



Students' school success in challenging times: importance of central personal and social resources during the COVID-19 pandemic

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Abstract

Students' well-being, learning activities, and learning success are key student outcomes that can be affected by challenging times such as the COVID-19 pandemic. Thus, it is vital to investigate the role of important personal (resilience, self-efficacy) and social resources (support from family, friends, teachers, important other) for central student outcomes (life satisfaction as a vital aspect of well-being, learning activities, and learning success) alongside perception of the COVID-19 situation. While the pandemic affected all of society, adolescents as a group who face core developmental challenges were especially vulnerable towards being negatively affected by the pandemic. Thus, analyses are based on 220 adolescent students (60.9% female, 37.7% male, 1.4% diverse) in Germany who were 16.21 years old on average ($SD=0.88$) at time of data collection in May 2021. Students filled out an online questionnaire on sociodemographics and variables of interest. Path models revealed that perceiving the COVID-19 pandemic as stressful was negatively related to life satisfaction ($\beta=-.27$). Furthermore, perceiving the COVID-19 pandemic as stressful was negatively related to students' self-efficacy ($\beta=-.22$) and positively to support from an important other ($\beta=.32$). Moreover, several resources were mainly positively related to our central student outcomes ($\beta=.13-.41$), and perception of the COVID-19 situation mediated two of those relations. Results underscore the importance of students' self-efficacy, which was related to all student outcomes. Furthermore, the results and methodological issues can impact further research and practice.

Keywords Learning success · Resilience · Self-efficacy · Social support · Well-being

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Introduction

Students' well-being, learning activities, and learning success are major educational goals in general, but even more so during extraordinary times in which students face multifaceted and ubiquitous burdens, such as a pandemic that affects students' social life as well as their learning. Perceiving the COVID-19 pandemic as (not) stressful and burdensome can be related to these key student outcomes. Thus, it is of high importance to investigate which factors might prevent students from perceiving the COVID-19 pandemic as stressful and are positively related to vital learning- and school success-related student outcomes and consequently may serve as protective factors against aforementioned negative effects of the pandemic.

Important benevolent factors during challenging situations include, for example, students' resources and their perception of those. Alongside personal factors (e.g., resilience, self-efficacy), social factors (e.g., social support) are of high importance for different learning- and school success-related student outcomes (e.g., Karademas, 2006; Olivier et al., 2019). First studies during COVID-19 have underscored the relevance of different resources for various student outcomes (e.g., Magson et al., 2021; Zhu et al., 2022), but did not investigate different resources and/or student outcomes simultaneously. Moreover, it is unclear what might mediate these relations. As the perception of situations is subjective, differs from one individual to the next, can be influenced by resources, and impacts student outcomes, perception of the situation could be a meaningful mediator of the relations between students' self-perceived resources and learning- and school success-related outcomes.

Against this background, this study simultaneously investigated students' perception of several resource factors (resilience, self-efficacy, social support from family, friends, teachers, important other) that might be central during COVID-19 and beyond, as well as their relations to the pivotal student outcome variables of self-rated well-being, learning activities, and learning success. Moreover, the mediating role of perception of the COVID-19 situation was analyzed. Adolescents were particularly affected by the pandemic since they simultaneously faced not only the pandemic as a critical life event but also further developmental tasks (e.g., establishing emotional independence, building more mature relationships, preparing for school graduation; Havighurst, 1953). Hence, adolescents were the focus of this study.

Educational goals and their relevance

Students' well-being is a relevant educational goal besides the acquisition of academic competencies. Well-being is considered to be a complex and multidimensional construct comprising physical, social, and psychological facets (e.g., Kanonire et al., 2020; Organization for Economic Co-operation and Development [OECD], 2017; World Health Organization [WHO], 2014). The construct refers to how a person feels and thinks about life in general as well as with respect to a certain domain such as school (Diener et al., 1999). The model of subjective well-being, which is based on the hedonic view of happiness, incorporates Bradburn's (1969) distinction between positive and negative affect as well as a cognitive component (Diener et al., 2018). The cognitive component comprises global and domain-specific satisfaction, referring to, for example, life in general, school, and leisure time (e.g., Diener et al., 2013; Kleinkorres et al., 2023). Prior research indicates that well-being is related to students' learning activities as well as their achievement, as one indicator of students' learning success (e.g., Kaya & Erdem, 2021; Kleinkorres et al., 2020; Yang et al., 2019).

Alongside students' well-being, their learning activities are also of high importance. Learning activities refer to the quality of the learning-related activities one pursues, such as discussing or applying learning content, which helps students to commit to memory what was learned. Thus, learning activities can be defined as significant activities that students engage in to be successful in school (e.g., Conole, 2007). Focusing on these activities is particularly important in the context of COVID-19 and remote teaching, because students did not learn in their familiar surroundings (i.e., the classroom) and received less guidance from their teachers. In general, learning activities are positively related to students' achievement (e.g., Fung et al., 2018; Schnitzler et al., 2021).

The triad of significant student outcomes examined in this study is completed by students' learning success. Learning success reflects whether and how much students learned and is a major indicator of students' school or academic success (e.g., York et al., 2015), alongside other student characteristics such as well-being, motivational-emotional variables, and academic achievement. Like well-being and learning activities, this construct is highly relevant in challenging times. In general, normed tests and large-scale assessments have shown that adolescent students' average learning gains in different domains per school year vary between a seventh and a quarter of a standard deviation (e.g., Avvisati & Givord, 2021; Bloom et al., 2008). During COVID-19, learning gains were markedly lower (e.g., Ludewig et al., 2022).

These three student outcomes are related to or reflect learning as well as school success and thus are not only crucial in general, but especially in challenging times. During exceptional times like the COVID-19 time, it can be difficult to maintain well-being, learning activities, and learning success, as learning has to be more self-regulated and self-organized than before. COVID-19 affected students worldwide in manifold ways and brought on numerous challenges, such as less social contact, emergency remote learning, learning in split classes to reduce infection rates and so forth. Consequently, students perceived the COVID-19 pandemic as stressful, even after returning to school (e.g., Ravens-Sieberer et al., 2021; Schwartz et al., 2021; Wang et al., 2021). With respect to the three key student outcomes, studies have revealed that during COVID-19, students of all ages felt less well, were less engaged in learning activities, and experienced learning losses (e.g., Cowie & Myers, 2021; Ludewig et al., 2022; Patrinos et al., 2022; Spiteri et al., 2022). Due to these significant impacts, it is necessary to investigate which resources can be protective.

Important resources and their importance for central student outcomes

Resources and their role for stress resistance and coping are central to a variety of theories. Arguably most influential is the transactional stress model by Lazarus and Folkman (1984), which proposes that, in a situation appraised as harmful, threatening or challenging, a person's resources determine the ensuing stress and in turn coping. Similarly, conservation of resources theory (e.g. Hobfoll, 1989) posits a direct relation between resources and stress, with a stronger focus on the retention and loss of resources. In addition to their relevance for stress, resources play also an important role for student outcomes such as subjective well-being or other individual goals, as theorized by Diener and Fujita (1995). As such, a broad definition of resources as either "centrally valued in their own right [...] or act[ing] as a means to obtain centrally valued ends" is appropriate (Hobfoll, 2002, p. 307). However, most theories propose a further differentiation into material, personal and social resources (e.g., Diener & Fujita, 1995; Lazarus & Folkman, 1984).

One important personal resource is resilience, a core concept in positive psychology. The resilience construct is not clearly defined, as researchers have proposed various conceptualizations (e.g., Eshel et al., 2016). Nevertheless, most definitions center around adversity and positive adaptation as two core concepts, meaning that in the context of this study, resilience can be understood as helpful for successfully overcoming the consequences of the COVID-19 pandemic (e.g., Fletcher & Sarkar, 2013; Luthar et al., 2000). It is known that students' resilience is positively associated with well-being and achievement (e.g., Andreou et al., 2020; Sattler & Gershoff, 2019). Besides resilience, there are additional key factors that can also be decisive for perseverance in extraordinary situations. One further vital personal resource is self-efficacy, which can be understood as belief in one's own abilities (Bandura, 2006). Thus, students' self-efficacy is positively related to achievement (e.g., Olivier et al., 2019; Zysberg & Schwabsky, 2021), but also to well-being (e.g., Ma et al., 2015; Weber et al., 2013).

Alongside personal resources, the environment or more concrete social factors such as social support are highly relevant (e.g., Ahmed et al., 2010; Chu et al., 2010; Lazarus & Folkman, 1984; Saltzman et al., 2020; Siedlecki et al., 2014). Social support means that relationships with important others satisfy one's psychological needs, such as safety and social relatedness, whose importance for well-being and achievement is emphasized in relationships motivation theory, one of six mini-theories within self-determination theory (e.g., Ryan & Deci, 2000). Consequently, prior research indicates that support from family, friends, teachers, and important others is positively associated with students' well-being and achievement (e.g., Chu et al., 2010; Kiuru et al., 2020; Liu et al., 2016; Schwerter et al., 2023). Students' self-efficacy as well as social support are pivotal resources or protective factors that are closely related to resilience (e.g., Harms et al., 2018).

Zooming in on the COVID-19 situation, only a few studies have investigated the importance of various resources for different student outcomes. Nevertheless, these studies have underscored the importance of resilience (e.g., Sood & Sharma, 2020; Zhu et al., 2022), self-efficacy (e.g., Pellerin & Raufaste, 2020) and social support (e.g., Rodriguez-Rivas et al., 2022; Zhu et al., 2022) for different student outcomes such as well-being, learning and achievement. In addition to their relations with crucial student outcomes, it is also conceivable that these resources may be associated with students' evaluation or perception of the COVID-19 situation, since resources enable persons to overcome and evaluate adverse situations positively.

Purpose of the study and research questions

Students' well-being, learning activities, and learning success are vital outcomes closely related to learning as well as school success. The COVID-19 pandemic was a strenuous situation that was associated with various challenges and impacted these central student outcomes. Therefore, it is of high importance to investigate the relevance of several resources for different major student outcomes simultaneously and to analyze the role of the perception of the COVID-19 situation. Understanding these complex relations can help to better support students and maintain their well-being, learning activities, and learning success, not only in challenging times. Against this background, we addressed the following research questions (see Fig. 1):

1. How is the perception of the COVID-19 pandemic related to well-being, learning activities, and learning success in that period of time?

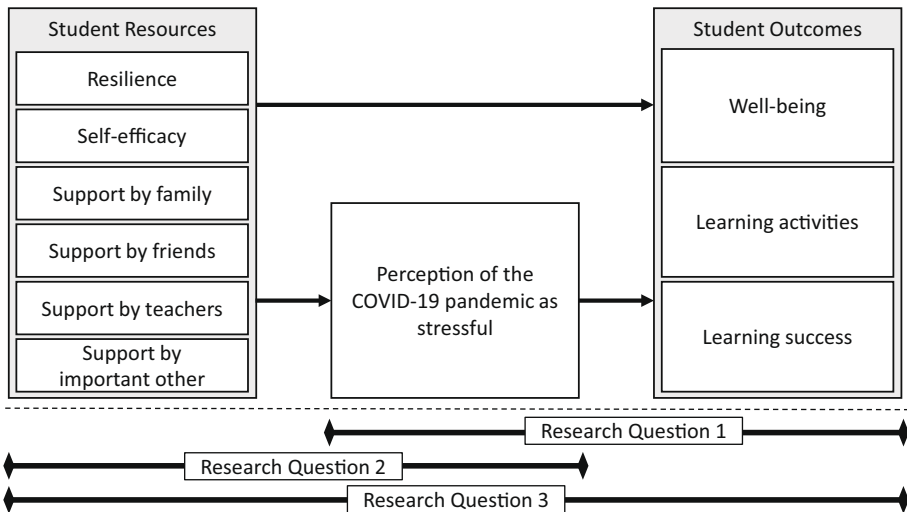


Fig. 1 Conceptual framework of the study: assumed relations between students' perceived resources, their perception of the COVID-19 pandemic and the self-reported student outcomes

We expected that perceiving the COVID-19 pandemic as stressful would be negatively related to well-being (1a), learning activities (1b), and learning success (1c).

2. To what extent are the perceived resources resilience, self-efficacy, and social support (family, friends, teachers, important other) associated with the perception of the COVID-19 pandemic?

We assumed that students' self-reported resilience (2a), self-efficacy (2b), and perceived social support (2c) would be negatively related to perceiving the COVID-19 pandemic as stressful.

3.
 - a. How are the resources self-reported resilience, self-efficacy, and social support (family, friends, teachers, important other) related to well-being, learning activities, and learning success?
 - b. Are the relations between resources and student outcomes mediated by perceiving the COVID-19 crisis as stressful?

We expected resources to be positively associated with the different student outcomes (3a). Furthermore, we assumed that perception of the COVID-19 pandemic would mediate the relations between the resource factors and the three student outcomes (3b).

Method

Participants and Procedure

Analyses are based on 220 students (60.9% female, 37.7% male, 1.4% diverse) in Grades 9 to 11 from seven classes in four secondary schools in North Rhine-Westphalia, Germany. The distribution of gender, immigrant background, and books at home dependent on grade level can be found in Supplement 1, Table A. Most students (76.4%) were enrolled in the two academic-track schools, others in a comprehensive school with senior grades (14.1%)

or middle-track school (9.5%). Students were 16.21 years old on average ($SD=0.88$). Based on speaking a language other than German at home (“I usually speak German at home and sometimes another language: _____.”, “I sometimes speak German at home and most of the time another language: _____.”, “I never speak German at home, but rather speak _____.”), 18.2% of the sample had an immigrant background which is comparable to national data of the micro-census 2021 with 17.5% of 15- to 18-year-olds reporting to speak another language than German at home most of the time (Statistisches Bundesamt, 2022). Students indicated the number of books at home as an indicator of cultural capital (Wendt et al., 2016), selecting from six answer possibilities (1 = none or very few [0–10 books] to 6 = enough to fill further shelves [over 500 books]). 46.4% reported having 100 or more books at home. This amount is similar in PISA 2015 data (48.5%; Davoli & Entorf, 2018).

Following a snowball recruitment approach, students were asked by contacted teachers to fill out the online questionnaire during a lesson as non-school personnel were not allowed to enter school buildings due to the COVID-19 pandemic. Participation took place online in May 2021 and required informed consent. Students participated voluntarily and answered questions regarding social demographics as well as the variables of interest. LimeSurvey was used to conduct the study, which was designed to take 20 min to complete. In May 2021, some schools were partly reopened, so that some students were receiving only remote instruction (55.0%), some remotely and at school (21.4%), and others only at school (23.6%). Due to the composition of the student sample as well as the school types, a multiple analysis of variance (MANOVA) was conducted to check for systematic differences in the variables of interest depending on students' gender (1 = male, 2 = female, 3 = diverse), grade in school (9 = Grade 9, 10 = Grade 10, 11 = Grade 11), school type (1 = middle-track school, 2 = comprehensive school, 3 = academic-track school), and type of instruction (1 = remote, 2 = remote/in school, 3 = in school). Only type of instruction showed significant differences ($F(20,366)=2.42$, $p<0.01$, partial $\eta^2=0.12$, Wilk's $\Lambda=0.780$). Table 1 displays the variation in the investigated variables by type of instruction. Hence, type of instruction served as a control variable in all analyses.

Measures

Learning- and school success-related student outcomes

Students answered questions regarding their well-being, learning activities during the COVID-19 pandemic, and learning success. Students' well-being was assessed with seven items from the German National Educational Panel Study (NEPS; Blossfeld et al., 2011) assessing life satisfaction as one important aspect of well-being. The items captured how satisfied students were with various aspects of life. Two example items were “How satisfied have you been during the current school semester with ...your life overall/...friends”. Students rated their agreement with the statements on a five-point Likert scale ranging from 1 = Not at all satisfied to 5 = Completely satisfied. The reliability of the scale was satisfactory ($\alpha=0.78$). To measure students' rating of their learning activities, a seven-item scale was administered. The items were self-constructed based on theoretical assumptions regarding self-regulated learning (Artelt et al., 2001) and the unique situation brought on by the COVID-19 pandemic and asked about the frequency with which the students engaged in different high-quality learning activities (internalizing, practicing and applying,

Table 1 Differences between students' being educated only remotely, remotely and at school, only at school

Measure	Remotely (<i>n</i> = 121)		Remotely/at school (<i>n</i> = 47)		At school (<i>n</i> = 52)		<i>F</i> (2,192)	η_p^2	Post hoc LSD
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Well-being ^a	3.26	0.71	3.23	0.70	3.70	0.62	5.62**	.06	1 < 3***
Learning activities ^a	2.69	0.52	2.77	0.62	2.84	0.62	5.23**	.05	1 < 3 [†]
Learning success ^a	2.33	1.10	2.40	0.83	2.90	1.09	6.25**	.06	1 < 3**, 2 < 3*
Resilience ^a	3.39	0.62	3.41	0.55	3.78	0.53	5.11**	.05	1 < 3***, 2 < 3**
Self-efficacy ^b	2.47	0.67	2.69	0.61	2.88	0.65	5.29**	.05	1 < 2 [†] , 1 < 3***
Support family ^a	3.60	1.12	3.74	1.11	3.79	1.10	0.40	.00	–
Support friends ^a	4.14	0.96	3.90	1.07	3.97	1.04	0.24	.00	–
Support teachers ^a	2.52	0.95	2.54	0.91	2.90	0.95	3.67*	.04	1 < 3**, 2 < 3*
Support other ^a	4.02	1.18	4.01	1.17	3.78	1.14	0.52	.01	–
Perception COVID-19 ^a	4.12	0.81	4.09	0.70	3.81	0.91	0.94	.01	–

^a 1 = *Not at all satisfied/Never/Learned much less/Do not agree at all* to 5 = *Completely satisfied/Always/Learned much more/Fully agree*, ^b 1 = *Does not apply at all* to 4 = *Fully applies*

[†] $p \leq .10$, * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

repeating, and visualizing lesson content, as well as engaging in conversations with other students, teachers, and parents) during the current school semester under COVID-19 pandemic conditions (e.g., “During the current school semester, how often did you do the following under COVID-19 pandemic conditions? Memorize or internalize learning content.”). Students rated how often they agreed with the items on a five-point Likert scale from 1 = *Never* to 5 = *Always*. The scale's reliability was sufficient ($\alpha = 0.68$). Students' perceived *learning success* was measured with one self-constructed question which captured perceived learning success during the current school semester compared to before the pandemic (“During the current school semester, how much did you learn overall under COVID-19 pandemic conditions? Compared to a school semester under normal teaching conditions, during the current school semester under pandemic conditions I have...”). Response options were 1 = *Learned much less* to 5 = *Learned much more*.

Perception of the COVID-19 pandemic

Students' *perception of the COVID-19 pandemic* was assessed with four items which captured whether students perceived the situation as stressful. Items were self-constructed given the novelty of the COVID-19 situation and encompassed multiple aspects of the situation students faced (e.g., “How stressful do you find the COVID-19 pandemic situation? I find the COVID-19 pandemic situation stressful in terms of ... a possible infection. / ... changes to school instruction.”). Items were answered on a five-point Likert scale from 1 = *Do not agree at all* to 5 = *Fully agree*. The scale's reliability was sufficient ($\alpha = 0.71$).

Students' resources

Resources were measured with six different scales covering two personal and four social resources. One personal resource was students' *resilience*, which was assessed with ten

items from Campbell-Sills and Stein (2007) based on the Connor-Davidson Resilience Scale (2003), which were adapted with respect to COVID-19 and the school context. Students' perception of their own resilience with respect to the challenging situation was assessed with items like "What was it like for you in the COVID-19 pandemic? How do the following statements apply to you in the current school semester? Even though there are obstacles, I believe I can achieve my goals. / When it comes to dealing with life challenges and general difficulties, I consider myself to be a strong person". Items were translated into German and adapted to the pandemic schooling situation. Students gave answers on a five-point Likert scale from 1 = *Never* to 5 = *Always*. Reliability was good ($\alpha=0.81$). Students' *self-efficacy*, as another personal resource, was assessed with four items covering self-efficacy with respect to the COVID-19 situation. Items from the original scale by Schwarzer and Jerusalem (1999) were adapted for this purpose. An example statement is "Please check what best applies to you during the current school semester under COVID-19 pandemic conditions. I also found it easy to understand new subject matter despite changes in learning conditions." Response options ranged from 1 = *Does not apply at all* to 4 = *Fully applies*. This scale's reliability was satisfactory ($\alpha=0.79$). *Social support* was considered as an external, social risk-mitigating factor. Four scales with three items each measured the qualitative-functional aspect of social support in terms of the perceived availability of emotional support (Schulz & Schwarzer, 2003) from family, friends, teachers, or another important person. Items from the Multidimensional Scale of Perceived Social Support (Zimet et al., 1988) were adapted and formulated similarly with respect to each group. Example items were "With respect to the current school semester under COVID-19 conditions, how much do you agree with the following statements? My family really tries to help me. / I can talk to my friends about my problems. / I can talk to my teachers about my problems. / There is a special person with whom I can share my joys and sorrows." Answers were given on a five-point Likert scale from 1 = *Do not agree at all* to 5 = *Fully agree*. Reliabilities were all good ($\alpha_{\text{Family}}=0.83$, $\alpha_{\text{Friends}}=0.91$, $\alpha_{\text{Teachers}}=0.85$, $\alpha_{\text{Other}}=0.90$).

Data analysis

SPSS 28 was used to calculate descriptive statistics and correlations. To answer the research questions, path models were specified in *Mplus* 8.1 (Muthén & Muthén, 1998–2017). Goodness of fit was evaluated with the comparative fit index (CFI), root mean square error of approximation (RMSEA), and χ^2 (Hu & Bentler, 1999; Kenny et al., 2015). Due to the small sample size, all constructs were modeled manifest. Moreover, due to small number of clusters, it was not possible to consider the hierarchical data structure. Nevertheless, ICCs were all ≤ 0.07 . Bias-corrected bootstrapping was used for significance testing of the effects in the mediation analysis (e.g., MacKinnon, 2008; MacKinnon et al., 2004). Following Zhao et al. (2010) as well as Rucker et al. (2011), we interpreted the results of the mediation analysis as mediation if the indirect effect was significant, regardless of whether the direct effect was also significant. Correlations between dependent as well as independent variables were permitted. There were no missing data as students had to answer each item to progress in the questionnaire.

Results

Descriptive statistics

On average, students experienced the COVID-19 pandemic as stressful (see Table 2; one sample *t*-test deviated statistically from the theoretical scale mean of 3.0: $t(219)=18.85$, $p\leq 0.001$), but on average also reported being resilient (one sample *t*-test deviated statistically from the theoretical scale mean of 3.0: $t(219)=11.76$, $p\leq 0.001$). Furthermore, students' well-being was positively related to their learning activities, indicating that when well-being was rated as higher, students reported more frequently engaging in learning activities. The correlations can be classified as small (Cohen, 1988). Moreover, the more learning activities students engaged in, the higher they rated their learning success. This correlation was moderate. Furthermore, resilience positively related to self-efficacy on a medium level (Cohen, 1988).

Relations of perception of the COVID-19 pandemic and learning- and school success-related outcomes

The relations between perception of the COVID-19 pandemic and students' well-being, learning activities, and learning success are displayed in Table 3, Model 1. The model was saturated; thus, fit indices could not be calculated. The path model revealed that perceiving the COVID-19 pandemic as stressful was statistically significantly negatively related to students' well-being, indicating that when students perceived the COVID-19 pandemic as stressful, they had lower life satisfaction. However, perception of the COVID-19 situation was not statistically significantly associated with learning activities or with learning success. The level of explained variance was small for well-being (Cohen, 1988). The data supported Hypothesis 1a, but not 1b or 1c.

Association between resources and perception of the COVID-19 pandemic

Table 3, Model 2 displays the relations between different resources and perception of the COVID-19 pandemic. The model fit was satisfactory ($\chi^2=11.56$, $df=4$, $p\leq 0.05$, CFI=0.98, RMSEA=0.10). The path model revealed that students' self-efficacy was statistically significantly negatively associated with perception of the COVID-19 pandemic, indicating that the higher students' self-efficacy, the less stressful they perceived the COVID-19 pandemic to be. Moreover, support from an important other person was statistically significantly positively related to perception of the COVID-19 pandemic, meaning that being supported by an important other person was associated with perceiving the COVID-19 pandemic as more stressful. The level of explained variance for perception of the COVID-19 pandemic was small (Cohen, 1988). The data supported only Hypothesis 2b, but due to the unexpected direction of the relation or statistical insignificance, not Hypotheses 2a or 2c.

Direct and indirect relations between resources and learning- and school success-related outcomes

To test whether perception of the COVID-19 pandemic served as a mediator of the relations between resources and student outcomes, a path model was specified. The model fit was satisfactory (see Fig. 2). The resources resilience, self-efficacy, and support from

Table 2 Descriptive statistics and intercorrelations

Variable	M	SD	2	3	4	5	6	7	8	9	10	11	12
1. Well-being ^a	3.34	0.71	.14*	.13	.47**	.42**	.40**	.15*	.27**	.02	-.29**	-.22**	-.01
2. Learning activities ^a	2.74	0.57	—	.39**	.01	.37**	.18**	.15*	.27**	.20**	.09	.22**	-.01
3. Learning success ^a	2.48	1.07	—	—	.04	.37**	.05	.03	.11	.00	-.03	.15*	.03
4. Resilience ^a	3.48	0.61	—	—	—	.36**	.28**	.12	.26**	-.03	-.13	-.26**	.06
5. Self-efficacy ^b	2.61	0.67	—	—	—	—	.25**	.06	.35**	.06	-.22**	-.14*	-.02
6. Support family ^a	3.67	1.12	—	—	—	—	—	.26**	.37**	.24**	.11	-.13*	-.00
7. Support friends ^a	4.05	1.01	—	—	—	—	—	—	.18**	.54**	.23**	.17*	-.09
8. Support teachers ^a	2.62	0.95	—	—	—	—	—	—	—	.20**	-.05	-.11	-.02
9. Support other ^a	3.96	1.17	—	—	—	—	—	—	—	—	.31**	.16*	-.02
10. Perception COVID-19 ^a	4.04	0.82	—	—	—	—	—	—	—	—	—	.26**	-.03
11. Gender ^c	—	—	—	—	—	—	—	—	—	—	—	—	.03
12. Age	16.21	0.88	—	—	—	—	—	—	—	—	—	—	—

^a 1 = Not at all satisfied/Never/Learned much less/Do not agree at all to 5 = Completely satisfied/Always/Learned much more/Fully agree, ^b 1 = Does not apply at all to 4 = Fully applies, ^c 1 = Male, 2 = Female, 3 = Diverse

* $p \leq .05$, ** $p \leq .01$

Table 3 Results of path models predicting life satisfaction, learning activities, and learning success (Model 1) and stress experience (Model 2)

Variable	Model 1						Model 2		
	Well-being		Learning activities		Learning success		Perception COVID-19	SE	
	β	SE	β	SE	β	SE			
Perception COVID-19	-.27***	.07	.08	.08	.02	.08	Resilience	-.02	.07
Type of instruction	.21**	.07	.05	.08	.08	.08	Self-efficacy	-.22**	.07
							Support family	.08	.08
							Support friends	.10	.08
							Support teachers	-.10	.07
							Support other	.32***	.08
R^2		.14		.01		.01			.22

** $p \leq .01$, *** $p \leq .001$. Correlations between independent and/or dependent variables respectively ($p \leq .05$): Model 1: Learning activities – Learning success $\Phi = .37$; Model 2: Resilience – Self-efficacy: $\Phi = .36$, Resilience – Support family: $\Phi = .28$, Resilience – Support teachers: $\Phi = .26$, Self-efficacy – Support family: $\Phi = .27$, Self-efficacy – Support teachers: $\Phi = .33$, Support family – Support friends: $\Phi = .28$, Support family – Support teachers: $\Phi = .39$, Support family – Support other: $\Phi = .27$, Support friends – Support teachers: $\Phi = .17$, Support friends – Support other: $\Phi = .55$, Support other – Support teachers: $\Phi = .19$

family were statistically significantly positively related to students' well-being. That means that the higher students rated their resilience, self-efficacy and support from family, the higher they also evaluated their well-being. Furthermore, students' resilience was statistically significantly negatively associated and self-efficacy, support from teachers and an important other person statistically significantly positively associated with learning activities. The significant negative association between resilience and learning activities did not exist on the bivariate level. Additionally, only students' self-efficacy was statistically significantly positively related to learning success.

The relation between self-efficacy and well-being was partially mediated by perception of the COVID-19 pandemic (total indirect: $\beta = 0.07$, $SE = 0.03$, $p \leq 0.01$, [0.02, 0.12]). Self-efficacy was negatively associated with perceiving the COVID-19 pandemic as stressful, while perception of the COVID-19 pandemic was negatively related to well-being. The direct relation remained significant ($\beta = 0.13$, $SE = 0.06$, $p \leq 0.05$, [0.02, 0.25]). Moreover, the association between support from an important other person and well-being was mediated by perception of the COVID-19 pandemic (total indirect: $\beta = -0.10$, $SE = 0.03$, $p \leq 0.01$, [-0.17, -0.04]). Support from an important other person was statistically significantly positively related to perception of the COVID-19 pandemic, while perception of the COVID-19 pandemic was statistically significantly negatively associated with well-being (see Fig. 2). Nevertheless, there was no direct relation between support from an important other and well-being ($\beta = 0.07$, $SE = 0.07$, $p \geq 0.05$, [-0.08, 0.21]). The level of explained variance was small for perception of the COVID-19 pandemic, learning activities, and learning success, but large for well-being (Cohen, 1988). The data partially supported Hypothesis 3a, as not all relations reached statistical significance, and one was negative. Hypothesis 3b was also partially supported, as perception of the COVID-19 pandemic mediated only two relations.

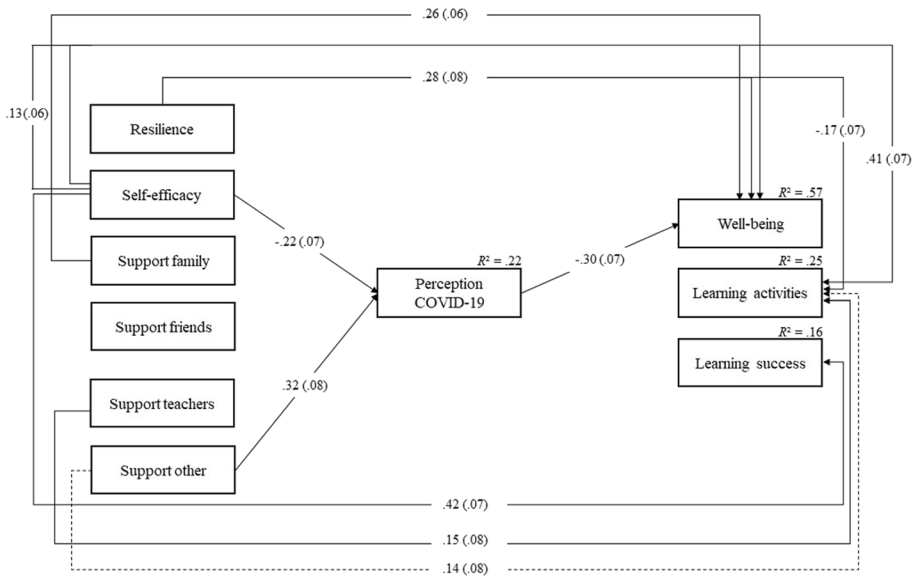


Fig. 2 Direct and indirect relations between resources and life satisfaction, learning activities, and learning success. *Notes.* Only significant paths are depicted. The control variable type of instruction is not depicted for simplicity’s sake. Dotted line means $p \leq .10$. Model fit: $\chi^2 = 11.56$, $df = 4$, $p < .05$, CFI = 0.98, RMSEA = .10. Correlations between independent and dependent variables respectively ($p \leq .05$): Resilience – Self-efficacy: $\Phi = .36$, Resilience – Support family: $\Phi = .28$, Resilience – Support teachers: $\Phi = .26$, Self-efficacy – Support family: $\Phi = .27$, Self-efficacy – Support teachers: $\Phi = .33$, Support family – Support friends: $\Phi = .28$, Support family – Support teachers: $\Phi = .39$, Support family – Support other: $\Phi = .27$, Support friends – Support teacher: $\Phi = .17$, Support friends – Support other: $\Phi = .55$, Support other – Support teachers: $\Phi = .19$; Learning activities – Learning success $\Phi = .26$

Discussion

Due to the relevance of different resources for major learning- and school success-related student characteristics, especially during times of crisis, the aim of this study was to analyze what role certain resources played for students’ well-being, learning activities, and learning success. Furthermore, we sought to examine how students perceived the COVID-19 pandemic and whether this was a potential mediator.

Students generally perceived the COVID-19 pandemic as stressful, although substantial variance existed. Perceived stress was statistically significantly related to well-being, but not to learning activities or learning success – contrary to prior research, which found that the pandemic conditions also affected learning and achievement (e.g., Hammerstein et al., 2021; Spiteri et al., 2022). One reason might be that both how one perceives the current situation and well-being are two very subjective construct whose perception is likely affect-driven, such that a relation between these two variables is more likely than between perception of the situation and the more objective measures of learning activities and learning success. This result underscores that young people’s perception of the COVID-19 pandemic was relevant for their well-being.

Zooming in on central resources, only one personal factor was statistically significantly related to students’ perception of the COVID-19 pandemic. Perceiving oneself as self-efficacious seemed to help students handle and cope with the situation, suggesting that this

was an important resource. This result confirms theoretical assumptions that it is good to perceive oneself as efficacious and have the confidence to master even difficult situations (e.g., Bandura, 2006), but systematically extends them by focusing on extraordinary times. Furthermore, only one of the four social resource factors considered was statistically significantly related to students' perception of the COVID-19 situation. Being supported by an important other person was associated with experiencing the pandemic as more stressful. Unfortunately, we do not know who the important person was, but depending on the nature of the relationship, it could be that this person not only gave support to, but also sought out support from the student. Moreover, the important other person might have also complained and talked about the situation, resulting in an additional stressor and leading students to perceive the situation as more stressful. When a negative event occurs, humans have a strong need to think and talk about it as they search for meaning (e.g., Pennebaker, 2000). If the situation is traumatic, such communication helps the person who is talking about it, but not the person being talked to. In the latter person, it can lead to negative affect and thus perhaps to perceiving the COVID-19 situation as more stressful. Furthermore, according to conservation of resources theory, social support can have a negative impact if it is not aligned with situational needs (e.g., Hobfoll, 1989). Another interpretation could be that during COVID-19, social contact was strongly restricted. Thus, receiving support from an important other person (maybe only) in digital form could increase the salience of the desire to see the person in real life as well, which was difficult, and in turn lead students to perceive the situation as more stressful. Unfortunately, it is unclear whether the reported support was given digitally or in person.

Personal as well as social resources were directly related to various student outcomes, which is in line with prior literature (e.g., Andreou et al., 2020; Kiuru et al., 2020; Olivier et al., 2019), but extends the current body of literature by focusing on other cultural and age groups as well as on these relations during demanding times. Students' resilience was positively related to their well-being, indicating that the more resilient students were on average, the more satisfied with their lives they were (e.g., Sood & Sharma, 2020; Zhu et al., 2022). The negative relation between resilience and learning activities might be a suppression effect, as no significant bivariate correlation existed. Moreover, the other personal variable, self-efficacy, was beneficial for all three student outcomes, underscoring the importance of students' self-efficacy for different learning- and school success-related student outcomes (e.g., Bandura, 2006; Pellerin & Raufaste, 2020). If one feels self-efficacious, one might also feel able to cope with stressors such as the COVID-19 pandemic and thus feel more satisfied with one's life, apply self-regulated learning in challenging times, and perceive higher learning success. Turning to social resilience factors, only support from family was significantly related to well-being (e.g., Rodriguez-Rivas et al., 2022). This result underscores the importance of a good social network. In contrast, support from teachers as well as important other was only related to students' learning activities. Thus, support from teachers and an important other led students to engage in more learning activities. Furthermore, perception of the COVID-19 pandemic mediated two relations. Self-efficacious students perceived the COVID-19 situation as less stressful on average, and were in turn more satisfied with their lives. However, students who felt supported by an important other perceived the COVID-19 pandemic as more stressful, and were in turn less satisfied with life. As explained above, support from an important other could be a double-edged sword: beneficial with respect to increasing learning activities and success, but less beneficial if it also highlights the demanding situation or the desire for more social contact. Nevertheless, in the complex model, there was no significant direct link between support from an important other and well-being. This also holds true for the bivariate relation.

Limitations and future directions

Several points need to be considered when interpreting the results. The sample size was relatively small and lower than the a priori determined sample size of $N=490$ students suggested to achieve strong statistical power; thus it was not possible to take the hierarchical structure of the data into account, nor to model constructs latently. Furthermore, the statistical power might be insufficient to reveal possible additional smaller effects. Moreover, due to the cross-sectional and non-experimental design, no causal inferences can be drawn. Additionally, we do not know how resources as well as perception of the COVID-19 pandemic might be related to other facets of well-being (e.g., Diener et al., 1999), such as social or physical aspects. Alongside these limitations, this study has also important strengths. One is the focus on students' resources such as resilience, which is highly topical in educational psychology and empirical educational research in general, but also and in particular with respect to challenging times such as the COVID-19 pandemic. Furthermore, several important resource factors as well as various vital learning- and school success-related student outcomes were analyzed simultaneously, allowing us to investigate complex assumptions. Thus, the study provided substantial, holistic insights into students' resources and perception of a challenging situation and their relations with central student outcomes.

The results and limitations of this study have several implications for research and practice. As students' well-being is a complex and multifaceted construct (e.g., Kanonire et al., 2020), it might be worthwhile to analyze how resilience factors as well as the perception of challenging periods are related to further well-being facets. The same holds true with respect to the myriad further resources that could be examined in future research, such as processual factors like (mal)adaptive coping strategies, like also seeing the positive side of the situation (e.g., Folkman & Lazarus, 1985; Folkman et al., 1986; Skinner et al., 2003). These factors might also be of particular interest in challenging times and explain variance in the investigated student outcomes, as they capture whether one is able to see different perspectives or positive aspects of a situation. Other factors besides resources which are related to crucial student outcomes could also be analyzed. One is instructional quality in remote teaching, as instructional quality is highly important for and related to students' learning success (e.g., Hattie, 2008; Lepper et al., 2022; Stang & McElvany, 2020). Furthermore, it could be valuable to test whether parents or teachers are able to judge students' resources like resilience and self-efficacy as well as learning- and school success-related outcomes accurately in order to be able to intervene in support of students' resilience, self-efficacy or learning activities where necessary. Prior research indicates that teacher judgments of students' achievement are more accurate than their judgments of other student characteristics (e.g., Stang & Urhahne, 2016; Urhahne & Wijnia, 2021). Alongside implications for research, the study's results also have practical implications. First and foremost, as students' self-efficacy was significantly related to all three vital student outcomes as well as to perception of the COVID-19 situation, it should be more strongly emphasized in educational contexts as well as at home. Furthermore, even though the study was conducted in 2021 during COVID-19, it also has significance for the present and future educational practice as COVID-19 still has long-lasting effects on students' achievement, well-being as well as psychological functioning (e.g., Di Pietro, 2023; Ravens-Sieberer et al., 2023). Thus, especially malleable student resources should be in focus of promotion such as, for example, their self-efficacy which is not only important in demanding times, as it is also generally highly relevant for students' success (e.g., Zysberg & Schwabsky, 2021). Interventions to support students' self-efficacy already exist (e.g., Unrau et al., 2018; Samuel & Warner,

2021) and could be adapted. Moreover, one could train students to reframe situations so that they may be seen as less stressful. In future times, if remote and/or hybrid teaching has to be implemented again, one should be aware that students need own resources and support to successfully overcome challenging times. Furthermore, families should be more sensitized to the decisive role they play in their children's life, especially with respect to their well-being, which is an educational goal in and of itself (e.g., OECD, 2017; Kanonire et al., 2020).

Conclusion

In summary, the present study has provided meaningful insights into the relations between the investigated perceived resources and learning- and school success-related outcomes as well as the role of perception of the COVID-19 pandemic within these relations. The study's results might help us to efficiently react to today's so-called VUCA world, characterized by volatility, uncertainty, complexity, and ambiguity. The OECD advocates for preparing humanity for living in this VUCA world (e.g., Laukkonen et al., 2019). Thus, personal resources such as resilience and self-efficacy, but also support from family and teachers seem to be beneficial for successfully coping with extraordinary situations such as the COVID-19 pandemic.

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Data availability Data are not available in a public repository due to the absence of consent from respondents to publish (some or all of) the analyzed data.

Declarations

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Conflict of interest The authors declare no competing interests.

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References

- Ahmed, W., Minnaert, A., van der Werft, G., & Kuyper, H. (2010). Perceived social support and early adolescents' achievement: The mediational roles of motivational beliefs and emotions. *Journal of Youth and Adolescents*, 39, 36–46. <https://doi.org/10.1007/s10964-008-9367-7>

- Andreou, E., Roussi-Vergou, C., Didaskalou, E., & Skrzypiec, G. (2020). School bullying, subjective well-being, and resilience. *Psychology in the Schools*, *57*(8), 1193–1207. <https://doi.org/10.1002/pits.22409>
- Artelt, C., Demmrich, A., & Baumert, J. (2001). Selbstreguliertes Lernen. In Deutsches PISA-Konsortium (Eds.), *PISA 2000. Basiskompetenzen von Schülerinnen und Schülern im internationalen Vergleich [PISA 2000.: Basic Competencies of Students in International Comparison]* (pp. 271–298). Leske + Budrich. https://doi.org/10.1007/978-3-322-83412-6_8
- Avvisati, F., & Givord, P. (2021). *How much do 15-year-olds learn over one year of schooling? An international comparison based on PISA* (OECD Education Working Papers No. 257). OECD Publishing. <https://doi.org/10.1787/a28ed097-en>
- Bandura, A. (2006). Adolescent development from an agentic perspective. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 1–43). Information Age Publishing.
- Bloom, H. S., Hill, C. J., Black, A. R., & Lipsey, M. W. (2008). Performance trajectories and performance gaps as achievement effect-size benchmarks for educational interventions. *Journal of Research on Educational Effectiveness*, *1*(4), 289–328. <https://doi.org/10.1080/19345740802400072>
- Blossfeld, H.-P., Roßbach, H.-G., & Von Maurice, J. (Eds.) (2011). Education as a lifelong process – the German National Educational Panel Study (NEPS). *Zeitschrift für Erziehungswissenschaft [Journal of Educational Science]*, *14*, 1–4. <https://doi.org/10.1007/s11618-011-0198-z>
- Bradburn, N. M. (1969). *The structure of psychological well-being*. Aldine.
- Campbell-Sills, L., & Stein, M. B. (2007). Psychometric analysis and refinement of the Connor–Davidson resilience scale (CD-RISC): Validation of a 10-item measure of resilience. *Journal of Traumatic Stress*, *20*(6), 1016–1028. <https://doi.org/10.1002/jts.20271>
- Chu, P. S., Saucier, D. A., & Hafner, E. (2010). Meta-Analysis of the relationships between social support and well-being in children and adolescents. *Journal of Social and Clinical Psychology*, *29*(6), 624–645. <https://doi.org/10.1521/jscp.2010.29.6.624>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). L. Erlbaum Associates.
- Connor, K. M., & Davidson, J. R. T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, *18*(2), 76–82. <https://doi.org/10.1002/da.10113>
- Conole, G. (2007). Describing learning activities: Tools and resources to guide practice. In E. Beetham & R. Sharpe (Eds.), *Rethinking pedagogy for a digital age: Designing and delivering e-learning* (pp. 81–91). Routledge.
- Cowie, H., & Myers, C. A. (2021). The impact of the COVID-19 pandemic on the mental health and well-being of children and young people. *Children & Society*, *35*(1), 62–74. <https://doi.org/10.1111/chso.12430>
- Davoli, M., & Entorf, H. (2018). *The PISA shock, socioeconomic inequality, and school reforms in Germany. IZA policy paper no. 140*. IZA – Institute of Labor Economics.
- Diener, E., & Fujita, F. (1995). Recourses, personal strivings, and subjective well-being: A nomothetic and idiographic approach. *Journal of Personality and Social Psychology*, *68*(5), 926–935. <https://doi.org/10.1037/0022-3514.68.5.926>
- Diener, E., Oishi, S., & Tay, L. (2018). Advances in subjective well-being research. *Nature Human Behaviour*, *2*(4), 253–260. <https://doi.org/10.1038/s41562-018-0307-6>
- Diener, E., Suh, E. M., Lucas, R. R., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, *125*(2), 276–302. <https://doi.org/10.1037/0033-2909.125.2.276>
- Diener, E., Inglehart, R., & Tay, L. (2013). Theory and validity of life satisfaction scales. *Social Indicators Research*, *112*(3), 497–527. <https://doi.org/10.1007/s11205-012-0076-y>
- Di Pietro, G. (2023). The impact of Covid-19 on student achievement: Evidence from a recent meta-analysis. *Educational Research Review*, Article 100530. <https://doi.org/10.1016/j.edurev.2023.100530>
- Eshel, Y., Kimhi, S., & Goroshier, M. (2016). Post-traumatic recovery to distress symptoms ratio mediates relations of resilience fostering resources and their predictors. *Stress and Health*, *32*, 216–223. <https://doi.org/10.1002/smi.2594>
- Fletcher, D., & Sarkar, M. (2013). Psychological Resilience: A review and critique of definitions, concepts, and theory. *European Psychologist*, *18*(1), 12–23. <https://doi.org/10.1027/1016-9040/a000124>
- Folkman, S., & Lazarus, R. S. (1985). If it changes it must be a process: Study of emotion and coping during three stages of a college examination. *Journal of Personality and Social Psychology*, *48*(1), 150–170. <https://doi.org/10.1037//0022-3514.48.1.150>
- Folkman, S., Lazarus, R. S., Dunkel-Schetter, C., DeLongis, A., & Gruen, R. J. (1986). Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *Journal of Personality and Social Psychology*, *50*(5), 992–1003.
- Fung, F., Tan, C. Y., & Chen, G. (2018). Student engagement and mathematics achievement: Unraveling main and interactive effects. *Psychology in the Schools*, *55*(7), 815–831. <https://doi.org/10.1002/pits.22139>

- Hammerstein, S., König, C., Dreisörner, T., & Frey, A. (2021). Effects of COVID-19 related school closures on student achievement – A systematic review. *Frontiers in Psychology, 12*, Article 746289. <https://doi.org/10.3389/fpsyg.2021.746289>
- Harms, P. D., Brady, L., Wood, D., & Silard, A. (2018). Resilience and well-being. In E. Diener, S. Oishi, & L. Tay (Eds.), *Handbook of well-being* (pp. 1–12). DEF Publishers.
- Hattie, J. (2008). *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. Routledge.
- Havighurst, R. J. (1953). *Human development and education*. Longmans & Green.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513–524. <https://doi.org/10.1037/0003-066X.44.3.513>
- Hobfoll, S. E. (2002). Social and psychological resources and adaptation. *Review of General Psychology, 6*(4), 307–324. <https://doi.org/10.1037/1089-2680.6.4.307>
- Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- Kanonire, T., Federiakin, D. A., & Uglanova, I. L. (2020). Multicomponent framework for students' subjective well-being in elementary school. *School Psychology, 35*, 321–331. <https://doi.org/10.1037/spq0000397>
- Karademas, E. C. (2006). Self-efficacy, social support and well-being: The mediating role of optimism. *Personality and Individual Differences, 40*(6), 1281–1290. <https://doi.org/10.1016/j.paid.2005.10.019>
- Kaya, M., & Erdem, C. (2021). Students' well-being and academic achievement: A meta-analysis study. *Child Indicators Research, 14*(5), 1743–1767. <https://doi.org/10.1007/s12187-021-09821-4>
- Kenny, D. A., Kaniskan, B., & McCoach, D. B. (2015). The performance of RMSEA in models with small degrees of freedom. *Sociological Methods & Research, 44*(3), 486–507. <https://doi.org/10.1177/0049124114543236>
- Kiuru, N., Wang, M. T., Salmela-Aro, K., Kannas, L., Ahonen, T., & Hirvonen, R. (2020). Associations between adolescents' interpersonal relationships, school well-being, and academic achievement during educational transitions. *Journal of Youth and Adolescence, 49*(5), 1057–1072. <https://doi.org/10.1007/s10964-019-01184-y>
- Kleinkorres, R., Stang, J., & McElvany, N. (2020). A longitudinal analysis of reciprocal relations between students' well-being and academic achievement. *Journal for Educational Research Online, 12*(2), 114–165. <https://doi.org/10.25656/01:20975>
- Kleinkorres, R., Stang-Rabrig, J., & McElvany, N. (2023). Comparing parental and school pressure in terms of their relations with students' well-being. *Learning and Individual Differences, 104*, Article 102288. <https://doi.org/10.1016/j.lindif.2023.102288>
- Laukkonen, R. E., Biddell, H., & Gallagher, R. (2019). *Preparing humanity for change and artificial intelligence: Learning to learn as a safeguard against volatility, uncertainty, complexity, and ambiguity*. OECD Publishing.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.
- Lepper, C., Stang, J., & McElvany, N. (2022). Bedeutung der wahrgenommenen Motivierungsqualität für intrinsische Motivation und Selbstkonzept von Grundschulkindern. *Unterrichtswissenschaft, 50*(1), 125–147. <https://doi.org/10.1007/s42010-021-00121-y>
- Liu, W., Mei, J., Tian, L., & Huebner, E. S. (2016). Age and gender differences in the relation between school-related social support and subjective well-being in school among students. *Social Indicators Research, 125*(3), 1065–1083. <https://doi.org/10.1007/s11205-015-0873-1>
- Ludewig, U., Kleinkorres, R., Schaufelberger, R., Schlitter, T., Lorenz, R., König, C., Frey, A., & McElvany, N. (2022). COVID-19 Pandemic and Student Reading Achievement: Findings from a School Panel Study. *Frontiers in Psychology*. Article 876485. <https://doi.org/10.3389/fpsyg.2022.876485>
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71*(3), 543–562.
- Ma, Z.-W., Zeng, W.-N., & Ye, K.-Y. (2015). Gender differences in Chinese adolescents' subjective well-being: The mediating role of self-efficacy. *Psychological Reports: Sociocultural Issues in Psychology, 116*(1), 311–321. <https://doi.org/10.2466/17.07.PR0.116k15w2>
- MacKinnon, D. P. (2008). *Introduction to statistical mediation analysis*. Erlbaum.
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*, 99–128. https://doi.org/10.1207/s15327906mbr3901_4
- Magson, N. R., Freeman, J. Y. A., Rapee, R. M., Richardson, C. E., Oar, E. L., & Fardouly, J. (2021). Risk and protective factors for prospective changes in adolescent mental health during the COVID-19 pandemic. *Journal of Youth and Adolescence, 50*, 44–57. <https://doi.org/10.1007/s10964-020-01332-9>

- Muthén, L. K., & Muthén, B. O. (1998–2017). *Mplus – Statistical Analysis with latent Variables. User's Guide* (8th ed.). Muthén & Muthén.
- Olivier, E., Archambault, I., De Clercq, M., & Galand, B. (2019). Student self-efficacy, classroom engagement, and academic achievement: Comparing three theoretical frameworks. *Journal of Youth and Adolescence*, *48*(2), 326–340.
- Organisation for Economic Cooperation Development [OECD]. (2015). *PISA 2015. Results (Volume III): Students' Well-Being*. OECD Publishing.
- Patrinos, H. A., Vegas, E., & Carter-Rau, R. (2022). *An Analysis of COVID-19 Student Learning Loss*. Retrieved May 12, 2022, from <http://hdl.handle.net/10986/37400>
- Pellerin, N., & Raufaste, E. (2020). Psychological resources protect well-being during the COVID-19 pandemic: A longitudinal study during the French lockdown. *Frontiers in Psychology*, *11*, Article 3200. <https://doi.org/10.3389/fpsyg.2020.590276>
- Pennebaker, J. W. (2000). Telling stories: The health benefits of narrative. *Literature and Medicine*, *19*(1), 3–18. <https://doi.org/10.1353/lm.2000.0011>
- Ravens-Sieberer, U., Kaman, A., Erhart, M., Devine, J., Schlack, R., & Otto, C. (2021). Impact of the COVID-19 pandemic on quality of life and mental health in children and adolescents in Germany. *European Child & Adolescent Psychiatry*, 1–11. <https://doi.org/10.1007/s00787-021-01726-5>
- Ravens-Sieberer, U., Devine, J., Napp, A. K., Kaman, A., Saftig, L., Gilbert, M., Reiß, F., Löffler, C., Simon, A. M., Hurrelmann, K., Walper, S., Schlack, R., Hölling, H., Wieler, L. H., & Erhart, M. (2023). Three years into the pandemic: results of the longitudinal german COPSY study on youth mental health and health-related quality of life. *Frontiers in Public Health*, *11*, Article 1129073.
- Rodriguez-Rivas, M. E., Varela, J. J., & Chuecas, C. G. M. J. (2022). The role of family support and conflict in cyberbullying and subjective well-being among Chilean adolescents during the Covid-19 period. *Heliyon*, e09243. <https://doi.org/10.1016/j.heliyon.2022.e09243>
- Rucker, D. D., Preacher, K. J., Tormala, Z. L., & Petty, R. E. (2011). Mediation analysis in social psychology: Current practices and new recommendations. *Social and Personality Psychology Compass*, *5*(6), 359–371. <https://doi.org/10.1111/j.1751-9004.2011.00355.x>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68–78.
- Saltzman, L. Y., Hansel, T. C., & Bordnick, P. S. (2020). Loneliness, isolation, and social support factors in post-COVID-19 mental health. *Psychological Trauma: Theory, Research, Practice, and Policy*, *12*(S1), 55–57. <https://doi.org/10.1037/tra0000703>
- Samuel, T. S., & Warner, J. (2021). “I can math!”: Reducing math anxiety and increasing math self-efficacy using a mindfulness and growth mindset-based intervention in first-year students. *Community College Journal of Research and Practice*, *45*(3), 205–222. <https://doi.org/10.1080/10668926.2019.1666063>
- Sattler, K., & Gershoff, E. (2019). Thresholds of resilience and within- and cross-domain academic achievement among children in poverty. *Early Childhood Research Quarterly*, *46*, 87–96. <https://doi.org/10.1016/j.ecresq.2018.04.003>
- Schnitzler, K., Holzberger, D., & Seidel, T. (2021). All better than being disengaged: Student engagement patterns and their relations to academic self-concept and achievement. *European Journal of Psychology and Education*, *36*, 627–652. <https://doi.org/10.1007/s10212-020-00500-6>
- Schulz, U., & Schwarzer, R. (2003). Soziale Unterstützung bei der Krankheitsbewältigung: Die Berliner Social Support Skalen (BSSS). *Diagnostica*, *49*(2), 73–82. <https://doi.org/10.1026/0012-1924.49.2.73>
- Schwartz, K. D., Exner-Cortens, D., McMorris, C. A., Makarenko, E., Arnold, P., Van Bavel, M., ..., & Canfield, R. (2021). COVID-19 and student well-being: Stress and mental health during return-to-school. *Canadian Journal of School Psychology*, *36*(2), 166–185. <https://doi.org/10.1177/08295735211001653>
- Schwarzer, R., & Jerusalem, M. (1999). *Skalen zur Erfassung von Lehrer- und Schülermerkmalen. Dokumentation der psychometrischen Verfahren im Rahmen der Wissenschaftlichen Begleitung des Modellversuchs Selbstwirksame Schulen [Scales for the assessment of teacher and student characteristics. Documentation of the psychometric procedures within the framework of the scientific monitoring of the pilot project Self-Efficacious Schools]*. Retrieved March 18, 2021, from <https://www.psync.de/skalendoku.pdf>
- Schwerter, J., Stang-Rabrig, J., Kleinkorres, R., Bleher, J., Doebler, P., & McElvany, N. (2023). *Importance of students' social resources for their academic achievement and well-being in elementary school* [Manuscript submitted for publication]. Center for Research on Education and School Development (IFS), TU Dortmund University.

- Siedlecki, K. L., Salthouse, T. A., Oishi, S., & Jeswani, S. (2014). The relationship between social support and subjective well-being across age. *Social Indicators Research*, *117*(2), 561–576. <https://doi.org/10.1007/s11205-013-0361-4>
- Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin*, *129*(2), 216–269. <https://doi.org/10.1037/0033-2909.129.2.216>
- Sood, S., & Sharma, A. (2020). Resilience and psychological well-being of higher education students during COVID-19: The mediating role of perceived distress. *Journal of Health Management*, *22*(4), 606–617. <https://doi.org/10.1177/0972063420983111>
- Spiteri, J., Deguara, J., Muscat, T., Bonello, C., Farrugia, R., Milton, J., ..., & Said, L. (2022). The impact of COVID-19 on children's learning: A rapid review. *Educational and Developmental Psychologist*, 1–13. <https://doi.org/10.1080/20590776.2021.2024759>
- Stang, J., & McElvany, N. (2020). Unterschiede in der Wahrnehmung der Qualität des Deutschunterrichts zwischen Grundschülerinnen und Grundschulern. *Zeitschrift Für Pädagogische Psychologie*, *35*, 261–273. <https://doi.org/10.1024/1010-0652/a000275>
- Stang, J., & Urhahne, D. (2016). Wie gut schätzen Lehrkräfte Leistung, Konzentration, Arbeits- und Sozialverhalten ihrer Schülerinnen und Schüler ein? Ein Beitrag zur diagnostischen Kompetenz von Lehrkräften. *Psychologie in Erziehung und Unterricht*, *63*, 204–219. <https://doi.org/10.2378/peu2016.art18d>
- Statistisches Bundesamt (Destatis). (2022). *Bevölkerung und Erwerbstätigkeit. Bevölkerung mit Migrationshintergrund – Ergebnisse des Mikrozensus 2021 [Population and employment. Population with a migration background - results of the 2021 microcensus]*.
- Unrau, N. J., Rueda, R., Son, E., Polanin, J. R., Lundeen, R. J., & Muraszewski, A. K. (2018). Can reading self-efficacy be modified? A meta-analysis of the impact of interventions on reading self-efficacy. *Review of Educational Research*, *88*(2), 167–204. <https://doi.org/10.3102/0034654317743199>
- Urhahne, D., & Wijnia, L. (2021). A review on the accuracy of teacher judgments. *Educational Research Review*, *32*(1), 100374. <https://doi.org/10.1016/j.edurev.2020.100374>
- Wang, C., Wen, W., Zhang, H., Ni, J., Jiang, J., Cheng, Y., ..., & Liu, W. (2021). Anxiety, depression, and stress prevalence among college students during the COVID-19 pandemic: A systematic review and meta-analysis. *Journal of American College Health*, 1–8. <https://doi.org/10.1080/07448481.2021.1960849>
- Weber, M., Ruch, W., Littman-Ovadia, H., Lavy, S., & Gai, O. (2013). Relationships among higher-order strengths factors, subjective well-being, and general self-efficacy – The case of Israeli adolescents. *Personality and Individual Differences*, *55*, 322–327. <https://doi.org/10.1016/j.paid.2013.03.006>
- Wendt, H., Bos, W., Tarelli, I., Vaskova, A., & Walzebug, A. (2016). *IGLU/TIMSS 2011 – Skalenhandbuch zur Dokumentation der Erhebungsinstrumente und Arbeit mit den Datensätzen [IGLU/TIMSS 2011 - Scale manual for documenting the survey instruments and working with the data sets]*. Waxmann.
- World Health Organization [WHO]. (2014). *Basic documents: Forty-eighth edition*. World Health Organization.
- Yang, Q., Tian, L., Huebner, E. S., & Zhu, X. (2019). Relations among academic achievement, self-esteem, and subjective well-being in school among elementary school students: A longitudinal mediation model. *School Psychology*, *34*(3), 328–340. <https://doi.org/10.1037/spq0000292>
- York, T. T., Gibson, C., & Rankin, S. (2015). Defining and Measuring Academic Success. *Practical Assessment, Research & Evaluation*, *20*(5). Retrieved May 13, 2022, from <http://pareonline.net/getvn.asp?v=20&n=5>
- Zhao, X., Lynch, J. G., Jr., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, *37*(2), 197–206. <https://doi.org/10.1086/651257>
- Zhu, Q., Cheong, Y., Wang, C., & Sun, C. (2022). The roles of resilience, peer relationship, teacher–student relationship on student mental health difficulties during COVID-19. *School Psychology*, *37*(1), 62–74. <https://doi.org/10.1037/spq0000492>
- Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, *52*(1), 30–41. https://doi.org/10.1207/s15327752jpa5201_2
- Zysberg, L., & Schwabsky, N. (2021). School climate, academic self-efficacy and student achievement. *Educational Psychology*, *41*(4), 467–482. <https://doi.org/10.1080/01443410.2020.1813690>

Current themes of research

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Most relevant publications in the field of Psychology of Education

Justine Stang-Rabrig.

Kleinkorres, R., Stang, J., & McElvany, N. (2020). A longitudinal analysis of reciprocal relations between students' well-being and academic achievement. *Journal for Educational Research Online*, 12, 114–165. <https://doi.org/10.25656/01:20975>.

König, S., Stang-Rabrig, J., Hannover, B., Zander, L., & McElvany, N. (2023) Stereotype threat in learning situations? An investigation among language minority students. *European Journal of Psychology of Education*, 38, 841–864. <https://doi.org/10.1007/s10212-022-00618-9>.

Lepper, C., Stang, J., & McElvany, N. (2022). Gender differences in text-based interest: Text characteristics as underlying variables. *Reading Research Quarterly*, 57(2), 537–554. <https://doi.org/10.1002/rrq.420>.

Stang, J., König, S., & McElvany, N. (2021). Implizite Einstellungen von Kindern im Grundschulalter gegenüber Menschen mit Migrationshintergrund. *Zeitschrift für Pädagogische Psychologie*. Advance online publication. <https://doi.org/10.1024/1010-0652/a000320>.

Stang, J., & Urhahne, D. (2016). Stabilität, Bezugsnormorientierung und Auswirkungen von Lehrkrafturteilen. *Zeitschrift für Pädagogische Psychologie*, 30, 251–262. <https://doi.org/10.1024/1010-0652/a000190>.

Stang-Rabrig, J., Brüggemann, T., Lorenz, R., & McElvany, N. (2022). Teachers' occupational well-being during the COVID-19 pandemic: The role of resources and demands. *Teaching and Teacher Education*, 117, Article 103803. <https://doi.org/10.1016/j.tate.2022.103803>.

Sebastian Nicolas Thomas Vogel.

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

Marco Forciniti.

No publications to mention yet.

Nele McElvany.

- Becker, M., & McElvany, N. (2018). The interplay of gender and social background: a longitudinal study of interaction effects in reading attitudes and behaviour. *British Journal of Education Psychology*, 88(4), 529–549. <https://doi.org/10.1111/bjep.12199>.
- Kigel, R. M., McElvany, N., & Becker, M. (2015). Effects of immigrant background on text comprehension, vocabulary, and reading motivation: A longitudinal study. *Learning and Instruction*, 35, 73–84. <https://doi.org/10.1016/j.learninstruc.2014.10.001>.
- McElvany, N., Ferdinand, H. D., Gebauer, M. M., Bos, W., Huelmann, T., Köller, O., & Schöber, C. (2018). Attainment-aspiration gap in students with a migration background: The role of self-efficacy. *Learning and Individual Differences*, 65, 159–166. <https://doi.org/10.1016/j.lindif.2018.05.002>.
- McElvany, N., Schroeder, S., Baumert, J., Schnotz, W., Horz, H., & Ullrich, M. (2012). Cognitively demanding learning materials with texts and instructional pictures: teachers' diagnostic skills, pedagogical beliefs and motivation. *European Journal of Psychology of Education*, 27(3), 403–420. <https://doi.org/10.1007/s10212-011-0078-1>.
- Steinmayr, R., Crede, J., McElvany, N., & Wirthwein, L. (2016). Subjective well-being, test anxiety, academic achievement: Testing for reciprocal effects. *Frontiers in Psychology*, 6, Article 1994. <https://doi.org/10.3389/fpsyg.2015.01994>.