

Technische Universität Dortmund

Fakultät Erziehungswissenschaft, Psychologie und Bildungsforschung

Towards Equal Opportunities: Understanding Predictors of Educational Attainment and Well-Being in Secondary Education

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

Vorgelegt von Katharina Molitor

geboren am 25.08.1994 in Adenau

Matrikelnummer 224109

Erstgutachterin: Prof. Dr. Nele McElvany

Zweitgutachterin: Prof. Dr. Sabine Hornberg

Dortmund, im Dezember 2024

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

Danksagung

Danke an alle, die diese Arbeit ermöglicht haben. Danke an meine Gutachterinnen und Prüferinnen, meine Kolleg*innen, unsere Hilfskräfte und Praktikantinnen, meine Familie und meine Freunde. Danke, dass ich immer offene Ohren und Türen gefunden habe. Danke für formellen und informellen Austausch. Danke für das Miteinander. Danke, dass ihr mich in dieser Zeit begleitet habt. Danke, für all eure Unterstützung zu jeder Tages- und auch manchmal Nachtzeit. Ohne euch wäre diese Arbeit nicht möglich gewesen.

Abstract

Students' educational outcomes are a product of complex relations. Familial, personal, and institutional factors contribute to educational attainment and well-being, which are two central educational outcomes. Educational attainment in Germany still strongly depends on students' family background (Boudon, 1974; OECD, 2019; Skopek & Passaretta, 2021), implying unequal opportunities for students stemming from different social strata and countries in favor of native students and students with a high socioeconomic status (SES). Also, students well-being depends on family SES (Basarkod et al., 2021; Diener et al., 1995; Navarro-Carrillo et al., 2020), with a bias towards high-SES students having higher well-being. Next to students' familial factors, also personal factors such as students' motivation and – oppositely to this – stressors are relevant for educational attainment as well as well-being. Different facets of student's motivation (e.g., expectation of success, value of education, learning motivation) are highly relevant predictors for students' educational attainment (Ditton et al., 2019; Verešová & Mala, 2016; Wigfield & Eccles, 2000), as well as for students' well-being (Deci & Ryan, 1985; Moè et al., 2009). However, also stressors, resp. cost related factors impact students' educational outcomes (Salmela-Aro & Upadyaya, 2014; Wigfield & Eccles, 2000), as stress is an indicator for excessive demands which might stem from and result in lower performance (Fraja et al., 2010; Trigwell et al., 2013) and well-being (Kleinkorres et al., 2023; Stang-Rabrig et al., 2023). However, family background and the central personal factors motivation and stressors are interrelated as well (C. Brown & Putwain, 2022; Eccles & Wigfield, 2020; Kleine et al., 2010). These relations indicate that relations between family background and educational outcomes in terms of educational attainment and well-being are mediated by motivation resp. stressors (Ditton et al., 2019; Steinmayr et al., 2012; L. Wang & Finch, 2018) providing a potential starting point in reducing educational inequalities.

For a deeper understanding of the factors contributing to educational attainment and well-being also institutional factors need to be considered. In this context the transition from elementary to secondary school is particularly important, as it is a critical life event (Praherso et al., 2017) with long lasting effects on students' performance and further educational pathway. Educational inequalities can be generated and reinforced by this event (R. Becker, 2017; Dräger et al., 2024). Decreases in students' well-being – also depending on the attended school type – are observed after the transition (Coelho et al., 2017; Jónsdóttir & Blöndal, 2023). In the German context, the transition is particularly critical, as it happens early in an international comparison and is socially biased due to students' performance in elementary school. For transitioning to secondary school enrollment recommendations for secondary school types are given at the end of elementary schools by teachers. These enrollment recommendations can be

socially biased as well (Dudas, 2014; Tiedemann & Billmann-Mahecha, 2010) and effects on students' educational attainment and well-being might be reinforced due to deviations from the enrollment recommendation. Deviating upwards from the enrollment recommendation was shown to have negative consequences for students' performance and self-concept (Bittmann, 2021; Pfost et al., 2018).

Against this background, this dissertation focused the complex relations that contribute to students' educational attainment in terms of obtaining *Abitur*, and students' well-being. The multidimensionality of well-being was considered by including four distinct well-being constructs that are life satisfaction, satisfaction with friends, academic self-concept and helplessness in German. Also, for family background, motivation, and stressors multiple measures were regarded in the distinct contributions to provide new insights on the multidimensional and complex mechanisms. For deriving the included variables Boudons' (1974) theory of primary and secondary effects of social stratification, the expectancy-value theory (Wigfield & Eccles, 2000) resp. the situated expectancy-value theory (Eccles & Wigfield, 2020), the big-fish-little-pond-effect (Marsh, 1987), and the self-determination-theory (Deci & Ryan, 1983) were used. This dissertation expanded previous knowledge and closed existing research gaps in terms of the following overarching research questions dealing with 1.) the role of students' family background for obtaining *Abitur* and well-being; 2.) which motivational factors are relevant predictors for obtaining *Abitur* and well-being; 3.) the relevance of stressors, for obtaining *Abitur* and well-being; and 4.) the relations between familial and personal (motivational factors and stressors) and the implications for obtaining *Abitur* and well-being, investigating potential mediation effects. Thereby the enrollment recommendation was considered and students having received an academic-track enrollment recommendation resp. not having received an academic-track enrollment recommendation were compared in terms of predictors for obtaining *Abitur* and attending academic-track school resp. non-academic-track school were compared in terms of their well-being.

In *Study I* key factors that determine obtaining *Abitur* are investigated. In particular, the study focused on students' family background (parental education, occupation, and immigrant background), their motivation (expectation of success, value of education, performance-oriented motivation) and effort as a stressor. The study drew upon theoretical consideration of Boudon (1974) and Wigfield and Eccles (2000). Using structural equation models and including students who attended an academic-track school during their secondary school time, data from the National Educational Panel Study Starting Cohort Grade 9 (NEPS SC4; $N = 5,409$ students) (NEPS Network, 2023) were used to longitudinally examine whether motivational factors can

weaken or even eliminate the connection between family background and educational attainment. Of particular note is the multidimensional operationalization of both family background and motivation. The central result of the study is that the initially most relevant predictor for obtaining *Abitur* - parental education - lost significance when motivational factors were taken into account. The partial mediation between family background and obtaining *Abitur* took place in particular through expectation of success, which emphasizes the importance of motivational factors. This provides practical starting points for reducing educational inequalities.

Study II takes up on those finding and lays a stronger emphasis on the transition decision at the end of elementary school. Again, family background (parental education, occupation, financial cost, home language), students' motivation (expectation of success, value of education), and stressors (perceived parental aspirations, learning stress) were investigated as predictors for obtaining *Abitur*. Boudon's (1974) theory of primary and secondary effects of social stratification and the expectancy-value model (Wigfield & Eccles, 2000) again were the theoretical basis. Students with and without academic-track enrollment recommendation were compared in terms of the relevance of the predictors, as it is known that students without academic-track enrollment recommendation can be successful on academic-school tracks (Pfost et al., 2018), however few results exist on the conditions for success. Therefore also the considerations of the big-fish-little pond-effect (Marsh, 1987) were included. Study II addresses this desiderate by using data from the German National Educational Panel Study starting cohort Grade 5 (NEPS SC3, $N = 2,671$) (NEPS Network, 2023). Group-comparing structural equation models revealed a higher relevance of parental education for students without an academic-track enrollment recommendation, while learning stress and expectation of success were more relevant for the opposite group. In order to promote educational equality, this study suggests that particularly students' expectations of success and value of education are of relevance.

The *further analyses* then focused students' well-being (life satisfaction, satisfaction with friends, academic self-concept and helplessness in German) as a second central educational outcome. Thereby a specific sample of students without academic-track enrollment recommendation was investigated, comparing students' attending academic-track schools vs. non-academic track schools in the predictors of their well-being. Included predictors was family background (parental education), motivation (value of education), and stressors (perceived parental aspirations and exhaustion). Potential mediation effects through the stressors were investigated as well. The further analyses were based on the theoretical considerations of the expectancy-value model (Wigfield & Eccles, 2000), the self-determination theory (Deci &

Ryan, 1983) and the considerations of the big-fish-little-pond-effect (Marsh, 1987). For investigating the well-being of students comparable in their competences (ensured by conducting a propensity score matching) but in different learning environments, we used the data of the German National Educational Panel Study Starting Cohort Grade 5 (NEPS SC3, $N = 818$) (NEPS Network, 2023). Group-comparing structural equation models were estimated and variables were stepwise included. Without including stressors, group differences for value of education, life satisfaction, and self-concept were found. The relation between value of education and self-concept was mediated by exhaustion for academic-track school students. As a conclusion can be drawn, that for academic-track school students without an academic-track school enrollment recommendation the learning environment and parental aspirations were more important for their well-being than being more successful than the teacher assessment at the end of elementary school time. An implication for practice is that it is necessary to consider the heterogeneity of a class and that there is not “one-size-fits-it-all”-approach for fostering students’ well-being.

This dissertation provides new insights on the complex relations between students’ family background, motivational factors, stressors, and their outcomes in terms of obtaining *Abitur* and well-being. Thereby, a particular focus laid on the recommendation status and (mis)matches with the attended school type. This way, a key characteristic of the German educational system is investigated in depth. Two central educational outcomes are investigated and potential starting points for reducing educational inequalities are identified and implications for practice are derived.

Zusammenfassung

Bildungsergebnisse von Schüler*innen sind das Ergebnis komplexer Beziehungen. Zwei zentrale Outcomes sind dabei der akademische Bildungserfolg und das Wohlbefinden von Schüler*innen. Diese hängen von familiären, persönlichen und institutionellen Faktoren ab. Der akademische Bildungserfolg hängt in Deutschland immer noch stark von familiären Herkunftsmerkmalen der Schüler*innen ab (Boudon, 1974; OECD, 2019; Skopek & Passaretta, 2021), was ungleiche Chancen für Schüler*innen aus verschiedenen sozialen Schichten und Herkunftsländern zugunsten von deutschen Schüler*innen und Schüler*innen mit einem hohen sozioökonomischen Status (SES) bedeutet. Auch das Wohlbefinden der Schüler*innen hängt vom SES ab (Basarkod et al., 2021; Diener et al., 1995; Navarro-Carrillo et al., 2020), wobei das Wohlbefinden von Schüler*innen mit hohem SES tendenziell höher ist. Neben familiären Faktoren sind auch persönliche Faktoren wie die Motivation der Schüler*innen sowie Stressoren für den Bildungserfolg und das Wohlbefinden von Bedeutung. Verschiedene Facetten der Schülermotivation (z. B. Erfolgserwartung, Wert von Bildung, Leistungsmotivation) sind hochrelevante Prädiktoren für den akademischen Bildungserfolg (Ditton et al., 2019; Verešová & Mala, 2016; Wigfield & Eccles, 2000) sowie für das Wohlbefinden (Deci & Ryan, 1985; Moè et al., 2009). Allerdings wirken sich auch Stressoren bzw. kostenbezogene Faktoren auf die Bildungsergebnisse von Schüler*innen aus (Salmela-Aro & Upadyaya, 2014; Wigfield & Eccles, 2000), da Stress ein Indikator für Überforderung ist, die sich in geringeren Leistungen (Fraja et al., 2010; Trigwell et al., 2013) und Wohlbefinden niederschlagen kann (Kleinkorres et al., 2023; Stang-Rabrig et al., 2023). Aber auch der familiäre Hintergrund und die zentralen persönlichen Faktoren Motivation und Stressoren sind miteinander verknüpft (C. Brown & Putwain, 2022; Eccles & Wigfield, 2020; Kleine et al., 2010). Diese Zusammenhänge deuten darauf hin, dass Beziehungen zwischen familiärem Hintergrund und Bildungsergebnissen in Bezug auf Bildungserfolg und Wohlbefinden durch Motivation bzw. Stressoren mediiert werden (Ditton et al., 2019; Steinmayr et al., 2012; L. Wang & Finch, 2018), was einen potenziellen Ansatzpunkt für den Abbau von Bildungsungleichheiten darstellt.

Für ein tieferes Verständnis der Faktoren, die zu Bildungserfolg und Wohlbefinden beitragen, müssen auch institutionelle Faktoren berücksichtigt werden. In diesem Zusammenhang ist der Übergang von der Grundschule zur weiterführenden Schule besonders wichtig, da es sich dabei um ein kritisches Lebensereignis handelt (Praherso et al., 2017), das langfristige Auswirkungen auf die Leistungen der Schüler*innen und ihren weiteren Bildungsweg hat. Der Übergang von der Grundschule in die weiterführende Schule ist dabei ein zentraler Faktor bei der Entstehung bzw. Verstärkung von Bildungsungleichheiten (R.

Becker, 2017; Dräger et al., 2024). Nach dem Übergang in die weiterführende Schule wird ein Rückgang des Wohlbefindens der Schüler*innen - auch in Abhängigkeit von der besuchten Schulform - beobachtet (Coelho et al., 2017; Jónsdóttir & Blöndal, 2023). Im deutschen Kontext ist der Übergang besonders kritisch, da er im internationalen Vergleich früh erfolgt und aufgrund der vom SES abhängigen Leistungen in der Grundschule sozial verzerrt ist. Für den Übergang in die weiterführende Schule werden am Ende der Grundschulzeit zudem von den Lehrkräften Übergangsempfehlungen für eine Schulform ausgesprochen. Diese Übergangsempfehlungen können ebenfalls sozial verzerrt sein (Dudas, 2014; Tiedemann & Billmann-Mahecha, 2010). Abweichungen von der Übergangsempfehlung sind jedoch möglich und können sich auf den Bildungserfolg und das Wohlbefinden von Schüler*innen auswirken. Es hat sich gezeigt, dass Abweichungen von der Übergangsempfehlung möglich sind und Abweichungen hin zu leistungsstärkeren Schulformen negative Folgen für die Leistung und das Selbstkonzept von Schüler*innen haben (Bittmann, 2021; Pfof et al., 2018).

Vor dem Hintergrund dieser Befunde konzentrierte sich diese Dissertation auf die komplexen Zusammenhänge, die zum Bildungserfolg – gemessen über das Erreichen des Abiturs – und zum Wohlbefinden von Schüler*innen beitragen. Die Multidimensionalität des Wohlbefindens wurde berücksichtigt, indem vier verschiedene Dimensionen des Wohlbefindens einbezogen wurden: Lebenszufriedenheit, Zufriedenheit mit Freunden, akademisches Selbstkonzept und Hilflosigkeit im Fach Deutsch. Auch für den familiären Hintergrund, die Motivation und die Stressoren wurden in den einzelnen Beiträgen mehrere Maße berücksichtigt, um die Multidimensionalität der Konstrukte zu berücksichtigen und Einsicht in die komplexen Zusammenhänge zu gewinnen. Zur Ableitung der einbezogenen Variablen wurden Boudons (1974) Theorie der primären und sekundären Effekte sozialer Stratifikation, die Wert-Erwartungstheorie (Wigfield & Eccles, 2000) bzw. die situative Wert-Erwartungstheorie (Eccles & Wigfield, 2020), der Big-Fish-Little-Pond-Effekt (Marsh, 1987) und die Selbstbestimmungstheorie (Deci & Ryan, 1983) herangezogen. Die vorliegende Dissertation erweiterte das bisherige Wissen und schloss bestehende Forschungslücken, indem in den Forschungsfragen untersucht wurde 1.) welche Rolle der familiären Hintergrund der Schüler*innen für das Erreichen des Abiturs und das Wohlbefinden spielt; 2.) welche motivationalen Faktoren relevante Prädiktoren für das Erreichen des Abiturs und das Wohlbefinden sind; 3.) inwiefern Stressoren für das Erreichen des Abiturs und das Wohlbefinden relevant sind; und 4.) welche Beziehungen es zwischen familiären und persönlichen Faktoren (motivationalen Faktoren und Stressoren) gibt und welche Auswirkungen dies auf das Erreichen des Abiturs und das Wohlbefinden hat, wobei mögliche Mediationseffekte untersucht wurden. Dabei wurde die Übergangsempfehlung berücksichtigt

und Schüler*innen, die (k)eine Gymnasialempfehlung erhalten haben, wurden hinsichtlich der Relevanz der Prädiktoren für das Erreichen des Abiturs verglichen bzw. wurden Schüler*innen ohne Gymnasialempfehlung auf dem Gymnasium bzw. einer nicht gymnasialen Schulform in Bezug auf Prädiktoren ihres Wohlbefindens vergleichen.

In *Studie I* wurden Prädiktoren untersucht, die mit dem Erreichen des Abiturs zusammenhängen. Die Studie konzentrierte sich insbesondere auf den familiären Hintergrund der Schüler*innen (Bildung der Eltern, Beruf und Migrationshintergrund), ihre Motivation (Erfolgserwartung, Wert von Bildung, Leistungsmotivation) und Anstrengungsbereitschaft als Stressor. Die Studie stützte sich auf theoretische Überlegungen von Boudon (1974) und Wigfield und Eccles (2000). In dieser Studie wurden Daten aus dem Nationalen Bildungspanel Startkohorte Klasse 9 (NEPS SC4; $N = 5.409$ Schüler*innen) (NEPS Network, 2023) verwendet. Unter Verwendung von Strukturgleichungsmodellen wurden Schüler*innen, die während ihrer Sekundarschulzeit das Gymnasium besucht haben im Längsschnitt dahingehend untersucht, ob motivationale Faktoren den Zusammenhang zwischen dem familiären Hintergrund und dem Erreichen des Abiturs abschwächen oder sogar gänzlich aufheben können. Besonders hervorzuheben ist die multidimensionale Operationalisierung sowohl des familiären Hintergrunds als auch der motivationalen Faktoren. Zentrales Ergebnis der Studie ist, dass der ursprünglich relevanteste Prädiktor für das Erreichen des Abiturs - die elterliche Bildung - an Bedeutung verliert, wenn motivationale Faktoren berücksichtigt werden. Die partielle Mediation zwischen dem familiärem Hintergrund und dem Erreichen des Abiturs fand insbesondere durch die Erfolgserwartung statt, was die Bedeutung motivationaler Faktoren unterstreicht. Dies liefert praktische Ansatzpunkte für den Abbau von Bildungsungleichheiten.

Studie II knüpft an diese Ergebnisse an und legt einen stärkeren Schwerpunkt auf die Übergangentscheidung am Ende der Grundschulzeit. Auch hier wurden der familiäre Hintergrund (Bildung der Eltern, Beruf, finanzielle Kosten, gesprochene Sprache), die Motivation der Schüler*innen (Erfolgserwartung, Wert von Bildung) und Stressoren (wahrgenommene elterliche Aspirationen, Lernstress) als Prädiktoren für das Erreichen des Abiturs untersucht. Theoretische Basis waren wieder Boudons (1974) Theorie der primären und sekundären Effekte sozialer Stratifikation und die Wert-Erwartungstheorie (Wigfield & Eccles, 2000). Schüler*innen mit und ohne Gymnasialempfehlung wurden hinsichtlich der Relevanz der Prädiktoren verglichen, da zwar bekannt ist, dass Schüler*innen ohne Gymnasialempfehlung auf dem Gymnasium erfolgreich sein können (Pfof et al., 2018), jedoch nur wenige Ergebnisse zu den Erfolgsbedingungen vorliegen. Daher wurde auch der Big-Fish-Little-Pond-Effekt (Marsh, 1987) zur Erklärung der Zusammenhänge herangezogen. Studie II

geht dieses Forschungsdesiderat an. Dafür werden die Daten aus dem Nationalen Bildungspanel Startkohorte Klasse 5 (NEPS SC3, $N = 2.671$) verwendet (NEPS Network, 2023). Gruppenvergleichende Strukturgleichungsmodelle zeigten, dass die elterliche Bildung für Schüler*innen ohne Gymnasialempfehlung relevanter für das Erreichen des Abiturs war, während für Schüler*innen mit Gymnasialempfehlung Lernstress und Erfolgserwartungen eine höhere Relevanz hatten. Um Bildungsgleichheit zu fördern, legen die Ergebnisse dieser Studie nahe, dass insbesondere die Erfolgserwartungen und der Wert von Bildung für die Schüler*innen von Bedeutung sind.

Die *weiterführenden Analysen* nahmen das Wohlbefinden der Schüler*innen (Lebenszufriedenheit, Zufriedenheit mit Freunden, akademisches Selbstkonzept und Hilfflosigkeit in Deutsch) als weiteren zentralen Bildungsergebnis in den Fokus. Dabei wurden Schüler*innen ohne Gymnasialempfehlung untersucht. Schüler*innen, die der Empfehlung auf eine nicht-gymnasiale Schulform gefolgt sind, wurden mit Schüler*innen, die nach oben von der Übergangsempfehlung abgewichen sind hinsichtlich der Prädiktoren ihres Wohlbefindens verglichen. Als Prädiktoren wurden der familiäre Hintergrund (Bildung der Eltern), die Motivation (Wert von Bildung) und Stressoren (wahrgenommene elterliche Aspirationen und Erschöpfung) einbezogen. Mögliche Mediationseffekte durch die Stressoren wurden ebenfalls untersucht. Die weiterführenden Analysen basierten auf den theoretischen Überlegungen der Wert-Erwartungstheorie (Wigfield & Eccles, 2000), der Selbstbestimmungstheorie (Deci & Ryan, 1983) und zum Big-Fish-Little-Pond-Effekt (Marsh, 1987). Um das Wohlbefinden der Schüler*innen auf gymnasialen und nicht-gymnasialen Schulformen vergleichen zu können, wurde mittels eines Propensity Score Matchings sichergestellt, dass die Schüler*innen trotz unterschiedlicher Lernumgebungen in ihren Kompetenzen vergleichbar sind. Für die Analysen wurden die Daten des Nationalen Bildungspanels Startkohorte Klasse 5 (NEPS SC3, $N = 818$) verwendet (NEPS Network, 2023). Es wurden gruppenvergleichende Strukturgleichungsmodelle geschätzt und der Einbezug der Variablen erfolgte schrittweise. Ohne Einbezug der Stressoren wurden Gruppenunterschiede für den Wert von Bildung als Prädiktor der Lebenszufriedenheit und des Selbstkonzept gefunden. Der Zusammenhang zwischen dem Wert von Bildung und dem Selbstkonzept wurde bei den Schüler*innen auf dem Gymnasium durch die Erschöpfung mediiert. Die Befunde zeigen, dass für das Wohlbefinden von Gymnasiast*innen ohne Gymnasialempfehlung das Lernumfeld und die elterlichen Erwartungen wichtiger waren als die Tatsache, dass die Schüler*innen in ihrer Schullaufbahn erfolgreicher waren, als die Einschätzung ihrer Lehrkräfte durch die Übergangsempfehlung am Ende der Grundschulzeit vorhergesagt hatte. Für die Praxis bedeutet dies, dass die Heterogenität

einer Klasse berücksichtigt werden muss und dass es keinen „one-size-fits-it-all“-Ansatz für die Förderung des Wohlbefindens von Schüler*innen gibt.

Diese Dissertation liefert neue Erkenntnisse über die komplexen Zusammenhänge zwischen dem familiären Hintergrund, motivationalen Faktoren, Stressoren und dem Erreichen des Abiturs und dem Wohlbefinden von Sekundarschüler*innen. Ein besonderer Fokus liegt dabei auf der Übergangsempfehlung und (Nicht-)Übereinstimmungen mit der besuchten Schulform. Auf diese Weise wird ein zentrales Spezifikum des deutschen Bildungssystems eingehend untersucht. Es werden zwei zentrale Bildungsergebnisse untersucht und mögliche Ansatzpunkte zum Abbau von Bildungsungleichheiten identifiziert und Implikationen für die Praxis abgeleitet.

Table of Contents

Abstract	V
Zusammenfassung	IX
Table of Contents	XIV
1. Introduction	19
2. Theoretical background.....	21
2.1 Short overview over the German educational system	21
2.2 Outcomes of education	24
2.2.1 Educational attainment and its measurement.....	24
2.2.2. Well-being.....	27
2.3 Theoretical framework for predictors of educational attainment	29
2.3.1 Theories of educational inequalities and measurement of SES	29
2.3.2 Theories of motivation.....	33
2.4 Predictors of educational attainment and well-being	35
2.4.1 Personal and competence related predictors	39
2.4.2 Familial predictors	40
2.4.3 Motivational factors	44
2.4.4 Stressors	46
2.4.5 Institutional predictors	47
2.4.6 Relations between the familial and individual predictors.....	49
3. Research questions and hypotheses.....	51
4. Summary of the main results of the contributions of the dissertation.....	52
4.1 Study I: Is the relation between family background and obtaining an Abitur mediated by malleable motivational variables?	53
4.2 Study II: Obtaining Abitur without teacher recommendation – the role of social background, opportunity costs, and motivation.....	54
4.3. Further Analyses: How learning environments shape students’ well-being in school – the impact of familial, personal, and school-related factors	56
5. References I.....	58

6. Contributions of the Cumulative Dissertation.....	83
6.1 Study I: Is the relation between family background and obtaining an Abitur mediated by malleable motivational variables?	83
6.2 Study II: Obtaining Abitur without teacher recommendation – the role of social background, opportunity costs, and motivation.....	115
6.3 Further Analyses: How learning environments shape students’ well-being in school – the impact of familial, personal, and school-related factors	147
7. General Discussion.....	181
7.1 Discussion of the main results	181
7.1.1 Relations between family background and educational outcomes	182
7.1.2 Importance of motivational factors for educational outcomes.....	185
7.1.3 Relevance of stressors for educational outcomes	188
7.1.4 Relations between predictors and relevance for educational outcomes.....	192
7.2 Limitations and Strengths.....	194
7.2.1 Limitations	194
7.2.2 Strengths	195
7.3 Implications for research and practice.....	196
7.3.1 Implications for future research	196
7.3.2 Implications for educational practice.....	199
7.4 Conclusion	201
8. References II	203
9. Anhang	214
9.1 Eigenanteile der Doktorandin an den Einzelbeiträgen	214
9.2 Eidesstattliche Erklärung.....	216

List of Tables

Theoretical background

Table 1:	<i>Overview over the transition regulations in the German federal states.....</i>	23
Table 2:	<i>Published/accepted studies forming the cumulative dissertation, and further analyses.....</i>	53

Study I

Table 1:	<i>Measurement points, respondents and survey mode.....</i>	93
Table 2:	<i>Means (M), standard deviations (SD), internal consistencies (α), n of respondents, and intercorrelations among all analyzed variables in our sample and in the complete NEPS dataset (in brackets).....</i>	96
Table 3:	<i>Results of the structural equation models investigating the relation between family background variables and obtaining an Abitur (Model 1), motivational factors and obtaining an Abitur (Model 2) and the effects of family background mediated by motivational factors on obtaining an Abitur (Model 3)</i>	98
Table 4:	<i>Direct effects of family background variables on motivational factors and indirect effects of family background variables on obtaining Abitur through motivational factors in Model 3 (Table 3)</i>	101

Study II

Table 1:	<i>Intercorrelations among the analyzed variables (except for control variables) in our sample for students with (upper right) and without (lower left) ATER.....</i>	129
Table 2:	<i>Mean comparison of all analyzed variables (except for control variables), standard deviations (SD) and n of respondents by enrollment recommendation and school-leaving certificate.....</i>	130
Table 3:	<i>Results of the structural equation models for the relations between SES, opportunity costs, motivation and obtaining Abitur for students with and without ATER.....</i>	132

Supplementary Material Study II

Table A1:	<i>Intercorrelations among all analyzed variables in our sample for students with (upper right) and without (lower left) ATER.....</i>	145
Table A2:	<i>Mean comparison of all analyzed variables, standard deviations (SD) and n of respondents by enrollment recommendation and school-leaving certificate....</i>	146

Further Analyses

Table 1:	<i>Intercorrelations among all analyzed variables in our sample for students attending ATS and non-ATS.....</i>	161
Table 2:	<i>Mean comparison of all analyzed variables for students attending ATS and non-ATS without ATER, standard deviations (SD), internal consistencies (α), n of respondents for all analyzed variables in our sample and by enrollment recommendation.....</i>	162

Table 3:	<i>Results of the group-comparison structural equation models investigating the relations between SES, value of education, perceived parental aspirations, exhaustion and well-being (life satisfaction, satisfaction with friends, academic self-concept, helplessness German) for students without ATER attending ATS and non-ATS.....</i>	164
Table 4:	<i>Direct effects of SES and value of education on perceived parental aspirations and exhaustion and indirect effects of SES and value of education on well-being through perceived parental aspirations and exhaustion in Model 3 (Table 3).</i>	165

List of Figures

Theoretical background

Figure 1:	<i>Framework of this dissertation and included constructs</i>	38
Figure 2:	<i>Percentage of students attending academic-track schools by parental education</i>	41
Figure 3:	<i>Percentage of students attending different school types by immigrant background</i>	42

Supplementary Material Study I

Figure A1:	<i>Structural equation model testing the relation among students' family background and obtaining an Abitur</i>	111
Figure A2:	<i>Structural equation model testing the relation among students' motivation and obtaining an Abitur</i>	112
Figure A3:	<i>Percentage of students attending different school types by immigrant background</i>	113
Figure A4:	<i>Structural equation model testing the relations among students' family background, motivation and obtaining an Abitur among students who attend Gymnasium or Gesamtschule during their educational career</i>	114

1. Introduction

Scholastic education serves multiple purposes; among its primary objectives is the dissemination of knowledge, alongside fostering other important goals. To evaluate students' educational attainment in terms of competences or skills (NEPS Network, 2023; OECD, 2023; Schaufelberger et al., 2024) large scale assessments are frequently conducted. During their school years, students' educational performance is evaluated through grades, which culminate in school-leaving certificates. These certificates play a crucial role in determining further occupational pathways. Scholastic education shall prepare students for their occupational pathway while equipping them with the skills to become skilled workers, ready to contribute to the labor market. Next to knowledge and competences, further goals are targeted. Learning environments should not only facilitate the acquisition of knowledge and skills but also promote also students' well-being in school, which has increasingly been recognized in recent years as an important educational outcome. Students' emotions and emotional skills, attitudes and feeling towards school and in general are factors being considered. Well-being itself is thereby a goal, as students spend a comparable amount of time in school as at home (Morinaj & Hascher, 2019) and feeling well in all environments is crucial. This is emphasized as well-being contributes to educational attainment – relations between well-being and performance were repeatedly found (Bücker et al., 2018; Kaya & Erdem, 2021). Furthermore, societal outcomes are part of scholastic curricula – democratic values should be conveyed and thus scholastic education also contributes to a stable society. In this dissertation two educational goals are focused: students' educational attainment and well-being.

Educational attainment and well-being result of complex relations between factors stemming from different environments, which are the school itself as teaching and learning environment as well as interactions with peers taking place in this environment. Also, students' family background is highly relevant for educational outcomes. Persistent educational inequalities (Boudon, 1974) remain a notable feature of the German educational system, where family background continues to strongly influence childrens' educational attainment (Horneber & Weinhardt, 2018; OECD, 2019) and well-being (Navarro-Carrillo et al., 2020). Family background is one central predictor under investigation in this dissertation. Doing so, potential starting points for reducing the relations between family background and educational outcomes are also focused. Therefore, motivational factors and stressors resp. cost related factors (Eccles & Wigfield, 2020; Wigfield & Eccles, 2000) are included in the distinct analyses, as there are findings indicating that the relation between family background and educational outcomes might be weakened by high motivation (L. Wang & Finch, 2018). Furthermore, students are

investigated depending on the enrollment recommendation they received for secondary school, as this enrollment recommendation is socially biased as well (Bittmann, 2021) and deviating from the enrollment recommendation has implications for students' performance and socio-emotional outcomes. The transition to secondary school in Germany is particularly relevant for generating resp. increasing educational inequalities (Lohmann & Groh-Samberg, 2010), but also has implication for students' socio-emotional development and well-being (Praherso et al., 2017). This might be reinforced by students who do not follow the intended pathway and deviate from the enrollment recommendation.

This dissertation aims to expand previous knowledge in investigating those specific groups of students which might have differential need for promoting educational attainment and well-being. For operationalizing educational attainment, school-leaving certificates are used, which are a more general measure and represent a signal and a status symbol and are important for the further vocational and occupational pathway compared to often times used (domain-)specific performance. Furthermore, for predictors and outcomes, a multidimensional approach is used. For well-being four facets are covered. In terms of predictors, which are mainly family background, motivation, and stressors, also multiple measures are included in the distinct contributions. This happens in the light of the enrollment recommendation received at the end of elementary school time for two of the three contributions. This dissertation uses data of the National Educational Panel Study (NEPS) and thereby draws upon a large, valid dataset.

This dissertation is structured as follows: As part of the theoretical background (Section 2) for a deeper understanding of the mechanisms being investigated, this work starts with an overview over the German school system (Section 2.1). Afterwards an introduction for the two outcome variables educational attainment and well-being is given (Section 2.2). In the following section (2.3), the predictor variables are introduced theoretically. Thereby central theories of inequalities (2.3.1) and motivation (2.3.2) are outlined. The section on the predictors of educational attainment and well-being (2.4) starts with an overview over the theoretically derived included constructs and investigated relations in this dissertation. The current state of research for educational attainment and well-being is presented for the distinct constructs in the following sections (2.4.1 to 2.4.6). The overarching research questions for this dissertation are derived in section 3. Before discussing the findings of the contributions, a summary of the two empirical studies and the further analyses is given in section 4. Chapter 6.1 and 6.2 contain the two empirical studies of this dissertation and in chapter 6.3 the further analyses are presented. The general discussion of this dissertation starts with a discussion of the main results, that refer

to the four overarching research questions (7.1.1 to 7.1.4) This section is followed by a discussion of limitations (7.2.1) and strengths (7.2.2) of the individual contributions and the dissertation as a whole. Subsequently implications for future research (7.3.1) and practice (7.3.2) are derived. The dissertation closes with a general conclusion (7.4).

2. Theoretical background

2.1 Short overview over the German educational system

The German educational system exhibits several distinctive features compared to other countries. Notably, unlike countries such as the Scandinavian nations or the United States, the German system offers only a brief period during which students of varying abilities learn together in a unified setting. Joint education continues e.g., in Scandinavia until grade 9 (Imsen et al., 2017). In the American system, there is no differentiation in different school tracks, all students attend high school and differ in selected courses (Urban et al., 2019). In Germany, students are assigned to different school types with different performance requirements after completing elementary school time, which typically lasts for four years in most federal states, except for Berlin and Brandenburg, where elementary school time lasts six years (Klemm, 2022). Due to the country's federal structure, education falls under the jurisdiction of the 16 federal states, resulting in diverse school types and varying regulations regarding their admission criteria (KMK, 2021). After attending elementary school, there is a total of 16 secondary school types (mainly different in their notations) and mixtures of two- and three track systems. Common ground for all federal states are the school types *Förderschule* (special educational needs schools) and *Gymnasium* (lasting 12 or 13 years and allowing to take up university studies). Among multi-track schools and secondary schools leading to vocational training there is a large variety between the German federal states. In three track systems, the most common school types are *Hauptschule* (school leaving after 9 resp. 10 years of schooling) and *Realschule* (school leaving after 10 years of schooling). Equivalent school types for *Hauptschule* are i.e., *Werkschule* (Bremen) or *Mittelschule* (Bavaria). But some *Hauptschulen* also offer ten years of schooling and a school leaving certificate which is equivalent to attending *Realschule*. This development aligns with the trend towards two-track school systems and the declining significance of *Hauptschulen*. In line with this, there is a large variety of multi-track school, of which some offer two tracks leading to vocational training (*Regelschule* (Thuringia), *integrierte Sekundarschule* (Berlin) *Sekundarschule* (North-Rhine Westfalia, Saxony-Anhalt), *verbundene Haupt- und Realschule*, *Mittelstufenschule* (Hesse)), and other have three track also offering the opportunity to obtain an academic-track school leaving certificate (*integrierte*)

Gesamtschule (Mecklenburg-Western Pomerania, Brandenburg, North-Rhine Westfalia), *Gemeinschaftsschule* (Schleswig Holstein, Baden-Württemberg, Saarland), *Oberschule* (Bremen) *Stadtteilschule* (Hamburg)).

At the end of elementary school time, German students receive an enrollment recommendation for a secondary school type, that guides their transition to a specific secondary school type. Also Austria (Auer, 2015), Switzerland (Gibson & Koch, 2020), Luxembourg (Klapproth et al., 2013), and the Netherlands (Timmermans et al., 2018) have comparable mechanisms determining the attended secondary school type by a teacher recommendation. However, in Germany the implementation of teacher recommendations is not uniform across federal states. In the federal state of Bremen, for example, no recommendation is made (KMK, 2015). For the other federal states there are heterogeneous regulations as well. The enrollment recommendation is based on elementary school students' performance resp. the development of students' performance. However, there are differences in the included subjects between the federal states (for an overview, see Table 1). Some states include core subjects as German and Math (Baden-Württemberg, Saarland), other federal states such as Saxony, Bavaria or Brandenburg also include general knowledge/local history (Sachunterricht) or foreign languages. Also, in terms of grade average thresholds there are different regulations, if there are any. For receiving an academic-track enrollment recommendation the range for the grade point average is between at least 2 (good, Thuringia) and 3 (satisfying, Rhineland Palatine) with gradations, for example in Bavaria, where the average grade for academic-track school attendance is 2.3. In some federal states, such as North Rhine-Westphalia, there are no fixed thresholds for secondary school enrollment. However, students' performance levels remain highly relevant. The responsibility lies with teachers, who assess students' performance and development to provide an enrollment recommendation. Furthermore, teachers consider not only students' performance, but also their motivation and school-related behavior in terms of i.e., effort when giving the enrollment recommendation (KMK, 2015; Riek & van Ophuysen, 2016).

After receiving the enrollment recommendation, the transition to secondary school is different varies across federal states, as the binding nature of the differs. In federal state with low bindingness, parents have the freedom to decide which school type their children will attend after elementary school. Additional measures such as entrance examinations or probationary periods are required if students wish to enroll in a higher school type than what was recommended.

Table 1*Overview over the transition regulations in the German federal states*

Bindingness	Federal states	GPA for ATER	Entrance examination ATS	Probation period ATS
low	Bremen, Hamburg, Hesse, Mecklenburg-Western Pomerania*, Lower Saxony, North Rhine-Westphalia, Rhineland-Palatinate, Schleswig-Holstein	No, several factors count: e.g. Performance level, performance development, school related behavior and attitudes	No	No (*yes: first school semester after transition)
	Berlin	German, math, 1st foreign language, natural and social sciences count double (2.2 to 2.7 with good prognosis)	No	yes
rather high	Baden-Württemberg, Saarland	German and math max. 2.5/ max. 2 and 3 (total max. 5)	No	No
	Saxony-Anhalt	No, several factors count: e.g. Performance level, performance development, school related behavior and attitudes	No	No (*yes: first school semester after transition)
	Saxony	Math, German, general knowledge/local history (Sachunterricht) max 2.0	Yes, in written form (without ATER)	No
high	Bavaria, Thuringia	Math, German, general knowledge/local history (Sachunterricht) (max. 2.33/ 2.0)	No, three days trial lessons without ATER	No
	Brandenburg	Math, German, 1st foreign language (total max. 7)	No, two days trial lessons without ATER	No

Note. ATS = academic-track school. ATER = Academic-track enrollment recommendation.

Breaking this down, several implications emerge for working with school data in the German context arise. The heterogeneity of the school system must be carefully considered when analyzing different school contexts. For instance, allocating students attending multi-track schools to a specific school type is not always feasible due to the structure of the data. While two-track schools can generally be categorized as non-academic tracks, methodological

challenges arise with three-track schools. In such cases, the school type may be recorded, but specific information about the track students are enrolled in is often missing, complicating detailed analyses.

2.2 Outcomes of education

Scholastic education pursues many goals (KMK, 2017). First and foremost, knowledge transfer is one important goal. The aim is thereby that students who leave school are able to integrate themselves into the labor market by taking up vocational training or university studies after they left school. In recent years however, also students' well-being was more and more focused as a distinct educational outcome. Students spend a significant portion of their daily lives in schools, making their well-being in this environment crucial. Feeling comfortable and supported in school is not only a vital prerequisite for academic performance and knowledge acquisition but also an important educational goal in its own right. Furthermore, also societal outcomes are part of scholastic curricula – thus, for example, democratic values should be conveyed. Correspondingly, scholastic education also contributes to a stable society. This dissertation focuses two central educational outcomes which are educational attainment and well-being. As both outcomes comprise multiple facets, they are described in the following section in detail.

2.2.1 Educational attainment and its measurement

Educational attainment is a central goal of scholastic education. However, educational attainment itself is not a single outcome and can be differentiated further in the assessment of grades, standardized competence tests, and school-leaving certificates. Especially grades and school-leaving certificates have relevant implications for educational trajectories and occupational pathways.

In the scholastic context, the most important measure for students are grades. Grades are given for tests, exams and class participation and have many functions for different groups of people. They are used to evaluate performance and provide feedback on performance for students. Also parents receive information on students' performance status via grades (Lintorf, 2011). Next to current performance status also long-term information on performance development can be traced. From the current performance, also deductions for further performance can be drawn. This is particularly important at educational transitions. When transitioning from elementary to secondary school, grades are one of the core elements for teachers in deciding which enrollment recommendation students receive as explained above (KMK, 2015; Maaz & Nagy, 2010). Grades thus contribute to performance-oriented selection of students for different educational pathways. In school-leaving certificates grades are

moreover an important prerequisite for students further educational and occupational pathways as certain study programs have specific grade thresholds for admission. Next to this, students are introduced to the principle of performance orientation via grading (Berkemeyer, 2020). Furthermore, grades are a seemingly objective way of assessing students in their performance, as they seem to provide a uniform evaluation standard. In data assessments, grades are mostly assessed in questionnaires. However, previous research has shown, that grades differ by students' immigrant status and socioeconomic status (SES), although they might have similar abilities in standardized competence tests (Helbig & Morar, 2017). Also school-related behavior is included by teachers when evaluating students by grading (Stang-Rabrig & Urhahne, 2016). Furthermore, teacher stereotypes towards groups of students are also relevant when grading – i.e. teachers' beliefs of students being able to perform well or not (Kleen et al., 2022; Pit-ten Cate & Glock, 2024).

Next to grades, also standardized competence tests are relevant measures, which are especially assessed in large-scale assessments. The aim is to measure students' competences and to provide a more standardized measure of their performance compared to traditional grading systems. Standardized competence tests are typically conducted in a classroom setting during a survey. Those are mostly conducted for the main subjects Math and German (e.g., IGLU/PIRLS: Schaufelberger et al., 2024). But also students' science knowledge (e.g., PISA: OECD, 2023) and their ICT or digital competence (e.g., NEPS: NEPS Network, 2023) are assessed. The aim of standardized competence tests is to provide a comparable measure with standardized values – particularly compared to grades which are depending on further factors than performance and – as explained above – can vary by SES, gender, immigrant background and further factors, even when performance measured via standardized competence tests is equal (Bittmann, 2021). Standardized competence tests thus allow to compare students in their performance and to gain knowledge about the accuracy of grades. They are conducted and evaluated anonymously, allowing to assess competences objectively. However, conducting standardized competence tests is time-consuming and expensive. They are typically developed and evaluated by researchers through an extensive development process – this involves deciding which competences need to be assessed and designing appropriate questions and answers, to accurately measure those competencies. The tests need to be objective, reliable and valid, which is why pretests before assessing them in larger groups of students are necessary (Haladyna, 2013; Moosbrugger & Kelava, 2020). Developing a competence test can take several months, including the time to develop it and possible revisions. Typical competence tests are fixed-item tests. This means that all students get the same questions and based on their answers a score on

their performance is calculated. In this context, different performance levels, i.e., for special educational needs students need to be considered, as item difficulty can be perceived differently depending on abilities (Moosbrugger et al., 2020). However, recent advancements in computer-based testing have enabled the implementation of adaptive tests. These tests adjust to a student's ability during the assessment. Based on ongoing calculations of the student's performance, the test presents more challenging items to higher-skilled individuals and simpler items to those with lower skill levels, providing a more personalized and accurate measure of competence. (Krabbe et al., 2023; van der Linden, 2018). Possible advantages are individual test lengths and less frustration due to not solving or solving tasks too easily (Hambleton & Zaal, 2013). However, the administration of adaptive tests is more complex than the administration of fixed-item tests and technology-based testing is required.

The scholastic educational pathway depends on students' competences and performance. In the end however it results in a school-leaving certificate. While grades and results of competence tests rather have significance for a limited period of time, school-leaving certificates have rather long-lasting implications for social participation and employability (Baumgarten et al., 2022), as school-leaving certificates are formal degrees and thus represent a central entry condition to different levels of occupational pathways and for the further life course (i.e., taking up university studies vs. taking up vocational training). Especially school dropouts before achieving a formal certificate carry many risks for individuals, which are i.e., unemployment, poverty, and social exclusion (Baumgarten et al., 2022; Campbell, 2015; Rumberger, 2020). Also higher risk of criminality due to the previously mentioned consequences follow from low education (Baier, 2019). The relations between higher school-leaving certificates and low rates of unemployment are well supported (Autorengruppe Bildungsberichterstattung, 2016; Hausner et al., 2015; Maaz, 2017). Next to economic consequences, educational qualifications also are status symbols (Clark & Martorell, 2014; Clasen & Butterwegge, 2014).

Previous research on educational attainment primarily focused on the effects of grades and competencies, as these are key indicators of students' academic success and future opportunities. Given the critical importance of school-leaving certificates as entry credentials for various educational pathways, it is essential to examine not only the predictors of performance and competences but also the factors influencing the attainment of these certificates. This dissertation focuses specifically on school-leaving certificates, with a particular emphasis on identifying the predictors for obtaining *Abitur*.

2.2.2. Well-being

Next to educational attainment, in recent years also students' well-being came into focus when assessing educational outcomes, as next to performance-oriented outcomes also students' well-being is considered as an important educational goal. Additionally to feeling well in school as a vital goal, well-being is a value on its own and also relevant in terms of positive functioning and performance-related outcomes, as they are positively predicted by students' well-being (Amholt et al., 2020).

Well-being is a broad and multidimensional construct of which a general definition is missing (Gysin, 2018; Hascher, 2004; Maddux, 2017; Ruggeri et al., 2020). However, different conceptualizations have in common that well-being is a holistic construct that encompasses satisfaction resp. happiness in all areas of life (Cooke et al., 2016; Martela & Sheldon, 2019). A base model of well-being differentiates between hedonic and eudaimonic well-being (Joshanloo, 2016; Ryff et al., 2021). This differentiation was already made in ancient Greece by philosophers like Aristotle. While the hedonic well-being is defined by positive resp. negative affect and striving for a happy life, the eudaimonic well-being focuses the striving for meaning and a higher purpose resp. a meaningful life (Ryff et al., 2021). Modern concepts of well-being are grounded on those two strands and these two concepts are also reflected in school-related well-being. For the hedonic well-being those are i.e., joy at school, satisfaction with school and life and attitudes towards school. For the eudaimonic well-being, matches between intrinsic values and goals and self-concept are of relevance (Kryza-Lacombe et al., 2019).

When investigating young peoples' well-being, the school context is an important environment that should not be neglected, as students' everyday life takes place there. Students spend a lot of time in school and interaction and comparison with peers significantly contribute to shaping students' well-being (Aldridge & McChesney, 2018; Morinaj & Hascher, 2019; Steinmayr et al., 2018). Referring to general well-being theories, well-being can be differentiated into a cognitive, social, affective, and a physical component (Diener, 1984; Hascher, 2004; Kanonire et al., 2020). The cognitive component includes general measures of well-being such as overall life satisfaction, which is relatively constant over time (Proctor et al., 2011). The social component refers to social embeddedness and satisfaction with it (Borgonovi & Pál, 2016; Keyes, 1998). Affective measures represent assessments of one's current life situation including a person's mood and emotions. Those are usually time-dependent and subject to change. Affect includes positive as well as negative aspects and well-being is considered as high in the presence of positive and absence of negative affect (Pekrun,

2017). The physical component includes measures of health (Cooke et al., 2016; Scheier & Carver, 1992). The four dimensions of well-being described above are also evident in the school context. Cognitive well-being is represented i.e., by students' (life) satisfaction and academic self-concept (Tian et al., 2015). The social dimension refers to aspects of social embeddedness and interactions in school (Schmidt et al., 2019). In line with Diener's (1984) definition, the affective dimension includes students' emotions towards school, i.e., school enjoyment (Hascher & Hagenauer, 2020). Physical well-being in the school context refers to measures such as days absent from school (Richter & Hurrelmann, 2009).

Well-being contributes to students' learning and performance. The direction of the relations between performance and well-being has been broadly discussed, with recent meta-analyses and studies resulting in indications for a reciprocal relationship (Bücker et al., 2018; Kaya & Erdem, 2021; Kleinkorres et al., 2020). Well-being was shown to be predictive for educational attainment (Amholt et al., 2020). Feeling well in school, having positive emotions towards and associating positive experiences with school might broaden students' momentary thought-action repertoires following Fredrickson's (2001) broaden-and build theory. But also the prediction of well-being by educational attainment is theoretically and empirically well supported (Stang-Rabrig et al., 2023). According to Ryan and Deci's (2000b) self-determination theory (SDT) the fulfillment of basic psychological needs—autonomy, competence, and relatedness—is essential for motivation and well-being. The need for autonomy thereby represents the feeling of voluntarily taking actions, being in control and taking responsibility for one's actions. The need for competence represents the goal of developing skills and abilities and being able to use these skills to complete tasks. Feeling competent also includes feeling challenged but not overloaded with demands. It also comprises the need of being able to affect the environment. The need for relatedness represents a need of social embeddedness, feeling connected with others, and having a good social support network (Ryan & Deci, 2020).

In addition to these two distinct approaches to action, the learning environment also plays a crucial role in shaping students' well-being (Rathmann et al., 2017). The big-fish-little-pond effect (Marsh, 1987) explains how the environment's performance influences students' well-being in terms of academic self-concept. Students' self-concept develops in relation to the performance of the class. Being a mid-performing student in a low performing class is more beneficial for students' self-concept than being a mid-performing student in a high-performing class, as students tend to compare their performance to their peers' performance (Fang et al., 2018). But also demands placed on students have an impact on their well-being, especially

when there are mismatches between students' abilities and the demands. This was theorized for a workplace environment in the job-demands-resource-model (Demerouti et al., 2001). The assumptions made for the work-environment also hold in the school context, as also in this environment matches resp. mismatches between students' performance and performance requirements are evident (Salmela-Aro & Upadaya, 2014). A mismatch towards high requirements and low performance can lead to burnout, overload and thus has negative effects on well-being.

2.3 Theoretical framework for predictors of educational attainment

After focusing the outcome variables in section 2.2, in the following section 2.3 the theoretical foundations of the constructs included in this study—family background, and motivation are outlined. Subsequently, Section 2.4 presents the current state of research related to these constructs.

2.3.1 Theories of educational inequalities and measurement of SES

Educational inequalities represent systematic relations between SES and educational outcomes. A large educational inequality implies inequalities of opportunities depending on students SES. SES includes a variety of dimensions. Bourdieu (1973) theorized that a person's social background consists of economic, cultural, and social capital. Economic capital includes occupation and income. Those factors are highly interrelated and are a rather common measure to determine a person's social class, and includes measurable indicators such as occupational positions and income. Economic capital strongly influences students' opportunities in terms of tutoring, attending private schools etc. Cultural capital covers parental value orientations and attitudes towards their children's education. This includes parental aspirations towards their children's educational outcomes in terms of school leaving certificates and occupational career, but also home possessions such as books or artworks, as well as parental education. Social capital represents a social support network among family and friends informing about different possible educational careers or organizing vocational training via personal contacts. The available capital resources can be connected to the basic need defined in the SDT (Ryan & Deci, 2000b). The need for autonomy can be linked to economic capital, as autonomously being able to take actions requires the economic resources to take up these actions, i.e., such as attending school longer and taking up university studies instead of leaving school after lower secondary education and taking up vocational training directly afterwards due to economic constraints. The need for competence can be related to cultural capital, as it represents educational prerequisites and determines educational goals which then determine the need for competence.

The fulfilment of the need for relatedness can be linked to social capital, as social capital represents a social support network among family and friends.

The different capitals according to Bourdieu (1973) represent different facets of socioeconomic background. However, the multidimensional nature of each capital leads to significant variation in how SES is measured. For operationalizing SES there is a variety of hierarchical standardized measures (Schneider, 2016). In terms of education a basic measure is years of education, which contains information on how long a person attended formal education (Schneider, 2016). This measure is oftentimes discussed critically, as it is not sure, which educational contexts are included by persons answering questions on years of education. Furthermore, it remains unclear, whether grade retentions are included as separate years of schooling. Also, internationally compared, same years of schooling might lead to different educational outcomes. However, assessing immigrants' educational status via educational years might provide base information on the achieved education even when formal educational qualifications are not comparable (Schneider et al., 2023). However, there are further measures, focusing the international comparability of education. The International Standard Classification of Education (ISCED) was developed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) in the 1970s to provide a uniform standard for educational statistics on international and national level (UNESCO, 1997). ISCED classifies all educational levels from early childhood education to doctoral level and ranges in its current implementation from 2011 from 0-8. Similar categories are used with the Comparative Analysis of Social Mobility in Industrial Nations (CASMIN). This measure was developed in a research project on comparing social mobility (König et al., 1987) to internationally compare social mobility. This measure includes categories from "not completed basic education" to "higher tertiary education" and ranges from 1 to 3 with differentiations in the different categories.

Occupations are internationally classified in the International Standard Classification of Occupations (ISCO-classes). ISCO was developed by the International Labor Organization (ILO) in the 1960s and is an assignment of a four-digit number containing information on i.e., tasks and occupational fields of an occupation (Geis & Hoffmeyer-Zlotnik, 2001; International Labour Office [ILO], 1990). However, there are national specifics in the classification, as not all occupational groups and categories are transferable across all countries. In Germany, also the *Klassifizierung der Berufe* (KldB) is a valid, national categorization for occupations (Geis & Hoffmeyer-Zlotnik, 2001; S. Schneider, 2016). Based on the ISCO-88-classes (ILO, 1990) from 1968, Ganzeboom (1996) developed the International Socio-Economic Index of Occupational Status (ISEI) which is a hierarchical measure including income, education and

occupation. He assumed that every occupation requires a certain educational level and results in a certain income. The measure was updated in 2010 based on ISCO-08 and ranges from 10 (subsistence farmers, fishers, hunters, and gatherers) to 90 (judges) (Ganzeboom & Treiman, 2010). A rougher classification however also based on ISCO-classes is made by Erikson, Goldthorpe & Portocarero (EGP-classes) (Erikson et al., 1979). This classification is based on employment status and occupation and includes the type of work, position, the authority to give instructions and required qualification. The measure ranges from 1 (higher professionals) to 7 (unlearned workers). In this dissertation the highest ISEI in the household and the highest ISCED in the household were used as indicators for SES, as they are internationally recognized measures.

The dependence of children's educational outcomes on their familial socioeconomic prerequisites is a longstanding global issue. This phenomenon is evident in various contexts including the US-context (Hanushek et al., 2022; Stephens et al., 2014), Asian countries (Lam & Zhou, 2022) as well as the European context (Kloosterman et al., 2009; Passaretta et al., 2020). Also in the German context, educational inequalities are prevalent. Students, whose parents have low education, attend academic-track schools significantly less often than students, whose parents have high education (Horneber & Weinhardt, 2018). As already described, especially students secondary school degrees are influential for their further educational and occupational career. Thus, the time of transition to secondary school is seen as particularly critical for generating and increasing educational inequalities (Lohmann & Groh-Samberg, 2010). Explanations have been subject to research and theories since the problem arose and became a topic. But also recent developments and new explanatory approaches were supplemented. Boudon's (1974) theory of primary and secondary effects of social stratification remains a cornerstone in understanding educational inequalities, particularly those arising during transitions to secondary school. This theory emphasizes the mechanisms influencing educational transitions and their role in perpetuating social stratification. Primary effects of social stratification represent differences in performance due to social status. An explanation are heterogeneous (learning) environments from birth onwards that influence their development. Children have different resources by social status and differ in their social, economic, and cultural capital, as Bourdieu (1973) theorized. More available resources mean more favorable conditions for the development of language, learning motivation and learning habits. These factors in turn positively influence students' performance (R. Becker, 2004).

Secondary effects of social stratification then focus different educational decisions depending on social status. Different educational decisions are based on differences in

educational aspirations, motives of status attainment and cost-benefit considerations. The social position theory (Keller & Zavalloni, 1964) explains the development of differing aspirations by SES. Parents aspire for their children an educational qualification that is equivalent or better to their own. For immigrant students parents aspire oftentimes higher educational qualifications than the ones they hold. This is explained by the immigrant optimism theory (Kao & Tienda, 1995). Due to the wish to advance in social status through education, immigrant students and their parents are more ambitious in terms of educational attainment. Furthermore, immigrants might be a socially selective group of people, migrating due to the wish to obtain good education for their children (Cebolla-Boado et al., 2021).

Motives of status attainment explain why high-SES parents aspire higher educational outcomes for their children, as a drop in social status is aimed to be avoided (Stocké, 2012). As high-SES parents have more to lose in terms of social status, motives of status attainment are more prevalent in this group. Also cost and benefit of high educational attainment are assessed differently by social status. The theorized cost and benefit considerations by Boudon (1974) were described in more detail by Erikson and Jonsson (1996) in their rational choice model. Benefits of education are expected outcomes as occupational status and income and avoidance of loss of social status. Also, there are expected costs that are monetary (time of schooling, university studies vs. taking up vocational training) or nonmonetary (learning stress, cost of status loss). Moreover, the probability for the child to successfully complete the intended educational pathway is taken into account. Benefit, cost, and probabilities are assessed differently by SES leading to different educational decisions – the benefit of high education is assessed higher by high-SES parents, while monetary costs are less of a factor due to the better income situation. But the cost of status loss is more severe in this group, while at the same time the higher performance of high-SES students leads to a better assessment of the probability to succeed.

Boudon's theory was extended in terms of tertiary effects of social stratification by Gresch (2012) and Helbig and Morar (2017). While primary and secondary effects focus familiar prerequisites, tertiary effects focus inequalities in terms of teacher assessments by immigration status (Gresch, 2012) resp. SES (Helbig & Morar, 2017). When grading students, next to students' competences and actual performance, teachers also include students' likelihood to success and perceived parental support, as they "attest children from better-educated families more school adequate noncognitive skills" (P. N. Blossfeld et al., 2015, p. 148). Both factors are strongly related to students' SES. Whether this happens consciously or unconsciously is not clearly identifiable.

2.3.2 Theories of motivation

When seeking to explain educational outcomes, in addition to students' family background, other individual factors also play a significant role. Motivation is a relevant factor in all areas of life – in occupational and school context as well as in social life. Motivation is also crucial for students learning success and is seen as a factor contributing to a reduction of educational inequalities (L. Wang & Finch, 2018). In a learning environment, it is understood as “a process in which goal-directed activity is instigated and sustained” (Schunk et al., 2014, p. 5) and represents the (inner) desire to acquire knowledge and creates an incentive to engage with learning contents with e.g., persistence and direction (Ryan & Deci, 2000b). More broadly, motivation encompasses the underlying motives that drive decisions or actions (Rheinberg & Vollmeyer, 2019). There are manifold reasons why people are motivated to engage in something, which is why motivation is a multidimensional construct (van den Broeck et al., 2021). The many facets of motivation can be rather intrinsically motivated vs. extrinsically motivated; however, extrinsic and intrinsic motivation represent a continuum rather than distinct categories. These differentiations also made in the self-determination theory (Deci & Ryan, 1983; Ryan & Deci, 2020). Intrinsic motivation represents a personal interest in an activity, topic or subject, which motivates to learn. Extrinsic motivation represents external factors boosting motivation (Hennessey et al., 2014; Ryan & Deci, 2000a). Those external factors are mainly consequences of actions, which can be positive or negative. Positive outcomes are i.e., rewards by parents for good grades and negative outcomes are i.e., punishments (Cheung & Pomerantz, 2012). Both intrinsic and extrinsic motivation can be performance-oriented and mastery-oriented (Cook & Artino, 2016; Elliot & Thrash, 2001; J. Q. Lee et al., 2010; Pintrich, 2000). Performance-orientated motivation focuses the performance outcome itself – this can be a grade, avoidance of grade retentions or obtaining a certain school leaving certificate (Heckhausen, 2013). It is situation-oriented, meaning that the state component of motivation is relevant. This encompasses measures such as learning for a good grade. Mastery-oriented motivation in contrast primarily aims at understanding the learning contents partly independent of the actual performance outcome (Kaplan & Maehr, 2007). It rather represents a long-term lasting motivation, implying that the trait component of motivation is relevant for this type of motivation (Cerasoli & Ford, 2014). Mastery-oriented learning is measured by using items such as learning to understand a certain relation.

A broad set of motivational theories as e.g., the social cognition theory (Bandura, 1977, 2001), the extended cognitive motivation theory (Heckhausen & Rheinberg, 1980), the achievement-goal theory (Elliot & Thrash, 2001), and the – for this dissertation particularly

relevant – expectancy-value theory (Wigfield & Eccles, 2000) aims to explain the relations between motivation and educational outcomes. They have in common, that the included motivational factors can be assigned to the above-mentioned categories of intrinsic and extrinsic resp. performance-oriented and mastery-oriented motivation. A core element of motivational theories are expectancies and values (Wigfield & Eccles, 2000). Expectancies in terms of success represent the estimated probability of being successful in certain situations as tasks or activities (Eccles & Wigfield, 2020; Wigfield & Eccles, 2000), as well as in terms of larger educational decisions such as taking up university studies or taking up vocational training. Values represent the personal importance of those situations and are further differentiated between four dimensions – the interest-enjoyment value, the attainment value, the utility value, and costs (Wigfield & Eccles, 2000). The interest-enjoyment value resp. intrinsic value refers to personal benefits of joy from doing a task. The intrinsic value is derived from the concept of intrinsic motivation from Deci and Ryan (1985). The attainment value represents valuing something in order to perform well on a specific task. The utility value refers to the usefulness for the further life course e.g., engaging particularly in one subject as an occupational pathway related to this subject is aspired. Costs consider activities competing with learning such as spending time with friends. Next to this, also the effort being necessary to complete a task and emotional load of completing a task are costs to consider by students (Wigfield & Cambria, 2010; Wigfield & Eccles, 2000).

Already Atkinsons (1957) achievement motivation theory assumed expectancies and values to be related to achievement. Wigfield and Eccles (2000) then further differentiated Atkinsons's assumptions in their expectancy-value model of achievement motivation. This model provides a comprehensive explanation, how achievement-related choices and achievement are shaped, considering not only motivational factors, but furthermore factors influencing students' motivation. Students' cultural milieu is considered the starting point for achievement and achievement related choices in the expectancy-value model. This is in line with Bourdieu's (1973) theoretical considerations of cultural capital and Boudon's (1974) theoretical assumption concerning secondary effects of social stratification. Closely related to the cultural milieu are parents' beliefs and behaviors, which in turn influence children's' perception of those beliefs. Also, according to Bandura's (1977) social cognitive theory, students' learning habits and goals can be led back to significant others functioning as role models, as learning processes are not autonomous. Although in Bandura's (1977) theory, the behavior does not necessarily need to be reproduced from a personally known person, the reflection of others' actions and behaviors is also found in parental beliefs and behaviors shaping the child's goals and behaviors. These multi-layered connections are also found in

Bronfenbrenner's ecological systems theory (Bronfenbrenner, 2005). This model identifies different levels or systems that influence developmental processes. Also, according to Bronfenbrenner, a child's development is influenced by its direct environment and the social interactions in this environment (e.g., family) – this represents the microsystem. On a meso-level, those different environments interact with each other – e.g., parents interact with teachers. On the other levels, further factors as parents' workplace (exosystem), societal values and norms (macrosystem) and events occurring during the life course, which can be non-normative such as illness in family or normative such as school entrance or school transitions (chronosystem) are of relevance. Next to this in the expectancy-value model also the child's characteristics are of relevance for educational decisions and outcomes. Aspects of students' well-being as their affect are included as well as students' previous achievement related experiences.

Recently the original expectancy-value-model was extended in terms of situation-relatedness (Eccles & Wigfield, 2020). Students' SES is differentiated in a stronger manner, as parental education, income, occupation and further sociodemographic factors are considered, replacing the factors being considered as factors of the cultural milieu. Also, parents' behaviors take on a higher priority – those are included multifaceted e.g., in terms of parental teaching, career orientation, or encouragement for activities. Next to achievement and achievement related choices students' belief (expectancies), values and goals are no longer only a predictor but also an outcome of the model.

Furthermore, (perceived) costs are part of the expectancy-value-model and relevant for students' educational attainment. Individuals aim to avoid costs (Wigfield & Eccles, 2000). However, costs can be extended in terms of stressors. Stressors might function as a counterpart to motivation, when coping strategies are not operational. Lazarus and Folkman (1984) developed the transactional model of stress. Stress thereby is a result of demands towards a person in relation to a person's resources – similar to cost and utility in the rational choice model or the expectancy value model. Selye (1956) defined stress thereby as a “nonspecific response of the body to any demand” and includes multiple dimensions such as workload, or exhaustion (Gross & Seebaß, 2016). Stressors do not automatically determine whether a situation is considered stressful – depending on the available resources a situation is perceived as stressful or not.

2.4 Predictors of educational attainment and well-being

In the preceding chapters, various educational outcomes were introduced, and theoretical frameworks for their predictors were presented. This chapter connects these

constructs and reviews the state of research on the predictors of the two key educational outcomes examined in this dissertation: educational attainment and well-being. Specifically, the focus on educational attainment centers on school-leaving certificates, extending the discussion beyond (domain-specific) performance. For well-being, a multidimensional approach is employed, encompassing general, social, and school-related aspects. Building on the theoretical models presented earlier, the theoretical framework for this dissertation is developed. As emphasized in the theoretical considerations, educational outcomes are influenced by complex relationships and multiple contributing factors. From these explanations, a set of predictors relevant to both outcome areas was identified. The predictors analyzed in the two studies are introduced in this chapter, with subsequent chapters detailing their relationships with the outcome variables.

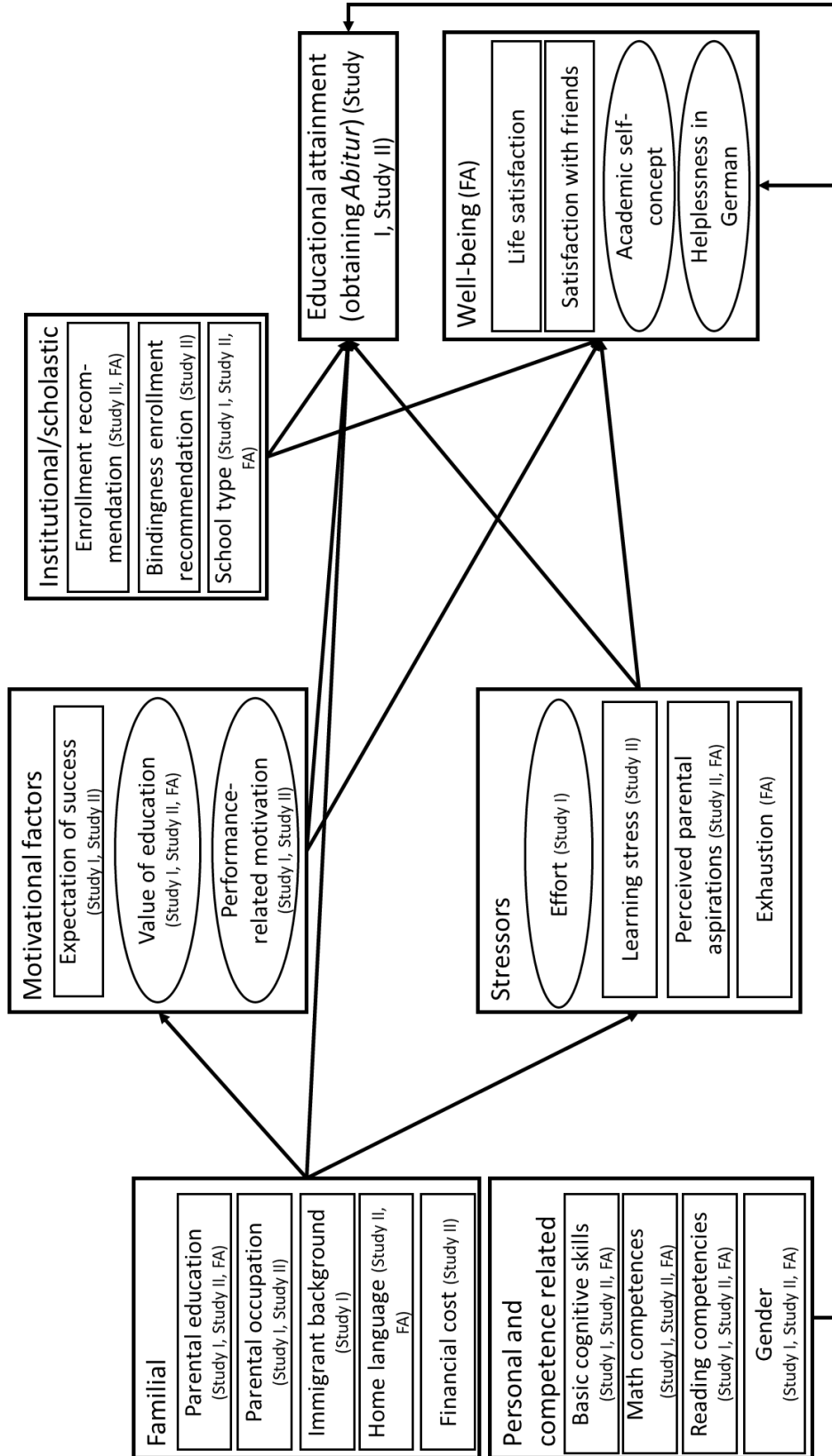
Firstly, for students' school-leaving certificates as well as for their well-being, students' performance was shown to be a central predictor (for well-being: Bücken et al., 2018; for educational attainment: M. Schneider & Preckel, 2017). Also, gender was shown to be predictive for educational outcomes (for well-being: Batz-Barbarich & Tay, 2018; for educational attainment: Lehti & Laaninen, 2024). Another central predictor for investigating educational attainment (Boudon, 1974; Stephens et al., 2014) and well-being (Crede et al., 2015; Diener et al., 1995) outcomes is students' family background. An indicator for subjective SES are perceived financial costs, which do also function as opportunity costs (Boudon, 1974; Erikson & Jonsson, 1996). Those were included as predictors for educational attainment. Shifting the focus towards motivational factors, core factors of the expectancy-value model of achievement-motivation are included (Wigfield & Eccles, 2000) – which are expectancy of success for educational attainment (Wiederkehr et al., 2015) and value of education for educational attainment (Verešová & Mala, 2016) and well-being (Moè et al., 2009). In order to examine a performance-oriented outcome, such as the school-leaving certificate, performance-oriented motivation was included as another motivational measure (Ditton et al., 2019). On the other side there are costs and stressors related to learning, influencing students' educational attainment as well as their well-being (Demerouti et al., 2001; Wigfield & Eccles, 2000). It is important to investigate potentially hindering factors as well. Included constructs are cost of effort (Durik et al., 2015) and learning stress in terms of educational attainment (Vogel & Schwabe, 2016). On the interface between familial starting conditions and motivation - however still closely related to familial factors – are perceived parental aspirations, which represent on the one hand parents wish to maintain social status but can on the other hand function as a kind of extrinsic motivation resp. a stressor (Keller & Zavalloni, 1964; Wigfield & Eccles, 2000). Perceived parental aspirations which can be found as perception of socializers' beliefs and

behaviors in the expectancy value model (Wigfield & Eccles, 2000) thus were included as predictors for educational attainment (Šimunović & Babarović, 2020) and well-being (Jones, 2015). Another stressor included in terms of well-being is exhaustion (Gross & Seebaß, 2016).

The special features of the German education system mentioned in Section 2.1 are also taken into account, as the received enrollment recommendation is linked to the outcome variables educational attainment and well-being. Furthermore, relations between familial predictors and motivation and stressors are explained in further detail, as the situated expectancy-value theory suggests (Eccles & Wigfield, 2020).

Figure 1 gives an overview over the included constructs and investigated relations in the two studies and further analyses. For clarity and better overview, only the paths directly relevant to the content have been highlighted. Additionally, each individual model within the three contributions includes further paths that are not explicitly marked here. In the following chapters, the state of research is presented for the above raised theoretically derived relations, which are investigated in the contributions of this dissertation.

Figure 1
Framework of this dissertation and included constructs



Note. Not all theoretical and empirical evident relations are included in this figure for reasons of clarity. However, the main paths analyzed in the two studies and the further analyses are covered. FA = further analyses.

2.4.1 Personal and competence related predictors

Wigfield and Eccles (2000) hypothesized, that previous achievement related experiences are a central predictor for educational attainment. However, even before achievement, foundational cognitive skills have emerged as key prerequisites and predictors of educational attainment. Results from Norway (van Hootegem et al., 2023), the UK (O'Connell & Marks, 2022) and Germany (Bittmann, 2022) and a meta-analysis which included studies from 33 different countries (B. Roth et al., 2015) found a medium-sized relation between cognitive abilities resp. intelligence and grades resp. performance. Van Hootegem et al. (2023) found a decline in the correlation over birth cohort, implicating a more meritocratic educational system in Norway in recent times. Bittmann (2022) replicated the study of O'Connell and Marks (2022) and confirmed cognitive abilities in being more important than SES for educational attainment. Prior achievement related experiences then in turn predict further achievement (Wigfield & Eccles, 2000). In the German context, already early performance in elementary school predicts further educational outcomes, as the enrollment recommendation and thus the attended secondary school type is depending on performance (KMK, 2015). The attended school type then in turn predicts the school-leaving certificate (Maaz et al., 2008). For the enrollment recommendation, especially performance in the core subjects German and math is important. But there is evidence that performance in German is more important for students' educational attainment than math performance (Neuenschwander et al., 2018). Knowledge of language and the ability to write and understand texts is prerequisite for understanding contents in all school subjects.

Also in terms of well-being, performance emerged as relevant factor. As theoretically derived, bidirectional relations between performance and well-being can be assumed (Fredrickson, 2001; Ryan & Deci, 2000b), as feeling well is an important prerequisite for achievement (Cadime et al., 2016; Heffner & Antaramian, 2016) as well as achieving high is a predictor for well-being (Steinmayr et al., 2018). Recent studies thus support the reciprocal relations between both constructs (Bücker et al., 2018; Kaya & Erdem, 2021; Kleinkorres et al., 2020).

Furthermore, gender is a relevant predictor for students' educational attainment in different domains and age groups. While over long time, women were denied (higher) education (DiPrete & Buchmann, 2013), girls and women particularly benefitted from the educational expansion taking place in the 1960s (Faulstich-Wieland, 2008; Hadjar et al., 2014). Nowadays the gender-achievement gap in school turned towards educational attainment of females. There is a higher probability for boys to drop out of school, as evidence from the US (McFarland et

al., 2018), Scandinavian countries (Pekkarinen, 2012), Spain (Ovejas, 2024), and Germany (Legewie & DiPrete, 2012) shows. Also, the likelihood to attend lower secondary schools is higher for boys (Caro et al., 2009). In reading, girls outperformed boys in all countries participating in the PISA assessment, with varying gender gaps over countries – the lowest gaps were found in southern American countries as Argentina, Chile, Mexico, and Peru and Asian countries as China. The highest gender gaps were found in Finland and Arabian countries as Saudi Arabia, Qatar or the United Arab Emirates (OECD, 2019). Also in Science, girls outperformed boys, however, the gap was smaller than for reading performance. Boys outperformed girls on average in 32 OECD countries in mathematics, while also in 14 countries girls outperformed boys (OECD, 2019). Differences in performance can be led back to gender specific behavior as motivation and effort and interest patterns (H.-P. Blossfeld et al., 2009; Lehti & Laaninen, 2024; Thums et al., 2020). Also there is evidence, that teachers' gender biases have influence on students educational attainment, leading to different grades even when competences are comparable (Hannover et al., 2016; Protivínský & Münich, 2018; Terrier, 2020). In the further educational and occupational course however, women are underrepresented especially in the STEM-field and also in leading positions (Bloodhart et al., 2020; Hernandez Bark & Pundt, 2023)

Gender has also been found to be associated with variations in well-being. The results however are inconsistent depending on the age and profession of participants and the investigated well-being dimension. In terms of overall life satisfaction of 12-year-old students from different countries, girls reported lower well-being than boys (Kaye-Tzadok et al., 2017). Italian girls also reported lower scores of self-acceptance and higher levels of distress (Visani et al., 2011). However, among Spanish secondary school students opposite effects were found and girls showed higher well-being in terms of overall life satisfaction (Casas et al., 2013). A meta-analysis focusing adults found no significant relations between gender and subjective well-being, however showing lower job satisfaction for women (Batz-Barbarich & Tay, 2018). Another overview study confirms gender differences among adults with a disadvantageous well-being for women (Blanchflower & Bryson, 2024). The relations between gender and well-being thus seem to be relevant across the whole life span.

2.4.2 *Familial predictors*

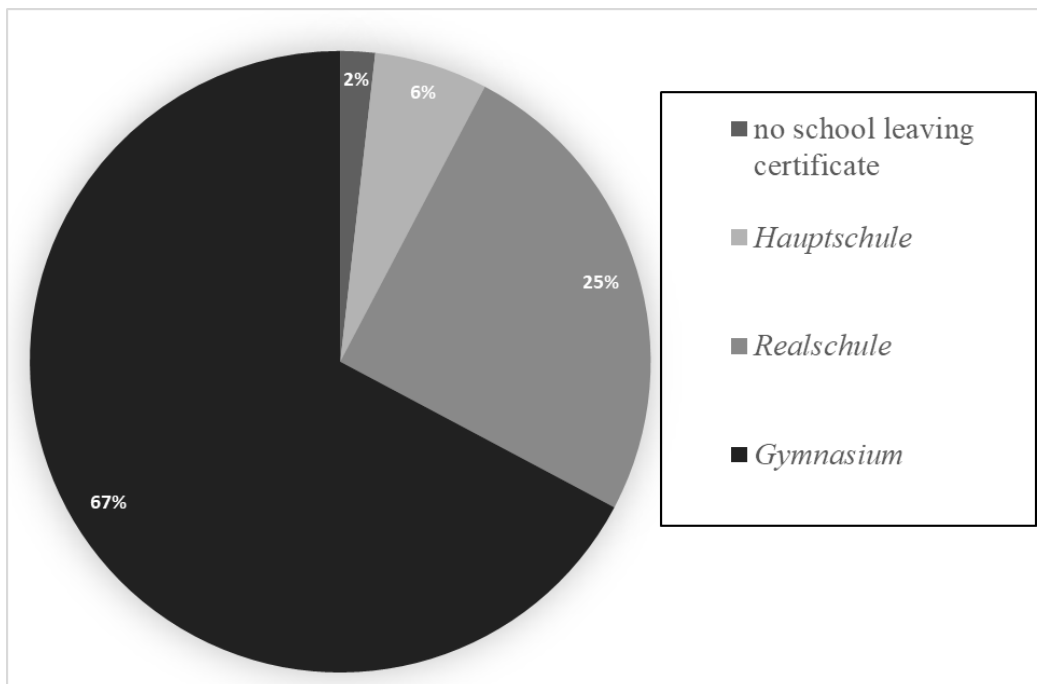
After focusing the relations between prerequisites like cognitive abilities, prior performance and gender, now familial predictors are taken in view. Students' family background consists of students' socioeconomic status (SES) including measures such as parental education and occupational status, and students' immigrant background. Also

measures of subjective SES in terms of perceived financial cost is included in terms of educational attainment.

Currently official data (Statistisches Bundesamt [Destatis], 2024) on school leavers for the school year 2021/2022 are available. In this school year about a third of school-leavers left school with *Abitur*, about 43% with a *Realschulabschluss* and 16 % with a *Hauptschulabschluss*. Almost 7 % left school without any formal school-leaving certificate. When taking a closer look at students attending the different school types by parental education a social bias can be observed. While approx. 6 % of students, whose parents obtained *Hauptschulabschluss* attended *Gymnasium* approx. 22 % of students whose parents hold a *Realschulabschluss* attend *Gymnasium*. This share is highest among students, whose parents obtained *Abitur* themselves, approx. two thirds (67%) of their children attend *Gymnasium* (Figure 2).

Figure 2

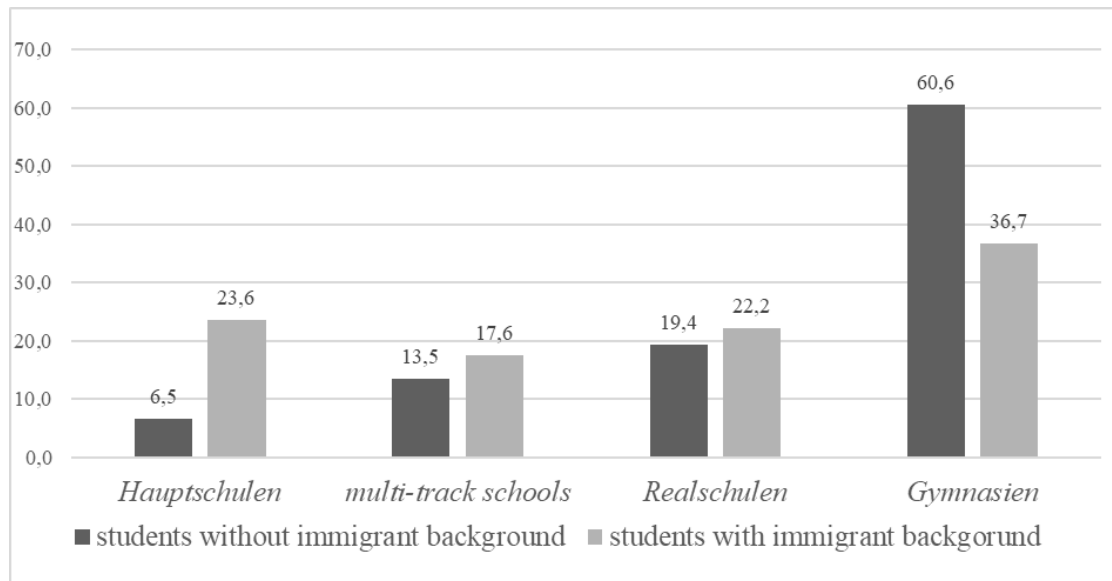
Percentage of students attending academic-track schools by parental education



A similar picture arises when comparing students with and without immigrant background in terms of school type attendance. Especially when looking at the highest and lowest school type, differences are observable. The share of students with immigrant background attending *Hauptschule* is 3.5 times as high as among students without immigrant background, while the share of immigrant students attending *Gymnasium* is almost half the share of students without immigrant background (Figure 3).

Figure 3

Percentage of students attending different school types by immigrant background



Those official data give a first impression of the unequal distribution of students on different school types by SES and immigrant background. Empirical data investigating the relation between SES and educational outcomes prove a directed relation – a higher SES is promoting students’ performance and thus their educational attainment in terms of school leaving certificates (Broer et al., 2019; C. Y. Tan et al., 2023). And although cognitive abilities have a large share in explaining educational outcomes, these relations can be reinforced by students’ SES (Stumm, 2017). Internationally compared educational inequalities in Germany are rather high. PISA-data show that Germany is among the countries showing an above-average reading performance, while being below average in equity in education (OECD, 2019), implying that students’ social background substantially influences students’ educational outcomes. Furthermore, advantaged students’ performance in Germany improved significantly between 2009 and 2018 – however from this positive trend disadvantaged students did not benefit as their performance did not change significantly (OECD, 2019).

As already described, students’ performance in elementary school is crucial for the enrollment recommendation and following this the attended secondary school type (KMK, 2015). But already by the end of elementary school time differences in students’ performance by their SES are evident (Skopek & Passaretta, 2021). This is explained by different stimuli students from different societal strata are exposed to from birth onwards (Schindler, 2015). The different performance at the end of elementary school time is one factor promoting educational inequalities at the transition to secondary school. Furthermore important is that high-SES students tend to receive academic-track school enrollment recommendations even when showing comparable performance as their low-SES peers, who do not receive an academic-

track enrollment recommendation (Böhmer et al., 2017; Ditton & Krüsken, 2006). Tertiary effects of social stratification are evident in this mechanism (Helbig & Morar, 2017), as teachers' assessments and grading vary by students SES. This is due to teacher stereotypes towards students' SES. Particularly high-SES students benefit from these stereotypes as they are assessed as higher performing (Kleen et al., 2022; Sneyers et al., 2020). The accuracy of enrollment recommendations also differs by students SES. A much higher share of high-SES students (87%), who were eligible for an academic-track school received a corresponding recommendation, than low-SES students (58%) (Dudas, 2014).

Next to SES, also immigrant background is a relevant predictor for students' performance and educational attainment. This relation was found in several OECD countries (Dustmann et al., 2012), the US (Ho & Kao, 2018), and Germany (Esser, 2019; Salikutluk, 2016). Immigrant students score on average lower on performance compared to their non-immigrant peers (Dollmann, 2016; Salikutluk, 2016). Reasons for these outcomes are assumed to lie within missing knowledge of language of instruction and the educational system (OECD, 2019). This finding is also supported by the result, that performance differences were reduced when including language spoken at home in the analyses (Loureiro et al., 2019; OECD, 2016). Also towards immigrant students teacher stereotypes and consequences for grading are evident (Glock & Krolak-Schwerdt, 2013; Pit-ten Cate & Glock, 2024). These biases also translate into biased enrollment recommendations for immigrant students (Glock et al., 2015) and following this immigrant students are on average underrepresented in academic-track schools (Beck, 2015).

Also well-being depends – next to further factors – on SES (Diener et al., 1995). This holds in general for a person's overall quality of life among children, adolescents, and adults (Proctor et al., 2011; B. Wang et al., 2023) as well as for the school related context (Basarkod et al., 2021). This is due to socially biased chances of socially participating in everyday life, better health and the possibility to satisfy one's needs. Positive relations for income, educational status and occupation were found in terms of subjective well-being (Navarro-Carrillo et al., 2020). Also for students (school-related) well-being relations with SES were found (Basarkod et al., 2021; Crede et al., 2015). In domain specific contexts, relations between students' SES and their math related self-concept and self-efficacy were evident, showing a higher self-concept for high-SES students (Kriegbaum & Spinath, 2016). Part of the explanation for this might be the positive relations between students SES and their performance (Kleinkorres et al., 2020), which then in turn are responsible for positive relation between students SES and their well-being. Also processes of comparing one's SES to SES of others can influence well-being.

Research shows that upward comparisons contribute negatively to well-being among adults (J. J. X. Tan et al., 2020). Ranking and comparing one's social status to others' social status however is connected to assessing the own SES correctly, resp. relating the own social status correctly to the social status of others (Anderson et al., 2012). Although societal comparisons are more important among adults, due to overall standard of living and relations between performance and SES, SES is already among students an important predictor for well-being.

Closely related to familial factors as already theoretically derived are opportunity costs (Erikson & Jonsson, 1996). This holds especially for financial cost, as attending higher secondary education and tertiary education in the following are linked with higher financial cost than completing lower secondary education with starting vocational training right afterwards (Stocké, 2012). Along with higher SES goes higher income. This influences parents' educational decisions at the transition. Secondary effects of social stratification (Boudon, 1974) are evident when considering financial factors at the transition to secondary school.

2.4.3 Motivational factors

The results presented in the preceding section indicate more favorable starting conditions for high-SES students. This holds for educational attainment and well-being and thus implies strong evidence for educational inequalities. However, also different facets of motivation were found to be relevant and might buffer against the relation between SES and educational attainment.

As derived in sections 2.3.2 and 2.4 core aspects of Wigfield and Eccles (2000) expectancy-value model function as predictors for educational attainment. Those are namely expectations of success in terms of educational attainment and value of education for educational attainment and well-being. The expectation of success is the probability to which extent students assess themselves of being able to be successful in a certain situation (Eccles & Wigfield, 2020) or to obtain a specific school-leaving certificate. This concept is closely related to the concept of self-efficacy; expectation of success is thereby focused on the task performance whereas self-efficacy is rather focused on the capacity to do a task (Bandura, 1977; Zulkosky, 2009). Expectation of success was found to be a relevant predictor for particularly students' scholastic performance and their educational attainment, even when controlling for students' performance. Those relations were found for domain specific contexts and overall GPA measures in all age groups of students and were evident for German elementary school students (Ditton et al., 2019), French and English secondary school students (Khattab, 2015; Wiederkehr et al., 2015), and US-university students (Durik et al., 2015).

The second core component are personal values of education. Values of education are on the one hand an intrinsic motivation to learn and engage in learning, when considering the expectancy-value model (Wigfield & Eccles, 2000). Considering the various value-components in the expectancy value model, the investigated measures can be located in the attainment value component. On the other hand, value of education can also be considered in a rational-choice theoretical perspective (Erikson & Jonsson, 1996), ranking education as beneficial. There is empirical evidence in terms of predicted educational outcomes that positive attitudes towards education and high values of education are beneficial for secondary school students educational attainment (Verešová & Mala, 2016). Having a high value of education positively predicted students' domain-specific performance and educational attainment among secondary school students (J. Meyer et al., 2024; Steinmayr et al., 2012). Performance was thereby measured domain-specific in the STEM-context as well as the grade point average (GPA) was included. The finding, that high values are important for academic achievement was also replicated for the specific sample of German academic-track school students in Grade 12 (Steinmayr et al., 2019).

In terms of well-being, Deci & Ryan (1985) theorized, positive psychological outcomes can be expected, when completing intrinsically valued tasks. Thus, personal attitudes towards education can influence well-being (Moè et al., 2009) When there are matches between students' values of education and their abilities, high values of education can be beneficial for students' well-being. In case of mismatches, high values of education can exert pressure and thus be disadvantageous for well-being (Stang-Rabrig et al., 2023).

Performance-oriented motivation is part of Atkinson's (1957) concept of achievement motivation. In the school context it describes students' wish to perform well and to achieve good outcomes in terms of grades and attainment. Performance-oriented motivation extrinsically motivates students, as good grades and achievement can be considered as a reward for engaging in school. Especially in terms of achievement-related scholastic outcomes, performance-oriented motivation proved to be a significant predictor (Dogan, 2015). A study from Norway furthermore indicates that students' extrinsic motivation is higher than their intrinsic motivation (Diseth et al., 2020). However, findings are not consistent in terms of performance-oriented motivation. When also including measures for mastery-orientation and values, performance-oriented motivation did not predict academic achievement (Howard et al., 2021; Steinmayr et al., 2019).

2.4.4 Stressors

In the preceding chapter factors were focused that are assumed to be beneficial for students' educational attainment and well-being when students score high on these factors (e.g., high SES, high motivation). Now the focus turns to factors that can be perceived as stressful to students and thus might negatively predict educational attainment and well-being when being strongly present among students (Pascoe et al., 2020) and that were focused less often in theoretical assumption and previous research than motivational factors both for educational attainment and well-being. As already mentioned beforehand, in terms of mismatches between performance and expectations towards one's performance pressure and stress might arise leading to worse performance and well-being (Hörstermann et al., 2018; Salmela-Aro & Upadaya, 2014). Stress is a multidimensional construct including many dimensions such as workload, anxiety, social distress or exhaustion (Gross & Seebaß, 2016). In the conducted studies, stressors from three areas were included: scholastic, rather workload-related (effort, learning stress), parental resp. social (perceived parental aspirations) and individual (exhaustion) stressors. Reactions to stress can be physical and mental – and mostly unfavorable for educational attainment and well-being (Salmela-Aro, Kiuru, & Nurmi, 2008). Stressors however do not necessarily need to predict educational attainment or well-being in a negative manner, as further research shows (Travis et al., 2020). In the following passages the relations between the included stressors and educational attainment and well-being are explained in more detail.

Effort is a factor considered by teachers when giving enrollment recommendations at the end of elementary school time next to students' performance, as it is a relevant school-related behavior and attitude (KMK, 2015). Effort is a motivational factor describing the willingness to engage in learning even in difficult situations. However, effort is also considered being a part of the cost dimension of the expectancy-value model (Wigfield & Eccles, 2000), as it represents an investment that needs to be made to complete a task successfully. It is also a school- resp. learning-related stressor. Effort was shown to be a relevant predictor for students' educational attainment, as students who put effort in studying showed better learning outcomes than their effortless peers (Fraja et al., 2010; Gneezy et al., 2019; Pu et al., 2020).

Learning stress is another school-related stressor and is part of the workload-dimension of stress (Gross & Seebaß, 2016). High learning load resp. learning stress can lead to overload, leading to worse performance. Thereby a central factor is, whether workload is perceived as appropriate or not (Trigwell et al., 2013). Learning stress can also be understood as opportunity costs as it might prevent higher educational attainment due to a too high investment of time and (mental) health (Feldon et al., 2019).

Part of familial resp. social stressors are (perceived) parental aspirations. In the expectancy-value model, they can be assigned to perceptions of socializers' beliefs and behaviors. Parental aspirations for students' educational outcomes are relevant for transition decisions to secondary school, which are mostly made by parents. Students' perception of those beliefs can function as extrinsic motivation, as fulfilling parents' wishes to obtain rewards or avoid punishment is aimed for by children (Cheung & Pomerantz, 2012) and thus improves their performance, resp. educational attainment. Also, in terms of students' well-being perceived parental aspirations are of relevance, as those perceptions can also be understood as external pressure. Not fulfilling basic psychological needs, parental pressure can also affect students' well-being (Kleinkorres et al., 2023; Stang-Rabrig et al., 2023). For older students, positive effects on their life satisfaction were found (Jung et al., 2018), implying that perceived expectations are changing from perceived pressure to a perception of belief in students' abilities.

Another facet of stress is exhaustion, which is a feeling of being energy-less, anxious and tired (Byrne et al., 2007). Exhaustion is one of the three dimensions of burnout. The concept of burnout was developed in the work context but is also found in the school context. The other two dimensions of school burnout, next to exhaustion, are a cynical attitude towards school and feeling of inadequacy as a student (Salmela-Aro & Upadyaya, 2014; Schaufeli et al., 2002). Burnout and thus also exhaustion are on the one hand aspects of well-being (Maslach & Leiter, 2016) but also function as predictors for well-being (Abolghasemi & Varaniyab, 2010; Deb et al., 2015). Being exhausted has negative consequences for well-being in many contexts. This relation holds for the work context (Garrosa-Hernández et al., 2013) and may be reinforced by unexpected events (B. Meyer et al., 2021). In the educational context results indicate a negative relation with well-being as well (Cadime et al., 2016).

2.4.5 Institutional predictors

Additionally, external factors such as the school system significantly impact students' educational attainment and well-being. One frequently cited reason for the significant educational inequalities is the early tracking of students into different types of schools (R. Becker, 2017). These mechanisms however were already described. The attended school type then in turn influences students' educational pathway. First and foremost, the attended school type predicts the obtained school-leaving certificate (Glaesser & Lauterbach, 2006). But also during the course of secondary school time effects of school types were observed. In Switzerland students with similar starting conditions in the French language were investigated in terms of their learning gains depending on the attended school type. Differences in learning

gains were found, hinting towards differential effects of school types (Dräger et al., 2024; Neumann et al., 2007). Similar analyses with alike results were conducted for German students in terms of their math competences (M. Becker et al., 2006; van Ophuysen & Wendt, 2010). A key feature of the German educational system also plays a crucial role in shaping students' educational pathways: the enrollment recommendation, as outlined earlier, is a central factor in the transition to secondary school. In the highly stratified German school system, upward mobility between school tracks remains rare due to limited permeability. However, with the ongoing shift from the traditional three-track system to a two-tiered system, some positive developments in permeability have been observed during secondary school years (Winkler, 2020). The transition to secondary school thus is highly predictive for the obtained school-leaving certificate. As already described above, deviations from the enrollment recommendation are possible (Bittmann, 2021; Pfof et al., 2018; Tiedemann & Billmann-Mahecha, 2010) – also those deviations are socially biased, as high SES-parents tend to deviate upwards from the recommendation, while low SES-parents were found to deviate downwards more often (Dumont et al., 2019). This is due to different educational decisions by SES and motives of status attainment. Secondary effects of social stratification as Boudon (1974) theorized can be observed. Students deviating upwards from the enrollment recommendation received lower grades and standardized test scores in math and reading and had a higher risk of changing school tracks towards a lower track school (Bittmann, 2021; Pfof et al., 2018). The enrollment recommendation is assumed to have an inequality reducing effect, as the decision for a secondary school track is transferred to teachers, instead of leaving it to parents. A higher bindingness of the recommendation in this case should go along with lower educational inequalities. However, no clear evidence for such a relationship has been found (T. Roth & Siegert, 2015). An explanation are the performance differences by SES during elementary school time (Skopek & Passaretta, 2021) and furthermore, particularly high-SES parents try to influence the enrollment recommendation towards an academic-track enrollment recommendation (Dumont et al., 2019). Thus, the enrollment recommendation itself is biased and might not be able to reduce educational inequalities as intended.

The transition to secondary school, the type of school attended, and—specifically within the German context—whether or not students follow the enrollment recommendation all have significant implications for well-being outcomes. The transition to secondary school goes along with changes in the educational requirements and is often perceived as a stressful life event (Praherso et al., 2017). The following decrease in well-being (Coelho et al., 2017; Herke et al., 2019; Obermeier & Gläser-Zikuda, 2022) can be explained by the job-demands-resource-model (Demerouti et al., 2001) which is referring to the work-context but was adapted for the school

context by Salmela-Aro and Upadyaya (2014). Comparing different school types, different consequences for students' well-being were found (Salmela-Aro, Kiuru, & Nurmi, 2008). A lower well-being after the transition to secondary school was found for students attending non-academic-track schools, however, the decrease in well-being which is observed for all students, is lower in this group (Jónsdóttir & Blöndal, 2023; Knoppick et al., 2015; Wu & Becker, 2023). Comparing high and low-SES students in higher education, lower well-being for low-SES students was found (Jury et al., 2017). When focusing students attending higher school types than recommended, these relations become evident as well. Attending a higher school type than recommended goes along with a lower academic self-concept (Bittmann, 2021; Pfof et al., 2018). This might be led back to the also lower competences found in this group.

2.4.6 Relations between the familial and individual predictors

Familial and motivational predictors and stressors are not independent from each other. This is also theoretically grounded in the situated expectancy-value model (Eccles & Wigfield, 2020). Students' family background is predictive for their educational attainment and well-being as it has been explained in the preceding sections. But also motivational factors and stressors are predicted by students' family background. This can be theoretically explained by available familial resources, that differ by SES resp. family background (Boudon, 1974; Bourdieu, 1973; Eccles & Wigfield, 2020). Also attitudes towards education among parents differ in dependence of their SES (Kleine et al., 2010) and students' knowledge and performance depend on their familial prerequisites (OECD, 2019). Different environments, starting from birth, shape the development of students' motivation, school-related attitudes, and the amount of time they invest in learning (Schindler, 2015). Different facets of students' motivation depend on family background. Expectation of success, value of education, and performance-oriented motivation, which were brought up as relevant predictors for educational attainment and well-being, were shown to be depending on family background.

As theorized in the situated-expectancy-value theory (Eccles & Wigfield, 2020), motivational factors are depending on students' family background. Studies among German (Ditton et al., 2019) and US-American (Bozick et al., 2010) elementary school students and English upper secondary school students (C. Brown & Putwain, 2022) found parental education to positively predict students' expectation of success. Furthermore, research among secondary school US-students showed, that subjective SES predicted hope, which was operationalized in terms of paths towards goal achievement, and the self-beliefs that students were able to persevere on those paths (Dixson et al., 2018). Students' expectations were more stable for high-SES students and low-SES students' expectations were declining over secondary school

time (Bozick et al., 2010). Expectation of success furthermore mediated the relation between SES and students' educational attainment (C. Brown & Putwain, 2022; Ditton et al., 2019). Also, for students' value of education similar relations were found. Students' value of education depends on their SES (Lazarides et al., 2015). For domain-specific values in terms of math, relations between SES and values were found among German secondary school students (Steinmayr et al., 2012). Value of education as a general, not domain-specific measure was also found to be related with SES in the US-American (C. Brown & Putwain, 2022) and European (Estonian) (Täht & Paskov, 2013) context. For immigrant students, higher values of education and more positive attitudes towards education were found (Greenman, 2013; OECD, 2019). This can be explained by the immigrant optimism theory (Kao & Tienda, 1995, 2022), which states that students with immigrant background are positively selected in terms of motivation, educational values and aspirations, as there is a strong emphasis on social increase in immigrant families. Also for value of education mediation effects in terms of SES were found (Steinmayr et al., 2012). Performance-related motivation also depends on family background. Relations between SES and motivation were found for the STEM domain in particular (L. Wang & Finch, 2018), but also in terms of general school motivation (Schoon, 2008). An immigrant status is also related to the extent of achievement resp. performance-related motivation which is developed (Kim et al., 2020).

The included stressors depend on students' family background as well. Effort was higher among high-SES students among German secondary school students (Neuenschwander & Niederbacher, 2021). The differences between these groups are led back to teacher stereotypes towards low-SES students, which influence students' behaviors in terms of a self-fulfilling prophecy (Jussim, 1986). Higher effort was also found for immigrant students (Greenman, 2013; Ömeroğulları & Gläser-Zikuda, 2021). Again, in this context, the immigrant optimism theory (Kao & Tienda, 1995, 2022) and thus the connected higher expectations impact students' school-related behaviors. In terms of learning stress, also SES is relevant – thereby low SES results in higher levels of stress. As high SES-students show better performance on average, for low-SES students the worse performance might lead to higher learning load and thus learning stress (Finkelstein et al., 2007). Also, parents' values and attitudes towards education are relevant in this context (Ditton, 2013). For (perceived) parental aspirations, SES and immigrant background were found to be relevant. Due to motives of status attainment, parental aspirations are higher for high-SES parents (Klapproth, 2020; Kleine et al., 2010). Perceived parental aspiration in turn are closely related to actual parental aspiration, which is why those are socially biased. Also, for immigrant students, differential effects were found. Next to motivation, immigrant students also scored higher on aspirations (McElvany et al., 2018; Salikutluk, 2016),

which again can be explained by the immigrant optimism theory (Kao & Tienda, 1995, 2022). Immigrant students and their parents are more ambitious in terms of educational attainment. This is due to the wish to advance in social status through education, and reasons for immigration might also be good educational outlooks for their children (Cebolla-Boado et al., 2021). The last included stressor – exhaustion – also depends on students' social background (Salmela-Aro, Kiuru, Pietikäinen, & Jokela, 2008). Reasons for these social biases might lie within students' competences, which are higher among high SES students. Again, the connection to students' performance can be drawn in explaining the different outcomes by students SES (Finkelstein et al., 2007).

3. Research questions and hypotheses

Linking students' family background with their motivation and stressors is a promising approach when aiming to understand the complex relations between these constructs and the consequences for educational outcomes and the implications for educational inequalities. This dissertation seeks to address these complexities and contribute to this important area of research. Two central educational outcomes are focused: educational attainment and well-being. In terms of the primary outcome area, educational attainment, previous research mostly focused (domain-)specific performance such as grades or competences. In this dissertation the focus is shifted towards obtaining *Abitur* as an educational outcome. This school-leaving certificate represents the entrance qualification for different occupational pathways and thus has more extensive implications as e.g., a grade point average. As a secondary outcome area, students' well-being is analyzed. Thereby a multidimensional approach for operationalizing well-being is used. A multidimensional approach is also adopted for predictors, incorporating multiple measures to assess students' family background, motivation, and stressors. When aiming to understand the complex relations contributing to students' educational attainment and thus also to the still existing educational inequalities in Germany, linking students' family background with their motivation is a promising approach. Further understanding possible mediation effects between family background and motivation in terms of educational attainment thus might provide insights in mechanisms to reduce educational inequalities. Also in terms of well-being connecting students family background measures to motivational factors and stressors still represents a research gap, which is addressed in this dissertation.

Additionally, this dissertation takes a step further and considers some key characteristics of the German educational system at the transition from elementary to secondary school, which is socially biased. In two contributions, the enrollment recommendation is considered. Thereby, a specific focus lies within students deviating upwards from the enrollment recommendation.

Predictors of educational attainment resp. well-being are analyzed group specific and conclusion for these different groups of students can be drawn. The aim of this dissertation was to bridge these perspectives and investigate the following overarching research questions for secondary school students:

1. Which role does students' family background (parental education, parental occupation immigrant background/home language, financial cost) play for obtaining *Abitur* (Study I) for students with and without academic-track enrollment recommendation (Study II) and well-being (life satisfaction, satisfaction with friends, academic self-concept, helplessness in German) (further analyses)?
2. Which motivational factors (expectancy of success, value of education, performance related motivation) are relevant predictors for educational attainment in terms of obtaining *Abitur* (Study I) for students with and without academic-track enrollment recommendation (Study II) and well-being (life satisfaction, satisfaction with friends, academic self-concept, helplessness in German) (further analyses)?
3. How do stressors (effort, learning stress, perceived parental aspirations, exhaustion) predict educational attainment for students with and without academic-track enrollment recommendation (Study II) and well-being (life satisfaction, satisfaction with friends, academic self-concept, helplessness in German) (further analyses)?
4. How are familial (parental education, parental occupation immigrant background/home language, financial cost) and individual factors (motivation: expectancy of success, value of education, performance related motivation; stressors: effort, perceived parental aspirations, learning stress) related to each other and what does this mean for educational attainment in terms of obtaining *Abitur* (Study I) and well-being (life satisfaction, satisfaction with friends, academic self-concept, helplessness in German) (further analyses)?

These overarching research questions are analyzed in the context of the specificity of the German educational system, which is the practice of enrollment recommendations. These are particularly important for Study II and the further analyses.

4. Summary of the main results of the contributions of the dissertation

This dissertation consists of two empirical studies and one contribution with further analyses. All contributions are based on NEPS-data. For Study I the data of the NEPS starting cohort Grade 9 (SC4) and for Study II and the further analyses data from the NEPS starting cohort Grade 5 (SC3) were used. The following section gives a short summary over each of contribution of this dissertation. An overview over the contributions is provided in Table 2.

Table 2*Published/accepted studies forming the cumulative dissertation, and further analyses*

Study	Authors	Title	Journal
Cumulus			
I	Molitor, K., Fabian, P., Thums, K., & McElvany, N. (2022)	Is the relation between family background and obtaining an Abitur mediated by malleable motivational variables?	Zeitschrift für Erziehungswissenschaft
II	Molitor, K., Fabian, P., & Stang-Rabrig, J.	Obtaining Abitur without teacher recommendation – the role of social background, opportunity costs, and motivation (accepted version)	Jahrbuch der Schulentwicklung Band 24
Further Analyses			
III	Molitor, K., Stang-Rabrig, J., McElvany, N. (2024)	How learning environments shape students' well-being in school – the impact of familial, personal, and school-related factors (submitted version)	Journal of Educational Psychology

4.1 Study I: Is the relation between family background and obtaining an Abitur mediated by malleable motivational variables?

Study I takes up current debates on educational inequalities and potential factors weakening the relation between family background and educational attainment. The study investigates how family background and motivational factors predict obtaining *Abitur* among students who attended *Gymnasium* during their educational career. Specifically, it examines whether motivational factors mediate the relationship between family background variables—such as parental education, occupational status, and immigrant background—and obtaining *Abitur*. Key motivational factors include expectation of success, the value placed on education, effort, and performance-oriented motivation. The included constructs are thereby derived from Boudon's theory of primary and secondary effects of social stratification and from the expectancy-value model. In this study, the data of the German National Educational Panel Study starting cohort Grade 9 (NEPS SC4) were used. Structural equation models with $N=5,409$ students were estimated and students' gender, math and reading competences and basic cognitive skills were controlled for. The results revealed that parental education is the most significant predictor of whether students obtain *Abitur*. Students whose parents have higher levels of education are more likely to succeed, while the influence of parental occupational status and immigrant background is not significant when parental education is considered simultaneously. Among the motivational factors, expectation of success are most important. Students who believe they are likely to pass the *Abitur* examination show a significantly higher

likelihood of actually achieving it. Results in terms of value of education were hypothesis-conform, predicting obtaining *Abitur* positively. In contrast the other included factors effort and performance-oriented motivation have a less clear impact on outcomes, with effort showing no significant association and performance-oriented motivation having a weak and negative relationship. The study also demonstrates that motivational factors partially mediate the effect of family background on educational attainment. Specifically, the relation between parental education on obtaining *Abitur* is weakened when motivational factors are taken into account. This mediation is due to expectation of success. The finding overall support previous research and confirm the ongoing relevance of educational inequalities. Particularly students' expectations of success provide a starting point for reducing educational inequalities. The results suggest that interventions aimed at improving students' expectations could play a key role in diminishing the educational disadvantages associated with a lower family educational background.

4.2 Study II: Obtaining Abitur without teacher recommendation – the role of social background, opportunity costs, and motivation

Study II again focuses obtaining *Abitur* as an educational outcome and expands the finding of Study I. Students from all school types are included and students with and without academic-track enrollment recommendations (ATER) are compared in terms of predictors of educational attainment. The study compared students with and without ATER regarding their socioeconomic status (parental education and occupation), opportunity costs (financial burden and learning stress), and motivational factors, including expectations of success, perceived parental aspirations, value of education and performance-related motivation and investigated whether these factors differ in their prediction of obtaining *Abitur* between students with and without ATER. The study is theoretically based on Boudon's theory of primary and secondary effects of social stratification, Wigfield and Eccles expectancy-value model and the big-fish-little pond-effect. Study II uses the data of the German National Educational Panel Study starting cohort Grade 5 (NEPS SC3) and tracks students from Grade 7 to the point of time where they obtain *Abitur*. A MANOVA and groups comparing structural equation models with 2,671 students were conducted. Students' language spoken at home, the bindingness of the enrollment recommendation, math and reading competences, basic cognitive skills, gender, and school type were controlled for. In terms of students' SES, the results of the MANOVA showed that students who obtained *Abitur* with ATER had higher SES than those without ATER. In terms of opportunity costs, students without ATER experienced higher levels of learning stress, likely due to the additional effort required to keep up with their peers on the academic track. Students with ATER had higher expectations of success and perceived stronger parental aspirations for

their academic achievement. These students believed more strongly in their own abilities, likely because they had received the formal recommendation, which could have boosted their confidence and reinforced their self-belief. Conversely, students without ATER had lower expectations of success, possibly due to the effects of competing in a high-performing environment. Value of education was significantly higher for students with ATER. The structural equation models showed that parental education are particularly significant for students without ATER, suggesting that well-educated parents provide critical support, such as tutoring or educational resources, that help their children succeed despite not receiving the formal teacher recommendation. This finding is in line with previous research indicating that high-SES students are more likely to receive ATER in the first place. The higher importance of parental education for students without ATER highlights the role of family support in compensating for the absence of institutional endorsement. In terms of opportunity costs, higher learning stress was a positive predictor of obtaining *Abitur* for students without ATER. This might suggest that learning stress, while challenging, can also reflect a higher level of commitment and motivation to overcome the difficulties associated with being in a more demanding academic environment. For motivational factors, significant group differences for expectation of success were found, indicating a higher relevance of expectation of success for students without ATER. Value of education was equally important for both groups, indicating that valuing education is a significant predictor of educational attainment regardless of whether the student received a formal recommendation. In conclusion, the study highlights the complex relations between SES, opportunity costs, and motivational factors in predicting obtaining *Abitur* for students having received or not received an ATER. For students without ATER, parental education appears to be particularly important, implying that students from lower SES backgrounds without ATER may face a double disadvantage. For students with ATER, motivational factors such as expectations of success and parental aspirations are more relevant predictors. This suggests that while social background plays a critical role for those without ATER, fostering student motivation and self-belief is key to supporting educational attainment for all students. The study also raises important questions about the fairness and accuracy of transition recommendations. Recommendations for improving teacher feedback and increasing flexibility in the educational system, such as allowing more time for students to develop before being tracked, could help reduce educational inequalities.

4.3. Further Analyses: How learning environments shape students' well-being in school – the impact of familial, personal, and school-related factors

In the *further analyses* the focus shifts towards another central educational outcome, which is students' well-being. In this contribution, the impact of different learning environments is investigated. To do so, students who did not receive an academic-track enrollment recommendation (ATER) attending non-academic-track schools (=following the intended pathway) and attending academic-track schools (=being in a higher performing environment than recommended) are compared in terms of their well-being. Furthermore, it is investigated whether different factors, that are SES (parental education), motivational factors (value of education), and stressors (perceived parental aspirations, exhaustion) contribute to their well-being. Well-being was operationalized multidimensionally including measures of life satisfaction, satisfaction with friends, academic self-concept, and helplessness in German. This contribution is based on theoretical strands of Ryan and Deci's self-determination theory, the big-fish-little-pond effect and Wigfield and Eccles' expectancy-value model yet again. The study utilized data from the German National Educational Panel Study starting cohort Grade 5 (NEPS SC3). Propensity score matching was employed to ensure comparability between the two groups based on their Grade 5 cognitive, math, and reading competences. The sample consisted of 92 students attending academic-track schools without ATER and 726 students attending non-academic-track schools without ATER. A MANOVA was conducted to compare means. To investigate differences in the prediction of well-being between both groups, group-comparing structural equation models were estimated. The MANOVA revealed that non-academic-track school students had significantly higher academic self-concepts than academic-track school students, likely due to the big-fish-little-pond effect. This finding suggests that being in an environment with lower overall performance requirements supports self-perception. However, no significant differences were observed between the groups in life satisfaction, satisfaction with friends, or helplessness in German. The group-comparing structural equation models showed for academic-track school students that placing a high value on education was associated with lower life satisfaction, with exhaustion mediating this relationship. SES positively predicted satisfaction with friends among academic-track school students, suggesting that social integration in high-performing environments is facilitated by socio-economic advantages. Academic self-concept was also predicted by value of education for academic-track school students initially, but this relationship weakened when exhaustion was included as a mediator, indicating that stress plays a significant role. For non-academic-track school students, perceived parental aspirations positively predicted academic self-concept, highlighting the motivational benefits of parental support in lower performing contexts. Contrasting patterns

emerged for helplessness in German: among academic-track school students, exhaustion negatively predicted helplessness, implying that greater effort might weaken feelings of helplessness. Conversely, for non-academic-track school students, exhaustion was positively associated with helplessness, reflecting the challenges of limited academic support in their environments. Overall, the study underscores the relevance of aligning educational settings with students' capabilities. Academic-track schools might impose stress that can negatively affect well-being, while non-academic-track school students benefit from parental encouragement to foster positive outcomes. Interventions focusing on stress management and fostering realistic academic goals are recommended to enhance well-being across diverse educational contexts.

5. References I

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6. Contributions of the Cumulative Dissertation

6.1 Study I: Is the relation between family background and obtaining an Abitur mediated by malleable motivational variables?

Molitor, K., Fabian, P., Thums, K., & McElvany, N. (2022). Is the relation between family background and obtaining an Abitur mediated by malleable motivational variables? *Zeitschrift für Erziehungswissenschaft*, 81(2), 471–492. <https://doi.org/10.1007/s11618-022-01096-x>

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Abstract

The present study examined the relation between family background variables, motivational factors, and educational attainment (defined as obtaining the highest form of school-leaving certificate in Germany—the *Abitur*) among students who attended *Gymnasium*. A multifaceted concept of both family background variables (parental educational level, parental occupational status, and immigrant background) and motivational factors (expectation of success, value of education, effort, and performance-oriented motivation) was applied. Structural equation models were estimated using longitudinal data from the German National Educational Panel Study (NEPS; $N = 5,409$ students). The results showed that the relation between family background variables and obtaining an *Abitur* was smaller when motivational factors were included. The mediation model results suggest that focusing on breaking the link between parental education and students' expectations for success would be helpful for reducing educational inequality.

Keywords

educational inequality, educational attainment, motivation, socioeconomic status

Zusammenfassung

Vorliegend wurde der Zusammenhang zwischen familiären Herkunftsvariablen, motivationalen Einflussfaktoren und dem Bildungserfolg für Schülerinnen und Schüler untersucht. Bildungserfolg wurde durch das Erreichen des Abiturs definiert. Dabei wurden sowohl die familiäre Herkunft (elterliche Bildung, elterlicher Berufsstatus, Migrationshintergrund) als auch motivationale Einflussfaktoren (Erfolgserwartungen, Wert von Bildung, Anstrengungsbereitschaft, leistungsbezogene Motivation) als mehrdimensionale Konzepte berücksichtigt. Mit längsschnittlichen Daten des Nationalen Bildungspanels (NEPS; $N = 5,409$ Schülerinnen und Schülern) wurden Strukturgleichungsmodelle berechnet. Die Ergebnisse zeigten, dass der Einfluss familiärer Herkunftsmerkmale auf den erreichten Bildungsabschluss geringer war, wenn gleichzeitig motivationale Einflussfaktoren berücksichtigt wurden. Aus dem Mediationsmodell lässt sich ableiten, dass insbesondere das Aufbrechen des Zusammenhangs zwischen der elterlichen Bildung und den Erfolgserwartungen der Schülerinnen und Schüler in den Blick genommen werden sollte, um Bildungsungleichheit zu verringern.

Schlagwörter

Bildungserfolg, Bildungsungleichheit, Motivation, sozioökonomischer Hintergrund

1. Introduction

A person's level of educational attainment serves as a crucial foundation for their further life course. Education is closely related to income, and a higher level of educational attainment—especially tertiary education—can reduce unemployment (Stephens et al., 2015). In Germany, enrollment in tertiary education is largely conditional upon obtaining the highest form of school-leaving certificate—the *Abitur*. Other forms of school-leaving certificates typically allow graduates to enroll in vocational training. Moreover, an increasing share of jobs requires a university degree (Jury et al., 2017). To prevent educational inequality, students with equal academic performance should have equal opportunity to achieve higher levels of education, as educational inequality is associated with a waste of human potential and should therefore be avoided (Ehmke and Jude, 2010).

Contrary to this premise, however, empirical research has shown that educational attainment depends on factors other than school performance. For example, students' educational attainment is related to their family background (Jury et al., 2017). This is concerning, because it means that students with different backgrounds have unequal opportunities to attain the same level of education. This effect also persists when controlling for academic performance (OECD, 2019).

Additional to family background (FB), different aspects of motivation have emerged as important for improving students' educational outcomes, such as expectation of success and performance-related motivation (Wang and Finch, 2018; Wiederkehr et al., 2015). While students' family background is relatively fixed, motivation is malleable (Kriegbaum and Spinath, 2016; Richardson and Abraham, 2009). Therefore, it is assumed that enhancing motivation can contribute to reducing educational inequality (Wang and Finch, 2018). The present study investigated this underlying assumption—that the impact of FB on educational attainment (defined as obtaining an *Abitur*) is mediated through malleable motivational factors.

While previous studies have mainly focused on (domain-specific) performance and motivation, we took a more general perspective focusing on the school leaving certificate and thus upper secondary students. Specifically, we investigated how a set of motivational factors mediated the association between FB and obtaining an *Abitur* among students enrolled in a *Gymnasium*. In order to answer the research question, three structural equation models were estimated using data from the German National Educational Panel Study (NEPS) starting cohort Grade 9. Initially, the standalone relations between FB and motivation and obtaining an *Abitur* were estimated in two separate models. Second, the mediating effect of motivation on the relationship between FB and obtaining an *Abitur* was computed using a comprehensive

mediation model. The third model focused on the relations among FB and motivational factors to obtain a more comprehensive picture of the relations among all investigated variables.

2. Research background

2.1 The impact of family background on educational outcomes

The highest form of school-leaving certificate in Germany—the *Abitur*— is traditionally obtained by attending *Gymnasium*. In the past decades *Gymnasium* has gained in importance and the percentage of students attending *Gymnasium* has increased as well. In line with this trend, the percentage of students leaving school with an *Abitur* has also increased (Köhler, 2004). Currently, about 50% of students leave school with an *Abitur*. Approximately two-thirds of them obtained this qualification at a *Gymnasium* (65%), while one-third obtained an *Abitur* at vocational or comprehensive schools (Statistisches Bundesamt [Destatis], 2021). Although educational inequalities with regard to obtaining an *Abitur* decreased in recent decades (Schindler, 2014), the share of students attending *Gymnasium* is still not distributed equally across societal strata. While 62% of students with highly educated parents enrolled in *Gymnasium* after elementary school, this was only the case for 22% of students whose parents had a lower level of education (Horneber and Weinhardt, 2018).

This bias might be explained by Boudon's (1974) theory of primary and secondary effects of social stratification. This model states that educational choices and thus educational outcomes depend on socioeconomic background, firstly because available socioeconomic resources differ among social strata, as argued by Bourdieu (1973), and secondly because educational choices depend on socioeconomic background, i.e., even students with similar competence levels might have different educational outcomes depending on their socioeconomic status (SES). One important explanation is the students' aim to maintain their parents' SES.

Relations between parental education and students' educational attainment have been found internationally. US students whose parents did not attend tertiary education tended to have a lower grade point average (GPA) (Stephens et al., 2014) and dropped out of college more often than their high-SES peers (DeAngelo et al., 2011). In the Netherlands, high-SES students enrolled in higher secondary education at higher rates than low-SES students (Kloosterman et al., 2009). Moreover, in PISA competence tests, high-SES students perform better than their low-SES peers (OECD, 2019). Similar results have been found in Germany. Already in elementary school, high-SES students in Germany received better grades than their low-SES peers, even at equal performance levels on competence tests (Maaz et al., 2011). These

higher grades among high-SES students in elementary school resulted in higher rates of enrollment in *Gymnasium*. Therefore, the transition from elementary to secondary school generates and increases social inequalities in the German educational system (Lohmann and Groh-Samberg, 2010). This trend only strengthened after the transition to secondary school. In *Gymnasium* in particular, there was a correlation between parental educational level and students' scholastic performance. Low-SES students tended to perform worse than their high-SES peers and were therefore less likely to successfully obtain an *Abitur* (Horneber and Weinhardt, 2018).

In addition to SES, having an immigrant background also influenced educational outcomes. Immigrants were less likely to exhibit a high level of school achievement. Knowledge of the language of instruction was an important factor in this context (OECD, 2016).

Furthermore, occupational status is directly depending on the educational level (Weil and Lauterbach, 2009). Prior research indicated also directed relations between family background variables – immigrant background predicted educational attainment and occupational status (Beicht and Granato, 2010; OECD, 2016).

In summary, family background variables were of high relevance for students' educational outcomes. In general, a high parental SES resulted in higher and an immigrant background in lower educational attainment and academic performance.

2.2 The impact of motivation on educational outcomes

Aside from family background, motivation is another crucial factor for educational outcomes. The expectancy-value model of achievement motivation by Wigfield and Eccles (2000) provides a comprehensive and multidimensional explanation of the relations among a number of distinct motivational factors relevant for educational outcomes. According to this model, achievement-related choices depend on the expectation of success and the value one assigns to a task. Expectations and values affect individuals' behavior directed towards achieving a goal; consequently, students who expected to be successful and assigned a high value to a task were more likely to succeed. Other relevant factors include the cultural environment, socializers' beliefs and behaviors as well as the child's perception of socializers' beliefs and behaviors, the child's goals, differential aptitudes, and previous achievement-related experiences (Wigfield and Eccles, 2000). This model was used to derive key motivational predictors of educational attainment, namely the expectation of success and the value of education, as two key elements of Wigfield and Eccles' theory. Furthermore, examining effort is essential to our aim of identifying protective factors for low-SES students and students from

immigrant backgrounds, because students who put more effort into studying outperform their peers (Pu et al., 2020). Moreover, since we aimed to identify factors predicting attainment of an Abitur (a clearly performance-related goal), we also included performance motivation.

Expectation of success—whether domain-specific or in general—was a good predictor of future performance in terms of school grades as well as competence tests (Wiederkehr et al., 2015; Wigfield and Eccles, 2000). In a study of German elementary school students, expectation of success emerged as a particularly important factor for academic achievement, measured as grade point average in core subjects, out of a set of motivational factors (Ditton et al., 2019). Moreover, Wigfield and Eccles (2000, p. 77) stated that “even when previous performance is controlled, children’s beliefs about their ability and expectancies for success are the strongest predictors of subsequent grades in math”. Finally, externally boosting US college students’ expectation of success increased math performance among students scoring low in perceived competence (Durik et al., 2015).

Subjective task value is another core element of Wigfield and Eccles’ (2000) theory. Research among German students has confirmed that ascribing a high value to STEM (science, technology, engineering, and maths) subjects positively affected grades achieved in these subjects (Steinmayr et al., 2012). Likewise, among students in other countries, valuing a task increased the intention and actual decision to persist with it (Martin, 2002; Wigfield and Eccles, 2000). Not only valuing specific tasks, but also valuing education in general has been found to positively influence educational attainment. A more positive attitude towards school and learning led to a higher GPA at the end of the school year among Slovak secondary school students (Verešová and Mala, 2016).

US students’ expectation of success and value of education influenced how much effort they invested in accomplishing their goal (Arthur et al., 2006; Martin, 2002). Students who ascribed a high value to education were more engaged in school (Durik et al., 2015). Consequently, students who put a great deal of effort into studying tended to outperform their peers who put less effort into studying (Arthur et al., 2006; Pu et al., 2020). This applied both to academic performance in general and to achievement test results in particular (Gneezy et al., 2019).

Furthermore, performance-related motivation is a facet of extrinsic motivation that has been identified as an important predictor of scholastic performance in both Germany and the US (Ditton et al., 2019; Richardson and Abraham, 2009; Wang and Finch, 2018). Research has shown that students who were motivated to learn felt less threatened by failure. Rather than reacting to pressure with a feeling of powerlessness, they developed approaches to deal with the pressure and succeeded in their tasks (Martin, 2002).

In conclusion, a large body of research has demonstrated the positive impact of motivational factors on scholastic performance and attainment. In this research, motivation has predominantly been operationalized as a domain-specific concept and educational outcomes as performance. However, there is still a need to further investigate the relation between general school-related motivation and overall educational attainment.

2.3 The relationship between family background and motivational factors

Not only has prior research demonstrated that FB and motivational factors influence educational attainment, there is also evidence that FB influenced motivational factors. Eccles and Wigfields' (2000) expectancy-value model likewise suggests a relation between family demographics and students' motivation. The above mentioned motive of status maintenance of parental SES leads to higher motivation among high-SES students. According to Bourdieu (1973) differences in available resources (economic, social, and cultural) might promote the anticipated family support. Also the time that is invested in learning activities is associated with a students resources. Related especially to students' social capital is furthermore the knowledge about the educational system. These differences promote especially students' expectation of success and learning motivation among students who are well equipped with resources. Also the Wisconsin Model of Socioeconomic Achievement has found family background to be related to and to be mediated by educational expectations as well as further individual variables (occupational aspirations, peer college aspirations) (Alexander et al., 1975).

Research investigating relation between family background and educational outcomes largely took a domain-specific view, with a particular focus on STEM subjects, reflecting the origin of Eccles and Wigfields' model in predicting STEM achievement. They have demonstrated that SES influenced motivational factors. High-SES students in Germany and the US tended to report placing a stronger value on education and a higher level of performance motivation with respect to school tasks (Kriegbaum and Spinath, 2016; Lazarides et al., 2015; Steinmayr et al., 2012). Parental employment positively predicted British students' achievement motivation (Cassidy, 2000) and school motivation (Schoon, 2008). Also, young Estonian adults with low SES tended to value education less and assessed their chances of accessing higher education as worse than their high-SES peers (Täht and Paškov, 2013). Also educational expectations vary through social strata. While high-SES students' expectations are relatively stable from primary school on, the expectations of low-SES students are more volatile and tend to decline during secondary school (Bozick et al., 2010).

Apart from family background, another central social factor shaping student motivation is their immigrant background. Following the immigrant optimism theory, students with immigrant background are a positively selected group towards their educational aspirations and motivation, due to the desire for a social increase (Kao and Tienda, 1995). In general, students from immigrant backgrounds tend to have more positive attitudes towards education than their native peers. They score higher on the importance of education as well as achievement motivation (OECD, 2019). They also tend to put more effort into studying on average (Greenman, 2013; Tjaden and Hunkler, 2017). Nevertheless they do not seem to be able to benefit from their higher motivation. Although they are more engaged they lag behind their native peers in respect to their academic outcomes (OECD, 2019). Core reasons discussed are language difficulties and lack of information among immigrant students concerning the educational system (OECD, 2016; Tjaden and Hunkler, 2017).

Furthermore, for STEM subjects, there is evidence that science motivation mediated the impact of SES on GPA among US students (Wang and Finch, 2018). A mediating effect of school motivation was found among British students (Schoon, 2008). Likewise, mediating effects of motivation were found in Germany. The relation between SES and math performance has been found to be mediated by the value students ascribed to maths (Steinmayr et al., 2012). Furthermore, for elementary school students, SES was found to be mediated by expectation of success. Indeed, no direct effect of parental education on scholastic achievement remained when motivational factors (expectation of success and parental aspirations) were considered (Ditton et al., 2019).

Despite this relation between FB and motivational factors, it is sometimes argued that motivational factors “might be a protective factor against the negative impact of low SES on academic achievement” (Wang and Finch, 2018, p. 132). Hence, investigating the relation between FB and motivation could be an important starting point for reducing educational inequality. Therefore, in order to extend previous studies, the relation between FB and educational attainment should be examined among upper secondary students from a more general perspective, i.e., with respect to the complex relations between FB, motivation and educational attainment.

3. Research questions and hypotheses

The present study aimed to answer the central research question of whether the relation among family background and obtaining an *Abitur* is mediated by motivational factors and thus reduced or even eliminated. While the impact of domain-specific interest and motivation on domain-specific achievement has received frequent empirical support (Steinmayr et al., 2012;

Wiederkehr et al., 2015), this study focused on general motivational aspects and obtaining the highest form of school-leaving certificate in Germany—the *Abitur*. Furthermore, we aimed to improve our understanding of the associations among central predictors of educational outcomes among upper secondary students, about whom we know less than about younger students. Our study built upon and expanded the previous research presented above by examining the following research questions and hypotheses:

Question 1: How are fundamental family background variables—namely parental educational level, parental occupational status, and immigrant background—related to obtaining an *Abitur* among students who attended *Gymnasium* at some point during their educational careers?

Hypothesis 1 (H1): High parental education and high parental occupational status are positively related to obtaining an *Abitur*; an immigrant background is negatively related to obtaining an *Abitur*.

Question 2: How are core motivational factors (expectation of success, value of education, effort, and performance-oriented motivation) associated with obtaining an *Abitur*?

H2: All aspects of motivation under investigation – expectation of success, value of education, effort, and performance-oriented motivation – are positively associated with obtaining an *Abitur* also when controlling for students' competences.

Question 3: Is the relation between family background (parental educational level, parental occupational status, and immigrant background) and obtaining an *Abitur* mediated by motivational factors (expectation of success, effort, value of education, and performance-oriented motivation)?

H3a: A high parental educational level and parental occupational status as well as an immigrant background are positively related to all aspects of motivation under investigation.

H3b: The relation between socioeconomic background variables and obtaining an *Abitur* is mediated by motivational factors (expectation of success, value of education, effort, and performance-oriented motivation) also when controlling for students' competences.

4. Method

4.1 Data and sample

Data from the German National Educational Panel Study (NEPS) starting cohort Grade 9 (SC4) (Blossfeld et al., 2011)¹ were used to answer the study's research questions. The NEPS is a representative large-scale survey that provides longitudinal data on educational trajectories and development of competencies throughout the life course.

The following analyses drew upon data from students and their parents. Students were enrolled in Grade 9 at the time of first measurement (T1), which took place in Winter 2010/11. Overall, data from five measurement points were included in the analyses (from November 2010 to August 2013) (see Table 1 for an overview of measurement points, respondents and survey mode). Data from students were collected in schools via paper-and-pencil interview (PAPI). For students who changed schools, classes or left the educational system, an individual tracking procedure was implemented after T1; such students completed a computer-assisted personal interview (CAPI) or computer-assisted telephone interview (CATI). Parents were interviewed via CATI.

We included in our sample only students who had been enrolled in *Gymnasium* at some point during secondary school and thus had a chance of obtaining an *Abitur* via the traditional route². Enrollment in *Gymnasium* immediately after elementary school was not mandatory for inclusion in the analyses. Furthermore, we defined no minimum time period of *Gymnasium* attendance. We excluded students who had never attended *Gymnasium*. The latter applied to 6,019 students, while $N = 5,941$ students were included in the sample. A further 532 students had to be excluded from the analyses due to missing values on the independent variables. Consequently, our final sample comprised $n = 5,409$ students. The students' mean age at T1 was 14.6 years ($SD = 0.65$), and 54.2% were female.

¹ This paper uses data from the National Educational Panel Study (NEPS): Starting Cohort Grade 9 [doi:10.5157/NEPS:SC4:11.0.0](https://doi.org/10.5157/NEPS:SC4:11.0.0). From 2008 to 2013, NEPS data was collected as part of the Framework Program for the Promotion of Empirical Educational Research funded by the German Federal Ministry of Education and Research (BMBF). As of 2014, NEPS has been carried out by the Leibniz Institute for Educational Trajectories (LifBi) at the University of Bamberg in cooperation with a nationwide network.

² For comprehensive schools, it was not possible to identify which school track particular students actually attended. Thus, it was impossible to determine whether each student in a multi-track school sought to obtain an *Abitur* or another school-leaving certificate. Therefore, only students who attended *Gymnasium* are included in the analyses. Focusing on students, who were enrolled in a *Gymnasium* can be interpreted as proxy of students' realistic aspiration towards the school-leaving certificates they would like to obtain at the given point of time, which allows for a more conservative estimation of motivational effects.

Table 1*Measurement points, respondents and survey mode*

	T1	T2	T3	T4	T5
Date	November 2010 - January 2011	January 2011 - July 2011	May 2011 - July 2011	March 2012 - May 2012	November 2012 - January 2013 (students in school) / September 2012 - August 2013 (school leavers)
Respon- dents	students	parents	students	students and school leavers	students and school leavers
Survey mode	PAPI	CATI	PAPI	PAPI (students in school) CATI/CAPI for school leavers	PAPI (students in school) CATI/CAPI for school leavers
Assessed variables	math competences, cognitive abilities, gender	PE, OS, IB	EOS	VOE	effort, PM

Note. PAPI = paper-and-pencil interview. CAPI = computer-assisted personal interview. CATI = computer-assisted telephone interview. PE = parental educational level. OS = parental occupational status. IB = immigrant background. EOS = expectation of success. VOE = value of education. PM = performance-related motivation.

4.2 Variables

4.2.1 Educational attainment

Educational attainment was measured in terms of the highest school-leaving certificate obtained. The NEPS contains a variable capturing the highest form of school-leaving certificate obtained and is based on information collected from students at various measurement points (including ones beyond the temporal scope of this study). For the analysis, this variable was coded in binary form (0 = no *Abitur*, 1 = *Abitur*). Students were coded as having an *Abitur* only if it had been obtained within the specified school period or one year thereafter. Students who obtained an *Abitur* beyond this time period were not coding as having an *Abitur* in our analyses. 77.4% of our sample obtained an *Abitur*.

4.2.2 Family background variables

Students' family background was measured with three constructs. Data on *parental education* (PE) were collected from parents at T2. The International Standard Classification of Education (ISCED) was used to operationalize parental education (UNESCO, 1997). This scale ranged from 0 = early childhood education to 9 = doctoral or equivalent level. This variable

was provided by the NEPS for the interviewed parent and their partner; in the current analysis, we considered the highest level within the household. The mean PE in our sample (see Table 2) was higher than the mean PE among all students in the complete NEPS dataset ($t = -35.20$; $df = 7,522$; $p < .001$).

In addition, a measure of *parents' occupational status* (OS) was considered. The International Socio-Economic Index of Occupational Status (ISEI) was used to operationalize parental occupational status (Ganzeboom et al., 1992). Like PE, this information was collected from parents at T2 and was provided in the NEPS data for the interviewed parent and their partner. We computed the highest parental ISEI—the HISEI. Again, mean parental OS in our sample was higher than in the complete dataset ($t = -37.61$; $df = 9,907$; $p < .001$). The mean parental HISEI among students attending *Gymnasium* was also higher compared to other large-scale assessments in Germany (Autorengruppe Bildungsberichterstattung, 2018).

Students' immigrant background (IB) was measured at T2 based on their parents' answers. A student was considered to have an immigrant background if they, one of their parents, or both parents were born abroad (0 = non-immigrant background, 1 = immigrant background). This applied to 8% of our sample.

4.2.3 Motivational variables

Students' motivation was measured with four distinct constructs. *Expectation of success* (EOS) of obtaining an *Abitur* was measured at T3 by asking students the following question: "Regardless of the qualifications that you can actually obtain at your school: How likely do you think it is that you could pass the *Abitur* examination?" Students could answer on a five-point Likert scale from 1 = "very unlikely" to 5 = "very likely". On average, the students in our sample assessed their chances of passing the *Abitur* as likely (see Table 2).

The *value* students attach to *education* (value of education; VOE) was measured at T4 with five variables. Responses were recorded on a five-point Likert scale from 1 = "fully disagree" to 5 = "fully agree". An example item is "Having a good education is valuable in its own right" (Stocké, 2005). The reliability of this scale was less than satisfactory ($\alpha = .59$)³. The value students attached to education was rather high among our sample.

General *effort* exerted for school was measured at T5 with three items, e.g., "I do more for school than I really have to" (Rakoczy et al., 2005). Responses were recorded on a four-point Likert scale from 1 = "does not apply" to 4 = "does apply". The reliability of this scale

³ Removing items from the scale did not improve the reliability of this scale.

was satisfactory ($\alpha = .70$). Just like EOS and VOE, students' reported effort was rather high among our sample.

Performance-related extrinsic motivation (PM) was measured at T5 with four items, e.g., "I learn for school because I want to be one of the best." Students answered on a five-point Likert scale from 1 = "fully disagree" to 5 = "fully agree" (Schiefele et al., 2002). The reliability of this scale was good ($\alpha = .82$). In contrast to EOS, VOE and effort, mean PM was rather low in our sample.

4.2.4 Control variables

Four control variables were included in all three models. Since performance and thus previous achievement-related experiences are crucial factors for educational attainment (Wigfield and Eccles, 2000), we controlled for *math* and *reading competences*. The NEPS included WLE measures for math and reading competence at T1 (Duchhardt and Gerdes, 2013; Haberkorn et al., 2012), which were standardized to have a mean of 0 in the full sample (Pohl and Carstensen, 2012). Math competence in our sample ranged from -3.33 to 4.62 logits and was higher than in the complete dataset ($t = -59.64$; $df = 11,227$; $p < .001$). Reading competence ranged from -3.18 to 3.30 logits and was also higher in our sample compared to the complete dataset ($t = -53.77$; $df = 10,852$; $p < .001$).

Furthermore, we controlled for *basic cognitive skills*. These are central predictors of scholastic achievement, with a correlation between cognitive abilities and scholastic achievement of around .50 having been broadly demonstrated (Roth et al., 2015). Basic cognitive skills were measured in terms of reasoning (DGCF, Haberkorn and Pohl, 2013; Lang et al., 2014) at T1. Basic cognitive skills were higher among students who had been enrolled in *Gymnasium* compared to the complete dataset ($t = -39.84$; $df = 10,690$; $p < .001$).

Moreover, relations between gender and educational attainment (OECD, 2019) have been demonstrated. Therefore, we additionally controlled for *gender*. Information on gender was gathered from students at T1 (male = 0, female = 1).

Table 2

Means (*M*), standard deviations (*SD*), internal consistencies (α), *n* of respondents, and intercorrelations among all analyzed variables in our sample and in the complete NEPS dataset (in brackets)

	Descriptive statistics				Intercorrelations											
	<i>M</i>	<i>SD</i>	α	<i>n</i>	2	3	4	5	6	7	8	9	10	11	12	
1) <i>Abitur</i>	0.77 (0.45)	0.42 (0.49)		5,702	.24	.17	-.11	.41	.06	.03	-.01	.31	.27	.21	.05	
2) PE	6.48 (4.86)	1.92 (2.06)		4,185		.56	-.37	.25	-.04	-.05	-.06	.24	.22	.12	-.03	
3) OS	64.04 (50.53)	17.36 (18.33)		5,322			-.15	.24	.02	-.03	-.03	.20	.17	.10	-.04	
4) IB	0.18 (0.22)	0.39 (0.42)		3,378				-.06	.11	.04	.06	-.15	-.16	-.08	.00	
5) EOS	3.89 (3.21)	0.93 (1.26)		5,524					.14	.11	.15	.38	.30	.20	.03	
6) VOE	3.13 (3.08)	0.62 (0.69)	.59 (.59)	5,288						.15	.26	-.06	-.06	-.06	.02	
7) Effort	2.36 (2.37)	0.61 (0.62)	.70 (.70)	4,426							.53	-.01	-.01	-.02	.13	
8) PM	2.67 (2.68)	0.66 (0.66)	.82 (.81)	4,625								.00	-.01	-.02	.10	
9) math competences	0.68 (0.02)	1.19 (1.21)		5,725									.41	.40	-.22	
10) reading competences	.62 (-.03)	1.11 (1.26)		5,555										.32	.10	
11) cognitive abilities	9.62 (8.65)	1.92 (2.46)		5,504											-.04	
12) gender	.54 (.50)	0.50 (.50)		5,814												

Note. PE = parental educational level. OS = parental occupational status. IB = immigrant background. EOS = expectation of success. VOE = value of education. PM = performance-related motivation. Significant correlations ($p < .05$) are in bold.

4.3 Analyses

To answer the research questions, three structural equation models were estimated in Stata 16.1 (StataCorp LLC, 2019). Missing data were treated with full-information maximum likelihood (FIML) estimates. Standardized coefficients are reported. The sample size was held constant across all models.

Model 1 investigated the relations between family background (PE, OS, and IB) and obtaining an *Abitur*. In addition, based on existing empirical findings, paths from IB to PE and OS and a path from PE to OS are estimated. Model 2 investigated the relations among motivational factors (EOS, VOE, effort, and PM) and obtaining an *Abitur*. In addition, paths from EOS and VOE to effort were estimated based on theoretical assumptions. The included motivational constructs were correlated with one another in the analyses, with the exceptions

of EOS and effort and VOE and effort. VOE, effort, and PM were modelled as latent variables. In Model 3, paths from all family background variables to all motivational constructs and obtaining an *Abitur* and from the motivational constructs to obtaining an *Abitur* were estimated. In addition, the indirect effects of family background on obtaining an *Abitur* via the motivational factors were estimated. All three models were controlled for the relations between cognitive abilities, math and reading competence, and gender and obtaining an *Abitur*⁴. Despite the binary outcome variable, we estimated a linear rather than a logistic model. This analysis strategy was chosen because linear regression coefficients are directly interpretable, in contrast to logistic regression coefficients. Furthermore, the error produced by using a linear rather than a logistic model is usually very small (Gomila, 2019; Labovitz, 1970). Due to the data structure (no unique class identifiers across measurement points), it was not possible to take into account the hierarchical structure of the data in terms of students nested within classes. Nevertheless, we clustered standard errors by school identifiers to minimize errors produced by the hierarchical structure of the data.

5. Results

5.1 Descriptives

With the exception of PM and effort, all included variables were correlated statistically significantly with obtaining an *Abitur* (see Table 2). Among FB variables, the strongest correlation with obtaining an *Abitur* was found for PE. Among motivational factors, the strongest correlation with obtaining an *Abitur* was found for EOS. The analyzed family background variables clearly differed in terms of their associations with the motivational variables. While statistically significant correlations with all analyzed motivational constructs were found for PE, OS was only significantly correlated with EOS. IB was significantly correlated with VOE, effort and PM.

5.2 Relations between family background and obtaining an *Abitur*

The first hypothesis stated that among students attending *Gymnasium*, high PE and OS are positively related to obtaining an *Abitur*, while having an IB is negatively related. This hypothesis was evaluated in Model 1 (Table 3, see also Figure A1 in the supplemental material). The CFI in Model 1 indicated a good model fit, while the RMSEA was less satisfactory.

⁴ As a robustness check, we conducted our analyses redefining the analysis unit, including students who attended *Gymnasium* or a multi-track school during their secondary school time. The alternative results for model 3 are available in the supplementary material (Figure A4).

The results of Model 1 showed that higher PE statistically significantly increased the likelihood of obtaining an *Abitur*, while there was no significant relation with OS. This means that PE is a more central predictor of educational success in terms of obtaining an *Abitur* than OS when considered simultaneously. Students' IB was also not significantly related to obtaining an *Abitur* when PE was simultaneously included in the model. These results have to be interpreted in the light of the strong relations among IB and PE and PE and OS.

The model with family background variables explained a total of 21% of the variance in obtaining an *Abitur* among students who had attended *Gymnasium* at some point during their school career. The findings support H1 with regard to PE but contradict the hypothesis with regard to IB and OS.

Table 3

Results of the structural equation models investigating the relation between family background variables and obtaining an Abitur (Model 1), motivational factors and obtaining an Abitur (Model 2) and the effects of family background mediated by motivational factors on obtaining an Abitur (Model 3)

	Model 1		Model 2		Model 3	
	β	SE	β	SE	β	SE
PE	.13***	.02			.10***	.03
OS	.03	.02			-.01	.02
IB	-.02	.02			-.05	.02
EOS			.30***	.02	.31***	.01
VOE			.08***	.02	.09**	.02
Effort			.01	.02	.06	.04
PM			-.06**	.02	-.08	.04
Math competences	.22***	.02	.15***	.02	.14***	.02
Reading competences	.12***	.01	.10***	.01	.09***	.01
Cognitive abilities	.07***	.02	.06***	.02	.06***	.02
Gender	.09***	.02	.07***	.01	.08***	.01
RMSEA	.08		.05		.05	
CFI	.91		.90		.90	
df	8		102		146	
R ²	.26		.08		.25	
N	5,409		5,409		5,409	

Note. PE = parental educational level. OS = parental occupational status. IB = immigrant background. EOS = expectation of success. VOE = value of education. PM = performance-related motivation. RMSEA = root mean square error of approximation. CFI = comparative fit index. *df* = degrees of freedom

Standardized coefficients. Model identification was achieved by setting the loadings of the first indicator to 1.

* $p < .05$. ** $p < .01$. *** $p < .001$

5.3 Relation between motivation and obtaining an *Abitur*

The relation between motivation and obtaining an *Abitur* was analyzed in Model 2 (see also Figure A2 in the supplemental material). Hypothesis H2 posited that all motivational factors under investigation would positively affect obtaining an *Abitur*. Model fit in Model 2 was acceptable.

The results showed that EOS was particularly positively associated with obtaining an *Abitur*. Statistically significant but weaker associations with VOE were also found. Thus, students' expectations of success were particularly positively related to educational attainment among students who had at some point attended *Gymnasium*. No relation with effort was found. As theoretically expected, effort was significantly positively affected by EOS and VOE. The association with PM—though weak—was significantly negative when all motivational variables were considered and thus contradicted the assumed relation.

The model with motivational variables explained a total of 8% of the variance in educational attainment among students who had attended *Gymnasium* at some point during their school career. These findings indicate that EOS and VOE predict obtaining an *Abitur* even when controlling for math and reading competence, cognitive abilities and gender, partially supporting H2.

5.4 Relations between family background and obtaining an *Abitur* mediated by motivational factors

5.4.1 Predicting motivational factors via family background

Model 3 (see also Figure A3 in the supplemental material) examined motivational factors as a potential mediator of the relation between FB variables and educational attainment. Model fit indices were good. Given the greater complexity of the third model compared to the first and second models, the RMSEA value in particular must be evaluated positively. In Hypothesis H3a, positive relations between PE, OS, and IB and motivational factors were expected. Heterogeneous associations between different family background variables and the motivational constructs were observed when all predictors were considered simultaneously.

PE was positively associated with EOS (Table 4). In turn, PE was not significantly related to VOE and negatively predicted students' effort and PM.

The results concerning the relationship between OS and motivational factors yielded a similar picture. Here again, EOS was the main motivational construct predicted. However, VOE was significantly predicted by OS, but not by PE. No significant relations between OS and effort or OS and PM were found.

A different picture arose for the relations between IB and motivational factors. While EOS was associated with PE and OS, EOS was not statistically significantly related to IB. Instead, positive relations with VOE and PM were observed.

In light of these results, it can be stated that there are relations between family background variables and motivational factors, although H3a was only partly confirmed—namely for the motivational constructs EOS in relation to PE and OS. OS and IB were positively related to VOE. Only IB significantly positive predicted PM, while the relation between OS and PM was negative, contradicting H3a.

5.4.2 Mediation role of motivational factors

Hypothesis H3b stated that motivational factors would mediate the relation between family background variables and obtaining an *Abitur*.

The indirect effects from family background variables to obtaining an *Abitur*, mediated by motivational factors, were mainly small (Table 4). For PE, indirect effects through EOS, and to a lesser extent VOE and effort, were found. A reduced relation between PE and educational attainment was observed when motivational factors were included in the model (Table 3), indicating a partial mediation for PE. The decrease in this effect compared to Model 1 was significant ($\Delta\chi^2=28.00$, $\Delta df=1$; $p<.001$). As IB and OS did not have a statistically significant direct effect on obtaining an *Abitur* in Model 1, a mediation cannot be tested. The individual and overall indirect effects for OS were near 0. However, indirect effects of IB via VOE and PM emerged.

Hypothesis H3b can be confirmed with respect to PE. The association decreased in comparison to Model 1, with the mediation mainly due to EOS. Students who had attended a *Gymnasium* at some point in their educational career were more likely to graduate with an *Abitur* if their parents had higher levels of education due to a direct as well as an indirect effect mediated by higher personal expectations regarding their own educational attainment. Moreover, R^2 indicated that Model 3 explains 21% of the variance in obtaining an *Abitur*.

Table 4

Direct effects of family background variables on motivational factors and indirect effects of family background variables on obtaining Abitur through motivational factors in Model 3 (Table 3)

Direct effects on motivational factors										
overall motiva- tional factors		EOS		VOE		Effort		PM		
β	SE	β	SE	β	SE	β	SE	β	SE	
PE		.19***	.02	.02	.03	-.09**	.03	-.06*	.03	
OS		.12***	.02	.09***	.03	-.00	.02	.01	.02	
IB		-.03	.02	.18***	.03	.03	.03	.06*	.02	
Indirect effects on obtaining an <i>Abitur</i>										
PE	.02**	.00	.09***	.01	.01***	.00	.01*	.00	.00	.00
OS	.00***	.00	.00	.00	.00	.00	.00***	.00	.00	.00
IB	-.07**	.01	-.23***	.02	-.02*	.01	.02	.01	.03*	.01

Note. PE = parental educational level. OS = parental occupational status. IB = immigrant background. EOS = expectation of success. VOE = value of education. PM = performance-related motivation.

* $p < .05$. ** $p < .01$. *** $p < .001$

6. Discussion

Our study aimed to determine whether students' motivation decreases or at least weakens the relation between family background and obtaining an *Abitur* among students who had attended *Gymnasium* at some point during their scholastic careers. This would be an important result, because students' family background is relatively stable, while motivation is malleable. If motivational factors buffer the relationship between family background and educational attainment, this would provide a starting point for improving the achievement of students from disadvantaged backgrounds.

Using data from the NEPS starting cohort Grade 9 (SC4), we first analyzed the relation between family background and obtaining an *Abitur*. Secondly, we examined the association between motivational factors and obtaining an *Abitur*. Finally, in the third model, all constructs were analyzed simultaneously, with motivational factors functioning as mediating variables. All models were controlled for math and reading competence, cognitive abilities, and gender. Extending previous research (Steinmayr et al., 2012; Wiederkehr et al., 2015) by focusing on obtaining an *Abitur*, the analyses examined general school-related motivation rather than domain-specific variables.

Despite focusing on students who attended *Gymnasium* in their educational career, which is a socially selective group, the often-reported relation between family background and educational attainment and/or performance for the overall student population (OECD, 2019) was also evident in this selective sample. Parental education was a more central predictor of obtaining an *Abitur* compared to parental occupational status and immigrant background, which

are only of minor relevance when parental education is simultaneously considered. Previous studies support the observation that immigrant background has a weaker association with educational success when socioeconomic background variables were also considered (OECD, 2016). It is conceivable that a similar mechanism operates with respect to parental occupational status in regard to parental education. However, this requires further investigation. The hypothesis concerning the relation between parental education and obtaining an *Abitur* among students who had attended *Gymnasium* can be confirmed. This indicates that similar mechanisms predict obtaining an *Abitur* and (domain-specific) performance.

The results also support and extend previous findings that motivational factors predict educational attainment, although important differences arose between the analyzed motivational constructs. When considering four core motivational constructs simultaneously, it became evident that expectation of success particularly notably predicted obtaining an *Abitur*, while there was no relation with effort. Similar findings were found by Marsh et al. (2016). There was no significant relation among effort and grades among lower secondary school students. Research concerning immigrant students found that a higher score on motivation did not necessarily result in better performance (OECD, 2019). In an attenuated manner this might also apply for the relation among effort and obtaining an *Abitur* in our sample. Furthermore, due to the relation among expectation of success and obtaining an *Abitur* no relation with effort might be found.

In summary, Hypothesis H2 can be confirmed with the exception of the relation between performance motivation and obtaining an *Abitur*, which was in the opposite direction as expected. However, the correlations in Table 2 and the results in Model 3 indicate non-significant relations between performance motivation and obtaining an *Abitur*. Due to these results and the weak relation, we do not consider it useful to interpret the coefficient in terms of content.

The results support the notion that motivational variables are systematically related to family background, although the picture was heterogeneous. Confirming the formulated hypotheses, parental education and occupational status predicted students' expectations of success. Moreover, parental occupational status and students' immigrant background predicted the value of education, while students' immigrant background was positively related to effort and performance motivation. Contrary to our formulated hypotheses, we found negative relations between parental education and students' effort and performance motivation. This might be due to the better performance of high-SES students. Since they perform better it might not be necessary for them to develop high scores on effort and performance motivation in contrast to low-achieving low-SES peers. No relations were found between parental education

and value of education, nor between parental occupational status and effort and performance motivation. Nevertheless, it can be stated that high-SES students and students from immigrant backgrounds tend to be more motivated at school.

Mediation analyses showed a partial mediation of parental education, indicating that motivational factors weaken the relation between parental education and obtaining an *Abitur*. The most important mediator was expectation of success, which was also the main predictor of obtaining an *Abitur* among the analyzed motivational factors. This aligns with studies investigating mediation effects in a domain-specific context (Ditton et al., 2019; Steinmayr et al., 2012; Wang and Finch, 2018).

Most importantly, the association between parental education and motivational variables should be considered when aiming to reduce or eliminate the relation between family background and educational attainment, because parental education was the most important predictor of all three family background variables in our sample.

This study has some core strengths, including the analysis sample stemming from a large, representative sample of German students, the longitudinal design following students from Grade 9 to the end of their schooling, as well as the comprehensive approach simultaneously considering three core family background variables and four important motivational constructs. Nevertheless, this study had several limitations that must be addressed, beginning with the low reliability of the value of education measure. Although the direction of the relation with value of education aligned with previous research, it may nevertheless have been distorted. In future research, particular attention should be paid to this construct to test whether the effect is replicable for educational success in general.

Another limitation concerns the time of first measurement. Students were interviewed for the first time in Grade 9, making it difficult to track their educational trajectories throughout (lower) secondary school, since they provided retrospective answers on which school track they had attended in each year of lower secondary school. In this context another limitation should be mentioned concerning the time of measurement of motivational factors. Several motivational factors were measured temporally close before *Abitur*. This close temporal relationship may have influenced the results for motivational factors such as the expectation of obtaining an *Abitur*. Unfortunately, data from NEPS starting cohort Grade 5 (SC3), which follows students from Grade 5 to the transition to the labor market or tertiary education, are not yet available. In the future, an attempt to replicate this study's findings with that sample can be undertaken. Moreover, the data did not allow us to take classroom context into account via multilevel analysis.

Further research should thus replicate this study's findings and extend its perspective by including classroom context variables. These should be included in the form of multilevel analyses whenever possible, because research has shown that peers can affect motivational factors and therefore educational success (Ladd et al., 2009). Likewise, different pathways to obtaining an *Abitur* should be examined, since enrollment in *Gymnasium* represents the traditional but by no means the only way to achieve this qualification (e.g., enrollment in a comprehensive school or vocational school).

In terms of the results' implications for educational practice, we concentrate on parental education as the most central predictor among the family background variables. One crucial factor for reducing educational inequality is breaking the relation between parental education and expectation of success. Expectation of success stood out as important predictor of obtaining an *Abitur* that was in turn dependent on parental education. Thus, it is essential to support low-SES students' educational attainment by specifically strengthening their expectations of success. This is especially important given that stereotypes about low-achieving low-SES students and high-achieving high-SES students are reproduced among students (Jury et al., 2017; Kriegbaum and Spinath, 2016; Wiederkehr et al., 2015). This internalization of stereotypes, which leads to a lower level of self-efficacy among low-SES students, can be addressed in educational settings.

Our results provide comprehensive information on the relation between family background, motivation and obtaining an *Abitur*. We examined a multifaceted set of both family background and motivational factors, with parental education emerging as a particularly central predictor of obtaining an *Abitur*. A partial mediation via motivational factors was found, suggesting starting points for reducing educational inequality.

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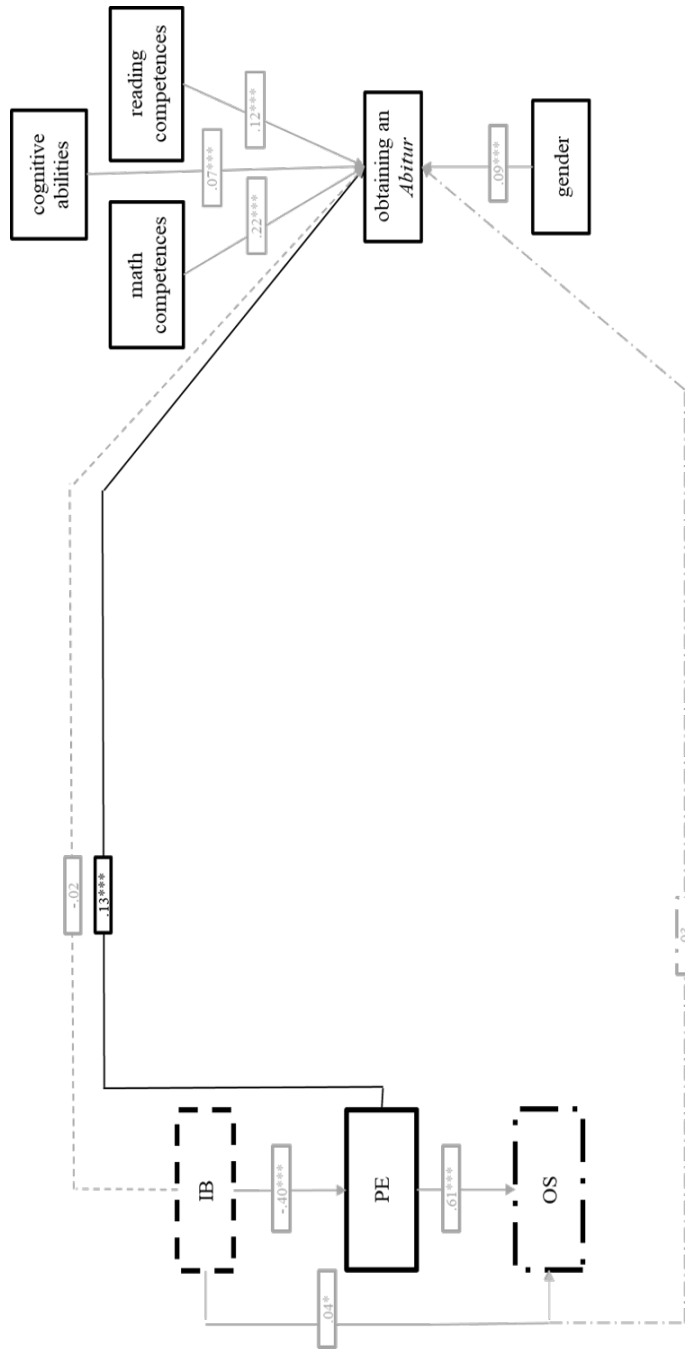
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Supplementary Material

Figure A1

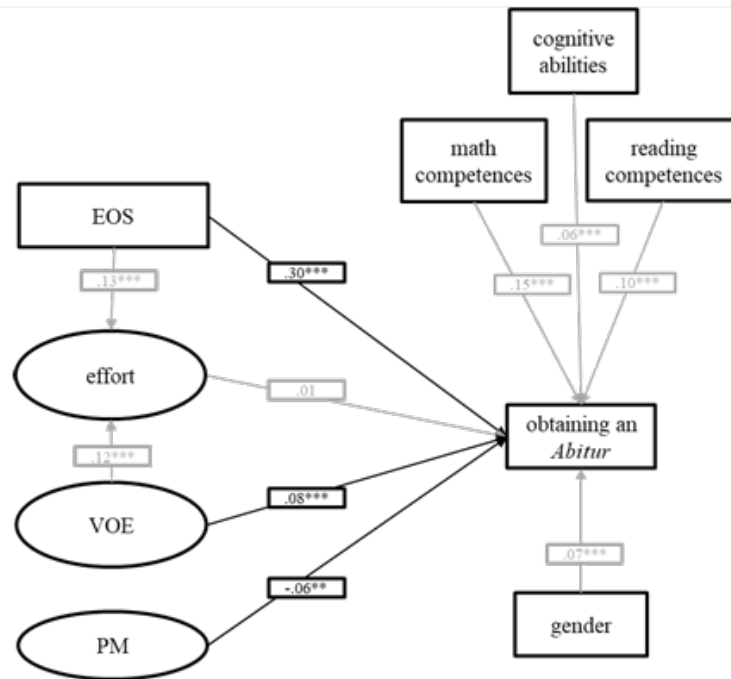
Structural equation model testing the relation among students' family background and obtaining an Abitur.



Note. $N = 5,409$ RMSEA = .08. CFI = .91. $df = 8$. $R^2 = .26$. Standardized coefficients. Model identification was achieved by setting the loadings of the first indicator to 1. IB = immigrant background. PE = parental educational level. OS = parental occupational status. RMSEA = root mean square error of approximation. CFI = comparative fit index. $df =$ degrees of freedom. For better readability, the paths from the family background variables and the boxes around the coefficients are marked in the same line pattern as the boxes around the family background variables. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure A2

Structural equation model testing the relation among students' motivation and obtaining an Abitur.



Note. $N = 5,409$. RMSEA = .05. CFI = .90. $df = 102$. $R^2 = .08$.

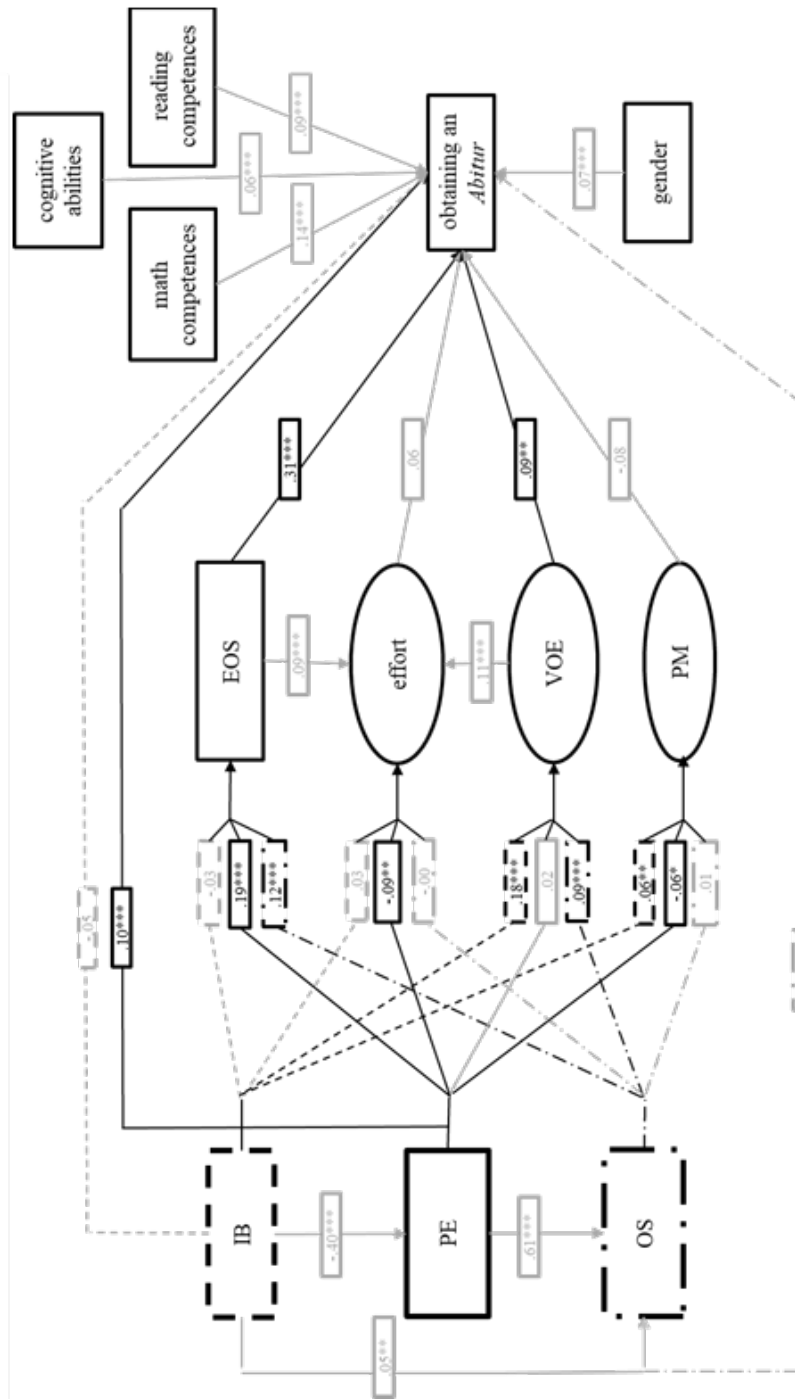
Standardized coefficients. Model identification was achieved by setting the loadings of the first indicator to 1.

EOS = expectation of success. VOE = value of education. PM = performance-related motivation. RMSEA = root mean square error of approximation. CFI = comparative fit index. df = degrees of freedom.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Figure A3

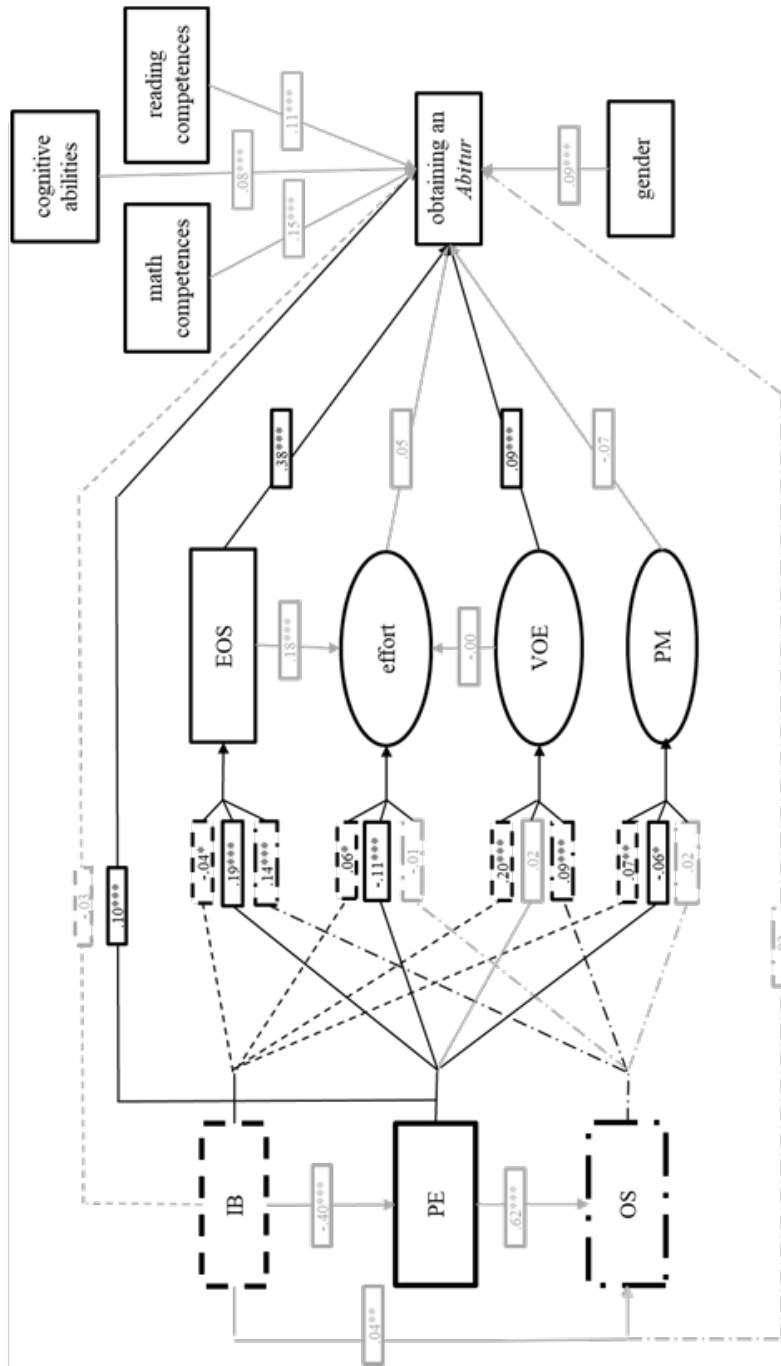
Structural equation model testing the relations among students' family background, motivation and obtaining an Abitur.



Note. $N = 5,409$. RMSEA = .05. CFI = .90. $df = 146$. $R^2 = .25$.
 Standardized coefficients. Model identification was achieved by setting the loadings of the first indicator to 1.
 IB = immigrant background. PE = parental educational level. OS = parental occupational status. EOS = expectation of success.
 VOE = value of education. PM = performance-related motivation. RMSEA = root mean square error of approximation. CFI = comparative fit index.
 df = degrees of freedom.
 For better readability, the paths from the family background variables and the boxes around the coefficients are marked in the same line pattern as the boxes around the family background variables.
 * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure A4

Structural equation model testing the relations among students' family background, motivation and obtaining an Abitur among students who attend Gymnasium or Gesamtschule during their educational career.



Note. $N = 6,400$. $RMSEA = .65$. $CFI = .84$. $df = 146$. $R^2 = .25$. Standardized coefficients. Model identification was achieved by setting the loadings of the first indicator to 1. VOE = value of education. PM = performance-related motivation. $RMSEA = 10$ of mean square error of approximation. CFI = comparative fit index. df = degrees of freedom. For better readability, the paths from the family background variables and the boxes around the coefficients are marked in the same line pattern as the boxes around the family background variables. * $p < .05$. ** $p < .01$. *** $p < .001$.

6.2 Study II: Obtaining Abitur without teacher recommendation – the role of social background, opportunity costs, and motivation

Molitor, K., Fabian, P., & Stang-Rabrig, J. (2025). Obtaining Abitur without teacher recommendation – the role of social background, opportunity costs, and motivation. In N. McElvany, M. Becker, H. Gaspard, S. König, R. Schaufelberger, B. Heppt & A. Naumann (Eds.), *Veröffentlichung des Instituts für Schulentwicklungsforschung. Jahrbuch der Schulentwicklung. Band 24. Bildungsprozesse und Kompetenzentwicklungen im Kontext sprachlicher und sozialer Heterogenität*. Weinheim: Beltz Juventa Verlag.

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Abstract

At the end of elementary school, German students receive an enrollment recommendation by their teachers which affects the attended secondary school type but can be biased by, for example, their socio-economic status (SES). A substantial share of students choose to attend and are successful in a higher-track school than recommended. However, it is unclear, which factors are of relevance for them being successful on academic school tracks. Based on theoretical assumptions, SES and motivational factors are core predictors of educational attainment and can be assumed to differ between students with and without academic-track enrollment recommendations (ATER). We investigated whether there are systematic differences in terms of SES (parental education/occupation), opportunity costs (financial cost, learning stress), and motivational factors (students' expectation of success, perceived idealistic parental aspirations, value of education, performance-related motivation) between students with and without ATER. Further, we analyzed whether the relations between SES, opportunity costs, motivational factors, and obtaining *Abitur* differed between these groups. A MANOVA revealed an on average higher SES and motivation among students obtaining *Abitur* with ATER and for students who obtained *Abitur* without ATER. Structural equation models showed that parental education was more relevant for students without ATER, while learning stress and expectation of success were more relevant for students with ATER. Implications for research and practice are discussed.

Keywords: Educational attainment, Educational inequality, Expectancy-value model, Motivation, Teacher assessment

Zusammenfassung

Schüler*innen erhalten am Ende der Grundschulzeit eine Übergangsempfehlung für eine weiterführende Schulform von ihren Lehrkräften, die prädiktiv für die besuchte Schulform ist, aber sozial verzerrt sein kann. Ein erheblicher Anteil Schüler*innen besucht eine höhere Schulform als empfohlen und ist dort erfolgreich. Die Bedingungen für einen erfolgreichen Gymnasialbesuch sind allerdings bislang nur teilweise erforscht. Auf der Grundlage theoretischer Annahmen sind die soziale Herkunft (SES) und Motivation zentrale Prädiktoren für den Bildungserfolg und es kann angenommen werden, dass sie sich zwischen Schüler*innen mit und ohne Gymnasialempfehlung (GE) unterscheiden. Wir untersuchen, ob es systematische Unterschiede in Bezug auf SES (elterliche Bildung/Berufsstatus), Opportunitätskosten (finanzielle Kosten, Lernstress) und Motivation (Erfolgserwartung, wahrgenommene elterliche Aspirationen, Wert von Bildung, leistungsbezogene Motivation) zwischen Schüler*innen mit und ohne GE gibt. Darüber hinaus haben wir untersucht, ob sich die Beziehungen zwischen SES, Motivation und dem Erreichen des Abiturs zwischen diesen Gruppen unterscheiden. Eine MANOVA ergab einen im Mittel höheren SES und höhere Motivation bei Abiturient*innen mit GE und einen höheren Lernstress bei Abiturient*innen ohne GE. Strukturgleichungsmodelle zeigten, dass die elterliche Bildung für Schüler*innen ohne GE und Lernstress und Erfolgserwartung für Schüler*innen mit GE relevanter waren. Implikationen für Forschung und Praxis werden diskutiert.

Schlüsselwörter: Bildungserfolg, Bildungsungleichheit, Erwartungs-Wert-Modell,
Lehrkräfteeinschätzungen, Motivation

1. Introduction

The transition from elementary to secondary school has been shown to contribute significantly to educational inequalities in Germany (e.g., Gibson & Koch, 2022; Lohmann & Groh-Samberg, 2010). A key characteristic of the German education system is the early division into different school types. By the end of elementary school, students receive enrollment recommendations (ER) from their teachers for a secondary school type, which influence the attended school track. Ideally, the ER is based on performance in core subjects (math, German), motivation, and school-related behavior. However, the prognostic quality and validity of ER was repeatedly discussed, since ER are not only linked to students' performance, motivation, and achievement-related behavior, but also to their social background (SES) (e.g., Dumont et al., 2014). Inaccurate teacher judgements (e.g., Urhahne & Wijnia, 2021) might influence the ER. Knowing that the ER has long-lasting effects on students' further educational career, it is highly problematic that some students are assessed inaccurately and thus cannot achieve their full potential. However, students can be successful in academic-track schools (ATS) even if they lack the corresponding ER (e.g., Pfost et al., 2018). Nevertheless, it is unclear and of crucial importance what characterizes and helps students who attend a more ambitious school track than recommended being successful at this school type. Besides family background variables such as SES, motivation is a starting point, as it has been shown to promote educational attainment (e.g. Ditton et al., 2019).

Thus, in our study, we aimed to increase knowledge about students who did not receive an academic-track enrollment recommendation (ATER), but still obtained *Abitur*. Therefore, we firstly compared these students with students obtaining/not obtaining *Abitur* with and without ATER in terms of mean levels of SES and opportunity costs (parental education and occupational status, financial burden and learning stress) and individual motivational factors (perceived idealistic parental aspirations, expectation of success, value of education, and performance-related motivation). Secondly, we investigated whether the relations between SES, opportunity costs, and motivational factors and obtaining *Abitur* differed between students with and without ATER. Expanding upon previous research, we were able to track students until they left school.

2. Theoretical background

2.1 The transition to secondary school in Germany

German students typically transfer to secondary school after grade four⁵. The transition is based on teachers' ER students receive at the end of elementary school⁶. The ER is based on (the development of) students' performance in core subjects (math and German) as well as students' motivation in terms of effort and school-related behavior (Kultusministerkonferenz [KMK], 2015). ERs are given for the most prevalent German school types: *Hauptschule*, *Realschule* (typically leading to vocational training), and *Gymnasium* (allowing students to continue on to university).

In different federal states, the ER is more or less binding for students' actual school enrollment. Mostly⁷, the final decision about the school type in which to enroll lies with the parents. In other federal states⁸, the ER is more binding and it is only possible to differ from the ER when taking performance tests or probation periods (KMK, 2015). The ER should reduce educational inequality, since it represents a teacher judgment based on supposedly objective performance criteria and uniform standards and is intended to counteract the influence of differential aspirations depending on parents' SES (KMK, 2015). However, it is problematic that these standards are not defined in concrete terms; there are no uniform regulations across federal states regarding the subjects or cut-off grades to be considered (KMK, 2015; Valtin, 2020). In practice, no inequality-reducing effect of the ER was found (Roth & Siegert, 2015).

2.2 Inequalities arising from the transition from elementary to secondary school

The transition to secondary school is seen as a factor generating and reinforcing educational inequalities in Germany, because the division in different school types happens very early compared to other countries (Lohmann & Groh-Samberg, 2010). These inequalities arise due to low educational upward mobility in the German school system and have consequences for students' further life course, as the attended school track after elementary school is a relevant predictor for the obtained school-leaving certificate and long-term educational and occupational outcomes (Stephens et al., 2015).

Educational inequalities resp. more precisely the relations between SES and educational outcomes can be explained by Boudons' (1974) theory of primary and secondary effects of social stratification. Primary effects relate to differences in students' performance depending

⁵Except for the federal states of Berlin and Brandenburg, where elementary school lasts six years.

⁶Except for the federal state of Bremen, where no enrollment recommendation is given.

⁷Berlin, Hamburg, Hessen, Lower Saxony, Mecklenburg-Western Pomerania, North Rhine-Westphalia, Rhineland-Palatinate, and Schleswig-Holstein.

⁸Baden-Württemberg, Bavaria, Brandenburg, Saarland, Saxony, Saxony-Anhalt, Thuringia

on family background variables such as SES. Students' SES determines the availability of non-monetary resources (social and cultural capital; Bourdieu, 1973), meaning that, from birth onwards students are exposed to different stimuli (Schindler, 2018). The available resources determine childrens' development, abilities and later on their educational performance and attainment (Passaretta et al., 2022). Secondary effects refer to differences in educational decisions and aspirations caused by certain family background variables such as SES due to differences in knowledge about the educational system and therewith related expectancies to succeed on different school types, values attached to education as well as cost-benefit considerations depending on the available economic capital (Bourdieu, 1973). Boudons' (1974) theory was extended in terms of tertiary effects, firstly concerning inequalities in terms of students immigrant background (Esser, 2016; Gresch, 2012), but later on also in terms of social inequalities (Blossfeld et al., 2019; Helbig & Morar, 2017). Next to focusing familiar prerequisites determining performance and educational decisions, tertiary effects consider effects of third parties such as teachers as important agents of socialisation. It is assumed that teachers convey socially unequal educational opportunities via grades and ER teacher assessments and teachers perception of students likelihood to succeed, as there are differences in i.e. grades students receive depending on their SES, although their performance in standardized competence tests is equal (Neugebauer, 2010).

The above described mechanisms operate at the transition to secondary school in the context of the ER, which can be socially distorted due to some issues (e.g., Dumont et al., 2019; Tiedemann & Billmann-Mahecha, 2010). Because of the relations between students' performance with their SES, primary effects are prevalent at the transition. Research showed that high-SES students obtained better grades and were more likely to receive higher school-leaving certificates (e.g., Broer et al., 2019). The relations between SES and achievement are already present by the end of elementary school (Bloh & van Ophuysen, 2008). Since the ER is, among other aspects, based on students' performance, high-SES students received ATER more often (Dumont et al., 2014). This relation is reinforced by tertiary effects – as already mentioned above, high-SES students receive better grades than their low-SES peers when they are at the same level of standardized test performance (Bittmann, 2021; Neugebauer, 2010).

Secondary effects can be found in deviations from the ER, which can be expected if parental aspirations differ from teachers' ER. Deviations are socially selective because parental aspirations differ by SES (e.g. Spera et al., 2009). Conversely, it is also possible to enroll in a lower-track school than recommended (enrolling in a non-ATS with ATER). Downward deviations are mainly found among low-SES students due to expectation of success and opportunity costs (Bloh & van Ophuysen, 2008). Opportunity cost encompass financial factors,

which are relevant in this context, as ATS involve higher costs in terms of i.e. the subsequent university education compared to vocational training. But also without deviating from the teacher recommendation secondary effects are present in terms of knowledge of the educational system. Parents can exert influence by contacting teachers and influencing them to recommend a higher school type. High-SES parents are most likely to do so, as they have high aspirations and wish to maintain their social status. This is particularly true in federal states where ER are more binding, as the freedom of choice of school type is more limited there (Dumont et al., 2019). Furthermore, learning stress is an opportunity cost to be considered, which is prevalent due to worse performance among low-SES students implying a higher learning load.

Tertiary effects become apparent when taking a closer look at the ER given by teachers in dependence of students' SES. While ER for high- and low-performing students were similar regardless of SES, the case was different for mid-performing students (Neugebauer, 2010). One reason might be the anticipated level of support that parents can provide, i.e. teachers believe high-SES students have a higher likelihood of success because they can draw upon a social support network if they face difficulties at school (Benner et al., 2016; Ditton & Krüsken, 2006).

2.3 Motivation and educational outcomes

These explanations raise the question which individual factors besides SES and opportunity costs promote educational attainment. One important factor that is strongly associated with educational outcomes is students' motivation. Hence, different aspects of students' motivation have emerged as important predictors for educational attainment (Ditton et al., 2019; Wang & Finch, 2018). Moreover, motivational factors are also considered alongside performance when teachers make their ER. Thus, motivation is of particular interest when explaining why students' might be successful without ATER.

Wigfield and Eccles' (2000) expectancy-value model of achievement motivation provides a comprehensive explanation for the relations between motivational factors and educational outcomes. Core elements in this model directly affecting achievement-related choices are students' expectation of success and the subjective task value. However, a broad set of further factors next to family background and opportunity costs indirectly affects achievement-related choices and outcomes, including previous achievement and perceptions of socializers' beliefs, expectations, and attitudes. In the context of this paper, the important motivational or motivational-related constructs students' expectation of success, perceived parental aspirations, value of education, and performance-related motivation are investigated.

There is strong evidence emphasizing the importance of expectation of success for performance, even when controlling for previous achievement (e.g., Wiederkehr et al., 2015). Also an intervention study showed that increasing expectation of success had a positive effect on performance among students who perceived their performance as worse than their peers' (Durik et al., 2015). Students' expectations of what they are capable of might be influenced by the ER they receive (Neuenschwander & Niederbacher, 2021). Furthermore, research on students with and without ATER found a lower self-concept among students enrolled in ATS without ATER (Bittmann, 2021; Pfof et al., 2018). Being in a high performing environment and due to the big-fish-little-pond effect (Marsh, 1987), students without ATER might rate their abilities and likelihood to succeed as lower than their peers. Also lack of teachers believes of them being able to obtain *Abitur* is of relevance (Gentrup et al., 2020).

Another factor related to educational attainment are students' perceptions of socializers' expectations. Perceived idealistic parental aspirations can be a source of extrinsic motivation for students (Šimunović and Babarović, 2020). It has been shown that children aim to meet their parents' expectations in order to avoid punishment or obtain rewards (Cheung & Pomerantz, 2012). The final transition decision is made by parents and depends on their aspirations – especially among students without ATER perceived parental aspirations could be of relevance, as parents actively defy teachers ER.

Further, subjective task value in terms of attainment value (Wigfield & Eccles, 2000) is another important predictor of educational attainment. In STEM (science, technology, engineering, and mathematics) subjects ascribing a high value to these subjects led to better performance (Steinmayr et al., 2012). Also having positive attitudes and high value to education in general positively predicted educational outcomes (Verešová & Mala, 2016). Enrollment in a higher school track than recommended might influence the relevance of students' value of education for their attainment.

Alongside these factors, students' performance motivation understood as the wish to perform well in school has also emerged as a central predictor for educational attainment (Ditton et al., 2019; Wang & Finch, 2018). As this study examines attainment of *Abitur* among students with and without ATER – a clearly performance-related goal – performance motivation is of major relevance.

2.4 Differences between students with and without ATER

Several studies have identified that about 10 % - 15% of students attend a higher-track school than recommended. A study by Tidemann-Mahecha (2010) found an upward deviation of around 15% for Lower Saxony, Pfof et al. (2018) found an upward deviation for around

10% of students in Bavaria and Hesse, and Dudas (2014) found around 12% upward deviations for Hamburg. Depending on the analysis sample (incl. /excl. multi-track schools), Bittmann (2021) showed – based on NEPS data (Germany as a whole) – an upward deviation of 12% – 18%. Focusing students who attend ATS without ATER, we can see that about 70% of them are successful, while approximately 90% of students with ATER are successful (Tiedemann & Billmann-Mahecha, 2010).

Comparing high- and low-SES students, Dudas (2014) found that the accuracy of teachers' ER differed by students' SES. While 87% of high-SES students who were suitable for ATS received a corresponding ER, only 58% of low-SES students received one. This is an indicator for tertiary effects being at work at the transition to secondary school. Comparing students at ATS with and without ATER, Pfof et al. (2018) found that students without ATER had lower grades and standardized math and reading scores than their peers with ATER in Grade 7. They also had a higher risk of transferring to a lower-track school. These findings imply a higher learning load and thus learning-related stress for students without ATER.

Overall, it can be stated that – although a higher share of students who receive an ER for the school type in which they actually enroll are ultimately successful in this school type – a large share of students without a corresponding ER is successful as well (Tiedemann & Billmann-Mahecha, 2010). However, it should be noted that being successful was defined as reaching grade 7 or 8 without a grade retention; there is no information about the school-leaving certificates students ultimately obtained. Furthermore, only individual German federal states were taken into account in the analyses (Dudas, 2014; Pfof et al., 2018; Tiedemann & Billmann-Mahecha, 2010)

3. Research questions and hypotheses

We sought to close the following research gaps: First, as presented before, students' SES, opportunity costs, and motivation are relevant predictors of educational attainment. However, less is known about how students with vs. without ATER deviate in these important educational attainment-related aspects and whether the influences of these factors on educational attainment differ among students with vs. without ATER being an important group to focus on. Second, we were able to track students until they obtained their school-leaving certificate and investigated SES, opportunity costs, and motivational variables simultaneously. This leads us to the following research questions and hypotheses:

Question 1: Are there on average systematic differences in terms of SES (parental education and occupation), opportunity costs (financial cost and learning stress), and

motivational factors (expectation of success, perceived idealistic parental aspirations, value of education, learning motivation) between students successfully deviating upwards from the ER (obtaining *Abitur* without ATER (Group 1)) and students following the given ER (students obtaining *Abitur* with ATER (Group 2), students not obtaining *Abitur* without ATER (Group 3)) and students deviating downwards from the given ER (students not obtaining *Abitur* with ATER (Group 4))?

In terms of SES we expect the following group differences: Students who obtained *Abitur* without ATER (Group 1) on average H1a1) have a lower SES (parental education and occupational status) than students obtaining *Abitur* with ATER (Group 2), H1a2) have a higher SES than students not obtaining *Abitur* without ATER (Group 3) and H1a3) students not obtaining *Abitur* with ATER (Group 4).

For opportunity costs we expect the following results: Students who obtained *Abitur* without ATER (Group 1) on average have higher scores on financial burden and learning stress than H1b1) students obtaining *Abitur* with ATER (Group 2), H1b2) students not obtaining *Abitur* without ATER (Group 3) and H1b3) students not obtaining *Abitur* with ATER (Group 4).

Regarding expectation of success and perceived idealistic parental aspirations, we expect differences as following: Students obtaining *Abitur* without ATER (Group 1) do on average H1c1) score lower on expectation of success and higher on perceived idealistic parental aspirations than students obtaining *Abitur* with ATER (Group 2), H1c2) score higher on expectation of success and higher on perceived idealistic parental aspirations than students not obtaining *Abitur* without ATER (Group 3) and H1c3) students not obtaining *Abitur* with ATER (Group 4).

For value of education and learning motivation we expected the groups to differ in the following ways: Students who obtained *Abitur* without ATER (Group 1) do on average value education more and have higher learning motivation than H1d1) students obtaining *Abitur* with ATER (Group 2), H1d2) students not obtaining *Abitur* without ATER (Group 3) and H1d3) students not obtaining *Abitur* with ATER (Group 4).

Question 2: How do the relations between SES (parental education and occupation), opportunity costs (financial cost and learning stress), and motivational factors (expectation of success, perceived idealistic parental aspirations, value of education, learning motivation), and obtaining *Abitur* differ between students with and without ATER?

We expect the following relations for students with and without ATER with obtaining *Abitur*:

Among students without ATER, obtaining *Abitur* is predicted H2a) more strongly by SES (parental education and occupational status), H2b) opportunity costs (financial burden and learning stress), H2c) equally strong by the motivational factors expectation of success and more strongly by perceived idealistic parental aspirations, H2d) more weakly by motivational factors value of education and learning motivation than among students with ATER.

4. Method

4.1 Data, sample, and procedure

We used data from the German National Educational Panel Study (NEPS) starting cohort Grade 5 (SC3) (NEPS Network, 2023)⁹. NEPS is a longitudinal, multi-cohort large-scale survey providing information on educational trajectories as well as student, parent, and teacher assessment. Students who changed schools or left the educational system were individually tracked and interviewed. Our sample consisted of students for whom information on the ER was available. This information was gathered from parents. We thus excluded $N = 1,328$ students without parent interview or missing information on the ER. Since no ER is given in Bremen, students from Bremen were not in the analyses as well. In line with previous conducted studies (Dudas, 2014; Pfof et al., 2018; Tidemann & Billmann-Mahecha, 2010), also students attending comprehensive schools were excluded. The first included measurement was Winter 2012/13, at which point students were attending Grade 7. Our sample in Grade 7 thus comprised $N = 2,671$ students, with a mean age of 12.5 ($SD = 0.84$) years, whereof 49% were female. Student questionnaires and competence tests were conducted in paper and pencil interviews (PAPI) mainly between Grades 7 and 9, while parent surveys were interviewed via telephone (CATI-mode) in Grade 7.

4.2 Variables¹⁰

4.2.1 Educational attainment

Educational attainment was measured by the highest school-leaving certificate obtained. The variable was binary-coded for our analyses (0 = no *Abitur*, 1 = *Abitur*) and was based on a variable providing information on the highest school-leaving certificate obtained at various measurement points. Approximately 61.8% of our sample left school with *Abitur*. This share is higher than among all German students (34 %; Statistical Federal Office [Destatis], 2023).

⁹ This paper uses data from the National Educational Panel Study (NEPS; see Blossfeld & Roßbach, 2019). The NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfBi, Germany) in cooperation with a nationwide network.

¹⁰ Scale parameters (means, standard deviations) for both groups can be found in Table 2, resp. in the online supplementary material for control variables (Table A2).

4.2.2 Enrollment recommendation

Information on ER were collected retrospectively from parents in Grade 7 – the later transition to secondary school in the federal states of Berlin and Brandenburg thus does not lead to methodological problems. This variable was coded in binary form (0 = no ATER, 1 = ATER). 62.4% of the students in our sample received ATER at the end of elementary school.

4.2.3 SES

Students' SES was operationalized using *parental education* and *occupational status*. This information was collected from parents in Grade 7. Information for both measures were available for the interviewed parent and their partner, out of which we considered the highest educational level. We used the International Standard Classification of Education (ISCED) (United Nations Educational Scientific and Cultural Organization [UNESCO], 1997) to operationalize parental education; the scale ranged from 0 = early childhood education to 9 = doctoral degree or equivalent. To operationalize parental occupational status, we used the International Socio-Economic Index of Occupational Status (ISEI), which ranges from 10 (subsistence farmers, fishers, hunters, and gatherers) to 90 (judges) (Ganzeboom, 2010).

4.2.4 Opportunity costs

Financial burden was measured in Grade 8 by one item on a five-point Likert scale from 1 = very difficult to 5 = very easy asking students: "As long as you go to school, you can hardly earn your own money. Your parents pay most of what you need (e.g., school supplies, clothes). How hard would it be for your parents to cover these costs if you obtained an Abitur?" *Learning stress* was also measured in Grade 8 with one item on a five-point Likert scale from 1 = very low to 5 = very high. Students were asked: "The different school-leaving qualifications require different amounts of effort. How much effort would it take you to acquire the Abitur?"

4.2.5 Motivational factors

Students' motivation was measured by four distinct constructs. Students' *expectation of success* in terms of passing *Abitur* was measured in Grade 8 by the following question: "Regardless of the qualifications that you can actually obtain at your school: How likely do you think it is that you could pass the Abitur examination?". Responses were recorded on a five-point Likert scale from 1 = "very unlikely" to 5 = "very likely". *Perceived idealistic parental aspirations*¹¹ covering perceived parental future-related academic wishes of the parents for the

¹¹ Hereafter: parental aspirations

child were assessed by students in Grade 9 with one item (Hoenig et al., 2016). Students were asked: “The following question deals with what your parents expect from you in school and for your professional career. What highest school-leaving qualification would your parents like you to have?” This variable was binary-coded for analyses (0 = no *Abitur*, 1 = *Abitur*). The *value of education* was measured with five items, e.g., “Having a good education is valuable in its own right” (Stocké, 2005). The items were assessed in Grade 7 and answered on a five-point Likert scale from 1 = “fully disagree” to 5 = “fully agree”. The reliability of this scale was satisfying for both groups (with ATER: $\alpha = .69$, without ATER: $\alpha = .71$). Students’ *performance-related motivation* was measured with four items, e.g. “I learn for school because I want to be one of the best.” (Schiefele et al., 2002) covering students willingness to actively and purposefully engage with learning content. These items were assessed in Grade 8 and responses were recorded on a five-point Likert scale from 1 = “fully disagree” to 5 = “fully agree”. The reliability of this scale was good for both groups (with ATER: $\alpha = .84$, without ATER: $\alpha = .82$).

4.2.6 Control variables

A set of control variables was included in the analyses. Students’ *language spoken at home* needed to be considered, since immigrant students on the one hand tend to perform on average worse in school compared to students without an immigrant background but on the other hand show higher scores on aspirations and motivation (McElvany et al., 2018). Responsible for this mismatch are lacks in the knowledge of the language of instruction (Organization for Economic Co-operation and Development [OECD], 2019a), which is why we included home language in the analyses. Measured in Grade 7, students were defined as German speakers when they only spoke German with both adults in their household (0 = home-language German, 1 = home-language non-German)¹². We also controlled for the *bindingness of the enrollment recommendation*. We therefore coded the federal states by their degree of bindingness at the time this cohort of students transitioned to secondary school (school year 2010/11) (0 = non-binding recommendation, 1 = binding recommendation).

Furthermore, Wigfield and Eccles (2000) theorized that previous performance is important in explaining students’ educational attainment. Thus, we included WLE scores for

¹² In Germany, a person is considered having an immigrant background if they or at least one parent were not born with German citizenship (Destatis, 2024). Based on this, there is various research that uses the country of birth instead of nationality; corresponding definitions can be found at the OECD or the European Commission (OECD/EU (2019b) or also at IGLU (Stubbe et al., 2023). A child has a migration background if he or she or at least one parent was born abroad. Similarly, the definition used here is that the child has a non-German language of interaction if they do not speak German exclusively with at least one parent. The share of pupils with "home language non-German" (14.1%) is comparable to the share of pupils with a migrant background based on the above definition (13.9%).

math and *reading competences* measured in Grade 7 in our analyses (Duchhardt & Gerdes, 2013; Haberkorn et al., 2012). Both measures were standardized to a mean of 0 and ranged from -3.66 to 4.81 (math competences) and -4.33 to 5.78 (reading competences) in our dataset. Additionally, students' *basic cognitive skills*, which represent a factor crucial for students' performance and educational attainment, were controlled for (Roth et al., 2015). A reasoning assessment (DGCF) that ranged from 0 to 12 was measured in Grade 7 (Haberkorn & Pohl, 2013). Also *gender* was regarded, as relations between gender and educational attainment have been demonstrated (OECD, 2019a). Information on students' gender were measured in Grade 7 (male = 0, female = 1). Also, the attended *school type* is an important predictor when investigating obtaining *Abitur*, for which we controlled in binary form (0 = non-ATS, 1 = ATS). We controlled for the highest attended school type during secondary school time. This measure stems from various measurement points. Students attending comprehensive schools had to be excluded, as no identification of school-track was possible.

4.3 Analyses

We used Stata 17 (StataCorp LLC, 2021) for our analyses. To answer our first research question, we conducted mean value comparisons (MANOVA) for all included variables, comparing four groups of students: students obtaining *Abitur* without ATER (Group 1), students obtaining *Abitur* with ATER (Group 2), students not obtaining *Abitur* without ATER (Group 3) and students not obtaining *Abitur* with ATER (Group 4). We compared Group 1 against the three other groups. To answer our second research question, we estimated four structural equation models (SEM) comparing the two groups of students (students with ATER vs. without ATER) in terms of educational attainment, i.e. whether they obtained *Abitur* or not. Model fit in Model 4 was assessed using χ^2 , RMSEA, CFI (Shi et al., 2020), and R^2 (Models 1-3 were saturated). We included the set of factors one at a time in a stepwise process¹³. Taking the hierarchical structure of the data (students nested within classes nested within schools) into account was not possible on the class level, since classes are not consistent across measurement points in the NEPS data. However, we clustered standard errors by school identifiers and controlled for school type. Standardized coefficients are reported. Value of education and performance-related motivation were modelled latently in the analyses. All SEMs included all control variables and all variables were correlated with one another. Measurement coefficients and intercepts were specified to be equal for both groups; other parameters were allowed to

¹³ We estimated mediation models using the motivational factors as mediators. Although RMSEA values were good, these models had an insufficient fit in terms of CFI, which was 0.84 or less. Thus, we decided not to report the mediation models.

vary. Sample size was held constant for all models. Although the outcome variable is binary, we decided to estimate linear models due to the better interpretability of linear regression coefficients compared to logistic regression coefficients and due to the fact that the error produced by this procedure is usually very small (Gomila, 2019).

5. Results

5.1 Descriptive Statistics

We included 2,671 students in our analyses. The majority of students in our sample obtained a school-leaving certificate matching with the received ER – 51.4 % obtained *Abitur* with ATER (Group 2), 27.3 % did not obtain *Abitur* with no ATER (Group 3). The groups deviating from the ER in obtaining *Abitur* without ATER (10.3 %) (Group 1) and not obtaining *Abitur* with ATER (11.0 %) (Group 4) were almost equally large.

All included variables were significantly correlated with obtaining *Abitur* among students with and without ATER, except for performance-related motivation (Table 1, Table A1 in the online supplementary for all variables incl. control variables). Parental education, occupation, and learning stress were likewise strongly correlated with obtaining *Abitur*. Among the motivational variables, expectation of success had the strongest correlation with obtaining *Abitur* in both groups, while parental aspirations were equally relevant for students without ATER.

Table 1

Intercorrelations among the analyzed variables (except for control variables) in our sample for students with (upper right) and without (lower left) ATER

		1	2	3	4	5	6	7	8	9
1	<i>Abitur</i>	1	.21	.20	.05	-.05	.34	-.12	.12	.04
2	PE	.21	1	.61	.07	-.05	.20	-.07	.03	-.06
3	OS	.20	.58	1	.07	-.05	.20	-.07	.03	-.06
4	CosFin	.12	.09	.11	1	.05	.15	.03	.09	.08
5	CostLea	.07	.04	.03	.20	1	-.21	-.10	-.02	-.05
6	EOS	.28	.12	.13	.16	.02	1	.22	.14	.19
7	ParAsp	.29	.10	.14	.12	.02	.36	1	.17	.11
8	VOE	.08	.02	.03	.02	-.02	.23	.22	1	.21
9	PM	.03	-.01	-.03	.11	-.02	.20	.11	.23	1

Note. ATER = academic-track enrollment recommendation. PE = parental educational level. OS = parental occupational status. CosFin = financial cost. CostLea = Cost of learning stress. EOS = expectation of success. ParASP = parental aspirations. VOE = value of education. PM = performance-related motivation. Significant correlations ($p < .05$) are in bold.

5.2 Mean comparison of students with and without ATER

To determine differences between students who obtained *Abitur* without ATER (Group 1) and students 1) who obtained *Abitur* with ATER (Group 2), 2) who did not obtain *Abitur* without ATER (Group 3), and 3) who did not obtain *Abitur* with ATER (Group 4), we conducted a MANOVA. The MANOVA revealed statistically significant differences between the analyzed groups (see Table 2, $F(48, 3897) = 43.32, p < .001, \text{Wilk's } \Lambda = .285$).

Table 2

Mean comparison of all analyzed variables (except for control variables), standard deviations (SD) and n of respondents by enrollment recommendation and school-leaving certificate

	Group 1		Group 2		$\Delta M p$	Group 3		$\Delta M p$	Group 4		$\Delta M p$
	<i>M</i> (<i>SD</i>)	<i>n</i>	<i>M</i> (<i>SD</i>)	<i>n</i>		<i>M</i> (<i>SD</i>)	<i>n</i>		<i>M</i> (<i>SD</i>)	<i>n</i>	
PE	6.85 (2.07)	302	7.72 (2.07)	1,502	.000	5.64 (2.40)	798	.000	6.54 (2.34)	320	.054
OS	56.99 (17.80)	298	66.35 (16.65)	1,492	.000	48.58 (18.76)	789	.000	56.97 (18.92)	316	.494
CosFin	4.23 (0.91)	251	4.11 (0.94)	1,278	.262	3.94 (1.14)	593	.003	3.97 (1.01)	251	.003
CostLea	4.66 (0.57)	267	4.47 (0.69)	1,376	.000	4.53 (0.91)	622	.112	4.58 (0.67)	265	.732
EOS	3.26 (0.93)	269	4.06 (0.71)	1,379	.000	2.62 (1.04)	619	.000	3.31 (0.99)	263	.717
ParAsp	0.54 (0.50)	251	0.77 (0.42)	1,326	.000	0.24 (0.43)	611	.000	0.36 (0.48)	238	.000
VOE	3.02 (0.86)	271	3.25 (0.84)	1,415	.010	2.86 (0.89)	676	.004	2.95 (0.90)	273	.304
PM	2.57 (0.86)	272	2.44 (0.64)	1,390	.202	2.52 (0.62)	643	.972	2.37 (0.61)	272	.173

Note. Group 1: students obtaining *Abitur* without ATER. Group 2: students obtaining *Abitur* with ATER. Group 3: students not obtaining *Abitur* without ATER. Group 4: students not obtaining *Abitur* with ATER. ATER = academic-track enrollment recommendation. PE = parental educational level. OS = parental occupational status. CosFin = financial cost. CostLea = Cost of learning stress. EOS = expectation of success. ParASP = parental aspirations. VOE = value of education. PM = performance-related motivation.

In terms of SES, the average SES among students who obtained *Abitur* with ATER was higher than that of their peers without ATER, confirming H1a1 (Table 2). The difference was significant for parental education and occupational status. Comparing Groups 1 and 3, an on average higher mean was found for Group 1 for both SES measures, confirming H1a2 as well. Contradicting H1a3, no statistically significant group differences between students deviating upwards vs. downwards from the ER were found. For opportunity costs, statistically significant differences between Groups 1 and 2 were found for financial burden, as presumed in H1b1. Although – in line with H1b2 and H2b3 – the results indicate that financial costs are higher in

Group 1 than in the Groups 3 and 4, no statistically significant differences were found. Students in Group 1 exhibited on average lower values on expectation of success but also parental aspirations than students in Group 2, partly confirming H1c1. Compared to Groups 3 and 4, there is a shift towards higher expectation of success and parental aspirations in Group 1. Except for the means for Group 1 and Group 4 in terms of expectations of success, the mean differences are significant, partly confirming H1c2 and H1c3. We also observed that the mean value of education was statistically significantly higher for Group 1 compared to Group 2, while no significant differences were found for performance motivation, contradicting H1d1. Compared to Group 3 value of education on average is higher in Group 1. For performance motivation, again, no statistically significant differences were found. H1d2 thus can be partly confirmed. Comparing groups 1 and 4, contradicting H1d3 no group differences in terms of value of education and performance motivation were found.

5.3 Results of the group comparison via structural equation models

To answer the question of whether relations between SES, opportunity costs, motivational factors and obtaining *Abitur* differed between students with and without ATER, we specified four structural equation models (see Table 3). In Model 1, significant positive relations between parental education and obtaining *Abitur* were found in both Groups. The relation was significantly stronger for students without ATER ($\Delta\chi^2=15.3$, $\Delta df=2$; $p<.001$), implying that for students without ATER parental education is more important for obtaining *Abitur* than for students with ATER. This partially supports H2a, as no significant relations for parental occupation were found in either group.

In Model 2, learning stress and financial burden were included in the model. Both variables did not significantly predict obtaining *Abitur* in either group. Comparing Models 1 and 2 in terms of R^2 , slightly more variance was explained ($R^2_{\text{Model 1}}: .221$, $R^2_{\text{Model 2}}: .230$).

In Model 3, we included expectation of success and parental aspirations. Both factors significantly positively predicted obtaining *Abitur*. While parental aspirations were an equally strong predictor in both groups, the positive impact of expectation of success was significantly more relevant for students with ATER ($\Delta\chi^2=6.5$, $\Delta df=2$; $p=.035$), meaning that students beliefs in themselves is of particular importance in this group.

H2c had to be rejected, as neither the stronger predictive power of parental aspiration for students without ATER nor the equally strong relations for expectation of success for both groups were found. After including expectation of success and parental aspirations, changes in the previously reported relationships were observed. The relation between parental education

Table 3
Results of the structural equation models for the relations between SES, opportunity costs, motivation and obtaining Abitur for students with and without ATER

	Model 1		Model 2		Model 3		Model 4	
	β	SE with ATER/without ATER	β	SE with ATER/without ATER	β	SE with ATER/without ATER	β	SE with ATER/without ATER
PE	.07*/.16***	.03/.04	.07*/.16***	.03/.04	.05/.14***	.03/.04	.05/.15***	.03/.04
OS	.05/.06	.03/.04	.04/.05	.03/.04	.00/.03	.03/.04	.01/.02	.03/.04
cost financial			-.01/.05	.02/.04	-.02/.02	.02/.04	-.03/.03	.03/.04
cost learning			.01/.05	.03/.04	.06*/.05	.03/.04	.07**/.05	.03/.04
EOS					.18***/.11**	.03/.04	.18***/.10*	.03/.04
parental aspirations					.13***/.11**	.03/.04	.12***/.07	.03/.04
VOE							.08*/.09*	.03/.04
PM							.01/.05	.03/.05
home language	.06*/.05	.03/.03	.05/.05	.03/.03	.03/.01	.03/.04	.01/.01	.03/.04
bindingness ER	-.06**/-.02	.02/.03	-.06**/-.02	.02/.03	-.04/-.03	.02/.03	-.03/-.01	.02/.03
gender	.07**/.12***	.02/.03	.07**/.11***	.03/.03	.06*/.11***	.02/.03	.07*/.11**	.03/.04
school type	.43***/.19***	.02/.03	.45***/.20***	.02/.03	.39***/.17***	.02/.03	.36***/.21***	.03/.04
cognitive abilities	.12***/.06	.03/.04	.11***/.04	.03/.04	.11***/.04	.03/.04	.10**/.05	.03/.04
math competences	.03/.02	.03/.04	.04/.02	.03/.05	.00/.03	.03/.05	.02/.02	.04/.05
reading competences	.08**/.12**	.03/.04	.07*/.11**	.03/.04	.06/.10*	.03/.04	.07*/.12**	.03/.05
RMSEA	-		-		-		.037	
CFI	-		-		-		.939	
χ^2	-		-		-		302	
Chi ²	-		-		-		839.5***	
R ²	.221		.230		.271		.274	
N	1,634/1,037		1,634/1,037		1,634/1,037		1,634/1,037	

Note. PE = parental educational level (0 = early childhood education to 9 = doctoral or equivalent level). OS = parental occupational status (10 = subsistence farmers, fishers, hunters, and gatherers to 90 = judges). cost financial (1 = very hard 5 = very easy). cost learning (1 = very low 5 = very high). EOS = expectation of success (1 = very unlikely to 5 = very likely). parental aspirations (0 = no *Abitur*, 1 = *Abitur*). VOE = value of education (1 = fully disagree to 5 = fully agree). PM = performance-related motivation (1 = fully disagree to 5 = fully agree). home language (1 = home-language non-German). bindingness ER (1 = binding recommendation). gender (1 = female). school type (1 = ATS). cognitive abilities (0-12). math competence (3.66 to 4.81). reading competence (-4.33 to 5.78). RMSEA = root mean square error of approximation. CFI = comparative fit index. χ^2 = degrees of freedom. Standardized coefficients. Model identification was achieved by setting the loading of the first indicator to 1.

* $p < .05$. ** $p < .01$. *** $p < .001$. Coefficients significantly differing between groups are in bold.

and obtaining *Abitur* became insignificant for students with ATER, even though the coefficient did not change much in size, while the relation for students without ATER remained similar – still indicating a positive relation between parental education and obtaining *Abitur* in this group. Furthermore, the relation between learning stress and obtaining *Abitur* became significant for students with ATER. Model 3 explained a higher amount of variance compared to Model 2 ($R^2_{\text{Model 2}}: .230, R^2_{\text{Model 3}}: .271$).

In Model 4, we included value of education and performance motivation. Chi^2 , RMSEA, and CFI indicated a good model fit. The expected stronger relations between value of education, performance motivation and obtaining *Abitur* for students without ATER (H2d) could not be confirmed. Although value of education was a relevant positive predictor for obtaining *Abitur*, no group differences were found. Both groups benefitted likewise from a high value of education. Performance motivation was no significant predictor in either group. After including value of education and learning motivation, further changes in the previously reported relations were observed. The associations between parental aspirations and obtaining *Abitur* became insignificant for students without ATER – however, the group difference was not significant ($\Delta\chi^2=0.57, \Delta df=2; p=.753$). Model 4 explained a slightly higher amount of variance compared to Model 3 ($R^2_{\text{Model 3}}: .271, R^2_{\text{Model 4}}: .274$).

6. Discussion

Using data from NEPS starting cohort grade 5 (SC3), our study aimed to investigate whether students with or without ATER differed concerning their SES, opportunity costs, and core motivational factors. Moreover, we examined whether different factors are of relevance for obtaining *Abitur* among students with and without ATER. The results contribute to previous findings and go beyond them in terms of identifying differences in central characteristics as SES, opportunity costs, and motivation and identifying the different important factors for obtaining *Abitur* in different groups, that are simultaneously considered.

Also in our sample, a substantial share of students deviated from the ER and was successful on a higher school type. The share of students successfully attending ATS without ATER was lower than in previous research focusing students in Grade 7 and thus, also another outcome. When comparing with other studies tracking students until the end of secondary school time, our results are in line with previous research (Bloh & van Ophuysen, 2008; Pfof et al., 2018).

Summarizing the findings concerning students' SES for both research questions, students with and without ATER who obtained *Abitur* differed significantly regarding SES.

Students with ATER had a higher SES than their peers. As the conditions for enrollment in an ATS were more favorable for high-SES students, this finding is in line with H1a1 and previous research (Bloh & van Ophuysen, 2008). When predicting educational attainment (H2a), we observed a higher relevance of parental education for students without ATER, underlining the relevance of SES for their educational outcomes. This result indicates that parental education is particular importance for students without ATER to obtain *Abitur*, as this is usually associated with higher SES and can therefore mean that students who may not have received ATER due to lower performance at the end of primary school are dependent on support in the form of tutoring, which parents with higher SES, i.e. also higher education, are more likely to be able to finance. Concerning opportunity costs, we found the following results: Students obtaining *Abitur* with and without ATER did not differ statistically significantly in financial burden, but the results confirmed our assumptions in tendency. However, learning stress was perceived as higher among students who obtained *Abitur* without ATER. This might be explained via performance, which tends to be lower among low-SES students and students deviating upwards from the ER (Pfost et al., 2018), meaning that this special group of students (obtaining *Abitur* without ATER) may have to invest more time in learning in order to obtain *Abitur* (Broer et al., 2019). Comparing our reference group to students not obtaining *Abitur* in tendency higher financial cost was detected. The mean differences in terms of opportunity costs showed that secondary effects of social stratification (Boudon, 1974) are relevant in our sample. Although students without ATER perceived more learning stress, this factor was not more relevant for obtaining *Abitur* (H2b). Quite oppositely, we observed that higher learning stress positively predicted obtaining *Abitur* in this group. This – at first glance – counterintuitive finding might be explained by the personal importance of learning and educational success. Learning stress must not be perceived negatively; it is also possible that it motivates students to learn (Saklofske et al., 2012). A non-linear relation is also possible – learning stress might be a positive predictor up to a certain point, but might turn negative at higher levels.

The findings concerning students' expectation of success were in line with H1c1. Students might believe more in themselves after receiving ATER, as they perceive that their teachers, who are important agents of socialization, believing in them to be able to perform well (Gentrup et al., 2020). Students not receiving ATER perceived themselves as capable of obtaining *Abitur* less often. As they also scored lower on competences than their peers, the lower scores on their expectations of success might be due to the big-fish-little-pond effect (Marsh 1987) resp. the little-fish-big-pond effect (Zell & Lesick 2021), as they are in a high performing learning environment. The expectations of success did not significantly differ between the two groups deviating from the ER – this can be interpreted as the ER shaping

students' expectations and students beliefs about being able to obtain *Abitur* (Neuenschwander & Niederbacher, 2021).

The results in terms of parental aspirations contradict the assumptions made in H1c1, as students, obtaining *Abitur* with ATER, perceived parental aspirations as higher. However, considering the bias towards high-SES students in our sample, an explanation could be that parents with high aspirations contacted teachers before giving ER in order to encourage ATER (Dumont et al., 2019), which reinforces the impression that secondary effects are evident at the transition. However, it is an open question whether parents alone made the enrollment decision or if the students also had an influence (e.g. Wohlkinger, 2014). In this case, it is plausible that parental aspirations were less relevant for students who obtained *Abitur* without ATER. Expectation of success and parental aspirations positively predicted obtaining *Abitur* for both groups, but were more relevant for students with ATER, contradicting H2c. Thus, among more privileged students (students with ATER, who tend to have a higher SES), motivational factors seem to develop greater relevance. Also having received ATER might reinforce students' beliefs in themselves and thus promote expectations of success being more relevance in this group.

Contradicting H1d1, value of education was higher among students obtaining *Abitur* with ATER compared to students obtaining *Abitur* without ATER. As status maintenance – which is also a factor for educational decisions and part of secondary effects of social stratification – is a relevant factor for high-SES parents, this finding is in line with this (Dumont et al., 2019). As for expectation of success no group differences were found between the two groups deviating from the ER. Even though value of education was a significant predictor in both groups, contradicting H2d no group differences were found, meaning that value of education is a likewise relevant motivational predictor in both groups and thus underlines its general importance for educational attainment (Meyer et al., 2024).

Summarizing our findings, students with and without ATER differ in terms of the factors predicting *Abitur*. While students' SES (parental education) was more relevant for students without ATER, motivational factors (expectation of success and parental aspirations) were more relevant for students with ATER. Educational attainment among students without ATER was thus primarily determined by their parents' education, implying that low-SES students without ATER might be doubly disadvantaged. Nevertheless, motivation in terms of value of education and expectation of success was a relevant predictor for educational attainment and promoting students' motivation is a key way to foster educational attainment, this applies to all students. When attempting to reduce educational inequality among students without ATER, it

would be interesting to examine how their somewhat higher motivation can be translated into higher educational attainment. This could be especially relevant for students without ATER who did not deviate from their ER, even though they theoretically had the potential to obtain *Abitur*.

6.1 Limitations and strengths

When interpreting the results, some limitations must be kept in mind. Although working with a large sample, many students were excluded from our analyses due to missing information on ER. Thus, students from the federal state of Bremen were excluded, as no enrollment recommendation was given. Furthermore, in line with previous research investigating and comparing outcomes of students with and without ATER, students attending multi-track schools were not part of our sample (Dudas, 2014; Pfost et al., 2018; Tidemann & Billmann-Mahecha, 2010). Due to the exclusions, our sample is biased towards a high share of students receiving ATER and obtaining *Abitur*. The results thus have to be interpreted in light of a sample with favorable outcomes, which might over- or underestimate the impact of some predictors. However, including students from Bremen and from multi-track schools might lead to problems in interpreting the results as well, as it is not clear what is actually measured, as i.e. no allocation to an academic resp. non-academic track is possible, and results might be biased due to this. Thus, we decided against imputing missing data.

Next, no control on the class level was possible, as we used NEPS data which do not measure the classroom context and associated effects (e. g. Ladd et al., 2009). Also due to data structure, it was not possible to analyze individual pathways of school-track changes, which is why we included attending an ATS as a general measure. One strength of our study is that, contrasting previous studies, data allowed us to observe students until the end of their school careers. This contributed to a deeper understanding of the school-leaving certificates students ultimately obtain and the mechanisms contributing to the attainment of a higher school-leaving certificate among students without ATER. Another strength is that we applied a comprehensive approach with two variables measuring SES and opportunity cost and four core motivational factors to obtain a more detailed picture and detect possible starting points for supporting higher educational attainment among students without ATER.

6.2 Implications for research and practice

Further research should identify factors beyond parental education that promote educational attainment and educational inequalities among incorrectly assessed students. The focus on different subgroups could be a starting point for that. Moreover, further variables such

as parental support or students' wellbeing (Diener et al., 2018) or teaching quality (Klieme & Rakoczy, 2008) could be included to explain the educational attainment of students without ATER. This would extend the focus to another important institution (school) or socialization agent (teachers) that is also highly relevant for students' educational outcomes. However, attending *Gymnasium* is the most common, but not the only way of obtaining *Abitur*. Especially when focusing low-SES children, these alternative, non-traditional ways should be further investigated. In this context comprehensive schools, which do have a higher horizontal permeability than school tracks in the highly stratified educational system are of interest for further research, as well as obtaining the qualification to take up tertiary education via vocational schools or occupational qualification. Furthermore, a focus should be set on how to improve teachers' evaluations that lead to ER.

Some implications for practice arise from our findings as well. On the individual level, as evident in the expectancy-value model (Wigfield & Eccles, 2000, Ditton et al., 2019), expectation of success is highly relevant for educational success. Thus, interventions to foster students' expectations as well as their beliefs in themselves might be a good option to support students without ATER in particular. Moreover, the value such students attach to education could be strengthened and might in turn lead to more equal opportunities in the educational system. On the institutional level, the point at which students are divided into separate tracks should be discussed critically, as many relevant prerequisites for educational attainment develop later than the end of elementary school, thus it is difficult to make predictions about students' future development (Valtin, 2020). Longer periods of comprehensive schooling or greater flexibility between school tracks could be solutions here. Furthermore, teachers do not receive long-term feedback on the accuracy of their ER. Providing teachers with feedback on whether the ER they made were accurate could improve the quality of their predictions in the long run (Dudas, 2014).

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Supplementary material

Table A1.

Intercorrelations among all analyzed variables in our sample for students with (upper right) and without (lower left) ATER

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 <i>Abitur</i>	1	.21	.20	.05	-.05	.34	-.12	.12	.04	.00	-.08	.07	.42	.24	.21	.22
2 PE	.21	1	.61	.07	-.05	.20	-.07	.03	-.06	-.19	-0.00	-0.00	.19	.11	.20	.18
3 OS	.20	.58	1	.07	-.05	.20	-.07	.03	-.06	-.10	-0.01	-0.01	.20	.11	.21	.19
4 CosFin	.12	.09	.11	1	.05	.15	.03	.09	.08	.04	-0.01	.05	.07	.01	.01	.01
5 CostLea	.07	.04	.03	.20	1	-.21	-.10	-0.02	-0.05	.01	.07	.03	-0.03	.03	-.12	-.07
6 EOS	.28	.12	.13	.16	.02	1	.22	.14	.19	-0.02	-.07	.00	.25	.10	.23	.21
7 ParAsp	.29	.10	.14	.12	.02	.36	1	.17	.11	.07	-0.04	.02	.27	.07	.09	.11
8 VOE	.08	.02	.03	.02	-0.02	.23	.22	1	.21	.11	-.06	-.13	.15	-0.00	.02	.01
9 PM	.03	-0.01	-0.03	.11	-0.02	.20	.11	.23	1	.04	.02	-.09	-0.03	-.05	.01	-0.01
10 HL	-0.00	-.23	-.24	.05	-0.01	.12	.21	.17	.11	1	-.06	.03	.00	-0.04	-0.12	-0.09
11 BindER	-0.05	.05	.01	-.07	.05	-.06	-.07	-.06	-0.03	-0.01	1	-.07	.03	-0.02	.08	.08
12 Gender	.09	-.06	-0.04	.02	.01	-0.01	.07	-.08	-.11	.06	-0.03	1	-0.01	.01	-.21	.09
13 SType	.27	.15	.17	.07	.03	.27	.28	.13	-0.05	.04	-.07	-.05	1	.17	.23	.19
14 CogAb	.15	.13	.08	.05	.11	.14	.06	.00	-.14	-.10	.06	-0.04	.17	1	.35	.27
15 MathC	.19	.19	.17	.02	.13	.20	.08	.03	-.10	-.17	.07	-.22	.23	.42	1	.45
16 ReadC	.23	.12	.13	.06	.06	.19	.13	-0.01	-.19	-.08	.06	.07	.20	.31	.48	1

Note. ATER = academic-track enrollment recommendation. PE = parental educational level. OS = parental occupational status. CosFin = financial cost. CostLea = Cost of learning stress. EOS = expectation of success. ParASP = parental aspirations. VOE = value of education. PM = performance-related motivation. HL = home language. BindER = bindingness of the enrollment recommendation. SType = school type. CogAb = cognitive abilities. MathC = math competences. ReadC = reading competences.

Significant correlations ($p < .05$) are in bold.

Table A2

Mean comparison of all analyzed variables, standard deviations (SD) and *n* of respondents by enrollment recommendation and school-leaving certificate

	Group 1		Group 2		$\Delta M p$	Group 3		$\Delta M p$	Group 4		
	M (SD)	<i>n</i>	M (SD)	<i>n</i>		M (SD)	<i>n</i>		M (SD)	<i>n</i>	$\Delta M p$
PE	6.85 (2.07)	302	7.72 (2.07)	1,502	.000	5.64 (2.40)	798	.000	6.54 (2.34)	320	.054
OS	56.99 (17.80)	298	66.35 (16.65)	1,492	.000	48.58 (18.76)	789	.000	56.97 (18.92)	316	.494
CosFin	4.23 (0.91)	251	4.11 (0.94)	1,278	.262	3.94 (1.14)	593	.003	3.97 (1.01)	251	.003
CosLea	4.66 (0.57)	267	4.47 (0.69)	1,376	.000	4.53 (0.91)	622	.112	4.58 (0.67)	265	.732
EOS	3.26 (0.93)	269	4.06 (0.71)	1,379	.000	2.62 (1.04)	619	.000	3.31 (0.99)	263	.717
ParAsp	0.54 (0.50)	251	0.77 (0.42)	1,326	.000	0.24 (0.43)	611	.000	0.36 (0.48)	238	.000
VOE	3.02 (0.86)	271	3.25 (0.84)	1,415	.010	2.86 (0.89)	676	.004	2.95 (0.90)	273	.304
PM	2.57 (0.86)	272	2.44 (0.64)	1,390	.202	2.52 (0.62)	643	.972	2.37 (0.61)	272	.173
HL	0.17 (0.38)	298	0.12 (0.32)	1,490	.024	0.18 (0.38)	785	.244	0.12 (0.32)	314	.002
BindER	0.34 (0.48)	267	0.49 (0.50)	1,376	.000	0.40 (0.49)	798	.563	0.59 (0.49)	320	.000
Gender	0.53 (0.50)	301	0.52 (0.50)	1,494	.670	1.44 (0.50)	790	.320	0.42 (0.49)	316	.020
CogAb	9.15 (2.13)	209	10.23 (1.56)	1,129	.000	8.40 (2.34)	601	.000	9.01 (2.36)	263	.530
MathC	0.72 (1.07)	256	1.66 (1.03)	1,389	.000	0.27 (1.04)	631	.000	1.05 (0.96)	256	.010
ReadC	0.78 (1.21)	255	1.66 (1.23)	1,388	.000	0.18 (1.13)	630	.000	0.89 (1.08)	257	.587

Note. Group 1: students obtaining *Abitur* without ATER. Group 2: students obtaining *Abitur* with ATER. Group 3: students not obtaining *Abitur* without ATER. Group 4: students not obtaining *Abitur* with ATER. ATER = academic-track enrollment recommendation. PE = parental educational level. OS = parental occupational status. CosFin = financial cost. CostLea = Cost of learning stress. EOS = expectation of success. ParASP = parental aspirations. VOE = value of education. PM = performance-related motivation. HL = home language. BindER = bindingness of the enrollment recommendation. CogAb = cognitive abilities. MathC = math competences. ReadC = reading competences.

6.3 Further Analyses: How learning environments shape students' well-being in school – the impact of familial, personal, and school-related factors

Molitor, K., Stang-Rabrig, J., McElvany, N. (2024). How learning environments shape students' well-being in school – the impact of familial, personal, and school-related factors
[Manuscript submitted for publication]

Abstract

Students' well-being became a central educational goal – but it differs by performance, social background, educational dispositions and learning environments. The transition to the highly stratified German secondary school system depends on an academic performance-based enrollment recommendation (ER) given by teachers at the end of elementary school. Deviating from this ER has implications for students' further performance. Additionally, first studies suggest consequences for students' well-being. However, how well-being outcomes and their predictors differ between students who followed the recommended pathway vs. students who enter a higher performing environment than recommended by their teacher requires further investigation. We sought to determine whether there are differences in students' well-being in terms of life satisfaction, satisfaction with friends, academic self-concept and helplessness in German between students without academic-track ER attending academic-track vs. non-academic-track schools. In a second step, we investigated social background, value of education, perceived parental aspirations and exhaustion as predictors for well-being, comparing groups via stepwise structural equation models including potential mediating effects of perceived parental aspirations and exhaustion. Results of MANOVA showed a higher self-concept among non-ATS students. Without including parental aspirations and exhaustion, group differences for value of education, life satisfaction and self-concept were found. Self-concept was positively predicted by parental aspirations for non-ATS and negatively predicted by exhaustion for ATS. Helplessness in German was negatively predicted by parental aspirations and positively predicted by exhaustion for non-ATS students. The relation between value of education and self-concept was mediated by exhaustion for ATS-students. Implications for research and practice are discussed.

Keywords: well-being, secondary-school students, motivation, at-risk students

Introduction

Students' school success is crucial for their further life course, as it shapes their career opportunities. However, school success is a multidimensional construct and in recent years, students' well-being in school has emerged as a central aim of scholastic education alongside academic achievement (Ed Diener et al., 2018). Students' well-being is an indicator of quality of life and is positively related to students' academic achievement (Bücker et al., 2018), although it is still unclear whether academic achievement predicts well-being (self-determination theory, Ryan & Deci, 2000) or well-being predicts academic achievement (broaden-and-build theory, Fredrickson, 2001). Alongside individual cognitive factors such as achievement, individual non-cognitive factors such as students' social background and stress predict their well-being. Furthermore, differential learning environments in heterogeneous school systems are of relevance. Different learning environments, such as those found in different school types, have different performance requirements, and there is evidence that being in a learning environment that does not match one's performance is negatively related to one's well-being (big-fish-little-pond effect, Marsh, 1987; Rathmann et al., 2018).

Different educational systems function differently with respect to aspects such as tracking and entry conditions for different school types. In Japan, there are entrance examinations for university-preparatory high schools vs. vocational schools, and in countries such as the Netherlands and Germany, students receive an enrollment recommendation (ER) from their teachers at the end of elementary school. Nevertheless, the actual school transition decision can differ from the ER, and students can attend higher or lower school types than recommended. When comparing students attending academic-track schools (ATS) with and without a corresponding recommendation, differences in competences and well-being have been found.

However, another comparison, which has been largely neglected until recently, is also of relevance in this context, namely comparing students who attend a higher school type than recommended with students who are comparable in terms of their competences –students who likewise received a non-ATS enrollment recommendation but attend a non-ATS. The well-being of these students with similar academic baselines in differential learning environments and school contexts is of specific interest for this paper. Also, different predictors of well-being such as students' SES, value of education, perceived parental aspirations and exhaustion are examined, as is a potential mediating role of perceived parental aspirations and exhaustion. Alongside students' social background, we thus also focus on malleable predictors to provide

potential starting points for interventions to promote students' well-being. We thereby aim to investigate well-being outcomes and their predictors in differential learning environments by comparing students who followed the recommended pathway by attending a non-ATS vs. students who attend an ATS against the recommendation and thus are in a higher performing learning environment. Thereby, we consider different performance levels and aim to separate effects stemming from different learning environments from those stemming from different performance levels. We compare students' well-being in Grade 9, which is before the first students graduate with the lowest school-leaving certificate.

Theoretical background

Well-being and its relevance in the scholastic context

A person's well-being is an indicator for their quality of life (Ed Diener et al., 2018; Hascher, 2008). It encompasses how a person thinks and feels about life in general, but also about certain domains such as work or school. Well-being is a multicomponent construct and comprises a psychological (cognitions, positive/negative affect), a physiological as well as a social component (Ed Diener, 1984; Hascher, 2004; Kanonire et al., 2020; Pollard & Lee, 2003).

In recent years, students' school well-being has become an important educational goal, as the different facets of the multidimensional concept of school well-being have emerged as predictors as well as consequence of students' educational achievement (Kaya & Erdem, 2021; Kleinkorres et al., 2020). On the one hand, students' well-being has shown to be predictive of educational attainment (e.g. Amholt et al., 2020). This might be explained by Fredricksons (2001) broaden-and-build theory, which explains the positive relation through positive emotions that broaden people's momentary thought-action repertoires, which then promote physical, social, psychological and intellectual resources. On the other hand, Ryan and Deci's (2000) self-determination theory explains how educational attainment might predict students' well-being. The fulfilment of basic psychological needs – including competence– enhances motivation and well-being (e.g., Stang-Rabrig et al., 2023). Recent studies and meta-analyses indicate a reciprocal relationship between the two constructs (Bücker et al., 2018; Kaya & Erdem, 2021; Kleinkorres et al., 2020).

A central indicator for general well-being is life satisfaction. Life satisfaction is a key aspect of the psychological component of well-being, as it is an overall indicator of current life conditions (Proctor et al., 2011). There is longitudinal evidence that life satisfaction is a

predictor as well as a consequence of educational attainment, even when controlling for SES and school-related affect (Ng et al., 2015).

A second core component of students' general well-being is social well-being, which comprises facets such as being socially integrated and – more generally – social functioning. Furthermore, it is one facet of overall health (Topp et al., 2015). Social embeddedness is relevant for students' educational outcomes (Patrick et al., 2002).

Zooming in on the school context, an important facet of school well-being is students' academic self-concept. Students' academic self-concept is an indicator for their perceived competence and thus a proxy for cognitive well-being. There is also evidence of a reciprocal relation between academic self-concept and students' performance (Ghazvini, 2011; Hübner et al., 2023).

A negative indicator for well-being in the school context is helplessness towards learning and/or certain subjects. Helplessness in the school context is part of the affect component of the psychological well-being facet and is derived from the concept of learned helplessness. This concept describes beliefs that one is not in control over one's life situation due to negative experiences (Seligman, 1972). Perceived helplessness negatively predicts performance (Fincham et al., 1989; Kleinkorres et al., 2020), but is also negatively predicted by performance (Kleinkorres et al., 2020). Reading comprehension is particularly crucial for learning success in other subjects, as written language is the basis for overall understanding (Savolainen et al., 2008). Therefore, helplessness in the school subjects German is investigated.

Predictors of well-being

Next to performance, further factors have emerged as central predictors of students' well-being, which can be differentiated into familial, personal, and school-related factors, for example (Hascher, 2011; Morinaj et al., 2021).

One prominent familial factor is students' socio-economic status (SES). Already E. Diener et al. (1995) stated that SES is a predictor for well-being. Higher well-being in terms of life satisfaction is found for high-SES students (Crede et al., 2015; Proctor et al., 2011). Positive relations with SES have also been found for students' academic self-concept (Basarkod et al., 2021). Moreover, students' helplessness depends on students' performance (Kleinkorres et al., 2020). Students' performance strongly depends on their SES (Jury et al., 2017; Stephens et al., 2014), implying a relation between students' SES and their helplessness as well.

Personal attitudes towards school and education are relevant in the context of academic attainment as well as well-being (Moè et al., 2009). Attitudes and values towards education might on the one hand motivate students to learn, as already Wigfield and Eccles (2000) theorized. On the other hand, due to mismatches between achievement and values, students might exert pressure on themselves. Perceived achievement pressure was shown to be negatively related to students' well-being in terms of academic self-concept and stress (Stang-Rabrig et al., 2023). Pressure might be exerted not only by personal values; perceived familial expectations should also be regarded in this context. Parental educational aspirations are an indicator for parental expectations regarding students' educational attainment. Students aim to fulfil their parents' expectations. Their motives to do so are avoidance of punishment on the one hand and obtaining rewards and recognition on the other hand (Cheung & Pomerantz, 2012). Following this, students' perceived parental aspirations can also be understood as external pressure (Jones, 2015). Parental pressure is related to various facets of well-being (Kleinkorres et al., 2023). In terms of the investigated well-being constructs, specific relations between life satisfaction and parental aspirations, pressure and expectations exist. Among young students, negative relations have been found (Kleinkorres et al., 2023), while positive relations between parents' educational expectations and life satisfaction have been found in longitudinal studies among adolescents (Jung et al., 2018). Parents' competence appraisals have been shown to influence students' academic self-concept (Gniewosz et al., 2012; Neuenschwander et al., 2007) and helplessness (Kim et al., 2023).

One personal factor is stress. Stress includes many dimensions, i.e. workload, anxiety or exhaustion (Gross & Seebaß, 2016). A common definition of stress was provided by Selye (1956), who defined stress as a "nonspecific response of the body to any demand". Stress is a relevant predictor for different facets of well-being. Negative relations have been found with students' general mental health (Deb et al., 2015; Pascoe et al., 2020) and life satisfaction (Abolghasemi & Varaniyab, 2010). Furthermore, stress negatively predicts academic self-concept (Garton & Pratt, 1995), general affect (Nagel, 2009) and promotes helplessness specifically (Feld & Shusterman, 2015).

Relations between the included predictors and mediation effects

Alongside the direct relations of the aforementioned predictors with well-being, indirect relations are also possible, as there are relations between SES and exhaustion and perceived parental aspirations as well as relations between value of education and these two factors. Exhaustion and perceived parental aspirations might thus function as mediators.

SES is closely related to parental aspirations (Spera et al., 2009). In this context, status attainment motives are relevant. As parents transfer their aspirations onto their children, parental aspirations as perceived by students are closely linked to students' SES. There are also relations between SES and stress. A low SES is associated with higher levels of stress (Finkelstein et al., 2007; Goodman et al., 2005). On the other hand, there is evidence from India that a low level of parental education is related to higher perceived academic performance pressure, resulting in higher stress (Deb et al., 2015). Furthermore, stress mediates the relation between SES and well-being (Tull, 2013).

Value of education has also emerged as a predictor for the included mediators. Dispositions towards education are transmitted from parents to their children (Wigfield & Eccles, 2000). Therefore, the value students place on education is likely to be similar to their parents' attitudes towards education (Roth & Salikutluk, 2012). However, the value students place on education is related to their educational aspirations (Hadjar & Scharf, 2019). There are also links between value of education and exhaustion (Wigfield & Eccles, 2000). Due to the exerted pressure in cases of mismatches between the value students place on education and their educational attainment, a higher level of stress occurs.

The impact of the transition from primary to secondary school on student well-being

Alongside the aforementioned individual predictors of well-being, institutional events are also relevant. In particular, the transition to secondary school is a critical event in students' educational careers, as it goes along with changes in students' personal life situation (Eccles & Roeser, 2009; Lohaus et al., 2004). The transition to secondary school in Germany is particularly critical, as it happens very early and the school system is highly stratified. In the following, we outline some of the peculiarities of the transition to secondary school in Germany.

Students in Germany usually move to secondary school after Grade 4¹⁴. After elementary school, students attend a variety of school types differing in their performance requirements and awarding school-leaving certificated that qualify students either for vocational training (non-academic.track schools (non-ATS)) or university studies (ATS). The most common non-ATS are *Hauptschule* and *Realschule*, the most common ATS is *Gymnasium*. An enrollment recommendation (ER) for a specific school track is given by teachers by the end of elementary school. This ER depends on students' performance, their school-related behavior and learning effort (KMK, 2015). However, students' socioeconomic

¹⁴ Except for the federal states of Berlin and Brandenburg, where elementary school lasts six years.

status (SES) also influences the ER, as high-SES students are awarded better grades (Broer et al., 2019). These can be considered primary effects of social stratification (Boudon, 1974). Furthermore, teachers anticipate higher levels of support for mid-performing high-SES students; consequently, those students receive an academic-track enrollment recommendation more often than their low-SES peers with equivalent performance (“benefit of the doubt”). Thus, the transition to secondary school in Germany is socially biased.

Although the ER is highly predictive for students’ actual secondary school enrollment, the ultimate decision about secondary school track enrollment is made by parents – which means that the recommended and attended school type may differ in some cases. Deviations from the enrollment recommendation are also socially biased due to motives of status attainment and higher aspirations among high-SES parents (Bittmann, 2021). These differences in decision-making are secondary effects of social stratification following Boudon (1974). Approx. 15% of all students attend a higher school track than recommended (Pfost et al., 2018).

Well-being after the transition from primary to secondary school

Life events such as educational transitions have been found to be negative predictors for students’ well-being, as social networks and educational requirements change and in general a new stage of life with different learning environments starts (Praherso et al., 2017). The transition to secondary school has been found to be one of the most stressful events in students’ school life. Students’ well-being in terms of life satisfaction and academic self-concept decreases after the transition to secondary school (Coelho et al., 2017; Herke et al., 2019; Shek & Liu, 2014). A decrease in student’s well-being (i.e. life and school satisfaction) has also been observed during the further course of secondary school (Obermeier & Gläser-Zikuda, 2022; Wu & Becker, 2023). For low-SES students, who tend to perform worse than their high-SES peers, the transition to secondary school is assumed to be particularly stressful (Evans et al., 2018; Herke et al., 2019). In line with this finding, there are results indicating that high performance before the transition has a positive impact on life satisfaction during the transition (Salmela-Aro & Tuominen-Soini, 2010).

Alongside general transition effects on students’ well-being, differential effects for different school tracks on different well-being facets have been observed. In this context, the big-fish-little-pond effect (Marsh, 1987) provides an explanation for why specific learning environments and students’ performance compared to their peers’ performance are predictive for students’ well-being. Social comparisons are a central factor particularly with regard to self-concept – being in a high-performing environment has negative effects on students’ self-

concept (Trautwein & Lüdtke, 2005). Similarly, being under-educated for one's job in the work context has shown negative effects on life satisfaction (Artés et al., 2014). Students attending ATS without an ATER are small fish in big ponds, as their educational performance was assessed as poorer than that of their peers with ATER, but they are in a high-performing environment.

Students attending non-ATS exhibit lower well-being than ATS students, but their well-being also decreases less over time (Herke et al., 2019; Wu & Becker, 2023). This trend has been confirmed for life satisfaction, where a negative development of well-being was observed for ATS students, while no changes were evident in non-ATS students (Knoppick et al., 2015). A decrease in academic self-concept was also observed for ATS students, while it increased for non-ATS students (Jónsdóttir & Blöndal, 2023). Higher levels of exhaustion were found in ATS students than non-ATS students (Salmela-Aro et al., 2008). An explanation might be the higher learning load in ATS. There are findings for scholastic reforms such as shortening the time spent in ATS by a year (Quis, 2015) and attending private vs. public schools (Green et al., 2014) which imply that a higher learning load is negative for students' well-being.

In the German context, well-being in ATS has been compared for students with and without a corresponding recommendation. First results indicate that ATS students with an academic-track enrollment recommendation (ATER) score higher on academic self-concept. This might be explained by the higher competences found in this group (Bittmann, 2021; Pfof et al., 2018). Nevertheless, it remains unclear how the well-being of students without an ATER compares depending on whether they follow the recommended educational path or deviate from this path to enter a different learning environment.

Research questions and hypotheses

How the aforementioned predictors relate to well-being has already been sufficiently investigated, which is why we took a group comparison perspective and focused on the specific group of students with an upward deviation from their ER who attend an ATS (*Gymnasium*) without an ATER. They were compared with students who followed their ER to a non-ATS but were comparable in their competencies in Grade 5. The aim was to separate effects of different performance levels from effects of the school environment and different learning environments. Students attending an ATS without an ATER potentially achieve better academic outcomes. Also, prior studies have investigated their development in well-being and competence compared to their peers attending an ATS with ATER. However, less is known about how well-being as a central educational outcome compares between students who followed their

recommended educational pathway versus those who deviated upwards and on which central familial, personal, and school-related factors well-being depends in both groups. To gain a deeper understanding and advance the current state of research, we investigated student well-being in Grade 9. At this time, all students regardless of track are still enrolled in school; therefore, they are in a comparable situation of not yet having obtained a school-leaving certificate. This facilitates comparisons of their well-being.

Firstly, in research question 1, we examined whether students' well-being (life satisfaction, satisfaction with friends, academic self-concept and helplessness in German) differed significantly between the two groups in Grade 9. On the one hand, following theory and the previous research presented above, it is likely that well-being is higher among non-ATS students due to the congruence between performance requirements and students' performance. This coherence is furthermore supported by the relations between well-being and academic achievement, as ATS students without an ATER have lower competence levels than their peers. On the other hand, it is possible that well-being is higher among ATS students. Students are more successful than predicted at the end of elementary school, which might booster their well-being. Also, they have a better launching pad for their occupational career at an ATS than they would at a non-ATS. Consequently, we expect differences in the means for the well-being measures H1a) life satisfaction, H1b) satisfaction with friends, H1c) academic self-concept and H1d) helplessness in German between students attending ATS vs. non-ATS. However, due to the presence of contradictory but plausible explanations, no directed hypotheses were formulated.

In research question 2, we examined whether there are differences in the relations between the predictors and well-being in Grade 9 between the two groups. Therefore, we investigated whether SES, value of education, perceived parental aspirations and exhaustion differ in their predictive power for students' well-being. As different facets of well-being are investigated, directed relations are not hypothesized for all relations between the predictors and well-being facets.

H2a) For students' life satisfaction, we expect value of education, perceived parental aspirations and exhaustion to be more important for ATS students, as the high-performing environment might cause students' general well-being to be more strongly linked to success or failure in school. Also, perceived parental expectations and exhaustion might be of higher relevance due to the pressure exerted. No directed differences between SES and life satisfaction are assumed.

H2b) For satisfaction with friends, we assume SES to be more important among ATS students, as they are in a high-SES and high-achieving environment in which a high parental SES might be beneficial for making friends at school. For value of education, perceived parental aspirations and exhaustion, no directed hypotheses are formulated.

H2c) For academic self-concept, we expect value of education and exhaustion to be more relevant for ATS students. Valuing education highly while potentially not being able to meet the school's academic requirements might impact students' academic self-concept. The same holds for exhaustion, though in a negative manner. For SES and perceived parental expectations, no directed hypotheses are formulated.

H2d) For helplessness in German, we assume SES and perceived parental aspirations to be more important for ATS students, as factors such as familial support or the possibility to pay for tutoring depend on students' SES and are particularly relevant in a high-performing environment. High perceived parental expectations might promote a feeling of helplessness in this environment as well. For value of education and exhaustion, no directed hypotheses are formulated.

In research question 3, we investigated whether perceived exhaustion and perceived parental aspirations mediated the relations between SES and value of education and well-being for both groups. In terms of relations between the predictors, we expected a positive relation between SES and perceived parental aspirations (H3a) and a negative relation between SES and exhaustion (H3b) due to higher performance among high-SES students and thus assumed lower levels of exhaustion and positive relations between students' value of education and perceived parental aspirations (H3c), as perceived parental aspirations might be influenced by students' values and exhaustion (H3d). Furthermore, we expected perceived parental aspirations and exhaustion to mediate the relations between SES and value of education and H3e) life satisfaction, H3f) satisfaction with friends, H3g) academic self-concept and H3h) helplessness in German.

Methods

Data sample and procedure

To answer our research questions, we used data from the German National Educational Panel Study (NEPS) starting cohort Grade 5 (SC3) (NEPS Network, 2023)¹⁵. NEPS provides multi-cohort, longitudinal large-scale survey data from students, parents, teachers and headmasters. Data collection took place between winter 2010/11 and winter 2014/15 and students attended Grade 5 at the time of first measurement. The student survey was conducted via paper and pencil (PAPI), the parent surveys were conducted by telephone (CATI).

To define our analysis sample, we conducted propensity score matching (Caliendo & Kopeinig, 2008). The goal was to find students attending academic track and non-academic track schools that were comparable in terms of their performance. To achieve this, students' performance in terms of basic cognitive skills, math and reading competences in Grade 5 were used for matching. We used 1:1 matching with replacement, resulting in 92 students in the treatment group (students attending *Gymnasium* without ATER) and 726 students in the control group (students attending non-ATS without ATER) in Grade 9. No group differences in performance were found after the matching procedure (Table 2). The mean age at T1 was 10.5 ($SD=0.84$) years, and 47% of our sample were female.

Variables

Well-being

Well-being was measured in Grade 9 with four variables. The general aspect *life satisfaction* and *satisfaction with friends* were measured by asking students "How satisfied are you currently and in general terms, with your life?" and "How satisfied are you with your acquaintances and friends?". The scale ranged from 0 (completely dissatisfied) to 10 (completely satisfied) (TNS Infratest Sozialforschung, 2009). (Further information about means, standard deviations and reliability coefficients of the scales used can be found in Table 2.) Students' school well-being was assessed via their *academic self-concept*, and *helplessness* in German. Academic self-concept was measured with three items on a four-point Likert scale from 1 = "does not apply at all" to 4 = "fully applies". An example item is "I learn fast in most school subjects" (Kunter, 2002). *Helplessness in German* was measured with five items on a four-point Likert scale from 1 = "does not apply at all" to 4 = "fully applies". An example item

¹⁵ This paper uses data from the National Educational Panel Study (NEPS; see Blossfeld and Roßbach (2019)). The NEPS is carried out by the Leibniz Institute for Educational Trajectories (LIfBi, Germany) in cooperation with a nationwide network.

is “No matter how hard I try in Math/German, my grades don't get any better.” (Schwarzer & Jerusalem, 1999).

Predictors of well-being

SES was operationalized in terms of *parental education* using the International Standard Classification of Education (ISCED) (UNESCO, 1997). The scale ranged from 0 = early childhood education to 9 = doctoral degree or equivalent. The highest educational level in the household among the surveyed parent and their partner when students were in Grade 5 was used. Students' *value of education* was measured in Grade 7 with four items on a five-point Likert scale from 1 = “fully disagree” to 5 = “fully agree”. An example item is “Having a good education is valuable in its own right” (Stocké, 2005a). *Perceived parental aspirations* were measured in Grade 8 by asking students “The following questions deal with what your parents expect from you in school and for your professional career. What highest school-leaving qualification would your parents like you to have?” (Stocké, 2005b). We coded this variable in binary form for the analyses (0 = no university entrance qualification, 1 = university entrance qualification). Students' stress in terms of *exhaustion* was measured in Grade 8 by asking students “I feel exhausted after a normal day” on a five-point Likert scale from 1 = “does not apply at all” to 5 = “fully applies” (Gross & Seebaß, 2016).

Control variables

Students' *language spoken at home* was included as a control variable in our analyses, as knowledge of the language of instruction is an important predictor for students' performance at school and school track enrollment (OECD, 2016). The language spoken at home was assessed in Grade 5. Students were divided into those who spoke only German at home with both parents and those who did not (0 = home language is German, 1 = home language is not German). *Gender* (Grade 5) was also included (0=male, 1=female), as there are relations between gender and well-being (OECD, 2019; Shek & Liu, 2014).

Measures of performance

To define the analysis sample, three measures of performance in Grade 5 were used: *basic cognitive skills*, *math* and *reading competencies*. Basic cognitive skills in terms of reasoning ranged from 0 to 12 (Haberkorn & Pohl, 2013). For math and reading competences, WLE scores with a standardized mean of 0 were included. The scales ranged from -3.66 to 4.81 (math) and from -4.33 to 5.78 (reading) (Duchhardt & Gerdes, 2013; Haberkorn et al., 2012).

Analyses

We used Stata 16.1 for our analyses (StataCorp LLC, 2019). To answer research question 1, we conducted mean value comparisons (MANOVA) for the included well-being measures. Afterwards, we estimated three group-comparison structural equation models for predictors of well-being. The grouping variable was school type (academic track vs. non-academic track school). To deal with missing data, we used full-information maximum likelihood (FIML) estimates. To assess model fit, we used RMSEA, CFI and R^2 .

In Model 1, SES and value of education were included as predictors. In Model 2, exhaustion and perceived parental aspirations were included. In Model 3, all variables were included and indirect effects of SES and value of education via perceived parental aspirations and exhaustion on all well-being outcomes were estimated. The control variables (gender and home language) were included in all models. The sample size was held constant in all models. Academic self-concept, helplessness in German and value of education were modelled latently. Correlations among the included variables were allowed and measurement coefficients and intercepts were specified to be equal in both groups; other parameters were allowed to vary. To determine the statistical significance of group differences, χ^2 difference tests were conducted.

Results

Descriptive statistics

There were medium-sized significant positive correlations between life satisfaction and all included well-being measures in both groups, except for helplessness in German, where only small correlations were found (Table 1). Satisfaction with friends was correlated with academic self-concept positively and helplessness in German negatively for non-ATS students. Academic self-concept and helplessness in German were correlated negatively for non-ATS students. In terms of correlations between outcome variables and predictors, for life satisfaction correlation with all predictor variables were found. For ATS-students parental education was positively and value of education, and exhaustion were negatively correlated. For non-ATS students negative correlations with all predictors except for value of education, which was correlated positively were found. No significant correlation with predictor variables were found for satisfaction with friends. Academic self-concept was negatively correlated with perceived parental aspirations for ATS students, and positively with exhaustion for non-ATS students. For helplessness in German correlations for non-ATS students were found – helplessness in

German was positively correlated with perceived parental aspirations and negatively with exhaustion in this group.

Table 1.

Intercorrelations among all analyzed variables in our sample for students attending ATS and non-ATS

	2	3	4	5	6	7	8	9	10
1 life satisfaction	.33/.55	.25/.23	-.08/-.05	.04/-.01	-.11/.05	-.07/-.10	-.02/.03	.09/.05	-.16/-.13
2 satisfaction friends		.18/.17	-.23/-.09	.20/-.03	-.09/.02	-.05/-.08	.14/.02	.11/.05	.01/-.03
3 academic self-concept			-.18/-.27	.05/-.03	-.19/.03	-.29/-.08	-.17/.15	.04/.05	.07/-.07
4 helplessness German				.01/-.02	.03/.03	-.10/.09	-.04/-.14	.04/-.07	-.11/-.14
5 parental education					-.07/.07	.11/-.01	.06/.14	-.27/-.12	.11/-.09
6 value of education						.33/.11	.07/.08	.08/.12	-.15/-.11
7 parental aspirations							.10/-.03	.13/.06	.12/.07
8 exhaustion								-.17/.03	.11/.02
9 home language									.00/.07
10 gender									

Note. ATS = academic-track school. ATS/non-ATS. Significant correlations ($p < .05$) are in bold.

Mean differences in well-being between ATS and non-ATS students

To investigate differences in well-being outcomes for students attending ATS vs. non-ATS, we conducted a MANOVA. Results revealed that the two groups differed significantly in terms of the investigated well-being measures ($F(6, 518)=53.7, p<.05, \text{Wilk's } \Lambda =.97$). A closer look revealed that they only significantly differed in their academic self-concept (H1c, Table 2). Students who attended a non-ATS scored higher on average on academic self-concept than their peers in an ATS. No further mean differences were found in students' well-being, contradicting all hypotheses but H1c.

Predictors of well-being for ATS and non-ATS students

Predictors of life satisfaction

In Model 1 (Table 3), for students attending an ATS, value of education emerged as a significant predictor for life satisfaction. The relation was negative, indicating lower life satisfaction when placing a high value on education. For students attending non-ATS, no significant relation was found ($\Delta\chi^2 = 4.0, \Delta df = 1; p = .045$) This group difference confirms H1a for value of education. In Model 2, it became evident that exhaustion negatively predicted life satisfaction; however, the relation was only significant for students at non-ATS, although the difference in significance does not imply a difference between groups, contradicting H2a for exhaustion ($\Delta\chi^2 = 0, \Delta df = 2; p = 1$). Parental aspirations did not significantly predict life

Table 2.

Mean comparison of all analyzed variables for students attending ATS and non-ATS without ATER, standard deviations (SD), internal consistencies (α), n of respondents for all analyzed variables in our sample and by enrollment recommendation

	ATS students				Non-ATS students				$\Delta M p.$
	<i>M</i>	<i>SD</i>	α	<i>n</i>	<i>M</i>	<i>SD</i>	α	<i>n</i>	
life satisfaction	7.56	2.09		75	7.34	2.33		572	.443
satisfaction friends	8.27	2.32		74	8.36	2.01		573	.703
academic self-concept	2.62	0.62	.82	74	2.85	0.58	.83	566	.002
helplessness German	1.66	0.59	.83	76	1.81	0.64	.86	567	.257
parental education	7.56	2.07		96	5.80	2.43		726	.000
value of education	3.10	0.84	.72	85	2.84	0.89	.73	609	.011
parental aspirations	0.91	0.29		79	0.29	0.45		584	.000
exhaustion	2.85	1.06		81	2.76	1.07		599	.483
home language	0.19	0.40		95	0.15	0.36		720	.337
gender	0.45	0.50		94	0.47	0.50		716	.627
math competencies	0.08	0.91		96	0.03	0.90		726	.699
reading competencies	0.12	1.11		96	0.12	1.08		726	.970
basic cognitive skills	7.23	2.54		96	7.39	2.59		726	.651

Note. ATS = academic-track school. ATER = Academic-track enrollment recommendation.

satisfaction. In Model 3, value of education was no longer a significant predictor of life satisfaction for students attending ATS. The other relations reported above did not change. However, contradicting H3e, no mediation effects for life satisfaction were found, although exhaustion was positively predicted by value of education for ATS students (H3d) ($\Delta\chi^2 = 6.5$, $\Delta df = 1$; $p = .011$) (Table 4). Perceived parental aspirations were significantly negatively predicted by value of education for ATS students and positively for non-ATS students (H3c) ($\Delta\chi^2 = 14.8$, $\Delta df = 1$; $p < .001$). Furthermore, there was as significant positive relation between SES and perceived parental aspirations for non-ATS students (H3a). Although there was no significant relation for ATS students, the group difference was not significant ($\Delta\chi^2 = 3.1$, $\Delta df = 1$; $p = .783$).

Predictors of satisfaction with friends

ATS students' SES positively predicted satisfaction with friends in Model 1 (H2b) – higher SES thus implies higher satisfaction with one's friends when attending an ATS ($\Delta\chi^2 = 44.9$, $\Delta df = 2$; $p < .001$). As was the case for life satisfaction, satisfaction with friends was

negatively predicted by exhaustion for non-ATS students, while no significant relations for parental aspirations were found, but again the group difference was not significant ($\Delta\chi^2 = 0.1$, $\Delta df = 2$; $p = .951$). When including all variables in Model 3, the coefficient for value of education becomes larger, but is still not a significant predictor for satisfaction with friends. No changes in the other relations reported beforehand were observed.

Predictors of academic self-concept

Value of education predicted academic self-concept in Model 1 significantly for ATS students, confirming H2c for value of education ($\Delta\chi^2 = 36.8$, $\Delta df = 1$; $p < .001$). In Model 2, perceived parental aspirations had a positive relation with students' self-concept in non-ATS, although the group difference was not significant ($\Delta\chi^2 = 2.1$, $\Delta df = 2$; $p = .350$). If students perceived a parental expectation that they receive a university entrance qualification, they had a higher self-concept. Furthermore, exhaustion significantly negatively predicted academic self-concept for ATS students – again confirming a group difference for H2c – ($\Delta\chi^2 = 58.4$, $\Delta df = 2$; $p < .001$), implying that the more exhausted ATS students feel, the lower their academic self-concept. Contrary to previously reported well-being measures, no significant relation for non-ATS students was found. After including all variables (Model 3), value of education was no longer a significant predictor for students' academic self-concept. A significant mediation effect for value of education for ATS students was found (Table 4). Although the single effects for the two mediators are insignificant, it is likely that the value of education is mediated by exhaustion, with the effect insignificant due to sample size. These findings indicate that exhaustion diminishes the relation between value of education and academic self-concept and partially confirms H3g in terms of exhaustion. In Model 3, the group difference between perceived parental aspirations and academic self-concept became significant, confirming H2c in terms of perceived parental aspirations in the full model ($\Delta\chi^2 = 9.2$, $\Delta df = 2$; $p < .010$). Also, the relation between exhaustion and academic self-concept became significant for non-ATS students. Although the coefficients differ in size, the group difference is no longer significant, now contradicting H2c for exhaustion ($\Delta\chi^2 = 4.3$, $\Delta df = 2$; $p = .120$).

Predictors of helplessness in German

Contradicting H2d, no significant relation with helplessness in German was found in either group for SES or value of education (Model 1). For non-ATS students, perceived parental aspirations were significantly negatively ($\Delta\chi^2 = 7.1$, $\Delta df = 2$; $p < .029$) and exhaustion was

Table 3.
Results of the group-comparison structural equation models investigating the relations between SES, value of education, perceived parental aspirations, exhaustion and well-being (life satisfaction, satisfaction with friends, academic self-concept, helplessness German) for students without ATER attending ATS and non-ATS

	Model 1				Model 2				Model 3								
	Life Satisfaction		Satisfaction with Friends		Self-Concept		Helplessness German		Life Satisfaction		Satisfaction with Friends		Self-Concept		Helplessness German		
	ATS β (SE)	Non-ATS β (SE)	ATS β (SE)	Non-ATS β (SE)	ATS β (SE)	Non-ATS β (SE)	ATS β (SE)	Non-ATS β (SE)	ATS β (SE)	Non-ATS β (SE)	ATS β (SE)	Non-ATS β (SE)	ATS β (SE)	Non-ATS β (SE)	ATS β (SE)	Non-ATS β (SE)	
SES	.05 (.12)	.23 (.12)+	-.06 (.09)	-.08 (.10)	-	-	-	-	.04 (.12)	.23 (.12)+	.02 (.10)	.04 (.12)	-.02 (.05)	-.03 (.05)	-.06 (.05)	-.06 (.05)	
Value of education	-.36 (.16)*	-.10 (.16)	-.49 (.14)***	.02 (.15)	-	-	-	-	-.07 (.24)	-.19 (.18)	-.14 (.21)	.29 (.20)	-.02 (.06)	-.04 (.06)	.01 (.06)	-.02 (.06)	
Parental aspiration	-	-	-	-	-.09 (.14)	-.11 (.17)	.02 (.10)	.02 (.10)	-.09 (.16)	-.11 (.18)	-.01 (.11)	.03 (.16)	.05 (.05)	.02 (.05)	.14 (.05)**	-.10 (.05)+	
Exhaustion	-	-	-	-	-.11 (.12)	-.09 (.14)	-.42 (.10)***	-.13 (.11)	-.10 (.16)	-.08 (.16)	-.39 (.14)**	-.32 (.15)*	-.10 (.04)*	-.09 (.05)*	-.08 (.05)*	-.09 (.05)+	-.13 (.05)**
Gender	.02 (.13)*	.02 (.13)	-.05 (.11)	-.30 (.12)**	-.17 (.12)	.04 (.12)	.16 (.11)	-.26 (.11)*	-.22 (.13)+	.01 (.13)	.12 (.13)	.04 (.12)	-.15 (.04)**	-.03 (.04)	-.04 (.05)	-.06 (.05)	
Home language	-.13 (.05)**	-.01 (.05)	.06 (.05)	-.13 (.05)**	.03 (.12)	.09 (.12)	.03 (.12)	.15 (.15)	.12 (.13)	.16 (.13)	.00 (.13)	-.18 (.13)	.07 (.05)	.06 (.05)	-.04 (.05)	-.16 (.05)**	
RMSEA	0.065																
CFI	0.880																
df	223																
R ²	0.115																
N	83																
	604																

Note. ATER = Academic-track enrollment recommendation. ATS = academic-track school. SES: socioeconomic status. RMSEA = root mean square error of approximation. CFI = comparative fit index. *df* = degrees of freedom.

Standardized coefficients. Model identification was achieved by setting the loading of the first indicator to 1. + $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

significantly positively ($\Delta\chi^2=17.4$, $\Delta df=2$; $p < .001$) related with helplessness in German in Model 2, confirming H2d in terms of those two predictors. In Model 3, the negative relation between exhaustion and helplessness in German became significant for ATS students – the more exhausted those students felt, the less helpless they felt in German. The positive relation between exhaustion and helplessness in German remained significant among non-ATS students, showing opposite relations for exhaustion in the two analyzed groups ($\Delta\chi^2=51.2$, $\Delta df=2$; $p < .001$).

Table 4

Direct effects of SES and value of education on perceived parental aspirations and exhaustion and indirect effects of SES and value of education on well-being through perceived parental aspirations and exhaustion in Model 3 (Table 3)

Direct effects on perceived parental aspirations and exhaustion			
	over all mediation variables	perceived parental aspirations	exhaustion
	ATS Non-ATS	ATS Non-ATS	ATS Non-ATS
	β (SE)	β (SE)	β (SE)
SES		.11 (.13)	.03 (.12)
		.08 (.05)+	.02 (.05)
Value of education		-.32 (.14)*	.47 (.12)***
		.22 (.05)***	.09 (.06)
Indirect effects on life satisfaction			
SES	-.01 (.04)	-.00 (.00)	.00 (.00)
	.00 (.04)	-.00 (.00)	-.00 (.00)
Value of education	-.08 (.34)	.06 (.22)	-.39 (.36)
	.02 (.07)	.03 (.07)	.03 (.07)
Indirect effects on satisfaction with friends			
SES	-.02 (.04)	-.00 (.00)	.00 (.01)
	.00 (.01)	-.00 (.00)	-.00 (.00)
Value of education	-.01 (.35)	.17 (.20)	-.11 (.20)
	-.02 (.06)	.04 (.07)	.04 (.07)
Indirect effects on academic self-concept			
SES	-.01 (.02)	-.00 (00)	.00 (00)
	.00 (.00)	-.00 (00)	-.00 (00)
Value of education	-.23 (.13)+	.03 (.06)	-.20 (.33)
	.02 (.02)	.00 (.02)	.00 (.02)
Indirect effects on helplessness German			
SES	.00 (.01)	-.00 (00)	.00 (.00)
	-.00 (.00)	-.00 (.00)	-.00 (00)
Value of education	-.16 (.10)	-.05 (.05)	.34 (.28)
	-.01 (.02)	-.01 (.02)	-.01 (.02)

Note. ATS = academic-track school. SES: socioeconomic status. + $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Discussion

Our study compared students attending an ATS without ATER with students attending a non-ATS without ATER in terms of different well-being outcomes (life satisfaction, satisfaction with friends, academic self-concept and helplessness in German) and central predictors of those well-being outcomes.

The MANOVA only showed significant differences for students' academic self-concept, which was higher among non-ATS students. This might be explained by the big-fish-little-pond effect (Marsh, 1987) or the little-fish-big-pond effect (Zell & Lesick, 2021). Students who perceived themselves as weaker performers than their peers assessed themselves in a less favorable manner (Fang et al., 2018). Being in a high-performing environment seems to be more important for students' academic self-concept than being successful at a higher school track than recommended. The educational environment has previously been shown to be important for students' well-being (Salmela-Aro & Tuominen-Soini, 2010). Comparing oneself to peers was found to be more important for how "attitudes toward themselves and their education develop than the different status of tracks and school-types" (Jónsdóttir & Blöndal, 2023, p. 621).

In terms of predictors for well-being, group differences were found in the structural equation models. SES was a relevant predictor for satisfaction with friends among ATS students. Our data thus imply that a high SES has a beneficial effect on social integration in ATS. ATS students' SES is higher than in non-ATS schools (Hillmert & Jacob, 2010); this relation was also found in our sample. Being similar to their peers seems to be favorable for satisfaction with friends in ATS.

Value of education functioned as an indicator for students' expectations and the pressure they exert on themselves and emerged as a predictor for life satisfaction and academic self-concept among ATS students in Model 1. Placing a high value on education negatively predicted ATS students' well-being. This might be related to the higher educational standards in ATS and the associated greater pressure on students without ATER to keep up. However, after including exhaustion and perceived parental aspirations, the relations between value of education and life satisfaction and academic self-concept were no longer significant. For academic self-concept, a significant mediation was found, which is likely due to exhaustion. The aforementioned relations between value of education and exhaustion (Wigfield & Eccles, 2000) was confirmed for our sample of ATS students. Placing a high value on education might lead to greater learning effort, which might be time consuming and thus result in exhaustion.

Being exhausted then seems to be more important for students' well-being than the initial value students attach to education.

Perceived parental aspirations captured perceived expectations of parents and positively predicted non-ATS students' well-being in terms of academic self-concept and helplessness in German. If students think their parents aspire for them to obtain a university entrance qualification, this seems to boost school well-being among non-ATS students, as this is a higher school leaving certificate than can be obtained in their current school track. For ATS students, the aspiration matches the school-leaving certificate awarded by their school, which is why there might not be a significant relation in this group.

For non-ATS students, exhaustion was a negative predictor for all included well-being measures in Model 3. Exhausted non-ATS students were less satisfied with their life and friends, had a worse academic self-concept and felt more helpless in German. Although for ATS students, exhaustion was only relevant for academic self-concept and helplessness in German, it was of greater importance than for non-ATS students in terms of academic self-concept. For helplessness in German, an opposite effect compared to non-ATS students was found. The more exhausted ATS students felt, the less helpless they felt in German. However, due to the higher learning load in ATS, students might feel exhausted because they are studying more for school, which reduces the feeling of being helpless. But this needs further investigation.

Overall, for ATS students, the learning environment and parental expectations were more important for well-being than being more successful than assessed by their teachers at the end of primary school.

Limitations and Strengths

When interpreting the results, some limitations have to be kept in mind. First of all, the sample size of students who attended an ATS without an ATER in Grade 9 was rather small, which might be disadvantageous for the significance of the results. However, there were between-group differences that were significant for ATS students. Also, when comparing ATS with non-ATS, multi-track schools and comprehensive schools increase the complexity. These schools allow students to change tracks more easily and often lead to university entrance qualifications – however, it was difficult to determine in which school track students attending these schools were enrolled in the dataset, which is why students in those school types had to be excluded. Furthermore, the classroom context is particularly relevant with respect to well-being. Satisfaction with friends provides a proxy for students' social well-being; however,

friendships can be either inside or outside the scholastic context. Therefore, investigating social networks in schools and including further indicators of the classroom context are critical, although not possible in this study due to the data structure.

A strength of our study was the multidimensional modelling of well-being, including two general and two school-specific well-being measures. Also, we were able to compare two groups with similar starting conditions in different learning environments longitudinally. In addition, we included expectations as predictors from three different points of view: expectations from primary school teachers in terms of the enrollment recommendation, expectations of students through value of education and expectations of parents through parental aspirations.

Implications for practice and research

We compared students based on the enrollment recommendation given at the end of elementary school. To obtain a more comprehensive picture of expectations placed on students, current teacher assessments about students' educational future should be included in future research. In line with the aforementioned limitation concerning comprehensive and multi-track schools, these learning environments should be explored further. It is also of interest to investigate the development of well-being during secondary school in differential learning environments. Moreover, the identification of further (malleable) factors promoting students' well-being should be advanced.

How to promote students' well-being is also important for practice. Our analyses show once more that it is important for teachers to pay attention to various student characteristics. In the family context, communicating parental aspirations such as beliefs in students' abilities might be a starting point for intervention. Monitoring students' level of stress and exhaustion is also important. Furthermore, the expectations students place on themselves should be critically discussed, as this might negatively affect their well-being.

We gained new insights on well-being outcomes for students in different performance environments with similar starting conditions in terms of individual performance. The implication is that students have heterogeneous needs depending on their learning contexts, which in turn affect their well-being. Individual factors as well as perceived parental expectations reveal a complex picture of how well-being is shaped in different school contexts. Expanding previous research focusing on students with different prerequisites in the same learning environment, we examined students with similar prerequisites in different learning environments.

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7. General Discussion

7.1 Discussion of the main results

This dissertation focused two central educational outcomes and identified central predictors for educational attainment and students' well-being as well as comparing predictors in different groups of students. In Study I, only students having attended *Gymnasium* during their educational career were analyzed in terms of predictors for obtaining *Abitur*. Thereby students' family background, motivation and stressors were examined. Potential mediating effects between family background and motivational factors resp. stressors were investigated. Study II compared students with and without academic track-enrollment recommendation. Again, predictors for obtaining *Abitur* were investigated. A set of family background variables, motivational factors and stressors were compared in their means between both groups and compared in their relevance for obtaining *Abitur* for both groups. The further analyses focused students without academic-track enrollment recommendation attending academic vs. non-academic school types and were compared in terms of predictors of well-being. Included predictors were family background, motivation and stressors yet again. Potential mediation effects were considered. In order to extent previous knowledge a multidimensional, group-comparing approach was used in terms of predictors but as well for well-being as an educational outcome. Also, the enrollment recommendation was considered in Study II and the further analyses, including an oftentimes neglected factor, that has implications for students' performance and their socioemotional outcomes. Following the overarching research questions, that were answered in the studies, now the questions and findings are discussed. The questions were:

1. Which role does students' family background (parental education, parental occupation immigrant background/home language, financial cost) play for obtaining *Abitur* (Study I) for students with and without academic-track enrollment recommendation (Study II) and well-being (life satisfaction, satisfaction with friends, academic self-concept, helplessness in German) (further analyses)?
2. Which individual, motivational factors (expectancy of success, value of education, performance related motivation) are relevant predictors for educational attainment in terms of obtaining *Abitur* (Study I) for students with and without academic-track enrollment recommendation (Study II) and well-being (life satisfaction, satisfaction with friends, academic self-concept, helplessness in German) (further analyses)?
3. How do stressors (effort, learning stress, perceived parental aspirations, exhaustion) predict educational attainment for students with and without academic-track enrollment

recommendation (Study II) and well-being (life satisfaction, satisfaction with friends, academic self-concept, helplessness in German) (further analyses)?

4. How are familial (parental education, parental occupation immigrant background/home language, financial cost) and individual factors (motivation: expectancy of success, value of education, performance related motivation; stressors: effort, perceived parental aspirations, learning stress)) related to each other and what does this mean for educational attainment in terms of obtaining *Abitur* (Study I) and well-being (life satisfaction, satisfaction with friends, academic self-concept, helplessness in German) (further analyses)?

7.1.1 Relations between family background and educational outcomes

In this chapter, the relevance of students' family background resp. SES for educational attainment and well-being is discussed. In terms of educational attainment, a rather performance-related outcome, which was operationalized by the school-leaving certificate in asking whether students obtained *Abitur* or not was analyzed. The results in terms of educational attainment have to be discussed in the light of a growing share of students attending academic-track schools and rising numbers of students obtaining *Abitur* for all social classes (Scharf et al., 2023). Educational expansion in Germany started throughout the 20th century. While in the 1950s about 80 % of students attended and completed *Hauptschule* and only 13 % attended and completed *Gymnasium* (Geißler, 2014). These shares have shifted over the last decades. While in 2001 the share of students attending *Gymnasium* was at 26 %, in 2022/23 40 % of students attended *Gymnasium* and 6 % of students attended *Hauptschule* (Destatis, 2024). This implies that education in the whole population increased on average. Reasons are for example a rising share of higher skilled professions requiring higher qualifications. The implications of the educational expansion for educational inequalities have been broadly discussed, as participation in education has risen in all social classes and it would be expected that the educational access is based on skills and abilities rather than social origin (Hadjar, 2019). However, while particularly women benefitted from the educational expansion, the social inequalities are still a large problem in the German educational system (Drobner & Patzina, 2021; Scharf et al., 2023). Two thirds of students with high parental education attended *Gymnasium*, while only approx. 20 % of students with a low level of parental education attended *Gymnasium*. About 20 % of those students attended *Hauptschule*, while this was the case only for 3 % of high-SES students (Horneber & Weinhardt, 2018).

In Study I and II family background resp. SES were analyzed as predictors of educational attainment. Overall, previous results were supported, as relations between SES and

educational attainment were found in both studies (Broer et al., 2019; C. Y. Tan et al., 2023). However, expanding previous research, a multidimensional approach in modelling family background resp. SES was used. In Study I parental education, occupational status and immigrant background were included for measuring family background to get a more fine-grained picture. Among those variables, only parental education predicted obtaining *Abitur*. As the three measures are closely interrelated, it is plausible not for all variables to be significant predictors. Especially when controlling immigrant background, oftentimes effects on educational attainment diminish or disappear when including SES-measures (OECD, 2016). However, it is argued that one reason for immigrant students to score on average lower on performance than their native peers is lack of knowledge in the language of instruction (OECD, 2019). This argumentation was taken into account by including home language of students in Study II and the further analyses instead of immigrant background. Language spoken at home was also no statistically significant predictor of educational attainment in Study II. This finding is also in line with previous research (Loureiro et al., 2019), which found stronger effects of SES. In Study I and Study II however samples were balanced towards high achieving, academic track school students. This might, next to the predominant effect of SES, explain the missing relations for immigrant background resp. language spoken at home.

Another measure - the burden of financial cost for obtaining *Abitur* – rather representing subjective SES (Zhao et al., 2023) was included in Study II. However, similar mechanisms as for immigrant background resp. language spoken at home seem to be operating in terms of financial cost, as no significant prediction was found and parental education was the only significant predictor in terms of family background variables. Furthermore, this variable was assessed by students. It is thus questionable, how well students can assess parents' financial resources to enable them to obtain *Abitur*, as there is research, that students' assessments of SES might be imprecise. Analyses based on PISA data showed that particularly among low-SES students and mainly in terms of parents' occupation, student data are less reliable than parent information (Kreuter et al., 2005; Maaz et al., 2006). Further analyses also among secondary school students and based on NEPS-data showed in particular deviations in given information for educational degrees obtained abroad. Furthermore, when using student instead of parent information social inequalities in terms of math competences were lower, and thus might be underestimated (Hovestadt & Schneider, 2021). These relations might explain the missing relation of financial cost and obtaining *Abitur*, although financial considerations are included by parents when deciding for a secondary school type. Furthermore, measures of subjective SES were particularly important when predicting well-being due to social

comparisons (J. J. X. Tan et al., 2020). The measure of financial cost however was not included in the further analyses to predict well-being as it is formulated relating to the financial cost in terms of obtaining *Abitur*, and not with respect to social comparison.

When focusing the finding of Study II in comparing students with and without academic track-enrollment recommendation in terms of their family background predictors for obtaining *Abitur*, significantly differing effects for parental education are evident – parental education is only significantly predicting obtaining *Abitur* for students without academic-track enrollment recommendation. Receiving an academic-track enrollment recommendation is a result of a complex process including students' performance, teachers' assessments, parents' impact and motives of status attainment, and legal regulations (Baeriswyl et al., 2011; Dumont et al., 2019; KMK, 2015) as is further explained in Section 2.1. Students without academic-track enrollment recommendation deviating upwards from the recommendation are after the transition in a learning environment which is objectively too high performing for them. Due to the factors contributing to a deviation from the enrollment recommendation, which predominantly stem from students' SES, the higher importance of parental education in this group is plausible. In line with previous research (Bittmann, 2021; Tiedemann & Billmann-Mahecha, 2010), the group of students without academic-track enrollment recommendation attending an academic-track school showed lower levels of SES than students having received an academic-track enrollment recommendation. They also scored lower on competences as well in Study II and in previous research (Pfohl et al., 2018), supporting furthermore the presence of educational inequalities and primary effects of social stratification (Boudon, 1974).

These findings underline, that there are still systematic differences in students' educational opportunities depending on their SES, even when controlling for a set of motivational variables. These differences can be mainly led back on parental education. In the conducted studies, immigrant background resp. home language were no significant predictors of obtaining *Abitur*, which might either be led back to the higher relevance of parental education or the selective sample. However, these findings do not contradict previous research. The results thus indicated that while including measures for economic and cultural capital, cultural capital was more relevant in terms of school-leaving certificates (Bourdieu, 1973). The results in Study II showed higher relevance of parental education for students without academic-track enrollment recommendation. As those students showed lower competences, secondary effects of social stratification (Boudon, 1974) are of high relevance in this group particularly, as transition decisions are made in this group more consciously by parents.

SES was also included in the further analyses, as SES was shown to be predictive for well-being outcomes (Diener et al., 1995; Navarro-Carrillo et al., 2020). The relationship between SES and well-being can, in part, be attributed to social comparisons and individuals' perceptions of their own SES, often referred to as subjective SES. (Buunk & Dijkstra, 2017; J. J. X. Tan et al., 2020). Social comparisons and subjective SES, particularly in terms of income are particularly important among adults. Current research oftentimes focused the relations between income and well-being. Thereby effects from household income on children's subjective well-being were found (Main, 2019), as well as relations between income and life satisfaction among adults (D'Ambrosio et al., 2020). Income predicts well-being positively up to a certain threshold. In the further analyses, SES was operationalized by parental education, which was relevant for social well-being out of the four analyzed well-being measures covering general well-being, social well-being and school-related well-being. SES was a significant predictor only for satisfaction with friends among academic-track school students, whereas it showed no significant influence for non-academic-track school students. As the social composition of academic-track schools is rather homogenous (Brinkmann et al., 2024), alignment with social class seems to be beneficial for social relatedness. These findings indicate that the cultural capital (Bourdieu, 1973) is particularly important for social well-being. Thereby social class specific behaviors and habitus (Bourdieu, 1973; Moll et al., 2024) seem to be central factors for social integration in high performing environments. Comparison of social status as for e.g., income thus seems to be of lower relevance for the analyzed groups and contexts.

7.1.2 Importance of motivational factors for educational outcomes

Motivation is a multidimensional construct encompassing many different facets. With regard to this, this dissertation aimed to take a comprehensive perspective in including multiple facets of motivation and analyze their importance for students' educational attainment in terms of obtaining *Abitur* and students' well-being. In the context of educational attainment, this study adopts not only a multidimensional perspective but also a broader, more general approach, moving beyond the predominantly domain-specific focus seen in previous research. Starting point for deriving motivational constructs in terms of educational attainment was Wigfield and Eccles (2000) expectancy-value model. The two core constructs expectation of success and value of education proved to be significant, positive predictors for educational attainment in Study I and Study II. Expectation of success was particularly relevant in both studies – it predicted obtaining *Abitur* the strongest among the other included predictors SES, immigrant background, further motivational factors and stressors, and while controlling performance. This

finding is in line with the statements from the expectancy-value model (Wigfield & Eccles, 2000) and previous research conducted among elementary and secondary school and college students (Ditton et al., 2019; Durik et al., 2015; Khattab, 2015). These findings underline the importance of a supportive environment in which students are aware of their abilities. For students who feel insecure about their abilities, active encouragement is essential to help them build confidence and reach their full potential. These findings are also in line with the theory of the self-fulfilling prophecy (Jussim, 1986; Merton, 1948). This concept describes how one's expectations or expectations of others generate the expected outcome or behavior, although with an unbiased view another outcome would have been possible resp. plausible. In the scholastic context self-fulfilling prophecies are mainly discussed in the context of teacher expectations and judgements and students' outcomes depending on these factors. Teachers develop expectations towards students, which can be biased by teacher stereotypes e.g., towards students' immigrant background, socioeconomic background or gender. Following these differing expectations, different students are treated differently by their teachers, which then causes student behavior resp. performance according to these biased expectations (K. Bauer & Gill, 2024; Gentrup et al., 2020). This might hinder students in tapping their full potential. This however can also be transferred to students' expectations, as students' expectations instead of teacher expectation might also be the starting point towards a self-fulfilling prophecy (Francis et al., 2017). This is also relevant in the context of current discussions about the impostor syndrome, which goes along with self-doubts about one's achievements. Not perceiving oneself as capable as one is, might lead to a decrease in performance and satisfaction and increase the risk of burnout – in an occupational context as well as in school (Bothello & Roulet, 2019; Hutchins et al., 2018). The risk of underestimating oneself is particularly evident in higher school tracks (Kosel et al., 2021).

The second core factor of Wigfield and Eccles' (2000) expectancy value model are values. In the original model, the value component comprises four dimensions – interest-enjoyment value, attainment value, utility value and cost. The value of education can be assigned to the attainment value component, which goes back to Atkinson (1957). Value of education was a relevant predictor in Study I and Study II, as value of education positively predicted obtaining *Abitur*. The effect size is comparable across different samples and also for the two groups which were compared in Study II. While previous research (Benden & Lauer mann, 2023; Steinmayr et al., 2012) showed the relevance of domain-specific values for domain-specific performance outcomes, the present studies also prove the relevance of value of education for a more general outcome. Value of education itself was also measured in terms of obtaining *Abitur*, which implies that the results of previous research are transferable in this

context. When focusing low-SES students, these findings are of particular relevance. Educational aspirations and values tend to be lower among low-SES students, a phenomenon largely attributed to the transmission of parental values to their children (Barni et al., 2011). Parental values are students' cultural capital (Bourdieu, 1973) and shape the educational pathway taken. Parents aim to maintain social status rather than advancing social status. This is one reason, why low-SES students partially deviate downwards from enrollment recommendations. Instead of attending *Gymnasium*, a non-academic school track is chosen. Although the preceding argumentation focuses parental values, the mechanisms are transferable to students' values of education, as they are shaped by parental educational values (Barni et al., 2011), similarly as it happens with educational aspirations (Schörner & Bittmann, 2024). Furthermore, the older students are, the more important their own wishes and values become for their further educational career. Especially when considering situations such as students having obtained a non-academic school-leaving certificate and moving further on to an academic school track after Grade 9 or 10 or the decision to continue schooling after one has already started and/or finished vocational training students own values and wishes are of higher relevance. But also at earlier stages the impact of students on the transition decision is discussed. There are some studies investigating the impact of student on the transition decision. Findings indicate, that also students have (limited) impact on the transition decision made. The impact depends mainly on parenting style and students' performance (Wohlkinger, 2014).

In Studies I and II also performance related motivation was included as a predictor. Performance-related motivation is a rather extrinsic motivation aiming at performance rather than mastery as a goal. No significant relation with obtaining *Abitur* was found in either study. As also mentioned in section 2.4.3 finding are inconsistent when it comes to performance-oriented motivation, as no relation with student achievement was found when including mastery-orientation or values (Howard et al., 2021; Steinmayr et al., 2019). As students' educational values are included in Studies I and II as well, these finding do not contradict previous research. Furthermore, there is evidence that performance orientation is more beneficial for high-SES students, while low-SES students benefit more from a mastery-oriented approach (Darnon et al., 2018). This might be due to different prerequisites in terms of performance in favor of high-SES students, which then can profit more from a performance-oriented approach, while low-SES students have a higher need to first master the topic in order to perform well. Another study showed direct relations between performance orientation and grades (Mouratidis et al., 2018). Since grades were not examined in the conducted studies, any potential relationship within the NEPS data can only be hypothesized. However, indirect

relations between performance-related motivation and school-leaving certificates are possible, which needs further investigation.

Value of education was included as a predictor for well-being in the further analyses. Value of education was relevant among academic-track school students while not including stressors in the model. A high value of education thereby negatively predicted life satisfaction and academic self-concept. A reason for the negative relation might be the higher educational demands in academic-track schools. These findings raise the question of whether the value placed on education might also act as a stressor, particularly when students hold high educational values but are unable to meet the corresponding performance expectations. Such relationships could be explained through the lens of the Job-Demands-Resource-Model (Karasek, 1979; Salmela-Aro & Upadyaya, 2014). However, when controlling for stressors no significant relations were found for value of education, although the direction of the coefficients still points in the same direction indicating a high value of education being disadvantageous for well-being. In this context the small sample size for academic-track school students might contribute to missing significant relations. The implications of these relations are discussed in further detail in the context of research question four in section 7.1.4.

7.1.3 Relevance of stressors for educational outcomes

This leads to the third research question, which focused the relevance of stressors for students' educational attainment (Study I and II) and well-being (further analyses). Stressors from three different areas were considered in terms of educational attainment (Study I and II) and well-being (further analyses): scholastic (Study I and II), parental (Study II and further analyses), and individual (further analyses).

In Study I, effort was included as a predictor for educational attainment. Previous research showed that high effort goes along with higher performance, when comparing students with high and low effort (Pu et al., 2020). However, no significant relation with obtaining *Abitur* was found. This might have multiple reasons. Potentially effort is important when it comes to differences in grades and performance, and less relevant when focusing the overall aim of obtaining a certain school-leaving certificate. As no comparable study with focusing school-leaving certificates was conducted in terms of effort, this needs further investigation. In addition, the sample of Study I is selective in terms of performance. Only students who attended *Gymnasium* during their educational career were analyzed. The above describes mechanisms might be even more evident due to this. This is also in line with further research, describing how high effort and low performance and low effort and high performance might also go along (Zinn et al., 2011). High effort thus might be found among low-performing students, as there is

a higher need to engage in schooling. However, educational outcomes of these students are still not comparable to high-performing students, who do not need to invest effort in learning. Furthermore, most students attending *Gymnasium* received an academic-track enrollment recommendation, as Study II and further research shows (Pfost et al., 2018; Tiedemann & Billmann-Mahecha, 2010). When giving the recommendation, effort is taken into account as a factor of school related behavior, which might also reduce the effect of effort.

In Study II learning stress was included as a predictor for obtaining *Abitur*. Learning stress positively predicts obtaining *Abitur* for students with academic-track enrollment recommendation and although the coefficient is insignificant for students without academic-track enrollment recommendation, no significant group difference was found. In terms of educational attainment stressors thus seem to rather be beneficial for students obtained school-leaving certificate. According to the rational choice theory (Erikson & Jonsson, 1996), cost and utility are considered when deciding for or against an option. The result of these considerations differs by SES. In high-SES families the utility of education is assessed as more important than the cost component. The group of students who received an academic-track enrollment recommendation on average has a higher SES than the group who did not receive such a recommendation, and only this group shows significant effects of learning stress. Next to this, also non-linear relations between stressors and educational attainment should be discussed. Previous research indicated, that a certain level of stress or high requirements might improve performance and motivate students (Saklofske et al., 2012), as long as it is not too demanding. This can be explained by the Job-Demand-Control-Model (Karasek, 1979), which states that high job demands might lead to a motivation push, when the perception of workload resp. learning load is perceived as appropriate (Trigwell et al., 2013). When learning load is perceived as appropriate, the basic need for competence is fulfilled (Ryan & Deci, 2000) and also the concept of cognitive activation comes into action for explaining the observed relations. Cognitive activation describes „a condition for students engaging in knowledge construction (e. g., through challenging tasks implemented with adequate pace) and an indication of students' being engaged in higher order thinking (e. g., students providing reasons for their answers)“ (Praetorius et al., 2018, p. 408). This implies that challenging students corresponding to their abilities might have positive impacts for students' educational outcomes, as cognitive activation is one of the three basic dimensions of teaching quality (Praetorius et al., 2018). Referring this to learning stress, this means that particularly for high-performing students stressors might be a rather motivational factor, as they are able to address the demands by learning and investing

time. As there are relations between SES and performance, especially for those students the positive relations between stressors and educational attainment can be explained.

Study II furthermore considers effects of perceived parental aspiration. Parental aspirations are a secondary effect in the sense of Boudon (1974), as they are socially biased and shape educational decisions depending on SES (Kleine et al., 2010). In the conducted studies perceived parental aspirations were considered, which are closely related to parental aspirations itself (Schörner & Bittmann, 2024). While parental aspirations might not be prevalent in students' school life and rather important for the transition decision made by parents at the end of elementary school time, the perceived parental aspirations towards the school leaving certificate that shall be obtained might on the one hand be perceived as motivational but on the other hand as stressor (Cheung & Pomerantz, 2012; Deb et al., 2015). In terms of obtaining *Abitur*, which is the parental aspiration addressed in the item, positive relations between perceived parental aspirations and obtaining *Abitur* for students with academic-track enrollment recommendation were found in Study II. However, since no significant group difference was found between the two analyzed groups, and the coefficient was significant for students without academic-track enrollment recommendation as well while not including value of education in the analyses, it has to be assumed that similar mechanisms are operating for this group as well. Similar explanations as for learning stress can be given in this context. Higher aspirations and thus higher perceived aspirations go along with higher SES, which in turn is connected to higher performance. Positive relation are thus – next to the aim to obtain rewards or avoid punishment (Cheung & Pomerantz, 2012) – also due to the implications that go along with high aspirations – plausible and according to previous research (Šimunović & Babarović, 2020).

Also in terms of well-being stressors were important predictors (further analyses). In this study, perceived parental aspirations and exhaustion were included and their impact in terms of life satisfaction, satisfaction with friends, academic self-concept and helplessness in German was investigated comparatively for students attending academic-track schools vs. non-academic-track schools. For both stressors and groups depending on the well-being dimension focused differential effects were found, implying that stressors act differently in the compared groups. The results are discussed in the following in more detail.

Perceived parental aspirations predicted students' well-being for students not attending academic-track schools. High perceived parental aspirations were beneficial for the two school-related well-being measures academic self-concept and helplessness in German. Perceived parental aspirations were measured in terms of obtaining *Abitur*, thus have a close relation to a performance related outcome, making it plausible that particularly those two well-being

measures are affected. This is also supported by previous research particularly in terms of academic self-concept (Buchmann et al., 2022). Furthermore, the positive relations occur in the comparatively low performing environment, which are non-academic-track schools. For these students the perception of their parents of aspiring them to obtain *Abitur* might contribute to their well-being as it is not perceived as stressful as the current school type does not provide *Abitur* as school-leaving certificate. Due to this, the perceived aspirations might rather be motivating and promoting well-being, as there is no specific threat in not fulfilling parental aspirations (Cheung & Pomerantz, 2012). This is also supported by further research that hints towards the fulfillment of basic psychological needs as mediators between aspirations and well-being (Hope et al., 2019). Students in non-academic track schools have – next to no threat – also no particular need to fulfil their parents' wishes.

Exhaustion was relevant for all well-being outcomes under investigation. However, depending on the attended school type, partially contrary relations were evident. For students attending non-academic-track schools – thus being in lower performing environments – exhaustion has negative implications for well-being. For students in high performing environments – i.e., attending academic-track schools – exhaustion was relevant for school-related well-being. Being exhausted in this group impacts school-related well-being: a negative relation with academic self-concept was found. But also helplessness in German was negatively predicted, implying that higher exhaustion goes along with higher well-being in this dimension. This might hint towards a connection of investing a lot in learning and school and thus having a feeling of autonomy (Ryan & Deci, 2000) and being in control over the expected outcome. Furthermore, exhaustion was on average higher among academic-track students. Study II showed that students obtaining *Abitur* without academic-track enrollment recommendation on average showed lower scores on performance measures than student with a recommendation corresponding to the school type. This in turn means, that the perceived demands are higher compared to their peers who received an academic-track enrollment recommendation. Those finding support the job demands resource model (Demerouti et al., 2001; Salmela-Aro & Upadyaya, 2014). The findings related to exhaustion, which acts both as a stressor and as a component of students' well-being (Maslach & Leiter, 2016), underscore the importance of incorporating well-being measures as predictors alongside traditional factors such as family background, motivation, performance, and learning environment. Furthermore, the findings need to be discussed in the light of a specific sample, as only students, who did not receive an academic-track enrollment recommendation were analyzed. This is a selective sample in terms of performance and SES, which might also impact the found relations.

7.1.4 Relations between predictors and relevance for educational outcomes

The fourth research question focused the relations between family background and motivational factors resp. stressors and the along going potential mediation effects in terms of educational attainment (Study I) and well-being (further analyses). In this chapter mainly the observed mediation effects are focused, relations between the predictors are mainly discussed in the light of the observed mediation effects. A detailed discussion of the relations between the predictors can be found in the individual studies.

In Study I motivational factors (expectation of success, value of education, performance-related motivation) and effort were investigated as mediators of family background variables (parental education, parental occupation and immigrant background). The further analyses included relations between SES (parental education), motivational factors (value of education), and stressors (perceived parental aspirations and exhaustion) The assumed relations can explained by the situated expectancy-value-theory (Eccles & Wigfield, 2020), which expands the expectancy-value theory (Wigfield & Eccles, 2000). Next to other additions particularly students social and cultural background is included, emphasizing relations between background variables and motivational factors. These relations are also empirically supported in previous research (C. Brown & Putwain, 2022; Steinmayr et al., 2012) as well as in Study I and the further analyses. Study I showed relations between parental education and occupation and expectation of success and value of education as the situated expectancy-value theory suggests (Eccles & Wigfield, 2020). The findings indicate, that a high SES is beneficial for students' motivation. The results concerning the relations between immigrant background and motivation also support previous finding in line with the immigrant optimism theory (Kao & Tienda, 1995, 2022). Higher value of education and performance-oriented motivation were found for students with immigrant background. As only a significant relation between parental education and obtaining *Abitur* was found in the first place in Study I, a potential mediation however is limited to this factor. Comparing the relations between parental education and obtaining *Abitur* with and without including motivational factors, a significant decrease in coefficient size and thus a mediation effect was found. The mediation takes place through expectation of success – which was also the strongest motivational predictor and also is significantly predicted by parental education. This finding confirms previous research, which states that the effect of SES on educational attainment might be weakened by motivational factors (L. Wang & Finch, 2018). Also for elementary school students a mediation of SES through cultural resources and expectations of success was found (Ditton et al., 2019). For Study II a similar design was aimed for to investigate potential mediation effects in the two compared groups. However, model fit indicated an insufficient model fit in terms of CFI when

including paths from family background to motivational factors, which is why mediation models were not reported in Study II. As RMSEA-values were satisfying for the mediation models and group sizes were sufficiently large, too high complexity can not explain the insufficient model fit. This rather hints towards connections (of further variables) not taken into account and needs further investigation.

In the further analyses stressors (parental aspiration and exhaustion) were investigated as mediators for the relations between SES resp. value of education and well-being. Value of education and perceived parental aspirations were related for academic and non-academic-track students. However, the negative relation for academic-track students and the positive relations for non-academic track students indicate, that students' own value of education on academic-track schools might be more prevalent than wishes perceived from parents. This is also in line with the non-significant relations between perceived parental aspirations and well-being measures. It also might hint towards mismatches in students' values and the perceived expectations parents have towards their children's expectations for academic-track school students and matches for non-academic-track school students. As particularly important emerged the relations between value of education and exhaustion (Wigfield & Eccles, 2000) for academic track-school students. Value of education significantly predicted exhaustion and the strong relation between value of education and academic self-concept was completely mediated, while exhaustion remained a strong predictor for academic self-concept. While having a high value of education seemed to be disadvantageous for students' well-being in the first place, it rather seems that a high value of education in connection with too high demands has a negative impact on students' school-related well-being. Again, the job-demand resources model (Demerouti et al., 2001; Salmela-Aro & Upadyaya, 2014) might explain these relations. Significantly lower performance was found for students attending academic-track schools without corresponding enrollment recommendation (Bittmann, 2021; Pfof et al., 2018). These finding hint towards a mismatch in demands and abilities, raising the level of stress for students. This combined with a higher value of education and thus high expectations for oneself, might reinforce the level of stress received and thus the negative relations for students' self-concept are the following outcome.

7.2 Limitations and Strengths

In the following two sections, methodological and conceptual limitations and strengths of the two studies, the further analyses and the dissertation as a whole will be discussed. However, methodological and conceptual limitations are not always separable.

7.2.1 Limitations

Although this dissertation took a multidimensional perspective in terms of operationalizing SES, motivation, stressors, and well-being and comprehensively connecting the constructs with each other, still large bits of variance are unexplained. This suggests that there are other constructs that have not yet been taken into account and should be included. These aspects are explored in greater depth in Chapter 7.3.1, which focuses on implications for future research.

However, also the included constructs have some shortcomings when looking at the one item measure of satisfaction with friends and acquaintances. This only partially reflects the complex social relations in class, as students' everyday life largely takes place in school and school is one of the places where most social contacts take place and friendships are made. Therefore, particularly social integration in class is crucial for students' well-being and this is only partially represented by the included measure. The investigation of social networks within the school thus should thus be further focused. Controlling for class characteristics in a more general manner with a class identifier (on a second level) was not possible due to data structure, as no persistent class identifiers were assigned. Also, due to data structure, it was not possible to track students' educational pathways in detail – this means that a general measure for “having attended an academic-track school” or not was included instead of including measured, which school type was attended directly after transitioning to secondary school and in the following school years.

Carrying out secondary data analyses poses further challenges. Although NEPS-data provide comprehensive measures covering many different theoretical strands, educational outcomes and predictors, and also provides information on competence data, data collection is limited by time. This poses the challenge that there are gaps in the survey program. The model structure is therefore not always guided solely by theoretical considerations, but also by the time at which the constructs were collected. For example, in the further analyses, value of education and parental education were measured at the same measurement point. Including the value of education as a mediator would have been an interesting approach; however, this was not feasible due to the limitation of having data collected at the same point of measurement. The same holds for value of education and perceived parental aspirations, for which also the

opposite direction of relations would have been interesting to investigate but was not possible due to data structure. Furthermore, in Study I motivational factors and particularly expectation of success were measured relatively closely to the obtained school-leaving certificate, potentially distorting the findings. The multi-stakeholder perspective is highly valuable; however, its effectiveness is limited by low participation rates. In this dissertation, data from students and parents were used, as parents' information on their SES are more reliable than students' information especially in a younger age of students (Hovestadt & Schneider, 2021). However, this leads to a sample reduction due to missing information on the parent data. Also, the sample is rather biased toward high-SES students, as high-SES students and parents are more likely to take part in surveys and less likely to drop out (Heimler, 2019; Malschinger et al., 2023).

7.2.2 Strengths

A central strength that runs throughout is the multidimensional approach. This holds for the inclusion of multiple measures for family background, for which SES measures (parental education and occupation) as well as perceived SES (financial cost) and immigrant background resp. home language were regarded and differential effects for educational attainment resp. well-being could be observed. Also, multiple motivational measures (expectation of success, value of education, and performance-oriented motivation) and complementary stressors from different areas (effort, learning stress, perceived parental aspirations, and exhaustion) were included in the analyses. The findings emphasize the importance of including different measures representing different facets as it was shown that some are much more important than others. Also, in terms of well-being, as a central educational outcome, different facets were regarded (life satisfaction, satisfaction with friends, academic self-concept, and helplessness in German). Overall, the broad range of included predictors and outcomes combined with a set of control variables provides a comprehensive view on predictors of students' educational attainment in terms of obtaining *Abitur* and well-being. Additionally, the educational practice of receiving enrollment recommendations and the consequences of following resp. not following the recommendation and thus being in a higher performing environment than anticipated are investigated in terms of two central educational outcomes.

These comprehensive analyses were possible due to a large, longitudinal dataset. Next to the methodological challenges, that arise when using complex secondary data and have been discussed in the preceding chapter, the NEPS data are great source for conducting these analyses. Students measures for different areas range from comprehensive socio-demographic information to measures on students' motivation, their learning environments, well-being,

school-related measures to standardized competence tests. These information are supplemented by parent interviews, from which information were included. This dissertation conducts secondary analyses based on this comprehensive and high-quality dataset, adding relevance to data collection of large-scale assessments, which is associated with high effort and financial expenditures (Cheng & Phillips, 2014)

In this dissertation, a broad range of students' information was included. The inclusion of data on family background collected from parents allowed to adjust for potentially biased outcomes when including student measures on parents' education and occupation (Hovestadt & Schneider, 2021). Also, the data allowed to track students until the end of their secondary school time and particularly with view on deviations from the enrollment recommendation to extend the findings of previous studies (Dudas, 2014; Pfof et al., 2018; Tiedemann & Billmann-Mahecha, 2010). The analyses of the two studies and the further analyses were furthermore conducted with suitable statistical methods. (Group-comparing) structural equation models allowed to model the complex relations that are theoretically assumed and empirically supported for manifest and latent variables (Ullman & Bentler, 2013). Also, the group-comparing perspective provides new insights on the mechanisms of actions for different group of students. This is further enhanced by performing a propensity score matching (Caliendo & Kopeinig, 2008) in the further analyses to establish comparability of the two groups.

7.3 Implications for research and practice

7.3.1 Implications for future research

The present dissertation aimed to take a comprehensive view and include multiple dimensions resp. measures of family background, motivation, and well-being. However, there are some shortcomings in the present studies, as already the limitations show. Also beyond that, research desiderata arose and further expansion of the state of research is necessary.

The studies conducted in this dissertation focus secondary school students. However, further research indicated, that already the starting conditions when attending elementary school differ significantly between high- and low-SES children (Passaretta et al., 2022). When aiming to explain educational inequalities and looking for the causes, early childhood is particularly important. Therefore, also effects of pre-schooling on starting conditions for school and its implications for educational inequalities should be further investigated. However, compensatory effects may also occur in elementary school (Engle et al., 2011) and should be focused, as the performance during elementary school time is the basis for the enrollment recommendation and thus for the further educational pathway. Peer effects during elementary school should also be considered, as research suggests that students' aspirations for secondary

school are influenced by the school types their friends plan to attend. Moreover, students are more likely to pursue enrollment in a particular school type if their friends are also expected to attend that school (Wohlkinger, 2014). This dynamic can have long-term effects on the school-leaving certificate ultimately obtained. These findings suggest that beginning to study students during secondary school, when they are already placed in either an academic or non-academic school track, may be too late to fully understand the conditions of the transition. Additionally, compensatory effects can only be examined among students already attending an academic-track school, resulting in a selected and potentially unrepresentative sample.

The mechanisms determining educational attainment on multi-track schools and potential compensatory effects of these school types still need to be further investigated. Multi-track schools with academic-school tracks are assumed to have inequality-reducing effects (Hadjar & Rothmüller, 2016; van de Werfhorst, 2021), as track-changes are less complicated (Schleithoff, 2014). This however needs further investigation, as school(-track) changes oftentimes are only partially traceable with the existing datasets. When aiming to investigate school(-track) changes further challenges occur. Tracking students after school changes requires individual tracking of students after they left the originally attended school, which is not provided by all studies conducted in the school context. When individual tracking, such as in the NEPS data, is employed, it often leads to challenges with sample size and methodological issues. High dropout rates among individually tracked students in the panel further complicate the analysis and reduce the robustness of the findings. Also, these datasets deal with high complexity in data structure due to oftentimes retrospective measures and not always fully recorded educational pathways.

Additionally, there is the possibility of catching up on educational qualifications as an adult. *Abitur* can be obtained after regular secondary school time. Also these pathways to higher education and the motivation of those who make use of it are not well researched yet (Buchholz & Pratter, 2017).

The academic consequences of enrollment recommendations are focused in previous research (Bittmann, 2021; Pfof et al., 2018) as well as in the present dissertation. The psychological implications of enrollment recommendations however are only insufficiently researched. First results, also in the present dissertation, hint towards consequences for students' academic self-concept and further well-being measures. In the conducted studies a (missing) enrollment recommendation was used as a proxy for students' allocation to a certain learning environment. An open question remains whether a non-corresponding enrollment

recommendation acts as a self-fulfilling prophecy, potentially triggering a stereotype threat effect, and which student characteristics play a key role in this context. The mechanisms here can only partially be pictured by the conducted research. Next to the perceived self-assessment of students' competences and performance, it would also be interesting to include academic-track school teachers stereotypes and expectations towards low-SES students and students without academic-track enrollment recommendation. In this context, also teacher-student interactions should be focused. Teaching quality and teacher-student-relations next to teacher stereotypes and expectations should be focused.

Also peer effects are relevant for students educational attainment. As describes above, this is on the one hand relevant for transition decision. But on the other hand, it is also relevant during secondary school. Included in further research should be classroom context, which is equally important for educational attainment and well-being (Chiu & Chow, 2015; M.-T. Wang et al., 2020). This includes measures such as class size and composition; e.g., shares of different groups of students (high-SES/low-SES, gender, immigrant background). Also social networks within the class and classroom climate are relevant factors. For educational attainment, peers' motivation to learn and aspirations are relevant, as those represent attitudes of significant others, that are impacting one's own attitudes towards learning. This can affect educational attainment and well-being in a positive or negative manner, depending on the attitudes towards learning (Double et al., 2020; Ladd et al., 2009).

Also in terms of stressors further research should be conducted. In this context, possible non-linear relations need further investigation. The conducted research in this dissertation as well as further research (Travis et al., 2020), showed that stressors do not necessarily negatively predict students' educational attainment and well-being. It looks more like a certain level of stress can also have a motivating effect. However, the tipping points at which a certain level of stress leads to excessive demands instead of challenges are probably individual and have not yet been comprehensively researched and should be further investigated.

The research lines of Study I and Study II, along with the further analyses, should be integrated to explore the relationship between well-being and school-leaving certificates, particularly with a focus on their long-term effects. There is a broad field of research connecting performance with well-being (Bücker et al., 2018; Kaya & Erdem, 2021). However, the school-leaving certificate, which has long-term effects on students further educational pathways and thus determines their occupational career options and income, are not investigated in terms of well-being outcomes.

From the conducted studies also an implication for operationalization follows. In educational studies, students' SES oftentimes is operationalized via number of books in the household or parental occupational status for which the HISEI is used. While number of books in the household is a measure for cultural capital, which was not investigated in this dissertation, in terms of SES parental occupational status (HISEI) and parental education (ISCED) were simultaneously included in Studies I and II. In terms of educational attainment results of both studies show a higher relevance of parental education. As education determines occupation (Duncan, 1961; Valentino, 2021) this result is in line with expectations. However, it implies that including parental educational measures whenever possible should be considered when investigating educational attainment. Furthermore, the present studies confirm previous findings in terms of immigrant background, where immigrant background only developed minor relevance when including further SES measures (OECD, 2016). This implies that only including a measure for immigrant background is not sufficient when aiming to understand the mechanism that foster educational inequalities in terms of family background as a whole.

7.3.2 Implications for educational practice

After focusing the implications for further research in the preceding chapter, now the focus shifts towards the implications for educational practice that can be derived from the two empirical studies and the further analyses. Implications for reducing educational inequalities in terms of educational attainment are drawn as well as starting points for promoting students' well-being are pointed out.

The conducted Studies I and II confirm the persisting educational inequalities in the German educational system in terms of educational attainment. The along going inequalities of opportunities depending on SES need to be reduced. As previous research has shown (e.g., Passaretta et al., 2022; Skopek & Passaretta, 2021), educational inequalities are generated already before formal schooling and are strongly evident at the end of elementary school time (Bloh & van Ophuysen, 2008). When aiming to reduce these inequalities, preschool education should be taken in view to compensate early on the different stimuli depending on SES children are exposed to from birth on (Schindler, 2015). Therefore, preschool education needs to be made use of independently of social status. Educators need to be trained to be sensible towards educational inequalities to address these. The same holds for elementary school teachers. From the start of elementary school time teachers need to be made aware of social differences in performance and also for different needs students might have. This underscores the importance of teachers becoming aware of their own biases and stereotypes, as well as taking steps to actively reduce them. This is particularly important for elementary school teachers in the

context of enrollment recommendations which were proven to be socially biased (Bittmann, 2021) and have long term effects on students' educational pathways. Some students are – partially but not exclusively to their social status – wrongly assessed by teachers in terms of the received enrollment recommendation. Teachers however do not receive feedback on whether the given recommendation was correct and which school type students attend whether they are successful on this school type. For improving the enrollment recommendation, such feedback is required. All these suggestions however require a sufficient number of educators, teachers and further educational staff in kindergartens and schools. Although regularly discussed, there is no evidence that a binding recommendation is beneficial in terms of reducing educational inequalities (T. Roth & Siegert, 2015). Students are furthermore separated on different school tracks relatively early by international standards. Extending the period during which students learn together is a topic of ongoing discussion. This is supported by finding that educational performance get more stable with higher age of students and the current end of elementary school is too early in this manner (Valtin, 2020). Parallel to the extension of the elementary school time, greater flexibility for school(-track) changes should be considered. As also the outlook on further research implies, multi-track schools should be given greater importance.

This dissertation offers valuable starting points for addressing and reducing educational inequalities during secondary school. A particular focus was placed on motivation as a potential mediator, highlighting its role as a lever to mitigate educational disparities by fostering and promoting students' motivation. Students' motivation is particularly important in this context, as it is malleable to some extent and therefore can be shaped by students' experiences and potential interventions. Especially expectation of success stood out as important predictor (Study I and II) and as a mediator of parental education (Study I). These results indicate that promoting students' expectation of success is a promising approach in reducing educational inequalities. Interventions to boost students' expectations of success thus should be considered, as a study of Durik et al. (2015) supports. These stimuli should be external and thus need to come from parents or teachers. Therefore, for promoting students' expectation of success, also parents and teachers need to be made aware of the existing relations and implications and instructions for promoting these expectations need to be given. This approach specifically aims to strengthen students' self-belief in themselves and their abilities. Achieving this requires clear, knowledge-based communication and constructive, positive suggestions for improvement. To maximize impact, these interventions should be seamlessly integrated into everyday teaching practices. As already discussed beforehand, expectations of success are conceptually similar to the concept of self-effectiveness. In this field, there is a broad body of research on how to

promote self-efficacy expectancies (Maddux, 2016; van Dinther et al., 2011), that can likewise be transferred to expectation of success.

Also, in terms of well-being implications for practice can be derived from the further analyses. Our findings clearly indicate, that well-being is a multidimensional construct. Furthermore, the group comparing perspective shows that, depending on child characteristics, different implications need to be derived. For supporting students' well-being in school, teachers need to be aware of students' backgrounds and characteristics. Having received an enrollment recommendation or not for an academic-track school and attending an academic-track school is in this context a proxy for different starting conditions. This might also be transferred to e.g., different performance levels and school related motivation among students in one class. The findings indicate there is no "one size fits it all"- approach for supporting students well-being. In terms of different well-being dimensions some more concrete implications for practice can be derived. In terms of social well-being, especially on academic-track school students' SES was important. For educational practice this means that communication between all students needs to be fostered and exchange formats such as joint afterschool activities for students from all social backgrounds might provide a starting point in doing so. Also stress experiences of students must be kept in mind – by parents as well as by teachers. This is especially the case for high-performing environments to prevent school changes to lower track schools and keep students' attitudes towards learning positive. Since students' attitudes towards learning are linked not only to their school-related well-being but also to their performance and educational attainment (Verešová & Mala, 2016), fostering positive attitudes could yield dual benefits, enhancing both well-being and academic outcomes.

7.4 Conclusion

Educational inequalities remain a significant challenge within the German educational system. Students' educational outcomes strongly depend on their familial perquisites implying that there are unequal opportunities for students stemming from different social strata to obtain different school leaving certificates, which in turn shape the further occupational pathway. In the German context these relations are particularly complex due to the many factors influencing the educational pathway taken, including the early transition to secondary school connected with the practice of receiving enrollment recommendations. The goal is not for every student to obtain *Abitur*, but rather to ensure equal opportunities, enabling all students who aspire to achieve *Abitur* to do so. Next to implications for students' performance and educational attainment, there are also implication for socio-emotional outcomes as students' well-being. This dissertation aimed to connect these different strands of research and to identify predictors

for students' school-leaving certificates and well-being outcomes in the light of the specific regulations for German secondary school students using a large, longitudinal dataset. In order to identify predictors potentially reducing the effects on SES on the investigated outcomes, students' motivation was included. This work builds on the theoretical considerations of Boudon (1974) and Bourdieu (1973) in terms of educational inequalities, the expectancy-value model (Wigfield & Eccles, 2000) for motivation. The relations concerning well-being were mainly derived by the self-determination theory (Ryan & Deci, 2000) and the big-fish-little-pond-effect (Marsh, 1987). This dissertation addressed the research gap in terms of the following research questions: 1.) Which role does students' family background play for obtained school-leaving certificates and well-being, 2.) which, motivational factors) are relevant predictors for the obtained school-leaving certificate for students with and without academic-track enrollment recommendation and well-being, 3.) how do stressors predict educational attainment for students with and without academic-track enrollment recommendation and well-being, and 4.) how are and individual related to each other and what does this mean for educational attainment in terms of obtaining *Abitur* and well-being. Thereby the included constructs (family background, motivation, stressors, well-being) were modelled multidimensionally.

This dissertation has provided valuable insights into the predictors of two critical educational outcomes: obtaining *Abitur* and students' well-being. By adopting a multidimensional and group-specific approach, this research advances our understanding of the interplay between family background, motivation, stressors, and the structural characteristics of the German educational system. A central finding of this dissertation is that students' expectations of success are central for their educational attainment - this goes so far that even the effect of SES is mediated. The second core finding is that in terms of well-being there is the need to differentiate between different facets of well-being and different groups of students when aiming to identify predictors of well-being. Strengthening students' beliefs in themselves is a promising approach to reduce educational inequalities also for students already being located in the tracked secondary school system. In conclusion, this dissertation highlights the complex interrelations between individual, familial, and systemic factors in shaping educational attainment and well-being. By addressing these dimensions comprehensively, the findings contribute to the ongoing effort to create a more equitable and supportive educational landscape, ensuring that all students have the opportunity to reach their full potential.

8. References II

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9. Anhang

9.1 Eigenanteile der Doktorandin an den Einzelbeiträgen

In diesem Abschnitt werden die Eigenanteile des Doktoranden an den zwei Beiträgen der Dissertation und den weiteren Analysen beschrieben. Dabei wird auf die Bereiche Erstautorenschaft, Konzeption der schriftlichen Abfassung des Beitrags, statistische Auswertungen, schriftliche Abfassung des Beitrags und Revision des Beitrags nach Rückmeldung der Gutachter*innen eingegangen.

Beitrag I

Molitor, K., Fabian, P., Thums, K., & McElvany, N. (2022). Is the relation between family background and obtaining an Abitur mediated by malleable motivational variables? *Zeitschrift für Erziehungswissenschaft*, 81(2), 471–492. <https://doi.org/10.1007/s11618-022-01096-x>

- Konzeption der schriftlichen Abfassung des Beitrags: Die schriftliche Abfassung wurde hauptverantwortlich von Katharina Molitor konzipiert. Prof. Nele McElvany, Dr. Paul Fabian und Dr. Kathrin Thums waren beratend tätig.
- Statistische Auswertungen: Die statistischen Auswertungen wurde hauptverantwortlich von Katharina Molitor durchgeführt. Prof. Nele McElvany, Dr. Paul Fabian und Dr. Kathrin Thums waren beratend tätig.
- Schriftliche Abfassung des Beitrags: Die Hauptverantwortung der Verschriftlichung des Beitrages lag bei Katharina Molitor. Prof. Nele McElvany, Dr. Paul Fabian und Dr. Kathrin Thums waren beratend tätig und gaben Rückmeldungen.
- Revision nach Rückmeldung der Gutachter*innen: Der Text wurde nach Erhalt der Anmerkungen und Änderungsvorschläge der Gutachter*innen hauptverantwortlich von Katharina Molitor überarbeitet. Prof. Nele McElvany Dr. Paul Fabian und Dr. Kathrin Thums haben den Überarbeitungsprozess beratend unterstützt.

Beitrag II

Molitor, K., Fabian, P., & Stang-Rabrig, J. (accepted for publication). Obtaining Abitur without teacher recommendation – the role of social background, opportunity costs, and motivation. In S. König, R. Schaufelberger, N. McElvany et al. (Eds.), *Veröffentlichung des Instituts für Schulentwicklungsforschung. Jahrbuch der Schulentwicklung. Band 24. Bildungsprozesse und Kompetenzentwicklungen im Kontext sprachlicher und sozialer Heterogenität*. Weinheim: Beltz Juventa Verlag.

- Konzeption der schriftlichen Abfassung des Beitrags: Die schriftliche Abfassung wurde hauptverantwortlich von Katharina Molitor konzipiert. Dr. Paul Fabian und Dr. Justine Stang-Rabrig waren beratend tätig.
- Statistische Auswertungen: Die statistischen Auswertungen wurde hauptverantwortlich von Katharina Molitor durchgeführt. Dr. Paul Fabian und Dr. Justine Stang-Rabrig waren beratend tätig.
- Schriftliche Abfassung des Beitrags: Die Hauptverantwortung der Verschriftlichung des Beitrages lag bei Katharina Molitor. Dr. Paul Fabian und Dr. Justine Stang-Rabrig waren beratend tätig und gaben Rückmeldungen.
- Revision nach Rückmeldung der Gutachter*innen: Der Text wurde nach Erhalt der Anmerkungen und Änderungsvorschläge der Gutachter*innen hauptverantwortlich von Katharina Molitor überarbeitet. Dr. Justine Stang-Rabrig hat den Überarbeitungsprozess beratend unterstützt.

Weiterführende Analysen

Molitor, K., Stang-Rabrig, J., & McElvany, N. (2024). How learning environments shape students' well-being in school – the impact of familial, personal, and school-related factors [Manuscript submitted for publication]

- Konzeption der schriftlichen Abfassung des Beitrags: Die schriftliche Abfassung wurde hauptverantwortlich von Katharina Molitor konzipiert. Prof. Dr. Nele McElvany und Dr. Justine Stang-Rabrig waren beratend tätig.
- Statistische Auswertungen: Die statistischen Auswertungen wurde hauptverantwortlich von Katharina Molitor durchgeführt. Prof. Dr. Nele McElvany und Dr. Justine Stang-Rabrig waren beratend tätig.
- Schriftliche Abfassung des Beitrags: Die Hauptverantwortung der Verschriftlichung des Beitrages lag bei Katharina Molitor. Prof. Dr. Nele McElvany und Dr. Justine Stang-Rabrig waren beratend tätig und gaben Rückmeldungen.
- Revision nach Rückmeldung der Gutachter*innen: -

9.2 Eidesstattliche Erklärung

Hiermit versichere ich, Katharina Molitor, **schriftlich** und **eidesstattlich** gemäß § 11 Abs. 2 PromO v. 08.02.2011/08.05.2013:

1. Die von mir vorgelegte Dissertation ist selbstständig verfasst und alle in Anspruch genommenen Quellen und Hilfen sind in der Dissertation vermerkt worden.
2. Die von mir eingereichte Dissertation ist weder in der gegenwärtigen noch in einer anderen Fassung an der Technischen Universität Dortmund oder an einer anderen Hochschule im Zusammenhang mit einer staatlichen oder akademischen Prüfung vorgelegt worden.

Ort, Datum

Unterschrift

3. Weiterhin erkläre ich **schriftlich** und **eidesstattlich**, dass mir der „Ratgeber zur Verhinderung von Plagiaten“ und die „Regeln guter wissenschaftlicher Praxis der Technischen Universität Dortmund“ bekannt sind und von mir in der vorgelegten Dissertation befolgt worden sind.

Ort, Datum

Unterschrift