*TBASRMOT;
MOT_MI_B = MIGTBAS*TBASRMOT;
```

```
ASC_SE_B = SERTBAS*TBASRASC;
ASC_LM_B = LMSTBAS*TBASRASC;
ASC_MI_B = MIGTBAS*TBASRASC;
```

```
REA_SE_C = SERTCOA*TCOAREAD;  
REA_LM_C = LMSTCOA*TCOAREAD;  
REA_MI_C = MIGTCOA*TCOAREAD;
```

```
MOT_SE_C = SERTCOA*TCOARMOT;  
MOT_LM_C = LMSTCOA*TCOARMOT;  
MOT_MI_C = MIGTCOA*TCOARMOT;
```

```
ASC_SE_C = SERTCOA*TCOARASC;  
ASC_LM_C = LMSTCOA*TCOARASC;  
ASC_MI_C = MIGTCOA*TCOARASC;
```

```
REA_SE_L = SERTLMS*TLMSREAD;  
REA_LM_L = LMSTLMS*TLMSREAD;  
REA_MI_L = MIGTLMS*TLMSREAD;
```

```
MOT_SE_L = SERTLMS*TLMSRMOT;  
MOT_LM_L = LMSTLMS*TLMSRMOT;  
MOT_MI_L = MIGTLMS*TLMSRMOT;
```

```
ASC_SE_L = SERTLMS*TLMSRASC;  
ASC_LM_L = LMSTLMS*TLMSRASC;  
ASC_MI_L = MIGTLMS*TLMSRASC;
```

```
OUTPUT: stdyx sampstat;
```

**Annotated Mplus syntax for Model 3**

TITLE: DEMOGRAPHIC DIVERSITY, READING LITERACY, AND INSTRUCTIONAL FOCUS

Research Question 3

Independent Variables (classroom & individual level):

Socioeconomic risk [SER],  
Language minority status [LMS],  
First-generation immigrant status [MIG]

Dependent Variables (classroom & individual level):

Reading competence [READ],  
Reading enjoyment [RMOT],  
Reading self-concept [RASC]

Mediating/moderating Variables (classroom level & cross-level interaction):

Reading-related support [TBAS]  
Support of language minority students [TLMS]

Control Variables (classroom & individual level):

Previous achievement [GRADE],  
Female gender [gender\_f]

DATA:

FILE = implist001125.dat;  
TYPE = imputation;

VARIABLE:

NAMES = IDSTUD IDCLASS  
ASBG04 ASBG03 TR\_MIG  
ASRREA  
ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H  
ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F  
ATBR09C ATBR09D ATBR09E ATBR09F  
ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G ATXE34F  
GRADE GENDF  
ASXE04A ASBH02A ASXE02 ASBH04 ASXE18B ASBR08A  
ASXE25A ASXE25B ASXE25C ASXE25D TR\_ARB  
ASXE20B ASXE20C ASXE20D GRADE\_MA  
TOTWGT TCHWGT  
ASRREA\_M;

USEVAR = ASRREA  
ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H  
ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F  
ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G  
ATXE34F  
GRADE GENDF  
SER LMS MIG  
SER\_c1 LMS\_c1 MIG\_c1 GRADE\_c1 GENDF\_c1;

CLUSTER = IDCLASS;

WITHIN = SER LMS MIG GRADE GENDF;

BETWEEN = ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G  
ATXE34F  
SER\_c1 LMS\_c1 MIG\_c1 GRADE\_c1 GENDF\_c1;

DEFINE:

```
IF (ASBG04 <= 2) THEN SER = 1;
IF (ASBG04 >= 3) THEN SER = 0;
IF (ASBG03 <= 2) THEN LMS = 1;
IF (ASBG03 >= 3) THEN LMS = 0;
IF (TR_MIG <= 3) THEN MIG = 1;
IF (TR_MIG == 4) THEN MIG = 0;
```

```
center SER LMS MIG GRADE GENDF (groupmean);
```

```
SER_cl = cluster_mean(SER);
LMS_cl = cluster_mean(LMS);
MIG_cl = cluster_mean(MIG);
GRADE_cl = cluster_mean(GRADE);
GENDF_cl = cluster_mean(GENDF);
```

```
standardize ASRREA;
standardize ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H;
standardize ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F;
```

```
standardize ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G;
standardize ATXE34F;
```

ANALYSIS:

```
TYPE = twolevel random;
ESTIMATOR = bayes;
FBITERATIONS = 40000;
BCONVERGENCE = 0.05;
CHAINS = 4;
PROCESSORS = 20;
```

MODEL:

```
!! Measurement error for single indicators:
!! F by Y@1; Y@theta -> with theta = (1-reliability)*sample variance
!! Reliability of single indicators in the model is estimated as follows:
!! For student variables, a standard estimate of .85 is used
!! Exception: Gender is assumed to be reliably reported, therefore rel =
1
!! Immigration is rated by teachers who have access to information
regarding
!! that aspect and therefore assumed to give highly reliable answers
!! Grades are assumed to be reported with high precision but since there
are
!! factors beside the actual previous achievement influencing the
grades,
!! reliability is set lower
!! For reading competence, plausible values are used instead of
competence
!! estimates, which is a different way to handle measurement insecurity.
!! Therefore, reliability is assumed to be 1 to avoid overestimation of
!! measurement error

!! See Marsh & Lüdtke (2009), Marsh et al. (2012) and
!! Becker et al. (2022) for model specifications
```

%within%

```
SERw  by SER@1;      SER@.031;    ! rel(estimated) = .85, var = 0.205
LMSw  by LMS@1;      LMS@.023;    ! rel(estimated) = .85, var = 0.152
MIGw  by MIG@1;      MIG@.008;    ! rel(estimated) = .95, var = 0.169
GRADEw by GRADE@1;   GRADE@.944; ! rel(estimated) = .85, var = 6.296
GENDFw by GENDF@1;   GENDF@.00;    ! rel(estimated) = 1
```

```
READw  by ASRREA@1; ASRREA@.00; ! rel(estimated) = 1
RMOTw  by ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H;
RASCw  by ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F;
```

```
SERw  with LMSw MIGw GRADEw;
LMSw  with MIGw GRADEw;
MIGw  with GRADEw;
```

```
READw  with RMOTw RASCw;
RMOTw  with RASCw;
```

```
READw  on SERw      (READSERw);
sLRC | READw on LMSw;
sMRC | READw on MIGw;
READw  on GRADEw   (READGRAw);
READw  on GENDFw   (READGENw);
```

```
RMOTw  on SERw      (RMOTSERw);
RMOTw  on LMSw      (RMOTLMSw);
RMOTw  on MIGw      (RMOTMIGw);
RMOTw  on GRADEw   (RMOTGRAw);
RMOTw  on GENDFw   (RMOTGENw);
```

```
RASCw  on SERw      (RASC SERw);
RASCw  on LMSw      (RASCLMSw);
sMSC | RASCw on MIGw;
RASCw  on GRADEw   (RASC GRAw);
RASCw  on GENDFw   (RASC GENw);
```

%between%

```
SERb  by SER_c1;     SER_c1@.00;
LMSb  by LMS_c1;     LMS_c1@.00;
MIGb  by MIG_c1;     MIG_c1@.00;
GRADEb by GRADE_c1;  GRADE_c1@.00;
GENDFb by GENDF_c1;  GENDF_c1@.00;
```

```
READb  by ASRREA;    ASRREA@.00;
RMOTb  by ASBR07B ASBR07C ASBR07D ASBR07E ASBR07F ASBR07H;
RASCb  by ASBR08B ASBR08C ASBR08D ASBR08E ASBR08F;
```

```
TBAS  by ATXE34A ATXE34B ATXE34C ATXE34D ATXE34G;
```

```
TLMS  by ATXE34F;    ATXE34F@.00;
```

```
SERb  with LMSb MIGb GRADEb;
LMSb  with MIGb GRADEb;
```

MIGb with GRADEb;

READb with RMOTb RASCb;

RMOTb with RASCb;

READb on SERb (READSERb);

READb on LMSb (READLMSb);

READb on MIGb (READMIGb);

READb on GRADEb (READGRAb);

READb on GENDFb (READGENb);

RMOTb on SERb (RMOTSERb);

RMOTb on LMSb (RMOTLMSb);

RMOTb on MIGb (RMOTMIGb);

RMOTb on GRADEb (RMOTGRAb);

RMOTb on GENDFb (RMOTGENb);

RASCb on SERb (RASCSEb);

RASCb on LMSb (RASCLMSb);

RASCb on MIGb (RASC MIGb);

RASCb on GRADEb (RASCGRAb);

RASCb on GENDFb (RASC GENb);

!! IV --> Moderators (significant paths from M2 only)

TBAS on SERb;

TLMS on LMSb;

TLMS on MIGb;

!! Random slopes

[sLRC] (READLMSw);

[sMRC] (READMIGw);

[sMSC] (RASC MIGw);

sLRC on TBAS;

sMRC on TBAS;

sMSC on TLMS;

MODEL CONSTRAINT:

!! Defining composition effects

!! Names are: [DV][IV]c

```
new(READSERc READLMSc READMIGc
    RASCSEc RASCLMSc RASC MIGc
    RMOTSEc RMOTLMSc RMOTMIGc
    READGRAc RMOTGRAc RASCGRAc
    READGENc RMOTGENc RASC GENc);
```

READSERc = READSERb-READSERw;

READLMSc = READLMSb-READLMSw;

READMIGc = READMIGb-READMIGw;

READGRAc = READGRAb-READGRAw;

READGENc = READGENb-READGENw;

```
RMOTSERc = RMOTSERb-RMOTSERw;  
RMOTLMSc = RMOTLMSb-RMOTLMSw;  
RMOTMIGc = RMOTMIGb-RMOTMIGw;  
RMOTGRAc = RMOTGRAb-RMOTGRAw;  
RMOTGENc = RMOTGENb-RMOTGENw;
```

```
RASCSErC = RASCSErB-RASCSErW;  
RASCLMSc = RASCLMSb-RASCLMSw;  
RASCMIgC = RASCMIgB-RASCMIgW;  
RASCGRAc = RASCGRAb-RASCGRAw;  
RASCGENc = RASCGENb-RASCGENw;
```

OUTPUT:

```
tech1 tech8 tech9;
```

PLOT:

```
TYPE = plot2;
```

### 5.3.5 Online Resource 5: Additional Information Regarding Results of Models 1–3

**Table S5.1**

*Association of Control Variables with Measures of Reading Literacy in Model 1*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level effects</i>						
Previous achievement	0.24*	0.01	0.06*	0.01	0.10*	0.01
Gender (female)	-0.02	0.03	0.16*	0.03	0.02	0.02
$R^2_{\text{within}}$	.42		.13		.24	
<i>Composition effects</i>						
Previous achievement	-0.12*	0.03	-0.04	0.02	-0.06*	0.02
[P] Gender (female)	0.38	0.24	0.18	0.16	0.17	0.13
$R^2_{\text{between}}$	.60		.47		.55	

Note. [P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

**Table S5.2**

*Intercorrelations of Independent and Control Variables as well as Dependent Variables, Respectively, in Model 1*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Socioeconomic risk	–	.01*	.01*	-.10*	-.00			
(2) Language minority	.02*	–	.01*	-.08*	-.00			
(3) Immigrant status (1 <sup>st</sup> gen.)	.02*	.03*	–	-.05*	-.00			
(4) Previous achievement	-.32*	-.18*	-.15*	–	.03*			
(5) Gender (female)	-.00	.00	.00	.17*	–			
(6) Reading competence						–	.02*	.02*
(7) Reading enjoyment						.03*	–	.01*
(8) Reading self-concept						.08*	.06*	–

*Note.* Unstandardized correlation coefficients on the individual level are reported in the lower triangle, on the classroom level in the upper triangle. Correlations between dichotomous variables are tetrachoric correlations.

\* $p < .05$ .

**Table S5.3***Association of Control Variables with Measures of Reading Literacy and Mediating**Variables in Model 2*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level effects</i>						
Previous achievement	0.24*	0.01	0.06*	0.01	0.10*	0.01
Gender (female)	-0.02	0.03	0.16*	0.03	0.02	0.02
$R^2_{\text{within}}$	.42		.13		.24	
<i>Composition effects</i>						
Previous achievement	-0.11*	0.03	-0.04	0.02	-0.06*	0.02
[P] Gender (female)	0.32	0.25	0.20	0.17	0.14	0.13
$R^2_{\text{between}}$	.61		.49		.58	
<i>Classroom level – Predicting mediating variables</i>						
	Reading-related support		Support of language minority students		Cognitive activation	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
Previous achievement	0.08	0.05	-0.04	0.08	0.04	0.04
$R^2_{\text{between}}$	.04		.16		.03	

*Note.* Paths between classroom gender composition and mediating variables were not included in the model as no theoretical associations were assumed.

[P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

**Table S5.4**

*Intercorrelations of Independent and Control Variables, Mediating Variables, and Dependent Variables, Respectively, in Model 2*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) Socioeconomic risk	–	.01*	.01*	-.10*	-.00						
(2) Language minority	.02*	–	.01*	-.08*	-.00						
(3) Immigrant status (1 <sup>st</sup> gen.)	.02*	.03*	–	-.05*	-.00						
(4) Previous achievement	-.32*	-.18*	-.15*	–	.03*						
(5) Gender (female)	-.00	.00	.00	.17*	–						
(6) Reading-related support						–	.10	.15*			
(7) Support of language minority students						n/a	–	.04			
(8) Cognitive activation						n/a	n/a	–			
(9) Reading competence								–	.02*	.02*	
(10) Reading enjoyment								.03*	–	.01*	
(11) Reading self-concept								.08*	.06*	–	

*Note.* Standardized correlation coefficients on the individual level are reported in the lower triangle, on the classroom level in the upper triangle. Correlations between dichotomous variables are tetrachoric correlations. As mediating variables were measured on the classroom level, correlations for the individual level are not calculated.

\*  $p < .05$ .

**Table S5.5***Association of Control Variables with Measures of Reading Literacy in Model 3*

	Reading competence		Reading enjoyment		Reading self-concept	
	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>b</i>	<i>SE</i>
<i>Individual level effects</i>						
Previous achievement	0.24*	0.01	0.06*	0.01	0.10*	0.01
Gender (female)	-0.02	0.03	0.16*	0.03	0.02	0.02
<i>Composition effects</i>						
Previous achievement	-0.12*	0.03	-0.04	0.02	-0.06*	0.02
[P] Gender (female)	0.40	0.24	0.21	0.17	0.18	0.14

Note. [P] = Proportion of students with this marker in the classroom.

\* $p < .05$ .

**Table S5.6**

*Intercorrelations of Independent and Control Variables, Moderating Variables, and Dependent Variables, Respectively, in Model 3*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Socioeconomic risk	–	.01*	.01*	-.10*	-.00			
(2) Language minority	.02*	–	.01*	-.08*	-.00			
(3) Immigrant status (1 <sup>st</sup> gen.)	.02*	.03*	–	-.05*	-.00			
(4) Previous achievement	-.32*	-.18*	-.15*	–	.04*			
(5) Gender (female)	-.00	.00	.00	.17*	–			
(6) Reading competence						–	.02*	.03*
(7) Reading enjoyment						.03*	–	.01*
(8) Reading self-concept						.08*	.06*	–

*Note.* Unstandardized correlation coefficients on the individual level are reported in the lower triangle, on the classroom level in the upper triangle. Correlations between dichotomous variables are tetrachoric correlations.

\* $p < .05$ .

**References (Supplemental Material Study IV)**

- van Buuren, S., & Groothuis-Oudshoorn, K. (2011). Mice: Multivariate Imputation by Chained Equations in R. *Journal of Statistical Software*, 45(3), 1–67.  
<https://doi.org/10.18637/jss.v045.i03>

## **5.4 Contributions of the Doctoral Candidate to the Studies in the Cumulative Dissertation**

In this section, the contributions of the doctoral candidate to each of the four studies included in the cumulative dissertation are described. For this purpose, the Contributor Role Taxonomy (CRediT; Brand et al., 2015<sup>13</sup>) system is used, which differentiates fourteen possible contributor roles: Conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualization, writing – original draft, and writing – review & editing. The degree of contribution for each role can further be specified as either lead, equal, or supporting contribution. Only the roles that apply to the doctoral candidate are listed for each study.

### **5.4.1 Study I**

Vogel, S. N. T., Stang-Rabrig, J., & McElvany, N. (2023). The importance of parents for key outcomes among socioeconomically disadvantaged students: Parents' role in emergency remote education. *Social Psychology of Education, 26*(6), 1565–1591. <https://doi.org/10.1007/s11218-023-09801-2>

Author contributions following CRediT: Conceptualization (equal), data curation (lead), formal analysis (lead), methodology (equal), visualization (lead), writing – original draft (lead), writing – review & editing (equal).

### **5.4.2 Study II**

Vogel, S. N. T., & Stang-Rabrig, J. (2025). Reading competence and vocabulary of students from diverse language backgrounds: Employing a lexical distance measure. In N. McElvany, S. König, R. Schaufelberger, M. Becker, H. Gaspard, B. Heppt, & A. Naumann (Eds.), *Bildungsprozesse und Kompetenzentwicklung im Kontext sprachlicher und sozialer Heterogenität*. Beltz Juventa.

---

<sup>13</sup> Brand, A., Allen, L., Altman, M., Hlava, M., & Scott, J. (2015). Beyond authorship: Attribution, contribution, collaboration, and credit. *Learned Publishing, 28*(2), 151–155. <https://doi.org/10.1087/20150211>

Author contributions following CRediT: Conceptualization (equal), data curation (lead), formal analysis (lead), investigation (lead), methodology (equal), visualization (lead), writing – original draft (lead), writing – review & editing (equal).

### **5.4.3 Study III**

Vogel, S. N. T., Stang-Rabrig, J., Jugert, P., Leyendecker, B., & McElvany, N. (2025). *The role of the family for succeeding in late primary school: Comparing first generation-, second generation-, and non-immigrant students*. PsyArXiv. [https://doi.org/10.31234/osf.io/fg96j\\_v3](https://doi.org/10.31234/osf.io/fg96j_v3)

Note that the authoritative revised and final version of the study has now been published as:

Vogel, S. N. T., Stang-Rabrig, J., Jugert, P., Leyendecker, B., & McElvany, N. (2025). The role of the family for succeeding in late primary school: Comparing first generation-, second generation-, and non-immigrant students. *Zeitschrift für Pädagogische Psychologie*. Advance online publication. <https://doi.org/10.1024/1010-0652/a000403>

Author contributions following CRediT: Conceptualization (equal), data curation (lead), formal analysis (lead), investigation (lead), methodology (equal), visualization (lead), writing – original draft (lead), writing – review & editing (equal).

### **5.4.4 Study IV**

Vogel, S. N. T., Stang-Rabrig, J., & McElvany, N. (2025). *Sociodemographic diversity, reading literacy, and instructional focus: Disentangling complex relations on the individual and classroom level*. PsyArXiv. [https://doi.org/10.31234/osf.io/ckae3\\_v2](https://doi.org/10.31234/osf.io/ckae3_v2)

Author contributions following CRediT: Conceptualization (equal), data curation (lead), formal analysis (lead), methodology (equal), visualization (lead), writing – original draft (lead), writing – review & editing (equal).