
Supplementary academic support:
The role of support quality and students' individual
characteristics

DISSERTATION

in fulfillment of the requirements for the doctoral degree at the Faculty of
Arts and Humanities at Kiel University

submitted by
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Kiel,
September 2023

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Date of the oral examination

29.01.2024

Approved for printing by the second Vice Dean for
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26.02.2024

DANKSAGUNG

In erster Linie möchte ich mich herzlich bei Karin Guill und Janina Roloff-Bruchmann für die Möglichkeit bedanken, im Projekt IMPULSE zu promovieren. Darüber hinaus danke ich Karin für die Betreuung der ersten 2,5 Jahre meiner Promotion und für den erheblichen Beitrag zu den Studien meiner Dissertation. Ebenso gilt mein großer Dank Katharina Kohl für die Betreuung meiner Promotion in den letzten 1,5 Jahren. Dein Feedback war sehr wertvoll für meine Dissertation und unsere Gespräche haben mir viel Freude bereitet. Außerdem danke ich Olaf Köller für die Möglichkeit, am IPN promovieren zu können sowie für die Begutachtung meiner Dissertation. Ebenso danke ich Johanna Fleckenstein, dass sie diese Arbeit begutachtet. Mein großer Dank gilt außerdem Gráinne Newcombe für die wertvolle Sprachkorrektur.

Ich danke Anna und Katharina von Herzen für die Erfahrungen, die wir in den letzten Jahren zusammen gesammelt haben, sowie für den wertvollen Austausch, das viele Lachen und die schönen Gespräche. Außerdem bedanke ich mich bei Livia für die emotionale und inhaltliche Unterstützung, die vielen Witze und die tollen Gespräche. Mein Dank gilt außerdem unseren ehemaligen Hilfskräften Rike und Pauline für die tolle Zusammenarbeit und die gewissenhafte Unterstützung.

Ein ganz besonderer Dank gilt meiner lieben Karo für die aufrichtige Freundschaft und den Glauben an mich. Dass du in den richtigen Momenten immer an meiner Seite bist, bedeutet mir unglaublich viel. Mein größter Dank gilt dir, Marcel, weil du mich in den letzten Jahren auf so viele unterschiedliche Arten unterstützt hast und mich in dieser intensiven Zeit jeden Tag aufgemuntert und abgelenkt hast. Mein tiefster Dank gilt meinen Eltern dafür, dass sie mich immer unterstützen und mich jederzeit mit offenen Armen empfangen. Ich widme diese Arbeit meiner Mutter. Mit deiner Zuversicht, deiner Stärke und deiner liebevollen Art bist du ein großes Vorbild für mich.

SUMMARY

After students leave their classrooms in the afternoon, most of them still receive support with their academic learning, for example, assistance with their homework or with test preparation. Supplementary academic support is often provided by parents, by institutions (for example, homework assistance in school), or by private tutors. Because it is believed to improve students' academic achievement, motivation, and learning behavior (e.g., Park et al., 2016), many resources are invested in supplementary academic support by the public, by parents, and by students themselves. Thus, it is necessary to empirically test the effectiveness of supplementary academic support for students' learning outcomes. According to the offer-use model (e.g., Helmke & Weinert, 1997; Lohaus & Wild, 2020; Seidel, 2014), the effectiveness of supplementary academic support is influenced by a complex interplay between (1) the characteristics of the support (e.g., its quantity and quality) and (2) students' individual characteristics, which influence how they perceive, use, and process the support (Fischer et al., 2009).

Prior research has relatively consistently shown that the quality of supplementary support is more important than its quantity in terms of frequent or intensive use (e.g., Dumont et al., 2014; Guill, Lüdtke, & Köller, 2020; Moroni et al., 2015). However, most of the existing studies on the role of support quality focused on parental homework assistance and their findings were consistent only for secondary schools (e.g., Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020; Moroni et al., 2015). Therefore, more research in other common supplementary support contexts (e.g., homework assistance in school or private tutoring) and research in elementary school is sorely needed to test the generalizability of prior studies.

A currently emerging line of research highlights the importance of understanding students as active, developing individuals, who significantly shape the learning processes and interactions that occur during supplementary support (e.g., Dumont et al., 2014; Kuan, 2011; Núñez et al., 2015). Developmental theories (e.g., the stage-environment fit theory: Eccles et al., 1993) and motivational theories (e.g., the self-determination theory, SDT: Ryan & Deci, 2000) suggest that the effectiveness of supplementary support may depend on students' developmental stage (e.g., Núñez et al., 2015) and their reasons for using supplementary support (e.g., Kuan, 2011). However, due to the insufficient number of studies to date, further research on the role of students' individual characteristics is clearly needed.

Finally, although the offer-use model suggests reciprocal links between the characteristics of supplementary support and students' use of it (e.g., Seidel, 2014; Vieluf et al., 2020), only few studies have tested reciprocal associations between support quality and students' individual characteristics by using cross-lagged longitudinal designs (e.g., Dumont et al., 2014; Silinskas et al., 2013).

On the basis of an adapted offer-use model for the effectiveness of supplementary support and the present state of research, the present dissertation had three main research questions. First, it investigated whether the importance of high-quality support for students' learning outcomes can be generalized across three supplementary support contexts (i.e., parental homework assistance, homework assistance in school, and private tutoring). Second, it tested whether students' individual characteristics (i.e., their grade level and their reasons for using supplementary support) influence the effectiveness of supplementary support. Third, it explored reciprocal associations between support quality and students' individual characteristics (i.e., their academic functioning). To address these research questions, three empirical studies were conducted.

Study 1 investigated reciprocal associations between the quality of parental and scholastic homework assistance and students' academic functioning (i.e., their homework behavior and academic achievement) in elementary school. The quality of homework assistance was measured on the basis of three quality dimensions derived from the SDT (Dumont et al., 2014): *responsiveness* and *structure*, representing high-quality support, and *control*, representing low-quality support. Cross-lagged panel models were calculated on the basis of longitudinal data from 335 fourth graders receiving parental homework assistance and 112 fourth graders receiving scholastic homework assistance.

Study 2 tested the role of students' grade level in the effectiveness of parental homework assistance by examining whether the quality and the effects of parental homework assistance changed over the course of secondary school. Structural equation modeling was conducted on the basis of cross-sectional data from 1,782 secondary school students in Grades 5 to 9.

Study 3 explored the role of the support quality of private tutoring and students' reasons for its use on the effectiveness of private tutoring for students' motivational-affective outcomes. The quality of supplementary support was measured by one indicator of tutors' supportive behavior (Guill, Lüdtke, et al., 2020), namely, the use of an individual frame of reference when giving feedback (Mischo & Haag, 2002; Mischo & van Kessel, 2005). Path models were calculated on the basis of longitudinal data from a large sample of secondary school students, derived from the German Competencies and Attitudes of Students study (KESS).

Regarding the relationship between support quality and students' learning outcomes (Research Question 1), the strength of the relationships varied greatly across the three support contexts, but two patterns of findings emerged across contexts. First, the results indicated that high-quality forms of support (e.g., responsiveness, structure, and the use of an individual frame of reference) can have a positive impact on students' learning behavior. Second, the findings suggested that unfavorable forms of support such as controlling behavior can have a negative impact on different learning outcomes (e.g., homework behavior and achievement). However, both results differed between the study conducted in elementary school (Study 1) and the studies conducted in secondary school (Study 2 and Study 3). These inconsistent findings point to the possibility that the effects of support quality may depend on students' grade level.

With regard to the role of students' individual characteristics (Research Question 2), the results indicated that these can have an influence on the effectiveness of supplementary support. For example, students' grade level was related to the quality of parental homework assistance, while students' reasons for using supplementary support influenced its effectiveness in improving certain variables (e.g., learning behavior).

Finally, the investigation of reciprocal relationships between the quality of supplementary support and students' individual characteristics (Research Question 3) showed that controlling homework assistance and low academic achievement reciprocally influenced each other; however, this result was also context-specific because it only occurred in the context of parental homework assistance.

In summary, the multifaceted findings of this dissertation provide nuanced support for the assumption of the adapted offer-use model that the effectiveness of supplementary academic support is influenced by a complex interplay between (1) support quality and (2) students' individual characteristics that affect the use of the supplementary support. That is, the findings varied across support contexts, grade levels, and indicators of support quality.

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1

INTRODUCTION AND THEORETICAL BACKGROUND

1.1 Introduction

The support of most students' academic learning extends far beyond the classroom walls because many students receive supplementary support outside of their regular classes. Supplementary academic support is often provided by parents, by institutions (for example, homework assistance in school), or by private tutors. One type of supplementary academic support that is considered highly relevant by teachers, policymakers, and parents themselves is parental academic support (e.g., Green et al., 2007). It has been suggested that one of the most frequent and most valued ways parents become involved in their children's education is by giving homework assistance (e.g., Walker et al., 2004), which seems plausible because the completion of homework is expected to be beneficial for students' achievement and self-regulated learning (Huang & Cho, 2009). Parental academic support is often complemented or substituted by the use of public or private support options. Reasons for using support options outside the family can be increasing educational aspirations or a lack of resources within the family to support students adequately (e.g., lack of time or knowledge). To improve access to supplementary academic support for students from all socioeconomic backgrounds (e.g., Steinmann et al., 2019), many countries organize institutional after-school programs in which students are supervised and receive academic support from pedagogical staff. One very common type of after-school programs in many countries is institutional homework assistance (e.g., in the United States: Cosden et al., 2004; Huang & Cho, 2009; in Australia: Gordon et al., 2020; in Germany: Brisson & Theis, 2020; Sauerwein & Rother, 2022). However, many families also decide to get privately organized supplementary academic support for their children. One of the most common forms in many countries (for example, in China: Guo et al., 2020; in Germany: Ömeroğulları et al., 2020) is hiring a private tutor who provides tailored support with different instructional foci (e.g., homework assistance or closing gaps in knowledge; Guill et al., 2021) for students on a regular basis (Park et al., 2016).

The public, parents, and students themselves invest large amounts of resources in supplementary academic support in the hope that it will improve students' academic achievement, motivation, and learning behavior. Therefore, it has a high practical relevance to evaluate the effectiveness of common types of supplementary academic support. According to the offer-use model (Helmke & Weinert, 1997; Lohaus & Wild, 2020; Seidel, 2014), the effectiveness of supplementary academic support is influenced by the interplay between (1) the characteristics of the support (e.g., the quantity and quality of the supplementary support) and

(2) students' individual characteristics, which influence how they perceive, use, and process the support (Fischer et al., 2009).

Research to date has mostly shown that the frequent or intensive use of supplementary academic support alone does not predict improvements in students' academic achievement (Barger et al., 2019; Fernández-Alonso et al., 2022; Guill et al., 2021; Moroni et al., 2015; Ömeroğulları et al., 2020). However, research on the quality of supplementary support has shown that students' academic functioning benefits from high-quality support that students perceive to be oriented towards their psychological needs for competence, autonomy, and social relatedness (Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020; Moroni et al., 2015). Additionally, a currently emerging line of research highlights the importance of understanding students as active, developing individuals, who significantly shape the learning processes and interactions that occur during supplementary support. For instance, prior studies have reported that students with higher academic functioning received higher quality homework assistance (e.g., Dumont et al., 2014) and that students who decided themselves to use private tutoring benefitted more from it (Kuan, 2011).

In brief, the present state of research empirically supports the assumption derived from the offer-use model that (1) the support quality and (2) students' individual characteristics influence the effectiveness of supplementary support. However, concerning both aspects there are important research desiderata that should be addressed. First, most of the existing studies on the role of support quality focused on parental homework assistance and their findings were consistent only for secondary schools (e.g., Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020; Moroni et al., 2015). Therefore, more research in other common supplementary support contexts and in other age groups (i.e., in elementary school) is sorely needed to test the generalizability of prior studies. Second, more research is needed to test which individual student characteristics influence the effectiveness of supplementary support. Although developmental theories (e.g., Eccles et al., 1993; Hoover-Dempsey & Sandler, 1995) suggest that the effectiveness of supplementary support may vary across developmental phases, only a few studies investigated whether students' grade level influences the quality and the effects of supplementary support (Gonida & Cortina, 2014; Núñez et al., 2015). Moreover, according to the self-determination theory (SDT; Ryan & Deci, 2000), students are more likely to profit from supplementary support if they have favorable motivational preconditions for its use, for example, if they decide autonomously if they want to use supplementary support. However, only few studies investigated whether supplementary academic support is more effective if students have internal (vs. external) reasons for its use (Kuan, 2011). Third, although students'

individual characteristics (e.g., their academic functioning) were shown to be both the antecedent and the outcome of the quality of supplementary support, only few studies have tested reciprocal associations between both constructs on the basis of cross-lagged longitudinal designs (Dumont et al., 2014; Silinskas et al., 2013).

On the basis of an adapted offer-use model for supplementary academic support, the present dissertation addresses these research desiderata in three empirical studies. *Study 1* addressed the need to test reciprocal relationships between students' individual characteristics and the quality of supplementary support, the need for research in elementary school, and the need for research that goes beyond parental homework assistance. To achieve this, it investigated reciprocal associations between the quality of parental and scholastic homework assistance and students' academic functioning (i.e., their homework behavior and academic achievement) in elementary school. *Study 2* aimed to narrow the research gap concerning the role that students' grade level plays in the effectiveness of supplementary support. Therefore, *Study 2* investigated students' grade level as a predictor of the quality of parental homework assistance and as a moderator of the associations between homework assistance quality and students' academic functioning in secondary school. *Study 3* addressed both the quality of supplementary academic support and the role of students' motivational preconditions in the context of private tutoring. That is, *Study 3* investigated whether secondary school students' motivational-affective outcomes benefit more from private tutoring if (a) tutors provide supportive feedback (i.e., if they use an individual frame of reference) and (b) students have internal (vs. external) reasons for participating in private tutoring.

Section 1.2 presents the adapted offer-use model employed in the present dissertation, along with its components. Thereby, an overview of the present state of research concerning the effectiveness of supplementary academic support is given, including the research desiderata that are addressed in the present work. After that, Section 1.3, Section 1.4, and Section 1.5 provide a more detailed overview of the state of research concerning the three main foci of the present work (i.e., support quality, students' individual characteristics, and reciprocal associations). Finally, the leading research questions and the three empirical studies of the present work are presented in Section 1.6 and Section 1.7.

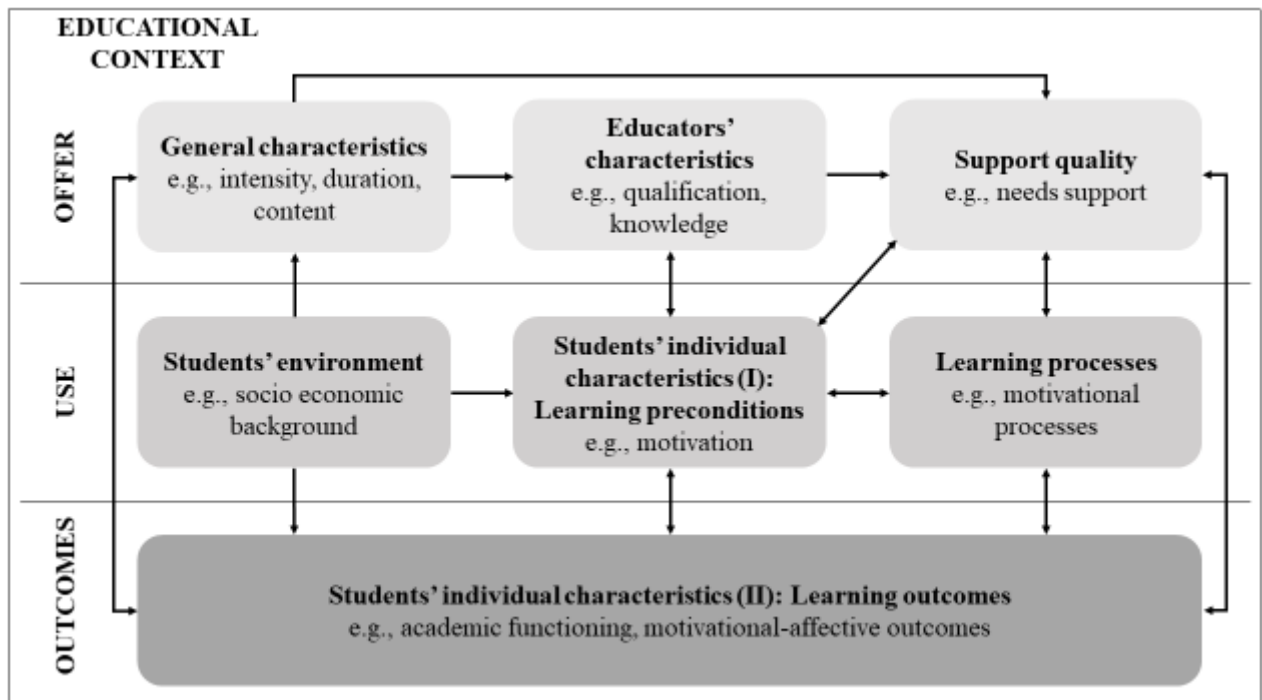
1.2 An offer-use model for supplementary academic support

The present dissertation is based on the offer-use model, adapted to the context of supplementary academic support (see Figure 1). The offer-use model was initially used in the context of classroom learning; it integrates the idea that both the characteristics of an academic

offer and students' individual characteristics play a role in the effectiveness for students' cognitive, motivational-affective, and behavioral learning outcomes (Helmke & Weinert, 1997; Lohaus & Wild, 2020; Seidel, 2014). In this context, academic offers are seen as learning opportunities, which are differentially perceived, processed, and used by individual students (Fischer et al., 2009). A major advantage of the offer-use model is that it integrates a variety of theories, which makes it possible to describe the complex interplay of antecedents and outcomes of learning processes (Seidel, 2014).

Figure 1

Offer-use model on the associations between the characteristics of supplementary support, students' use of it, and the learning outcomes of supplementary support



Note. Adapted from Seidel (2014) and Lohaus and Wild (2020).

The offer-use model employed in the present dissertation assumes that within different supplementary support contexts (see Section 1.2.1), the characteristics of the supplementary support (see Section 1.2.2) and students' use of it (see Section 1.2.3), including the motivational processes that occur during supplementary support (see Section 1.2.4), influence students' learning outcomes (see Section 1.2.5). One important feature of the offer-use model is that it includes a variety of reciprocal links between its components, which will be discussed in Section 1.2.6.

1.2.1 Supplementary academic support contexts

The present dissertation takes a closer look at three very common supplementary support contexts: parental homework assistance, institutional homework assistance, and private tutoring. Parental homework assistance takes place within students' homes and, thus, is influenced by family background variables, for instance, parents' educational background or occupational status (Cooper et al., 2000; Dumont et al., 2014; Niggli et al., 2007; Wild & Gerber, 2009). Institutional homework assistance is usually a public support option, which means that the quality and quantity of the support are affected by public structures with regard to the planning, financing, and implementation of the support (Stecher et al., 2007). Institutional homework assistance is often given in full-day schools, however, there are also other contexts (e.g., in Germany: Horte or Betreute Grundschulen [after-school care]). These contexts have in common that they provide students with time, space, materials, and assistance to do their homework. Institutional homework assistance is often given by pedagogical staff and less often by teachers or teacher students, which means that there is a large heterogeneity in the qualifications of the staff (Stecher et al., 2007). It is often offered on a voluntary basis and takes place in a group context (Brisson & Theis, 2020; Sauerwein & Rother, 2022). The third context, private tutoring, is usually a private support option, which is less regulated than public support options, for example, in terms of its content or tutors' qualifications (Guill et al., 2021; Ömeroğulları et al., 2020). For instance, private tutoring is less tied to the content of the curriculum and can be provided by people with or without educational training (e.g., teachers or older peers; Guill, Bahr, & Ömeroğulları, 2020). Taken together, the context in which supplementary academic support is given has an impact on its characteristics.

1.2.2 Characteristics of supplementary support

The characteristics of supplementary support comprise, for example, the general characteristics (e.g., duration, intensity, or content), the educators' characteristics (e.g., qualification or demographic characteristics), and the support quality (e.g., support for students' needs). Prior studies indicated that *general characteristics* and *educators' characteristics* do not play a major role in the effectiveness of supplementary support. For instance, there were either insignificant or negative links between the quantity (i.e., frequency, intensity, and duration) of supplementary support and students' academic achievement (Guill, Lüdtke, & Köller, 2020; Guill et al., 2021; Moroni et al., 2015; Ömeroğulları et al., 2020). Similarly, in terms of educators' characteristics, prior studies did not find evidence that students gained more from private tutoring if the tutor held a high qualification certificate (e.g., teacher training;

Ömeroğulları et al., 2020; Streber et al., 2011). However, support quality has been shown to play a major role in the effectiveness of supplementary support. That is, students benefit from supplementary support if it is aligned with students' psychological needs (e.g., Cooper et al., 2000). However, with a few exceptions (e.g., Guill, Bahr, & Ömeroğulları, 2020; Guill, Lüdtke, & Köller, 2020), previous studies on the quality of supplementary support were limited to the context of parental homework assistance and their findings were only consistent for secondary schools (e.g., Dumont et al., 2014; Moroni et al., 2015). Thus, the present dissertation aimed to test whether the findings of prior studies are replicable in other common supplementary support contexts and to explore the role of students' grade level in the effectiveness of supplementary support.

1.2.3 Students' use of supplementary support

According to the offer-use model (e.g., Seidel, 2014), students' use of supplementary support is influenced by students' educational environment (e.g., their family background), their individual learning preconditions (e.g., their prior motivation, prior knowledge, or grade level), and the cognitive, motivational-affective, and behavioral learning processes that occur during the supplementary support. A substantial amount of research has addressed the role that students' *educational environment*, in terms of their family background, plays in the effectiveness of supplementary support. For instance, several studies addressed the link between students' socioeconomic background and the quality of parental homework assistance; the findings of those studies were, however, inconsistent (studies reporting negative links: e.g., Cooper et al., 2000; Niggli et al., 2007; studies reporting insignificant links: e.g., Dumont et al., 2014; Wild & Gerber, 2009; Wild & Remy, 2002). In addition, some studies addressed the role that students' socioeconomic background plays in the effectiveness of private tutoring and found larger gains for students from higher socioeconomic backgrounds (e.g., Guo et al., 2020; Liao & Huang, 2018).

Concerning students' *individual characteristics* in terms of their learning preconditions, there is first evidence that students with lower cognitive preconditions (i.e., low-performing students) benefitted more from supplementary support (Guill, Lüdtke, & Köller, 2020; Guo et al., 2020). However, although developmental theories (e.g., Eccles et al., 1993; Hoover-Dempsey & Sandler, 1995) suggest that students' grade level may moderate the effectiveness of supplementary support, only few studies explored the role of students' grade level in the quality and the effects of supplementary support (e.g., Núñez et al., 2015; Zhang & Liu, 2022). Moreover, with regard to students' self-determined learning (Ryan & Deci, 2000), it is more

likely that supplementary support initiates positive motivational processes in students if students themselves decide to use supplementary support (Lohaus & Wild, 2020). However, due to the scarcity of studies investigating the role of students' reasons for using supplementary support, research is needed that evaluates whether supplementary support is more beneficial for students' learning outcomes if students themselves decide to use it (e.g., Kuan, 2011).

Multiple forms of cognitive, motivational-affective, and behavioral *learning processes* are initiated in students during supplementary support. It is assumed that these learning processes are influenced (1) by the quality of the support and (2) by students' individual learning preconditions. Because, in turn, students' learning processes are assumed to influence students' *learning outcomes*, they represent a central mediator variable in the offer-use model. The present dissertation focuses on the motivational processes that occur when students receive supplementary support due to the high value of students' motivation for their experience, learning, and performance (Pintrich & Schunk, 2002; Vansteenkiste et al., 2004; Vansteenkiste et al., 2005). The SDT (Ryan & Deci, 2000) is highly useful to describe the motivational processes that occur during supplementary support because it highlights the importance of students' environment for the development of students' motivation.

1.2.4 Students' motivational processes during supplementary support

According to the SDT (Ryan & Deci, 2000), different types of motivation exist on a continuum from *autonomous* to *controlled* behavior. The most autonomous type is *intrinsic motivation*, which describes engagement in an activity out of interest or enjoyment. However, especially in the context of supplementary academic support, it needs to be considered that only relatively few actions are fully intrinsically motivated, whereas extrinsic motivation is relatively common (Ryan & Deci, 2000). The motivation to use supplementary support is mostly to attain a specific goal (e.g., finishing homework or getting good grades). However, following the SDT, different types of extrinsic motivation exist, which vary in the extent to which they represent *autonomous* versus *controlled* behavior. For example, extrinsic motivation can involve a specific type of controlled behavior in order to avoid punishment (e.g., learning for a test to avoid scolding by parents). Another, more autonomous, type of extrinsically motivated behavior is related to the attainment of a specific goal that is personally valued, for example, doing homework carefully to achieve a good grade because grades are personally important (Ryan & Deci, 2000, 2017). There is strong evidence that students' learning outcomes are more positive, the more intrinsic or autonomous their motivation is; students who are intrinsically and autonomously motivated tend to be more interested, enthusiastic, and confident, which can lead to improved

performance, persistence, and general well-being (e.g., Burton et al., 2006; Lepper et al., 2005; Weidinger et al., 2020).

On the basis of the SDT, it is presumed that the quality of supplementary support is high if it fosters more autonomous and intrinsic types of motivation in students. It is assumed that this can be achieved through the support for students' basic psychological needs for competence, autonomy, and social relatedness (Ryan & Deci, 2000). The first need, competence, describes the experience of being able to effectively achieve specific learning outcomes (e.g., finishing homework tasks efficiently or keeping up with the class content). Supplementary support can support students' need for competence by the provision of a structured environment and encouraging, informative, and noncomparative feedback, for example, by using an individual frame of reference (Mischo & Haag, 2002; Mischo & van Kessel, 2005). In contrast, competence can be thwarted by discouraging or comparative feedback (Ryan & Deci, 2017).

The second need, autonomy, relates to students being in charge of initiating and regulating their own learning-related actions and experiences (e.g., deciding how they want to solve a task). Supplementary academic support can promote students' autonomy by offering choices, supporting students' self-regulation, and adopting students' perspectives. In contrast, students' need for autonomy is neglected if the person who provides supplementary support is controlling and intrusive (Grolnick & Pomerantz, 2022; Ryan & Deci, 2017).

The third need, social relatedness, refers to the presence of positive and secure connections within the supplementary support context. This can be achieved if students experience caring involvement, empathy, and acceptance instead of rejection, impersonal social interactions, and social comparisons (Deci et al., 1991; Grolnick & Pomerantz, 2022; Ryan & Deci, 2017)

To sum up, in the present dissertation, it is assumed that high-quality supplementary support that is oriented towards students' basic psychological needs for competence, autonomy, and social relatedness can support students' intrinsic and autonomous motivation, which, in turn, is expected to support a variety of cognitive and noncognitive learning outcomes.

1.2.5 Outcomes of supplementary academic support

The present work examines a wide range of outcomes related to the use of supplementary support, capturing aspects of academic achievement, motivational-affective outcomes, and learning behavior. The range of outcomes was subsumed under two terms, namely, students' *academic functioning* and students' *motivational-affective outcomes*. Students' academic

functioning captured two indicators of homework behavior (i.e., [1] effort and [2] procrastination) and two indicators of academic achievement ([3] test scores and [4] mean report card grades). The *effort* students invest in their homework is deemed one central outcome of homework assistance because improving students' study skills and their self-regulated learning is one of the main goals of homework (Cooper & Valentine, 2001; Dumont et al., 2014; Ramdass & Zimmerman, 2011). Moreover, there is evidence that students' homework effort is related with better learning and higher grades (e.g., Trautwein et al., 2006). Students' *procrastination* is a highly relevant outcome because it plays a dysfunctional role in students' learning, for example, it has been found to be negatively related with academic achievement (Kim & Seo, 2015; van Eerde, 2003). Moreover, it is often related with feelings of guilt and discomfort (Ragusa et al., 2023). Concerning the indicators of academic achievement, *test scores* are more valid and reliable in measuring students' actual abilities, whereas *report card grades* capture additional aspects of students' academic functioning (e.g., social and motivational factors), and they are highly relevant for students' opportunities after school, for example, for university entrance and employment opportunities (Fischer & Theis, 2014).

Students' motivational-affective outcomes comprised (5) academic interest, (6) academic self-concept, (7) test anxiety, (8) work habits, and (9) achievement pressure. Students' academic *interest* and academic *self-concept* are highly important because of their links with a variety of positive behavioral, affective, and cognitive outcomes (Kriegbaum et al., 2018; Marsh & Martin, 2011). Similarly, students' *test anxiety* is considered a highly relevant outcome due to its high prevalence (e.g., 16% of secondary school students perceived themselves as being highly test anxious; Putwain & Daly, 2014) and its negative consequences for students' well-being and academic achievement (Aldrup et al., 2020; Pekrun et al., 2017; Steinmayr et al., 2015). Moreover, a measurement of students' proactiveness and engagement was included (i.e., their proactive *work habits* in their regular classes) because it is an important part of students' self-determined learning (Ryan & Deci, 2000). Finally, the present dissertation addresses the potentially negative effects of supplementary support in terms of *achievement pressure* because students who participate in supplementary support may experience pressure to perform better because their environment (e.g., their parents or teachers) might expect it to "pay off" (Bray, 2003; Hajar, 2018).

1.2.6 Reciprocal links between the quality of supplementary support and students' individual characteristics

Importantly, students' achievement, motivation, emotions, and learning behavior not only represent students' learning outcomes in the offer-use model; they also become learning preconditions for future learning and they have an impact on the quality of supplementary support. In other words, the offer-use model considers many of the assumed links between the characteristics of the offer, students' use of it, and students' learning outcomes to be reciprocal (Seidel, 2014; Vieluf et al., 2020). Indeed, prior studies have shown that students' individual characteristics are both the outcome and the antecedent of the quality of parental homework assistance. That is, they found that low levels of students' academic functioning (e.g., low achievement, unfavorable homework behavior, low efficacy) predicted a lower quality of homework assistance, for example, more control and interference, lower cognitive engagement, and less autonomy support (Dumont et al., 2014; Gonida & Cortina, 2014; Niggli et al., 2007; Núñez et al., 2017). However, because only a few studies (Dumont et al., 2014; Silinskas et al., 2013; Xu et al., 2018) investigated reciprocal links between support quality and students' individual characteristics, Barger et al. (2019) pointed out that longitudinal research on the basis of cross-sectional designs is needed to clarify the processes in which educators' support and students' characteristics contribute to students' development over time.

The following sections give a more detailed overview of the theoretical concepts, previous findings, and research desiderata concerning the main research foci of the present work: the quality of supplementary support (Section 1.3), the role of students' individual characteristics (Section 1.4), and reciprocal associations between both constructs (Section 1.5).

1.3 The quality of supplementary support in three contexts

This section is concerned with the links between the quality of supplementary support and students' learning outcomes in three contexts: parental homework assistance, institutional homework assistance, and private tutoring. On the basis of the SDT (Ryan & Deci, 2000), it is assumed that high-quality (i.e., needs-oriented) support is positively related with students' learning outcomes because it promotes intrinsic and autonomous motivational processes in students. In other words, students' motivational processes (i.e., the experience of competence, autonomy, and social relatedness) are assumed to be a mediating variable in the link between support quality and students' learning outcomes. In the following sections, the theoretical concepts used to measure the quality of supplementary support on the basis of the SDT are

described for parental homework assistance (Section 1.3.1), institutional homework assistance (Section 1.3.2), and private tutoring (Section 1.3.3) before a brief summary is given in Section 1.3.4. Moreover, in each section, previous findings and the research desiderata concerning the associations between support quality and students' learning outcomes are discussed.

1.3.1 The quality of parental homework assistance

On the basis of the psychological needs described in the SDT, Dumont et al. (2014) proposed three quality dimensions of parental homework assistance: responsiveness, structure, and control. Responsiveness mainly refers to students' need for social relatedness, which is supported by parents who are approachable and supportive during homework (e.g., by helping the child when they ask for help). Structuring homework assistance aims to support students' need for competence by providing a learning environment that helps students to effectively do their homework. This can be achieved, for example, by providing enough time, space, and a quiet environment in which students can do their homework. The last quality dimension, control, relates to students' need for autonomy, which is undermined by parents' interfering and intrusive homework behavior, for example, when parents get involved without being asked for help (Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020). Homework assistance with high levels of responsiveness and structure and low levels of controlling behavior is assumed to support students' needs for social relatedness, competence, and autonomy (Ryan & Deci, 2000). A study by Dettmers et al. (2020) provided evidence that autonomy-supportive and structuring homework assistance was related with students' perceived experience of autonomy and competence. Therefore, parental support for students' psychological needs is assumed to enhance intrinsic and autonomous types of motivation, which, in turn, are beneficial for students' learning outcomes (Ryan & Deci, 2000).

Prior studies have empirically supported the assumed links between the three quality dimensions of parental homework assistance and students' learning outcomes. Parental responsiveness and support were shown to be positively related with students' achievement, homework time management, homework effort, persistence, and expectancy to be able to master their homework; whereas they were negatively related with homework procrastination (Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020; Moroni et al., 2015; Núñez et al., 2015; Silinskas & Kikas, 2019; Trautwein et al., 2006). Fewer studies have investigated links between parents' structuring behavior during homework and students' academic functioning. However, these studies reported positive links with students' homework and reading effort, whereas no effects on achievement were found (Dumont et al., 2014; Guill, Bahr, &

Ömeroğulları, 2020). In contrast to the research on parents' structuring behavior, a large body of research has investigated the associations between parental control and intrusive behavior during homework and students' learning outcomes. These studies found that control was related with lower academic achievement, more homework procrastination, less homework persistence, as well as lower academic self-concept and students' lower expectancy to be able to master their homework (Dumont et al., 2012; Guill, Bahr, & Ömeroğulları, 2020; Moroni et al., 2015; Silinskas & Kikas, 2019; Trautwein et al., 2006). While this pattern of results was consistent for secondary schools, the pattern of results for elementary schools is less clear because less research has been conducted in this context and the results varied across studies, across quality indicators of parental homework assistance, and across student outcomes (e.g., Cunha et al., 2018; Núñez et al., 2015; Silinskas et al., 2013). Thus, more research in elementary school is needed to test the generalizability of existing findings across developmental phases.

1.3.2 The quality of institutional homework assistance

Theoretical frameworks on the quality of supplementary support in the context of after-school programs have also drawn on the SDT. For instance, in the longitudinal “Study on the development of all-day school” (StEG [Studie zur Entwicklung von Ganztagschulen]), three dimensions that are assumed to support students' psychological needs were included: challenge (i.e., the support for students' need for competence), student-staff relationship (i.e., the support for students' need for social relatedness), and autonomy support (Fischer & Theis, 2014). Fischer and Theis (2014) reported that the three quality dimensions were positively related with students' school attachment. Similarly, Stecher et al. (2007) reported that positive student-staff relationships in extracurricular activities were related with higher perceived usefulness of the activities. However, Fischer and Theis (2014) found only little evidence for links between needs support in extracurricular activities and students' academic achievement. One major limitation of these prior studies is that they did not differentiate between different types of activities (e.g., academic vs. nonacademic programs). Therefore, Fischer and Theis (2014) pointed out that future research should address the support quality of activities that specifically aim to improve students' competencies and skills, for example, institutional homework assistance.

Only few (qualitative) studies so far have addressed the quality of institutional homework assistance (Gordon et al., 2020; Huang & Cho, 2009; Nordt, 2013). These studies described the quality of institutional homework assistance on the basis of indicators that can be integrated into the SDT framework. First, high-quality institutional homework assistance can promote students' need for social relatedness when educators listen to the students' thoughts during

homework, create positive, supportive, and open environments, and are responsive and empathetic. Second, institutional homework assistance can be expected to promote students' sense of efficacy and competence if it comprises enough time, a quiet context without distractions, and the materials that allow students to complete their homework. Regarding students' need for autonomy, prior studies have described both autonomy-supportive and autonomy-restricting characteristics of institutional homework assistance. For example, students' autonomy might be supported when their study skills and self-management are promoted (e.g., by giving them homework planners) as this may give them a sense of control over their homework organization. However, institutional homework assistance potentially could frustrate students' need for autonomy, given that it includes punishments if a student does not follow the rules, the supervisor can have a strict and authoritarian appearance, or critical and unwanted feedback may be given (Gordon et al., 2020; Huang & Cho, 2009; Nordt, 2013). While these prior studies offer a useful framework to describe the quality of institutional homework assistance, they did not empirically test the links of the quality dimensions with students' learning outcomes. Therefore, quantitative research on the quality of institutional homework assistance and its links with students' academic functioning is still needed.

1.3.3 The quality of private tutoring

Prior research has only recently begun to focus on the quality of private tutoring lessons. Guill, Bahr, and Ömeroğulları (2020) applied the three quality dimensions of parental homework assistance to the context of private tutoring because homework assistance is one frequent focus of private tutoring (Guill et al., 2021). They argued that the context of private tutoring generally favors a structured (i.e., quiet) environment and that tutors are likely to be highly responsive if their tutee has a question. However, parents' and students' high expectations regarding the effectiveness of private tutoring in terms of (quickly) improved achievement may also favor tutors' controlling behavior if students struggle with their homework (Guill, Bahr, & Ömeroğulları, 2020). Additionally, Guill, Lüdtke, and Köller (2020) suggested that tutors' support (e.g., constructive feedback or positive error culture) is one general quality dimension of private tutoring beyond homework assistance that is assumed to be related with the promotion of students' psychological needs. In both studies, there were significant links between the indicators of support quality and students' noncognitive outcomes (e.g., homework procrastination, and school and family satisfaction), although there were no links with academic achievement. However, although Guill, Lüdtke, and Köller (2020) argued that tutors' support is likely to have a positive impact on students' motivation, their study only included distal

indicators of students' motivation (i.e., family and school satisfaction). Thus, future studies should test the effects of tutors' support (e.g., using an individual frame of reference, positive error culture) on more proximal motivational outcomes (e.g., interest or academic self-concept). Moreover, research on the effects of private tutoring on students' motivational-affective outcomes is still needed because, with a few exceptions (Haag, 2007; Mischo & van Kessel, 2005; Otto & Karbach, 2019), prior studies on the effectiveness of private tutoring have strongly focused on achievement-related outcomes.

1.3.4 Brief summary

The SDT (Ryan & Deci, 2000) offers a useful theoretical framework to describe the quality of supplementary academic support across different contexts. However, in each context, there are research desiderata that should be addressed. First, in the context of parental homework assistance, the findings of prior studies have been consistent for secondary schools only (e.g., Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020; Moroni et al., 2015). Therefore, more research in elementary school is needed. Second, in the context of institutional homework assistance, quantitative research that investigates the support quality and its links with students' learning outcomes is still needed. Third, in the context of private tutoring, there is a research desideratum concerning the motivational-affective effects of private tutoring in general and of tutors' support.

1.4 The role of students' individual characteristics in the effectiveness of supplementary support

This section presents the theoretical concepts, existing findings, and research desiderata concerning the associations between students' individual characteristics (i.e., their learning preconditions) and the effectiveness of supplementary support in two ways. First, it addresses the role of students' grade level in the effectiveness of supplementary support (Section 1.4.1). Second, it focuses on the role of students' reasons for using supplementary support (Section 1.4.2) before a brief summary is given in Section 1.4.3.

1.4.1 The role of students' grade level in the effectiveness of supplementary support

In their offer-use model, Lohaus and Wild (2020) point out that a good fit between the characteristics of supplementary support and students' expectations and needs is necessary to promote positive learning outcomes in students. According to developmental theories (e.g., Eccles et al., 1993; Hoover-Dempsey & Sandler, 1995), students' developmental stage is one

factor that has a high impact on the fit between the demands and opportunities of learning environments and students' needs. As students move through school and enter new developmental stages, for example, adolescence, they experience a variety of cognitive, motivational, and emotional changes (Eccles et al., 1993; Gutman & Eccles, 2007). Moreover, their learning environments in their homes and in school also undergo a variety of changes. For instance, prior studies have reported that parental involvement in their children's education tends to decline when students move into and through secondary school (Bhargava & Witherspoon, 2015; Kim & Fong, 2014; Wei et al., 2022). Additionally, the transition from elementary to secondary school is related to changes in organizational, social, and instructional processes in school (Eccles & Roeser, 2009). In the stage-environment fit theory (Eccles et al., 1993), it is assumed that students are likely to have positive motivational-affective and behavioral outcomes if their environments succeed in meeting their developmental needs. By contrast, students are faced with difficulties in developmentally inappropriate surroundings (Eccles et al., 1993; Fischer & Theis, 2014; Gutman & Eccles, 2007). Prior studies empirically supported the assumption that adolescents in developmentally appropriate environments (e.g., environments that allow students to make choices) benefit in terms of their mental health and their motivational, affective, and behavioral engagement (Gutman & Eccles, 2007; Shubert et al., 2020; Symonds & Hargreaves, 2016; Zimmer-Gembeck et al., 2006).

Applying the stage-environment fit theory to the context of supplementary support, it is possible that (1) the quality of supplementary support and (2) its effectiveness change over the course of students' development. Indeed, first studies have indicated that the quality of parental homework assistance changes as students move through school (Gonida & Cortina, 2014; Núñez et al., 2015; Wild & Gerber, 2009). Moreover, prior meta-analyses on parental homework assistance have identified students' school level as a moderator in the links with students' achievement, although their findings were partially contradictory. Patall et al. (2008) reported positive links between parental homework assistance and students' achievement in elementary school and high school, while parental homework assistance in middle school yielded negative associations. A more recent meta-analysis by Barger et al. (2019), which included a larger number of studies, contradicted this pattern of results because they found negative associations between parental homework assistance and students' academic achievement that were similar in size across different grade levels (i.e., elementary, middle, and high school). Concerning private tutoring, a recent systematic review did not find that the effects of private tutoring were moderated by students' grade level (Zhang & Liu, 2022). One limitation of prior meta-analyses and research syntheses (Barger et al., 2019; Patall et al., 2008;

Zhang & Liu, 2022) is that they did not simultaneously consider the quality of supplementary support and students' grade level. Thus, research is needed that investigates whether students' grade level (1) influences the quality of supplementary support and (2) moderates the effectiveness of supplementary support.

1.4.2 Students' reasons for using supplementary support

The offer-use model suggests that students' learning preconditions influence the learning processes that occur during supplementary support, which, in turn, predict students' learning outcomes (e.g., Seidel, 2014). The motivational preconditions for receiving supplementary support are likely to be influenced by the process in which parents and students decide whether students receive some type of supplementary support (Kang et al., 2017; Lin et al., 2022; Lohaus & Wild, 2020). These decisions can be made by parents (i.e., students have external reasons for receiving supplementary support) or by students themselves (i.e., internal reasons). Because offering students choices and promoting their decision making is one important facet of autonomy support (Grolnick & Pomerantz, 2022; Ryan & Deci, 2017), it is likely that students' motivation to use supplementary support will be more intrinsic and autonomous if they have internal reasons for using private tutoring (Ryan & Deci, 2000, 2017). In turn, prior studies empirically supported the assumption that students' intrinsic and autonomous motivation was related with more productive learning activities, that is, deeper processing, higher persistence, and increased task involvement (Vansteenkiste et al., 2004; Vansteenkiste et al., 2005). Thus, it can be assumed that students benefit more from supplementary support if they have internal reasons for using supplementary support because this is likely to promote high-quality learning activities.

In the context of parental homework assistance, students' internal (vs. external) reasons for receiving support have been addressed by comparing parental involvement initiated by students (i.e., responsive homework assistance) with unwanted, intrusive involvement (i.e., controlling homework assistance; Dumont et al., 2014); each type of involvement had differential implications for students' academic functioning (see Section 1.3.1). In the context of private tutoring, only a few studies have addressed the role of students' reasons for using supplementary support. Kuan (2011) reported that cramming schools had stronger positive effects on students' academic achievement if students themselves decided to attend those schools. More research on whether students benefit more from private tutoring if they themselves choose to use such private tutoring is needed.

1.4.3 Brief summary

Developmental and motivational theories (e.g., Eccles et al., 1993; Ryan & Deci, 2000) and first empirical studies (e.g., Kuan, 2011; Núñez et al., 2015) suggest that students' grade level and their reasons for using supplementary support play an important role in the effectiveness of supplementary support. However, more research is needed to verify these initial findings.

The following section discusses the final main focus of the present dissertation, namely, reciprocal links between students' individual characteristics and the quality of supplementary academic support.

1.5 Reciprocal links between students' individual characteristics and supplementary support quality

In the offer-use model, different directions of impact are assumed; in addition to the impact of the offer on the students, the model also assumes that students' characteristics (e.g., their behavior) exert a significant influence on the quality and the effects of the offer (Lohaus & Wild, 2020; Seidel, 2014; Vieluf et al., 2020). This is in line with transactional theories of development that presume that students' development is a result of reciprocal processes between students and their social environments (Magnusson, 1992; Sameroff, 2009). Thus, while any kind of instruction or supplementary support is expected to have an impact on students' development, it needs to be considered that students also considerably shape their learning environment and the behavior of their educators. From a "student-directed" perspective on development, it has been argued that children are not passive recipients of their parents' behavior but that their skills, motivation, and behavior affect their parents in many ways (Dumont et al., 2014; Nurmi & Silinskas, 2014). For example, low academic achievement and motivational and behavioral difficulties can create pressure in parents, which can lead to controlling behavior (Grolnick, 2003). Indeed, prior studies reported that parents tend to use more intrusive and controlling homework involvement strategies if their child has low academic achievement (Dumont et al., 2014; Grolnick et al., 2002; Ng et al., 2004; Niggli et al., 2007; Pomerantz & Eaton, 2001). Similarly, parents have been found to use less adaptive involvement strategies (i.e., less responsiveness and structure) if students show unfavorable homework behavior (i.e., low effort and high procrastination; Dumont et al., 2014). However, only relatively few studies simultaneously investigated links in both directions on the basis of longitudinal data (Dumont et al., 2014; Silinskas et al., 2013; Xu et al., 2018). In line with this, Barger et al. (2019) argued that more studies using cross-lagged designs are needed to explore

reciprocal processes in which parents' and students' characteristics influence each other and shape students' development over time.

The theoretical concept that pressure resulting from children's low academic functioning leads to controlling behavior can be transferred to supplementary support outside the family. Although institutional homework educators or private tutors are less personally involved in students' academic success than parents, students' unproductive learning behavior or low academic achievement may still favor controlling behavior. Institutional homework assistants or private tutors who assist students with their homework might become more controlling when students demonstrate unproductive homework behavior (i.e., procrastination or low effort) because this might lead to criticism from parents if students still have to finish homework when they come home (Sauerwein & Rother, 2022). Moreover, as private tutoring is expected to promote students' academic achievement, tutors might experience pressure if their tutees have low grades. However, research that tests whether students' academic functioning predicts the quality of supplementary support outside students' families (i.e., institutional homework assistance or private tutoring) is still scarce.

Taken together, on the basis of the offer-use model and a variety of developmental theories (Grolnick, 2003; Magnusson, 1992; Sameroff, 2009), it can be assumed that students' individual characteristics and the quality of the supplementary support they get are reciprocally related. However, only a few studies tested reciprocal links between the two constructs and these studies focused exclusively on parental homework assistance (Dumont et al., 2014; Silinskas et al., 2013; Xu et al., 2018). Thus, there are research desiderata concerning studies that test reciprocal relationships between students' individual characteristics and supplementary support quality as well as concerning research that addresses the role of students' academic functioning in the context of supplementary support outside students' families (i.e., institutional homework assistance or private tutoring).

In Section 1.6, the main research desiderata that the present dissertation addresses are summed up before the three leading research questions are presented. In Section 1.7, the aims and study designs of the empirical studies that were conducted to answer the research questions are presented.

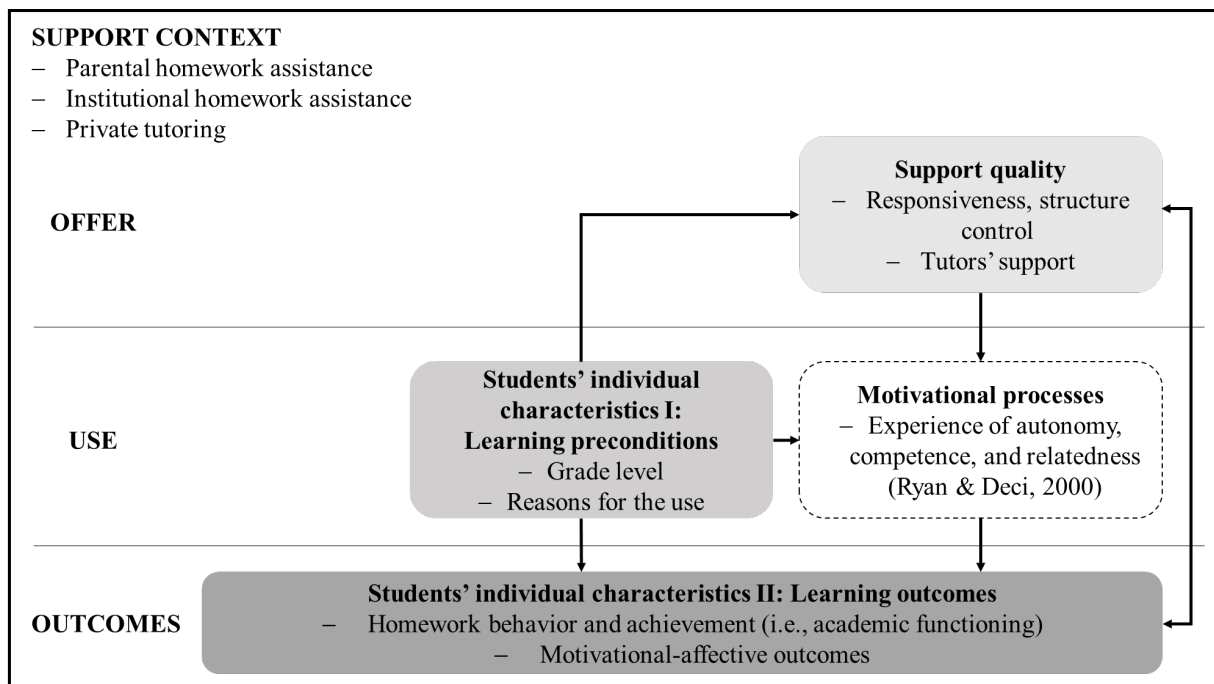
1.6 Research questions of the present dissertation

The present dissertation aims to address research desiderata concerning the effectiveness of supplementary academic support for students' academic functioning (e.g., their achievement and motivation). To do so, it focuses on three supplementary support options that are frequently

used by students after their regular school day ends: parental homework assistance, institutional homework assistance, and private tutoring. On the basis of an offer-use model for supplementary support, it addresses research desiderata concerning (1) the quality of the supplementary support, (2) the role of students' individual characteristics, and (3) reciprocal associations between support quality and students' individual characteristics. In the offer-use model, it is assumed that the links between the offer, the use, and the outcomes of supplementary support are mediated by students' cognitive, motivational-affective, and behavioral learning processes within a given support context. Due to their high importance for students' experience, learning, and performance (Pintrich & Schunk, 2002; Vansteenkiste et al., 2004; Vansteenkiste et al., 2005), the present work focused on motivational processes that occur during supplementary support. Figure 2 illustrates the central variables of the present dissertation (i.e., support quality and students' individual characteristics in terms of their individual learning preconditions and their learning outcomes) as well as the theoretical mediator variable (i.e., motivational learning processes).

Figure 2

Offer-use model displaying the central variables of the present dissertation: the quality of supplementary support, students' individual learning preconditions, and their learning outcomes



Note. Adapted from Seidel (2014) and Lohaus and Wild (2020).

Regarding the quality of supplementary support, the present work aimed to test the generalizability of prior studies that have shown that students' academic functioning benefits from high-quality homework assistance that is aligned with students' basic psychological needs for competence, autonomy, and relatedness. Because prior studies almost exclusively focused on parental homework assistance and their findings were only consistent for secondary schools, the present study investigated the effects of the quality of supplementary support in other supplementary support contexts (i.e., institutional homework assistance and private tutoring) and in elementary school. Concerning the role of students' individual characteristics in the effectiveness of supplementary support, their learning preconditions were investigated in terms of their grade level and their (internal vs. external) reasons for using supplementary support. This research is needed because, up until now, only a small number of studies have investigated the moderating role of students' grade level (e.g., Núñez et al., 2015) and students' reasons for using supplementary support (e.g., Kuan, 2011), although it is conceivable that the effectiveness of supplementary support is influenced by students' developmental phase and their motivational preconditions. Finally, the present dissertation addresses the role of students' individual characteristics by investigating reciprocal links between the quality of supplementary support and students' individual characteristics (i.e., their academic functioning) on the basis of longitudinal, cross-lagged data.

The overall aim of the present dissertation was to contribute to the knowledge about how educators in different supplementary academic support contexts should support students with their individual characteristics in order to promote positive learning outcomes. To achieve this, the present work aimed to answer three research questions:

Research Question 1 (RQ1):

Is high-quality (i.e., needs-oriented) supplementary academic support positively related with students' learning outcomes across different contexts?

Research Question 2 (RQ2):

Do students' grade level and their reasons for using supplementary support influence the effectiveness of supplementary support?

Research Question 3 (RQ3):

Are there reciprocal relationships between the quality of supplementary support and students' individual characteristics?

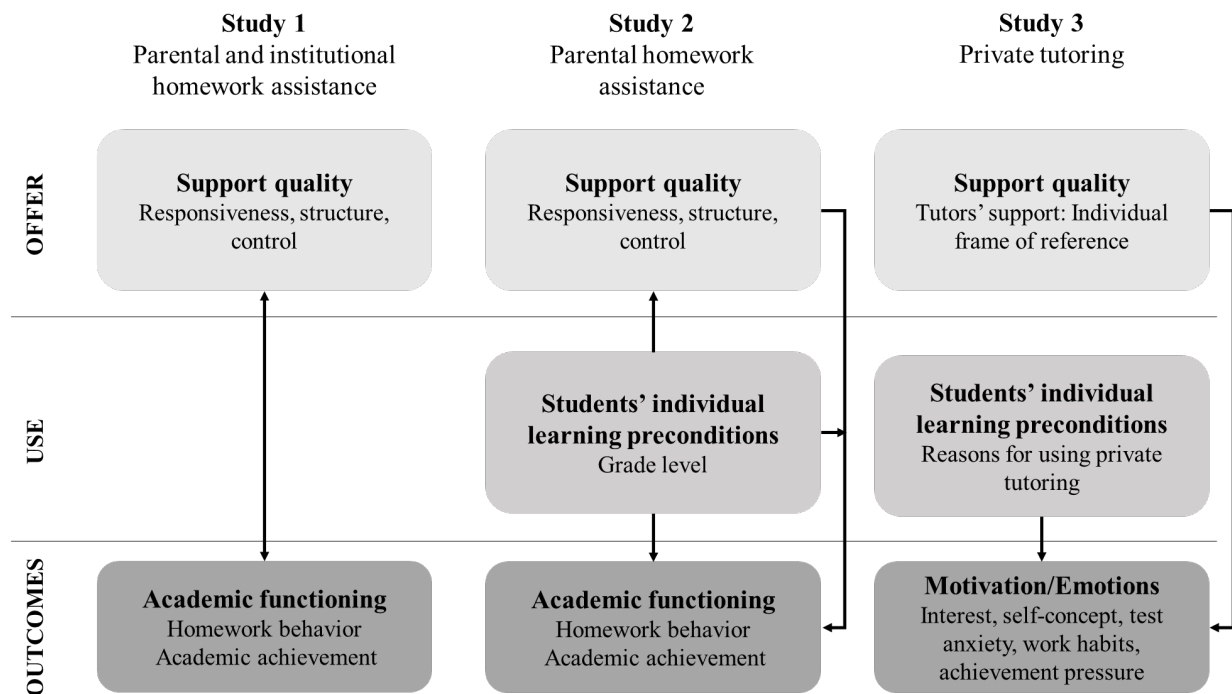
To address the research questions, three empirical studies were conducted. In the next section, a short overview of the aims and the design of each study is given.

1.7 Presentation of the three studies

In the following, the three empirical studies that were conducted to address the research questions are presented. An overview of the three studies and their integration into an offer-use model is given in Figure 3.

Figure 3

Overview of the three empirical studies of the present dissertation, integrated into the offer-use model



Note. Adapted from Seidel (2014) and Lohaus and Wild (2020).

1.7.1 Study 1: Reciprocal relationships between homework assistance and students' academic functioning

The first study investigated reciprocal links between the support quality of homework assistance and students' learning outcomes (i.e., their academic functioning in terms of their homework behavior and academic achievement). Given that findings on the quality of parental homework assistance have only been consistent at the secondary level and that research on the quality of homework assistance given at schools is scarce, Study 1 addressed parental and institutional (i.e., scholastic) homework assistance at the elementary level. To measure the quality of

homework assistance, dimensions derived from the SDT were used, namely, responsiveness, structure, and control (Dumont et al., 2014). On the basis of findings from research at the secondary level and the assumptions made by the SDT, responsiveness and structure were expected to be positively related with students' academic functioning in both homework contexts, whereas control was assumed to be negatively associated with students' academic functioning. To test the hypotheses, cross-lagged panel models were calculated on the basis of longitudinal data comprising two points of measurement that were collected for the purpose of the study.

1.7.2 Study 2: The role of students' grade level in the effectiveness of parental homework assistance

The second study addressed the role of students' individual learning preconditions in terms of their grade level in the effectiveness of parental homework assistance for students' academic functioning in secondary school. On the basis of the stage-environment fit theory (Eccles et al., 1993), it was assumed that the quality of parental homework assistance might change over the course of secondary schooling and that these changes could explain declines in academic functioning, which many students experience during adolescence. Moreover, Study 2 investigated whether the links between the quality of parental homework assistance and students' academic functioning changed over the course of secondary schooling. Structural equation modeling (Little, 2013) was applied on the basis of a large sample of secondary school students from Grades 5 to 9. In the models, students' grade level served in two different ways. First, it was tested as a predictor of the quality of parental homework assistance. In this context, indirect effects of students' grade level on academic functioning via the quality of parental homework assistance were additionally tested. Second, students' grade level was studied as a moderator variable in the associations between the quality dimensions and students' academic functioning.

1.7.3 Study 3: Motivational-affective effects of private tutoring

The third study examined the motivational-affective effects of attending private tutoring, of tutors' support in terms of using an individual frame of reference, and of students' reasons for using private tutoring. This was done in two steps. First, tutored and nontutored students were compared regarding five outcomes (i.e., interest, academic self-concept, test anxiety, work habits, and achievement pressure). Second, within the group of tutored students, the effects of tutors' use of an individual frame of reference and students' reasons for attending private tutoring (i.e., internal and external reasons) were investigated. Additionally, within the group

of tutored students, we tested whether the duration and intensity of private tutoring were related with achievement pressure. The data were drawn from the German *Competencies and Attitudes of Students* study (KESS) and made it possible to control for students' prior achievement and motivation and to conduct domain-specific analyses (for mathematics, German, and English). In the analyses, path models were computed on the basis of all (i.e., nontutored and tutored) students in the first step and within the groups of tutored students in the three subjects in the second step.

1.8 References

- Aldrup, K., Klusmann, U., & Lüdtke, O. (2020). Reciprocal associations between students' mathematics anxiety and achievement: Can teacher sensitivity make a difference? *Journal of Educational Psychology, 112*(4), 735–750. <https://doi.org/10.1037/edu0000398>
- Barger, M. M., Kim, E. M., Kuncel, N. R., & Pomerantz, E. M. (2019). The relation between parents' involvement in children's schooling and children's adjustment: A meta-analysis. *Psychological Bulletin, 145*(9), 855–890. <https://doi.org/10.1037/bul0000201>
- Bhargava, S., & Witherspoon, D. P. (2015). Parental involvement across middle and high school: Exploring contributions of individual and neighborhood characteristics. *Journal of Youth and Adolescence, 44*(9), 1702–1719. <https://doi.org/10.1007/s10964-015-0334-9>
- Bray, M. (2003). *Adverse effects of private supplementary tutoring: Ethics and corruption in education*. Unesco International Institute for Educational Planning.
- Brisson, B. M., & Theis, D. (2020). Traditionelle Hausaufgaben oder integrierte Lernzeiten? Ein Vergleich der Erfahrungen und Leistungsentwicklungen von Schülerinnen und Schülern mit unterschiedlichen Übungsformaten [Traditional homework or integrated learning time? A Comparison of Students' Experiences and Performance Developments with Different Practice Formats.]. *Psychologie in Erziehung Und Unterricht, 67*(4), 294–312. <https://doi.org/10.2378/peu2020.art22d>
- Burton, K. D., Lydon, J. E., D'Alessandro, D. U., & Koestner, R. (2006). The differential effects of intrinsic and identified motivation on well-being and performance: Prospective, experimental, and implicit approaches to self-determination theory. *Journal of Personality and Social Psychology, 91*(4), 750–762. <https://doi.org/10.1037/0022-3514.91.4.750>

- Cooper, H. C., Lindsay, J. L., & Nye, B. (2000). Homework in the home: How student, family, and parenting-style differences relate to the homework process. *Contemporary Educational Psychology*, 25(4), 464–487. <https://doi.org/10.1006/ceps.1999.1036>
- Cooper, H., & Valentine, J. C. (2001). Using research to answer practical questions about homework. *Educational Psychologist*, 36(3), 143–153. https://doi.org/10.1207/S15326985EP3603_1
- Cosden, M., Morrison, G., Gutierrez, L., & Brown, M. (2004). The effects of homework programs and after-school activities on school success. *Theory into Practice*, 43(3), 220–226. https://doi.org/10.1207/s15430421tip4303_8
- Cunha, J., Xu, J., Rosário, P., & Núñez, J. C. (2018). Validity and reliability of the Parental Homework Management Scale. *Psicothema*, 30(3), 337–343. <https://doi.org/10.7334/psicothema2017.426>
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26(3-4), 325–346.
- Dettmers, S., Yotyodying, S., & Jonkmann, K. (2020). Elterliche schulbezogene Erziehung in der Retrospektive: Zusammenhänge zwischen autonomieunterstützender Struktur bei der Hausaufgabenerledigung und Interesse, Persistenz und Wohlbefinden im Studium [Retrospective perceptions of school-related parenting: Effects of parental provision of autonomy-supportive structure]. *Psychologie in Erziehung Und Unterricht*, 67(4), 279–293. <https://doi.org/10.2378/peu2020.art21d>
- Dumont, H., Trautwein, U., & Lüdtke, O. (2012). Familiärer Hintergrund und die Qualität elterlicher Hausaufgabenhilfe [Family background and the quality of parental homework involvement]. *Psychologie in Erziehung Und Unterricht*, 59(2), 109–121. <https://doi.org/10.2378/peu2012.art08d>
- Dumont, H., Trautwein, U., Nagy, G., & Nagengast, B. (2014). Quality of parental homework involvement: Predictors and reciprocal relations with academic functioning in the reading domain. *Journal of Educational Psychology*, 106(1), 144–161. <https://doi.org/10.1037/a0034100>
- Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist*, 48(2), 90–101. <https://doi.org/10.1037/0003-066X.48.2.90>

- Eccles, J. S., & Roeser, R. W. (2009). Schools, academic motivation, and stage-environment fit. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of Adolescent Psychology*. Wiley. <https://doi.org/10.1002/9780470479193.adlpsy001013>
- Fernández-Alonso, R., Álvarez-Díaz, M., García-Crespo, F. J., Woitschach, P., & Muñoz, J. (2022). Should we help our children with homework? A meta-analysis using PISA data. *Psicothema*, 34(1), 56–65. <https://doi.org/10.7334/psicothema2021.65>
- Fischer, N., Kuhn, H. P., & Klieme, E. (2009). Was kann die Ganztagsschule leisten? Wirkungen ganztägiger Beschulung auf die Entwicklung von Lernmotivation und schulischer Performance nach dem Übergang in die Sekundarstufe [What do all-day schools accomplish? Impact of all-day schooling on the development of learning motivation and school performance after transition to the secondary level]. *Ganztägige Bildung und Betreuung, Zeitschrift für Pädagogik*. <https://doi.org/10.25656/01:6963>
- Fischer, N., & Theis, D. (2014). Extracurricular participation and the development of school attachment and learning goal orientation: The impact of school quality. *Developmental Psychology*, 50(6), 1788–1793. <https://doi.org/10.1037/a0036705>
- Gonida, E. N., & Cortina, K. S. (2014). Parental involvement in homework: Relations with parent and student achievement-related motivational beliefs and achievement. *The British Journal of Educational Psychology*, 84(Pt 3), 376–396. <https://doi.org/10.1111/bjep.12039>
- Gordon, C. S., Pink, M., & Jones, S. C. (2020). Children and tutor's perspectives on a homework support program in Melbourne: A university-school partnership. *Health & Social Care in the Community*, 28(5), 1611–1621. <https://doi.org/10.1111/hsc.12986>
- Green, C. L., Walker, J. M. T., Hoover-Dempsey, K. V., & Sandler, H. M. (2007). Parents' motivations for involvement in children's education: An empirical test of a theoretical model of parental involvement. *Journal of Educational Psychology*, 99(3), 532–544. <https://doi.org/10.1037/0022-0663.99.3.532>
- Grolnick, W. S. (2003). *The psychology of parental control: How well-meant parenting backfires*. Lawrence Erlbaum Associates Publishers.
- Grolnick, W. S., Gurland, S. T., DeCoursey, W., & Jacob, K. (2002). Antecedents and consequences of mothers' autonomy support: An experimental investigation. *Developmental Psychology*, 38(1), 143–155. <https://doi.org/10.1037/0012-1649.38.1.143>

- Grolnick, W. S., & Pomerantz, E. M. (2022). Should parents be involved in their children's schooling? *Theory into Practice*, 1–11.
<https://doi.org/10.1080/00405841.2022.2096382>
- Guill, K., Bahr, I., & Ömeroğulları, M. (2020). Qualität der Hausaufgabenhilfe in Elternhaus und Nachhilfeunterricht als Prädiktoren des hausaufgabenbezogenen Arbeitsverhaltens [Quality of homework support in the parental home and private tutoring as predictors of homework-related study behavior]. *Psychologie in Erziehung Und Unterricht*, 67(4). <https://doi.org/10.2378/peu2020.art08d>
- Guill, K., Lüdtke, O., & Köller, O. (2020). Assessing the instructional quality of private tutoring and its effects on student outcomes: Analyses from the German National Educational Panel Study. *The British Journal of Educational Psychology*, 90(2), 282–300. <https://doi.org/10.1111/bjep.12281>
- Guill, K., Ömeroğulları, M., & Köller, O. (2021). Intensity and content of private tutoring lessons during German secondary schooling: effects on students' grades and test achievement. *European Journal of Psychology of Education*, 37(4), 1093–1114.
<https://doi.org/10.1007/s10212-021-00581-x>
- Guo, Y., Chen, Q., Zhai, S., & Pei, C. (2020). Does private tutoring improve student learning in China? Evidence from the China Education Panel Survey. *Asia & the Pacific Policy Studies*, 7(3), 322–343. <https://doi.org/10.1002/app5.310>
- Gutman, L. M., & Eccles, J. S. (2007). Stage-environment fit during adolescence: Trajectories of family relations and adolescent outcomes. *Developmental Psychology*, 43(2), 522–537. <https://doi.org/10.1037/0012-1649.43.2.522>
- Haag, L. (2007). *Wirksamkeit von Nachhilfeunterricht: Eine Längsschnittanalyse* [Effectiveness of private tutoring: A longitudinal analysis]. Schülerhilfe.
- Hajar, A. (2018). Exploring Year 6 pupils' perceptions of private tutoring: Evidence from three mainstream schools in England. *Oxford Review of Education*, 44(4), 514–531.
<https://doi.org/10.1080/03054985.2018.1430563>
- Helmke, A., & Weinert, F. E. (1997). Bedingungsfaktoren schulischer Leistungen [Conditional factors of academic performance]. In F. E. Weinert (Ed.), *Enzyklopädie der Psychologie, Bd. 3: Psychologie des Unterrichts und der Schule* (pp. 71–176). Hogrefe.
- Hoover-Dempsey, V. K., & Sandler, M. H. (1995). Parental involvement in children's education: Why does it make a difference? *Teachers College Record*, 97(2), 310–331.

- Huang, D., & Cho, J. (2009). Academic enrichment in high-functioning homework afterschool programs. *Journal of Research in Childhood Education*, 23(3), 382–392. <https://doi.org/10.1080/02568540909594668>
- Kang, H., Raffaelli, M., Bowers, J., Munoz, L., & Simpkins, S. (2017). Parental participation in the process of youth joining a program: Perspectives from adolescents and parents. *Family Relations*, 66(2), 258–272. <https://doi.org/10.1111/fare.12247>
- Kim, K. R., & Seo, E. H. (2015). The relationship between procrastination and academic performance: A meta-analysis. *Personality and Individual Differences*, 82, 26–33. <https://doi.org/10.1016/j.paid.2015.02.038>
- Kim, S. W., & Fong, V. L. (2014). Homework help, achievement in middle school, and later college attainment in China. *Asia Pacific Education Review*, 15(4), 617–631. <https://doi.org/10.1007/s12564-014-9350-9>
- Kriegbaum, K., Becker, N., & Spinath, B. (2018). The relative importance of intelligence and motivation as predictors of school achievement: A meta-analysis. *Educational Research Review*, 25, 120–148. <https://doi.org/10.1016/j.edurev.2018.10.001>
- Kuan, P.-Y. (2011). Effects of cram schooling on mathematics performance: Evidence from junior high students in Taiwan. *Comparative Education Review*, 55(3), 342–368. <https://doi.org/10.1086/659142>
- Lepper, M. R., Corpus, J. H., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology*, 97(2), 184–196. <https://doi.org/10.1037/0022-0663.97.2.184>
- Liao, X., & Huang, X. (2018). Who is more likely to participate in private tutoring and does it work? Evidence from PISA (2015). *ECNU Review of Education*, 1(3), 69–95. <https://doi.org/10.30926/ecnuroe2018010304>
- Lin, A. R., Dawes, N. P., Simpkins, S. D., & Gaskin, E. R. (2022). Making the decision to participate in organized after-school activities: Perspectives from Mexican-origin adolescents and their parents. *Journal of Adolescent Research*, 37(3), 378–408. <https://doi.org/10.1177/0743558420967116>
- Little, T. D. (2013). *Longitudinal structural equation modeling*. Guilford Press.
- Lohaus, A., & Wild, E. (2020). Extracurriculare Förderangebote für benachteiligte Kinder und deren Eltern: Ein Angebot-Aneignungs-Modell zur Inanspruchnahme und Wirkung [Extracurricular support offers for disadvantaged children and their parents: An offer-adoption model for their use and effects]. *Zeitschrift Für Pädagogische Psychologie*, 35(1), 1–10. <https://doi.org/10.1024/1010-0652/a000268>

- Magnusson, D. (1992). Individual development: A longitudinal perspective. *European Journal of Personality*, 6(2), 119–138. <https://doi.org/10.1002/per.2410060205>
- Marsh, H. W., & Martin, A. J. (2011). Academic self-concept and academic achievement: Relations and causal ordering. *The British Journal of Educational Psychology*, 81(Pt 1), 59–77. <https://doi.org/10.1348/000709910X503501>
- Mischo, C., & Haag, L. (2002). Expansion and effectiveness of private tutoring. *European Journal of Psychology of Education*, 17(3), 263–273.
- Mischo, C., & van Kessel, M. (2005). Wie wirkt Nachhilfe? Mögliche Wirkfaktoren im Wissen der Nachhilfelehrer [How does private tutoring work? Potential impact factors in the knowledge of tutors]. *Empirische Pädagogik*, 19(1), 28–46.
- Moroni, S., Dumont, H., Trautwein, U., Niggli, A., & Baeriswyl, F. (2015). The need to distinguish between quantity and quality in research on parental involvement: The example of parental help with homework. *The Journal of Educational Research*, 108(5), 417–431. <https://doi.org/10.1080/00220671.2014.901283>
- Ng, F. F.-Y., Kenney-Benson, G. A., & Pomerantz, E. M. (2004). Children's achievement moderates the effects of mothers' use of control and autonomy support. *Child Development*, 75(3), 764–780. <https://doi.org/10.1111/j.1467-8624.2004.00705.x>
- Niggli, A., Trautwein, U., Schnyder, I., Lüdtke, O., & Neumann, M. (2007). Elterliche Unterstützung kann hilfreich sein, aber Einmischung schadet: Familiärer Hintergrund, elterliches Hausaufgabenengagement und Leistungsentwicklung [Parental Homework Support can be Beneficial, but Parental Intrusion is Detrimental:]. *Psychologie in Erziehung Und Unterricht*, 54, 1–14.
- Nordt, G. (2013). *Lernen und Fördern in der Hausaufgabenpraxis der offenen Ganztagsgrundschule in Nordrhein-Westfalen: Eine qualitative Studie aus der Perspektive der pädagogischen Kräfte und der Kinder* [Learning and support in the homework practice of open full-day elementary schools in North Rhine-Westphalia]. Waxmann.
- Núñez, J. C., Epstein, J. L., Suárez, N., Rosário, P., Vallejo, G., & Valle, A. (2017). How do student prior achievement and homework behaviors relate to perceived parental involvement in homework? *Frontiers in Psychology*, 8, 1217. <https://doi.org/10.3389/fpsyg.2017.01217>
- Núñez, J. C., Suárez, N., Rosário, P., Vallejo, G., Valle, A., & Epstein, J. L. (2015). Relationships between perceived parental involvement in homework, student homework behaviors, and academic achievement: differences among elementary,

- junior high, and high school students. *Metacognition and Learning*, 10(3), 375–406.
<https://doi.org/10.1007/s11409-015-9135-5>
- Nurmi, J.-E., & Silinskas, G. (2014). Parents and their children's school lives—commentary on the special issue, 'Parents' role in children's school lives'. *The British Journal of Educational Psychology*, 84(Pt 3), 454–458. <https://doi.org/10.1111/bjep.12046>
- Ömeroğulları, M., Guill, K., & Köller, O. (2020). Effectiveness of private tutoring during secondary schooling in Germany: Do the duration of private tutoring and tutor qualification affect school achievement? *Learning and Instruction*, 66.
<https://doi.org/10.1016/j.learninstruc.2020.101306>
- Otto, B., & Karbach, J. (2019). The effects of private tutoring on students' perception of their parents' academic involvement and the quality of their parent-child relationship. *Educational Psychology*, 39(7), 923–940.
<https://doi.org/10.1080/01443410.2019.1610725>
- Park, H., Buchmann, C., Choi, J., & Merry, J. J. (2016). Learning beyond the school walls: Trends and implications. *Annual Review of Sociology*, 42(1), 231–252.
<https://doi.org/10.1146/annurev-soc-081715-074341>
- Patall, E. A., Cooper, H., & Robinson, J. C. (2008). Parent involvement in homework: A research synthesis. *Review of Educational Research*, 78(4), 1039–1101.
<https://doi.org/10.3102/0034654308325185>
- Pekrun, R., Lichtenfeld, S., Marsh, H. W., Murayama, K., & Goetz, T. (2017). Achievement emotions and academic performance: Longitudinal models of reciprocal effects. *Child Development*, 88(5), 1653–1670. <https://doi.org/10.1111/cdev.12704>
- Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: Theory, research, and applications* (2nd ed.).
- Pomerantz, E. M., & Eaton, M. M. (2001). Maternal intrusive support in the academic context: Transactional socialization processes. *Developmental Psychology*, 37(2), 174–186. <https://doi.org/10.1037/0012-1649.37.2.174>
- Ragusa, A., González-Bernal, J., Trigueros, R., Caggiano, V., Navarro, N., Minguez-Minguez, L. A., Obregón, A. I., & Fernandez-Ortega, C. (2023). Effects of academic self-regulation on procrastination, academic stress and anxiety, resilience and academic performance in a sample of Spanish secondary school students. *Frontiers in Psychology*, 14, 1073529. <https://doi.org/10.3389/fpsyg.2023.1073529>

- Ramdass, D., & Zimmerman, B. J. (2011). Developing self-regulation skills: The important role of homework. *Journal of Advanced Academics*, 22(2), 194–218.
<https://doi.org/10.1177/1932202X1102200202>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78.
<https://doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R. M., & Deci, E. L. (2017). *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness*. Guilford Press.
<https://doi.org/10.1521/978.14625/28806>
- Sameroff, A. (2009). The transactional model. In A. Sameroff (Ed.), *The transactional model of development: How children and contexts shape each other* (pp. 3–21). American Psychological Association. <https://doi.org/10.1037/11877-001>
- Sauerwein, M., & Rother, P. (2022). Hilfestellung in der Hausaufgabenbetreuung und den Lernzeiten aus der Perspektive von Schüler*innen [Help in homework supervision and study periods from the perspective of students]. *Zeitschrift Für Erziehungswissenschaft*. <https://doi.org/10.1007/s11618-022-01071-6>
- Seidel, T. (2014). Angebots-Nutzungs-Modelle in der Unterrichtspsychologie. Integration von Struktur- und Prozessparadigma [Offer-use models in instructional psychology. Integration of structure and process paradigm]. <https://doi.org/10.25656/01:14686>
- Shubert, J., Wray-Lake, L., & McKay, B. (2020). Looking ahead and working hard: How school experiences foster adolescents' future orientation and perseverance. *Journal of Research on Adolescence: The Official Journal of the Society for Research on Adolescence*, 30(4), 989–1007. <https://doi.org/10.1111/jora.12575>
- Silinskas, G., & Kikas, E. (2019). Parental involvement in math homework: Links to children's performance and motivation. *Scandinavian Journal of Educational Research*, 63(1), 17–37. <https://doi.org/10.1080/00313831.2017.1324901>
- Silinskas, G., Niemi, P., Lerkkanen, M.-K., & Nurmi, J.-E. (2013). Children's poor academic performance evokes parental homework assistance—but does it help? *International Journal of Behavioral Development*, 37(1), 44–56.
<https://doi.org/10.1177/0165025412456146>
- Stecher, L., Radisch, F., Fischer, N., & Klieme, E. (2007). Bildungsqualität außerunterrichtlicher Angebote in der Ganztagschule [Educational quality in extra-curricular and out-of-school activities]. *Zeitschrift Für Soziologie*(4).

- Steinmann, I., Strietholt, R., & Caro, D. (2019). Participation in extracurricular activities and student achievement: Evidence from German all-day schools. *School Effectiveness and School Improvement*, 30(2), 155–176.
<https://doi.org/10.1080/09243453.2018.1540435>
- Steinmayr, R., Crede, J., McElvany, N., & Wirthwein, L. (2015). Subjective well-being, test anxiety, academic achievement: Testing for reciprocal effects. *Frontiers in Psychology*, 6, 1994. <https://doi.org/10.3389/fpsyg.2015.01994>
- Streber, D., Haag, L., & Götz, T. (2011). *Erfolgreiche Nachhilfe: Kann das jeder oder bedarf es besonderer Qualifikationen?* [Successful tutoring: Can anyone do it or does it require special qualifications?]. <https://kops.uni-konstanz.de/handle/123456789/18394>
- Symonds, J., & Hargreaves, L. (2016). Emotional and motivational engagement at school transition. *The Journal of Early Adolescence*, 36(1), 54–85.
<https://doi.org/10.1177/0272431614556348>
- Trautwein, U., Lüdtke, O., Schnyder, I., & Niggli, A. (2006). Predicting homework effort: Support for a domain-specific, multilevel homework model. *Journal of Educational Psychology*, 98(2), 438–456. <https://doi.org/10.1037/0022-0663.98.2.438>
- van Eerde, W. (2003). A meta-analytically derived nomological network of procrastination. *Personality and Individual Differences*, 35(6), 1401–1418.
[https://doi.org/10.1016/S0191-8869\(02\)00358-6](https://doi.org/10.1016/S0191-8869(02)00358-6)
- Vansteenkiste, M., Simons, J., Lens, W., Sheldon, K. M., & Deci, E. L. (2004). Motivating learning, performance, and persistence: The synergistic effects of intrinsic goal contents and autonomy-supportive contexts. *Journal of Personality and Social Psychology*, 87(2), 246–260. <https://doi.org/10.1037/0022-3514.87.2.246>
- Vansteenkiste, M., Zhou, M., Lens, W., & Soenens, B. (2005). Experiences of autonomy and control among chinese learners: Vitalizing or immobilizing? *Journal of Educational Psychology*, 97(3), 468–483. <https://doi.org/10.1037/0022-0663.97.3.468>
- Vieluf, S., Praetorius, A.-K., Rakoczy, K., Kleinknecht, M., & Pietsch, M. (2020). Angebots-Nutzungs-Modelle der Wirkweise des Unterrichts. Ein kritischer Vergleich verschiedener Modellvarianten [Offer-use models of the impact of teaching. A critical comparison of different model variants]. *Empirische Forschung zu Unterrichtsqualität. Theoretische Grundfragen und quantitative Modellierungen, Zeitschrift für Pädagogik*. <https://doi.org/10.25656/01:25864>

- Walker, J., Hoover-Dempsey, K., Whetsel, D., & Green, C. (2004). Parental involvement in homework: A review of current research and its implications for teachers, after school program staff, and parent leaders.
- Wei, J., Pomerantz, E. M., Ng, F. F.-Y., Yu, Y., Wang, M., & Wang, Q. (2022). Do the effects of parents' involvement in youth's academic adjustment vary with youth's developmental phase? A longitudinal investigation in China. *Contemporary Educational Psychology*, 71, 102118. <https://doi.org/10.1016/j.cedpsych.2022.102118>
- Weidinger, A. F., Spinath, B., & Steinmayr, R. (2020). The value of valuing math: Longitudinal links between students' intrinsic, attainment, and utility values and grades in math. *Motivation Science*, 6(4), 413–422. <https://doi.org/10.1037/mot0000179>
- Wild, E., & Gerber, J. (2009). Lernlust statt Lernfrust - Evaluation eines Elterstrainings zur Verringerung von Hausaufgabenkonflikten bei Schülern mit Lernschwierigkeiten [Evaluation of parent training to reduce homework conflicts among pupils with learning difficulties]. *Psychologie in Erziehung Und Unterricht*, 56, 303–318.
- Wild, E., & Remy, K. (2002). Quantität und Qualität der elterlichen Hausaufgabenbetreuung von Drittklässlern in Mathematik [Quantity and quality of parental homework supervision of third graders in mathematics]. *Bildungsqualität von Schule: Schulische und außerschulische Bedingungen mathematischer, naturwissenschaftlicher und überfachlicher Kompetenzen, Zeitschrift für Pädagogik*. <https://doi.org/10.25656/01:3952>
- Xu, J., Du, J., Wu, S., Ripple, H., & Cosgriff, A. (2018). Reciprocal effects among parental homework support, effort, and achievement? An empirical investigation. *Frontiers in Psychology*, 9, 2334. <https://doi.org/10.3389/fpsyg.2018.02334>
- Zhang, E., & Liu, Y. (2022). Effects of private tutoring intervention on students' academic achievement: A systematic review based on a three-level meta-analysis model and robust variance estimation method. *International Journal of Educational Research*, 112, 101949. <https://doi.org/10.1016/j.ijer.2022.101949>
- Zimmer-Gembeck, M. J., Chipuer, H. M., Hanisch, M., Creed, P. A., & McGregor, L. (2006). Relationships at school and stage-environment fit as resources for adolescent engagement and achievement. *Journal of Adolescence*, 29(6), 911–933. <https://doi.org/10.1016/j.adolescence.2006.04.008>

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STUDY 1: RECIPROCAL RELATIONSHIPS BETWEEN PARENTAL AND SCHOLASTIC HOMEWORK ASSISTANCE AND STUDENTS' ACADEMIC FUNCTIONING AT ELEMENTARY SCHOOL

Benckwitz, L., Kohl, K., Roloff, J., Lüdtke, O., & Guill, K. (2023). Reciprocal relationships between parental and scholastic homework assistance and students' academic functioning at elementary school. *Frontiers in Psychology, 14*. <https://doi.org/10.3389/fpsyg.2023.1106362>

Abstract

Homework assistance is provided both by parents and by institutions, for example, full-day schools. Previous research found evidence that the quality of homework assistance – measured by three dimensions derived from the self-determination theory, namely, responsiveness, structure, and control – is reciprocally related with students' academic functioning (i.e., achievement and homework behavior). However, findings on parental homework assistance have been consistent only for the secondary level, whereas elementary school students have been studied less and previous results obtained for this population are inconclusive. Moreover, research on homework assistance that is given at school is scarce. Therefore, the present study aimed to investigate whether reciprocal associations between the quality of homework assistance and students' academic functioning in elementary school can be found (1) for parental homework assistance and (2) for scholastic homework assistance. We calculated cross-lagged panel models based on longitudinal data from 335 German fourth graders collected in autumn 2019 (September and October) and winter 2020 (February and March). The analyses for scholastic homework assistance were based on a subsample of 112 students. Whereas responsiveness and structure did not predict students' outcomes in the way we expected, control had unfavorable relationships in both homework settings. Moreover, parental control was reciprocally related with students' mean grades in three subjects. The positive forms of homework assistance (responsiveness and structure) were predicted by different indicators of academic functioning in the two homework settings.

Keywords: parental homework assistance, homework assistance at school, homework behavior, academic functioning, academic achievement, elementary school

2.1 Introduction

Parents can be involved in their children's school career in various ways, for example, in school-to-home communication, involvement at school, and involvement in learning activities at home (Epstein, 1986). Although there has been discussion about the justification of homework due to the high costs for children, parents, and teachers (e.g., time-related costs or arguments within the family; Dumont et al., 2012; Núñez et al., 2015; Trautwein et al., 2006), homework is an integral part of most students' daily life (Cooper et al., 2006). Moreover, previous research has found largely positive effects of the completion of homework tasks on students' academic achievement (Cooper et al., 2006; Fan et al., 2017). Thus, parental homework assistance can be considered to be a form of parental involvement that is both very common and important for children's educational careers (Patall et al., 2008). At the same time, homework assistance is now often taken over or supported by institutions, for example, full-day schools. The importance of scholastic homework assistance in Germany has grown due to the demand for the compatibility of family and work life and also the demand to provide better learning conditions for all students in the context of social inequalities in education (Nordt, 2020; Sauerwein & Rother, 2022). Moreover, scholastic homework assistance has the potential to relieve families because parental homework assistance often leads to conflicts between parents and children (Dumont et al., 2012).

Prior quantitative research on the relationship of homework assistance with students' outcomes focused almost exclusively on parental homework assistance, and literature on scholastic homework assistance is scarce. Regarding parental homework assistance, previous studies found that it can be both beneficial for and detrimental to students' academic development (Patall et al., 2008; Wilder, 2014; Xu et al., 2018). This suggests that parental homework assistance is not per se a positive resource but that its effects depend on specific circumstances. Along these lines, studies that focused on the quality of parental homework assistance instead of, or in addition to, the quantity showed that the quality is more relevant for students' academic functioning (i.e., achievement and homework behavior; Dumont et al., 2014) than the quantity. These studies described high-quality homework assistance as being characterized by responsiveness, structure, emotional support, and autonomy support, whereas controlling and intrusive parental behavior represents low-quality assistance (Dumont et al., 2014; Guill et al., 2020; Moroni et al., 2015). Prior research provided evidence for bidirectional links, with students' academic functioning being both the outcome and the antecedent of parental homework assistance (e.g., Dumont et al., 2014; Guill et al., 2020; Niggli et al., 2007;

Núñez et al., 2017). This picture has been consistently shown in studies at the secondary level, with multiple studies reporting relationships between the quality of parental homework assistance, students' academic achievement (Dumont et al., 2014; Moroni et al., 2015; Niggli et al., 2007; Núñez et al., 2015), and students' homework behavior (Dumont et al., 2014; Guill et al., 2020; Núñez et al., 2015; Trautwein et al., 2006). However, at the elementary level, the pattern of results is less clear because less research has been conducted and the results varied across studies, across quality indicators of parental homework assistance, and across indicators of students' academic functioning (e.g., Cunha et al., 2018; Núñez et al., 2015; Silinskas et al., 2013).

Due to the inconsistency of the results of previous research at the elementary level, in the present study, we examined whether similar bidirectional links between homework assistance and students' academic functioning that have been found in secondary school can also be found for a sample of elementary school children in Germany. On the basis of the empirical evidence outlined above, we focused on the quality of parental homework assistance and included quality dimensions that have been found to be relevant in secondary school samples, namely, responsiveness, structure, and control (Dumont et al., 2014). In addition, with research on scholastic homework assistance being scarce, we examined these links not only for parental but also for scholastic homework assistance.

2.1.1 The quality of parental homework assistance

Research on the quality of homework assistance (Dumont et al., 2014; Guill et al., 2020; Nordt, 2013) often draws on the self-determination theory (SDT; Ryan & Deci, 2000). The SDT concerns the role that contextual conditions play in motivational and personality development, which makes it a valuable theory to investigate the role of parental and scholastic homework assistance in students' academic functioning. According to the SDT, students' intrinsic motivation, personal growth, and well-being are promoted in learning environments that allow the satisfaction of three innate psychological needs, namely, competence, social relatedness, and autonomy (Deci et al., 1991; Ryan & Deci, 2000). On the basis of the SDT, Dumont et al. (2014) proposed three quality dimensions of parental homework assistance: *responsiveness*, *structure*, and *control*. To measure the quality of parental homework assistance, student reports are commonly used because they offer several benefits (for an overview of the benefits, see Dumont et al., 2014). For example, it has been argued that the child's perception of the parental involvement forms the way in which the child responds to it (Hoover-Dempsey et al., 2005).

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Responsiveness refers to being approachable and supportive during the homework process. For instance, it is characterized by helping the child when they express the need for help, listening to the child's thoughts, and supporting them to overcome obstacles during homework preparation. By showing interest and supportive involvement in the homework of their child, parents can support students' need for social relatedness (Dumont et al., 2014; Guill et al., 2020). Moreover, students' autonomy is supported because the assistance is only provided at the request of the child. Previous research at the secondary level found that homework assistance that was perceived as responsive and supportive was positively related with students' achievement, homework time management, homework effort, and expectancy to be able to master their homework; it was negatively related with homework procrastination (Dumont et al., 2014; Guill et al., 2020; Moroni et al., 2015; Núñez et al., 2015; Trautwein et al., 2006).

Structure during homework assistance refers to setting clear rules and guidelines for homework preparation, for example, by setting the rule that a student has to finish the homework first before meeting friends (Dumont et al., 2014; Guill et al., 2020). Providing a structured learning environment allows students to increase both the time they spend on learning and their learning effectiveness (Carroll, 1963). Therefore, it has the potential to positively affect students' achievement and enhance their competency experience. In previous studies at the secondary level, parental homework assistance that was characterized by high structure was positively associated with students' effort, but no associations with achievement were found (Dumont et al., 2014; Guill et al., 2020).

The third quality dimension, namely, *control*, is characterized by parents interfering without being asked for help or by parents threatening their children with punishment if they do not do their homework properly. It is theoretically assumed to negatively impact students' academic functioning because it undermines their sense of competence and autonomy, by suggesting to the child that they are not able to solve the tasks independently, and their social relatedness, by creating a situation in which the child feels uncomfortable. Control is distinct from structure because it represents decidedly negative aspects of parental behavior, whereas structure refers to positive aspects of parental controlling behavior (Dumont et al., 2014; Grolnick & Pomerantz, 2009; Guill et al., 2020). In contrast to responsive and structuring homework assistance, controlling and intrusive behavior during the homework process showed unfavorable relationships with students' academic functioning at the secondary level, for example, with lower academic achievement, more homework procrastination, less homework persistence, as well as lower academic self-concept, and lower expectancy to be able to master

their homework (Dumont et al., 2012; Guill et al., 2020; Moroni et al., 2015; Trautwein et al., 2006).

To sum up, on the basis of the SDT, it can be theoretically argued that parental *responsiveness* and *structure* have the potential to positively influence students' academic functioning by supporting their psychological needs and, thus, promoting their intrinsic motivation. High intrinsic motivation can be assumed to be favorable for a) students' academic achievement because it promotes high-quality learning (Ryan & Deci, 2020) and for b) students' homework behavior because it is more likely that students make great effort and procrastinate less if they are intrinsically motivated. In contrast, *control* is assumed to be detrimental to students' academic functioning because it undermines students' psychological needs and, thus, decreases their intrinsic motivation. Therefore, in the present study, we used responsiveness, structure, and control to measure the quality of parental homework assistance and we expected to find favorable relationships for responsiveness and structure and unfavorable relationships for control.

2.1.2 Reciprocal relationships between the quality of parental homework assistance and students' academic functioning

Researchers have proposed that parents are likely to adapt their involvement to students' competencies and their level of motivation and behavior (Grolnick & Apostoleris, 2002; Grolnick & Slowiaczek, 1994). Grolnick (2003) discussed different types of pressure related to parental involvement that can evoke controlling behavior in parents and, thus, can contribute to low-quality parental involvement. Among other sources, this pressure can come from contextual factors such as economic stress (referred to as *pressure from above*) or from a child's low academic functioning (referred to as *pressure from below*; Dumont et al., 2014; Grolnick, 2003; Grolnick & Pomerantz, 2022). For example, parents may be alarmed about their child's low academic achievement and, as a reaction to that, feel the need to exercise more control regarding their child's homework (behavior). Along these lines, it has been argued that the relationship between parental involvement and students' academic functioning is reciprocal (Bronstein et al., 2005; Grolnick & Slowiaczek, 1994), with students' academic functioning being both the outcome and the antecedent of parental involvement.

Indeed, previous research at the secondary level has provided evidence for reciprocal links between the quality of parental homework assistance and students' academic functioning: as described above, several studies found that the quality of parental homework assistance predicted children's academic functioning (e.g., Dumont et al., 2014; Guill et al., 2020; Moroni

et al., 2015). Studies that looked at the effects of students' academic functioning on the quality of parental homework assistance or at reciprocal relationships found that low levels of academic functioning (i.e., low achievement, unfavorable homework behavior, low parents' perceptions of their child's efficacy) predicted a lower quality of homework assistance (i.e., more control and interference, lower cognitive engagement and autonomy support; Dumont et al., 2014; Gonida & Cortina, 2014; Niggli et al., 2007; Núñez et al., 2017; Xu et al., 2018). Whereas Grolnick's (2003) theoretical assumptions of *pressure from below* relate to controlling behavior only, Dumont et al. (2014) found effects of students' academic functioning on all three dimensions of parental homework assistance (i.e., low academic functioning was related to lower responsiveness and structure and higher control). In this context, it is noteworthy that Dumont et al. (2014) found that students' homework behavior was linked to the positive forms of homework assistance (responsiveness and structure), whereas achievement was linked to parental control, pointing to the possibility that the individual quality dimensions might be linked differentially to different student outcomes.

In sum, both theoretical assumptions and empirical evidence point to bidirectional relationships between parental homework assistance and students' academic functioning in secondary school. Because elementary school students have been studied less and previous results obtained for this population have been inconclusive, in the present study, we explicitly examined these reciprocal links in a sample of elementary school students.

2.1.3 Homework assistance for elementary school children

Extensive cross-sectional and longitudinal research has studied the relationship between parental homework assistance and students' academic functioning in secondary school (e.g., Dumont et al., 2012; Dumont et al., 2014; Feng et al., 2019; Guill et al., 2020; Moroni et al., 2015; Trautwein et al., 2006; Xu et al., 2018). However, as Nordt (2013) pointed out, findings on older students cannot simply be transferred to younger students. The reasons for this are that both students' needs and their educational environment change over the course of different grade levels and with transitions to different school types. Both Eccles et al. (1993) and Hoover-Dempsey and Sandler (1995) highlighted the importance of the compatibility between students' developmental stage and their educational environment (i.e., its characteristics and demands) for their educational outcomes. They proposed that students benefit most if their educational environment matches their developmental needs and provides opportunities for growth. Thus, although students' needs as proposed by the SDT and the quality dimensions of homework assistance derived from it are generally valid regardless of the developmental stage, it is still

possible that there are age- and grade-level differences in the relative importance of the dimensions and in how easily students' needs can be satisfied. For example, it might be easier for parents to meet younger students' needs because younger children usually have more positive attitudes towards both schoolwork, such as homework, and parental attention, such as help, praise, or interest (Hoover-Dempsey & Sandler, 1995). Moreover, the move from childhood to adolescence and the transition to secondary school increase opportunities for students to experience autonomy outside their home (e.g., by spending more time with their peers), which leads students to be more independent and to gain more autonomy from their parents (Eccles et al., 1993; Hoover-Dempsey & Sandler, 1995). In contrast to secondary school students, younger students might respond less negatively to parental control during homework assistance – as a type of behavior that undermines autonomy – because their need for autonomy is still less pronounced.

Regarding the quality dimensions that have been found to be relevant in secondary school samples (Dumont et al., 2014), prior studies in elementary school samples only found weak evidence for a link between parental responsiveness and students' academic functioning (Núñez et al., 2015; Silinskas & Kikas, 2019). Whereas parental support (which is comparable with responsiveness) did not predict students' achievement in any of the studies, Silinskas and Kikas (2019) found a positive link with students' homework behavior (i.e., increased task persistence). Regarding *structure* at elementary school, to the best of our knowledge, only Cunha et al. (2018) included this dimension of parental homework assistance. They reported a negative correlation of parental environment-time management with students' achievement. Because of the cross-sectional design of the study, the direction of the link is unclear; the negative association might also mirror parents' increasing structure when their children are struggling with their academic achievement. However, bidirectional links between students' academic functioning and the two positive forms of parental homework assistance (i.e., responsiveness and structure) have not yet been studied in elementary school. For parental *control* in elementary school, prior studies also only found weak evidence for links with students' academic functioning. Only Núñez et al. (2015) reported a significant link with students' achievement, whereas other studies did not report significant associations (Gonida & Cortina, 2014; Wu et al., 2022). Studies that looked into bidirectional effects provided first evidence that students' academic functioning (i.e., parents' perceptions of their child's efficacy, students' self-concept, students' reading and math skills) might predict controlling and monitoring parental behavior in elementary school (Gonida & Cortina, 2014; Silinskas et al., 2013; Silinskas & Kikas, 2019). Taken together, with the exception of the associations between students' prior academic functioning and subsequent

controlling parental behavior, findings regarding possible reciprocal associations between the quality of parental homework assistance and students' academic functioning in elementary school are inconclusive.

To sum up, although students' needs as proposed by the SDT and the quality dimensions of parental homework assistance are generally valid regardless of students' developmental stage, it is still possible that there are age-related differences in how easily students' needs can be satisfied and in the relative importance of the quality dimensions. Because prior research in elementary school has been largely inconclusive, we examined whether there are reciprocal relationships between the quality of parental homework assistance and students' academic functioning at the elementary school level that are similar to those that have been found at the secondary school level.

2.1.4 Homework assistance at school

In the past decades, homework assistance has partly shifted from the home to institutional environments. Following Sauerwein and Rother (2022), the increasing prevalence of institutional homework assistance has two major reasons. First, institutional homework assistance takes over part of the care work while parents are working in their jobs and thereby contributes to the compatibility of family and work life. Second, institutional homework assistance has the potential to decrease social inequalities by providing assistance to students who do not receive (high-quality) homework assistance at home (Nordt, 2020). In the context of the present study – elementary school students in Germany – homework assistance outside the students' home is often provided as part of full-day school programs¹. In fact, 89% of all elementary full-day schools offer this type of support (StEG-Konsortium, 2019). Besides full-day schools, homework assistance is also provided by after-school care programs (e.g., *Horte* or *Betreute Grundschulen*), which take place in different settings and have different providers. As the settings are quite similar in all forms of assistance, we subsume them under the term “homework assistance at school” in the present study. Traditionally, German elementary schools were organized as half-day schools, with children spending their afternoon and, thus, their homework time at home. Although full-day programs have been extended in Germany, still only about half of all elementary school students participate in a full-day school program (e.g., in 2019 about 47%; the Standing Conference of the Ministers of Education and Cultural

¹ In Germany, there are three types of full-day schools. The difference between the three types lies in whether the full-day program is compulsory for all students (*gebundene Ganztagschule*), for just some students (*teilgebundene Ganztagschule*), or is an optional addition to compulsory half-day school (*offene Ganztagschule*). Optional full-day programs are the most common type (StEG-Konsortium, 2019).

Affairs in the Federal Republic of Germany, 2021). Homework assistance at school is often organized on a voluntary basis; it takes place in a group setting in the afternoon after regular classes are finished. It is usually provided by pedagogical staff and less often by teachers or university students (Brisson & Theis, 2020; Sauerwein & Rother, 2022). Nordt (2013) described the infrastructure at school, for instance, quiet rooms to work in and the provision of materials, as an advantage of homework assistance at school.

Because the SDT (Ryan & Deci, 2000) proposes universal psychological needs, it can be used across contexts to assess the quality of homework assistance. Therefore, the SDT (Ryan & Deci, 2000) also offers a useful theoretical framework for the assessment of scholastic homework assistance, which is similar to parental homework assistance. Moreover, qualitative empirical research has described quality dimensions that are related with the dimensions derived from the SDT (Gordon et al., 2020; Huang & Cho, 2009; Nordt, 2013). With regard to the quality dimension of *responsiveness*, descriptions of high-functioning homework assistance at school included comparable behavior such as listening to the children's thoughts during homework preparation, creating positive and open environments, offering emotional and social support, and being responsive and empathetic (Gordon et al., 2020; Huang & Cho, 2009; Nordt, 2013). Regarding *structure*, prior studies reported that some homework assistants at school placed high value on setting rules that refer to the organization of the work space (e.g., students should have all important working materials with them; Nordt, 2013). They also reported that developing helpful study skills (e.g., time management, organizational skills) is one important aspect of homework assistance at school (Gordon et al., 2020; Huang & Cho, 2009). Nordt (2013) described *controlling* homework assistance at school as being characterized by many rules (e.g., students should be quiet and should not walk around), by punishments if a student does not follow the rules, by a strict and authoritarian appearance of the supervisor, or by critical feedback that is provided even if the student does not ask for help or for feedback. Moreover, the results obtained by Nordt (2013) provide first indications that the relationship between control at school and students' academic functioning might be reciprocal because some supervisors stated that they applied particularly strict rules when students showed less adaptive behavior (e.g., when they did not follow rules or when they struggled with concentration). However, there is a lack of quantitative empirical research on the quality dimensions of homework assistance at school and on links to student outcomes.

Although the SDT (Ryan & Deci, 2000) can be applied to a variety of contexts, and qualitative research on scholastic homework assistance has proposed quality dimensions similar to those of parental homework assistance (Dumont et al., 2014), it is important to test whether

the associations with students' academic functioning in the school setting are similar to those in the parental setting. Given that, unlike parental homework assistance, homework assistance at school is provided by (at least partially) trained personnel who can be assumed to be familiar with the benefits of need-supportive behavior (Guill et al., 2020), the quality of homework assistance might be higher in the scholastic than in the parental context. However, because homework assistance at school often takes place in a group setting, whereas parental homework assistance is predominantly given in one-on-one settings, scholastic homework assistance might influence students' achievement and homework behavior less than parental homework assistance. Regarding students' academic functioning as an antecedent of the quality of homework assistance, these links might also be weaker in the scholastic than in the parental setting because homework assistants at school might feel less pressure if students have low academic achievement as they are more distanced from the students' school careers.

In sum, homework assistance at school is highly important and becoming more and more common. Thus, empirical research on the quality of homework assistance at school and its links to students' academic functioning is sorely needed. Therefore, in the present study, we applied the SDT (Ryan & Deci, 2000) to the context of homework assistance at school by examining possible reciprocal relationships between the quality dimensions proposed for parental homework assistance and students' academic functioning.

2.1.5 The present study

The present study had two aims. The first aim was to examine whether there are reciprocal relationships between the quality of parental homework assistance and students' academic functioning at the elementary school level (Research Question 1 [RQ1]). The second aim of our study was to exploratively investigate possible reciprocal relationships between the quality of homework assistance and students' academic functioning for the context of scholastic homework assistance (Research Question 2 [RQ2]).

To measure students' academic functioning, we followed prior research (Dumont et al., 2014; Guill et al., 2020) and included four indicators of students' academic functioning. First, we used two indicators to measure academic achievement, namely, students' grades and a test score. Although test results are better suited to reliably assess students' achievement, students' grades might more directly influence the homework process as parents might be better informed about students' grades than about test results (Dumont et al., 2014). Whereas prior research focused on academic achievement in the reading domain (Dumont et al., 2014; Moroni et al., 2015), we assessed students' grades in three subjects (mathematics, German, and social studies)

and conducted a mathematics test. Second, we used two indicators of homework behavior, namely, homework effort and homework procrastination (Dumont et al., 2014). Students' homework behavior is a relevant indicator of students' academic functioning because it is one of the main goals of homework to improve students' study skills and their self-regulated learning (Cooper & Valentine, 2001; Dumont et al., 2014; Ramdass & Zimmerman, 2011), which – in turn – might improve students' academic achievement.

RQ1: On the basis of the SDT (Ryan & Deci, 2000) and its application in the context of homework assistance (Dumont et al., 2014), as well as prior research on secondary school students (e.g., Guill et al., 2020; Moroni et al., 2015), we expected parental *responsiveness* and *structure* to be positively and reciprocally related with students' academic achievement and homework effort, while we expected them to be negatively associated with students' procrastination (Hypothesis 1a). In contrast, we expected parental *control* to be negatively and reciprocally related with students' academic achievement and homework effort, whereas we expected it to be positively and reciprocally related with homework procrastination (Hypothesis 1b).

RQ2: To explore possible links between the quality of homework assistance at school and students' academic functioning, we used a subsample of students who received scholastic homework assistance in addition to parental homework assistance. In line with our hypotheses regarding parental homework assistance, we expected scholastic *responsiveness* and *structure* to be positively and reciprocally related with students' academic achievement and homework effort, while we expected them to be negatively associated with students' procrastination (Hypothesis 2a). Further, we expected scholastic *control* to be negatively and reciprocally related with students' academic achievement and homework effort, whereas we expected it to be positively and reciprocally related with homework procrastination (Hypothesis 2b).

The present study adds to previous research in two ways: First, we focused on elementary school students, a population under-researched in previous studies. Second, we explored associations in the context of homework assistance at school, a context of children's schooling that is growing in importance.

2.2 Materials and methods

2.2.1 Sample

We drew on longitudinal data from two points of measurement that were collected for the purpose of this study. In June 2019, after the study was approved by the responsible ministry

(Ministry of Education, Science, Research, and Culture in Schleswig-Holstein), 100 elementary schools (half-day and full-day schools of all types) were contacted, of which 10 schools agreed to participate in the study. The first point of measurement was from September to October 2019 (T1); the second was from February to March 2020 (T2) and ended before schools had to close due to the COVID-19 pandemic. Participation in the study was voluntary; written consent was obtained from the parents. Students did not have any disadvantages if they decided not to participate in the study.

To test Hypotheses 1a and 1b (parental homework assistance), we drew on data from 335 fourth graders (50.2% girls) in 21 classes who participated in at least one of the two points of measurement (T1: $n = 312$, T2: $n = 277$). In Schleswig-Holstein, Grade 4 is the last grade of elementary school and students are assigned to different secondary school tracks based on their academic achievement at the end of elementary school. Thus, the students in our sample were relatively heterogeneous regarding their performance. In the total sample, 23.6% of the students stated that they spoke another language besides German at home, which indicates a migration background. Regarding the education of their parents, 55.6% of the students stated that at least one of their parents had the qualification to go to university (i.e., had obtained the school leaving certificate *Abitur*), while 33.5% did not know whether their parents had this qualification.

To test Hypotheses 2a and 2b (homework assistance at school), we used data from a subsample of 112 students (57.3% girls) who additionally provided information on scholastic homework assistance on at least one of the two points of measurement (T1: $n = 85$, T2: $n = 75$). In the subsample, 20.7% indicated that they had a migration background and 49.5% stated that their parents had *Abitur*, while 37.1% did not know whether their parents had this qualification.

2.2.2 Instruments

All constructs were measured at both time points using the same instruments (the items are displayed in the Supplementary Material in Table S1). The data collection took place during regular school hours in class and lasted one school period (45 minutes). Each student first completed a paper-pencil mathematics test that took 12 minutes and afterwards filled in an online questionnaire on a tablet handed out by the administrators. The data collection was administered by trained research assistants who were undergraduate psychology students at the time.

Quality of homework assistance. Three dimensions of homework quality – responsiveness, structure, and control – were assessed using items from Dumont et al. (2014). Students rated the quality of the homework assistance they received on a 4-point Likert scale

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(1 = *completely disagree* to 4 = *completely agree*). Originally, the items referred to parental assistance only, but they were adapted in the present study to assess scholastic assistance as well. That is, the items were mostly used in parallel form, with “supervisor” replacing “parent” for the items referring to scholastic homework assistance. Students from the subsample that received any form of scholastic homework assistance answered the items twice, once for the homework setting at home (14 items) and once for the homework setting at school (12 items because two items measuring structure were not applicable for homework assistance at school). Responsiveness was measured with four items (Cronbach’s α /McDonald’s ω : parental: $\alpha_{T1} = .55/\omega_{T1} = .57$, $\alpha_{T2} = .73/\omega_{T2} = .73$; scholastic: $\alpha_{T1} = .66/\omega_{T1} = .69$, $\alpha_{T2} = .72/\omega_{T2} = .74$). Structure was operationalized with six items for parental homework assistance and with four items for scholastic homework assistance (parental: $\alpha_{T1} = .67/\omega_{T1} = .67$, $\alpha_{T2} = .69/\omega_{T2} = .69$; scholastic: $\alpha_{T1} = .65/\omega_{T1} = .63$, $\alpha_{T2} = .70/\omega_{T2} = .71$). Control was assessed with four items (parental: $\alpha_{T1} = .62/\omega_{T1} = .64$, $\alpha_{T2} = .67/\omega_{T2} = .67$; scholastic: $\alpha_{T1} = .84/\omega_{T1} = .84$, $\alpha_{T2} = .85/\omega_{T2} = .85$).

Academic functioning. We used four indicators to measure students’ academic functioning: (a) report card grades, (b) a mathematics test, (c) homework effort, and (d) homework procrastination. Report card grades and the mathematics test are indicators of academic achievement, whereas homework effort and homework procrastination are indicators of homework behavior.

Academic achievement. Students stated their last report card grades in mathematics, German, and social studies on a scale ranging from one (highest grade) to six (lowest grade). In the German school system, teachers have the option of adding a plus or a minus to grades (for example, 2+ for a student who achieves slightly better than a 2). We used the average of the grades in the three subjects and recoded the grades, including plus and minus, so that high values indicated better grades (1 = *lowest grade* to 13 = *highest grade*)². Moreover, students completed a mathematics test that was adapted from Lipowsky et al. (2011), which captured the four basic arithmetic operations (addition, subtraction, multiplication, and division). The test consisted of 28 items at T1 and 31 items at T2, which were distributed across six pages with three to eight items on each page ($\alpha_{T1} = .85$, $\alpha_{T2} = .88$). Students had limited time for each page and were not allowed to go back to a previous page when the time was up (1.5 to 2 min per page). The items were scored as right (= 1 point) or wrong (= 0 points) and the score of each item was added up to a total score (0 = *lowest score* to 28 [T1]/31 [T2] = *highest score*).

² There was no option for 1+, 5+, 5–, 6+, and 6– because these grades are rarely given.

Homework behavior. Students rated their homework behavior regarding effort and procrastination on a 4-point Likert scale (1 = *completely disagree* to 4 = *completely agree*; the items are displayed in the Supplementary Material, Table S1). Homework effort was assessed using five items that were adapted from Trautwein et al. (2006; $\alpha_{T1} = .81/\omega_{T1} = .81$, $\alpha_{T2} = .84/\omega_{T2} = .85$). One item for homework effort, which captured the amount of homework that students did as well as they could, was measured on a different scale (1 = *none* to 4 = *all*). Procrastination was measured with three items (Dumont et al., 2014; $\alpha_{T1} = .70/\omega_{T1} = .71$, $\alpha_{T2} = .78/\omega_{T2} = .79$). *Covariates.* Students also reported on their gender (1 = *male*, 2 = *female*) and on their family background in terms of a possible migration background and parental education. As an indicator of migration background, students were asked whether they spoke a language other than German at home (1 = *yes*, 2 = *no*). To operationalize parents' educational background, students stated whether their parents had a qualification for university study (in Germany: Abitur; 1 = *yes*, 2 = *no*, 3 = *I don't know*). We coded this information into two dummies; the first one indicated whether parents had Abitur (0 = *no/I don't know*, 1 = *yes*), the second one indicated whether students knew whether their parents had Abitur (0 = *yes/no*, 1 = *I don't know*). To make full use of the information from both points of measurement, we combined information from T1 and T2 for each covariate.

2.2.3 Statistical analyses

To get an overview of the data, we first computed descriptive statistics (reliabilities, means, standard deviations, skewness, and kurtosis) and bivariate correlations in SPSS (Version 27). The main analyses were calculated in Mplus 8.5 (Muthén & Muthén, 1998–2017). We used structural equation modeling (SEM; e.g., Little, 2013) to study the reciprocal relationships between parental homework assistance and students' academic functioning. Parental responsiveness, structure, and control, as well as students' effort and procrastination, were specified as latent variables, while students' grades and test results were modeled as manifest variables. Prior to the main analysis, we tested measurement invariance across time by using confirmatory factor analysis. Therefore, we tested configural, metric, and scalar invariance for each latent variable. The fit indices of each level of measurement invariance are displayed in Table 1. To compare the models, we evaluated differences in CFI (ΔCFI) by comparing the configural with the metric and scalar invariance; values greater than or equal to $-.01$ indicated equivalent model fit (Cheung & Rensvold, 2002). The ΔCFI ranged between $-.02$ and $.00$ (configural vs. metric) and $-.04$ and $.00$ (configural vs. scalar). Although the ΔCFI exceeded the cut-off value proposed by Cheung and Rensvold (2002) for students' procrastination and

parental control, for reasons of parsimony (i.e., limiting the number of parameters that needed to be estimated in SEM), the factor loadings were modeled as invariant across time in all models in the following steps of the analyses. Moreover, the error terms of each indicator were allowed to correlate across time.

Table 1

Measurement invariance of the quality dimensions of parental homework assistance and homework behavior across time

Variable	χ^2	df	Fit indices				Model
			CFI	TLI	RMSEA	SRMR	Δ CFI
<i>Responsiveness</i>							
Configural	32.85	15	.96	.93	.06	.05	
Metric	39.60	18	.95	.93	.06	.06	−.01 ^a
Scalar	43.05	21	.95	.93	.06	.07	−.01 ^b
<i>Structure</i>							
Configural	68.57	47	.96	.94	.04	.05	
Metric	72.38	52	.96	.95	.04	.06	.00 ^a
Scalar	80.73	57	.95	.95	.04	.06	−.01 ^b
<i>Control</i>							
Configural	34.66	15	.95	.90	.07	.04	
Metric	42.48	18	.93	.90	.07	.05	−.02 ^a
Scalar	53.48	21	.91	.88	.07	.05	−.04 ^b
<i>Effort</i>							
Configural	37.97	29	.99	.99	.03	.03	
Metric	41.03	33	.99	.99	.03	.04	.00 ^a
Scalar	45.12	37	.99	.99	.03	.05	.00 ^b
<i>Procrastination</i>							
Configural	18.45	5	.96	.89	.09	.04	
Metric	28.35	7	.94	.88	.10	.06	−.02 ^a
Scalar	30.27	9	.94	.91	.09	.05	−.02 ^b

Note. CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual. ^acomparing configural with metric invariance. ^bcomparing configural with scalar invariance.

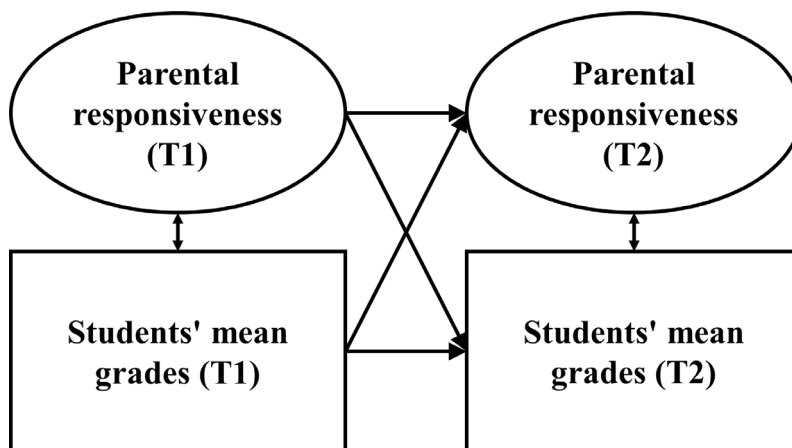
To study the relationship between scholastic homework assistance and students' academic functioning, we used a different approach because the sample size was relatively small ($n = 112$ students participated in at least one point of measurement). In SEM, high model complexity in combination with a small sample size can lead to estimation problems (Ulitzsch et al., 2021). To decrease model complexity, we used a single-indicator approach (Hayduk & Littvay, 2012; Savalei, 2019). In the single-indicator approach, the latent variable is measured

with a composite indicator (i.e., scale score), and the error variance is fixed to the measurement error variance. More specifically, for scholastic responsiveness, structure, and control and for students' effort and procrastination, we set the loading of the composite indicator to one and fixed the measurement error variance to $s^2(1 - \text{rel})$, where s^2 is the observed variance of the indicator and rel is an estimate of the composite's score reliability (Cronbach's alpha).

For the main analysis, we calculated cross-lagged panel models with homework assistance quality at T1 predicting academic functioning at T2 and vice versa, controlling for student gender, migration background, and parental education (i.e., homework assistance quality and academic functioning at T1 and T2 were regressed on the covariates). The models were calculated separately for each quality dimension of parental and scholastic homework assistance (responsiveness, structure, and control) and each indicator of students' academic functioning (mean grade, test result, effort, and procrastination). Thus, each model included only one quality dimension and only one student outcome, resulting in 12 models for parental homework assistance and 12 models for scholastic homework assistance. Figure 1 illustrates how these models were constructed using the example of parental responsiveness as a quality dimension and students' mean grades as an indicator of students' academic functioning.

Figure 1

Analytical model of the reciprocal relationship between parental responsiveness and students' mean grades



Note. Parental responsiveness and students' mean grades at T2 were regressed on the covariates. T1/T2 = first/second point of measurement.

2.2.4 Missing data

The amount of missing data ranged between 7% and 32% in the total sample. Within the group of students who received scholastic homework assistance, the amount of missing data on the variables on the quality of scholastic homework assistance ranged between 26% and 37%. To

handle missing data, full information maximum likelihood estimation, integrated into *Mplus*, was used (Enders, 2010).

2.3 Results

2.3.1 Descriptives

The means, standard deviations, and bivariate intercorrelations are displayed in Table 2 (intercorrelations at T1), Table 3 (intercorrelations at T2), and Table 4 (intercorrelations between T1 and T2). Students reported relatively high (i.e., higher than the midpoint of the scale) mean parental responsiveness and structure as well as relatively low control at both points of measurement. To compare the quality of parental and scholastic homework assistance, we conducted paired *t*-tests for each quality dimension (e.g., parental responsiveness at T1 vs. scholastic responsiveness at T1) in the subsample of students who had provided information on both parental and scholastic homework assistance. Students reported levels of scholastic responsiveness and control that were similar to those of parental homework assistance at both points of measurement (T1/T2: $p > .05$), but they reported significantly lower levels of scholastic structure than parental structure at both points of measurement (T1: $t[79] = 5.99, p < .001$; T2: $t[72] = 7.00, p < .001$).

The quality dimensions were only partly associated with each other. One finding that was consistent across the environments and points of measurement was that responsiveness and structure were positively related with each other ($.29 \leq r \leq .57$). In contrast, control showed different relationships depending on the environment and the point of measurement. While parental control was positively related with responsiveness at T1 ($r = .16$), scholastic control was positively related with structure at T2 ($r = .33$).

Of the three quality dimensions at T1, only control was significantly correlated with academic functioning at T2. That is, both parental and scholastic control at T1 were linked to more procrastination at T2 (parental: $r = .15$; scholastic: $r = .45$). Additionally, parental control was negatively linked to the mean grade ($r = -.28$). The four indicators of academic functioning at T1 were only partly correlated with the quality dimensions of parental and scholastic homework assistance at T2, and the relationships varied between the two contexts. The only finding that was consistent across the two contexts was that effort at T1 and structure at T2 were positively correlated (parental: $r = .15$; scholastic: $r = .31$).

Table 2

Intercorrelations between the manifest variables at T1

	M%	SD	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9	10	11	12
1. Mean grades (T1)	9.42	2.10	-0.61	0.56												
2. Test score (T1)	17.41	4.43	-0.33	0.16	.29											
3. Effort (T1)	3.38	0.55	-1.47	3.29	.17	.09										
4. Procrastination (T1)	1.85	0.78	0.81	-0.07	-.25	-.13	-.48									
5. Parental responsiveness (T1)	3.39	0.53	-0.93	0.67	-0.02	.12	.15	.00								
6. Parental structure (T1)	3.32	0.54	-0.85	0.13	.03	.04	.20	-0.03	.30							
7. Parental control (T1)	1.71	0.65	0.97	0.24	-.20	-0.02	-.18	.27	.16	.05						
8. Scholastic responsiveness (T1)	3.38	0.62	-1.29	2.14	.08	.18	.05	-0.06	.36	.39	-0.02					
9. Scholastic structure (T1)	2.87	0.73	-0.32	-0.58	-0.22	-0.06	.09	-0.02	.07	.28	.00	.29				
10. Scholastic control (T1)	1.62	0.76	1.54	1.95	-.40	-0.06	-0.12	.40	-0.01	.02	.48	.08	.19			
11. Gender ^a	50.20%	-	-	-	.08	-.14	.17	-0.05	.09	.08	-0.06	.10	-0.05	-.31		
12. Migration background ^b	23.60%	-	-	-	.01	-0.05	.01	.05	.10	.00	-0.09	.08	-0.12	-.25	.13	
13. Qualification for university study ^c	55.60%	-	-	-	.22	.25	-0.06	-0.02	.07	.17	.03	.23	.13	.10	-0.03	-.21

Note. T1 = first point of measurement. Statistically significant correlations at $p \leq .05$ are in bold. Reference categories are given below.

^aMale.

^bMigration background.

^cNo qualification for university/I don't know.

Table 3

Intercorrelations between the manifest variables at T2

	M/%	SD	Skewness	Kurtosis	1	2	3	4	5	6	7	8	9	10	11	12
1. Mean grades (T2)	9.35	2.39	-0.69	0.52												
2. Test score (T2)	16.91	5.59	0.18	-0.58	.35											
3. Effort (T2)	3.38	0.56	-1.20	1.74	.34	.05										
4. Procrastination (T2)	1.77	0.80	1.06	0.37	-.39	-.24	-.43									
5. Parental responsiveness (T2)	3.46	0.59	-1.61	2.54	.00	-.04	.20	-.19								
6. Parental structure (T2)	3.38	0.51	-0.80	0.24	.03	-.08	.23	-.10	.36							
7. Parental control (T2)	1.61	0.66	1.41	1.96	-.29	-.20	-.12	.28	-.02	-.02						
8. Scholastic responsiveness (T2)	3.41	0.56	-1.69	4.13	.15	-.10	.42	-.26	.12	.12	-.14					
9. Scholastic structure (T2)	2.94	0.70	-0.42	-0.27	.01	-.06	.42	-.09	.06	.37	.01	.57				
10. Scholastic control (T2)	1.80	0.89	1.03	0.12	-.10	-.12	.06	.27	-.10	.06	.45	-.02	.33			
11. Gender ^a	50.20%	-	-	-	.09	-.15	.16	-.02	.14	.05	-.19	.15	.20	-.08		
12. Migration background ^b	23.60%	-	-	-	.05	-.11	.06	-.02	.23	-.04	-.19	-.12	-.31	-.30	.13	
13. Qualification for university study ^c	55.60%	-	-	-	.13	.15	-.14	.03	.02	.09	.03	-.22	-.09	.07	-.03	-.21

Note. T2 = second point of measurement. Statistically significant correlations at $p \leq .05$ are in bold. Reference categories are given below.

^aMale.

^bMigration background,

^cNo qualification for university/I don't know.

Table 4

Intercorrelations between the manifest variables at T1 (table rows) and T2 (table columns)

	T2									
	1	2	3	4	5	6	7	8	9	10
1. Mean grades (T1)	.60	.31	.16	-.37	.05	.04	-.24	.26	-.01	-.12
2. Test score (T1)	.24	.59	.06	-.20	.05	-.02	-.05	-.07	-.01	-.16
3. Effort (T1)	.33	.03	.56	-.26	.12	.15	-.07	.26	.31	.02
4. Procrastination (T1)	-.32	-.06	-.25	.36	-.16	-.14	-.01	.05	-.03	.13
5. Parental responsiveness (T1)	.00	-.05	.02	.02	.37	.19	.01	-.18	-.18	-.12
6. Parental structure (T1)	.01	.06	.11	-.01	.12	.46	-.15	.01	.07	-.06
7. Parental control (T1)	-.28	-.03	-.04	.15	.09	.07	.40	-.13	-.05	.25
8. Scholastic responsiveness (T1)	.18	.18	-.02	-.08	.12	.03	-.09	.19	.07	-.13
9. Scholastic structure (T1)	-.23	-.08	-.11	-.07	.13	.34	.06	-.10	.46	.38
10. Scholastic control (T1)	-.23	-.01	-.05	.45	-.15	.03	.44	-.06	.01	.44

Note. T1/T2 = first/second point of measurement. Statistically significant correlations at $p \leq .05$ are in bold.

2.3.2 Cross-lagged models

In the following, we present our findings on the cross-lagged relationships between the three quality dimensions of parental and scholastic homework assistance (responsiveness, structure, and control) and the four indicators of students' academic functioning (achievement: mean grade and test result; homework behavior: homework effort and homework procrastination). The sequence in which the findings are described follows the hypotheses as stated above.

2.3.2.1 Parental homework assistance and academic functioning

The models for parental homework assistance are displayed in Figures 2 to 4. Tables displaying the detailed results can be found in the online Supplementary Material³. We report standardized coefficients (stdyx for all latent and manifest continuous outcomes and predictors and stdy for categorical variables, i.e., the covariates).

Hypothesis 1a. We expected parental responsiveness and structure to be positively and reciprocally related with students' (a) mean grades, (b) test result, and (c) homework effort, while we expected them to be negatively associated with (d) homework procrastination.

Against our expectations, no significant links were found between perceived parental responsiveness and structure and students' mean grades. Contrary to our hypothesis, parental

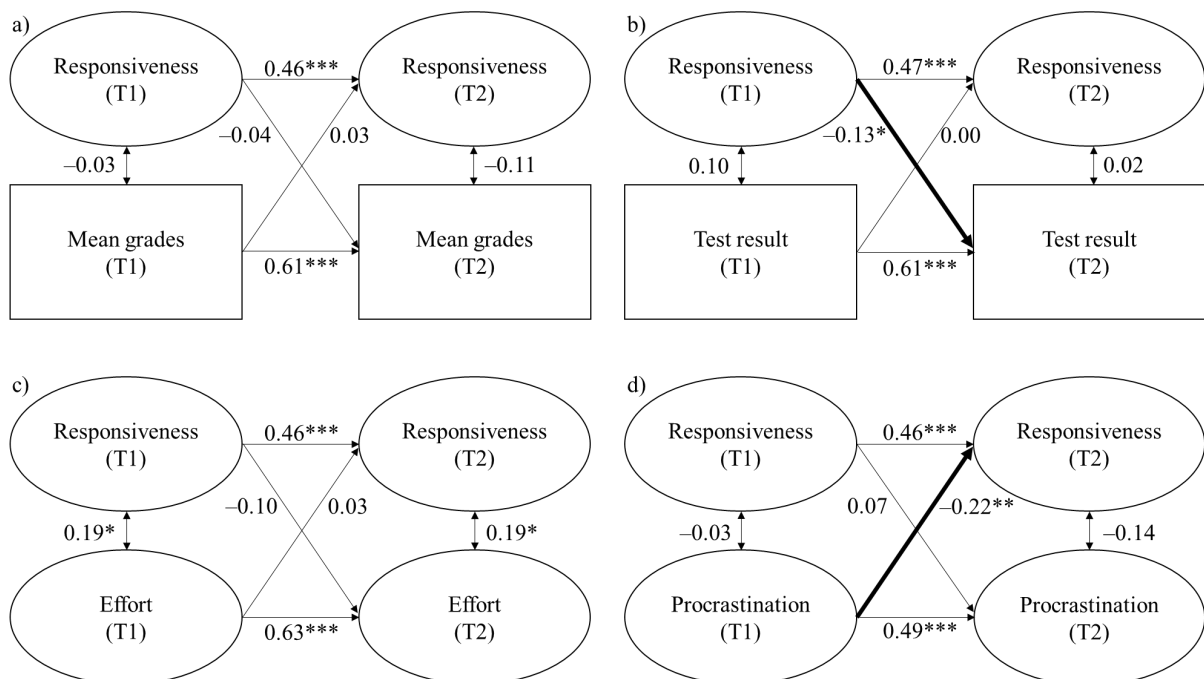
³ <https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1106362/full#supplementary-material>

responsiveness at T1 negatively predicted students' test result at T2 ($\beta = -.13, p = .046$, see Figure 2b). Thus, students scored lower on the mathematics achievement test at T2 the more parental responsiveness they perceived at T1. However, this relationship was not reciprocal because parental responsiveness at T2 was not predicted by students' test result at T1. Moreover, parental structure was neither unidirectionally nor reciprocally related with students' test result. In contrast to our hypothesis, parental responsiveness and structure were not related with students' homework effort. However, while parental responsiveness and structure at T1 also did not predict students' procrastination at T2, both responsiveness and structure at T2 were predicted by students' procrastination at T1. Thus, students reported lower parental responsiveness ($\beta = -.22, p = .006$, see Figure 2d) and parental structure at T2 ($\beta = -.18, p = .027$, see Figure 3d) the more they procrastinated at T1.

To sum up, Hypothesis 1a was only minimally supported. Out of the expected links between parental responsiveness and structure and students' academic functioning, only two proved to be significant: students' prior procrastination predicted subsequent parental responsiveness and structure during homework assistance. However, we also found one relationship that was contrary to our expectations because prior parental responsiveness negatively predicted subsequent test results.

Figure 2

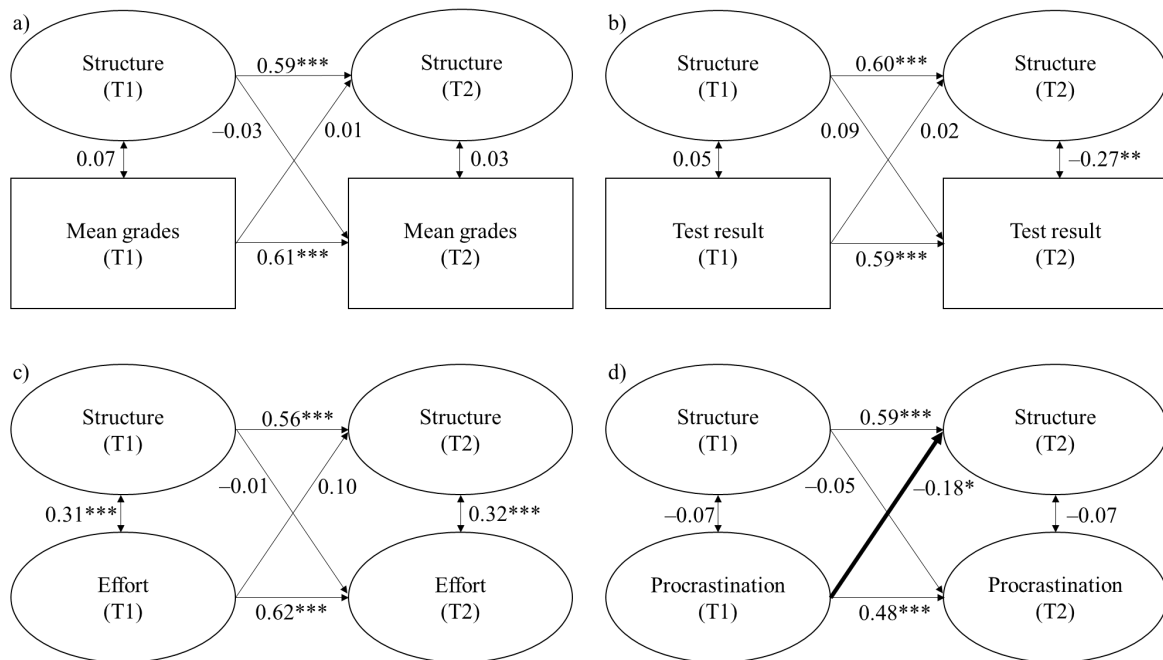
Cross-lagged models for parental responsiveness and students' academic functioning



Note. Standardized coefficients. All covariates were included. Statistically significant cross-lagged coefficients are in bold. T1/T2 = first/second point of measurement. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Figure 3

Cross-lagged models for parental structure and students' academic functioning



Note. Standardized coefficients. All covariates were included. Statistically significant cross-lagged coefficients are in bold. T1/T2 = first/second point of measurement. * $p = .05$, ** $p \leq .01$, *** $p \leq .001$.

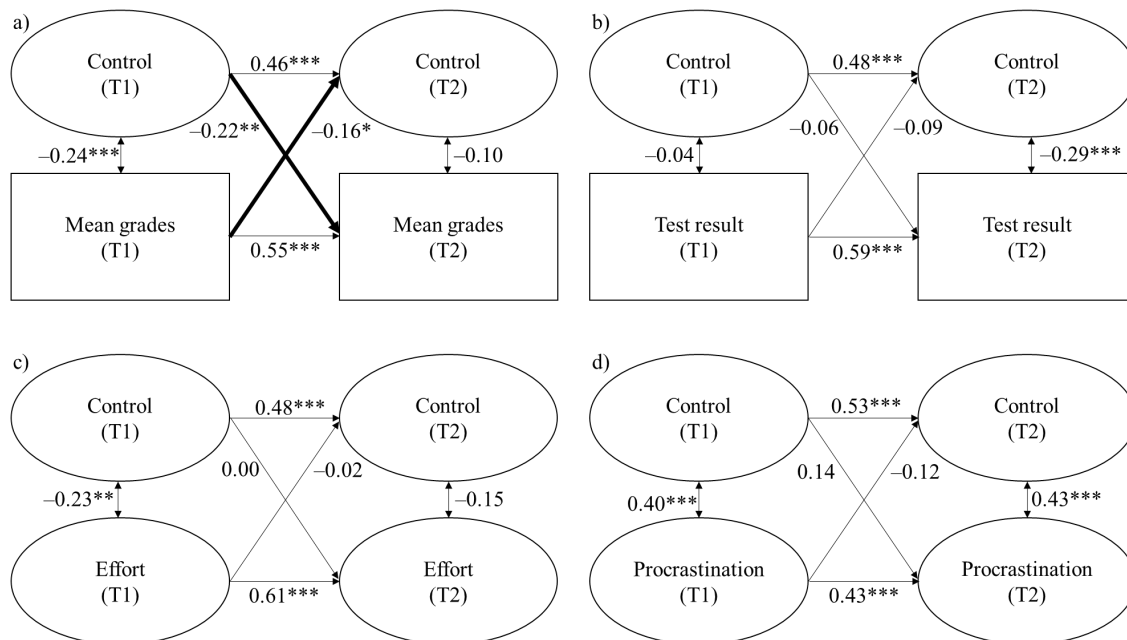
Hypothesis 1b. We expected parental control to be negatively and reciprocally related with students' (a) mean grades, (b) test result, and (c) homework effort, whereas we expected it to be positively and reciprocally related with (d) homework procrastination.

In line with our hypothesis, we found a reciprocal association between parental control and students' mean grades (see Figure 4a). Control at T1 negatively predicted students' mean grades at T2 ($\beta = -.22, p = .002$), while students' mean grades at T1 negatively predicted control at T2 ($\beta = -.16, p = .041$). Thus, students had lower subsequent mean grades the more they reported parental control during homework assistance. Vice versa, students perceived more subsequent control the lower their prior grades were. However, parental control was not associated with students' test results or their homework behavior.

To sum up, Hypothesis 1b was partially supported because we found a reciprocal relationship between parental control and students' mean grades, but we did not find a reciprocal relationship for the other indicators of academic achievement.

Figure 4

Cross-lagged models for parental control and students' academic functioning



Note. Standardized coefficients. All covariates were included. Statistically significant cross-lagged coefficients are in bold. T1/T2 = first/second point of measurement. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

2.3.2.2 Scholastic homework assistance and academic functioning

The models for scholastic homework assistance are displayed in Figures 5 to 7. Tables displaying the results can be found in the online Supplementary Material⁴.

Hypothesis 2a. We expected scholastic responsiveness and structure to be positively and reciprocally related with students' (a) mean grades, (b) test result, and (c) homework effort, while we expected them to be negatively associated with (d) students' procrastination.

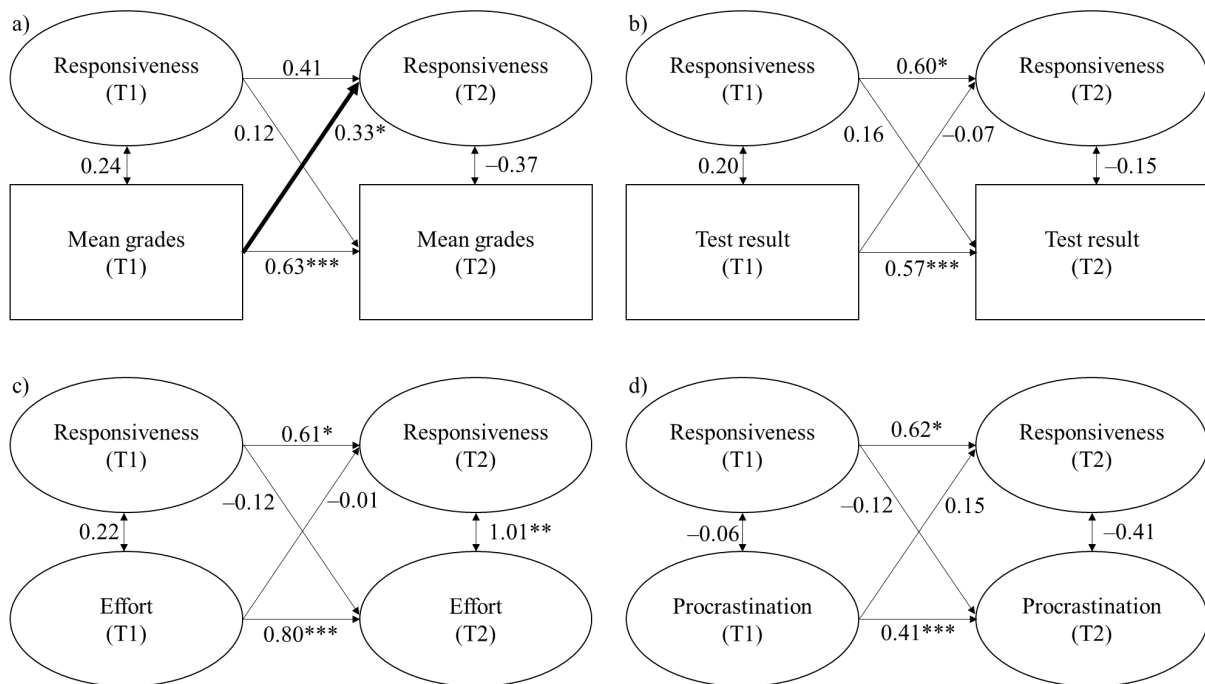
While responsiveness and structure during homework assistance at school at T1 did not predict students' mean grades at T2, students' mean grades at T1 positively predicted responsiveness at T2 ($\beta = .33$, $p = .027$, see Figure 5a) but did not predict structure. Therefore, students with higher prior mean grades perceived higher subsequent responsiveness during homework assistance at school. However, no significant relationships were found between scholastic responsiveness or structure and students' test result or homework behavior.

To sum up, Hypothesis 2a was only minimally supported. We did not find that responsiveness or structure during homework assistance at school predicted any of the indicators of students' academic functioning. However, students' mean grades predicted scholastic responsiveness.

⁴ <https://www.frontiersin.org/articles/10.3389/fpsyg.2023.1106362/full#supplementary-material>

Figure 5

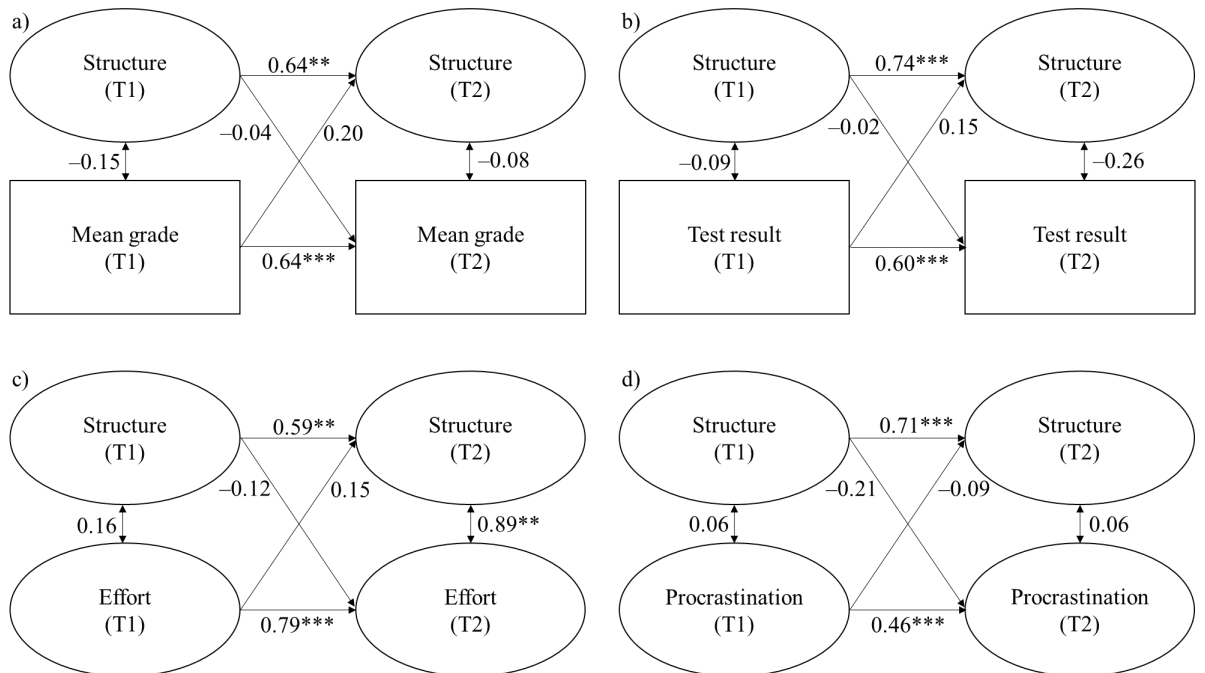
Cross-lagged models for scholastic responsiveness and students' academic functioning



Note. Standardized coefficients. All covariates were included. Statistically significant cross-lagged coefficients are in bold. T1/T2 = first/second point of measurement. * $p = .05$, ** $p \leq .01$, *** $p \leq .001$.

Figure 6

Cross-lagged models for scholastic structure and students' academic functioning



Note. Standardized coefficients. All covariates were included. Statistically significant cross-lagged coefficients are in bold. T1/T2 = first/second point of measurement. * $p = .05$, ** $p \leq .01$, *** $p \leq .001$.

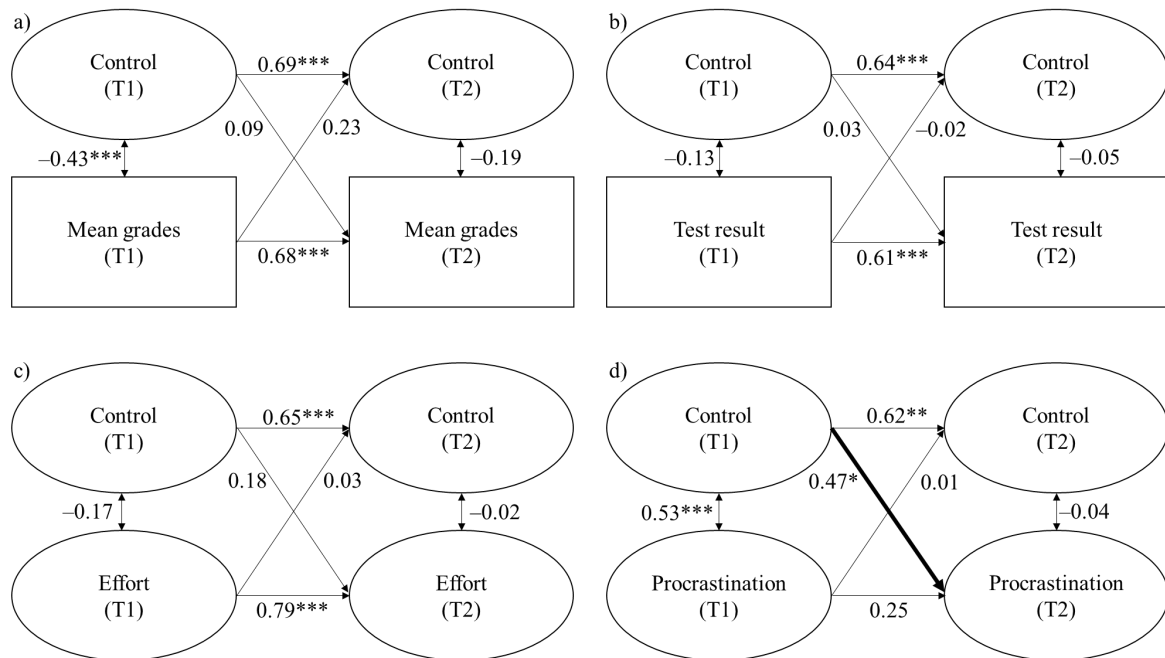
Hypothesis 2b. We expected scholastic control to be negatively and reciprocally related with students' (a) mean grade, (b) test result, and (c) homework effort, whereas we expected it to be positively and reciprocally related with (d) homework procrastination.

No significant unidirectional or reciprocal relationships were found between control during homework assistance at school and students' academic achievement or their homework effort. However, in line with our hypothesis, control during homework assistance at school at T1 positively predicted students' homework procrastination at T2 ($\beta = .47, p = .017$, see Figure 7d). Therefore, students reported higher subsequent homework procrastination the more they perceived control during homework assistance at school. Vice versa, students' homework procrastination at T1 did not significantly predict control during homework assistance at school at T2.

To sum up, Hypothesis 2b was only minimally supported because control predicted students' homework procrastination but did not predict any of the other indicators of students' academic functioning. Vice versa, students' academic functioning did not predict control during homework assistance at school.

Figure 7

Cross-lagged models for scholastic control and students' academic functioning



Note. Standardized coefficients. All covariates were included. Statistically significant cross-lagged coefficients are in bold. T1/T2 = first/second point of measurement. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

2.4 Discussion

Our study had two aims. The first aim was to examine reciprocal relationships between the quality of parental homework assistance and students' academic functioning at the elementary school level, where previous findings have been inconsistent (e.g., Cunha et al., 2018; Núñez et al., 2015; Silinskas et al., 2013). The second aim of our study was to investigate whether there are reciprocal relationships between the quality of scholastic homework assistance and students' academic functioning. Our reason for investigating this is the growing importance of scholastic homework assistance and the lack of quantitative research that addresses homework assistance in this environment.

Table 5

Overview of the main findings

Hypothesis	Quality dimension	Academic functioning	Parental		Scholastic	
			HA _{T1} → AF _{T2}	AF _{T1} → HA _{T2}	HA _{T1} → AF _{T2}	AF _{T1} → HA _{T2}
1a/2a	Responsiveness	Mean grades	o	o	o	.33*
		Test score	-.13*	o	o	o
		Effort	o	o	o	o
		Procrastination	o	-.22**	o	o
	Structure	Mean grades	o	o	o	o
		Test score	o	o	o	o
		Effort	o	o	o	o
		Procrastination	o	-.18*	o	o
1b/2b	Control	Mean grades	-.22**	-.16*	o	o
		Test score	o	o	o	o
		Effort	o	o	o	o
		Procrastination	o	o	.47*	o

Note. o = no significant link, T1/T2 = first/second point of measurement, AF = academic functioning, HA = homework assistance. * = $p \leq .05$. ** = $p \leq .01$.

The main findings are summarized in Table 5. Overall, we found a complex pattern of results. Regarding parental homework assistance, we found reciprocal relationships between parental control and mean grades. In addition, we found several unidirectional links, namely, a negative link between procrastination at T1 and both parental responsiveness and structure at T2. Unexpectedly, parental responsiveness at T1 was negatively related with students' test score in a mathematics achievement test at T2. All other links did not reach statistical significance. Regarding scholastic homework assistance, only two unidirectional links proved to be significant: scholastic control at T1 was positively related with procrastination at T2, and mean grades at T1 positively predicted scholastic responsiveness at T2. There were no other statistically significant unidirectional or bidirectional links. In sum, even though several of the

assumed associations were not found in the present study, the findings provide valuable information on the quality of homework assistance both at home and at school.

2.4.1 Parental homework assistance

2.4.1.1 Links between parental responsiveness, structure, and students' academic functioning (H1a)

Although previous studies reported that parental responsiveness and structure positively predicted students' academic functioning at secondary school (e.g., Dumont et al., 2014; Guill et al., 2020; Moroni et al., 2015), the missing link in our study is in line with the findings of Núñez et al. (2015), who did not find significant relationships between parental support and academic functioning at elementary school. Similar to the present study, students in the study of Núñez et al. (2015) were at the end of elementary school – albeit in Grades 5 and 6 as elementary school in Spain comprises Grades 1 to 6. Therefore, the lack of significant relationships found might partly be due to the timing of Núñez et al.'s (2015) and our study. It is possible that the dynamics between students and their parents are relatively consolidated at the end of elementary school, which might make it harder to find changes in the quality of homework assistance and students' academic functioning. This assumption is reflected in our study as we found relatively high stabilities of both the quality dimensions and the indicators of academic functioning (see Figures 2 and 3). Moreover, parents of elementary school students might generally provide high levels of responsiveness and structure because their children's study skills and self-management are not yet fully developed (Dufresne & Kobasigawa, 1989; Patall et al., 2008). At the same time, there might be less variation in younger students' homework behavior because their intrinsic motivation is usually higher as intrinsic motivation only starts to decline with increasing age (Gnambs & Hanfstingl, 2016; Gottfried et al., 2001). Both assumptions are also reflected in our findings, as students perceived high mean responsiveness and structure and reported high mean effort and low mean procrastination (see Tables 2 and 3). Taken together, high levels of parental responsiveness and structure, in combination with favorable homework behavior of the students, might be the reason for why we did not find significant relationships between the constructs.

The negative association we found between parental responsiveness and students' mathematics test result is unexpected and incongruent with prior longitudinal research on parental support (Moroni et al., 2015). However, one other study (Cooper et al., 2000) also found a negative link between responsiveness, measured as the frequency of direct homework involvement (i.e., helping if it is needed), and students' standardized test result. However, the

finding of Cooper et al. was based on cross-sectional data and, therefore, might rather mirror increases in parental involvement if students have low academic achievement. One possible explanation for the negative link found in our study is that high levels of responsiveness might lead to students relying strongly on the help of their parents, which might make it difficult for students to take an achievement test on their own. However, this finding should be interpreted with caution because parental responsiveness at T1 and students' test result at T2 did not show a significant relationship in the bivariate correlations. Therefore, more research with standardized achievement tests is needed to verify the negative link we found between parental responsiveness and test results at the elementary school level.

For the links in the opposite direction, that is, students' academic functioning at T1 predicting parental responsiveness and structure at T2, we also found only limited evidence. Only one indicator of academic functioning, namely, homework procrastination, was linked to parental responsiveness and structure. Interestingly, this is in line with prior research on secondary school students by Dumont et al. (2014), who did not find an effect of students' reading achievement on responsiveness and structure, whereas students' homework behavior predicted both quality dimensions. Dumont et al. (2014) concluded that students' homework behavior might be particularly important for positive forms of parental homework assistance. Because the homework situation is often perceived as a situation with the potential for conflict (Dumont et al., 2012), parents of children who often procrastinate in homework situations may become stressed or irritated by their children's behavior and feel less inclined to assist with homework in the future.

2.4.1.2 Links between parental control and students' academic functioning (H1b)

For parental control, we found a reciprocal relationship with students' mean grades. All other expected links – bidirectional as well as unidirectional – were not significant. These findings are interesting in several regards. First, the reciprocal link between parental control and mean grades is in line with prior research on unidirectional associations that found that parental control negatively predicted students' grades at both the elementary and the secondary level (Moroni et al., 2015; Núñez et al., 2015) and that, conversely, students' achievement predicted parental controlling or monitoring behavior (e.g., Dumont et al., 2014; Núñez et al., 2017; Silinskas et al., 2013). However, to the best of our knowledge, no previous study found a reciprocal relationship between control and students' mean grades. Following Dumont et al. (2014), reciprocal relationships of control are alarming because students and parents might get into a vicious circle of increasing control and simultaneously decreasing academic functioning. This vicious circle might be particularly harmful for low achievers because they have been

found to be more sensitive to controlling behavior (Grolnick & Pomerantz, 2022; Ng et al., 2004). In contrast to mean grades, no links were found between parental control and the other achievement variable, students' test results, (in either direction). This differs from research on secondary school students, which has shown that parental control negatively predicted the results of standardized reading tests (Moroni et al., 2015), but it is in line with prior research on elementary school students that also did not find a link between controlling behavior and standardized test results (Silinskas et al., 2013; Wu et al., 2022). One possible explanation for the missing link is that grades are more salient and meaningful for parents than the results of standardized achievement tests. Parents receive a considerable amount of information on their children's performance levels in the form of grades, but they often have little information on children's standing in objective achievement tests. Moreover, grades are key determinants of children's educational careers and, thus, are of high relevance for parents.

The missing link between prior parental control and students' subsequent homework behavior is in contrast to prior research on secondary school students that found unfavorable effects of parental control on students' homework behavior (Dumont et al., 2012; Guill et al., 2020; Moroni et al., 2015; Trautwein et al., 2006), but it is in line with prior research on elementary school students (Núñez et al., 2015). This lack of associations for elementary school students might be explained by younger students' less pronounced need for autonomy and their positive attitude towards school and towards their parents, which might be relatively robust to external influences such as parents' controlling behavior (Eccles et al., 1993; Hoover-Dempsey & Sandler, 1995). Regarding students' homework behavior as a predictor of parental control, our finding that students' unfavorable homework behavior did not result in more control is again in line with the findings of Dumont et al. (2014) on secondary school students. They argued that unfavorable homework behavior might be less alarming for parents than low grades and, therefore, only leads to decreases in positive forms of parental homework assistance (i.e., responsiveness and structure, see H1a) and not to increases in controlling behavior.

To sum up, we were able to apply the quality dimensions of homework assistance derived from the SDT (Ryan & Deci, 2000) to students at elementary school. However, our results suggest that findings on the effects of the quality dimensions on students' academic functioning from prior research on secondary students cannot be simply transferred to elementary students. Therefore, more research that compares different age groups is needed. Regarding the effects of students' academic functioning on the quality dimensions, the pattern we found for elementary school students is similar to the pattern that was found by Dumont et al. (2014) for older students. However, more research is needed to verify these results.

2.4.2 Scholastic homework assistance

The second aim of our study was to test whether there are reciprocal relationships between the quality of scholastic homework assistance and students' academic functioning. The reason we investigated this is the high relevance of homework assistance at school and the lack of quantitative research on the quality of homework assistance provided in the scholastic environment.

2.4.2.1 Links between scholastic responsiveness, structure, and students' academic functioning (H2a)

Similar to the results on parental homework assistance found in our study and in contrast to the results of research on parental homework assistance for older students (Dumont et al., 2014; Guill et al., 2020; Moroni et al., 2015), we did not find that scholastic responsiveness and structure predicted students' academic functioning. The lack of links found for structure is especially surprising because prior research on secondary school students has found positive effects when structuring homework assistance is given by persons other than the parents, namely, private tutors (Guill et al., 2020). However, similar to our considerations regarding the comparable results for parental homework assistance, due to students' young age and their higher need for support, there might be too little variance in the responsiveness and structure provided by homework assistants at school to result in significant relationships. Moreover, one could assume that scholastic homework assistants, who are often pedagogical staff, show high mean levels of responsiveness and structure due to their professional knowledge. However, the surprising finding that structure was lower in the scholastic than in the parental setting could be because, at school, it is harder to achieve high levels of structure (for example, a quiet learning environment) than at home because homework assistance at school mostly takes place in a group setting.

Regarding our finding that scholastic responsiveness was positively predicted by students' mean grades, it is possible that students with better grades have other characteristics that favor more responsiveness that we did not control for, for example, more socially adjusted behavior that might make it easier for them to ask for help in an appropriate way. Moreover, it is possible that students with better grades rate their homework environment more positively as they might have a more positive attitude to school and homework in general or might be able to make better use of the support provided by the homework assistants. Still, this finding is alarming because it points to potential inequalities in educational support, which may further increase existing differences.

The missing link between students' prior procrastination and subsequent scholastic responsiveness and structure is one major difference between our results and prior results on parental homework assistance. Possibly, supervisors at school are less emotionally involved when their students procrastinate because students' homework behavior might be less personally important to them than it is to the students' parents.

2.4.2.2 Links between scholastic control and students' academic functioning (H2b)

Unlike our findings for parental homework assistance, no links were found between prior scholastic control and students' subsequent academic achievement. One possible explanation for this is that students received scholastic homework assistance in addition to parental homework assistance (45.1% of the students at T1 and 38.4% of the students at T2 stated that they received scholastic homework assistance only one to two times per week). Thus, for students who receive scholastic homework assistance less often, the level of scholastic control might play a smaller role than the level of parental control. Therefore, future research should investigate a (sub-)sample consisting of students who receive homework assistance predominantly at school.

The missing link between students' academic achievement at T1 and scholastic control at T2 is particularly surprising because this association has been consistently found in prior research on parental homework assistance for both elementary and secondary school students (e.g., Dumont et al., 2014; Núñez et al., 2017; Silinskas et al., 2013) and we also found this link for parental homework assistance in the present study. However, it has been discussed that controlling behavior might stem from pressure that is related to parental involvement. This pressure can come from multiple sources, for example, a child's low achievement or parents' or others' expectations regarding the child's performance (Dumont et al., 2014; Grolnick & Pomerantz, 2022). Compared to parents, homework assistants at school might feel less pressure if students have low academic achievement because they are more distanced from the students' school career.

However, we found that students reported more procrastination the more control they perceived during scholastic homework assistance, which is in line with prior research on parental homework assistance (Dumont et al., 2014) and homework assistance given by both parents and private tutors (Dumont et al., 2014; Guill et al., 2020).

Taken together, we were able to apply the quality dimensions of homework assistance derived from the SDT (Ryan & Deci, 2000) to the context of scholastic homework assistance. However, only few of the relationships we had expected to find were statistically significant. On a descriptive level, one common finding for parental and scholastic homework assistance

was that responsiveness and structure did not predict students' academic functioning. However, control was related with students' outcomes in both environments, but with different indicators of their academic functioning. Another difference between the two homework environments was that the two positive forms of homework assistance (i.e., responsiveness and structure) were predicted by different indicators of academic functioning. However, more research is needed to verify these commonalities and differences between the two homework environments.

2.4.3 Strengths and limitations

Our study has several strengths. First, we investigated homework assistance provided for elementary school students; this population has been studied less than other populations and previous results obtained for this population have been inconclusive. Second, we investigated homework assistance at school, which has not yet been addressed in quantitative studies. Third, we measured the quality of homework assistance instead of its quantity, which has been shown to be the more important predictor, and we included structure as a quality dimension that has been less studied up until now, although it has been argued that it distinguishes positive types of controlling behavior from intrusive ones (Dumont et al., 2014; Grolnick & Pomerantz, 2009; Guill et al., 2020). Fourth, we considered both grades and a test result to measure students' academic achievement. Finally, the major strength of our study is the longitudinal design, which allowed us to control for the prior quality of homework assistance and students' prior indicators of academic functioning.

However, there are also some limitations that should be considered when interpreting our results. First of all, we were not able to control for students being nested in classes because of the combination of the relatively small number of classes in our sample and the complexity of the analytical models (i.e., the number of parameters that need to be estimated in SEM). It might be important to control for clustering in classes because there might be class effects due to differences in the quality of homework assignments (Trautwein et al., 2006) that might influence students' achievement and their homework behavior by being more or less interesting and activating. Moreover, the subsample for scholastic homework assistance was relatively small, which might have made it less likely to yield statistically significant and reliable results. Although the scales measuring the quality of homework assistance showed good reliability in prior studies at the secondary school level (Dumont et al., 2014; Guill et al., 2020), some of the scales showed rather low reliability in our sample (e.g., parental responsiveness at T1, with a value of $\alpha = .55$). Another limitation was that, following the criteria proposed by Cheung and

Rensvold (2002), metric measurement invariance and conventional norms for acceptable fit were violated for some constructs (i.e., parental control and students' procrastination). Although Robitzsch and Lüdtke (2022) recently questioned whether measurement invariance is a prerequisite for group comparisons and comparisons across time points, it cannot be ruled out that different psychometric properties of the measurements across the two time points might have impeded the accuracy of our results (Cheung & Rensvold, 2002). Moreover, although we controlled for measurement errors, the stabilities of the constructs, and a considerable number of relevant covariates, there might be other unobserved confounders (e.g., students' self-regulation, which might influence both the quality of parental homework assistance and students' outcomes) that could lead to distorted estimates of cross-lagged effects in cross-lagged panel designs (Lüdtke & Robitzsch, 2022).

Additionally, there are some limitations regarding the assessment of the constructs. It might be productive to assess the quality of parental homework assistance and students' homework behavior subject-specifically. Regarding the quality of homework assistance, Wild and Gerber (2007) argued that the quality might depend on students' performance, which differs between the subjects, and on parents' subject-specific perception of their own competence. Students' homework behavior might also be subject-specific because of subject-specific differences in students' competencies, interest, and intrinsic motivation (Trautwein et al., 2006). Finally, we relied solely on student reports although it might be more informative to additionally use reports from multiple sources, for example, from parents, teachers, or observers (Grolnick & Slowiaczek, 1994; Hoover-Dempsey et al., 2005).

2.4.4 Theoretical, practical, and scientific implications

We were able to apply the quality dimensions of parental homework assistance derived from the SDT (Ryan & Deci, 2000) to elementary school students and to homework assistance that is given at school. Theoretically, this supports the assumption that the SDT is generally valid across developmental stages and different learning environments. However, our findings differed from the findings of prior research on secondary school students and on homework assistance given by parents. This provides first indications that the quality dimensions might affect students' outcomes differently at different developmental stages, which is in line with the theoretical assumptions of Eccles et al. (1993) and Hoover-Dempsey and Sandler (1995) that students benefit most if their educational environment matches their developmental needs. Taken together, when measuring the quality of homework assistance on the basis of the

satisfaction of students' needs, it might be beneficial to use an approach that keeps in mind that students' needs change over the course of their development.

Despite the limitations of our study, practical implications can be derived from its results. Because control was negatively related with students' academic functioning in both environments, both parents and homework assistants at school should be informed about the negative consequences of controlling and intrusive behavior for students' academic functioning. Interventions and training for parents on homework assistance seem to be a promising approach as Patall et al. (2008) as well as Wild and Gerber (2009) reported encouraging effects. As homework assistance at school is becoming more and more important, it might be promising to also offer these interventions and this training for homework assistants at schools. It has been argued that low-quality homework assistance partly stems from pressure that is related to parental involvement (Dumont et al., 2014; Grolnick & Pomerantz, 2022). Therefore, reducing pressure might be a promising approach to decrease the use of control during homework assistance and to break the vicious circle between control and low academic achievement. This might be achieved by creating positive school climates for parents or by supporting effective school-parent communication (Grolnick & Pomerantz, 2022). Moreover, homework assistants at schools should be sensitized to the importance of being equally responsive to students regardless of their academic achievement. One promising approach to increase homework assistants' awareness of and responsiveness to students' needs could be a mindfulness-based professional development program that has shown encouraging findings in increasing teachers' social and emotional competence and classroom interactions (Jennings et al., 2017). Although we did not find positive relationships of prior parental responsiveness and structure with students' subsequent academic functioning, we still argue that parents should continue to provide responsiveness and structure even if their child shows unfavorable homework behavior because – following the SDT (Ryan & Deci, 2000) – these positive forms of homework assistance have the potential to support students' needs and, although there has not been enough research on younger students, there have been promising findings for older students (e.g., Dumont et al., 2014; Guill et al., 2020; Moroni et al., 2015). Moreover, because responsiveness and structure have been found to be relevant for secondary school students, it makes sense that parents already begin to establish and maintain positive forms of homework assistance in the early years of schooling.

Finally, scientific implications for future research can be derived from our study. Because we found partly different results for elementary school students to those found in prior research on secondary school students, future research should compare the relationships for students

from different age groups. Therefore, future research should follow Núñez et al. (2015) and compare the links found between the quality of homework assistance and students' outcomes in different age groups or should use longitudinal data with longer time periods to determine which types of homework assistance are suitable for which age group. Moreover, more research on different homework settings and research that compares these settings is needed to verify our results. Due to the expansion of full-day schools in Germany, future research should pay special attention to scholastic homework assistance. In this context, it would be valuable to distinguish between different providers of homework assistance (e.g., pedagogical staff, teachers, or university students) who have heterogeneous qualifications and, thus, are likely to differ in the quality of the homework assistance they provide. For example, homework assistance can be provided by pedagogical staff who can be assumed to be aware of the benefits of need-supportive behavior or by university students who are not yet fully trained and might have less expertise (Guill et al., 2020). Finally, it needs to be considered that the expansion of full-day schools has raised questions about the role of homework and that some full-day schools have developed substitute or complementary programs for homework. For example, Brisson and Theis (2022) reported that study periods that were integrated into compulsory education had benefits compared to traditional homework regarding task quality, perceived cost and competence, and students' well-being.

2.5 Conclusion

Whereas prior research has relatively consistently shown that there are reciprocal relationships between the quality of parental homework assistance and students' academic functioning at secondary school, less is known about links between the two constructs for elementary school students and for homework assistance that is given at school. The present study therefore adds to the body of literature on homework assistance and its links with students' outcomes. Taken together, we found fewer associations than expected based on the SDT (Ryan & Deci, 2000) and on the findings from prior research on secondary school students. Therefore, our results show that findings from prior research cannot simply be transferred to other age groups and other homework settings. Moreover, our findings are complex because they differed between the quality dimensions, the indicators of academic functioning, and the two settings that we investigated. Therefore, more research is needed that compares the associations between homework assistance and students' academic functioning for different age groups, including students at elementary school, and in different homework settings.

2.6 References

- Brisson, B. M., & Theis, D. (2020). Traditionelle Hausaufgaben oder integrierte Lernzeiten? Ein Vergleich der Erfahrungen und Leistungsentwicklungen von Schülerinnen und Schülern mit unterschiedlichen Übungsformaten [Traditional homework or integrated learning time? A comparison of students' experiences and performance developments with different practice formats]. *Psychologie in Erziehung Und Unterricht*, 67(4), 294–312. <https://doi.org/10.2378/peu2020.art22d>
- Bronstein, P., Ginsburg, G. S., & Herrera, I. S. (2005). Parental predictors of motivational orientation in early adolescence: A longitudinal study. *Journal of Youth and Adolescence*, 34(6), 559–575. <https://doi.org/10.1007/s10964-005-8946-0>
- Carroll, J. B. (1963). A model for school learning. *Teacher College Record*, 64(8), 723–733.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, 9(2), 233–255. https://doi.org/10.1207/S15328007SEM0902_5
- Cooper, Lindsay, & Nye (2000). Homework in the home: How student, family, and parenting-style differences relate to the homework process. *Contemporary Educational Psychology*, 25(4), 464–487. <https://doi.org/10.1006/ceps.1999.1036>
- Cooper, H., Robinson, J. C., & Patall, E. A. (2006). Does homework improve academic achievement? A synthesis of research, 1987–2003. *Review of Educational Research*, 76(1), 1–62. <https://doi.org/10.3102/00346543076001001>
- Cooper, H., & Valentine, J. C. (2001). Using research to answer practical questions about homework. *Educational Psychologist*, 36(3), 143–153. https://doi.org/10.1207/S15326985EP3603_1
- Cunha, J., Xu, J., Rosário, P., & Núñez, J. C. (2018). Validity and reliability of the Parental Homework Management Scale. *Psicothema*, 30(3), 337–343. <https://doi.org/10.7334/psicothema2017.426>
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26(3-4), 325–346.
- Dufresne, A., & Kobasigawa, A. (1989). Children's spontaneous allocation of study time: Differential and sufficient aspects. *Journal of Experimental Child Psychology*, 47(2), 274–296. [https://doi.org/10.1016/0022-0965\(89\)90033-7](https://doi.org/10.1016/0022-0965(89)90033-7)

- Dumont, H., Trautwein, U., & Lüdtke, O. (2012). Familiärer Hintergrund und die Qualität elterlicher Hausaufgabenhilfe [Family background and the quality of parental homework involvement]. *Psychologie in Erziehung Und Unterricht*, 59(2), 109–121. <https://doi.org/10.2378/peu2012.art08d>
- Dumont, H., Trautwein, U., Nagy, G., & Nagengast, B. (2014). Quality of parental homework involvement: Predictors and reciprocal relations with academic functioning in the reading domain. *Journal of Educational Psychology*, 106(1), 144–161. <https://doi.org/10.1037/a0034100>
- Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist*, 48(2), 90–101. <https://doi.org/10.1037/0003-066X.48.2.90>
- Enders, C. K. (2010). *Applied missing data analysis. Methodology in the social sciences*. Guilford Press. <http://site.ebrary.com/lib/alltitles/docDetail.action?docID=10389908>
- Epstein, J. L. (1986). Parents' reactions to teacher practices of parent involvement. *The Elementary School Journal*, 86(3), 277–294. <https://doi.org/10.1086/461449>
- Fan, H., Xu, J., Cai, Z., He, J., & Fan, X. (2017). Homework and students' achievement in math and science: A 30-year meta-analysis, 1986–2015. *Educational Research Review*, 20, 35–54. <https://doi.org/10.1016/j.edurev.2016.11.003>
- Feng, X., Xie, K., Gong, S., Gao, L., & Cao, Y. (2019). Effects of parental autonomy support and teacher support on middle school students' homework effort: Homework autonomous motivation as mediator. *Frontiers in Psychology*, 10, 612. <https://doi.org/10.3389/fpsyg.2019.00612>
- Gnambs, T., & Hanfstingl, B. (2016). The decline of academic motivation during adolescence: an accelerated longitudinal cohort analysis on the effect of psychological need satisfaction. *Educational Psychology*, 36(9), 1691–1705. <https://doi.org/10.1080/01443410.2015.1113236>
- Gonida, E. N., & Cortina, K. S. (2014). Parental involvement in homework: Relations with parent and student achievement-related motivational beliefs and achievement. *The British Journal of Educational Psychology*, 84, 376–396. <https://doi.org/10.1111/bjep.12039>
- Gordon, C. S., Pink, M., & Jones, S. C. (2020). Children and tutor's perspectives on a homework support program in Melbourne: A university-school partnership. *Health & Social Care in the Community*, 28(5), 1611–1621. <https://doi.org/10.1111/hsc.12986>

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- Gottfried, A. E., Fleming, J. S., & Gottfried, A. W. (2001). Continuity of academic intrinsic motivation from childhood through late adolescence: A longitudinal study. *Journal of Educational Psychology, 93*(1), 3–13. <https://doi.org/10.1037/0022-0663.93.1.3>
- Grolnick, W. S. (2003). *The psychology of parental control: How well-meant parenting backfires*. Lawrence Erlbaum Associates Publishers.
- Grolnick, W. S., & Apostoleris, H. N. (2002). What makes parents controlling? In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 161–181). The University of Rochester Press.
- Grolnick, W. S., & Pomerantz, E. M. (2009). Issues and challenges in studying parental control: Toward a new conceptualization. *Child Development Perspectives, 3*(3), 165–170. <https://doi.org/10.1111/j.1750-8606.2009.00099.x>
- Grolnick, W. S., & Pomerantz, E. M. (2022). Should parents be involved in their children's schooling? *Theory into Practice, 1*–11. <https://doi.org/10.1080/00405841.2022.2096382>
- Grolnick, W. S., & Slowiaczek, M. L. (1994). Parents' involvement in children's schooling: A multidimensional conceptualization and motivational Model. *Child Development, 65*(1), 237. <https://doi.org/10.2307/1131378>
- Guill, K., Bahr, I., & Ömeroğulları, M. (2020). Qualität der Hausaufgabenhilfe in Elternhaus und Nachhilfeunterricht als Prädiktoren des hausaufgabenbezogenen Arbeitsverhaltens [Quality of homework support in the parental home and private tutoring as predictors of homework-related study behavior]. *Psychologie in Erziehung Und Unterricht, 67*(4). <https://doi.org/10.2378/peu2020.art08d>
- Hayduk, L. A., & Littvay, L. (2012). Should researchers use single indicators, best indicators, or multiple indicators in structural equation models? *BMC Medical Research Methodology, 12*, 159. <https://doi.org/10.1186/1471-2288-12-159>
- Hoover-Dempsey, V. K., & Sandler, M. H. (1995). Parental involvement in children's education: Why does it make a difference? *Teachers College Record, 97*(2), 310–331.
- Hoover-Dempsey, K. V., Walker, J. M. T., Sandler, H. M., Whetsel, D., Green, C. L., Wilkins, A. S., & Closson, K. (2005). Why do parents become involved? Research findings and implications. *The Elementary School Journal, 106*(2), 105–130. <https://doi.org/10.1086/499194>
- Huang, D., & Cho, J. (2009). Academic enrichment in high-functioning homework afterschool programs. *Journal of Research in Childhood Education, 23*(3), 382–392. <https://doi.org/10.1080/02568540909594668>

- Jennings, P. A., Brown, J. L., Frank, J. L., Doyle, S., Oh, Y., Davis, R., Rasheed, D., DeWeese, A., DeMauro, A. A., Cham, H., & Greenberg, M. T. (2017). Impacts of the CARE for Teachers program on teachers' social and emotional competence and classroom interactions. *Journal of Educational Psychology*, 109(7), 1010–1028. <https://doi.org/10.1037/edu0000187>
- Lipowsky, F., Faust, G., & Karst, K. (2011). *Dokumentation der Erhebungsinstrumente des Projekts „Persönlichkeits- und Lernentwicklung von Grundschulkindern“ (PERLE) - Teil 2. Materialien zur Bildungsforschung* [Documentation of the survey instruments of the project “Personality and Learning Development of Primary School Children”]. GPPF.
- Little, T. D. (2013). *Longitudinal structural equation modeling*. Guilford Press.
- Lüdtke, O., & Robitzsch, A. (2022). A Comparison of Different Approaches for Estimating Cross-Lagged Effects from a Causal Inference Perspective. *Structural Equation Modeling: A Multidisciplinary Journal*, 29(6), 888–907. <https://doi.org/10.1080/10705511.2022.2065278>
- Moroni, S., Dumont, H., & Trautwein, U. (2016). Typen elterlicher Hausaufgabenhilfe und ihr Zusammenhang mit der familialen Sozialisation [Profiles of parental homework involvement and their association with family socialization]. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie*, 48(3), 111–128. <https://doi.org/10.1026/0049-8637/a000153>
- Moroni, S., Dumont, H., Trautwein, U., Niggli, A., & Baeriswyl, F. (2015). The need to distinguish between quantity and quality in research on parental involvement: The example of parental help with homework. *The Journal of Educational Research*, 108(5), 417–431. <https://doi.org/10.1080/00220671.2014.901283>
- Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus User's Guide* (8th ed.). Muthén & Muthén.
- Ng, F. F.-Y., Kenney-Benson, G. A., & Pomerantz, E. M. (2004). Children's achievement moderates the effects of mothers' use of control and autonomy support. *Child Development*, 75(3), 764–780. <https://doi.org/10.1111/j.1467-8624.2004.00705.x>
- Niggli, A., Trautwein, U., Schnyder, I., Lüdtke, O., & Neumann, M. (2007). Elterliche Unterstützung kann hilfreich sein, aber Einmischung schadet: Familiärer Hintergrund, elterliches Hausaufgabenengagement und Leistungsentwicklung [Parental homework support can be beneficial, but parental intrusion is detrimental]. *Psychologie in Erziehung und Unterricht*, 54, 1–14.

- Nordt, G. (2013). *Lernen und Fördern in der Hausaufgabenpraxis der offenen Ganztagsgrundschule in Nordrhein-Westfalen* [Learning and support in the homework practice of open full-day elementary schools in North Rhine-Westphalia]. Waxmann.
- Nordt, G. (2020). Hausaufgaben – Schulaufgaben – Lernzeiten [Homework - school work - study time]. In P. Bollweg, J. Buchna, T. Coelen, & H.-U. Otto (Eds.), *Handbuch Ganztagsbildung* (pp. 1045–1061). Springer Fachmedien Wiesbaden.
https://doi.org/10.1007/978-3-658-23230-6_78
- Núñez, J. C., Epstein, J. L., Suárez, N., Rosário, P., Vallejo, G., & Valle, A. (2017). How do student prior achievement and homework behaviors relate to perceived parental involvement in homework? *Frontiers in Psychology*, 8, 1217.
<https://doi.org/10.3389/fpsyg.2017.01217>
- Núñez, J. C., Suárez, N., Rosário, P., Vallejo, G., Valle, A., & Epstein, J. L. (2015). Relationships between perceived parental involvement in homework, student homework behaviors, and academic achievement: differences among elementary, junior high, and high school students. *Metacognition and Learning*, 10(3), 375–406.
<https://doi.org/10.1007/s11409-015-9135-5>
- Patall, E. A., Cooper, H., & Robinson, J. C. (2008). Parent involvement in homework: A research synthesis. *Review of Educational Research*, 78(4), 1039–1101.
<https://doi.org/10.3102/0034654308325185>
- Ramdass, D., & Zimmerman, B. J. (2011). Developing self-regulation skills: The important role of homework. *Journal of Advanced Academics*, 22(2), 194–218.
<https://doi.org/10.1177/1932202X1102200202>
- Robitzsch, A., & Lüdtke, O. (2022). Why Measurement Invariance is Not Necessary for Valid Group Comparisons. PsyArXiv. <https://doi.org/10.31234/osf.io/cjyqp>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78.
<https://doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61.
<https://doi.org/10.1016/j.cedpsych.2020.101860>
- Sauerwein, M., & Rother, P. (2022). Hilfestellung in der Hausaufgabenbetreuung und den Lernzeiten aus der Perspektive von Schüler*innen [Help in homework supervision and

- study periods from the perspective of students]. *Zeitschrift Für Erziehungswissenschaft*, 25, 975–998. <https://doi.org/10.1007/s11618-022-01071-6>
- Savalei, V. (2019). A comparison of several approaches for controlling measurement error in small samples. *Psychological Methods*, 24(3), 352–370. <https://doi.org/10.1037/met0000181>
- Secretariat of the Standing Conference of the Ministers of Education and Cultural Affairs in the Federal Republic of Germany. (2021). *Allgemeinbildende Schulen in Ganztagsform in den Ländern in der Bundesrepublik Deutschland: Statistik 2015 bis 2019* [Full-day general education schools in the federal states of Germany]. https://www.kmk.org/fileadmin/Dateien/pdf/Statistik/Dokumentationen/GTS_2019_Bericht.pdf
- Silinskas, G., Niemi, P., Lerkkanen, M.-K., & Nurmi, J.-E. (2013). Children's poor academic performance evokes parental homework assistance—but does it help? *International Journal of Behavioral Development*, 37(1), 44–56. <https://doi.org/10.1177/0165025412456146>
- StEG-Konsortium. (2019). *Ganztagsschule 2017/2018. Deskriptive Befunde einer bundesweiten Befragung. Studie zur Entwicklung von Ganztagschulen* [Descriptive findings of a nationwide survey. Study on the development of full-day schools]. DIPF, DJI, IFS, Justus-Liebig-Universität. <https://doi.org/10.25656/01:17105>
- Trautwein, U., Lüdtke, O., Schnyder, I., & Niggli, A. (2006). Predicting homework effort: Support for a domain-specific, multilevel homework model. *Journal of Educational Psychology*, 98(2), 438–456. <https://doi.org/10.1037/0022-0663.98.2.438>
- Ulitzsch, E., Lüdtke, O., & Robitzsch, A. (2021). Alleviating estimation problems in small sample structural equation modeling-A comparison of constrained maximum likelihood, Bayesian estimation, and fixed reliability approaches. *Psychological Methods*, 28(3). <https://doi.org/10.1037/met0000435>
- Wild, E., & Gerber, J. (2007). Charakteristika und Determinanten der Hausaufgabenpraxis in Deutschland von der vierten zur siebten Klassenstufe [Characteristics and determinants of doing homework in Germany from fourth grade to seventh grade]. *Zeitschrift Für Erziehungswissenschaft*, 10(3), 356–380. <https://doi.org/10.1007/s11618-007-0041-8>
- Wild, E., & Gerber, J. (2009). Lernlust statt Lernfrust - Evaluation eines Elterntrainings zur Verringerung von Hausaufgabenkonflikten bei Schülern mit Lernschwierigkeiten

- [Evaluation of parent training to reduce homework conflicts among pupils with learning difficulties]. *Psychologie in Erziehung Und Unterricht*, 56, 303–318.
- Wilder, S. (2014). Effects of parental involvement on academic achievement: a meta-synthesis. *Educational Review*, 66(3), 377–397.
<https://doi.org/10.1080/00131911.2013.780009>
- Wu, J., Barger, M. M., Oh, D. D., & Pomerantz, E. M. (2022). Parents' daily involvement in children's math homework and activities during early elementary school. *Child Development*. Advance online publication. <https://doi.org/10.1111/cdev.13774>
- Xu, J., Du, J., Wu, S., Ripple, H., & Cosgriff, A. (2018). Reciprocal effects among parental homework support, effort, and achievement? An empirical investigation. *Frontiers in Psychology*, 9, 2334. <https://doi.org/10.3389/fpsyg.2018.02334>

3

STUDY 2: PERCEIVED QUALITY OF PARENTAL HOMEWORK ASSISTANCE, STUDENTS’ HOMEWORK BEHAVIOR, AND ACHIEVEMENT IN SECONDARY SCHOOL – DOES GRADE LEVEL PLAY A ROLE?

Benckwitz, L., Kohl, K., Suárez, N., Núñez, J. C., Guill, K. (2024). Perceived quality of parental homework assistance, students’ homework behavior, and achievement in secondary school – Does grade level play a role?. *Learning and Individual Differences*, 110. <https://doi.org/10.1016/j.lindif.2024.102422>

Abstract

High-quality (i.e., needs-oriented) parental homework assistance is positively associated with students' outcomes. However, taking developmental theories into account, the quality and the effects of homework assistance may change over the course of secondary school. Thus, we investigated grade-related differences in the quality of homework assistance and tested whether its links with students' outcomes were moderated by students' grade level. We used structural equation modeling on the basis of data from 1,782 secondary school students in Grades 5 to 9. We found grade-related differences in the quality of homework assistance, which contributed to differences in students' homework behavior and achievement across grades. However, we did not find that the links between the quality of homework assistance and students' outcomes differed substantially between students from different grades. On the basis of our findings, it can be recommended to maintain high-quality homework assistance in the early and middle stages of secondary school.

Keywords: parental homework assistance, self-determination theory, stage-environment fit, homework behavior, developmental needs, secondary school

3.1 Introduction

Parental homework assistance is considered a valuable resource in terms of promoting students’ academic functioning (i.e., their academic achievement and homework behavior; Dumont et al., 2014). However, according to previous research, these beneficial properties depend on the quality of the homework assistance (Moroni et al., 2015; Patall et al., 2008). High-quality homework assistance can be characterized by high levels of responsiveness and structure as well as by low levels of controlling behavior (Benckwitz et al., 2023; Dumont et al., 2014; Guill et al., 2020). Such homework assistance has the potential to promote students’ academic functioning as it supports students’ psychological needs as proposed by the self-determination theory, that is, the needs for competence, autonomy, and social relatedness (SDT; Ryan & Deci, 2020). Indeed, prior research has shown that students’ academic functioning benefits from needs-oriented parental homework assistance (e.g., Dumont et al., 2014; Guill et al., 2020; Moroni et al., 2015; Núñez et al., 2023).

However, although developmental theories such as the stage-environment fit theory (Eccles et al., 1993) propose that the quality of parental involvement and its effectiveness might change over the course of different developmental stages, previous studies mostly focused on one age group (e.g., Moroni et al., 2015; Niggli et al., 2007; Silinskas et al., 2013; Wu et al., 2022). Indeed, only a few studies compared the links between parental homework assistance and students’ academic functioning across developmental stages (Gonida & Cortina, 2014; Núñez et al., 2015; Wei et al., 2022). Thus, in the present study we addressed the role that students’ developmental stage (i.e., their grade level) plays in parental homework assistance. We focused on the early and middle stages of secondary school, namely Grades 5 to 9, because this period is characterized by a variety of psychological, cognitive, and social changes that occur during adolescence (Eccles et al., 1993).

Due to adolescents’ increased need for autonomy (e.g., Gutman & Eccles, 2007), parents of students in higher grades are challenged to grant their children more autonomy in doing their homework (Patall et al., 2008). However, because in the early and middle stages of secondary school parents are still an important source of help with their children’s homework (Wild & Gerber, 2007) they are simultaneously challenged to maintain productive types of homework assistance (e.g., responsiveness and structure). These complex developmental processes are likely to influence the quality of parental homework assistance. Therefore, the first aim of the present study was to test whether there are grade-related differences in parental responsiveness, structure, and control over the course of secondary school and whether these differences can

explain declines in students’ academic functioning which many students experience during adolescence (Gaspard et al., 2017; Scherrer & Preckel, 2019; Wang & Eccles, 2012; Wigfield et al., 2015).

Additionally, changes in parental homework assistance might not only concern its quality, but also its effectiveness (Núñez et al., 2015; Patall et al., 2008; Wei et al., 2022). Within the SDT framework, the three basic psychological needs are considered to be universal, that is, valid across developmental stages. However, developmental theories such as the stage-environment fit theory (Eccles et al., 1993) propose that the (relative) importance of these needs may change over the course of different developmental stages. Thus, homework assistance might be more or less beneficial or even detrimental to students’ academic functioning depending on the fit with students’ developmental needs. For example, in a developmental stage where the need for autonomy is relatively strong, students might react even more negatively to controlling parental behavior than in other developmental stages. Therefore, the second aim of this study was to investigate whether students’ grade level plays a moderating role in the links between the quality of parental homework assistance and students’ academic functioning.

3.1.1 Quality of parental homework assistance and its links with students’ academic functioning

To define the quality of parental homework assistance, prior research (Dumont et al., 2014; Guill et al., 2020; Nordt, 2013) has often drawn on the SDT (Ryan & Deci, 2000, 2020) because it targets the role that students’ learning environments play in their development. According to the SDT, parental homework assistance that recognizes students’ needs for competence, autonomy, and social relatedness is assumed to promote students’ academic functioning (Dumont et al., 2014). Based on these theoretical considerations, three quality dimensions of parental homework assistance have been derived and empirically tested, namely, responsiveness, structure, and control (Dumont et al., 2014). The first quality dimension, *responsiveness*, refers to being approachable and supportive during the homework process and is expected to enhance students’ experience of social relatedness (Dumont et al., 2014; Guill et al., 2020; Ryan & Deci, 2017). The second quality dimension, *structure*, describes the organization of the homework process by parents establishing clear and consistent rules and guidelines (e.g., making the rule that students have to finish their homework before they can watch TV or meet friends; Dumont et al., 2014; Farkas & Grolnick, 2010). Thus, structured homework assistance allows students to have a sense of effectiveness when doing homework, which can result in increases in students’ perceived competence (Farkas & Grolnick, 2010;

Guill et al., 2020). The third quality dimension, *control*, is characterized by parents interfering in the homework process without being asked for help (Dumont et al., 2014; Guill et al., 2020). Therefore, controlling homework assistance hinders students from feeling autonomous.

Prior studies at the secondary school level have shown that parental responsiveness and structure were related with better academic functioning in terms of higher achievement and/or better homework behavior (e.g., better time management, lower procrastination, and higher effort). In contrast, control was related with lower academic achievement and less adaptive homework behavior (e.g., Dumont et al., 2014; Guill et al., 2020; Moroni et al., 2015; Trautwein et al., 2006). However, with few exceptions (e.g., Núñez et al., 2015; Silinskas & Kikas, 2019; Wild & Gerber, 2007) these studies focused on one or a few grade levels. Thus, they did not take into account the pervasive developmental changes that occur during adolescence which are likely to have implications for both the quality of parental homework assistance and its effectiveness (i.e., the links between quality dimensions and students’ academic functioning). This is discussed in more detail in the following sections.

3.1.2 Changes in the quality of parental homework assistance during secondary school

The SDT and the quality dimensions proposed by it can be applied across ages and developmental stages (Dumont et al., 2014; Ryan et al., 2022). However, students experience a variety of psychological, cognitive, and social changes during secondary school (Eccles et al., 1993). It is plausible that parents observe and acknowledge these changes and that parents respond to them through changes in their behavior during homework assistance.

First, parents might become less responsive as their children reach higher grades because homework tasks become more complex and challenging and they may feel less self-efficacious in supporting their children (Hoover-Dempsey et al., 2005; Wei et al., 2019). Moreover, parents might reduce their responsiveness during homework because other people become an additional source of support as students grow older (for example, peers; Wei et al., 2019; Wild & Gerber, 2007). However, only a small number of existing studies have examined developmental changes in parental responsiveness, and these studies have shown mixed results. Whereas Wild and Gerber (2007) did not find statistically significant changes in functional homework assistance (i.e., responsive and autonomy-supportive behavior) from Grade 5 to 7, other studies documented decreases in perceived parental homework support, help, and responsiveness in secondary school (Cooper et al., 2000; Silinskas & Kikas, 2019). Following the stage-environment fit theory, declining levels of responsiveness may lead to frustration of students’ need for social relatedness because, despite their growing need for autonomy,

adolescents continue to desire emotionally close and secure relationships with their parents (& Eccles, 2007). Thus, declining levels of responsiveness may contribute to decreases in academic functioning which many students experience during adolescence (Gaspard et al., 2017; Scherrer & Preckel, 2019; Wang & Eccles, 2012; Wigfield et al., 2015).

Second, there might be changes in the provision of parental structure during adolescence. On the one hand, Wang et al. (2014) argued that parents might increase structuring behavior during adolescence because this type of involvement is in line with students' developmental needs at that age as it allows students to play a more active and self-determined role in their own homework. Indeed, they found that the provision of structure at home increased from Grade 7 to 11. On the other hand, parents might assume that their children need less assistance in structuring the homework process because older students have gained problem-solving, planning, and decision-making skills that should enable them to take more responsibility for their school career (Hill & Tyson, 2009; Keating, 2004; Patall et al., 2008; Wei et al., 2019). This assumption was supported by Cooper et al. (2000) who found that students' grade level was negatively related with parental structure (i.e., elimination of distractions during homework). Taken together, it is possible that parents decrease the provision of parental structure despite its beneficial properties for adolescents (Wang et al., 2014; Wang, & Sheikh-Khalil, 2014). On the basis of the stage-environment fit (Eccles et al., 1993), decreases in the provision of parental structure might contribute to declines in students' competence beliefs which have been well documented by longitudinal research (Fredricks & Eccles, 2002; Jacobs et al., 2002; Wigfield et al., 1991). Thus, they may be related to developmental declines in students' academic functioning.

Third, the level of parental control may change during adolescence. On the one hand, parents might become more controlling during adolescence because, at that time, students might perceive homework assistance per se as intrusive and, thus, react more resistantly to parental homework assistance (Wei et al., 2022). This, in turn, could evoke negative affect and controlling behavior in parents. Moreover, students' academic achievement often declines during adolescence and low academic achievement has been found to predict controlling parental behavior (Benckwitz et al., 2023; Dumont et al., 2014). On the other hand, it is possible that parental control decreases over the course of secondary school because parents usually renegotiate autonomy versus control during adolescence (Eccles et al., 1993). Indeed, prior research has provided evidence that controlling homework assistance decreases over time (Cooper et al., 2000; Gonida & Cortina, 2014; Silinskas & Kikas, 2019; Wild & Gerber, 2007). According to the stage-environment fit theory (Eccles et al., 1993), grade-related decreases in

controlling behavior may support students' increased need for autonomy and, therefore, support their academic functioning.

3.1.3 Grade-related changes in the links between the quality of parental homework assistance and students' homework behavior and academic achievement

According to the stage-environment fit theory (Eccles et al., 1993), students' academic functioning is supported if parents provide homework assistance that meets students' developmental needs. Thus, it is conceivable that the effects of parental responsiveness, structure, and control might depend on students' developmental stage and the needs that are particularly important during that stage.

First, although maintaining relatedness with their parents is important to students as they move through adolescence (Gutman & Eccles, 2007; Hill et al., 2007) it is possible that links between parental responsiveness and students' outcomes are weaker for students in higher grades. As students grow older and relationships outside the family gain in importance, students begin to reach out to people other than their parents for help if they are struggling with their homework (e.g., to peers, Wei et al., 2019; Wild & Gerber, 2007). Moreover, they have increased information-gathering skills, which they can use when problems arise during homework instead of asking their parents for help (e.g., ICT literacy; Gnambs, 2021). However, prior research has not supported the assumption that the links between parental responsiveness and students' outcomes decrease as students grow older. In a meta-analysis, Pinquart (2016) did not find a moderating effect of students' age on the link between responsive parenting and students' academic achievement. Moreover, Núñez et al. (2015) found that homework support (which is comparable with responsiveness) was more beneficial for older students' (i.e., in Grades 7 to 10) homework behavior and achievement than for younger students (i.e., in Grades 5 to 6).

Second, it is possible that parental structure becomes more relevant as students move through adolescence (Wang et al., 2014). The provision of structure might have the potential to compensate for the decline in competence beliefs and achievement that many students experience during that time (Fredricks & Eccles, 2002; Jacobs et al., 2002; Wigfield et al., 1991). Indeed, Wang et al. (2014) found that the provision of structure was related with a smaller decline in academic achievement from Grades 7 to 11. Moreover, organizing the homework process (e.g., by making sure that students finish their homework before meeting friends) might be particularly important during adolescence when peer relationships become highly important and students might prioritize spending time with their peers over doing their

homework. However, it is also possible that parental structure is less important for older students because they are able to structure their homework themselves. Thus, older students might even react negatively to structuring parental behavior because they interpret it as a threat to their growing autonomy. However, from an empirical perspective, little is known about whether the links change as students grow older.

Third, parental control during homework is likely to have more detrimental effects on students' homework behavior and their achievement as they reach higher grades due to students' increased desire for autonomy (Eccles et al., 1993; Gutman & Eccles, 2007). However, prior research on grade-related changes in the links between parental homework control and students' outcomes is inconclusive. While Gonida and Cortina (2014) found no evidence that grade level (Grade 5 vs. Grade 8) moderated the links between parental homework control and students' motivational beliefs and achievement, Núñez et al. (2015) found evidence that parental control was more harmful for older students' homework behavior.

3.1.4 The present study

In the present study, we aimed to complement prior research on the quality of parental homework assistance that was conducted on the basis of the SDT (Dumont et al., 2014; Guill et al., 2020; Ryan & Deci, 2000) by adding a stage-environment fit perspective (Eccles et al., 1993). This allowed us to investigate the role of the complex developmental changes that occur during adolescence for the quality of parental homework assistance and its effectiveness for students' academic functioning. To measure students' academic functioning we included two indicators of homework behavior (effort and procrastination) and one measure of students' academic achievement (students' mean grades in three subjects). As homework behavior is not only deemed an important outcome in itself (Cooper & Valentine, 2001; Dumont et al., 2014; Ramdass & Zimmerman, 2011) but also considered a mediator in the relationship between homework assistance and students' academic achievement (Núñez et al., 2015; Otero et al., 2020; Tunkkari et al., 2021), we included this indirect link in our two analytical models.

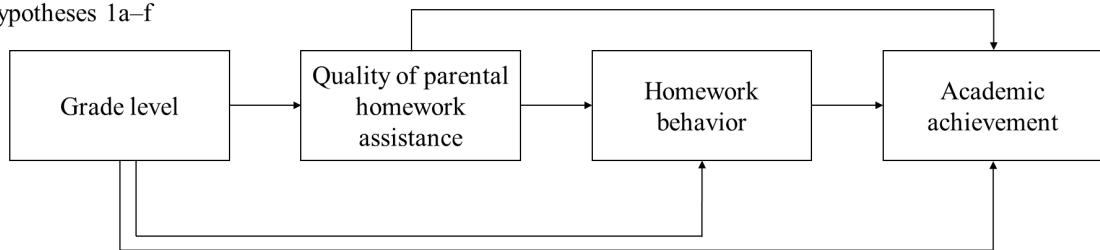
First (research question 1 [RQ1]), we examined whether students' grade level predicted the quality of parental homework assistance during secondary school and whether potential differences in the quality of parental homework assistance contributed to grade-related differences in students' academic functioning (see Figure 1). In accordance with the theoretical considerations outlined above, we expected perceived responsiveness (Hypothesis 1a), structure (H1b), and control (H1c) to be lower in higher grades. Additionally, we expected to find negative indirect links between grade level and students' outcomes via responsiveness

(H1d) and structure (H1e; i.e., higher grade level → lower responsiveness/structure → less positive homework behavior and lower achievement). Furthermore, we expected grade level to be positively linked with students' outcomes via control (H1f; i.e., higher grade level → lower control → more positive homework behavior and achievement).

Figure 1

Assumed relationships between students' grade level, the quality of parental homework assistance, and students' homework behavior and achievement

RQ 1: Hypotheses 1a–f

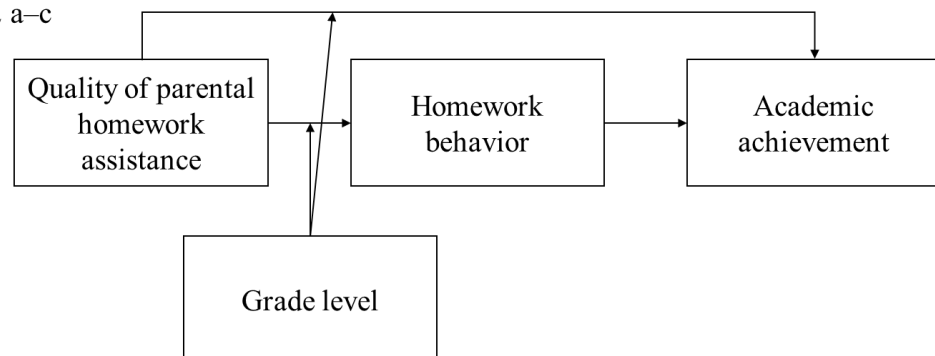


Second (research question 2 [RQ2]), we investigated whether students' grade level moderated the relationships between the quality of parental homework assistance and students' homework behavior and their academic achievement (see Figure 2). On the basis of theoretical considerations, we assumed that the positive links between responsiveness and students' outcomes would be weaker for older students due to their increased skills and knowledge and their expanded support network (H2a). In contrast, we expected the positive associations between structure and students' outcomes to be stronger for students in higher grades because structuring homework assistance might be particularly needed in a period where social relatedness with peers becomes highly important (H2b). Finally, we hypothesized that the negative relationships between control and students' outcomes would be stronger for students in higher grades due to their increased desire for autonomy (H2c).

Figure 2

Assumed interactions between the quality of parental homework assistance and students' grade level

RQ2: Hypotheses 2 a–c



3.2 Material and methods

3.2.1 Sample

We drew on data that were collected in the context of two studies on the quality of supplementary education (i.e., homework assistance and private tutoring). The data collection of the first study ($n = 1,490$) took place from June to July 2017 (for details on the study design and additional findings, see Guill et al., 2020)⁵. The data collection of the second study ($n = 292$) took place from May to June 2019. We combined both samples because the instruments of the relevant constructs were identical and the sample characteristics were similar (i.e., both samples consisted of students in Grades 5 to 9 in academic and nonacademic tracks, and the data collection of both studies took place in two federal states of Germany, namely, Schleswig-Holstein and North Rhine-Westphalia). Our total sample consisted of $N = 1,782$ (55% female) from 13 secondary schools⁶. The majority of the students (94%) attended an academic track, whereas only a small number of students attended a nonacademic track. In Schleswig-Holstein and North Rhine-Westphalia, secondary school starts with Grade 5 and students are allocated to the different secondary tracks based on their achievement in elementary school.

In the total sample, 27% of the students stated that they spoke another language besides German at home, which indicates a migration background. Regarding their educational background, in line with the high percentage of students who attended an academic track, 79% of the students stated that at least one of their parents had the qualification to go to university (i.e., had obtained the Abitur [the school leaving certificate that enables entrance to third-level education in Germany]).

Participation in the studies was voluntary and written consent was obtained from the parents. Students did not have any disadvantages if they decided not to participate. However, in Study 1, students had the chance to win a gift voucher (€25) as an incentive. Both studies were approved by the Ministry of General Education and Vocational Training, Science, Research and Culture in Schleswig-Holstein.⁷

⁵ Using data from the first study, Guill et al. (2020) investigated the links between the quality of parental homework assistance and students' homework behavior and achievement. Although there is some overlap in the data used in Guill et al.'s study and in our study, this study makes a unique contribution to the state of research because it addresses the role of students' grade level in the associations between homework assistance quality and students' outcomes, whereas Guill et al. (2020) tested the relationships across grade levels.

⁶ The sample included 21 students who were recruited via private tutoring institutes.

⁷ The data collection in North Rhine-Westphalia required approval from the principal of each school.

3.2.2 Measures

All instruments relevant for the present study were assessed in both studies and via student questionnaires (the items are displayed in the supplemental material, Table S1). In Study 1 (2017), schools could decide whether they completed the questionnaires as paper-pencil questionnaires, which were sent by mail to the schools (10%), or digitally. Half a school lesson was scheduled for data collection (approximately 25 minutes; for more information on the data collection, see Guill et al., 2020). In Study 2 (2019), data collection was completely digitally based and students could use PCs, tablets, or their smartphones. One school lesson was scheduled for the data collection of Study 2 (approximately 45 minutes) because it included additional questions and variables (which were not included in this study).

Students' grade level: Students stated their grade level in the questionnaire (1 = *Grade 5*, 2 = *Grade 6*, 3 = *Grade 7*, 4 = *Grade 8*, 5 = *Grade 9*).

Quality of homework assistance: Responsiveness, structure, and control were assessed using 14 items (Dumont et al., 2014). Students rated the perceived quality of their parental homework assistance on a 4-point Likert scale (1 = *completely disagree* to 4 = *completely agree*). Responsiveness was measured with four items (e.g., “My parents help me with my homework if I ask them to”, Cronbach's α /McDonald's ω = .75/.76). Structure was operationalized with six items (e.g., “My parents make sure that I have enough time and space to do my homework”, α = .75/ ω = .74) Control was assessed with four items (e.g., “My parents often interfere when I'm doing my homework”, α = .71/ ω = .73).

Homework behavior: Students' homework behavior was assessed using two indicators, namely, effort and procrastination. Both constructs were measured on a 4-point Likert scale (1 = *completely disagree* to 4 = *completely agree*). Homework effort was assessed using four items that were adapted from Trautwein et al. (2006; e.g., “I do my homework as best as I can”, α = .84/ ω = .84). Procrastination was measured with three items from Dumont et al. (2014; e.g., “I put off doing my homework until the last minute”, α = .71/ ω = .73).

Academic achievement: To measure students' current academic achievement, students were asked to state their grades in their last exams in mathematics, German, and English. Prior studies reported bidirectional links between the quality of parental homework assistance and students' achievement (Benckwitz et al., 2023; Dumont et al., 2014). Therefore, we additionally asked students for their last midterm report card grades in mathematics, German, and English as an indicator of their prior achievement. These midterm report cards were handed out in January and February, that is, several months before data collection (Study 1: June to July, Study 2: May to June). For both students' current and students' prior achievement, we used the

average of the three grades and recoded them so that high values indicated better grades (0 = *lowest grade* to 15 = *highest grade*).

Covariates: Students reported their gender (0 = *male*, 1 = *female*), their school track (0 = *nonacademic*, 1 = *academic*), and their family background in terms of a possible migration background and the level of parental education. As an indicator of migration background, students were asked whether they spoke another language besides German at home (0 = *no*, 1 = *yes*). To operationalize educational background, students stated whether at least one of their parents had a qualification for university (Abitur; 0 = *no*, 1 = *yes*). Additionally, because we combined two studies, we controlled for the origin of the data (0 = *Study 1*, 1 = *Study 2*).

3.2.3 Analyses

To get an overview of the data, we first computed descriptive statistics and bivariate correlations. For the main analyses, we conducted structural equation modeling (SEM; Little, 2013) in *Mplus* 8.5 (Muthén & Muthén, 1998-2017). We specified the quality dimensions and homework behavior as latent variables and achievement as a manifest variable in all models. As suggested in the literature, missing data were handled by using the full information maximum likelihood procedure (FIML; Enders, 2010) integrated into *Mplus*. The amount of missing data ranged between 2% (gender) and 19% (parental education), with an average of 6% missing data.

Our main models (see Figures 1 and 2) comprised the three quality dimensions of parental homework assistance as predictors of homework behavior and achievement, with homework behavior serving as a mediator of the relationships between homework assistance quality and achievement. Students' grade level was included in two different ways, corresponding to the two research questions. In the first step of the main analyses, testing H1a–c, students' grade level was entered into the model as a predictor of the three homework assistance quality dimensions. Additionally, we tested indirect effects of students' grade level on homework behavior and achievement via the quality dimensions of parental homework assistance (H1d–f). First, we tested indirect links between students' grade level and their homework behavior via the quality of parental homework assistance. Second, we tested indirect links between students' grade level and their mean grades via the quality of parental homework assistance and their homework behavior. In the second step of the analyses, examining H2a–c, we tested students' grade level as a moderator of the links between the quality dimensions and students' homework behavior and achievement. Interaction terms (i.e., *responsiveness* × *grade level*, *structure* × *grade level*, and *control* × *grade level*) were tested separately, one at a time.

As a supplementary analysis, we followed Gonida and Cortina (2014) and calculated a multi-group analysis in which we compared the latent means of the quality dimensions and the structural model between students from Grades 5 and 6 (i.e., the orientation phase of secondary school, $n = 721$) and students from Grades 7 to 9 (i.e., the middle stage of secondary school, $n = 1006$). For each research question, we added constraints to the model (i.e., RQ1: constraints of the latent means to be equal [Model 1]; RQ2: constraints of the structural model to be equal [Model 2]). We tested χ^2 -differences between the constrained and the unconstrained model (Model 0) to decide whether the constraints were related with a significant decline in the model fit (Gonida & Cortina, 2014).

3.3. Results

3.3.1 Descriptives and bivariate correlations

The mean values, standard deviations, and intercorrelations between the variables are displayed in Table 1. Grade-specific mean values and standard deviations for the quality dimensions and student outcomes can be found in the online supplemental material⁸, Figures S1 to S3. In each grade level, there was a substantial number of students (Grade 5: $n = 386$, Grade 6: $n = 335$, Grade 7: $n = 396$, Grade 8: $n = 298$, Grade 9: $n = 312$ ⁹). On average, students perceived relatively high levels of parental responsiveness and structure (i.e., above the theoretical mean of the scale) and relatively low levels of control (i.e., below the theoretical mean of the scale). The quality dimensions were positively related with each other ($.10 \leq r \leq .35$) which suggests that functional (i.e., parental responsiveness and structure) and dysfunctional (i.e., parental control) types of homework assistance can co-exist in families. Students' grade level was negatively related with all three quality dimensions of homework assistance ($-.34 \leq r \leq -.17$) and was unfavorably related with students' homework behavior and grades ($-.32 \leq r \leq .32$).

⁸ <https://www.sciencedirect.com/science/article/pii/S1041608024000153?via%3Dihub#ec0005>

⁹ 55 students did not provide information on their grade level.

Table 1*Descriptives of and intercorrelations between the manifest variables*

	<i>M/%</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12
1. Grade level														
2. Responsiveness	3.31	0.66	-.24											
3. Structure	2.98	0.64	-.34	.35										
4. Control	1.34	0.49	-.17	.10	.14									
5. Effort	2.94	0.63	-.32	.24	.36	-.04								
6. Procrastination	2.02	0.75	.32	-.18	-.23	.13	-.49							
7. Mean grade	9.20	2.53	-.15	.09	.06	-.11	.27	-.30						
8. Prior mean grade	9.26	2.28	-.17	.13	.08	-.15	.29	-.30	.72					
9. Gender (female)	54.8%	–	.04	.03	-.07	-.18	.23	.01	.04	.07				
10. Academic track (yes)	93.8%	–	-.07	-.05	.01	-.10	.03	-.03	.00	.03	-.01			
11. Migration background (yes)	27.0%	–	-.09	-.12	.04	.03	.02	-.04	-.06	-.08	.00	.04		
12. At least one parent qualified for university (yes)	78.7%	–	-.13	.20	.08	.03	.05	-.09	.17	.18	-.03	.12	.00	
13. Origin of the data (Study 2)	16.4%	–	-.08	.04	.06	-.01	.09	-.04	.00	.05	.02	.09	.04	-.09

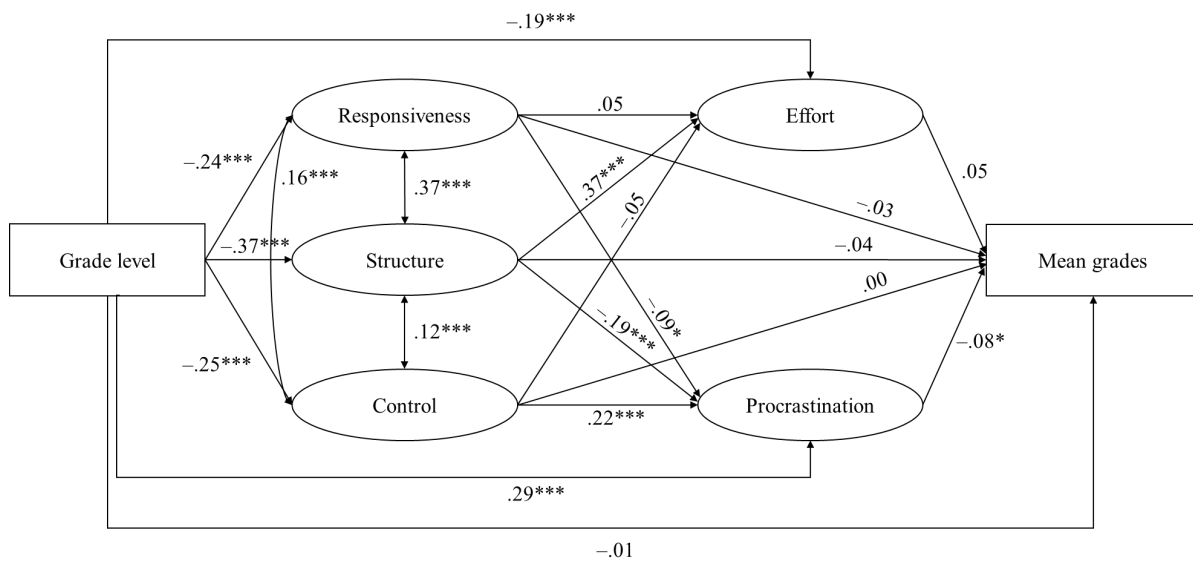
Note. Coefficients are based on complete case analyses ($1,453 \leq N \leq 1,782$). Statistically significant correlations at $p \leq .05$ are in bold.

3.3.2 Grade-related differences in the quality of parental homework assistance

Regarding RQ1, we expected that students in higher grades would perceive their parents to be less responsive (H1a), less structuring (H1b), and less controlling (H1c) than students in lower grades would. The results for RQ1 are displayed in Figure 3; detailed results can be found in the online supplemental material, Table S2. We report standardized coefficients (stdyx for all latent and manifest continuous variables).

Figure 3

Links between students' grade level, the quality of parental homework assistance, students' homework behavior, and mean grades



Note. $*p \leq .05$. $***p \leq .001$. All covariates were controlled for. $*p \leq .05$. $***p \leq .001$. Model Fit Indices: $\chi^2(307, N = 1,782) = 1340.454, p < .001$, RMSEA: .04, CFI = .92, TLI = .90, SRMR = .04

Students' grade level was negatively related with parental responsiveness ($\beta = -.24, p \leq .001$), structure ($\beta = -.37, p \leq .001$), and control ($\beta = -.25, p \leq .001$). Thus, students in higher grades perceived their parents to be less responsive, structuring, and controlling than students in lower grades. Similarly, our supplementary analysis suggested differences in the quality of parental homework assistance between students in Grades 5 and 6 (i.e., the orientation phase of secondary school) and students in Grades 7 to 9 (i.e., the middle phase of secondary school) because constraining the latent means of the quality dimensions to be equal across groups lead to a significant decline in the model fit ($\Delta\chi^2 = 12.657, \Delta df = 3, p \leq .001$). Taken together, the results supported Hypotheses 1a–c.

Additionally, we tested whether the quality of parental homework assistance served as a mediator that might explain why students' grade level is unfavorably linked with students' homework behavior and achievement (H1d–f, see Table 2). We found an indirect positive link between students' grade level and students' homework procrastination via parental responsiveness ($\beta = .022, p = .017$). Thus, students' grade level was linked to more homework procrastination via lower levels of parental homework responsiveness. However, we did not find statistically significant indirect associations of grade level with homework effort and mean grades via responsiveness ($-.012 \leq \beta \leq -.001, p \geq .05$). Therefore, Hypothesis 1d was only partially confirmed.

Regarding parental structure, we found that it mediated the links between students' grade level and students' homework effort ($\beta = -.139, p \leq .001$) and procrastination ($\beta = .069, p \leq .001$). Hence, students' grade level was related with less favorable homework behavior (i.e., less effort and higher procrastination) via lower levels of parental structure. Moreover, we found an indirect effect of students' grade level on mean grades via structure and procrastination ($\beta = -.006, p = .027$), but not via structure and effort ($\beta = -.008, p = .103$). Therefore, students' grade level was negatively linked with students' mean grades via lower levels of structure and higher levels of procrastination. Therefore, Hypothesis 1e was largely confirmed.

Regarding parental control as a mediator, we found that students' grade level was negatively linked with students' homework procrastination via control ($\beta = -.055, p \leq .001$) and was positively linked with students' mean grades via control and procrastination ($\beta = .004, p = .024$). Thus, students' grade level was related with lower levels of parental control, which, in turn, were related with less homework procrastination, and, finally, with higher mean grades. However, we did not find indirect relationships between students' grade level, parental control, homework effort, and mean grades. Therefore, our analyses only partially supported Hypothesis 1f.

Table 2

Indirect links between students' grade level, the quality of parental homework assistance, students' homework behavior, and mean grades

	<i>Effort</i>	<i>Procras- tination</i>	<i>Mean grades</i>
<i>Grade level</i>	β (SE)	β (SE)	β (SE)
via responsiveness	-.012 (.008)	.022 (.009)	
via responsiveness and effort			-.001 (.001)
via responsiveness and procrastination			-.002 (.001)
via structure	-.139 (.015)	.069 (.015)	
via structure and effort			-.008 (.005)
via structure and procrastination			-.006 (.003)
via control	.011 (.007)	-.055 (.010)	
via control and effort			.001 (.001)
via control and procrastination			.004 (.002)

Note. Standardized coefficients. Statistically significant coefficients at $p \leq .05$ are in bold.

3.3.3 Does students' grade level moderate the links between the quality of parental homework assistance and students' homework behavior and academic achievement?

Regarding RQ2, we expected that students' grade level would moderate the links of parental responsiveness (H2a), structure (H2b), and control (H2c) with students' homework behavior and mean grades. Detailed results can be found in the online supplemental material, Tables S3–5. We report standardized coefficients (stdyx for all latent and manifest continuous variables).

We did not find that students' grade level moderated the links with students' homework behavior and academic achievement for any of the three quality dimensions (responsiveness: $-.03 \leq \beta \leq .02$, $p \geq .05$; structure: $-.01 \leq \beta \leq .03$, $p \geq .05$; control: $-.02 \leq \beta \leq -.01$, $p \geq .05$). Similarly, our supplementary analysis suggested structural invariance between students from Grades 5 and 6 and students from Grades 7 to 9 because constraining the structural model to be equal across the two groups did not lead to a significant decline in the model fit ($\Delta\chi^2 = 9.492$, $\Delta df = 9$, $p = .393$). Taken together, our findings did not support the assumption that students' grade level moderates the links between the quality of parental homework assistance and students' outcomes (H2a–c).

3.4 Discussion

The aims of our study were twofold. The first aim was to test whether there are grade-related differences in the quality of parental homework assistance and whether these potential differences can explain differences in students' homework behavior and achievement over the course of secondary school. The second aim of our study was to test whether students' grade level moderates the relationships between the quality of parental homework assistance and students' homework behavior and academic achievement.

3.4.1 Grade-related differences in the quality of parental homework assistance and their role in the links between students' grade level and their academic functioning

Regarding the first aim of our study, we hypothesized that perceived parental responsiveness, structure, and control during homework would be significantly lower in higher grades, which was supported by the findings of our study. The finding of lower responsiveness in higher grades is in line with prior research that has documented decreases in parental homework support and responsiveness (Cooper et al., 2000; Silinskas & Kikas, 2019). Theoretically, responsiveness aims to support students' need for social relatedness with their parents (Dumont et al., 2014). Although students desire more autonomy from their parents during adolescence, emotionally close relationships still play an important role (Gutman & Eccles, 2007). Therefore, following the stage-environment fit theory (Eccles et al., 1993), lower levels of parental responsiveness might lead to a mismatch between students' need for social relatedness and their parents' behavior, which might favor difficulties in the educational domain, for example, declining motivation and achievement (Gutman & Eccles, 2007). Similarly, lower levels of structure might lead to a mismatch between students' need for competence and their educational environment. Indeed, we found that lower levels of parental responsiveness and structure partially explained the links between students' grade level and less productive homework behavior and lower academic achievement. However, some of these indirect links were very small (e.g., $\beta = -.006$ for *grade level* \rightarrow *control* \rightarrow *procrastination* \rightarrow *mean grades*, see Table 2). One explanation for the small indirect effect seems to be that the relationships between students' homework behavior and students' mean grades were either insignificant (in the case of effort: $\beta = .05, p = .10$) or small (in the case of procrastination: $\beta = -.008, p = .01$). The lack of a link between homework effort and students' grades is surprising because one would expect that more effort would lead to greater mastery of the school material and would be taken into account by the teachers when assigning grades. In the case of procrastination, it is possible that starting homework early does not always ensure better performance. For example, students

might start quickly but do their homework superficially, which would not lead to greater mastery and, thus, would not help to improve students' performance. Therefore, it might be promising to investigate combinations of several variables that might predict students' performance more accurately (e.g., a combination of low levels of procrastination with high levels of effort).

When interpreting the negative link between students' grade level and parental responsiveness and structure, it needs to be considered that, even in the highest grade in our study (i.e., Grade 9), mean levels of responsiveness and structure were relatively high (i.e., responsiveness: $M_{\text{Grade9}} = 3.00$; structure: $M_{\text{Grade9}} = 2.61$). Therefore, all students in our sample received a substantial amount of productive support. However, our sample mostly consisted of students in academic tracks, where the quality of homework assistance might be higher than in nonacademic tracks. Indeed, the quality of parental homework assistance has been found to be predicted by a variety of characteristics that are likely to be more prevalent in academic tracks, for example, high academic functioning (Benckwitz et al., 2023; Dumont et al., 2014) or high socioeconomic status (Cooper et al., 2000; Hyde et al., 2006; Niggli et al., 2007). Therefore, future studies should include substantial numbers of students from all tracks.

Finally, the finding that students in higher grades perceived lower levels of controlling behavior is in line with findings from prior studies that reported decreasing levels of controlling homework assistance over time (Gonida & Cortina, 2014; Wild & Gerber, 2007). This finding indicates that parents might respond to their children's increasing need for autonomy and reduce controlling behavior as students move through secondary school, which might mitigate the deterioration of students' homework behavior and achievement by creating a better stage-environment fit (Eccles et al., 1993). This assumption was supported by the mediation analysis in our study as students' grade level was related with lower levels of parental control, which, in turn, were linked with lower levels of procrastination, and, finally, with higher academic achievement. However, the indirect link between students' grade level via parental control and homework procrastination was extremely small, but it was still statistically significant ($\beta = .004$, $p = .024$). As the quality dimension control measures the neglect of students' need for autonomy, it would be interesting for future studies to include measurements of active autonomy support (e.g., Xu et al., 2024).

Taken together, our findings suggest that students in higher grades report both less functional (i.e., responsive and structuring) and dysfunctional (i.e., controlling) parental homework assistance, which is in line with findings of prior studies that have shown that home-based involvement tends to decline when students move into and through secondary school

(Bhargava & Witherspoon, 2015; Kim & Fong, 2014; Wang et al., 2014; Wei et al., 2019). Our results complement these findings by suggesting that not only does the quantity decrease but also the quality aspects of homework assistance become less pronounced as students grow older. In future studies, it would be interesting to investigate predictors of changes in parental homework assistance during secondary school. For example, parents of older children may feel less self-efficacious to help their children due to the increased complexity of their homework tasks (Hoover-Dempsey et al., 2005; Wei et al., 2019). Therefore, some parents may organize other support offers for their children when they grow older (e.g., private tutoring). Indeed, Hille et al. (2016) found that German students in higher grades participate in private tutoring more often than students in lower grades, although the difference was only statistically significant between primary school students and secondary school students, but not between grades in secondary school.

3.4.2 Grade-related differences in the links between the quality of parental homework assistance and students' homework behavior and academic achievement

Regarding the second aim of our study, we hypothesized that students' grade level would moderate the links between the quality dimensions and students' academic functioning. However, our analyses did not support this hypothesis. The lack of an interaction effect between parental responsiveness and students' grade level suggests that the links between parental responsiveness and students' outcomes might be similar across the observed grades in our study (i.e., Grades 5 to 9). Theoretically, because responsiveness aims to support students' need for social relatedness (Dumont et al., 2014), this result proposes that social relatedness with their parents remains important for students throughout the early and middle stages of secondary school (Gutman & Eccles, 2007); this highlights the generalizability of the basic psychological needs proposed by the SDT (Ryan & Deci, 2000, 2017). It is also in line with the result of a meta-analysis by Pinquart (2016), who did not find a moderating effect of students' age on the link between responsive parenting and students' academic achievement, but it is inconsistent with the findings of Núñez et al. (2015). Although they investigated a similar sample (i.e., students from Grades 5 to 10), they found grade-related effects of parental responsiveness on students' homework behavior and achievement, that is, they only found statistically significant effects for older students (Grades 7 to 10) and not for younger students (Grades 5 to 6). Because, in Spain, secondary school starts with Grade 7, their sample consisted of students before and after their transition to secondary school. It is possible that the links between parental responsiveness and students' outcomes vary more strongly between elementary and secondary

school than within secondary school because school transitions are related with changes in students' learning environments at school (e.g., students have to navigate more subjects and more demanding classes) and at home (e.g., changes in parental behavior and expectations). These changes are likely to have an impact on the stage-environment fit (Eccles et al., 1993). Therefore, more research that includes both elementary and secondary school students is needed.

Regarding parents' structuring behavior, previous studies reported positive relationships with students' educational outcomes at the secondary level (Dumont et al., 2014; Guill et al., 2020), whereas less is known about whether these links change over the course of students' development. The lack of an interaction effect between grade level and structure, in combination with the favorable links between structure and homework behavior found in our study, suggests that students from all grades at the early and middle stages of secondary school benefit similarly from parental structure. Because structure aims to support students' need for competence, this finding highlights the universality of the need for competence, as proposed by the SDT, across developmental stages (Ryan & Deci, 2017). However, with research on grade-related changes in the links between structure and students' educational outcomes being scarce, more research is needed to verify this finding.

The lack of an interaction effect between parental control and students' outcomes, in combination with the unfavorable links with students' homework behavior found in our study, indicates that parental control might be similarly detrimental to students' outcomes at different stages of secondary school. This finding also underpins the theoretical assumption of the SDT that controlling and intrusive parental behavior harms the experience of autonomy of all students, regardless of their grade level (Ryan & Deci, 2000). Our findings were in line with the findings of Gonida and Cortina (2014) and Núñez et al. (2015), who did not find that the association between parental homework control and students' outcomes varied substantially across grades.

Overall, our findings suggest that the associations between the quality of parental homework assistance and students' academic functioning are similar across the early and middle stages of secondary school. This finding indicates that the quality dimensions of parental homework assistance derived from the SDT (Dumont et al., 2014; Ryan & Deci, 2000) are generally predictive of students' academic functioning across grades and ages.

3.4.3 Implications for theory and practice

Our results suggest that taking a stage-environment fit perspective (Eccles et al., 1993) adds value when investigating the links between parental homework assistance and students' academic functioning. Although we did not find support for the assumption that developmental changes in students' needs lead to differences in their reactions to parental homework assistance, our findings suggest that the parental behavior that is manifest in the quality of parental homework assistance might differ across grade levels in secondary school. Moreover, these differences might influence the stage-environment fit and, thus, students' homework behavior and achievement. Given that students' grade level did not moderate the relationships between the quality dimensions and students' academic functioning, the associations can be considered similar across grades in our sample. This finding shows the theoretical generalizability of basic needs as proposed by the SDT (Ryan & Deci, 2000; Ryan et al., 2022) and the quality dimensions of parental homework assistance derived from it (Dumont et al., 2014).

Regarding homework practice, our findings indicate that parents should try to maintain productive types of homework assistance (i.e., responsiveness and structure) as their children move through the early and middle stages of secondary school because both parental responsiveness and structure were positively related with homework behavior and these links were not weaker for older students. Moreover, lower levels of perceived responsiveness and structure contributed to unfavorable links between students' grade level and students' homework behavior and academic achievement. Therefore, by maintaining responsiveness and structure, parents might counteract the unfavorable developments that many students experience over the course of secondary school. Given that students in higher grades perceived lower levels of controlling behavior, and that lower control was (indirectly) related with less procrastination and higher achievement, it might be promising to further encourage parents to continue to decrease controlling behavior. Skaliotis (2009) suggested that interventions might be needed that aim to maintain or increase positive types of parental involvement at crucial time points, for example, school transitions or the beginning of new developmental stages. Indeed, interventions on parental involvement have yielded first promising findings (Allen et al., 2019; Wild & Gerber, 2009).

3.4.4 Limitations and future research

Despite the strengths of this study, there are some limitations that need to be considered when interpreting our findings. First, our data were cross-sectional and, therefore, do not make it

possible to draw causal conclusions. For example, the links between the quality dimensions and students' homework behavior may also reflect that unfavorable homework behavior has been found to predict lower levels of parental responsiveness and structure (Benckwitz et al., 2023; Dumont et al., 2014). Similarly, the grade-related differences that we found do not reflect actual trajectories of changes in parental behavior or student outcomes (Wei et al., 2019). Second, our sample consisted of students in the early and middle stages of secondary school (i.e., *Sekundarstufe I* in Germany). However, differences in the quality of parental homework assistance and its links with students' academic functioning might be greater when a larger range of developmental stages is considered, that is, phases from preadolescence to the late stages of adolescence. Therefore, future studies should include students from elementary school to the final stage of secondary school (i.e., *Sekundarstufe II*). Third, all instruments were student self-reports and a common method bias cannot be ruled out (e.g., Podsakoff et al., 2003). From an SDT perspective (Ryan & Deci, 2000), the use of students' self-reports in measuring the quality of supplementary support is justified because it is likely that students' own perception of their support is most meaningful for the fulfillment of their psychological needs (Dumont et al., 2014). However, students' reports may be influenced by developmental phases because some students may assess their parents' behavior as more negative than it actually is as an attempt to gain autonomy from their parents. Therefore, future studies should include additional measurements in order to receive a more comprehensive picture of the quality of homework assistance (e.g., parent reports or observations; e.g., Hyde et al., 2006). In addition, using alternative approaches might be promising in the measurement of students' homework behavior. For example, trace data retrieved from digital homework programs could be used to measure students' homework behavior more directly, for example, students' behavioral engagement during homework (e.g., time-on-task or homework completion). Finally, future studies should include standardized test scores to measure students' academic achievement because they are more valid and reliable in measuring students' actual abilities.

3.5 Conclusion

Taken together, our findings suggest that students' grade level plays a role in the context of parental homework assistance in the sense that students in higher grades seem to perceive less parental control but also less productive homework assistance. These grade-related differences appear to have implications for the fit between students' needs and their parents' behavior and, in turn, for the development of students' homework behavior and academic achievement. Thus, high-quality parental homework assistance is likely to have the potential to mitigate unfavorable

developments in the educational domain that often occur during adolescence. Therefore, parents should be informed about the benefits of maintaining productive types of support over the course of secondary school.

3.6 References

- Allen, E. S., Grolnick, W. S., & Córdova, J. V. (2019). Evaluating a self-determination theory-based preventive parenting consultation: The Parent Check-In. *Journal of Child and Family Studies*, 28(3), 732–743. <https://doi.org/10.1007/s10826-018-01309-0>
- Benckwitz, L., Kohl, K., Roloff, J., Lüdtke, O., & Guill, K. (2023). Reciprocal relationships between parental and scholastic homework assistance and students' academic functioning at elementary school. *Frontiers in Psychology*, 14, 1106362. <https://doi.org/10.3389/fpsyg.2023.1106362>
- Bhargava, S., & Witherspoon, D. P. (2015). Parental involvement across middle and high school: Exploring contributions of individual and neighborhood characteristics. *Journal of Youth and Adolescence*, 44(9), 1702–1719. <https://doi.org/10.1007/s10964-015-0334-9>
- Cooper, H., Lindsay, J. J., & Nye, B. (2000). Homework in the home: How student, family, and parenting-style differences relate to the homework process. *Contemporary Educational Psychology*, 25(4), 464–487. <https://doi.org/10.1006/ceps.1999.1036>
- Cooper, H., & Valentine, J. C. (2001). Using research to answer practical questions about homework. *Educational Psychologist*, 36(3), 143–153. https://doi.org/10.1207/S15326985EP3603_1
- Dumont, H., Trautwein, U., & Lüdtke, O. (2012). Familiärer Hintergrund und die Qualität elterlicher Hausaufgabenhilfe [Family background and the quality of parental homework involvement]. *Psychologie in Erziehung Und Unterricht*, 59(2), 109–121. <https://doi.org/10.2378/peu2012.art08d>
- Dumont, H., Trautwein, U., Nagy, G., & Nagengast, B. (2014). Quality of parental homework involvement: Predictors and reciprocal relations with academic functioning in the reading domain. *Journal of Educational Psychology*, 106(1), 144–161. <https://doi.org/10.1037/a0034100>
- Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist*, 48(2), 90–101. <https://doi.org/10.1037/0003-066X.48.2.90>

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- Enders, C. K. (2010). *Applied missing data analysis. Methodology in the social sciences*. Guilford Press. <http://site.ebrary.com/lib/alltitles/docDetail.action?docID=10389908>
- Farkas, M. S., & Grolnick, W. S. (2010). Examining the components and concomitants of parental structure in the academic domain. *Motivation and Emotion*, 34(3), 266–279. <https://doi.org/10.1007/s11031-010-9176-7>
- Fredricks, J. A., & Eccles, J. S. (2002). Children's competence and value beliefs from childhood through adolescence: Growth trajectories in two male-sex-typed domains. *Developmental Psychology*, 38(4), 519–533. <https://doi.org/10.1037/0012-1649.38.4.519>
- Gaspard, H., Häfner, I., Parrisius, C., Trautwein, U., & Nagengast, B. (2017). Assessing task values in five subjects during secondary school: Measurement structure and mean level differences across grade level, gender, and academic subject. *Contemporary Educational Psychology*, 48, 67–84. <https://doi.org/10.1016/j.cedpsych.2016.09.003>
- Gnambs, T. (2021). The development of gender differences in information and communication technology (ICT) literacy in middle adolescence. *Computers in Human Behavior*, 114. <https://doi.org/10.1016/j.chb.2020.106533>
- Gonida, E. N., & Cortina, K. S. (2014). Parental involvement in homework: Relations with parent and student achievement-related motivational beliefs and achievement. *The British Journal of Educational Psychology*, 84, 376–396. <https://doi.org/10.1111/bjep.12039>
- Grolnick, W., & Pomerantz, E. M. (2009). Issues and challenges in studying parental control: Toward a new conceptualization. *Child Development Perspectives*, 3(3), 165–170. <https://doi.org/10.1111/j.1750-8606.2009.00099.x>
- Guill, K., Bahr, I. A., & Ömeroğulları, M. (2020). Qualität der Hausaufgabenhilfe in Elternhaus und Nachhilfeunterricht als Prädiktoren des hausaufgabenbezogenen Arbeitsverhaltens [Quality of homework support in the parental home and private tutoring as predictors of homework-related study behaviour]. *Psychologie in Erziehung und Unterricht*, 67. <https://doi.org/10.2378/peu2020.art08d>
- Gutman, L. M., & Eccles, J. S. (2007). Stage-environment fit during adolescence: Trajectories of family relations and adolescent outcomes. *Developmental Psychology*, 43(2), 522–537. <https://doi.org/10.1037/0012-1649.43.2.522>
- Hill, N. E., Bromell, L., Tyson, D. F., & Flint, R. (2007). Developmental commentary: Ecological perspectives on parental influences during adolescence. *Journal of Clinical*

- Child and Adolescent Psychology*, 36(3), 367–377.
<https://doi.org/10.1080/15374410701444322>
- Hill, N. E., & Tyson, D. F. (2009). Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. *Developmental Psychology*, 45(3), 740–763. <https://doi.org/10.1037/a0015362>
- Hoover-Dempsey, K. V., Walker, J. M. T., Sandler, H. M., Whetsel, D., Green, C. L., Wilkins, A. S., & Closson, K. (2005). Why do parents become involved? Research findings and implications. *The Elementary School Journal*, 106(2), 105–130.
<https://doi.org/10.1086/499194>
- Hyde, J. S., Else-Quest, N. M., Alibali, M. W., Knuth, E., & Romberg, T. (2006). Mathematics in the home: Homework practices and mother–child interactions doing mathematics. *The Journal of Mathematical Behavior*, 25(2), 136–152.
<https://doi.org/10.1016/j.jmathb.2006.02.003>
- Jacobs, J. E., Lanza, S., Osgood, D. W., Eccles, J. S., & Wigfield, A. (2002). Changes in children's self-competence and values: Gender and domain differences across grades one through twelve. *Child Development*, 73(2), 509–527.
<https://doi.org/10.1111/1467-8624.00421>
- Keating, D. P. (2004). Cognitive and brain development. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (2nd ed., pp. 45–84). Hoboken, NJ: Wiley.
- Kim, S. W., & Fong, V. L. (2014). Homework help, achievement in middle school, and later college attainment in China. *Asia Pacific Education Review*, 15(4), 617–631.
<https://doi.org/10.1007/s12564-014-9350-9>
- Little, T. D. (2013). *Longitudinal structural equation modeling*. Guilford Press.
- Moroni, S., Dumont, H., Trautwein, U., Niggli, A., & Baeriswyl, F. (2015). The need to distinguish between quantity and quality in research on parental involvement: The example of parental help with homework. *The Journal of Educational Research*, 108(5), 417–431. <https://doi.org/10.1080/00220671.2014.901283>
- Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus User's Guide* (8th ed.). Muthén & Muthén.
- Niggli, A., Trautwein, U., Schnyder, I., Lüdtke, O., & Neumann, M. (2007). Elterliche Unterstützung kann hilfreich sein, aber Einmischung schadet: Familiärer Hintergrund, elterliches Hausaufgabenengagement und Leistungsentwicklung [Parental homework support can be beneficial, but parental intrusion is detrimental]. *Psychologie in Erziehung Und Unterricht*, 54, 1–14.

- Nordt, G. (2013). *Lernen und Fördern in der Hausaufgabenpraxis der offenen Ganztagsgrundschule in Nordrhein-Westfalen: Eine qualitative Studie aus der Perspektive der pädagogischen Kräfte und der Kinder [Learning and support in the homework practice of open full-day elementary schools in North Rhine-Westphalia]*. Waxmann.
- Núñez, J. C., Freire, C., Ferradás, M. d. M., Valle, A., & Xu, J. (2023). Perceived parental involvement and student engagement with homework in secondary school: The mediating role of self-handicapping. *Current Psychology*, 42, 4350–4361. <https://doi.org/10.1007/s12144-021-01791-8>
- Núñez, J. C., Suárez, N., Rosário, P., Vallejo, G., Valle, A., & Epstein, J. L. (2015). Relationships between perceived parental involvement in homework, student homework behaviors, and academic achievement: differences among elementary, junior high, and high school students. *Metacognition and Learning*, 10(3), 375–406. <https://doi.org/10.1007/s11409-015-9135-5>
- Otero, M. J. F., Moledo, M. L., Otero, A. G., & Rego, M. A. S. (2020). Students' mediator variables in the relationship between family involvement and academic performance: Effects of the styles of involvement. *Psicología Educativa*, 27(1), 85–92. <https://doi.org/10.5093/psed2020a19>
- Patall, E. A., Cooper, H. , & Robinson, J. C. (2008). Parent involvement in homework: A research synthesis. *Review of Educational Research*, 78(4), 1039–1101. <https://doi.org/10.3102/0034654308325185>
- Pinquart, M. (2016). Associations of parenting styles and dimensions with academic achievement in children and adolescents: A meta-analysis. *Educational Psychology Review*, 28(3), 475–493. <https://doi.org/10.1007/s10648-015-9338-y>
- Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88(5), 879–903. <https://doi.org/10.1037/0021-9010.88.5.879>
- Ramdass, D., & Zimmerman, B. J. (2011). Developing self-regulation skills: The important role of homework. *Journal of Advanced Academics*, 22(2), 194–218. <https://doi.org/10.1177/1932202X1102200202>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>

Chapter 3 – Study 2: The role of students' grade level in homework assistance

- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press.
<https://doi.org/10.1521/978.14625/28806>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, 101860.
<https://doi.org/10.1016/j.cedpsych.2020.101860>
- Ryan, R. M., Duineveld, J. J., Di Domenico, S. I., Ryan, W. S., Steward, B. A., & Bradshaw, E. L. (2022). We know this much is (meta-analytically) true: A meta-review of meta-analytic findings evaluating self-determination theory. *Psychological Bulletin*, 148(11-12), 813–842. <https://doi.org/10.1037/bul0000385>
- Scherrer, V., & Preckel, F. (2019). Development of motivational variables and self-esteem during the school career: A meta-analysis of longitudinal studies. *Review of Educational Research*, 89(2), 211–258. <https://doi.org/10.3102/0034654318819127>
- Silinskas, G., & Kikas, E. (2019). Math homework: Parental help and children's academic outcomes. *Contemporary Educational Psychology*, 59.
<https://doi.org/10.1016/j.cedpsych.2019.101784>
- Silinskas, G., Niemi, P., Lerkkanen, M.-K., & Nurmi, J.-E. (2013). Children's poor academic performance evokes parental homework assistance—but does it help? *International Journal of Behavioral Development*, 37(1), 44–56.
<https://doi.org/10.1177/0165025412456146>
- Skaliotis, E. (2009). Changes in parental involvement in secondary education: An exploration study using the longitudinal study of young people in England. *British Educational Research Journal*, 36(6), 975–994. <https://doi.org/10.1080/01411920903342020>
- Trautwein, U., Lüdtke, O., Schnyder, I., & Niggli, A. (2006). Predicting homework effort: Support for a domain-specific, multilevel homework model. *Journal of Educational Psychology*, 98(2), 438–456. <https://doi.org/10.1037/0022-0663.98.2.438>
- Tunkkari, M., Aunola, K., Hirvonen, R., Silinskas, G., & Kiuru, N. (2021). The interplay between maternal homework involvement, task-avoidance, and achievement among adolescents. *Journal of Family Psychology*, 35(7), 863–874.
<https://doi.org/10.1037/fam0000686>
- Wang, M.-T., & Eccles, J. S. (2012). Adolescent behavioral, emotional, and cognitive engagement trajectories in school and their differential relations to educational

- success. *Journal of Research on Adolescence*, 22(1), 31–39.
<https://doi.org/10.1111/j.1532-7795.2011.00753.x>
- Wang, M.-T., Hill, N. E., & Hofkens, T. (2014). Parental involvement and African American and European American adolescents' academic, behavioral, and emotional development in secondary school. *Child Development*, 85(6), 2151–2168.
<https://doi.org/10.1111/cdev.12284>
- Wang, M. T., & Sheikh-Khalil, S. (2014). Does parental involvement matter for student achievement and mental health in high school? *Child Development*, 85, 610–625.
- Wei, J., Pomerantz, E. M., Ng, F. F.-Y., Yu, Y., Wang, M., & Wang, Q. (2019). Why does parents' involvement in youth's learning vary across elementary, middle, and high school? *Contemporary Educational Psychology*, 56, 262–274.
<https://doi.org/10.1016/j.cedpsych.2018.12.007>
- Wei, J., Pomerantz, E. M., Ng, F. F.-Y., Yu, Y., Wang, M., & Wang, Q. (2022). Do the effects of parents' involvement in youth's academic adjustment vary with youth's developmental phase? A longitudinal investigation in China. *Contemporary Educational Psychology*, 71, 102118. <https://doi.org/10.1016/j.cedpsych.2022.102118>
- Wigfield, A., Eccles, J. S., Fredricks, J. A., Simpkins, S., Roeser, R. W., & Schiefele, U. (2015). Development of achievement motivation and engagement. In R. M. Lerner (Ed.), *Handbook of child psychology and developmental science* (pp. 1–44). Wiley & Sons. <https://doi.org/10.1002/9781118963418.childpsy316>
- Wigfield, A., Eccles, J. S., Mac Iver, D., Reuman, D. A., & Midgley, C. (1991). Transitions during early adolescence: Changes in children's domain-specific self-perceptions and general self-esteem across the transition to junior high school. *Developmental Psychology*, 27(4), 552–565. <https://doi.org/10.1037/0012-1649.27.4.552>
- Wild, E., & Gerber, J. (2007). Charakteristika und Determinanten der Hausaufgabenpraxis in Deutschland von der vierten zur siebten Klassenstufe [Characteristics and determinants of doing homework in Germany from fourth grade to seventh grade]. *Zeitschrift Für Erziehungswissenschaft*, 10(3), 356–380.
<https://doi.org/10.1007/s11618-007-0041-8>
- Wild, E., & Gerber, J. (2009). Lernlust statt Lernfrust - Evaluation eines Elterntrainings zur Verringerung von Hausaufgabenkonflikten bei Schülern mit Lernschwierigkeiten [Evaluation of parent training to reduce homework conflicts among pupils with learning difficulties]. *Psychologie in Erziehung Und Unterricht*, 56, 303–318.

Chapter 3 – Study 2: The role of students' grade level in homework assistance

- Wu, J., Barger, M. M., Oh, D. D., & Pomerantz, E. M. (2022). Parents' daily involvement in children's math homework and activities during early elementary school. *Child Development*. Advance online publication. <https://doi.org/10.1111/cdev.13774>
- Xu, J., Guo, S., Feng, Y., Ma, Y, Zhang, Y., Núñez, J.C., & Fan, H. (2024). Parental homework involvement and students' achievement: A three-level meta-analysis. *Psychothema*, 36, 1, 1-14.

4

STUDY 3: INVESTIGATING THE RELATIONSHIP BETWEEN PRIVATE TUTORING, TUTORS' USE OF AN INDIVIDUAL FRAME OF REFERENCE, REASONS FOR PRIVATE TUTORING, AND STUDENTS' MOTIVATIONAL- AFFECTIVE OUTCOMES

Benckwitz, L., Guill, K., Roloff, J., Ömeroğulları, M., & Köller, O. (2022). Investigating the relationship between private tutoring, tutors' use of an individual frame of reference, reasons for private tutoring, and students' motivational-affective outcomes. *Learning and Individual Differences*, 95. <https://doi.org/10.1016/j.lindif.2022.102137>

Abstract

Private tutoring is considered an effective intervention to improve students' outcomes. Although many studies have examined its relationship with achievement, motivational-affective outcomes have rarely been studied. Based on the self-determination theory and the control-value theory, we evaluated the relationship of private tutoring with motivational-affective outcomes in three subjects. Further, tutors' individual frame of reference and students' internal and external reasons to attend private tutoring were investigated as potential impact factors of private tutoring. Longitudinal data were drawn from the German Competencies and Attitudes of Students study (KESS). Path analyses did not reveal a relationship between private tutoring and students' motivational-affective outcomes. An individual frame of reference and internal reasons had favourable associations with work habits in mathematics, while external reasons showed unfavourable associations with work habits and test anxiety in mathematics. Thus, private tutoring cannot generally be expected to enhance motivational-affective outcomes, although it can be beneficial under specific conditions.

Keywords: private tutoring, shadow education, motivation, achievement emotions, individual frame of reference

4.1 Introduction

Students' participation in private tutoring is widespread in many countries across the globe (e.g., Bray, 2020, 2021). According to Park et al. (2016, p. 235), private tutoring is defined as “parents hiring private tutors who provide tailored tutorials on a regular schedule in either one-on-one or group settings”. In East Asian countries, private tutoring is very common, for example, in Korea, where 71.4% of all middle school students attended private tutoring in 2019 (Korean Statistical Information Service, 2020). In Europe, the proportion of students attending private tutoring is particularly high in southern European countries such as Greece, where 95% of university students stated that they had had out-of-school support in English when they were in school (Tsiplakides, 2018). In Germany, where the current research was conducted, there has been a growing prevalence of private tutoring since 2000 (Hille et al., 2016). However, previous research has found differences in the participation rate in private tutoring between subjects and grade levels in Germany. According to the Trends in International Mathematics and Science Study (TIMSS), 8.2% of all students at the end of primary school received private tutoring in mathematics in 2019; only 1.2% received private tutoring in science (Guill & Wendt, 2020). Further, Hille et al. (2016) found that private tutoring participation increased with grade level. According to their analysis of data from the Socio-Economic Panel (SOEP), 18% of all students at secondary school attended paid private tutoring in 2013. Since then, participation in private tutoring might have been impacted by the COVID-19 pandemic. Wößmann et al. (2021) found that, since the first school closures, 13% of the youngest children in German households participated in private tutoring with the aim of catching up on missed school lessons due to the pandemic. In the future, the use of private tutoring is likely to increase due to national programs that focus on helping students to catch up on missed schooling. Therefore, research on the impact of the COVID-19 pandemic on the participation in private tutoring is needed.

In the hope that their child's educational outcomes will improve, families invest large amounts of money in private tutoring (Germany: expenditures of approximately 879 Million Euro per year; Klemm & Hollenbach-Biele, 2016) and students themselves have to spend their free time attending private tutoring lessons. These investments are only reasonable if private tutoring actually helps to improve relevant students' outcomes, for example, academic achievement or motivational-affective characteristics.

Up to this point, the majority of studies investigating the relationship of private tutoring with students' outcomes have focussed on achievement-related students' outcomes (Park et al., 2016). In contrast, the relationship of private tutoring with students' motivational-affective

outcomes has only been examined in a few studies (Haag, 2007; Mischo & van Kessel, 2005; Otto & Karbach, 2019). Further, only two studies focussed on the role of students' reasons to attend private tutoring (Guill et al., 2021; Kuan, 2011), which can be internal if the decision to attend private tutoring is made by the students themselves and/or external if their teachers or parents decide that the student should participate in private tutoring.

With the aim of addressing this deficit, the present study focused on the relationship of private tutoring with important motivational-affective outcomes at secondary school, based on longitudinal data from the Competencies and Attitudes of Students study (KESS 7: Bos et al., 2009; KESS 8: Bos & Gröhlich, 2010). In addition to measuring the relationship of participation in private tutoring with motivational-affective outcomes in three subjects, namely, mathematics, English, and German, we also took into account the duration and intensity of private tutoring. Furthermore, we considered both tutors' behaviour, in terms of their use of an individual frame of reference when providing feedback, and students' internal and external reasons to attend private tutoring as predictors to gain insights into impact factors that might make private tutoring beneficial for students' motivation and emotions.

4.1.1 Effectiveness of private tutoring

Previous research on the effectiveness of private tutoring has been inconclusive (for a literature review see Park et al., 2016). The effectiveness of private tutoring has been studied in several countries across the globe. These countries differ in the extent to which private tutoring takes place in their country and they also differ in their education systems (e.g., testing policies, quality of formal education, institutionalisation of education; Park et al., 2016). However, what the studies from different countries have in common is that they focussed on the effectiveness of private tutoring for academic achievement. While some studies found positive relationships of private tutoring with students' academic achievement (for Turkey: Berberoğlu & Tansel, 2014; for China: Guo et al., 2020; for Korea: Ha & Park, 2017), other studies did not report general positive relationships with grades and test results (for Sri Lanka: Cole, 2017; for Germany: Guill & Bos, 2014; Guill, Lüdtke, & Köller, 2020; Luplow & Schneider, 2014; Ömeroğulları et al., 2020; for China: Liao & Huang, 2018). Guill and Bos (2014) took into account a subjective indicator of academic achievement. Their analyses were based on the same two cohorts of the KESS study that were used in the present study (KESS 7 and KESS 8). They found that the majority of students and parents reported that they had the impression that private tutoring improved the student's academic achievement, which might be a factor that motivates

students and parents to further use private tutoring and that positively affects students' motivation and emotions regarding the tutored subject.

In some studies, heterogeneous relationships of private tutoring with students' outcomes were found. Guo et al. (2020) and Guill, Lüdtke, and Köller (2020) reported larger effects of private tutoring for low-performing students. Additionally, Guo et al. (2020) and Liao and Huang (2018) found larger gains from private tutoring for students from higher socioeconomic backgrounds. Guill and Bos (2014) investigated the effects of private tutoring duration and tutors' formal qualification on students' grades and test scores, also based on data from KESS 7 and KESS 8, but also using data from another longitudinal study (LAU: Aspects of Learning Background and Learning Development). They did not find systematic effects of private tutoring duration and tutors' qualification when controlling for students' prior knowledge, prior motivation, and demographic variables. Ömeroğulları et al. (2020) studied the effects of private tutoring intensity and content on students' grades and test scores, based on the same sample that was used in the present study. They did not find a positive main effect of private tutoring on students' achievement, again controlling for prior knowledge, prior motivation, and demographic variables. Moreover, they did not find positive effects of tutoring duration, intensity, content, and students' motivation to attend private tutoring on students' achievement.

In conclusion, there is a growing, though still inconclusive, body of research on the effectiveness of private tutoring with regard to grades and test results, while there is still a lack of research on the effectiveness with regard to students' outcomes in the motivational-affective domain.

4.1.2 The relationship of private tutoring with students' motivational-affective outcomes

According to the self-determination theory (SDT: Deci et al., 1991; Deci & Ryan, 1993; Ryan & Deci, 2000), students' intrinsic motivation is promoted in learning environments that allow the satisfaction of the innate psychological needs for competence, autonomy, and social relatedness. *Competence* describes the state in which an individual knows how to efficaciously attain certain outcomes, while *autonomy* relates to being in charge of initiating and regulating one's own actions (Deci et al., 1991). The last need, namely *social relatedness*, refers to the presence of satisfying and secure relationships with other individuals (Deci et al., 1991), for example, teachers, classmates, or tutors.

According to the control-value theory of achievement emotions (CVT: Pekrun, 2006), students' emotions are influenced by two appraisals: subjective control and subjective value. While *subjective control* refers to the perceived causal influence on achievement-related actions

and outcomes, *subjective value* describes the perceived importance of these actions and outcomes (Pekrun, 2006).

Students who receive private tutoring are often low achievers (Byun et al., 2018). This is reciprocally associated with negative motivational outcomes, for example, low academic self-concept (Marsh et al., 2005), and with negative achievement emotions, for example, high anxiety (Pekrun et al., 2017). We therefore investigated the relationship of private tutoring with five motivational-affective outcomes. The first three were motivational outcomes: (1) Academic interest: Following the SDT (Deci, 1992), academic interest occurs in an interaction between a student and an academic activity that fits the student's psychological needs; it is therefore closely linked with intrinsic motivation. (2) Work habits in regular classes: Following Trautwein (2003), we define work habits as proactive classroom participation, for example, cognitive engagement and diligent work in a school subject even with difficult learning content. Work habits refer to students' proactiveness and engagement, which are part of students' self-determined learning (Ryan & Deci, 2000). (3) Academic self-concept, which is often defined as students' mental representations of their own subject-specific abilities (e.g., Brunner et al., 2010) and represents students' confidence in their own abilities, which is one important aspect of the SDT (Deci et al., 1991).

Further, we investigated the relationship of private tutoring with one achievement emotion: (4) Test anxiety, which refers to fear and physiological reactions that occur in situations in which students' abilities and achievements are assessed (Steinmayr et al., 2015) and is thought to reduce cognitive resources and intrinsic motivation (Pekrun et al., 2017). Additionally, we evaluated the relationship of the duration and intensity of private tutoring with (5) perceived achievement pressure caused by private tutoring, as pressure is a factor that is detrimental to students' intrinsic motivation (Ryan & Deci, 2000) and might be associated with negative emotions (Wolfradt et al., 2003).

4.1.3 Positive effects

Following the SDT (Deci et al., 1991; Deci & Ryan, 1993; Ryan & Deci, 2000), private tutoring might have positive effects on students' motivation if it contributes to the satisfaction of their psychological needs. Theoretically, students' need for competence might be satisfied through private tutoring, as it provides qualified support and increases the time spent on learning, which might enhance learning effectiveness (Carroll, 1973). Although the current state of research does not provide enough evidence to see private tutoring as a generally successful intervention to actually improve academic achievement (Park et al., 2016), Guill and Bos (2014) found that

the majority of students and parents are convinced that private tutoring improves students' mathematics achievement. This subjective impression of an improvement in achievement indicates that students might at least feel more competent due to private tutoring. The one-on-one or small group setting of private tutoring allows the tutor to adjust the instructions to the students' needs (Pellegrini et al., 2021). Students' need for autonomy can be supported through private tutoring if the tutor provides optimally challenging tasks for the student because being able to successfully master a learning task allows the student to strive for autonomy (Krapp, 2005). Further, private tutoring has the potential to increase autonomy because tutored students have to rely less on their parents' help, which might avoid school-related tension at home (Solomon et al., 2002). Additionally, private tutors can extend students' repertoire of learning strategies and this can enable students to learn more successfully on their own (van Kessel & Haag, 2011). Finally, private tutoring has the potential to increase students' social relatedness if the tutor is supportive and understanding of the student's school situation, which might be problematic due to low achievement, motivational deficits, and negative achievement emotions (Byun et al., 2018; Pekrun et al., 2017). In the case of private tutoring in a group setting, social relatedness can also be promoted by meeting peers who are attending private tutoring for similar reasons, for example, low achievement (Bray, 1999).

To sum up, private tutoring theoretically has the potential to improve students' motivational-affective outcomes by supporting students' needs. Students' academic interest is closely linked with their intrinsic motivation (Deci, 1992), which—following the SDT—is influenced by the fulfilment of students' psychological needs (Deci et al., 1991; Deci & Ryan, 1993; Ryan & Deci, 2000). According to Krapp (2005), experiencing competence, autonomy, and social relatedness in learning situations provides students with positive emotional feedback about their functioning and, therefore, can promote their academic interest. By supporting students' psychological needs, private tutoring might also improve students' work habits, that is, their proactiveness in the classroom, because the reasons for a lack of proactive classroom participation can be low motivation and listlessness (Trautwein, 2003), which is improved if students feel more competent, autonomous, and socially related (Deci et al., 1991; Deci & Ryan, 1993; Ryan & Deci, 2000). The one-on-one or small group setting of private tutoring makes it easier for tutors to adjust their instructions to the individual needs of the students and to provide them with optimally challenging tasks (Liu et al., 2021; Pellegrini et al., 2021). Successfully mastering these tasks in a specific subject can lead to feelings of competence and autonomy (Krapp, 2005), which—in turn—can improve students' academic self-concept in the tutored subject (Liu et al., 2021). Further, these successful experiences can add up to an increased

feeling of control in learning situations, which refers to having the ability to influence an activity and its outcomes, for example, to master a test in a school subject and to achieve a good result (Pekrun, 2006). More perceived control can be expected to lead to less test anxiety because higher control is related with less intensive negative achievement emotions (Pekrun, 2006). Studies that focus on the relationship of private tutoring with students' motivational-affective outcomes are rare up to this point. Mischo and Haag (2002) were able to show, on the basis of a pre-post quasi-experimental design, that students in Germany who attended very intense private tutoring for nine months (four times per week, 90 minutes per lesson) reported larger improvements in learning motivation, self-concept of ability, and test anxiety than students in a control group without private tutoring. Additionally, in a longitudinal study that was also conducted in Germany (Haag, 2007), tutored students reported improvements in their self-concept of ability, management of homework, and school anxiety after six months of private tutoring. However, because of the lack of a control group, these findings could not be clearly attributed to private tutoring. A German study with a pre-post quasi-experimental design by Otto and Karbach (2019) showed a more beneficial development of students' self-efficacy and their satisfaction with their school performance after four months of private tutoring compared to a matched control group without private tutoring. However, the sample size was relatively small ($N = 76$). Despite these promising findings in the motivational-affective domain, Jung and Seo (2019) did not find an effect of private tutoring on students' self-regulated learning in Korea. Guill, Bahr, and Ömeroğulları (2020) found evidence in German secondary schooling that the motivational-affective effects of private tutoring might depend on the quality of the received support. While highly structured homework support during private tutoring had a positive effect on students' homework behaviour, controlling homework support showed negative effects. Evidence that private tutoring might have a positive relationship with students' motivation and emotions is also provided by qualitative research. In semi-structured interviews and drawings, students expressed that private tutoring enhanced their self-confidence and interest in learning (for England: Hajar, 2018) and helped them to participate more actively in class (for the Netherlands: Jansen et al., 2020).

4.1.4 Negative effects

However, private tutoring can also have negative effects on students' motivation and emotions (Bray, 2003; Park et al., 2016). Theoretically, participation in an intervention that aims to improve students' academic achievement might reduce students' feelings of competence because participation in private tutoring can be related with being labelled as a low achiever

(Bray, 1999), which could negatively impact students' interest and self-concept of ability in the tutored subject. Additionally, students' work habits in regular classes might suffer if they feel less competent and, therefore, are unmotivated to actively participate in class. Further, autonomy might be reduced through participation in private tutoring because attending tutoring reduces the leisure time that students could otherwise spend on activities they prefer. Autonomy might also be reduced because participation in a fee-based activity that is expected to improve students' performance could cause achievement pressure for students (Bray, 2003; Hajar, 2018). Especially if students receive private tutoring over a long period and with high intensity, achievement pressure, which is detrimental to students' intrinsic motivation (Ryan & Deci, 2000) and emotions (Wolfradt et al., 2003), might be high. Finally, social relatedness might be reduced through private tutoring if students spend parts of their free time on private tutoring instead of spending time with their usual social contacts.

To sum up, both positive and negative associations of private tutoring with students' motivational-affective outcomes can be assumed, although empirical evidence is rare up to this point (Haag, 2007; Mischo & Haag, 2002; Otto & Karbach, 2019). More research is needed that (1) investigates private tutoring that takes places with a more common intensity, (2) compares students attending private tutoring with students not attending private tutoring and (3) has a large sample size. We expected to find positive associations of private tutoring with motivational-affective outcomes, with increases in academic interest, work habits, academic self-concept, and decreases in test anxiety. As a less favourable association, we expected the duration and intensity of private tutoring to increase achievement pressure caused by private tutoring.

4.1.5 Motivational-affective impact factors of private tutoring

So far, inconclusive research results on the effectiveness of private tutoring suggest that it might be beneficial for some students, while other students do not benefit or, even worse, show negative effects of private tutoring (Park et al., 2016). For this reason, this study aimed to gain insights into the motivational-affective impact factors of private tutoring. On the one hand, previous research has shown that students' noncognitive outcomes are influenced by the amount of support they receive from their teachers (Praetorius et al., 2018; Ryan & Deci, 2000). On the other hand, effects might depend on students' internal and external reasons to attend private tutoring, as autonomy is supported through private tutoring if students themselves have strong internal reasons to participate, while autonomy is undermined if external reasons are high. We

therefore discuss the motivational-affective effects of tutors' behaviour and of students' internal and external reasons to attend private tutoring.

4.1.6 Tutor behaviour: The individual frame of reference

Several models exist to describe the quality of teacher behaviour (Bäumer et al., 2011; Hamre et al., 2013; Kunter & Voss, 2011; Praetorius et al., 2018). Previous research has shown that the quality dimension of student support, which refers to emotional and social processes in the learning environment (Praetorius et al., 2018), has a strong impact on students' noncognitive outcomes, such as intrinsic motivation, self-concept, and interest (Aldrup et al., 2018; Dietrich et al., 2015; Fauth et al., 2014; Scherer et al., 2016). One important aspect of the support dimension is a constructive and respectful way of providing feedback, which can be provided by using an individual frame of reference (Guill, Lüdtke, and Köller, 2020). This means that the individual learning progress and achievement of students is recognised instead of the learning outcomes of students being compared with the achievement of a social reference group, for example, students' classmates (Mischo & Haag, 2002; Mischo & van Kessel, 2005). According to previous research, the use of an individual frame of reference has positive effects on students' motivation and achievement emotions and can result in increases in students' joy in learning and satisfaction with school, a positive perception of their learning environment (Jerusalem & Mittag, 1999), and in decreases in low-achieving students' test anxiety (Rheinberg, 1980). We therefore assumed that private tutors' feedback that is based on an individual frame of reference would show favourable associations with students' interest, self-concept, work habits, and test anxiety. Finally, the use of an individual frame of reference might reduce achievement pressure caused by private tutoring because it emphasises students' individual progress (Mischo & Haag, 2002).

4.1.7 Students' internal and external reasons to attend private tutoring

Students' motivation might be influenced not only by tutors' behaviour but also by students' internal and external reasons to attend private tutoring. The decision to attend private tutoring can be made by students themselves (internal reasons) and/or by their teachers or parents (external reasons). According to the SDT (Ryan & Deci, 2000), intrinsic motivation is enhanced if individuals can autonomously exercise a certain type of behaviour. Hence, it is conceivable that the motivational-affective effects of private tutoring are positive if students' internal reasons to attend private tutoring are high. In contrast, external reasons restrict students' need for autonomy and, thus, can be assumed to have negative effects on students' motivation (Ryan & Deci, 2000). Students might interpret externally motivated private tutoring as a negative

feedback regarding their academic achievement, which can negatively affect their feeling of competence (Deci et al., 1991). Following the SDT (Deci et al., 1991; Ryan & Deci, 2000), feeling less competent is detrimental to students' motivation and, therefore, might lead to lower interest, worsened work habits, and lower self-concept. External reasons to attend private tutoring might also increase students' test anxiety, as negative feedback regarding their academic achievement undermines their feeling of control (Pekrun, 2006). Finally, high external reasons to attend private tutoring, for example, from teachers or parents, might increase the achievement pressure caused by private tutoring (Bray, 2007).

Kuan (2011) found that cramming schools have stronger effects on students' achievement if students themselves chose to participate. However, to the best of our knowledge, no previous study has evaluated the relationship of students' internal and external reasons to attend private tutoring with motivational-affective outcomes. The current research therefore addresses this research gap. In line with theoretical assumptions derived from the SDT (Ryan & Deci, 2000) and the CVT (Pekrun, 2006), we expected high internal reasons to attend private tutoring to be positively associated with achievement motivation and emotions, while, in contrast, high external reasons to attend private tutoring were assumed to be negatively related with students' motivational-affective outcomes.

4.1.8 Research aims and hypotheses

- 1) This study investigated the relationship of private tutoring and its duration and intensity with the following motivational-affective outcomes in three subjects, namely, mathematics, English, and German: (1) academic interest, (2) work habits, (3) academic self-concept, (4) test anxiety, and (5) perceived achievement pressure caused by private tutoring.
- 2) Furthermore, we evaluated the relationships of (a) tutors' use of an individual frame of reference, and (b) students' internal and (c) external reasons to attend private tutoring with students' motivational-affective outcomes.

Hypothesis 1: Private tutoring increases academic interest and improves work habits and academic self-concept, while it reduces test anxiety (1a). These relationships are larger the longer and the more intensively students are tutored (1b). The duration and intensity of private tutoring increases achievement pressure caused by private tutoring (1c).

Hypothesis 2: Tutors' use of an individual frame of reference increases students' academic interest and improves their work habits and academic self-concept, while it reduces test anxiety and achievement pressure caused by private tutoring.

Hypothesis 3: Internal reasons to attend private tutoring increase academic interest and improve work habits and academic self-concept, while they reduce test anxiety and achievement pressure caused by private tutoring.

Hypothesis 4: External reasons to attend private tutoring reduce academic interest and worsen work habits and academic self-concept, while they increase test anxiety and achievement pressure caused by private tutoring.

4.2 Method

4.2.1 Sample

Data were drawn from two consecutive waves of the KESS study: KESS 7 at the beginning of Grade 7 in 2005 (Bos et al., 2009) and KESS 8 at the end of Grade 8 in 2007 (Bos & Gröhlich, 2010). The sample of KESS 8 consists of students from 172 schools in Hamburg ($M = 80.81$ students, $SD = 37.73$), a city-state in Northern Germany. An analytic sample of $N = 8,510$ students remained after students from special educational need schools and students without information on private tutoring in KESS 8 were excluded.

Data were collected by the Ministry of Schools and Vocational Training in Hamburg (Hamburger Behörde für Schule und Berufsbildung), which also assumed the responsibility for reviewing the research ethics and privacy issues. The study was approved by the Institutional Review Board of the Ministry of Schools and Vocational Training. Written informed consent was obtained from the parents. Answering student and parent questionnaires was voluntary. There were no disadvantages for the students and parents in the case of nonparticipation. The achievement tests for students were mandatory.

4.2.2 Measures

The present study used the same measures as three prior studies that were based on the same two waves of the KESS study (Guill & Bos, 2014; Guill et al., 2021; Ömeroğulları et al., 2020). The present study differs from those prior studies in that the outcomes in this study were students' motivational-affective characteristics in Grade 8, whereas in the prior studies, the outcome was students' academic achievement in Grade 8. In the prior studies, the authors controlled for students' prior motivational-affective characteristics in Grade 7, whereas in the present study, we controlled for students' prior achievement in addition to their prior motivational-affective outcomes. The items were taken from the KESS 8 student and parent questionnaire, unless stated otherwise.

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Duration and intensity of private tutoring. The following items refer to the German word “Nachhilfeunterricht”, which mostly means paid private tutoring. Students with ongoing private tutoring made statements about its duration and intensity. Duration was measured in four categories: *up to 3 months, 4 to 6 months, 7 to 9 months, more than 9 months*. Tutoring intensity was classified into three categories: *up to 1 hour per week, up to 2 hours per week, more than 2 hours per week*. Questions regarding duration and intensity were asked for each of the following subjects: mathematics, English, German as mother tongue, and German as a second language. Values on the duration and intensity of tutoring in German as mother tongue and German as a second language were integrated into one variable by using the larger of the two values.

Motivation and emotions. Data on *domain-specific academic interest* (Schiefele, 1996) were only available for mathematics and were measured by five items adapted from the Programme for International Student Assessment 2000 (PISA) and the Progress in International Reading Literacy Survey 2001 (PIRLS; e.g., “Mathematics is personally important to me”). Reliability was measured by Cronbach’s alpha and was high ($\alpha_{\text{Mathematics}} = .93$). *Work habits* were measured domain-specifically by five items for each domain that were adapted from a study by Trautwein (2003; e.g., “I try to participate in my mathematics classes”; $\alpha_{\text{M}} = .73$; $\alpha_{\text{English}} = .79$; $\alpha_{\text{German}} = .67$). *Academic self-concept* (Marsh, 1990a) was also measured domain-specifically by three items for each domain, adapted from PISA 2000 (e.g., “I have always been good in mathematics”; $\alpha_{\text{M}} = .91$, $\alpha_{\text{E}} = .78$, $\alpha_{\text{G}} = .68$). *Test anxiety* was measured by three items adapted from the research project “Adaptation in school and educational aspiration” (SABA; Valtin et al., 2000; e.g., “When my teacher announces a test, I get frightened”; $\alpha_{\text{M}} = .79$, $\alpha_{\text{E}} = .84$, $\alpha_{\text{G}} = .82$). *Achievement pressure* caused by private tutoring was operationalised by five items that were designed for the purpose of the KESS 8 study (Bos et al., 2010; e.g., “Since I started attending private tutoring, my parents expect me to perform better at school”; $\alpha_{\text{M}} = .71$, $\alpha_{\text{E}} = .71$, $\alpha_{\text{G}} = .74$) on the basis of the literature on the potential negative consequences of private tutoring (Bray, 2003). Information on achievement pressure was collected in the private tutoring section of the questionnaire and, therefore, was only available for students with ongoing tutoring. Each construct was measured on a 4-point Likert scale, which was reverse-coded (1 = *does not apply at all* to 4 = *fully applies*).

Impact factors of private tutoring. To measure the *tutors’ use of an individual frame of reference* (Mischo & van Kessel, 2005), students rated three items on a 4-point Likert scale that was adapted from PISA 2002 (reverse-coded to 1 = *does not apply at all* to 4 = *fully applies*;

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e.g., “When I improve performance in the tutored subject, this is a good result for my tutor even if my performance is still below the class average”; $\alpha_M = .78$, $\alpha_E = .77$, $\alpha_G = .77$).

Students rated their *internal reasons* (e.g., “I get private tutoring because I want to”; $\alpha_M = .77$, $\alpha_E = .78$, $\alpha_G = .77$) and *external reasons* to attend private tutoring (e.g., “I get private tutoring because my parents want me to”; $\alpha_M = .69$, $\alpha_E = .70$, $\alpha_G = .70$) on a 4-point Likert scale with three items each (reverse-coded to 1 = *does not apply at all* to 4 = *fully applies*). The scales used to assess internal and external reasons were designed for the KESS 8 study on the basis of the SDT (Deci & Ryan, 1993) and the literature on motives to attend private tutoring (Bray, 1999).

Covariates. To be able to control for the prior private tutoring of students without ongoing tutoring, we followed Guill and Bos (2014) and dummy-coded parents’ statements on whether and for how long their child had been attending private tutoring at an earlier time point in Grade 7 or 8 (0 = *none*, 1 = *any private tutoring in the past two years*). Further, we controlled for changes in students’ learning time since the beginning of their private tutoring, because we assumed that private tutoring only has favourable effects if it leads to additional learning time. Changes in learning time were measured by four items (e.g., “Since I started to attend private tutoring, I have spent 1 = *less* / 2 = *an equal amount of* / 3 = *more time doing my homework at home*”; $\alpha_M = .80$, $\alpha_E = .81$, $\alpha_G = .79$).

The longitudinal design of our study allowed us to control for differences in achievement, motivation, and emotions before the start of or at least after only a small number of tutoring lessons. In detail, to account for selection effects between tutored and nontutored students in prior achievement (Byun et al., 2018), we controlled for subject-specific midterm grades in Grade 8 (reverse-coded: 1 = *fail* to 6 = *very good*), basic cognitive abilities measured by the KFT 4-12+ R in Grade 7 (Heller & Perleth, 2000), as well as individual and school mean test scores in mathematics, English, and reading in Grade 7. Additionally, we controlled for students’ values on the motivational-affective constructs in Grade 7, except for achievement pressure caused by private tutoring, because this construct was considered neither in KESS 7 nor in the group of nontutored students.

We also controlled for the different secondary school tracks that existed in Germany at the time of data collection by using a dummy-variable for each track (integrated school: *Integrierte Haupt- und Realschule* [IHR], lower secondary track: *Hauptschule*, intermediate track: *Realschule*, comprehensive school: *Gesamtschule*, academic track: *Gymnasium*). To account for students’ demographic characteristics and their family background, several constructs were controlled for: two dummy-variables for educational background (parent[s]

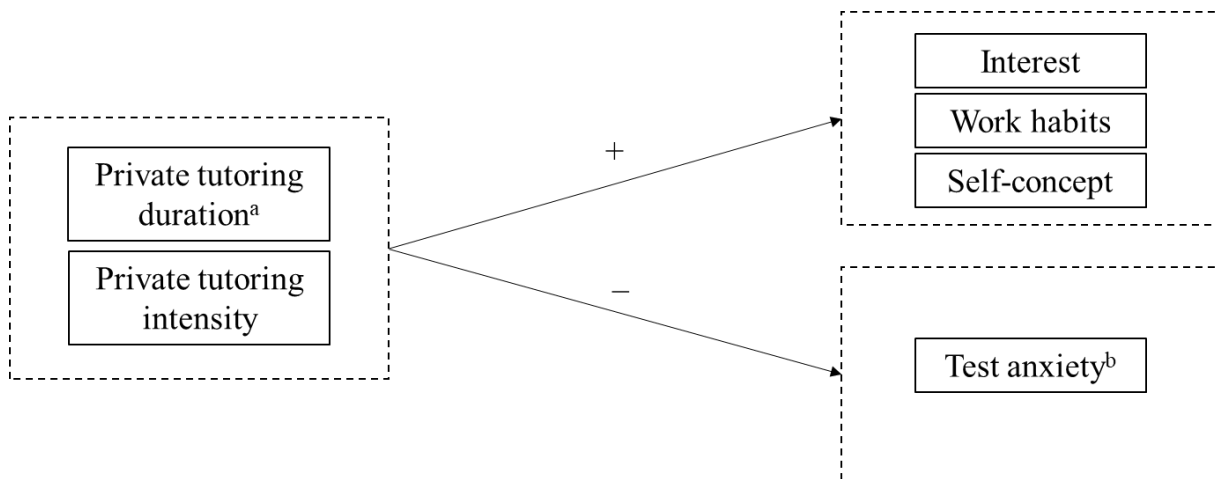
qualified for university; parent[s] with university degree: 0 = *no*, 1 = *yes*), two dummy-variables for migration background (one parent born abroad; both parents born abroad: 0 = *no*, 1 = *yes*), the highest International Socio-Economic Index of Occupational Status in the family (HISEI: Ganzeboom et al., 1992), and gender (0 = *male*, 1 = *female*).

4.2.3 Statistical analyses

We conducted our statistical analyses in two steps (see Figures 1 and 2 for mathematics). First, the relationship of private tutoring and its intensity and duration with (1) academic interest, (2) work habits, (3) academic self-concept, and (4) test anxiety were tested. In this step, the data of all students ($N = 8,510$), tutored and nontutored in each subject, were analysed.

Figure 1

Theoretical model for mathematics underlying the first step of the analysis



Note. The models for German and English differ in that no information on interest was available. All covariates were included in the model. ^aReference category: no current private tutoring. ^bHigh values indicate high test anxiety.

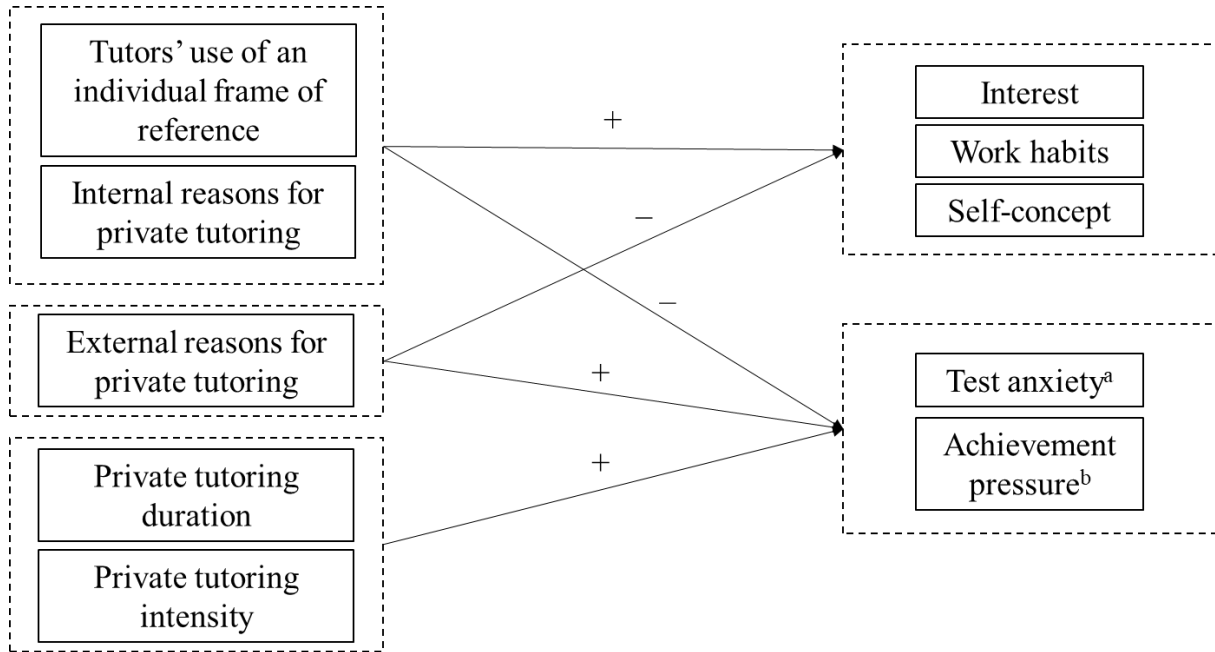
Second, analyses within the samples of currently tutored students were conducted for each subject (mathematics: $n = 1,025$; English: $n = 693$; German: $n = 491$). In addition to the other four motivational-affective outcomes, (5) achievement pressure caused by private tutoring was analysed as an outcome in this step. Further, (a) the tutors' use of an individual frame of reference and students' (b) internal and (c) external reasons to attend private tutoring were introduced as predictors into the analyses within the samples of tutored students.

Analyses were conducted in *Mplus* 8 (Muthén & Muthén, 1998–2017). As the covariate distribution of tutored and nontutored students showed a large area of common support (Ömeroğulları et al., 2020), we did not conduct propensity score matching before the regression analyses. Multiple regressions for each outcome were combined into one path model for each subject. Within each path model, all correlations were allowed. By using the “type=complex”

command in *Mplus* (Muthén & Muthén, 1998-2017), the multilevel structure of the data, with students being nested in schools, was considered. In addition, we used the robust maximum likelihood (MLR) estimator to obtain standard errors that were robust to nonnormality (e.g., Bandalos, 2014; Maydeu-Olivares, 2017). The results are reported as standardised regression coefficients (stdyx for continuous variables and stdy for binary variables).

Figure 2

Theoretical model for mathematics underlying the second step of the analysis



Note. The models for German and English differ in that no information on interest was available. All covariates were included in the model. ^aHigh values indicate high test anxiety. ^bHigh values indicate high achievement pressure.

4.2.4 Missing data

The percentage of missing data varied from 0.7% to 81.5% in the total sample of tutored and nontutored students, with an average missing rate of 27.4%. The variables on students' work habits in Grade 7 had the highest missing rates (81.5% in mathematics, 80.3% in English, 79.2% in German; 75% of the missing data were missing completely at random [MCAR] due to the multimatrix design of this part of the questionnaire). Other reasons for missing data were individual nonresponse and students not following the instruction to choose one tutoring subject to make statements about the characteristics of their private tutoring. To handle missing data, the following procedure was applied in line with Ömeroğulları et al. (2020): Missing data in the dependent and independent variables were handled by multiple imputation with the mice package (van Buuren & Groothuis-Oudshoorn, 2011) and miceadds (Robitzsch et al., 2016) in R. Within mice, we specified multilevel imputation on the school level for test scores and grades

($n = 10$ data sets with 50 iterations). The results of our analyses were averaged over 10 imputed data sets according to Rubin's rules (1987).

Missing data on tutoring items were not imputed; they were handled using full information maximum likelihood estimation (FIML; Enders, 2010) integrated into *Mplus*. Missing rates on the tutors' individual frame of reference (rates from 54.8% in mathematics to 85.9% in German) and changes in learning time (rates from 54.0% in mathematics to 85.3% in German) were very high, because students were asked to choose one tutoring subject to make statements about these constructs but often did not follow this instruction and chose more than one subject. These students' statements about tutoring could not be clearly assigned to one tutoring subject and were therefore recoded as missing.

4.3 Results

In the following, we focus the reporting of our findings mainly on private tutoring in mathematics. Additionally, we report the results for English and German if they were meaningfully divergent from the findings for mathematics.

4.3.1 Descriptive statistics and bivariate correlations

At the end of Grade 8, 18.6% of all students in the sample were currently attending private tutoring in some subject, while 12% of the total sample were attending private tutoring in mathematics. With regards to the duration of the ongoing tutoring in mathematics, most of the students had attended it for up to 3 months (38.6%). Concerning the intensity, approximately one half of the students (52.8%) received up to one hour of tutoring per week, while only 12.5% attended private tutoring for more than two hours per week.

The descriptive values on the outcomes and covariates of the tutored students and nontutored students are presented in Table 1 (more extensive descriptives can be found in Appendices A.1 for mathematics, A.2 for English, and A.3 for German). On a descriptive level, students with ongoing private tutoring in mathematics had slightly less favourable values on academic interest (Grade 8: $M_{\text{tutored}} = 2.22$, $SD_{\text{tutored}} = .93$), work habits (Grade 8: $M_{\text{tutored}} = 3.07$, $SD_{\text{tutored}} = .57$), academic self-concept (Grade 8: $M_{\text{tutored}} = 2.08$, $SD_{\text{tutored}} = .93$), and test anxiety (Grade 8: $M_{\text{tutored}} = 2.31$, $SD_{\text{tutored}} = .85$; high values indicate high test anxiety) than nontutored students in both Grade 8 and Grade 7. Tutored students also had lower descriptive values on midterm grades in Grade 8 ($M_{\text{tutored}} = 3.30$, $SD_{\text{tutored}} = .92$), general cognitive abilities ($M_{\text{tutored}} = 14.18$, $SD_{\text{tutored}} = 6.50$), and test scores in Grade 7 ($M_{\text{tutored}} = -.40$, $SD_{\text{tutored}} = .91$).

Table 1

Tutored and nontutored students' descriptives in mathematics

	tutored		nontutored	
	<i>N</i> =	1,025	<i>N</i> =	7,485
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Motivation and emotions				
Interest (G8)	2.22	0.93	2.48	0.93
Work habits (G8) ^a	3.07	0.57	3.11	0.56
Self-concept (G8)	2.08	0.93	2.57	1.01
Test anxiety (G8) ^b	2.31	0.85	2.16	0.85
Covariates				
Midterm grade (G8)	3.30	0.92	3.81	1.04
General cognitive abilities	14.18	6.50	15.73	6.64
Test score (G7)	−0.40	0.91	−0.07	1.14
Interest in mathematics (G7)	2.47	0.86	2.74	0.85
Work habits (G7)	2.99	0.55	3.14	0.57
Self-concept (G7)	2.32	0.94	2.79	0.96
Test anxiety (G7) ^b	2.24	0.85	2.11	0.83
One parent born abroad	14.0%		10.5%	
Both parents born abroad	19.9%		22.5%	
Highest ISEI in family	51.44	15.94	51.25	16.34
Gender: female	60.7%		50.2%	

Note. Variables measured on a metric scale are presented as mean values, while categorical variables are presented as percentages. Grades are reverse-coded (1 = *fail* to 6 = *very good*). G8: Grade 8. G7: Grade 7. ISEI: International Socio-Economic Index of Occupational Status. ^aThe sample for work habits in mathematics was *N* = 1,015 for tutored students and *N* = 7,393 for nontutored students, because the variable was removed from the imputation model due to collinearity with other variables. ^bHigh values indicate high test anxiety.

The correlations between tutored students' characteristics in mathematics are displayed in Table 2 (more extensive correlation tables can be found in Appendices A.4 for mathematics, A.5 for English, and A.6 for German). Most of the correlations between students' motivational-affective outcomes in Grade 8 were rather low ($r \leq .20$), except for the correlation between academic interest and self-concept in mathematics ($r_M = .54$). The correlations between tutoring characteristics and motivational-affective outcomes were rather low too, except for the correlations of achievement pressure caused by private tutoring with internal reasons ($r_M = .29$) and with external reasons ($r_M = .39$) in mathematics. Substantial correlations between motivational-affective outcomes in English and German were found for self-concept and work habits ($r_E = .38$, $r_G = .28$).

Table 2

Correlations between tutored students' motivational-affective outcomes and tutoring characteristics in mathematics

	1	2	3	4	5	6	7	8	9
1. PT duration									
2. PT intensity	.14								
3. Interest (G8)	-.04	.08							
4. Work habits (G8)	.01	-.03	.09						
5. Self-concept (G8)	-.04	.12	.54	-.04					
6. Test anxiety (G8) ^a	.02	.06	.05	.01	-.05				
7. Achievement pressure (G8) ^b	-.07	.12	.20	.01	.10	.12			
8. Tutors' individual frame of reference	.11	.05	-.07	.18	-.14	.12	.16		
9. PT – Internal reasons	-.06	.03	.04	.20	-.05	.05	.29	.28	
10. PT – External reasons	.03	.13	.04	-.14	.02	.16	.39	.07	-.06

Note. Significant correlations are shown in bold ($p \leq .05$). G8: Grade 8. PT: Private tutoring.

^aHigh values indicate high test anxiety. ^bHigh values indicate high achievement pressure.

4.3.2 The relationship of private tutoring with students' motivational-affective outcomes

Hypotheses 1a and 1b: The results regarding the relationship between the duration and intensity of private tutoring with students' motivational-affective outcomes in mathematics are shown in Table 3 (results for English and German can be found in Table A.7 and A.8 in the Appendices). Tutored and nontutored students did not differ significantly in their motivational-affective outcomes, regardless of the duration and intensity of the ongoing private tutoring. Therefore, Hypotheses 1a and 1b were not confirmed.

Table 3

Path model results: The relationship of private tutoring with students' motivational-affective outcomes in mathematics (N = 8,510)

	Interest (G8)		Work habits (G8)		Self-concept (G8)		Test anxiety (G8)	
	β	SE	β	SE	β	SE	β	SE
Private tutoring								
duration: 0–3 months ^a	.03	.06	–.04	.06	.01	.06	.01	.06
duration: 4–6 months ^a	–.02	.08	.09	.07	–.08	.07	.14	.08
duration: 7–9 months ^a	–.03	.11	–.09	.10	–.03	.10	.02	.13
duration: > 9 months ^a	–.06	.09	–.03	.08	–.02	.08	–.01	.10
intensity: up to 1hr	–.03	.07	.01	.06	–.11	.06	.04	.07
intensity: up to 2hr	–.04	.08	.02	.07	–.06	.07	.03	.09
intensity: > 2hr	.04	.12	–.14	.11	.12	.11	.01	.12
Covariates								
PT at an earlier time point ^b	–.03	.07	.06	.06	–.05	.05	.08	.07
Midterm grade (G8)	.12	.02	.15	.01	.34	.02	–.04	.01
General cognitive abilities	.01	.01	–.06	.01	.07	.02	–.02	.02
Test score (G7)	.06	.02	–.10	.02	.12	.02	–.11	.02
Mean test score school level (G7)	.01	.04	.09	.04	–.01	.03	.04	.03
Interest (G7)	.27	.02	.09	.02	.14	.02	.03	.02
Work habits (G7)	.00	.02	.09	.02	–.01	.01	–.01	.02
Self-concept (G7)	.16	.02	–.06	.02	.24	.02	–.02	.02
Test anxiety (G7)	.04	.01	–.03	.01	–.01	.01	.34	.02
IHR: lower level ^c	.00	.10	–.05	.12	–.15	.11	.00	.11
IHR: intermediate level ^c	–.11	.09	.22	.10	–.22	.07	.04	.13
Intermediate track ^c	–.25	.06	.19	.05	–.26	.06	.09	.07
Comprehensive school: lower level ^c	–.10	.06	.07	.06	–.17	.05	.09	.07
Comprehensive school: higher level ^c	–.23	.06	.32	.06	–.31	.06	.10	.07
Academic track ^c	–.41	.08	.16	.09	–.40	.08	.01	.10
Parent(s) qualified for university ^d	–.03	.03	–.01	.04	.01	.04	–.01	.05
Parent(s) with university degree ^e	.03	.04	.08	.05	.01	.04	–.02	.04
One parent born abroad ^f	.00	.05	.00	.05	–.02	.05	–.01	.04
Both parents born abroad ^f	.09	.03	.05	.04	–.01	.03	.10	.04
Highest ISEI	–.01	.02	.02	.02	–.02	.02	–.01	.02
Gender ^g	–.29	.02	.12	.03	–.28	.02	.07	.03
R ²	.27		.06		.42		.18	

Note. Standardised regression coefficients. Significant coefficients are shown in bold ($p \leq .05$). Continuous variables are stdyx- and binary variables are stdy-standardised. Grades are reverse-coded (1 = *fail* to 6 = *very good*). PT: Private tutoring. G8: Grade 8. G7: Grade 7. IHR: Integrated secondary school (*Integrierte Haupt- und Realschule*). ISEI: International Socio-Economic Index of Occupational Status. R²: Coefficient of determination. Reference categories: ^ano current private tutoring. ^bno PT at an earlier time point. ^clower secondary track. ^dboth parents not qualified for university. ^eboth parents without a university degree. ^fboth parents born in Germany. ^gmale.

4.3.3 Analyses within the groups of tutored students

The tables showing the results within the groups of tutored students can be found in Appendices A.9 (mathematics), A.10 (English), and A.11 (German). Within the groups of tutored students ($n_M = 1,025$; $n_E = 693$; $n_G = 491$), again, no relationships of the duration and intensity of private tutoring were found with (1) academic interest, (2) work habits, (3) academic self-concept, or (4) test anxiety.

Hypothesis 1c: However, a significant negative relationship was found between the duration of private tutoring in mathematics and (5) achievement pressure caused by private tutoring ($\beta_M = -.07$, $p < .05$), which indicates that achievement pressure caused by private tutoring decreased over time. This contradicts the hypothesis of a positive relationship between the duration of private tutoring and achievement pressure caused by private tutoring. No significant relationships were found between duration and intensity of tutoring and students' motivational-affective outcomes in English and German.

4.3.3.1 The tutors' individual frame of reference

The results concerning the tutors' use of an individual frame of reference and students' internal and external reasons to attend private tutoring in all three subjects are displayed in Figure 3.

Hypothesis 2: Students' work habits in mathematics were more positive the more their tutor made use of an individual frame of reference ($\beta_M = .14$, $p < .05$). Thus, the expected positive relationship between the tutors' use of an individual frame of reference and motivational-affective outcomes was confirmed for students' work habits in mathematics, although no relationships were found for other outcomes. The use of an individual frame of reference did not have any significant relationship with the motivational-affective outcomes in English and German.

4.3.3.2 Internal and external reasons to attend private tutoring

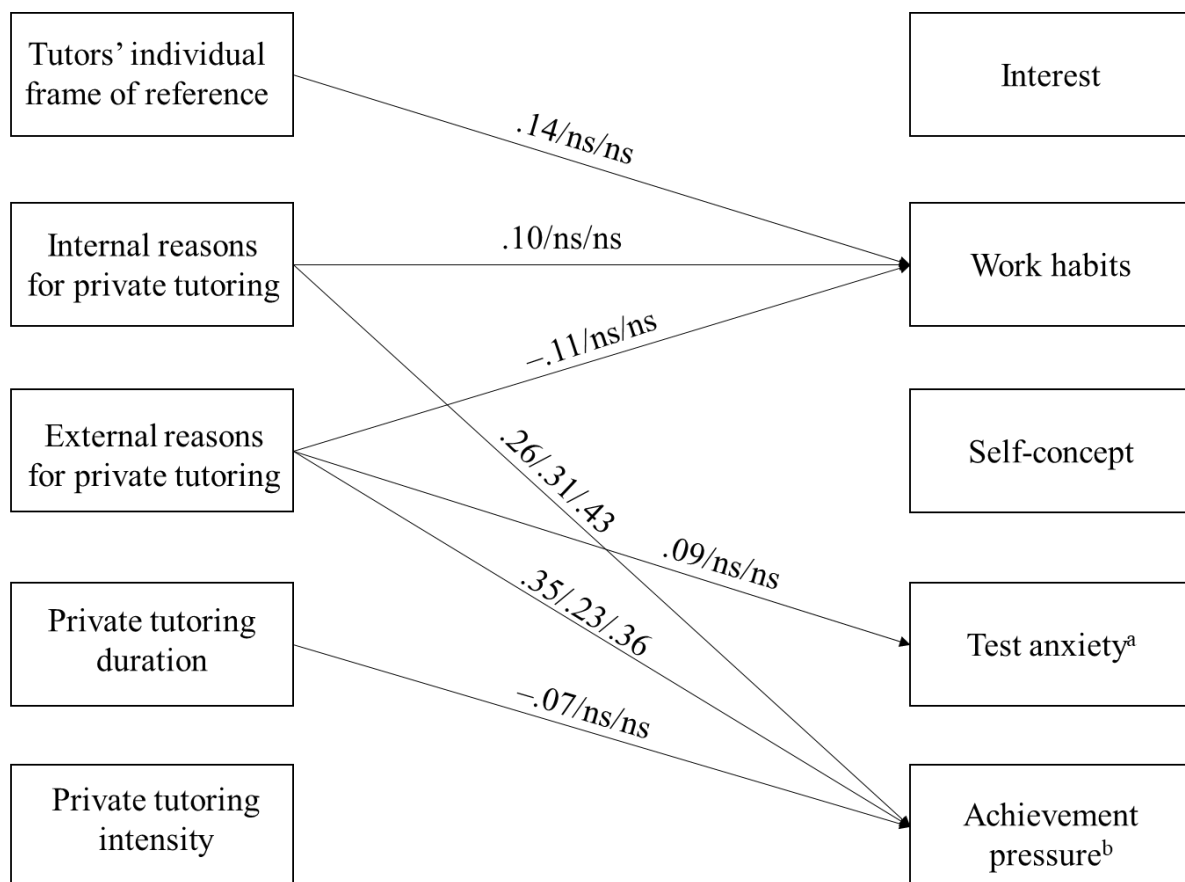
Hypothesis 3: Students who had strong internal reasons to attend private tutoring showed more positive work habits in mathematics ($\beta_M = .10$, $p < .01$). As a less favourable result, a positive relationship was found between internal reasons and achievement pressure caused by private tutoring in every subject ($\beta_M = .26$, $p < .001$; $\beta_E = .31$, $p < .001$; $\beta_G = .43$, $p < .001$). Thus, students perceived higher achievement pressure the stronger their internal reasons to attend private tutoring were. However, no further relationships with other motivational outcomes were found. Thus, Hypothesis 3 was only partially confirmed.

Hypothesis 4: In contrast, students with strong external reasons to attend private tutoring showed less positive work habits ($\beta_M = -.11$, $p < .01$) and higher test anxiety ($\beta_M = .09$, $p < .05$) in mathematics. Furthermore, a positive relationship of external reasons with achievement

pressure caused by private tutoring was found in every subject ($\beta_M = .35, p < .001$; $\beta_E = .23, p < .001$; $\beta_G = .36, p < .001$). Thus, students also perceived higher achievement pressure in all three subjects the stronger their external reasons to attend private tutoring were. Again, no relationships with other motivational-affective outcomes were found. Hence, Hypothesis 4 was partially confirmed.

Figure 3

Path model results: The relationships of tutors' use of an individual frame of reference and of students' internal and external reasons to attend private tutoring with motivational-affective outcomes in mathematics, English, and German



Note. Standardised regression coefficients in mathematics (first value), English (second value), and German (third value). Paths are shown if they were significant in at least one subject. All covariates were included in the model. PT = Private tutoring, ns = not significant. ^aHigh values indicate high test anxiety. ^bHigh values indicate high achievement pressure.

4.4 Discussion

Our study had two research aims. First, we aimed to evaluate the relationship of private tutoring and its duration and intensity with students' motivational-affective outcomes in mathematics, English, and German by comparing tutored and nontutored students' outcomes: (1) academic

interest, (2) work habits, (3) academic self-concept, and (4) test anxiety. Further, we examined associations between the duration and intensity of private tutoring and (5) achievement pressure caused by private tutoring.

Hypotheses 1a and 1b: Contrary to our expectations, no relationship was found between private tutoring and students' academic interest, work habits, academic self-concept, and test anxiety when controlling for prior achievement, cognitive abilities, prior motivational-affective outcomes, school track, and sociodemographic variables. Thus, our findings indicate that private tutoring in general cannot be recommended as an intervention that successfully enhances the motivational-affective outcomes examined in this study. This result is not in line with the results of previous studies, which showed favourable changes in motivational-affective outcomes due to private tutoring (Haag, 2007; Mischo & Haag, 2002; Otto & Karbach, 2019). These contradictory findings might be traced back to differences in the intensity of private tutoring. In contrast to Mischo and Haag (2002), for example, who evaluated the effects of very intense private tutoring (four times per week, 90 minutes per lesson), we focussed on private tutoring with a more common intensity (only 12.5% of students with private tutoring in mathematics received more than two hours of private tutoring per week). Private tutoring with a common intensity might play only a minor role in the fulfilment of students' psychological needs in comparison to the role of regular classes, as well as the role of students' interactions with teachers, peers, and family. Nonetheless, following the SDT (Deci et al., 1991; Deci & Ryan, 1993; Ryan & Deci, 2000), it can be theoretically argued that private tutoring has the potential to promote students' intrinsic motivation through supporting their needs for competence, autonomy, and social relatedness and, therefore, can be expected to improve students' interest, work habits, and self-concept. However, empirically, there might be large differences in the extent to which private tutoring actually supports students' needs, for example, due to the fact that tutors might be more or less able to provide optimally challenging tasks that allow their students to strive for autonomy (Krapp, 2005). Because the relationship of private tutoring with students' interest, work habits, and self-concept can be assumed to depend on the actual support of their needs, it would be valuable in future studies to directly measure the extent to which tutored students experience support for their needs. Regarding the achievement emotion that we investigated, namely, test anxiety, it would be promising to directly measure whether students' sense of control in learning-related situations is increased through private tutoring, which—in turn—might reduce their test anxiety (Pekrun, 2006).

Hypothesis 1c: However, private tutoring duration was associated with achievement pressure caused by private tutoring in mathematics. Contrary to our expectations, achievement

pressure was found to decrease over time. This might be explained by the findings of Guill & Bos (2014) that parents and students share the impression that private tutoring enhances students' achievement. This perceived effectiveness of private tutoring might lead to satisfaction with the intervention and, therefore, to lower achievement pressure.

Second, we aimed to gain insights into impact factors that make private tutoring beneficial for students' motivation and emotions by taking into account the tutors' use of an individual frame of reference when providing feedback and students' internal and external reasons for attending private tutoring. Within the three subject-specific groups of tutored students, we were able to find relationships of an individual frame of reference and of students' internal and external reasons to attend private tutoring with students' motivational-affective outcomes.

Hypothesis 2: The tutors' use of an individual frame of reference in private tutoring lessons, which is an important part of being a supportive tutor (Guill, Lüdtke, & Köller, 2020), went along with improved work habits in regular mathematics classes. This result points in the same direction as the results of previous studies that found positive relationships of an individual frame of reference with students' motivational-affective outcomes (Jerusalem & Mittag, 1999; Rheinberg, 1980). Although this result was only found for mathematics and the use of an individual frame of reference did not have any associations with the other outcomes, this is still a promising result because the outcome of work habits relates to students' behaviour in regular classes. Thus, we found that tutors' behaviour was associated with students' behaviour outside private tutoring lessons, which is encouraging because improvements in students' work habits might lead to enhanced achievement in the future and might make private tutoring no longer necessary if the work habits have improved enough.

Hypotheses 3 and 4: Because the decision for students to participate in private tutoring can be their own and/or someone else's, we further analysed the relationship of students' internal and external reasons to attend private tutoring with students' motivational-affective outcomes. While a small favourable relationship was found between students' internal reasons to attend private tutoring and work habits in regular mathematics classes, external reasons had a small unfavourable association with work habits and test anxiety in mathematics. Thus, students' reasons to attend private tutoring were associated with their motivational-affective outcomes outside private tutoring lessons, namely, with their work habits in regular classes and test anxiety in the tutored subject. The finding that internal reasons to attend private tutoring showed more favourable results than external reasons was in line with our theoretical assumptions. Hence, these findings underline the relevance of supporting students' autonomy for motivational outcomes, as postulated by the SDT (Deci et al., 1991; Ryan & Deci, 2000).

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Further, the finding that high external reasons to attend private tutoring were associated with high test anxiety might indicate that students who attend private tutoring at the request of someone else feel less competent and therefore assume that they have low control over achievement-related activities and their outcomes, which—as assumed in the CVT (Pekrun, 2006)—can lead to test anxiety.

Both internal and external reasons to attend private tutoring were related with achievement pressure caused by private tutoring in all three subjects. While we expected external reasons to attend private tutoring to increase achievement pressure, we did not expect to find this result for internal reasons. However, these findings might be explained by high expectations for improvement in students' achievement if students themselves, parents, or teachers have a strong interest in the student's participation in private tutoring. The relatively large size of the relationship might be partly traced back to methodological reasons, because the questions on internal and external reasons were asked in the same part of the questionnaire as the questions on achievement pressure caused by private tutoring, while questions on the other outcomes were asked in other parts of the questionnaire.

With the exception of the unfavourable associations of internal and external reasons to attend private tutoring with students' achievement pressure caused by private tutoring in all three subjects, significant associations with the other outcomes were found only in mathematics. Previous research has shown subject-specific differences in students' motivational outcomes (Marsh, 1990b; Wolters & Pintrich, 1998). It is therefore likely that the tutors' use of an individual frame of reference and students' reasons for attending private tutoring have a domain-specific impact on the outcomes as well. Wolters and Pintrich (1998) found that students at secondary schools perceived mathematics as being more important, useful, and interesting than other subjects. This high valuing of mathematics might facilitate the motivational-affective effects of private tutoring in mathematics in comparison to the other subjects. Further, mathematics differs significantly from linguistic subjects such as English and German regarding the lesson content. Thus, it is likely that private tutors use domain-specific approaches in their lessons that might affect students' motivation and emotions in different ways.

To sum up, private tutoring did not show significant relationships with students' academic interest, work habits, academic self-concept, and test anxiety in our analyses. However, students' perceived achievement pressure caused by private tutoring was shown to decrease over time in mathematics. Tutors' use of an individual frame of reference as well as students' internal reasons to attend private tutoring were found to be linked to improved work habits in

mathematics outside private tutoring lessons. External reasons to attend private tutoring were related with worsened work habits and higher test anxiety; again, this relationship was found only for mathematics. Finally, both internal and external reasons to attend private tutoring were associated with higher achievement pressure caused by private tutoring in all three subjects.

4.4.1 Strengths and limitations

One major strength of our analyses is the large longitudinal data set we could draw data from, which allowed us to control for students' prior achievement and prior motivational-affective outcomes; this aspect is necessary because low-achieving students more often attend private tutoring (Byun et al., 2018). Thus, we were able to account for the selection effects of private tutoring regarding these constructs. Further, the data set provides domain-specific information on most of the dependent and independent variables and includes detailed information on private tutoring. Hence, we were able to go beyond examining the relationship of private tutoring and its duration and intensity with students' motivational-affective outcomes by identifying characteristics of tutors and students that have the potential to make private tutoring beneficial for students' motivation and emotions. Our study adds to the existing body of research on private tutoring and its relationship with important motivational-affective outcomes, which, so far, have not been taken into account as much as students' achievement.

Although our study provides some new insights into tutors' behaviour and students' internal and external reasons for attending private tutoring, our analyses have some limitations that should be considered when interpreting the findings. First, methodological factors might have limited our analyses. One limitation is that we were not able to examine causal relationships between the dependent and independent variables because students were not assigned randomly to private tutoring lessons. Although we used longitudinal data and took students' prior achievement and prior motivational-affective outcomes as well as other important covariates into account, there still might be selection effects regarding students' other characteristics. Another methodological limitation is related to the high missing rates of some variables (e.g., work habits in Grade 7), which resulted from individual nonresponse, the multimatrix design of some parts of the questionnaire, and students not following the instruction to choose one tutoring subject to make statements about the characteristics of their private tutoring. Although multiple imputation and FIML are described as state-of-the-art methods to handle missing data (e.g., Enders, 2010; Schafer & Graham, 2002), the results depend more strongly on the imputation model when missing rates are high. Therefore, the results of the variables with high missing rates are subject to greater uncertainty. In future research, less

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rotation of the items in the questionnaire and online questionnaires with programmed filters could be promising approaches to avoid high rates of missing data. Additionally, there are some limitations regarding the observed outcomes. We examined the relationship of private tutoring with only one achievement-related emotion, namely, test anxiety. Finally, the construct of achievement pressure caused by private tutoring had two limitations: we had no information on the achievement pressure perceived by students without private tutoring or on the baseline values in Grade 7. Further research should address the relationship of private tutoring with more achievement-related emotions (e.g., enjoyment, pride, anger, shame, boredom, and hopelessness: Pekrun et al., 2017) and should compare the perceived achievement pressure of students with and without private tutoring.

Second, most of the results were found for private tutoring in mathematics and could not be replicated for tutoring in English and German. Methodologically, this might be due to smaller sample sizes and higher rates of missing values on items on some tutoring characteristics (intensity, individual frame of reference, and changes in learning time) in English and German, which made the estimations in these subjects less precise and, therefore, less likely to be significant.

Third, the data set contained information on only one specific aspect of tutor behaviour, namely, the use of an individual frame reference as a facet of being a supportive tutor (Guill, Lüdtke, & Köller, 2020). However, other facets of the support dimension (e.g., sensitivity to individual interests and needs, respectful handling of errors: Guill, Lüdtke, & Köller, 2020; Praetorius et al., 2018) might also influence students' motivation and emotions. They should be addressed in future research based on other data sets that contain information on other facets of being a supportive teacher.

Fourth, the scales on achievement pressure and the internal and external reasons for attending private tutoring were used for the first time in KESS 8 and, thus, there is limited information on their validity. However, these scales still make an important contribution because they transform theoretical reasoning (Deci & Ryan, 1993) and findings on motives to attend private tutoring (Bray, 1999) and on negative motivational effects (Bray, 2003) into scales that can be used in large-scale assessments.

Finally, the path model measuring the relationship between the duration and the intensity of private tutoring with students' work habits in mathematics showed only a small determination coefficient ($R^2 = .06$ in mathematics, see Table 3, Column 2), which indicates that there are other covariates than the observed covariates that might be more strongly related with students' work habits, for example, students' need support by the regular teacher.

Therefore, more research is needed with covariates that are more strongly related with students' work habits to fully understand the relationship between private tutoring and students' work habits. Further, while the data were collected at the beginning of Grade 7 and at the end of Grade 8, future research should ideally measure students' work habits as well as other outcomes shortly before and after participation in private tutoring.

4.5 Conclusions

Although there is extensive (even though inconclusive) research on the effects of private tutoring on students' achievement (Park et al., 2016), its relationship with motivational and affective outcomes has only been addressed in a few studies so far (Haag, 2007; Mischo & Haag, 2002; Otto & Karbach, 2019). The current study therefore adds to the body of research on the relationship of private tutoring with students' motivational-affective outcomes in Germany. Further research is needed to test whether these findings can be generalised across countries that have differences in the extent to which private tutoring takes place their country and they also differ in their education systems (Park et al., 2016).

Based on our findings, a general recommendation for private tutoring with the aim of enhancing motivational-affective outcomes cannot be made. However, we were able to find some results regarding tutors' behaviour (use of an individual frame of reference) and students' characteristics (internal and external reasons to attend private tutoring). The positive relationship we found between tutors' use of an individual frame of reference and students' work habits in mathematics is a promising result, because improved work habits might lead to enhanced performance in the future. More research is needed to investigate whether these improvements in students' work habits actually lead to higher academic achievement. However, on the basis of our results, we can recommend the use of an individual frame of reference during private tutoring lessons as an effective strategy to enhance students' work habits in mathematics.

Moreover, our findings underline the importance of autonomy-supportive behaviour from parents and teachers for a positive development of students' motivation and emotions. While students' internal reasons to attend private tutoring had a favourable association with work habits in mathematics, external reasons (i.e., the decision for the student to attend private tutoring being made by parents or teachers) showed unfavourable associations with work habits and test anxiety in mathematics. Therefore, in regard to the enhancement of motivation and emotions, we recommend fostering students' internal reasons to attend private tutoring if supplementary education is considered. This might be done by discussing the utility of the

potential tutoring subject with the student, for example, through highlighting the relevance of mathematics for daily life and future education (Brisson et al., 2017). However, in order to enable autonomous decisions, alternatives to private tutoring should be discussed too, from which the student themselves can choose (e.g., practising with a friend or a parent).

4.6 References

- Aldrup, K., Klusmann, U., Lüdtke, O., Göllner, R., & Trautwein, U. (2018). Social support and classroom management are related to secondary students' general school adjustment: A multilevel structural equation model using student and teacher ratings. *Journal of Educational Psychology, 110*(8), 1066–1083.
<https://doi.org/10.1037/edu0000256>
- Bandalos, D. L. (2014). Relative performance of categorical diagonally weighted least squares and robust maximum likelihood estimation. *Structural Equation Modeling: A Multidisciplinary Journal, 21*(1), 102–116.
<https://doi.org/10.1080/10705511.2014.859510>
- Bäumer, T., Preis, N., Roßbach, H.-G., Stecher, L., & Klieme, E. (2011). Education processes in life-course-specific learning environments. *Zeitschrift Für Erziehungswissenschaft, 14*(S2), 87–101. <https://doi.org/10.1007/s11618-011-0183-6>
- Berberoglu, G., & Tansel, A. (2014). Does private tutoring increase students' academic performance? Evidence from Turkey. *International Review of Education, 60*(5), 683–701. <https://doi.org/10.1007/s11159-014-9436-y>
- Bos, W., Bensen, M., & Gröhlich, C. (2009). *KESS 7 – Kompetenzen und Einstellungen von Schülerinnen und Schülern – Jahrgangsstufe 7* [KESS 7 – Competencies and attitudes of students – Grade 7]. Waxmann.
- Bos, W., & Gröhlich, C. (2010). *KESS 8 – Kompetenzen und Einstellungen von Schülerinnen und Schülern am Ende der Jahrgangsstufe 8* [KESS 8 – Competencies and attitudes of students at the end of Grade 8]. Waxmann.
- Bos, W., Gröhlich, C., Dudas, D.-F., Guill, K., & Scharenberg, K. (2010). *KESS 8 – Skalenhandbuch zur Dokumentation der Erhebungsinstrumente* [KESS 8 – Scales handbook]. Waxmann.
- Bray, M. (1999). *The shadow education system: Private tutoring and its implications for planners. Fundamentals of educational planning: Vol. 61*. Unesco International Institute for Educational Planning.

Chapter 4 – Study 3: Motivational-affective effects of private tutoring

- Bray, M. (2003). *Adverse effects of private supplementary tutoring: Ethics and corruption in education*. Unesco International Institute for Educational Planning.
- Bray, M. (2007). *The shadow education system: Private tutoring and its implications for planners* (2. ed.). *Fundamentals of educational planning: Vol. 61*. UNESCO Internat. Inst. for Educational Planning.
- Bray, M. (2020). Shadow education: Scale, drivers, and future directions in the global spread of private supplementary tutoring. In UNESCO (Ed.), *Humanistic futures of learning - Perspectives from UNESCO Chairs and UNITWIN Network* (pp. 100–104).
- Bray, M. (2021). Shadow education in europe: Growing prevalence, underlying forces, and policy implications. *ECNU Review of Education*, 4(3), 442–475.
<https://doi.org/10.1177/2096531119890142>
- Brisson, B. M., Dicke, A.-L., Gaspard, H., Häfner, I., Flunger, B., Nagengast, B., & Trautwein, U. (2017). Short intervention, sustained effects: Promoting students' math competence beliefs, effort, and achievement. *American Educational Research Journal*, 54(6), 1048–1078. <https://doi.org/10.3102/0002831217716084>
- Brunner, M., Keller, U., Dierendonck, C., Reichert, M., Ugen, S., Fischbach, A., & Martin, R. (2010). The structure of academic self-concepts revisited: The nested marsh/shavelson model. *Journal of Educational Psychology*, 102(4), 964–981.
<https://doi.org/10.1037/a0019644>
- Byun, S.-Y., Chung, H. J., & Baker, D. (2018). Global patterns of the use of shadow education: Student, family, and national influences. *Research in the Sociology of Education*, 20, 75–105. <https://doi.org/10.1108/S1479-353920180000020004>
- Carroll, J. B. (1973). Ein Modell schulischen Lernens [A model of academic learning]. In W. Edelstein & D. Hopf (Eds.), *Konzepte der Humanwissenschaften. Bedingungen des Bildungsprozesses* (pp. 234–250). Klett.
- Cole, R. (2017). Estimating the impact of private tutoring on academic performance: primary students in Sri Lanka. *Education Economics*, 25(2), 142–157.
<https://doi.org/10.1080/09645292.2016.1196163>
- Deci, E. L. (1992). The relation of interest to the motivation of behavior: A self-determination theory perspective. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 43–70). Lawrence Erlbaum Associates, Inc.

Chapter 4 – Study 3: Motivational-affective effects of private tutoring

- Deci, E. L., & Ryan, R. M. (1993). Die Selbstbestimmungstheorie der Motivation und ihre Bedeutung für die Pädagogik [The self-determination theory of motivation and its relevance for pedagogics]. *Zeitschrift Für Pädagogik*, 39(2), 223–238.
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, 26(3-4), 325–346.
- Dietrich, J., Dicke, A.-L., Kracke, B., & Noack, P. (2015). Teacher support and its influence on students' intrinsic value and effort: Dimensional comparison effects across subjects. *Learning and Instruction*, 39, 45–54.
<https://doi.org/10.1016/j.learninstruc.2015.05.007>
- Enders, C. K. (2010). *Applied missing data analysis. Methodology in the social sciences*. Guilford Press. <http://site.ebrary.com/lib/alltitles/docDetail.action?docID=10389908>
- Fauth, B., Decristan, J., Rieser, S., Klieme, E., & Büttner, G. (2014). Student ratings of teaching quality in primary school: Dimensions and prediction of student outcomes. *Learning and Instruction*, 29, 1–9. <https://doi.org/10.1016/j.learninstruc.2013.07.001>
- Ganzeboom, H. B., Graaf, P. M. de, & Treiman, D. J. (1992). A standard international socio-economic index of occupational status. *Social Science Research*, 21(1), 1–56.
[https://doi.org/10.1016/0049-089X\(92\)90017-B](https://doi.org/10.1016/0049-089X(92)90017-B)
- Guill, K., Bahr, I. A., & Ömeroğulları, M. (2020). Qualität der Hausaufgabenhilfe in Elternhaus und Nachhilfeunterricht als Prädiktoren des hausaufgabenbezogenen Arbeitsverhaltens [Quality of homework support in the parental home and private tutoring as predictors of homework-related study behaviour]. *Psychologie in Erziehung und Unterricht*, 67. <https://doi.org/10.2378/peu2020.art08d>
- Guill, K., & Bos, W. (2014). Effectiveness of private tutoring in mathematics with regard to subjective and objective indicators of academic achievement: Evidence from a German secondary school sample. *Journal for Educational Research Online*, 6(1), 34–67.
- Guill, K., Lüdtke, O., & Köller, O. (2020). Assessing the instructional quality of private tutoring and effects on student outcomes: Analyses from the German National Educational Panel Study. *British Journal of Educational Psychology*, 90(2), 282–300.
<https://doi.org/10.1111/bjep.12281>
- Guill, K., Ömeroğulları, M., & Köller, O. (2021). Intensity and content of private tutoring lessons during German secondary schooling: Effects on students' grades and test

- achievement. *European Journal of Psychology of Education*, 36. <https://doi.org/10.1007/s10212-021-00581-x>
- Guill, K., & Wendt, H. (2020). Privater Nachhilfeunterricht und Lehrkräftefortbildung am Ende der Grundschulzeit [Private tutoring and teacher training at the end of the elementary school years]. In Schwippert, K., Kasper, D., Köller, O., McElvany, N., Selter, C., Steffensky, M., & Wendt, H. (Eds.), *TIMSS 2019: Mathematische und naturwissenschaftliche Kompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich* (pp. 209–222). Waxmann.
- Guo, Y., Chen, Q., Zhai, S., & Pei, C. (2020). Does private tutoring improve student learning in China? Evidence from the China Education Panel Survey. *Asia & the Pacific Policy Studies*, 7(3), 322–343. <https://doi.org/10.1002/app5.310>
- Ha, Y., & Park, H.-J. (2017). Can after-school programs and private tutoring help improve students' achievement? Revisiting the effects in Korean secondary schools. *Asia Pacific Education Review*, 18(1), 65–79. <https://doi.org/10.1007/s12564-016-9451-8>
- Haag, L. (2007). *Wirksamkeit von Nachhilfeunterricht: Eine Längsschnittanalyse* [Effectiveness of private tutoring: A longitudinal analysis]. Schülerhilfe.
- Hajar, A. (2018). Exploring Year 6 pupils' perceptions of private tutoring: evidence from three mainstream schools in England. *Oxford Review of Education*, 44(4), 514–531. <https://doi.org/10.1080/03054985.2018.1430563>
- Hamre, B. K., Pianta, R. C., Downer, J. T., DeCoster, J., Mashburn, A. J., Jones, S. M., Brown, J. L., Cappella, E., Atkins, M., Rivers, S. E., Brackett, M. A., & Hamagami, A. (2013). Teaching through interactions. *The Elementary School Journal*, 113(4), 461–487. <https://doi.org/10.1086/669616>
- Heller, K. A., & Perleth, C. (2000). *KFT 4-12+R. Kognitiver Fähigkeitstest für 4. bis 12. Klassen, Revision* [KFT 4-12+R. Cognitive abilities test für Grade 4 to 12, Revision]. Beltz.
- Hille, A., Spieß, C. K., & Staneva, M. (2016). Immer mehr Schülerinnen und Schüler nehmen Nachhilfe, besonders in Haushalten mit mittleren Einkommen [More and more students receive private tutoring, especially in middle-income households]. *DIW Wochenbericht*(6), 111–120.
- Jansen, D., Elffers, L., & Volman, M. L. L. (2020). A place between school and home: Exploring the place of shadow education in students' academic lives in the

Chapter 4 – Study 3: Motivational-affective effects of private tutoring

- Netherlands. *ORBIS SCHOLAE*, 14(2), 39–58.
<https://doi.org/10.14712/23363177.2020.11>
- Jerusalem, M., & Mittag, W. (1999). Selbstwirksamkeit, Bezugsnormen, Leistung und Wohlbefinden [Self-efficacy, reference norm, achievement, and well-being.]. In M. Jerusalem & R. Pekrun (Eds.), *Emotion, Motivation und Leistung* (pp. 223–245). Hogrefe.
- Jung, H., & Seo, E. H. (2019). Examining a causal effect of private tutoring in Korea: does private tutoring damage students' self-regulated learning? *Asia Pacific Education Review*, 20(3), 375–389. <https://doi.org/10.1007/s12564-018-9570-5>
- Klemm, K., & Hollenbach-Biele, N. (2016). *Nachhilfeunterricht in Deutschland: Ausmaß – Wirkung – Kosten* [Private tutoring in Germany: Spread - effectiveness - costs]. Bertelsmann Stiftung.
- Korean Statistical Information Service. (2020). *Participation rate on private education by school level and characteristics*.
https://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT_1PE102&vw_cd=MT_ETITLE&list_id=O151_001&scrId=&seqNo=&language=en&obj_var_id=&itm_id=&conn_path=A6&path=%252Feng%252Fsearch%252FsearchList.do
- Krapp, A. (2005). Basic needs and the development of interest and intrinsic motivational orientations. *Learning and Instruction*, 15(5), 381–395.
<https://doi.org/10.1016/j.learninstruc.2005.07.007>
- Kuan, P.-Y. (2011). Effects of cram schooling on mathematics performance: Evidence from junior high students in Taiwan. *Comparative Education Review*, 55(3), 342–368.
<https://doi.org/10.1086/659142>
- Kunter, M., & Voss, T. (2011). Das Modell der Unterrichtsqualität in COACTIV: Eine multikriteriale Analyse [The model of instructional quality in COACTIV: A multicriteria analysis]. In M. Kunter, J. Baumert, W. Blum, U. Klusmann, S. Krauss, & M. Neubrand (Eds.), *Professionelle Kompetenz von Lehrkräften – Ergebnisse des Forschungsprogramms COACTIV* [Professional competence of teachers. Results from the COACTIV project]. Waxmann.
- Liao, X., & Huang, X. (2018). Who is more likely to participate in private tutoring and does it work? Evidence from PISA (2015). *ECNU Review of Education*, 1(3), 69–95.
<https://doi.org/10.30926/ecnuroe2018010304>

Chapter 4 – Study 3: Motivational-affective effects of private tutoring

- Liu, H., Yao, M., Li, J., & Li, R. (2021). Multiple mediators in the relationship between perceived teacher autonomy support and student engagement in math and literacy learning. *Educational Psychology, 41*(2), 116–136.
<https://doi.org/10.1080/01443410.2020.1837346>
- Luplow, N., & Schneider, T. (2014). Nutzung und Effektivität privat bezahlter Nachhilfe im Primarbereich. *Zeitschrift Für Soziologie, 43*(1), 31–49.
- Marsh, H. W. (1990a). *Self description questionnaire (SDQ) II: A theoretical and empirical basis for the measurement of multiple dimensions of adolescents self-concept: An interim test manual and a research monograph*. The Psychological Corporation.
- Marsh, H. W. (1990b). The structure of academic self-concept: The Marsh/Shavelson model. *Journal of Educational Psychology, 82*(4), 623–636. <https://doi.org/10.1037/0022-0663.82.4.623>
- Marsh, H. W., Trautwein, U., Lüdtke, O., Köller, O., & Baumert, J. (2005). Academic self-concept, interest, grades, and standardized test scores: Reciprocal effects models of causal ordering. *Child Development, 76*(2), 397–416. <https://doi.org/10.1111/j.1467-8624.2005.00853.x>
- Maydeu-Olivares, A. (2017). Maximum Likelihood Estimation of Structural Equation Models for Continuous Data: Standard Errors and Goodness of Fit. *Structural Equation Modeling: A Multidisciplinary Journal, 24*(3), 383–394.
<https://doi.org/10.1080/10705511.2016.1269606>
- Mischo, C., & Haag, L. (2002). Expansion and effectiveness of private tutoring. *European Journal of Psychology of Education, 17*(3), 263–273.
- Mischo, C., & van Kessel, M. (2005). Wie wirkt Nachhilfe? Mögliche Wirkfaktoren im Wissen der Nachhilfelehrer [How does private tutoring work? Potential impact factors in the knowledge of tutors]. *Empirische Pädagogik, 19*(1), 28–46.
- Muthén, L. K., & Muthén, B. O. (1998-2017). *Mplus User's Guide* (8th ed.). Muthén & Muthén.
- Ömeroğulları, M., Guill, K., & Köller, O. (2020). Effectiveness of private tutoring during secondary schooling in Germany: Do the duration of private tutoring and tutor qualification affect school achievement? *Learning and Instruction, 66*. <https://doi.org/10.1016/j.learninstruc.2020.101306>
- Otto, B., & Karbach, J. (2019). The effects of private tutoring on students' perception of their parents' academic involvement and the quality of their parent-child relationship.

- Educational Psychology*, 39(7), 923–940.
<https://doi.org/10.1080/01443410.2019.1610725>
- Park, H., Buchmann, C., Choi, J., & Merry, J. J. (2016). Learning beyond the school walls: Trends and implications. *Annual Review of Sociology*, 42(1), 231–252.
<https://doi.org/10.1146/annurev-soc-081715-074341>
- Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review*, 18(4), 315–341. <https://doi.org/10.1007/s10648-006-9029-9>
- Pekrun, R., Lichtenfeld, S., Marsh, H. W., Murayama, K., & Goetz, T. (2017). Achievement emotions and academic performance: Longitudinal models of reciprocal effects. *Child Development*, 88(5), 1653–1670. <https://doi.org/10.1111/cdev.12704>
- Pellegrini, M., Lake, C., Neitzel, A., & Slavin, R. E. (2021). Effective programs in elementary mathematics: A meta-analysis. *AERA Open*, 7, 233285842098621.
<https://doi.org/10.1177/2332858420986211>
- Praetorius, A.-K., Klieme, E., Herbert, B., & Pinger, P. (2018). Generic dimensions of teaching quality: The German framework of three basic dimensions. *ZDM*, 50(3), 407–426. <https://doi.org/10.1007/s11858-018-0918-4>
- Rheinberg, F. (1980). *Leistungsbewertung und Lernmotivation* [Performance evaluation and learning motivation]. Hogrefe.
- Robitzsch, A., Grund, S., & Henke, T. (2016). *Miceadds* [Computer software].
<https://CRAN.R-project.org/package=miceadds>
- Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys. Wiley series in probability and mathematical statistics: Applied probability and statistics*. John Wiley & Sons.
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78.
<https://doi.org/10.1037/0003-066X.55.1.68>
- Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, 7(2), 147–177. <https://doi.org/10.1037/1082-989X.7.2.147>
- Scherer, R., Nilsen, T., & Jansen, M. (2016). Evaluating individual students' perceptions of instructional quality: An investigation of their factor structure, measurement

- invariance, and relations to educational outcomes. *Frontiers in Psychology*, 7, 110. <https://doi.org/10.3389/fpsyg.2016.00110>
- Schiefele, U. (1996). *Motivation und Lernen mit Texten* [Motivation and learning with texts]. Hogrefe.
- Solomon, Y., Warin, J., & Lewis, C. (2002). Helping with homework? Homework as a site of tension for parents and teenagers. *British Educational Research Journal*, 28(4), 603–622. <https://doi.org/10.1080/0141192022000005850a>
- Steinmayr, R., Crede, J., McElvany, N., & Wirthwein, L. (2015). Subjective well-being, test anxiety, academic achievement: Testing for reciprocal effects. *Frontiers in Psychology*, 6, 1994. <https://doi.org/10.3389/fpsyg.2015.01994>
- Trautwein, U. (2003). *Schule und Selbstwert: Entwicklungsverlauf, Bedeutung von Kontextfaktoren und Effekte auf die Verhaltensebene* [School and self-worth]. Waxmann.
- Tsiplakides, I. (2018). Shadow education and social class inequalities in secondary education in Greece: The case of teaching English as a foreign language. *International Journal of Sociology of Education*, 7(1), 71. <https://doi.org/10.17583/rise.2018.2987>
- Valtin, R., Wagner, C., Ostrop, G., & Darge, K. (2000). *Das Forschungsprojekt SABA Plus: Schulische Adaptation und Bildungsaspiration (Fortsetzung im 7. Schuljahr) Bericht für die an der Untersuchung beteiligten Schulen* [The research project SABA plus]. https://amor.cms.hu-berlin.de/~h0319kfm/forschung/saba_plus.html
- van Buuren, S., & Groothuis-Oudshoorn, K. (2011). Mice: Multivariate imputation by chained equations in R. *Journal of Statistical Software*, 45(3). <https://doi.org/10.18637/jss.v045.i03>
- van Kessel, M., & Haag, L. (2011). *Praxisleitfaden für Nachhilfelehrer* [Practical guide for private tutors]. Lehrerselbstverlag.
- Wolfradt, U., Hempel, S., & Miles, J. N. (2003). Perceived parenting styles, depersonalisation, anxiety and coping behaviour in adolescents. *Personality and Individual Differences*, 34(3), 521–532. [https://doi.org/10.1016/S0191-8869\(02\)00092-2](https://doi.org/10.1016/S0191-8869(02)00092-2)
- Wolters, C. A., & Pintrich, P. R. (1998). Contextual differences in student motivation and self-regulated learning in mathematics, English, and social studies classrooms. *Instructional Science*, 26(1/2), 27–47. <https://doi.org/10.1023/A:1003035929216>

Chapter 4 – Study 3: Motivational-affective effects of private tutoring

Wößmann, L., Freundl, V., Grewenig, E., Lergetporer, P., Werner, K., & Zierow, L. (2021). Bildung erneut im Lockdown: Wie verbrachten Schulkinder die Schulschließungen Anfang 2021? [Education on lockdown again: How did school children spend the school closures in early 2021?]. *Ifo Schnelldienst Vorab*(5).
<https://www.ifo.de/DocDL/sd-2021-05-woessmann-et-al-corona-schulschliessungen.pdf>

Acknowledgments:

Funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) – 316567771.

This study uses data from the longitudinal study KESS. The data set was generated by the Free and Hanseatic City of Hamburg through the Ministry of Schools and Vocational Training between 2005 and 2012 and was provided to the MILES (Methodological Issues in Longitudinal Educational Studies) scientific consortium for a limited period with the aim of conducting in-depth examinations of scientific questions. MILES is coordinated by the Leibniz Institute for Science and Mathematics Education (IPN).

4.7 Appendix

Table A.1

Tutored and nontutored students' descriptives in mathematics

	tutored		nontutored	
	<i>N</i> = 1,025		<i>N</i> = 7,485	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Motivation and emotions				
Interest (G8)	2.22	0.93	2.48	0.93
Work habits (G8) ^a	3.07	0.57	3.11	0.56
Self-concept (G8)	2.08	0.93	2.57	1.01
Test anxiety (G8) ^b	2.31	0.85	2.16	0.85
Covariates				
Midterm grade (G8)	3.30	0.92	3.81	1.04
General cognitive abilities	14.18	6.50	15.73	6.64
Test score (G7)	−0.40	0.91	−0.07	1.14
Mean test score school level (G7)	−0.07	0.72	−0.12	0.74
Interest in mathematics (G7)	2.47	0.86	2.74	0.85
Work habits (G7)	2.99	0.55	3.14	0.57
Self-concept (G7)	2.32	0.94	2.79	0.96
Test anxiety (G7) ^b	2.24	0.85	2.11	0.83
IHR: lower level	1.3%		2.0%	
IHR: intermediate level	1.9%		1.9%	
Lower secondary track	6.0%		8.7%	
Intermediate track	12.9%		14.0%	
Comprehensive school: lower level	17.0%		13.6%	
Comprehensive school: higher level	13.2%		14.1%	
Academic track	47.8%		45.7%	
Parent(s) qualified for university	51.5%		52.6%	
Parent(s) with university degree	31.7%		34.6%	
One parent born abroad	14.0%		10.5%	
Both parents born abroad	19.9%		22.5%	
Highest ISEI in family	51.44	15.94	51.25	16.34
Gender: female	60.7%		50.2%	

Note. Variables measured on a metric scale are presented as mean values, while categorical variables are presented as percentages. Grades are reverse-coded (1 = *fail* to 6 = *very good*). G8: Grade 8. G7: Grade 7. IHR: Integrated secondary school (*Integrierte Haupt- und Realschule*). ISEI: International Socio-Economic Index of Occupational Status. ^aThe sample for work habits in mathematics was *N* = 1,015 for tutored students and *N* = 7,393 for nontutored students, because the variable was removed from the imputation model due to collinearity with other variables. ^bHigh values indicate high test anxiety.

Table A.2

Tutored and nontutored students' descriptives in English

	tutored		nontutored	
	<i>N</i> = 693		<i>N</i> = 7,817	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Motivation and emotions				
Work habits (G8)	3.00	0.62	3.12	0.61
Self-concept (G8)	2.72	0.81	3.03	0.80
Test anxiety (G8) ^a	2.25	0.86	2.17	0.85
Covariates				
Midterm grade (G8)	3.35	0.85	3.84	0.95
General cognitive abilities	14.74	6.51	15.62	6.65
Test score (G7)	−1.18	1.23	−0.76	1.29
Mean test score school level (G7)	−0.88	0.90	−0.79	0.93
Work habits (G7)	3.00	0.54	3.12	0.57
Self-concept (G7)	2.75	0.78	3.03	0.76
Test anxiety (G7) ^a	2.23	0.85	2.12	0.83
IHR: lower level	1.6 %		1.9 %	
IHR: intermediate level	1.9 %		2.1 %	
Lower secondary track	7.9 %		8.5 %	
Intermediate track	15.9 %		13.9 %	
Comprehensive school: lower level	20.9 %		13.7 %	
Comprehensive school: higher level	12.0 %		13.1 %	
Academic track	39.8 %		46.8 %	
Parent(s) qualified for university	47.6 %		52.9 %	
Parent(s) with university degree	29.0 %		34.7 %	
One parent born abroad	12.3 %		10.8 %	
Both parents born abroad	20.8 %		22.3 %	
Highest ISEI in family	49.86	15.91	51.40	16.32
Gender: female	49.9 %		51.6 %	

Note. Variables measured on a metric scale are presented as mean values, while categorical variables are presented as percentages. Grades are reverse-coded (1 = *fail* to 6 = *very good*). G8: Grade 8. G7: Grade 7. IHR: Integrated secondary school (*Integrierte Haupt- und Realschule*). ISEI: International Socio-Economic Index of Occupational Status. ^aHigh values indicate high test anxiety.

Table A.3

Tutored and nontutored students' descriptives in German

	tutored		nontutored	
	<i>N</i> = 491		<i>N</i> = 8,019	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Motivation and emotions				
Work habits (G8)	3.01	0.56	3.11	0.56
Self-concept (G8)	2.90	0.69	3.10	0.70
Test anxiety (G8) ^a	2.33	0.87	2.17	0.85
Covariates				
Midterm grade (G8)	3.48	0.83	3.91	0.89
General cognitive abilities	13.57	6.69	15.66	6.62
Test score (G7)	−0.79	1.14	−0.08	1.20
Mean test score school level (G7)	−0.43	0.69	−0.10	0.75
Work habits (G7)	2.95	0.54	3.08	0.55
Self-concept (G7)	2.86	0.69	3.10	0.68
Test anxiety (G7) ^a	2.30	0.88	2.12	0.83
IHR: lower level	2.9 %		1.9 %	
IHR: intermediate level	2.4 %		2.0 %	
Lower secondary track	12.8 %		8.3 %	
Intermediate track	16.9 %		13.8 %	
Comprehensive school: lower level	27.3 %		13.8 %	
Comprehensive school: higher level	10.6 %		12.7 %	
Academic track	27.1 %		47.5 %	
Parent(s) qualified for university	42.6 %		53.1 %	
Parent(s) with university degree	26.1 %		34.7 %	
One parent born abroad	13.6 %		10.8 %	
Both parents born abroad	26.1 %		21.9 %	
Highest ISEI in family	47.46	15.80	51.51	16.30
Gender: female	44.0 %		51.9 %	

Note. Variables measured on a metric scale are presented as mean values, while categorical variables are presented as percentages. Grades are reverse-coded (1 = *fail* to 6 = *very good*). G8: Grade 8. G7: Grade 7. IHR: Integrated secondary school (*Integrierte Haupt- und Realschule*). ISEI: International Socio-Economic Index of Occupational Status. ^aHigh values indicate high test anxiety.

Table A.4

Correlations between tutored students' characteristics in mathematics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. PT duration																									
2. PT intensity	.14																								
3. Interest (G8)	-.04	.08																							
4. Work habits (G8)	.01	-.03	.09																						
5. Self-concept (G8)	-.04	.12	.54	-.04																					
6. Test anxiety (G8) ^a	.02	.06	.05	.01	-.05																				
7. Achievement pressure (G8) ^b	-.07	.12	.20	.01	.10	.12																			
8. Individual frame of reference	.11	.05	-.07	.18	-.14	.12	.16																		
9. PT – Internal reasons	-.06	.03	.04	.20	-.05	.05	.29	.28																	
10. PT – External reasons	.03	.13	.04	-.14	.02	.16	.39	.07	-.06																
11. Change in learning time	.03	.18	.10	.19	.08	.11	.22	.23	.26	.16															
12. Midterm grade	.09	-.05	.21	.12	.40	-.09	-.08	-.09	-.04	-.17	-.03														
13. General cognitive abilities	-.02	-.08	-.00	-.05	.10	-.05	-.15	-.02	-.04	-.15	-.02	.16													
14. Test score	-.04	-.13	.00	-.01	.08	-.16	-.18	.01	-.02	-.19	-.02	.17	.50												
15. Mean test score school level	.03	-.20	-.19	.07	-.18	-.09	-.20	.06	.04	-.18	-.01	-.03	.36	.64											
16. Interest (G7)	-.05	.08	.41	-.01	.39	.00	.12	-.03	.03	.00	.11	.14	.00	.09	-.14										
17. Work habits (G7)	-.01	.03	.13	.12	.14	-.08	.01	-.01	-.01	-.11	.02	.10	.02	.17	.10	.25									
18. Self-concept (G7)	-.09	.06	.38	-.01	.43	-.09	.10	-.12	-.08	.01	.05	.20	.08	.12	-.17	.58	.35								
19. Test anxiety (G7) ^a	.02	.01	-.01	-.05	-.12	.38	.09	.07	.02	.12	.04	-.11	-.10	-.17	-.09	-.03	-.09	-.15							
20. Academic track	.01	-.20	-.21	.05	-.20	-.07	-.21	.08	.06	-.19	.01	-.08	.35	.59	.88	-.11	.09	-.14	-.07						
21. Parent(s) qualified for university	-.01	-.02	-.05	.05	-.05	-.07	-.01	.07	.03	-.08	-.04	.02	.10	.26	.36	-.05	.01	-.06	-.06	.32					
22. Parent(s) with university degree	-.01	-.04	-.04	.04	-.06	-.04	-.03	.06	.05	-.05	-.04	.01	.13	.23	.35	-.05	-.01	-.07	-.05	.31	.66				
23. One parent born abroad	.02	-.02	-.05	-.01	-.01	.01	.01	.01	.02	.02	.05	-.02	.03	.01	.05	-.05	-.05	-.07	.02	.04	.09	.08			
24. Both parents born abroad	.03	.11	.12	.01	.07	.07	.10	-.01	-.03	.05	.00	.01	-.14	-.14	-.16	.15	.01	.16	.12	-.11	-.14	-.14	-.20		
25. Highest ISEI	.01	-.10	-.07	.04	-.10	-.04	-.06	.03	.04	-.10	-.04	.06	.14	.26	.37	-.09	.00	-.10	-.09	.32	.53	.55	.02	-.34	
26. Gender: female	.06	-.15	.27	.06	-.30	.13	-.13	.13	.10	-.20	-.07	-.02	.13	-.02	.14	-.25	-.06	-.34	.17	.17	.03	.03	.00	-.01	.04

Note. Significant correlations are shown in bold ($p \leq .05$). G8: Grade 8. G7: Grade 7.

PT: Private tutoring. ISEI: International Socio-Economic Index of Occupational Status.

^aHigh values indicate high test anxiety. ^bHigh values indicate high achievement pressure.

Table A.5

Correlations between tutored students' characteristics in English

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. PT duration																							
2. PT intensity	.16																						
3. Work habits (G8)	-.03																						
4. Self-concept (G8)	-.04	.09																					
5. Test anxiety (G8) ^a	-.08	.08	-.01	-.08																			
6. Achievement pressure (G8) ^b	-.04	.10	.06	.01	.17																		
7. Individual frame of reference	.03	.09	.05	.07	.00	.02																	
8. PT – Internal reasons	-.06	-.07	.10	-.02	.06	.32	.23																
9. PT – External reasons	.02	.14	-.06	-.03	.14	.32	.06	-.08															
10. Change in learning time	-.04	-.05	.02	-.06	.17	.21	.16	.15	.31														
11. Midterm grade	.06	-.04	.20	.37	-.03	.11	-.01	-.09	-.14	-.05													
12. General cognitive abilities	.05	-.11	-.07	-.08	-.15	-.17	-.06	-.08	-.13	-.11	.02												
13. Test score	-.01	-.13	.07	.09	-.14	-.16	.01	-.04	-.14	-.07	.07	.37											
14. Mean test score school level	.02	-.15	.06	-.01	-.12	-.16	.06	-.03	-.14	-.08	-.04	.40	.73										
15. Work habits (G7)	-.03	-.02	.05	.10	-.15	-.04	.01	-.02	-.02	-.09	.03	-.02	.11	.04									
16. Self-concept (G7)	-.05	.01	.22	.37	-.11	-.01	-.12	-.02	-.02	.08	.21	-.07	.22	.01	.21								
17. Test anxiety (G7) ^a	.01	.05	-.02	-.06	.38	.12	.08	.08	.11	.20	.00	-.16	-.15	-.08	-.15	-.13							
18. Academic track	-.00	-.16	.09	-.02	-.15	-.16	-.03	-.02	-.14	-.05	-.06	.44	.62	.84	.07	.01	-.07						
19. Parent(s) qualified for university	-.01	-.06	.11	.05	-.09	-.04	.08	-.03	-.07	-.06	.01	.14	.28	.35	.04	.00	-.09	.33					
20. Parent(s) with university degree	.01	-.06	.09	.01	-.03	-.06	.13	.01	.01	.07	-.02	.14	.30	.34	.06	.00	-.10	.29	.67				
21. One parent born abroad	-.07	.01	.12	.09	.07	.04	.05	.01	.03	.00	.02	-.03	.02	.02	.02	.05	.03	.00	.06	.04			
22. Both parents born abroad	.02	.16	.07	.01	.05	.07	.03	.00	-.04	.06	.04	-.10	-.13	-.14	.04	.07	.10	-.10	-.07	-.09	-.19		
23. Highest ISEI	.04	-.18	.09	-.01	-.05	-.07	.18	-.01	-.07	.01	.04	.18	.28	.34	.00	.00	-.11	.30	.51	.53	.00	-.31	
24. Gender: female	-.05	-.05	.02	-.05	.12	-.11	.25	.13	.17	-.07	.07	.04	.09	.06	-.02	-.04	.21	.08	-.06	-.07	-.01	.04	-.04

Note. Significant correlations are shown in bold ($p \leq .05$). G8: Grade 8, G7: Grade 7.

PT: Private tutoring. International Socio-Economic Index of Occupational Status.

^aHigh values indicate high test anxiety. ^bHigh values indicate high achievement pressure.

Table A.6

Correlations between tutored students' characteristics in German

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. PT duration																							
2. PT intensity	.22																						
3. Work habits (G8)	.06	-.08																					
4. Self-concept (G8)	.03	-.11	.28																				
5. Test anxiety (G8) ^a	-.03	.09	.04	-.02																			
6. Achievement pressure (G8) ^b	.00	.04	-.03	-.03	.14																		
7. Individual frame of reference	-.10	-.24	.23	-.03	-.08	.13																	
8. PT – Internal reasons	-.11	-.05	.11	.07	.10	.43	.33																
9. PT – External reasons	.03	.06	-.10	-.07	.15	.39	.25	.10															
10. Change in learning time	.00	-.10	-.01	.20	.02	.13	-.10	.11	.26														
11. Midterm grade	.05	-.13	.27	.40	-.02	-.16	-.01	-.07	-.16	.17													
12. General cognitive abilities	-.04	-.09	-.03	-.12	-.11	-.15	-.01	-.07	-.13	.01	.17												
13. Test score	-.12	-.05	-.00	.08	-.17	-.23	.05	-.01	-.22	-.06	.24	.43											
14. Mean test score school level	-.11	-.03	.08	-.04	-.15	-.15	.10	-.04	-.11	-.09	.20	.38	.59										
15. Work habits (G7)	-.04	-.08	.12	.15	-.05	-.13	.11	.03	-.14	-.07	.15	-.05	.14	.12									
16. Self-concept (G7)	-.09	-.08	.08	.25	-.04	-.02	.02	.09	-.10	-.10	.16	-.07	.18	.02	.40								
17. Test anxiety (G7) ^a	.06	.11	.05	-.03	.38	.11	.23	.10	.13	.15	-.02	-.15	-.21	-.13	.00	-.04							
18. Academic track	-.18	-.04	.04	-.05	-.15	-.20	-.01	-.02	-.12	-.02	.10	.39	.54	.79	.14	.06	-.11						
19. Parent(s) qualified for university	-.03	.02	.05	.04	-.10	.00	-.06	.01	-.04	-.14	.07	.13	.24	.37	.03	-.02	-.07	.32					
20. Parent(s) with university degree	-.06	.02	.04	-.02	-.02	.01	.02	.05	.03	-.13	.02	.12	.19	.33	.05	-.04	-.03	.30	.69				
21. One parent born abroad	-.04	.01	.03	.07	.06	.07	.08	.03	.03	.13	.01	-.06	-.05	.03	-.04	-.04	.01	.02	.07	.02			
22. Both parents born abroad	.05	.06	-.01	-.02	.01	.04	-.06	.02	-.06	.08	-.04	-.10	-.18	-.20	.04	.04	.09	-.10	-.13	-.09	-.24		
23. Highest ISEI	.01	-.04	.04	.04	-.02	-.02	-.15	.04	-.03	-.21	.12	.14	.24	.34	.01	.04	-.11	.26	.52	.51	-.02	-.30	
24. Gender: female	-.08	-.08	.04	.12	.12	-.08	-.04	.07	-.15	.03	.16	.04	.12	.04	.01	.12	.19	.09	-.05	-.03	.01	-.02	-.03

Note. Significant correlations are shown in bold ($p \leq .05$). G8: Grade 8. G7: Grade 7.

PT: Private tutoring. ISEI: International Socio-Economic Index of Occupational Status.

^aHigh values indicate high test anxiety. ^bHigh values indicate high achievement pressure.

Table A.7

Path model results: The relationship of private tutoring with students' motivational-affective outcomes in English (N = 8,510)

	Work habits (G8)		Self-concept (G8)		Test anxiety (G8)	
	β	SE	β	SE	β	SE
Private tutoring						
PT duration: 0–3 months ^a	.05	.07	.02	.06	.04	.07
PT duration: 4–6 months ^a	.03	.09	–.11	.08	–.09	.09
PT duration: 7–9 months ^a	–.17	.14	–.22	.12	.08	.12
PT duration: > 9 months ^a	.04	.10	–.05	.09	–.15	.09
PT intensity: up to 1hr	–.04	.08	–.11	.07	.03	.08
PT intensity: up to 2hr	–.05	.09	.02	.08	.04	.09
PT intensity: > 2hr	–.07	.13	.02	.10	.10	.12
Covariates						
PT at an earlier time point ^b	–.05	.06	–.08	.07	.03	.07
Midterm grade (G8)	.21	.02	.36	.02	–.04	.02
General cognitive abilities	–.07	.02	–.06	.02	–.06	.02
Test score (G7)	–.03	.02	.08	.02	–.05	.02
Mean test score school level (G7)	.06	.03	.03	.03	.03	.03
Work habits (G7)	.06	.02	.01	.01	–.01	.02
Self-concept (G7)	.22	.02	.31	.02	.01	.02
Test anxiety (G7)	.02	.02	.01	.01	.35	.02
IHR: lower level ^c	–.14	.10	.00	.11	–.01	.11
IHR: intermediate level ^c	–.03	.09	–.06	.12	.04	.12
Intermediate track ^c	–.01	.05	–.05	.07	.08	.07
Comprehensive school: lower level ^c	.06	.06	.04	.08	.10	.06
Comprehensive school: higher level ^c	.14	.06	.03	.07	.09	.06
Academic track ^c	.11	.07	.01	.08	–.02	.08
Parent(s) qualified for university ^d	–.05	.03	–.01	.03	–.01	.05
Parent(s) with university degree ^e	.03	.05	.02	.04	–.02	.04
One parent born abroad ^f	.04	.04	.05	.03	.01	.04
Both parents born abroad ^f	.14	.03	.06	.03	.11	.04
Highest ISEI	.02	.02	.00	.02	–.01	.02
Gender ^g	.01	.03	–.01	.02	.12	.02
R ²	.16		.37		.17	

Note. Significant coefficients are shown in bold ($p \leq .05$). Continuous variables are stdyx- and binary variables are stdy-standardised. Grades are reverse-coded (1 = *fail* to 6 = *very good*). PT: Private tutoring. G8: Grade 8. G7: Grade 7. IHR: Integrated secondary school (*Integrierte Haupt- und Realschule*). ISEI: International Socio-Economic Index of Occupational Status. R²: Coefficient of determination. Reference categories: ^ano current private tutoring. ^bno PT at an earlier time point. ^clower secondary track. ^dboth parents not qualified for university. ^eboth parents without a university degree. ^fboth parents born in Germany. ^gmale.

Table A.8

Path model results: The relationship of private tutoring with students' motivational-affective outcomes in German (N = 8,510)

	Work habits (G8)		Self-concept (G8)		Test anxiety (G8)	
	β	SE	β	SE	β	SE
Private tutoring						
PT duration: 0–3 months ^a	–.06	.06	–.02	.07	.00	.07
PT duration: 4–6 months ^a	.00	.10	–.02	.09	–.04	.11
PT duration: 7–9 months ^a	.12	.10	.03	.14	–.15	.14
PT duration: > 9 months ^a	.03	.12	.09	.12	–.13	.13
PT intensity: up to 1hr	.03	.09	–.07	.09	.10	.10
PT intensity: up to 2hr	–.03	.11	–.11	.11	.17	.13
PT intensity: > 2hr	–.17	.12	–.15	.14	.12	.14
Covariates						
PT at an earlier time point ^b	.05	.08	.00	.09	–.03	.09
Midterm grade (G8)	.27	.02	.33	.02	–.04	.01
General cognitive abilities	–.05	.01	–.07	.02	–.04	.02
Test score (G7)	–.09	.02	.07	.02	–.09	.02
Mean test score school level (G7)	.04	.03	.01	.03	.04	.03
Work habits (G7)	.09	.02	.02	.01	.00	.01
Self-concept (G7)	.10	.02	.26	.01	.02	.01
Test anxiety (G7)	.00	.01	–.02	.02	.35	.02
IHR: lower level ^c	–.08	.10	.02	.08	.00	.11
IHR: intermediate level ^c	.23	.10	–.04	.10	.05	.12
Intermediate track ^c	.17	.05	–.20	.06	.09	.07
Comprehensive school: lower level ^c	.14	.06	–.05	.07	.10	.07
Comprehensive school: higher level ^c	.24	.06	–.12	.07	.09	.07
Academic track ^c	.15	.09	–.15	.09	–.01	.09
Parent(s) qualified for university ^d	–.02	.04	.00	.03	–.01	.05
Parent(s) with university degree ^e	.06	.05	.04	.04	–.03	.04
One parent born abroad ^f	.02	.04	.05	.04	.00	.04
Both parents born abroad ^f	.09	.03	.01	.03	.09	.04
Highest ISEI	.01	.02	–.01	.02	–.01	.02
Gender ^g	–.04	.02	.15	.03	.13	.02
R ²	.12		.28		.18	

Note. Significant coefficients are shown in bold ($p \leq .05$). Continuous variables are stdyx- and binary variables are stdy-standardised. Grades are reverse-coded (1 = *fail* to 6 = *very good*). PT: Private tutoring. G8: Grade 8. G7: Grade 7. IHR: Integrated secondary school (*Integrierte Haupt- und Realschule*). ISEI: International Socio-Economic Index of Occupational Status. R²: Coefficient of determination. Reference categories: ^ano current private tutoring. ^bno PT at an earlier time point. ^clower secondary track. ^dboth parents not qualified for university. ^eboth parents without a university degree. ^fboth parents born in Germany. ^gmale.

Table A.9

Path model results: The relationship of tutors' use of an individual frame of reference and of students' reasons to attend private tutoring with motivational-affective outcomes in mathematics (N = 1,025)

	Interest (G8)		Work habits (G8)		Self-concept (G8)		Test anxiety (G8)		Achievement pressure (G8)	
	β	SE	β	SE	β	SE	β	SE	β	SE
Private tutoring										
PT duration	-.04	.04	-.02	.03	-.02	.03	-.01	.04	-.07	.03
PT intensity	.01	.04	-.03	.04	.07	.04	.02	.04	.01	.03
Tutors' individual frame of reference	-.01	.07	.14	.06	-.06	.06	.03	.06	.08	.05
PT – Internal reasons	.06	.04	.10	.04	.01	.04	.06	.05	.26	.04
PT – External reasons	.02	.04	-.11	.04	.02	.04	.09	.04	.35	.03
Covariates										
Change in learning time	.02	.06	.16	.05	.02	.05	.02	.06	.08	.04
Midterm grade (G8)	.12	.04	.16	.03	.32	.03	.01	.04	-.02	.03
General cognitive abilities	.04	.04	-.09	.04	.09	.03	.01	.04	-.02	.04
Test score (G7)	.04	.05	-.12	.05	.06	.05	-.13	.05	-.03	.06
Mean test score school level (G7)	.00	.09	.10	.07	-.06	.08	.01	.09	.02	.09
Interest (G7)	.22	.04	-.05	.05	.17	.05	.04	.04	.04	.04
Work habits (G7)	.01	.04	.07	.04	.01	.03	-.01	.04	.01	.04
Self-concept (G7)	.17	.04	.03	.05	.14	.05	-.04	.05	.08	.04
Test anxiety (G7)	.03	.04	-.04	.04	-.01	.03	.33	.04	.03	.03
IHR: lower level ^a	.02	.02	-.04	.04	-.01	.04	.00	.04	.04	.04
IHR: intermediate level ^a	-.01	.04	.03	.03	-.03	.03	.01	.04	.02	.02
Intermediate track ^a	-.09	.06	-.04	.06	-.09	.05	.05	.06	.00	.05
Comprehensive school: lower level ^a	-.02	.07	-.03	.07	-.06	.06	.06	.07	.10	.05
Comprehensive school: higher level ^a	-.05	.06	.07	.06	-.10	.06	.08	.06	.05	.05
Academic track ^a	-.21	.12	.00	.11	-.18	.10	.09	.12	-.07	.10
Parent(s) qualified for university ^b	-.01	.04	.04	.05	.02	.04	-.04	.05	.04	.05
Parent(s) with university degree ^c	.01	.05	.01	.05	.01	.04	-.02	.06	-.02	.05
One parent born abroad ^d	-.01	.04	-.02	.04	-.01	.04	-.01	.04	.04	.03
Both parents born abroad ^d	.07	.04	.02	.05	.01	.03	.01	.04	.09	.04
Highest ISEI	.01	.05	-.01	.05	-.04	.04	.04	.04	.02	.04
Gender ^e	-.13	.04	.03	.04	-.17	.04	.08	.04	-.02	.04
R ²	.28		.14		.37		.19		.32	

Note. Significant coefficients are shown in bold ($p \leq .05$). Continuous variables are stdyx- and binary variables are stdy-standardised. Grades are reverse-coded (1 = *fail* to 6 = *very good*). PT: Private tutoring. G8: Grade 8. G7: Grade 7. IHR: Integrated secondary school (Integrierte Haupt- und Realschule). ISEI: International Socio-Economic Index of Occupational Status. R²: Coefficient of determination. Reference categories: ^alower secondary track. ^bboth parents not qualified for university. ^cboth parents without a university degree. ^dboth parents born in Germany. ^emale.

Table A.10

Path model results: The relationship of tutors' use of an individual frame of reference and of students' reasons to attend private tutoring with motivational-affective outcomes in English (N = 693)

	Work habits (G8)		Self-concept (G8)		Test anxiety (G8)		Achievement pressure (G8)	
	β	SE	β	SE	β	SE	β	SE
Private tutoring								
PT duration	-.01	.04	-.04	.04	-.04	.05	-.02	.04
PT intensity	-.04	.07	.05	.06	.05	.06	.08	.05
Tutors' individual frame of reference	.07	.12	.10	.10	-.01	.12	-.01	.12
PT – Internal reasons	.10	.05	-.01	.05	.04	.05	.31	.05
PT – External reasons	-.02	.06	-.02	.06	.02	.07	.23	.06
Covariates								
Change in learning time	-.09	.13	-.07	.11	.14	.11	.16	.11
Midterm grade (G8)	.14	.06	.28	.04	.00	.04	-.03	.04
General cognitive abilities	-.11	.05	-.05	.05	-.05	.05	-.01	.05
Test score (G7)	-.06	.08	.06	.07	-.02	.07	-.04	.09
Mean test score school level (G7)	.01	.09	-.02	.10	-.01	.10	.01	.09
Work habits (G7)	.04	.05	-.02	.06	-.05	.06	-.03	.05
Self-concept (G7)	.21	.05	.33	.05	-.05	.06	-.01	.05
Test anxiety (G7)	-.02	.06	-.01	.05	.30	.05	.03	.05
IHR: intermediate level ^a	.01	.04	.00	.04	-.01	.04	-.02	.05
Intermediate track ^a	-.09	.10	-.08	.08	-.05	.08	-.08	.08
Comprehensive school: lower level ^a	.02	.09	-.02	.09	.03	.09	.02	.07
Comprehensive school: higher level ^a	-.05	.08	-.06	.08	-.01	.08	-.05	.07
Academic track ^a	.07	.14	-.05	.13	-.07	.14	-.11	.12
Parent(s) qualified for university ^b	.01	.07	.05	.07	-.07	.06	.05	.06
Parent(s) with university degree ^c	.01	.07	.04	.07	.02	.07	-.08	.07
One parent born abroad ^d	.05	.05	.02	.05	.05	.05	.10	.04
Both parents born abroad ^d	.05	.06	-.02	.05	.02	.05	.10	.06
Highest ISEI	.03	.07	-.08	.06	.05	.06	.06	.06
Gender ^e	.02	.06	-.06	.05	.06	.05	-.08	.05
R ²	.14		.27		.22		.30	

Note. Significant coefficients are shown in bold ($p \leq .05$). Continuous variables are stdyx- and binary variables are stdy-standardised. Grades are reverse-coded (1 = *fail* to 6 = *very good*). PT: Private tutoring. G8: Grade 8. G7: Grade 7. IHR: Integrated secondary school (*Integrierte Haupt- und Realschule*). ISEI: International Socio-Economic Index of Occupational Status. R²: Coefficient of determination. Reference categories: ^alower secondary track and IHR: lower level. ^bboth parents not qualified for university. ^cboth parents without a university degree. ^dboth parents born in Germany. ^emale.

Table A.11

Path model results: The relationship of tutors' use of an individual frame of reference and of students' reasons to attend private tutoring with motivational-affective outcomes in German (N = 491)

	Work habits (G8)		Self-concept (G8)		Test anxiety (G8)		Achievement pressure (G8)	
	β	SE	β	SE	β	SE	β	SE
Private tutoring								
PT duration	.07	.06	.05	.07	-.05	.07	-.03	.06
PT intensity	-.04	.11	-.08	.13	-.01	.14	.01	.08
Tutors' individual frame of reference	.15	.24	-.01	.29	-.19	.34	-.13	.18
PT – Internal reasons	.09	.09	.07	.11	.13	.13	.43	.07
PT – External reasons	-.14	.11	.08	.14	.10	.17	.36	.10
Covariates								
Change in learning time	.07	.20	-.23	.21	.03	.26	-.04	.16
Midterm grade (G8)	.25	.07	.40	.07	.02	.07	-.06	.06
General cognitive abilities	-.05	.08	-.13	.10	-.06	.12	.00	.07
Test score (G7)	-.18	.09	.16	.11	-.06	.12	-.08	.07
Mean test score school level (G7)	.07	.11	-.08	.13	-.01	.11	.08	.10
Work habits (G7)	.05	.07	-.02	.08	.02	.07	.00	.07
Self-concept (G7)	.04	.08	.17	.09	-.06	.09	-.01	.06
Test anxiety (G7)	.02	.06	.00	.06	.32	.08	.02	.05
IHR: lower level ^a	-.12	.05	.01	.06	.03	.07	.03	.06
IHR: intermediate level ^a	-.03	.06	-.03	.06	.01	.05	-.01	.04
Intermediate track ^a	-.04	.08	-.15	.09	.09	.10	.03	.06
Comprehensive school: lower level ^a	-.01	.09	-.07	.11	.13	.10	.07	.07
Comprehensive school: higher level ^a	-.08	.08	-.10	.11	.15	.09	.07	.07
Academic track ^a	.01	.13	-.12	.16	.04	.13	-.12	.11
Parent(s) qualified for university ^b	.06	.09	.04	.11	-.11	.10	.07	.09
Parent(s) with university degree ^c	-.05	.10	-.06	.10	.07	.09	-.06	.11
One parent born abroad ^d	.00	.09	.03	.10	.03	.14	.04	.07
Both parents born abroad ^d	.03	.08	.02	.09	-.04	.09	.07	.06
Highest ISEI	.02	.09	.01	.09	-.03	.10	.03	.08
Gender ^e	-.05	.06	.03	.08	.10	.07	-.02	.06
R ²	.16		.33		.28		.37	

Note. Significant coefficients are shown in bold ($p \leq .05$). Continuous variables are stdyx- and binary variables are stdy-standardised. Grades are reverse-coded (1 = *fail* to 6 = *very good*). PT: Private tutoring. G8: Grade 8. G7: Grade 7. IHR: Integrated secondary school (*Integrierte Haupt- und Realschule*). ISEI: International Socio-Economic Index of Occupational Status. R²: Coefficient of determination. Reference categories: ^alower secondary track. ^bboth parents not qualified for university. ^cboth parents without a university degree. ^dboth parents born in Germany. ^emale.

5

GENERAL DISCUSSION

On the basis of an adapted offer-use model for supplementary academic support (e.g., Helmke & Weinert, 1997; Seidel, 2014), the present dissertation addressed three research questions. First, drawing on the SDT (Ryan & Deci, 2000), it tested whether the positive effects of high-quality (i.e., needs-oriented) supplementary support can be generalized across contexts. Thus, the quality of supplementary support was tested as a predictor of students' learning outcomes in three commonly used contexts: (1) parental homework assistance, (2) institutional homework assistance, and (3) private tutoring. Second, from a student-directed perspective on development (e.g., Eccles et al., 1993; Nurmi & Silinskas, 2014), it explored the role of students' individual characteristics in the effectiveness of supplementary support. Therefore, on the basis of the offer-use model, it tested whether students' individual characteristics (operationalized here as grade level and reasons for using supplementary support) are preconditions for its effective use. Research on students' grade level is sorely needed because (1) the findings regarding the quality of parental homework assistance have been consistent only for secondary schools (Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020; Moroni et al., 2015) and (2) only few studies investigated whether the support quality and its effects on students' learning outcomes change as students grow older (e.g., Gonida & Cortina, 2014; Núñez et al., 2015). Therefore, the present dissertation investigated whether the relationships in elementary school are similar to those in secondary school and whether homework assistance quality and its effects change across grade levels. Moreover, on the basis of the SDT (Ryan & Deci, 2000), the present work aimed to narrow the gap in research on the role of students' reasons for using supplementary support (e.g., Kuan, 2011). Third, on the basis of transactional theories (Magnusson, 1992; Sameroff, 2009), it explored reciprocal links between students' individual characteristics (operationalized here as academic functioning) and the quality of supplementary support.

In the following, the main results of the three empirical studies are summarized (Section 5.1) and discussed with regards to the three research questions (Section 5.2, Section 5.3, and Section 5.4). After that, theoretical and practical implications are outlined (Section 5.5), before the limitations are presented (Section 5.6) and an outlook for future research is given (Section 5.7). Finally, a general conclusion is drawn from the three empirical studies (Section 5.8).

5.1 Summary of the empirical studies

5.1.1 Study 1: Reciprocal links between the quality of homework assistance and students' academic functioning

Study 1 was concerned with the relationships between support quality and students' learning outcomes as assumed in the offer-use model (see Figure 2) and in the SDT (Ryan & Deci, 2000). The aim of Study 1 was to address the need for research that tests the generalizability of prior findings across contexts and age groups, as well as the need for research on reciprocal links between support quality and students' individual characteristics. Thus, it investigated reciprocal associations between the quality of homework assistance and elementary school students' academic functioning (i.e., their homework behavior and academic achievement) in two contexts: parental homework assistance and institutional (i.e., scholastic) homework assistance. In the parental context, there was a negative reciprocal relationship between parental control and students' mean grades in three subjects (i.e., mathematics, German, and social studies). Moreover, some unidirectional associations were statistically significant. Students' homework procrastination was related with less parental responsiveness and structure. Unexpectedly, parental responsiveness negatively predicted students' test scores in a mathematics test. However, all other links were statistically insignificant (e.g., parental homework assistance did not predict students' homework behavior). In the scholastic homework context, the data only provided evidence for two unidirectional links; control was related with more homework procrastination, and higher mean grades were associated with more responsiveness. Overall, Study 1 provided only partial empirical evidence that support quality and students' academic functioning influence each other; however, the findings were complex and varied across the two contexts, the quality dimensions, and the indicators of students' academic functioning.

5.1.2 Study 2: The role of students' grade level in the effectiveness of parental homework assistance

Study 2 examined the links between students' individual learning preconditions, support quality, and students' learning outcomes as assumed in the offer-use model (see Figure 2). Its aim was to narrow the gap in research on the role that students' individual characteristics play in the effectiveness of supplementary support. Therefore, on the basis of the stage-environment fit theory (Eccles et al., 1993), it examined the role of students' grade level in the links between the quality of parental homework assistance and students' academic functioning in two ways.

First, it investigated whether the quality of parental homework assistance changed from Grades 5 to 9 and whether these changes contributed to declines in students' academic functioning, which often occur during adolescence (Gaspard et al., 2017; Wigfield et al., 2015). Second, it explored whether students' grade level moderated the associations between the quality of parental homework assistance and students' academic functioning. Regarding the first aspect, the data indicated that all three quality dimensions of parental homework assistance (i.e., responsiveness, structure, and control) were less pronounced in higher grades. Depending on the quality dimension, different indirect paths between students' grade level and their academic functioning were found. Students' grade level was indirectly related with more homework procrastination via lower levels of responsiveness and structure and with less homework effort via declines in structure. However, grade level-related declines in parental control were related with less homework procrastination and higher academic achievement. Regarding the second aspect, all three quality dimensions were related with indicators of students' homework behavior, whereas there were no links with mean grades. There was no evidence that students' grade level moderated the relationships between the quality of homework assistance and students' academic functioning. To sum up, Study 2 indicated that students' grade level seems to influence the effectiveness of supplementary support. That is, whereas the quality dimensions seemed to be equally beneficial for or detrimental to students' homework behavior across grade levels, parents seemed to decrease all types of homework assistance over the course of secondary school, which contributed to changes in students' academic functioning.

5.1.3 Study 3: Motivational-affective effects of private tutoring

Study 3 addressed the links between support quality and students' learning outcomes and between students' individual learning preconditions and their learning outcomes as presumed in the adapted offer-use model (see Figure 2). Its aim was to reduce the research gaps (1) on the effects of private tutoring on students' motivational-affective outcomes, (2) on the effects of tutors' support, and (3) on students' reasons for using private tutoring. The data analysis was conducted in two steps. First, Study 3 tested the motivational-affective effects of private tutoring in secondary school students by comparing four motivational-affective outcomes (i.e., interest, self-concept, test anxiety, and work habits) between tutored and nontutored students in three subjects (i.e., mathematics, English, and German). Second, it tested the conditions under which private tutoring could potentially be beneficial for students' motivation and emotions. Therefore, within the group of tutored students, the associations between tutors' support in terms of using an individual frame of reference, students' (internal and external) reasons for

using private tutoring, and students' motivational-affective outcomes were investigated separately in each subject. In this step, students' achievement pressure due to the use of private tutoring was included as an additional outcome. The analyses did not reveal any advantages in terms of improved motivation and emotions for tutored students compared to nontutored students when controlling for students' prior motivation and achievement. However, within the group of students who received private tutoring in mathematics, there were several significant links. First, students experienced less achievement pressure the longer they participated in private tutoring. Second, tutors' use of an individual frame of reference was related with more productive work habits. Third, students' internal reasons for attending private tutoring were related with improved work habits, and students' external reasons were related with less productive work habits and higher test anxiety in mathematics. Finally, one result reached statistical significance in all three subjects: strong internal and external reasons for attending private tutoring were related with higher achievement pressure. Taken together, the data did not suggest that private tutoring can be seen as generally effective in improving students' motivational-affective outcomes. However, tutors' support, students' reasons for using private tutoring, and the subject seem to be factors that play a role in effectiveness of private tutoring for students' motivation and emotions.

In the following sections, the results of the three empirical studies are integrated into the three research questions of the present dissertation.

5.2 RQ1: Is high-quality (i.e., needs-oriented) supplementary academic support positively related with students' learning outcomes across different contexts?

The first research question concerned the links between the quality of supplementary academic support and students' learning outcomes in the adapted offer-use model (see Figure 2). To test whether the importance of high-quality (i.e., needs-oriented as defined by the SDT) support can be generalized across supplementary support contexts, support was tested as a predictor of students' learning outcomes in three contexts in which supplementary academic support is commonly given: parental homework assistance, homework assistance in school, and private tutoring. In Study 1 and Study 2, three quality dimensions that are assumed to be related with students' psychological needs were used to describe the quality of parental and scholastic homework assistance (i.e., responsiveness, structure, and control; Dumont et al., 2014). Study 3 addressed tutors' support in terms of using an individual frame of reference when giving feedback to students. Following the SDT (Ryan & Deci, 2000), this is presumed to make students feel more related, competent, and autonomous (Guill, Lüdtke, & Köller, 2020). In the

following sections, the findings are discussed for each context before a conclusion is drawn for RQ1 in Section 5.2.4.

5.2.1 The quality of parental homework assistance and students' academic functioning

On the basis of the adapted offer-use model and the SDT (Ryan & Deci, 2000), Study 1 and Study 2 tested links between support quality and students' learning outcomes in the context of parental homework assistance. That is, both studies investigated associations between the quality of parental homework assistance and students' academic functioning (i.e., their homework behavior and academic achievement). The pattern of results varied substantially between the two studies. Responsiveness and structure did not predict students' homework behavior in Study 1 (i.e., in elementary school), but it did predict it in Study 2 (i.e., in secondary school). While responsiveness and structure did not predict students' academic achievement in Study 2, there was an unexpected negative link between responsiveness and students' test results in Study 1. In both studies, parental control was related with indicators of academic functioning; in Study 1, control was negatively related with students' mean grades, whereas in Study 2, it was positively related with homework procrastination.

Thus, Studies 1 and 2 provided partial evidence for the links between parental support quality and students' learning outcomes that were expected on the basis of the offer-use model and the SDT (Ryan & Deci, 2000). The lack of positive associations between responsiveness and structure and students' homework behavior in Study 1 were in contrast to the results of several prior studies that reported positive links between high-quality homework assistance and students' homework behavior, for example, it was related with more effort and task persistence, and lower procrastination (Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020; Silinskas & Kikas, 2019). Moreover, the results of Study 1 were in contrast to the results of Study 2 of the present dissertation. The inconsistencies in the results of the two studies may be due to the different sample sizes (i.e., the sample size in Study 1 was relatively small) as well as to the different grade levels (i.e., elementary school in Study 1 vs. secondary school in Study 2). Therefore, they highlight the importance of investigating the role of students' grade level in the effectiveness of supplementary support (see Section 5.3.1).

One consistent finding across Study 1 and Study 2 was that parental responsiveness and structure during homework assistance did not show positive links with students' academic achievement. This finding was in contrast to the assumption derived from the SDT (Ryan & Deci, 2000) that homework assistance that is oriented towards students' psychological needs is beneficial for students' academic achievement. This finding is partially in line with previous

research; although a small number of studies reported positive relationships with achievement (e.g., Moroni et al., 2015; Núñez et al., 2015), other studies did not find that high levels of responsiveness and structure were related with better academic achievement (e.g., Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020; Karbach et al., 2013; Silinskas & Kikas, 2019). Following Xu et al. (2018), one reason for the lack of links with academic achievement found in Study 1 and Study 2 might be that the measurement of responsiveness included two types of support, with differential links to students' achievement: autonomy support (e.g., listening to students' ideas) and content support (e.g., helping if students' struggle with their homework). Xu et al. (2018) found that autonomy support was positively related with students' achievement, whereas content support was negatively associated with it. This might explain why responsiveness was either unrelated or, in the case of Study 1, negatively related with students' academic achievement. Therefore, future frameworks should include differentiations between content support and autonomy support, as suggested by prior studies (Xu et al., 2018; Xu et al., 2017).

Both Study 1 and Study 2 provided evidence for the negative links between low-quality (i.e., controlling) support and students' learning outcomes that were assumed on the basis of the offer-use model and the SDT (Ryan & Deci, 2000). However, the findings of the two studies differed in which outcome was predicted by parental homework control. In Study 1, parental control was negatively linked with academic achievement, while there were no links with homework behavior. In contrast, parental control negatively predicted students' homework behavior in Study 2. However, there were no links with students' academic achievement in Study 2, which was in contrast to the results of many prior studies (Dumont et al., 2012; Karbach et al., 2013; Núñez et al., 2015; Silinskas & Kikas, 2019). However, methodological factors may have contributed to this lack of findings because the sample of Study 2 consisted mainly of students from academic tracks and the perceived mean level of control was low (i.e., $M = 1.34$ on a scale from 1 to 4), which might have made it less likely to find significant results. Moreover, Study 2 was conducted on the basis of cross-sectional data and it is conceivable that parental control unfolds its negative effects only over the course of time. Therefore, longitudinal research is still needed.

In summary, only some of the links between the quality of parental homework assistance and students' academic functioning that were expected on the basis of the offer-use model and the SDT (Ryan & Deci, 2000) were statistically significant; Study 1 and Study 2 only provided partial evidence for the importance of high-quality (i.e., needs-oriented) support in the context of parental homework assistance. More specifically, the results suggest differential associations

between the quality dimensions and students' outcomes rather than suggesting that the quality dimensions are equally important for all indicators of academic functioning. That is, high-quality forms of homework assistance seem to be mainly important for students' homework behavior, whereas low-quality (i.e., controlling) homework assistance might be more generally detrimental to students' learning outcomes. Moreover, the inconsistencies in the results of Study 1 and Study 2 suggest that findings on high-quality homework assistance cannot be simply generalized from secondary to elementary school. Therefore, students' grade level may be an important moderator in the effectiveness of supplementary support (see Section 5.3.1 for a discussion).

5.2.2 The quality of institutional homework assistance and students' academic functioning

In addition to the parental context, Study 1 investigated relationships between support quality and students' learning outcomes in the context of institutional (i.e., scholastic) homework assistance. For this, the framework of parental homework assistance quality (Dumont et al., 2014) was applied to scholastic homework assistance. In the scholastic context, there was only limited evidence for relationships between the three quality dimensions and students' academic functioning. In fact, responsiveness and structure did not predict any of the indicators of students' academic functioning. Only control was related with more homework procrastination, but it was unrelated with homework effort and academic achievement.

Therefore, in the scholastic context, the findings only minimally supported the links between support quality and students' learning outcomes that were assumed on the basis of the offer-use model and the SDT (Ryan & Deci, 2000). The lack of findings between responsiveness and structure and students' academic functioning was in contrast to previous findings on parents' and tutors' homework assistance (Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020; Nurmi & Silinskas, 2014; Silinskas & Kikas, 2019). These inconsistencies may be due to the small sample of students who received scholastic homework assistance or to the characteristics of scholastic homework assistance. For instance, the group context in which institutional homework assistance usually takes place might make it harder to provide a structure that allows students to quietly and effectively do their homework. Indeed, in Study 1, students rated the structure to be significantly lower in the scholastic than in the parental context. Moreover, due to the heterogeneous qualifications of institutional homework assistants (Stecher et al., 2007), the assistants might differ in how well they can deal with the heterogeneity of students, for example, in terms of their socioeconomic background. This might influence the effectiveness of scholastic homework assistance because prior research has shown

that composition effects regarding students' family background affect the perceived usefulness of supplementary activities (Stecher et al., 2007).

The finding that control in institutional homework assistance was related with more procrastination provides limited empirical support for the assumption made in the offer-use model that low-quality (i.e., controlling) support can be detrimental to students' learning outcomes. However, control was not related with lower academic achievement, which is in contrast to the results of prior research in the parental homework context (Dumont et al., 2012; Núñez et al., 2015). It is possible that control in scholastic homework assistance is only detrimental to outcomes that are closely related to homework (i.e., homework behavior) because interactions in this context are limited to the homework process, whereas parental homework control might be part of a generally autonomy-restricting parenting style that might have a broader impact on students (i.e., might influence both homework behavior and academic achievement). Moreover, because of the group context, the individual student might experience less control in the institutional context than in the parental context (Guill, Bahr, & Ömeroğulları, 2020). Nonetheless, it is possible that control in institutional homework assistance is detrimental to the achievement of some groups of students, for example, for low-achieving students. Indeed, prior research has shown that control was even more harmful for low-achieving students (Ng et al., 2004).

In general, the quality dimensions might be less consistently related with students' learning outcomes than assumed because there is a large heterogeneity in the general characteristics of scholastic homework assistance; this should be explored in future studies. For instance, homework assistance in institutional contexts is provided by staff with different qualification backgrounds (Stecher et al., 2007). Therefore, the pedagogical staff is likely to differ in their knowledge about needs-oriented support. Moreover, because participation in scholastic homework assistance is usually voluntary, students are likely to differ in their participation intensity and in the extent to which they receive scholastic homework assistance in addition to parental homework assistance. Indeed, there is evidence that students perceive supplementary support as more useful if they participate frequently (Stecher et al., 2007). Therefore, future research should focus on students who predominantly receive institutional homework assistance, as well as on test interaction effects between intensity and support quality or control on the quality of parental homework assistance.

Taken together, Study 1 only minimally supported the links between the quality of scholastic homework assistance and students' academic functioning that were assumed on the basis of the offer-use model (Helmke & Weinert, 1997; Seidel, 2014) and the SDT (Ryan &

Deci, 2000). That is, out of many expected links, only the association between control and students' homework procrastination was statistically significant. The lack of significant links may be due to the small sample of students who received institutional homework assistance or to the large heterogeneity in scholastic homework assistance (e.g., in terms of group size, composition, qualification of the tutor). Thus, because research on the quality of institutional homework assistance is still at the beginning, more longitudinal research with large samples is needed, which would make it possible to test whether variables such as group size, composition, participation intensity, and staff qualifications moderate the effectiveness of institutional homework assistance.

5.2.3 Tutors' individual frame of reference and students' motivational-affective outcomes

On the basis of the offer-use model and the SDT (Ryan & Deci, 2000), Study 3 tested the assumed links between support quality and students' academic functioning in the context of private tutoring. The support quality of private tutoring was addressed by testing associations between tutors' support in terms of using an individual frame of reference and students' motivational-affective outcomes (i.e., interest, self-concept, test anxiety, work habits, and achievement pressure) in three subjects, namely, mathematics, English, and German. Guill, Lüdtke, and Köller (2020) noted that through the promotion of students' psychological needs (Ryan & Deci, 2000), tutors' support might be beneficial for students' motivation and emotions. However, Study 3 found only one significant link, namely, tutors' use of an individual frame of reference was positively related with students' work habits in mathematics, whereas this effect was not found in English and German. Moreover, there were no associations between tutors' use of an individual frame of reference and the other motivational-affective outcomes (i.e., interest, self-concept, test anxiety, and achievement pressure), regardless of the subject.

The inconsistent effects of tutors' use of an individual frame of reference across subjects may be potentially due to methodological reasons (e.g., higher rates of missing values in English and German). However, it is also possible that tutors' use of an individual frame of reference may affect students' work habits in a domain-specific way. For example, the use of an individual frame of reference may be more effective in subjects in which students are often confronted with social comparisons.

The lack of significant links between tutors' use of an individual frame of reference and the other motivational-affective outcomes (i.e., interest, self-concept, test anxiety, and achievement pressure) was in contrast to the results of prior studies that reported positive associations between teachers' use of an individual frame of reference and students'

motivational-affective outcomes (e.g., self-concept and joy in learning; Jerusalem & Pekrun, 1999; Lüdtke & Köller, 2002). However, in the study by Lüdtke and Köller (2002), a positive effect on students' self-concept was found only on the class level and not on the individual level, thereby indicating that the use of an individual frame of reference in a one-on-one context might be less beneficial than in a group context. Thus, future research should explore other forms of tutors' support that may be more suitable for a one-on-one context. For example, it would be worthwhile to test whether teachers' behavior, which has been found to be beneficial for students' motivation, is equally effective in private tutoring (e.g., sensitivity: Aldrup et al., 2020; e.g., social support: Aldrup et al., 2018; e.g., close communication: Jansen et al., 2022; e.g., student-centered feedback: Panadero & Lipnevich, 2022).

In brief, Study 3 only provided limited and domain-specific evidence that the support quality of private tutoring is positively related with students' learning outcomes. That is, an individual frame of reference was only positively related with students' work habits in mathematics. However, because the study included only one facet of tutors' support, more research is needed that explores the links between different types of tutors' support and students' learning outcomes.

5.2.4 Summary of the results concerning RQ1

Drawing on the offer-use model (e.g., Helmke & Weinert, 1997; Seidel, 2014) and the SDT (Ryan & Deci, 2000), the first aim of the present dissertation was to test whether the positive effects of high-quality (i.e., needs-oriented) supplementary support can be generalized across contexts. However, the three studies only partially supported the assumed links between support quality and students' learning outcomes. Moreover, the strength of the associations varied across the three contexts.

Two patterns of results were evident across supplementary support contexts. First, supplementary support that can be presumed to promote students' psychological needs was positively related with students' learning behavior (i.e., homework behavior and work habits in regular classes) in Study 2 and Study 3. Second, low-quality (i.e., controlling) support was negatively related with students' learning outcomes in Study 1 and Study 2. The otherwise inconsistent findings across contexts highlight the importance of considering the context in which the supplementary support is given and the general characteristics of the supplementary support (e.g., group size, composition, participation, frequency, or qualifications of the supporting person). Therefore, although prior studies did not find that the general characteristics of supplementary support played a major role in its effectiveness (Guill et al., 2021; Moroni et

al., 2015; Ömeroğulları et al., 2020), it is conceivable that these characteristics moderate the effects of the quality of the supplementary support. For example, positive effects of responsiveness and structure in scholastic homework assistance may occur if students participate frequently. Thus, in future studies, it may be worthwhile to explore interaction effects between general characteristics and support quality. Moreover, the largely inconsistent effects of parental homework assistance found in Study 1 and Study 2 highlight the importance of considering students' individual characteristics (e.g., their grade level) when examining the effectiveness of supplementary support; this is discussed in the next section.

5.3 RQ2: Do students' grade level and their reasons for using supplementary support influence the effectiveness of supplementary support?

Because the offer-use model (e.g., Helmke & Weinert, 1997; Seidel, 2014) and student-directed perspectives emphasize that students are active and developing agents in their education (e.g., Dumont et al., 2014; Nurmi & Silinskas, 2014), the second research question investigated whether students' individual characteristics (operationalized here as their grade level and their reasons for using supplementary support) are preconditions for the effective use of supplementary support. On the basis of the SDT (Ryan & Deci, 2000), Study 1 tested whether the relationships between parental homework assistance and students' academic functioning in elementary school are similar to those that prior studies found in secondary school (e.g., Dumont et al., 2014). Following the stage-environment fit theory (Eccles et al., 1993), Study 2 explored whether the quality of homework assistance and its effects change during secondary school. The results of both studies concerning students' grade level are discussed in Section 5.3.1. Moreover, drawing on the SDT (Ryan & Deci, 2000), Study 3 addressed the importance of autonomous choices for students' motivation by exploring students' internal and external reasons for using private tutoring, which is discussed in Section 5.3.2. After that, a general conclusion concerning RQ2 is drawn in Section 5.3.3.

5.3.1 The role of students' grade level in the effectiveness of supplementary support

In Study 1 (i.e., in elementary school), several of the expected links between homework assistance quality and students' academic functioning failed to reach statistical significance. First, none of the three quality dimensions (i.e., responsiveness, structure, and control) predicted students' homework behavior. This lack of findings is in line with a multigroup analysis by Núñez et al. (2015), which did not yield significant links between homework assistance quality and students' homework behavior in elementary school. There is a possibility that elementary

school students generally put more effort into their homework and procrastinate less because they are usually more intrinsically motivated and have more positive attitudes towards their school work (Eccles et al., 1993; Hoover-Dempsey & Sandler, 1995). Thus, their homework behavior may depend less on high-quality homework assistance.

However, two links were found between the quality of parental homework assistance and students' academic achievement. First, there was an unexpected negative association between parental responsiveness and students' test results. It is possible that high levels of content support (Xu et al., 2018), which was one aspect of the measurement of responsiveness, may deprive student of important learning opportunities. Thereby, strong content support may hinder the development of students' abilities. Second, in line with the SDT (Ryan & Deci, 2000) and prior studies, there was a negative link between parental control and students' mean grades.

In brief, in elementary school, the quality of homework assistance predicted students' academic achievement but not their homework behavior. This is interesting because Trautwein et al. (2006) suggested that students' homework behavior mediates the links between the quality of homework assistance and students' academic achievement. However, Núñez et al. (2015) reported empirical support for this link only in secondary school and not in elementary school. Therefore, it is possible that, in elementary school, other variables explain the link between the quality of supplementary support and students' academic achievement. For example, as described above, cognitive processes may mediate the links between support quality and students' academic achievement in elementary school. Taken together, the results of Study 1 suggest that the effects of parental homework assistance in elementary school differ from those in secondary school (e.g., Guill, Bahr, & Ömeroğulları, 2020; Trautwein et al., 2006).

Study 2 followed up on Study 1 by investigating changes in the quality and the effects of parental homework assistance in secondary school. It pursued two goals: First, it tested whether the quality of parental homework assistance changed across grade levels in secondary school and whether these changes contributed to changes in students' academic functioning, which often occur during secondary school (e.g., Gaspard et al., 2017; Scherrer & Preckel, 2019). Second, it tested whether students' grade level moderated the effects of the quality of homework assistance on students' academic functioning.

Study 2 showed that parents reduced all three types of homework assistance as their children moved through secondary school. These changes in the quality of parental homework assistance contributed to grade-related changes in students' homework behavior and achievement. Whereas decreases in parental responsiveness and structure over the course of secondary school were related to less favorable homework behavior and lower achievement,

declines in parental control were indirectly linked with less procrastination and higher achievement. However, students' grade level did not moderate the links between the quality of parental homework assistance and students' academic functioning; parents being responsive and providing structure during homework assistance was similarly effective for students in Grades 5 to 9, whereas controlling behavior was comparably detrimental.

In brief, the results of Study 2 imply that the quality dimensions of parental homework assistance do not become more beneficial for or detrimental to students' academic functioning as students grow older. Therefore, the lack of interaction effects found between students' grade level and the quality of homework assistance highlights the generalizability of the three quality dimensions derived from the SDT across grade levels within secondary school (Ryan & Deci, 2000). This finding is in line with some studies that reported consistent effects of parental behavior on students' learning outcomes across grade levels (Gonida & Cortina, 2014; Pinquart, 2016). Rather, the results suggest that students' grade level is a relevant student characteristic in the context of parental homework assistance because grade level-related differences in the quality of homework assistance contributed to changes in students' academic functioning. These findings were partially in line with the stage-environment fit theory, which presumes that students often experience difficulties in secondary school because their educational environment does not fit their developmental needs (Eccles et al., 1993). Whereas the results imply that declines in responsiveness and structure may have negative consequences for students' academic functioning, declines in parental control, in contrast, may buffer negative developments in students' academic functioning during secondary school.

It is important to consider that the measurements of the quality of homework assistance relied solely on students' self-reports. Therefore, it is possible that the reported differences in the quality dimensions also resulted from developmental changes in students' perceptions of their parents' behavior and not only from actual changes in their parents' behavior. Additionally, the quality dimension of control only captures students' perceptions of their need for autonomy being frustrated and not the actual support of students' experience of autonomy. Thus, in future studies, it would be interesting to test whether parents practice more active autonomy support as their children grow older, for example, joint decision making, open exchange, and providing rationales for demands and limits (Dettmers et al., 2020). Moreover, the present dissertation and some prior studies indicated that the effects of homework assistance may differ between elementary and secondary school (Núñez et al., 2015; Patall et al., 2008). Therefore, in future research, it would be worthwhile to test changes in the quality and effects of homework assistance over longer periods of time (e.g., from elementary to secondary

school). Finally, because Study 2 relied on cross-sectional data, research on the basis of longitudinal data is still needed.

Overall, in line with student-directed perspectives that emphasize that students are active and developing agents in their education (e.g., Eccles et al., 1993; Numi & Silinskas, 2014), Study 1 and Study 2 indicate that students' grade level is an important learning precondition for effective supplementary support. That is, relationships between homework assistance and students' academic functioning may differ between elementary and secondary school. Moreover, while secondary school students from different grade levels seem to benefit similarly from parental homework assistance, the quality of this assistance (or students' perception of it) seems to change over the years. According to the results of Study 2, this may have implications for the development of students' academic functioning over the course of secondary school. However, longitudinal research with other types of measurements and a greater range of grade levels is needed to verify these findings. Moreover, future studies should address the role that students' grade level plays in the effectiveness of other supplementary support contexts (i.e., institutional homework assistance or private tutoring).

5.3.2 The role of students' reasons for using private tutoring in its effectiveness

Study 3 tested whether students' reasons for using supplementary support are relevant preconditions for the effective use of supplementary support. Therefore, on the basis of longitudinal data, it investigated whether students' internal and external reasons for using private tutoring predicted tutored students' motivational-affective outcomes (i.e., interest, self-concept, test anxiety, work habits, and achievement pressure due to private tutoring) when controlling for prior values. Study 3 did not find that students' reasons for using private tutoring were related with students' interest and self-concept. However, students who received tutoring in mathematics and had strong internal reasons for using it reported more positive work habits in regular mathematics classes than tutored students with weak internal reasons. In contrast, students who received tutoring in mathematics and had strong external reasons reported less positive work habits and more test anxiety. Whereas these findings could not be replicated in English and German, two findings occurred in all three subjects: Both students' internal and external reasons for using private tutoring were related with higher levels of achievement pressure in students due to the use of private tutoring.

Overall, the findings of Study 3 only partially supported the assumption that students' reasons for using supplementary support are a relevant precondition for its effective use that was assumed on the basis of the offer-use model (e.g., Helmke & Weinert, 1997; Seidel, 2014)

and the SDT (Ryan & Deci, 2000). The finding that there were no associations between students' internal and external reasons for using private tutoring and the most proximal motivational outcomes, namely, interest and self-concept, was unexpected. Arguably, making the autonomous decision to participate in supplementary support may not be enough to make it beneficial for students' interest and self-concept. For instance, students with low interest in a school subject may need specific support in order to find the subject more interesting. One factor that has been shown to be relevant for the development of students' interest is teachers' enthusiasm (Lazarides et al., 2018), which would be interesting to explore in future studies in the context of supplementary support. Regarding students' academic self-concept, it is possible that private tutoring only leads to an improvement if it contributes to enhanced academic achievement. Because there is theoretical and empirical support for reciprocal associations between students' self-concept and academic achievement (Arens et al., 2021; Jiang et al., 2020; Marsh, 1990; Marsh & Martin, 2011), future studies could explore how both variables influence each other via the use of supplementary support.

However, the findings suggest that students' internal and external reasons for using private tutoring are relevant preconditions for the development of specific learning outcomes. The differential effects of internal and external reasons on students' work habits suggest that students' learning behavior can benefit from supplementary support if it is initiated in a way that supports students' autonomy, for example, by promoting students' decision making (Grolnick & Pomerantz, 2022; Ryan & Deci, 2017). Despite the relevance of these findings, it must be noted that they were only obtained in mathematics. The only finding that occurred in all three subjects was that students with higher internal and external reasons for using private tutoring reported more achievement pressure. This may be the case because the measurements not only capture whether students or others made the decision to use private tutoring; they may also capture the reasons behind the decision. For instance, it may be very urgent to get help from a private tutor when a student's transfer to the next grade level is at risk. In this case, the use of private tutoring may be related with increased achievement pressure, regardless of whether students themselves or their parents make the decision to use private tutoring.

Taken together, Study 3 suggests that students' reasons for using supplementary support may be a precondition for the effective use of private tutoring, but only for specific outcomes and predominantly in mathematics. However, more research is needed to verify these findings and to explore other (subject-specific) preconditions for the effective use of supplementary support.

5.3.3 Summary of the results concerning RQ2

The second aim of the present dissertation was to test whether students' individual characteristics (operationalized here as their grade level and their reasons for using supplementary support) are preconditions for the effective use of supplementary support. On the basis of the adapted offer-use model and student-directed perspectives on development (e.g., Eccles et al., 1993; Nurmi & Silinskas, 2014), it was assumed that students' grade level and their reasons for using supplementary support influence its effectiveness. The three studies offered empirical support for the assumed associations, although some of the evidence was limited to specific outcomes and specific subjects. Nevertheless, the results suggested two ways in which students' individual characteristics influence the effectiveness of supplementary support. First, Study 1 and Study 2 indicated that students' grade level might be a relevant student characteristic for the effectiveness of supplementary support. Second, students' reasons for using supplementary support seemed to play a (domain-specific) role in its effectiveness; however, only for specific outcomes. Future studies should verify these first findings and address the role of students' grade level in other supplementary support contexts.

5.4 RQ3: Are there reciprocal relationships between the quality of supplementary support and students' individual characteristics?

Following the adapted offer-use model and transactional theories of development (Magnusson, 1992; Sameroff, 2009), the third research question regarded reciprocal relationships between the quality of supplementary support and students' individual characteristics (operationalized here as their academic functioning). Study 1 addressed reciprocal links in two supplementary academic support contexts, namely, parental and scholastic homework assistance. On the basis of theories that link students' achievement, behavior, and motivation to the quality of parental involvement (e.g., Grolnick, 2003; Nurmi & Silinskas, 2014), it investigated reciprocal links between the quality of homework assistance and students' academic functioning (i.e., their academic achievement and homework behavior).

In the context of parental homework assistance, students perceived less responsiveness and structure when they reported that they procrastinated a lot when doing their homework, but this link was not reciprocal because responsiveness and structure did not predict students' homework behavior (see Section 5.2.1). Moreover, although parental responsiveness negatively predicted students' test results (see Section 5.2.1), there were no reciprocal links between students' academic achievement and the high-quality forms of parental homework assistance.

However, there was a reciprocal negative link between parental control and students' academic achievement. In the institutional context, there were no reciprocal relationships between homework assistance quality and students' academic functioning. Nevertheless, in addition to the finding that control predicted homework procrastination (see Section 5.2.2), responsiveness was negatively predicted by students' mean grades.

Overall, the evidence for reciprocal links between support quality and students' individual characteristics in terms of their academic functioning was rather weak and varied across the two contexts. While in the parental context, the assumptions of the offer-use model and transactional theories (e.g., Sameroff, 2009) were partially supported, the results in the institutional context were only minimally in line with the assumption that students and their environment mutually influence each other. In the parental context, there was a unidirectional link from students' homework procrastination to responsiveness and structure. This result was only partially in line with the findings of Dumont et al. (2014), who found reciprocal links between high-quality homework assistance and students' homework behavior. As discussed in Section 5.2.1, it is possible that high-quality homework assistance does not predict students' homework behavior in elementary school, whereas students' homework behavior seems to be a relevant predictor of responsiveness and structure. In contrast, in the institutional context, responsiveness was predicted by students' mean grades. These inconsistencies in the results between the two homework contexts may result from the low sample size in the scholastic context. However, it is also possible that parents and scholastic homework assistants are influenced by different indicators of students' academic functioning. Parents might have a higher sense of gratification when they observe productive homework behavior in their children and might, in turn, be more inclined to put effort into supporting their children with their homework (Atlay et al., 2019). In the institutional context, it is possible that high-quality homework assistance is influenced by homework behavior at the group level more than at the individual level. If a group of students has unfavorable mean homework behavior (e.g., high mean levels of procrastination), this might require a lot of classroom management (e.g., Klieme et al., 2001) and might mean that the staff has less time to be responsive to each student. Therefore, there may be no links between students' homework behavior and high-quality homework assistance at the individual level. However, students with higher mean grades may receive more responsiveness because they may generally be more adjusted and may have better skills to ask homework assistants for help in an appropriate way. Another possible explanation is that they might have more positive attitudes towards homework and, thus, rate their homework assistance as more positive.

Low-quality (i.e., controlling) homework assistance was reciprocally related with students' homework behavior in the parental context, whereas none of the indicators of academic functioning predicted control in the scholastic context. It is conceivable that low academic achievement over long periods of time evokes frustration and concern in parents and, thus, they might feel pressure to intervene (Dumont et al., 2014; Grolnick, 2003; Núñez et al., 2017). As a reaction, parents might increase controlling behavior because they might not be aware either of its detrimental effects or of productive and autonomy-supportive alternatives. In contrast, it is possible that professional homework assistants tend less to exhibit controlling behavior because, due to their (at least semi-) professional background, they might be aware of the detrimental effects of controlling behavior. Moreover, low academic achievement might not evoke as much pressure and controlling behavior in them as in parents because they are less personally involved in students' school careers. As the sample of students with institutional homework assistance in Study 1 was small, these findings need to be interpreted with caution, and more research is needed to verify this result.

Taken together, Study 1 only provided partial and context-specific support for the assumption that supplementary support quality and students' individual characteristics are reciprocally related. In the parental context, students' homework behavior predicted high-quality homework assistance, whereas their academic achievement was reciprocally related with low-quality (i.e., controlling) assistance. In the institutional context, students' mean grades positively predicted responsiveness. The inconsistency in the results may be due to differences in the sample size or due to specific aspects of each context (e.g., one-on-one homework in the parental context vs. group contexts in the scholastic context). Therefore, future studies based on larger samples should verify these findings and explore the role of context-specific characteristics.

In the following, the general implications of the three studies are discussed (Section 5.5). After that, the limitations of the present dissertation are presented in Section 5.6, before an outlook for future research is given in Section 5.7. Finally, a general conclusion is drawn in Section 5.8.

5.5 Theoretical and practical implications

5.5.1 Theoretical implications

Several theoretical implications can be derived from the present work. Overall, the present dissertation empirically supports the assumption of the offer-use model that (1) support quality

and (2) students' individual characteristics play a role in the effectiveness of supplementary academic support. Regarding the quality of supplementary support, the results partially underpin the theoretical assumption derived from the SDT that supplementary support can be beneficial for students' learning outcomes if it provides support for students' psychological needs (Ryan & Deci, 2000). However, the findings varied strongly across indicators of support quality, learning outcomes, and supplementary support contexts. Thus, in theoretical frameworks of support quality, it may be worthwhile to consider differential effects of the quality dimensions on students' outcomes. For instance, high-quality support seems to be more strongly related with students' learning behavior, whereas low-quality support seems to be detrimental across outcomes. Moreover, because the findings varied across supplementary support contexts, they emphasize the importance of differentiating between contexts, as suggested in the offer-use model (e.g., Seidel, 2014).

Concerning students' individual characteristics, the present dissertation provides overall support for the assumption derived from student-directed perspectives that students are active and developing agents in the supplementary support they receive (e.g., Eccles et al., 1993; Nurmi & Silinskas, 2014; Sameroff, 2009). Thus, it can be generally recommended that student-directed perspectives should be included in theoretical concepts on effective supplementary support. However, the strength of the associations differed across indicators of students' individual characteristics, indicators of support quality, and supplementary support contexts. Therefore, it may be valuable to consider that students' characteristics do not equally influence all facets of support quality. For example, students' unproductive learning behavior seems to reduce high-quality parental homework assistance, whereas low academic achievement seems to evoke controlling behavior in parents. Moreover, the findings also suggest that the strength of students' impact on their environment may be context-specific.

5.5.2 Practical implications

Although the present dissertation does not provide enough evidence to assume that support quality influences students' learning outcomes equally across the three supplementary support contexts, in each context, specific forms of support behavior can be recommended to promote students' academic development (e.g., responsiveness, structure, or using an individual frame of reference). For students to benefit from these types of support, educators in supplementary academic support contexts need to be informed about the benefits of such support. This is particularly important because parents, as well as homework assistants in schools or private tutors, vary in their knowledge about the benefits of needs-oriented behavior. Therefore, it

would be a promising approach to offer training, interventions, online programs, or information events on this topic in schools. Indeed, Patall et al. (2008) as well as Wild and Gerber (2009) reported encouraging effects of trainings on effective homework assistance. Importantly, educators who are involved in supplementary support need to be motivated to use such training programs. For instance, it is probable that parents will be more likely to use these opportunities and be receptive to guidance on effective homework assistance if the school climate is positive and if the school-family communication is appreciative and effective (Grolnick & Pomerantz, 2022). Indeed, Dettmers et al. (2020) found that the quality of homework assistance was higher if parents reported effective school-family communication. Moreover, such training should be designed and communicated in ways that encourage families from different backgrounds to participate, for example, through online courses that offer different language options. Similarly, incentives should be found to motivate homework assistants in schools and private tutors to use training programs. For instance, a certain number of hours spent on additional training could be recommended by schools or private tutoring institutes.

Regarding the content of training on effective supplementary support, it should include information on the benefits of needs-oriented support and the risks of autonomy-restricting behavior. However, the limitations of the different forms of support should also be communicated in order to avoid false expectations. For instance, parents might be frustrated if they put a lot of effort into providing more effective homework assistance and this does not lead to immediate improvements in their children's academic achievement. Thus, they should be informed that high-quality homework assistance is more likely to influence students' homework behavior, which might lead to improved achievement in the future. Moreover, training should include information about the role that students' individual characteristics play in effective supplementary support. That is, educators should be reminded that students play an active role in the supplementary support they receive. For example, training could be used to sensitize educators to the importance of maintaining high-quality support when students have low academic achievement or obtain higher grades.

Although training programs and workshops on effective supplementary support may be a promising approach to improve specific student outcomes (e.g., learning behavior), the present dissertation suggests that the effects on some variables may be limited, for example, motivation. If it is the aim of supplementary support to promote these variables, it may be more promising to use standardized interventions, which have been shown to have positive effects on motivation (e.g., the "Motivation in Mathematics" intervention; Gaspard et al., 2015).

5.6 Limitations

Some general limitations need to be considered when interpreting the finding of the present dissertation. First, with the exception of the mathematics test in Study 1, all instruments were student self-reports. From an SDT perspective (Ryan & Deci, 2000), the use of students' self-reports in measuring the quality of supplementary support is justified because it is likely that students' own perception of their support is most meaningful for the fulfillment of their psychological needs (Dumont et al., 2014). However, a meta-analysis by Hou et al. (2020) showed that children's and parents' perceptions of parenting often diverge considerably and that parents perceive their parenting as more positive than their children do. While it is possible that some parents overestimate their parenting skills, some students may also assess their parents' behavior as more negative than it actually is as an attempt to gain autonomy from their parents, for example, during adolescence. Therefore, students' reports on their parents' behavior may also be influenced by developmental phases, which may have an impact on the validity of the measurement (see Section 5.7 for ideas on how to deal with this issue in future studies).

Second, in the present dissertation, it was not possible to test the theoretical assumption that the associations between support quality and students' learning outcomes are mediated by support for students' psychological needs for autonomy, competence, and social relatedness. Although the indicators of support quality included in the present dissertation have a strong theoretical foundation, it is possible that they might not always relate to students' needs as expected. Therefore, more research should follow that of Dettmers et al. (2020) and directly test whether support quality is related with support for students' basic psychological needs.

Third, although the studies of the present dissertation included students in different grade levels, the single studies were limited to one grade or to one stage of schooling (elementary or secondary school). Moreover, it was only possible to explore the role of students' grade level in the parental homework context, whereas the samples for scholastic homework assistance and private tutoring were limited to one grade level. Thus, to test more comprehensively whether the quality and effectiveness of supplementary support change as students grow older, it would be important to include students from a wider range of grade levels and data from more supplementary support contexts.

5.7 Future research

The present dissertation offers several ideas for future research. Most importantly, future studies should go beyond the use of student self-reports and include additional measurements in order to receive a more comprehensive picture of the quality and outcomes of supplementary support and to reduce same-rater biases. To measure support quality, it would be informative to include educators' ratings of their support quality or to conduct observations or recordings of interactions during supplementary support (e.g., Hyde et al., 2006). In addition, using alternative approaches might be promising in the measurement of students' learning behavior. For example, trace data retrieved from digital homework programs or other learning programs could be used to measure students' learning behavior as an outcome of supplementary support (e.g., homework completion or practice behavior in digital learning programs; Baker & Inventado, 2014; Hilz et al., 2023). Moreover, on the basis of the situated expectancy-value theory (SEVT; Wigfield & Eccles, 2020), future research could include situative and intraindividual measurements of students' experience during supplementary support because students' might experience support for their needs in some situations, while they might feel unsupported in other situations. To achieve this, experience sampling (i.e., repeated measures) is a promising approach to gain insights into students' in situ experiences during supplementary support. For example, in the context of homework diaries, it would be possible to test which types of behavior predict situative changes in the extent to which students feel supported, thereby going beyond the prediction of mean values across students (e.g., Parrisius et al., 2022).

Second, on the basis of the offer-use model (e.g., Helmke & Weinert, 1997; Seidel, 2014), future studies should explore interactions between students' individual characteristics and support quality. For example, structure during homework assistance may be needed less by students who are already highly self-regulated and might therefore prefer to do their homework on their own. However, for other students who have self-regulatory difficulties during homework, responsiveness and structure may be particularly important.

Third, because most of the prior research and the present dissertation focused on students' motivation as the mediator in the link between support quality and students' learning outcomes, future studies should address other mediators, for example, cognitive activation. This is particularly important because the findings of this dissertation suggest that the mediators in the relationships between support quality and students' academic functioning may differ between elementary and secondary school. For example, future studies could explore whether educators' characteristics (e.g., pedagogical or content knowledge; Baumert et al., 2010) or educators'

behavior (e.g., challenging questions: Praetorius et al., 2018) predict positive outcomes of supplementary academic support, with cognitive activation as the mediating factor.

Finally, due to the increasing research focus on digital learning programs (e.g., Pellegrini et al., 2021), more research is needed on how students can be supported in the effective use of digital learning programs. For example, future studies could explore how parents and other educators in supplementary support can support students' needs for autonomy, competence, and social relatedness (Ryan & Deci, 2000) during the use of learning technologies.

5.8 Conclusion

Drawing on the offer-use model as a conceptual framework (e.g., Helmke & Weinert, 1997; Seidel, 2014), the present dissertation investigated the effectiveness of supplementary academic support in three common contexts, namely, parental homework assistance, institutional homework assistance, and private tutoring. Employing the offer-use model, it focused on (1) the role of support quality, specifically in terms of support for students' psychological needs, and (2) the impact of students' individual characteristics (i.e., their grade level and their reasons for using supplementary support). The findings of the present dissertation help to narrow several research gaps concerning both aspects as well as their interplay.

The first main finding was the nuanced and context-specific relationship between support quality and students' learning outcomes. The evidence points to the potential benefits of high-quality support, although its effectiveness seems to be limited to specific outcomes (i.e., learning behavior) and may differ across supplementary support contexts. The second main finding was that students' individual characteristics predicted the quality and the effects of supplementary support. That is, students' grade level was related with support quality, while students' reasons for using supplementary support influenced its effectiveness in fostering specific outcomes, for example, the development of proactive work habits. These findings highlight the importance of recognizing students as active, developing users of supplementary support, as suggested in the offer-use model. Finally, the present dissertation revealed limited but noteworthy support for reciprocal relationships between support quality and students' individual characteristics; low-quality support and low academic achievement were reciprocally associated. However, this finding was also context-specific and only occurred in the context of parental homework assistance.

In summary, the results of the present dissertation are multifaceted and the findings varied substantially across supplementary support contexts. Thus, they indicate that the effectiveness of supplementary support may be influenced by a complex and context-specific interplay

between the quality of supplementary support and students' individual characteristics. Importantly, these insights hold potential value for educators in supplementary support contexts because they can inform strategies for enhancing the effectiveness of supplementary support for specific learning outcomes.

5.9 References

- Aldrup, K., Klusmann, U., & Lüdtke, O. (2020). Reciprocal associations between students' mathematics anxiety and achievement: Can teacher sensitivity make a difference? *Journal of Educational Psychology, 112*(4), 735–750. <https://doi.org/10.1037/edu0000398>
- Aldrup, K., Klusmann, U., Lüdtke, O., Göllner, R., & Trautwein, U. (2018). Social support and classroom management are related to secondary students' general school adjustment: A multilevel structural equation model using student and teacher ratings. *Journal of Educational Psychology, 110*(8), 1066–1083. <https://doi.org/10.1037/edu0000256>
- Arens, A. K., Jansen, M., Preckel, F., Schmidt, I., & Brunner, M. (2021). The structure of academic self-concept: A methodological review and empirical illustration of central models. *Review of Educational Research, 91*(1), 34–72. <https://doi.org/10.3102/0034654320972186>
- Atlay, C., Tieben, N., Hillmert, S., & Fauth, B. (2019). Instructional quality and achievement inequality: How effective is teaching in closing the social achievement gap? *Learning and Instruction, 63*, 101211. <https://doi.org/10.1016/j.learninstruc.2019.05.008>
- Baumert, J., Kunter, M., Blum, W., Brunner, M., Voss, T., Jordan, A., Klusmann, U., Krauss, S., Neubrand, M., & Tsai, Y.-M. (2010). Teachers' mathematical knowledge, cognitive activation in the classroom, and student progress. *American Educational Research Journal, 47*(1), 133–180. <https://doi.org/10.3102/0002831209345157>
- Dettmers, S., Yotyodying, S., & Jonkmann, K. (2020). Elterliche schulbezogene Erziehung in der Retrospektive: Zusammenhänge zwischen autonomieunterstützender Struktur bei der Hausaufgabenenerledigung und Interesse, Persistenz und Wohlbefinden im Studium [Retrospective perceptions of school-related parenting: Effects of parental provision of autonomy-supportive structure]. *Psychologie in Erziehung Und Unterricht, 67*(4), 279–293. <https://doi.org/10.2378/peu2020.art21d>
- Dumont, H., Trautwein, U., & Lüdtke, O. (2012). Familiärer Hintergrund und die Qualität elterlicher Hausaufgabenhilfe [Family background and the quality of parental

- homework involvement]. *Psychologie in Erziehung Und Unterricht*, 59(2), 109–121.
<https://doi.org/10.2378/peu2012.art08d>
- Dumont, H., Trautwein, U., Nagy, G., & Nagengast, B. (2014). Quality of parental homework involvement: Predictors and reciprocal relations with academic functioning in the reading domain. *Journal of Educational Psychology*, 106(1), 144–161.
<https://doi.org/10.1037/a0034100>
- Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist*, 48(2), 90–101. <https://doi.org/10.1037/0003-066X.48.2.90>
- Gaspard, H., Dicke, A.-L., Flunger, B., Brisson, B. M., Häfner, I., Nagengast, B., & Trautwein, U. (2015). Fostering adolescents' value beliefs for mathematics with a relevance intervention in the classroom. *Developmental Psychology*, 51(9), 1226–1240. <https://doi.org/10.1037/dev0000028>
- Gaspard, H., Häfner, I., Parrisius, C., Trautwein, U., & Nagengast, B. (2017). Assessing task values in five subjects during secondary school: Measurement structure and mean level differences across grade level, gender, and academic subject. *Contemporary Educational Psychology*, 48, 67–84. <https://doi.org/10.1016/j.cedpsych.2016.09.003>
- Gonida, E. N., & Cortina, K. S. (2014). Parental involvement in homework: Relations with parent and student achievement-related motivational beliefs and achievement. *The British Journal of Educational Psychology*, 84(Pt 3), 376–396.
<https://doi.org/10.1111/bjep.12039>
- Grolnick, W. S. (2003). *The psychology of parental control: How well-meant parenting backfires*. Lawrence Erlbaum Associates Publishers.
- Grolnick, W. S., & Pomerantz, E. M. (2022). Should parents be involved in their children's schooling? *Theory into Practice*, 1–11.
<https://doi.org/10.1080/00405841.2022.2096382>
- Guill, K., Bahr, I., & Ömeroğulları, M. (2020). Qualität der Hausaufgabenhilfe in Elternhaus und Nachhilfeunterricht als Prädiktoren des hausaufgabenbezogenen Arbeitsverhaltens [Quality of homework support in the parental home and private tutoring as predictors of homework-related study behavior]. *Psychologie in Erziehung Und Unterricht*, 67(4). <https://doi.org/10.2378/peu2020.art08d>
- Guill, K., Lüdtke, O., & Köller, O. (2020). Assessing the instructional quality of private tutoring and its effects on student outcomes: Analyses from the German National

- Educational Panel Study. *The British Journal of Educational Psychology*, 90(2), 282–300. <https://doi.org/10.1111/bjep.12281>
- Guill, K., Ömeroğulları, M., & Köller, O. (2021). Intensity and content of private tutoring lessons during German secondary schooling: effects on students' grades and test achievement. *European Journal of Psychology of Education*, 37(4), 1093–1114. <https://doi.org/10.1007/s10212-021-00581-x>
- Helmke, A., & Weinert, F. E. (1997). Bedingungsfaktoren schulischer Leistungen [Conditional factors of academic performance]. In F. E. Weinert (Ed.), *Enzyklopädie der Psychologie, Bd. 3: Psychologie des Unterrichts und der Schule* (pp. 71–176). Hogrefe.
- Hoover-Dempsey, V. K., & Sandler, M. H. (1995). Parental involvement in children's education: Why does it make a difference? *Teachers College Record*, 97(2), 310–331.
- Hou, Y., Benner, A. D., Kim, S. Y., Chen, S., Spitz, S., Shi, Y., & Beretvas, T. (2020). Discordance in parents' and adolescents' reports of parenting: A meta-analysis and qualitative review. *The American Psychologist*, 75(3), 329–348. <https://doi.org/10.1037/amp0000463>
- Hyde, J. S., Else-Quest, N. M., Alibali, M. W., Knuth, E., & Romberg, T. (2006). Mathematics in the home: Homework practices and mother–child interactions doing mathematics. *The Journal of Mathematical Behavior*, 25(2), 136–152. <https://doi.org/10.1016/j.jmathb.2006.02.003>
- Jansen, T., Meyer, J., Wigfield, A., & Möller, J. (2022). Which student and instructional variables are most strongly related to academic motivation in K-12 education? A systematic review of meta-analyses. *Psychological Bulletin*, 148(1-2), 1–26. <https://doi.org/10.1037/bul0000354>
- Jiang, S., Simpkins, S. D., & Eccles, J. S. (2020). Individuals' math and science motivation and their subsequent STEM choices and achievement in high school and college: A longitudinal study of gender and college generation status differences. *Developmental Psychology*, 56(11), 2137–2151. <https://doi.org/10.1037/dev0001110>
- Karbach, J., Gottschling, J., Spengler, M., Hegewald, K., & Spinath, F. M. (2013). Parental involvement and general cognitive ability as predictors of domain-specific academic achievement in early adolescence. *Learning and Instruction*, 23, 43–51. <https://doi.org/10.1016/j.learninstruc.2012.09.004>
- Klieme, E., Schümer, G., & Knoll, S. (2001). Mathematikunterricht in der Sekundarstufe I: Aufgabenkultur und Unterrichtsgestaltung [Mathematics teaching in lower secondary

- schools: Task culture and lesson design]. *TIMSS - Impulse Für Schule Und Unterricht*, 43–57.
- Kuan, P.-Y. (2011). Effects of cram schooling on mathematics performance: Evidence from junior high students in Taiwan. *Comparative Education Review*, 55(3), 342–368. <https://doi.org/10.1086/659142>
- Lazarides, R., Buchholz, J., & Rubach, C. (2018). Teacher enthusiasm and self-efficacy, student-perceived mastery goal orientation, and student motivation in mathematics classrooms. *Teaching and Teacher Education*, 69, 1–10. <https://doi.org/10.1016/j.tate.2017.08.017>
- Magnusson, D. (1992). Individual development: A longitudinal perspective. *European Journal of Personality*, 6(2), 119–138. <https://doi.org/10.1002/per.2410060205>
- Marsh, H. W. (1990). The structure of academic self-concept: The Marsh/Shavelson model. *Journal of Educational Psychology*, 82(4), 623–636. <https://doi.org/10.1037/0022-0663.82.4.623>
- Marsh, H. W., & Martin, A. J. (2011). Academic self-concept and academic achievement: Relations and causal ordering. *The British Journal of Educational Psychology*, 81(Pt 1), 59–77. <https://doi.org/10.1348/000709910X503501>
- Moroni, S., Dumont, H., Trautwein, U., Niggli, A., & Baeriswyl, F. (2015). The need to distinguish between quantity and quality in research on parental involvement: The example of parental help with homework. *The Journal of Educational Research*, 108(5), 417–431. <https://doi.org/10.1080/00220671.2014.901283>
- Ng, F. F.-Y., Kenney-Benson, G. A., & Pomerantz, E. M. (2004). Children's achievement moderates the effects of mothers' use of control and autonomy support. *Child Development*, 75(3), 764–780. <https://doi.org/10.1111/j.1467-8624.2004.00705.x>
- Núñez, J. C., Epstein, J. L., Suárez, N., Rosário, P., Vallejo, G., & Valle, A. (2017). How do student prior achievement and homework behaviors relate to perceived parental involvement in homework? *Frontiers in Psychology*, 8, 1217. <https://doi.org/10.3389/fpsyg.2017.01217>
- Núñez, J. C., Suárez, N., Rosário, P., Vallejo, G., Valle, A., & Epstein, J. L. (2015). Relationships between perceived parental involvement in homework, student homework behaviors, and academic achievement: differences among elementary, junior high, and high school students. *Metacognition and Learning*, 10(3), 375–406. <https://doi.org/10.1007/s11409-015-9135-5>

- Nurmi, J.-E., & Silinskas, G. (2014). Parents and their children's school lives—commentary on the special issue, 'Parents' role in children's school lives'. *The British Journal of Educational Psychology*, 84(Pt 3), 454–458. <https://doi.org/10.1111/bjep.12046>
- Ömeroğulları, M., Guill, K., & Köller, O. (2020). Effectiveness of private tutoring during secondary schooling in Germany: Do the duration of private tutoring and tutor qualification affect school achievement? *Learning and Instruction*, 66. <https://doi.org/10.1016/j.learninstruc.2020.101306>
- Panadero, E., & Lipnevich, A. A. (2022). A review of feedback models and typologies: Towards an integrative model of feedback elements. *Educational Research Review*, 35, 100416. <https://doi.org/10.1016/j.edurev.2021.100416>
- Parrisius, C., Gaspard, H., Zitzmann, S., Trautwein, U., & Nagengast, B. (2022). The “situative nature” of competence and value beliefs and the predictive power of autonomy support: A multilevel investigation of repeated observations. *Journal of Educational Psychology*, 114(4), 791–814. <https://doi.org/10.1037/edu0000680>
- Patall, E. A., Cooper, H., & Robinson, J. C. (2008). Parent involvement in homework: A research synthesis. *Review of Educational Research*, 78(4), 1039–1101. <https://doi.org/10.3102/0034654308325185>
- Pellegrini, M., Lake, C., Neitzel, A., & Slavin, R. E. (2021). Effective programs in elementary mathematics: A meta-analysis. *AERA Open*, 7, 233285842098621. <https://doi.org/10.1177/2332858420986211>
- Pinquart, M. (2016). Associations of parenting styles and dimensions with academic achievement in children and adolescents: A meta-analysis. *Educational Psychology Review*, 28(3), 475–493. <https://doi.org/10.1007/s10648-015-9338-y>
- Praetorius, A.-K., Klieme, E., Herbert, B., & Pinger, P. (2018). Generic dimensions of teaching quality: The German framework of three basic dimensions. *ZDM*, 50(3), 407–426. <https://doi.org/10.1007/s11858-018-0918-4>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press. <https://doi.org/10.1521/978.14625/28806>

- Sameroff, A. (2009). The transactional model. In A. Sameroff (Ed.), *The transactional model of development: How children and contexts shape each other* (pp. 3–21). American Psychological Association. <https://doi.org/10.1037/11877-001>
- Scherrer, V., & Preckel, F. (2019). Development of motivational variables and self-esteem during the school career: A meta-analysis of longitudinal studies. *Review of Educational Research*, 89(2), 211–258. <https://doi.org/10.3102/0034654318819127>
- Seidel, T. (2014). Angebots-Nutzungs-Modelle in der Unterrichtspsychologie. Integration von Struktur- und Prozessparadigma [Offer-use models in instructional psychology. Integration of structure and process paradigm]. <https://doi.org/10.25656/01:14686>
- Silinskas, G., & Kikas, E. (2019). Parental involvement in math homework: Links to children's performance and motivation. *Scandinavian Journal of Educational Research*, 63(1), 17–37. <https://doi.org/10.1080/00313831.2017.1324901>
- Stecher, L., Radisch, F., Fischer, N., & Klieme, E. (2007). Bildungsqualität außerunterrichtlicher Angebote in der Ganztagschule [Educational quality in extra-curricular and out-of-school activities]. *Zeitschrift Für Soziologie*(4).
- Trautwein, U., Lüdtke, O., Schnyder, I., & Niggli, A. (2006). Predicting homework effort: Support for a domain-specific, multilevel homework model. *Journal of Educational Psychology*, 98(2), 438–456. <https://doi.org/10.1037/0022-0663.98.2.438>
- Wigfield, A., & Eccles, J. S. (2020). 35 years of research on students' subjective task values and motivation: A look back and a look forward. In A. J. Elliot (Ed.), *Advances in Motivation Science* (Vol. 7, pp. 161–198). Elsevier. <https://doi.org/10.1016/bs.adms.2019.05.002>
- Wigfield, A., Eccles, J. S., Fredricks, J. A., Simpkins, S., Roeser, R. W., & Schiefele, U. (2015). Development of achievement motivation and engagement. In R. M. Lerner (Ed.), *Handbook of Child Psychology and Developmental Science* (pp. 1–44). John Wiley & Sons, Inc. <https://doi.org/10.1002/9781118963418.childpsy316>
- Wild, E., & Gerber, J. (2009). Lernlust statt Lernfrust - Evaluation eines Elterntrainings zur Verringerung von Hausaufgabenkonflikten bei Schülern mit Lernschwierigkeiten [Evaluation of parent training to reduce homework conflicts among pupils with learning difficulties]. *Psychologie in Erziehung Und Unterricht*, 56, 303–318.
- Xu, J., Du, J., Wu, S., Ripple, H., & Cosgriff, A. (2018). Reciprocal effects among parental homework support, effort, and achievement? An empirical investigation. *Frontiers in Psychology*, 9, 2334. <https://doi.org/10.3389/fpsyg.2018.02334>

Xu, J., Fan, X., Du, J., & He, M. (2017). A study of the validity and reliability of the parental homework support scale. *Measurement, 95*, 93–98.
<https://doi.org/10.1016/j.measurement.2016.09.045>

APPENDIX

Deutschsprachige Zusammenfassung

Nachdem Schüler:innen am Nachmittag das Klassenzimmer verlassen haben, erhalten die meisten von ihnen weitere Unterstützung beim fachlichen Lernen, zum Beispiel bei der Erledigung ihrer Hausaufgaben oder bei der Vorbereitung auf Klassenarbeiten. Diese außerunterrichtliche, fachliche Unterstützung erfolgt dabei in unterschiedlichen Kontexten (z. B. in der Familie, in Institutionen, oder in privatem Nachhilfeunterricht). In erster Linie stellen Eltern eine Unterstützungsquelle dar, die von Lehrkräften, politischen Entscheidungsträger:innen und auch von den Eltern selbst als äußerst wichtig angesehen wird (z. B. Green et al., 2007). Eine weitverbreitete Form der elterlichen Unterstützung (z. B. Walker et al., 2004) ist die Hilfe bei der Erledigung der Hausaufgaben, da diese zum einen ein zentraler Überschneidungspunkt zwischen Elternhaus und Schule sind und ihnen zum anderen positive Effekte auf die Leistung und das selbstregulierte Lernen zugeschrieben werden (Guill, Bahr, & Ömeroğulları, 2020; Huang & Cho, 2009). Fachliche Unterstützung durch Eltern wird häufig durch die Inanspruchnahme öffentlicher oder privater Unterstützungsangebote ergänzt oder ersetzt. Gründe für die Inanspruchnahme außerfamiliärer Unterstützung können steigende Bildungsaspirationen oder ein Mangel an Ressourcen sein, um Schüler:innen angemessen zu unterstützen (z. B. fehlende Zeit oder fehlendes Wissen). Um den Zugang zu fachlicher außerunterrichtlicher Unterstützung für Schüler:innen aus allen sozioökonomischen Schichten zu verbessern (Steiner, 2009; Steinmann et al., 2019), gibt es in vielen Ländern öffentliche Angebote, in deren Rahmen Schüler:innen Betreuung am Nachmittag und fachliche Unterstützung von pädagogischem Personal erhalten. Ein häufig genutztes öffentliches Unterstützungsangebot ist die institutionelle Hausaufgabenhilfe (z. B. in den Vereinigten Staaten: Cosden et al., 2004; Huang & Cho, 2009; in Australien: Gordon et al., 2020; in Deutschland: Brisson & Theis, 2020; Sauerwein & Rother, 2022). Viele Familien entscheiden sich jedoch dafür, private Unterstützungsangebote für ihre Kinder in Anspruch zu nehmen. So ist es zum Beispiel in vielen Ländern üblich (z. B. in China: Guo et al., 2020; in Deutschland: Ömeroğulları et al., 2020), dass Schüler:innen im Rahmen von privatem Nachhilfeunterricht regelmäßige, auf ihr Fähigkeitsniveau abgestimmte Unterstützung erhalten (Park et al., 2016).

Da außerunterrichtliche Unterstützung mit der Hoffnung verbunden ist, dass sie zu positiven Lernergebnissen von Schüler:innen beiträgt, investieren Staaten, Eltern, und Schüler:innen selbst große Mengen an Ressourcen in verschiedene Unterstützungsangebote (z. B. finanzielle oder zeitliche Ressourcen). Daher ist es notwendig, die Wirksamkeit häufig genutzter Unterstützungsangebote empirisch zu überprüfen. Das Angebots-Nutzungs-Modell

(z. B. Helmke & Weinert, 1997; Lohaus & Wild, 2020; Seidel, 2014) schlägt vor, dass außerunterrichtliche Unterstützung ein Lernangebot darstellen, welches von Schüler:innen unterschiedlich wahrgenommen, genutzt und verarbeitet wird (Fischer et al., 2009). Dementsprechend wird die Effektivität von außerunterrichtlicher Unterstützung nach dem Angebots-Nutzungs-Modell nicht nur durch Merkmale des Angebots (z. B. Quantität oder Qualität), sondern auch durch individuelle Merkmale der Schüler:innen beeinflusst. Dabei werden unterschiedliche Wirkrichtungen angenommen; neben der Wirkung des Angebots auf die Schüler:innen geht das Modell zusätzlich davon aus, dass Merkmale der Schüler:innen (z. B. ihr Verhalten) einen maßgeblichen Einfluss auf die Gestaltung des Angebots ausüben (Vieluf et al., 2020).

Die bisherige Forschung zu den Merkmalen außerunterrichtlicher Unterstützungsangebote hat zumeist gezeigt, dass eine häufige oder intensive Nutzung allein keine Verbesserung der schulischen Leistung von Schüler:innen vorhersagt (z. B. Barger et al., 2019; Fernández-Alonso et al., 2022; Guill et al., 2021; Moroni et al., 2015; Ömeroğulları et al., 2020). Studien zur Qualität außerunterrichtlicher Unterstützungsangebote sind sich jedoch weitestgehend einig, dass Schüler:innen von qualitativ hochwertiger Unterstützung profitieren, die an ihren psychologischen Bedürfnissen nach Kompetenz, Autonomie und sozialer Verbundenheit orientiert ist (Dumont et al., 2014; Guill, Lüdtke, & Köller, 2020; Moroni et al., 2015). Allerdings lag der Fokus bisheriger Arbeiten stark auf dem elterlichen Kontext und das Befundmuster war bisher nur in der Sekundarstufe konsistent (Dumont et al., 2014; Guill, Bahr, & Ömeroğulları, 2020; Moroni et al., 2015). Daher bedarf es Forschung zur Qualität von weiteren häufig genutzten Unterstützungsangeboten (z. B. schulische Hausaufgabenhilfe oder Nachhilfe) sowie Studien in unterschiedlichen Altersgruppen (z. B. in der Grundschule), um die Verallgemeinerbarkeit früherer Studien zu prüfen.

Darüber hinaus gibt es erste Studien zum Einfluss individueller Merkmale von Schüler:innen auf die Wirksamkeit außerunterrichtlicher Unterstützung (Dumont et al., 2014; Kuan, 2011; Núñez et al., 2015). Hierbei werden Schüler:innen als aktive, sich entwickelnde Individuen verstanden, welche die Qualität und Effektivität außerunterrichtlicher Unterstützungsangebote maßgeblich mitgestalten. Aufgrund der bisher unzureichenden Studienlage werden jedoch weitere Studien zur Rolle individueller Merkmale von Schüler:innen benötigt. So haben zum Beispiel bisher nur wenige Studien den Einfluss der Klassenstufe auf die Qualität und die Effekte außerunterrichtlicher Unterstützung untersucht (z. B. Núñez et al., 2015), obwohl entwicklungspsychologische Theorien nahelegen, dass die Wirksamkeit solcher Angebote von der Entwicklungsstufe der Schüler:innen abhängen könnte

(z. B. Eccles et al., 1993; Hoover-Dempsey & Sandler, 1995). Ebenso ist es nach der Selbstbestimmungstheorie (Ryan & Deci, 2000) wahrscheinlicher, dass Schüler:innen von außerunterrichtlicher Unterstützung profitieren, wenn sie selbstbestimmt entscheiden können, ob sie zusätzliche Unterstützung in Anspruch nehmen wollen. Bislang wurde jedoch nur in wenigen Studien erforscht, ob außerunterrichtliche Unterstützung bei hoher Eigenmotivation effektiver ist (Guill et al., 2021; Kuan, 2011).

Eine ähnliche Wissenslücke besteht bezüglich der im Angebots-Nutzungs-Modell angenommenen Wechselwirkungen zwischen Merkmalen der außerunterrichtlichen Unterstützung und Nutzung des Angebots durch die teilnehmenden Schüler:innen. So wurden reziproke Beziehungen zwischen der Qualität außerunterrichtlicher Unterstützung und den individuellen Merkmalen von Schüler:innen (z. B. ihrem Verhalten oder ihrer Leistung) bisher in nur wenigen Studien adressiert (Dumont et al., 2014; Silinskas et al., 2013; Xu et al., 2018). Des Weiteren fokussierten sich diese wenigen Studien ausschließlich auf den Kontext der elterlichen Hausaufgabenhilfe. Deshalb bedarf es weiterer Studien, die das komplexe Zusammenspiel zwischen Unterstützungsqualität und den individuellen Merkmalen von Schüler:innen auf der Grundlage von Längsschnittdesign in unterschiedlichen außerunterrichtlichen Unterstützungskontexten untersuchen.

Die vorliegende Dissertation zielt darauf ab, die oben genannten Forschungsdesiderata bezüglich der Wirksamkeit außerunterrichtlicher fachlicher Unterstützung zu adressieren. Hierfür wurde ein angepasstes Angebots-Nutzungs-Modell eingesetzt. Dieses wird im folgenden Abschnitt beschrieben, bevor die leitenden Forschungsfragen der vorliegenden Arbeit vorgestellt werden.

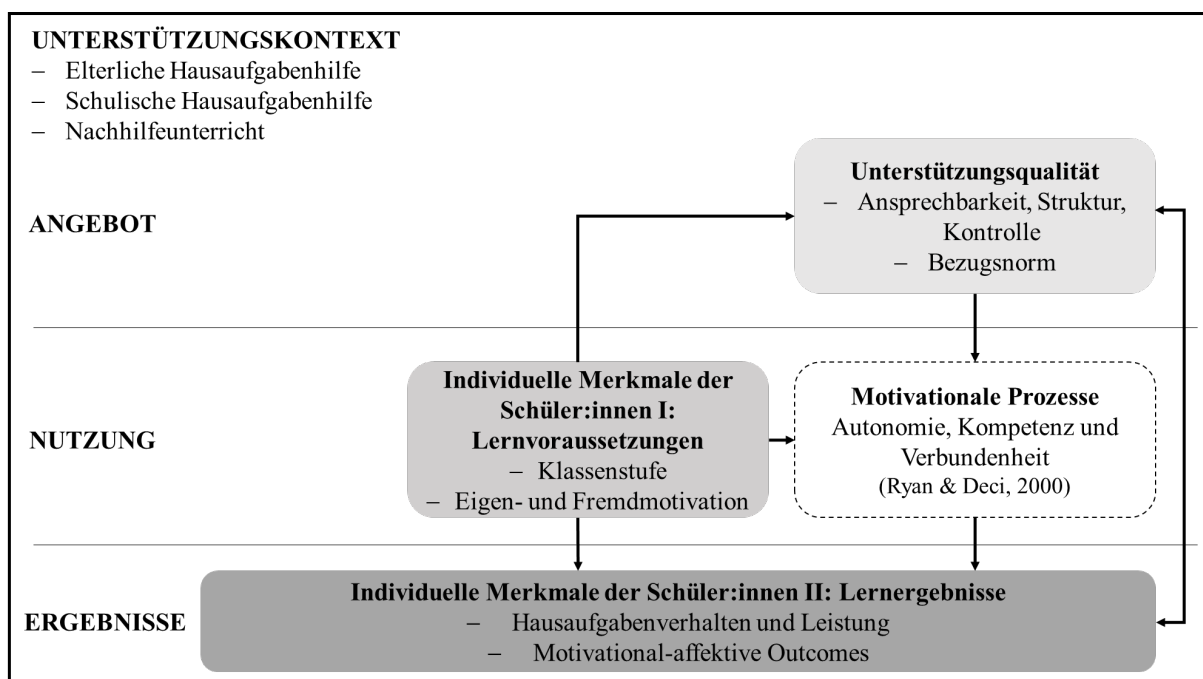
Konzeptioneller Rahmen und Fragestellungen der Dissertation

Das Angebots-Nutzungs-Modells bietet einen konzeptionellen Rahmen, um die vielschichtigen Prozesse und Interaktionen während der Nutzung außerunterrichtlicher Unterstützung mithilfe unterschiedlicher Theorien zu erklären. Nach der Selbstbestimmungstheorie der Motivation (Ryan & Deci, 2000) können diese Prozesse und Interaktionen zu positiven Lernergebnissen führen, wenn dabei die psychologischen Grundbedürfnisse der Schüler:innen nach Autonomie, Kompetenz und sozialer Verbundenheit unterstützt werden. Darüber hinaus werden entwicklungspsychologische (z. B. die Stage-Environment Fit Theorie nach Eccles et al., 1993) und transaktionale Theorien (z. B. Magnusson, 1992; Sameroff, 2009) herangezogen, um den Einfluss von Schüler:innen-Merkmalen auf die Qualität und die Wirksamkeit außerunterrichtlicher Unterstützung sowie reziproke Beziehungen im Modell zu erklären.

Während Angebots-Nutzungs-Modelle (z. B. Helmke & Weinert, 1997; Seidel, 2014) üblicherweise eine Vielzahl an Komponenten auf drei Ebenen (Angebot, Nutzung, Lernergebnisse) inkludieren, konzentriert sich das angepasste Modell auf die Komponenten, welche die Zusammenhänge zwischen der Unterstützungsqualität und den individuellen Merkmalen der Schüler:innen abbilden und erklären (siehe Abbildung 1).

Abbildung 1

Angenommene Beziehungen zwischen der Qualität außerunterrichtlicher Unterstützung und den individuellen Merkmalen von Schüler:innen (Lernvoraussetzungen und Lernergebnisse); adaptiertes Angebots-Nutzungs-Modell nach Seidel, 2014.



Anmerkungen. Die motivationalen Prozesse stellen die theoretische Grundlage dar, wurden aber nicht empirisch überprüft.

Das angepasste Angebots-Nutzungs-Modell nimmt an, dass der Kontext, in welchem die außerunterrichtliche Unterstützung stattfindet, sowohl die Merkmale eines Unterstützungsangebots als auch die Angebotsnutzung der Schüler:innen beeinflusst. In der vorliegenden Arbeit werden Unterstützungsangebote in drei häufig genutzten Kontexten untersucht: elterliche Hausaufgabenhilfe, schulische Hausaufgabenhilfe und privater Nachhilfeunterricht.

Auf der Angebotsebene liegt der Fokus auf Grundlage des oben skizzierten Forschungsstandes auf der Qualität der außerunterrichtlichen Unterstützung. Hierbei werden verschiedene Indikatoren der Unterstützungsqualität herangezogen. Im Kontext der elterlichen und schulischen Hausaufgabenhilfe werden drei Qualitätsdimensionen genutzt, die aus der

Selbstbestimmungstheorie (Ryan & Deci, 2000) abgeleitet wurden: Ansprechbarkeit, Struktur und Kontrolle während der Hausaufgaben (Dumont et al., 2014). Um die Qualität von Nachhilfeunterricht abzubilden, wird auf eine Facette unterstützenden Verhaltens von Nachhilfelehrkräften zurückgegriffen (Guill, Lüdtke, & Köller, 2020), nämlich der Verwendung einer individuellen Bezugsnormorientierung (Mischo & Haag, 2002; Mischo & van Kessel, 2005).

Auf der Nutzungsebene werden zum einen die individuellen Merkmale von Schüler:innen als Lernvoraussetzungen für die effektive Nutzung außerunterrichtlicher Unterstützung berücksichtigt. In Hinblick auf die Stage-Environment Fit Theorie (Eccles et al., 1993) und die Selbstbestimmungstheorie (Ryan & Deci, 2000) werden hierbei die Klassenstufe sowie die Eigen- und Fremdmotivation zur Inanspruchnahme außerunterrichtlicher Unterstützung inkludiert. Zum anderen sind auf der Nutzungsebene die motivationalen Prozesse (d. h. die Bedürfnisbefriedigung) während der Nutzung außerunterrichtlicher Unterstützung angesiedelt (Ryan & Deci, 2000), von denen angenommen wird, dass sie die Zusammenhänge zwischen der Unterstützungsqualität und den individuellen Merkmalen der Schüler:innen medieren.

Auf der Ergebnisebene werden in der vorliegenden Dissertation das Hausaufgabenverhalten und die Leistung sowie die motivational-affektiven Merkmale von Schüler:innen betrachtet. Wichtig ist hierbei, dass die Lernergebnisse von Schüler:innen ebenfalls individuelle Merkmale darstellen, die in reziproken Beziehungen einen Einfluss auf nachfolgende Prozesse und Interaktionen der außerunterrichtlichen Unterstützung ausüben können.

Das Ziel der vorliegenden Dissertation ist es, Forschungsdesiderata bezüglich der komplexen Interaktionen zwischen der Qualität außerunterrichtlicher Unterstützung und den individuellen Merkmalen von Schüler:innen zu adressieren. Auf diese Weise soll Wissen darüber generiert werden, wie außerunterrichtliche Unterstützung so gestaltet werden kann, dass individuelle Schüler:innen davon profitieren. Aus diesen übergeordneten Zielen ergeben sich drei Forschungsfragen:

Forschungsfrage 1:

Besteht ein positiver Zusammenhang zwischen qualitativ hochwertiger (d. h. bedürfnisorientierter) außerunterrichtlicher Unterstützung und den Lernergebnissen von Schüler:innen über verschiedene Kontexte hinweg?

Forschungsfrage 2:

Beeinflussen die Klassenstufe sowie die Nutzungsmotivation die Wirksamkeit außerunterrichtlicher Unterstützungsangebote?

Forschungsfrage 3:

Gibt es reziproke Beziehungen zwischen der außerunterrichtlichen Unterstützungsqualität und den individuellen Merkmalen von Schüler:innen?

Die Beantwortung der Forschungsfragen erfolgte im Rahmen von drei empirischen Studien, deren Design und Ergebnisse im Folgenden vorgestellt werden.

Studie 1: Reziproke Beziehungen zwischen der Qualität von Hausaufgabenhilfe und dem Hausaufgabenverhalten sowie der Leistung von Grundschüler:innen

Die erste Studie thematisierte die im Modell angenommenen wechselseitigen Beziehungen zwischen Unterstützungsqualität und den individuellen Merkmalen von Schüler:innen in zwei Kontexten. Hierfür wurden reziproke Beziehungen zwischen der Qualität elterlicher und schulischer Hausaufgabenhilfe und dem Hausaufgabenverhalten sowie der Leistung von Schüler:innen der vierten Klasse untersucht. Die Qualität der Hausaufgabenhilfe wurde anhand von drei Dimensionen gemessen, die aus der Selbstbestimmungstheorie (Ryan & Deci, 2000) abgeleitet wurden: Ansprechbarkeit, Strukturgebung und Kontrolle (Dumont et al., 2014). Um die reziproken Beziehungen zwischen den Qualitätsdimensionen und den Merkmalen der Schüler:innen zu testen, wurden *Cross-lagged Panel Modelle* auf der Basis von longitudinalen Daten zu zwei Messzeitpunkten berechnet. Im elterlichen Hausaufgabenkontext bestand eine negative reziproke Beziehung zwischen elterlicher Kontrolle und der Durchschnittsnote in drei Fächern (Mathematik, Deutsch und Sozialkunde). Darüber hinaus erwiesen sich drei einseitige Zusammenhänge als statistisch signifikant. Überraschenderweise sagte eine hohe elterliche Ansprechbarkeit niedrigere Ergebnisse in einem Mathematiktest hervor. Darüber hinaus nahmen Schüler:innen, die bei der Hausaufgabenbearbeitung häufig prokrastinierten, ihre Eltern als weniger ansprechbar und weniger strukturierend wahr. Alle weiteren Beziehungen wiesen keine statistische Signifikanz auf (z. B. sagte keine der Qualitätsdimensionen das Hausaufgabenverhalten der Schüler:innen hervor). In der schulischen Hausaufgabenhilfe wurden nur zwei einseitige Beziehungen statistisch signifikant; Kontrolle war mit mehr Prokrastination bei den Hausaufgaben verbunden, und höhere Durchschnittsnoten sagten mehr Ansprechbarkeit der Hausaufgabenbetreuer:innen hervor. Insgesamt deutete Studie 1 nur

teilweise daraufhin, dass sich die Qualität der Hausaufgabenhilfe und das Hausaufgabenverhalten sowie die Leistung von Schüler:innen wechselseitig beeinflussen, da die Ergebnisse zwischen den betrachteten Kontexten und den Qualitätsdimensionen unterschieden.

Studie 2: Die Rolle der Klassenstufe in der Effektivität elterlicher Hausaufgabenhilfe

In der zweiten Studie wurde die Annahme des angepassten Angebots-Nutzungs-Modells getestet, dass es sich bei der Klassenstufe um eine individuelle Lernvoraussetzung handelt, die die Effektivität der elterlichen Hausaufgabenhilfe beeinflusst. Basierend auf der Stage-Environment Fit Theorie (Eccles et al., 1993) wurde dabei erstens untersucht, ob sich die Qualität der elterlichen Hausaufgabenhilfe im Laufe der Sekundarschule verändert und ob diese Veränderung möglicherweise dazu beitragen, dass sich das Hausaufgabenverhalten sowie die Leistung in den höheren Klassenstufen verschlechtern. Zweitens wurde getestet, ob die Klassenstufe die Zusammenhänge zwischen den drei Qualitätsdimensionen und den Ergebnisvariablen der Schüler:innen (d. h. dem Hausaufgabenverhalten und der Schulleistung) moderiert. Die Fragestellungen wurden durch Strukturgleichungsmodelle (Little, 2013) auf der Grundlage einer großen Stichprobe von Schüler:innen der Sekundarschule (Klassen 5 bis 9) überprüft.

Bezüglich der ersten Fragestellung zeigten die Daten, dass alle drei Qualitätsdimensionen elterlicher Hausaufgabenhilfe (d. h. Ansprechbarkeit, Struktur und Kontrolle) in höheren Klassenstufen weniger stark ausgeprägt waren. Abhängig von der Qualitätsdimension wurden unterschiedliche indirekte Zusammenhänge zwischen der Klassenstufe und den Ergebnisvariablen gefunden. Erstens ging mit der Abnahme der elterlichen Ansprechbarkeit in höheren Klassen ein höheres Maß an Prokrastination einher. Zweitens war die klassenstufenbedingte Abnahme der elterlichen Strukturgebung mit weniger produktivem Hausaufgabenverhalten (d. h. mehr Prokrastination und weniger Anstrengung bei den Hausaufgaben) und schlechteren Schulleistungen verbunden. Drittens zeigten sich wünschenswerte indirekte Zusammenhänge zwischen der Klassenstufe und der Prokrastination und der Schulleistung der Schüler:innen. So ging eine Abnahme in der Kontrolle in den höheren Klassen mit weniger Prokrastination und besseren Durchschnittsnoten einher.

Bezüglich der zweiten Fragestellung zeigten sich Zusammenhänge zwischen den drei Qualitätsdimensionen und dem Hausaufgabenverhalten der Schüler:innen, während ihre Leistung nicht durch die Qualität der Hausaufgabenhilfe hervorgesagt wurde. Ebenfalls

sprachen die Befunde nicht dafür, dass die Klassenstufe die Zusammenhänge zwischen Qualitätsdimensionen und Ergebnisvariablen moderiert.

Zusammenfassend deutet Studie 2 darauf hin, dass die Klassenstufe möglicherweise einen Einfluss auf die Effektivität der elterlichen Hausaufgabenhilfe hat. Obwohl die Qualitätsdimensionen gleichermaßen förderlich bzw. schädlich für das Hausaufgabenverhalten der Schüler:innen in verschiedenen Klassenstufen zu sein scheinen, legen die Daten nahe, dass die Effektivität durch die Klassenstufe beeinflusst wird, weil sich die Qualität der elterlichen Hausaufgabenhilfe im Verlauf der Sekundarstufe verändert.

Studie 3: Motivational-affektive Effekte von Nachhilfeunterricht

In der dritten Studie wurde der angenommene Einfluss der Unterrichtsqualität bzw. der individuellen Lernvoraussetzungen auf die Lernergebnisse von Nachhilfeunterricht überprüft. Auf der Grundlage der Selbstbestimmungstheorie (Ryan & Deci, 2000) wurden die motivational-affektive Effekte von Nachhilfeunterricht in den Fächern Mathematik, Deutsch und Englisch untersucht. Darüber hinaus adressierte Studie 3 (1) die Verwendung einer individuellen Bezugsnorm durch die Nachhilfekraft als einen Indikator einer hohen Unterstützungsqualität und (2) die Bedeutung einer hohen Eigen- und Fremdmotivation als individuelle Lernvoraussetzungen für einen erfolgreichen Nachhilfeunterricht. Für die Beantwortung der Fragestellungen wurden Daten zu zwei Messzeitpunkten der KESS-Studie (Kompetenzen und Einstellungen von Schüler:innen in Deutschland) herangezogen, die in zwei Schritten analysiert wurden. Im ersten Schritt wurden getrennt für jedes Fach Schüler:innen mit und ohne Nachhilfeunterricht hinsichtlich vier motivational-affektiver Merkmale verglichen (Interesse, akademisches Selbstkonzept, Testangst, und proaktive Unterrichtseteiligung). Der zweite Schritt wurde, ebenfalls fachspezifisch, innerhalb der Gruppen der Schüler:innen mit Nachhilfeunterricht durchgeführt. In diesem Schritt wurde Leistungsdruck durch Nachhilfe als zusätzliches Einkommen eingeführt. Als potenzielle Prädiktoren der fünf motivational-affektiven Outcomes wurden die Intensität und Dauer des Nachhilfeunterrichts, die individuelle Bezugsnorm der Nachhillehrkraft, sowie die Eigen- und Fremdmotivation der Schüler:innen getestet.

Im ersten Schritt der Analyse zeigten sich unter Kontrolle der vorherigen Werte keine Vorteile für Schüler:innen mit Nachhilfeunterricht bezüglich ihrer motivational-affektiven Merkmale gegenüber Schüler:innen ohne Nachhilfe. Innerhalb der Gruppe der Schüler:innen mit Nachhilfeunterricht in Mathematik gab es jedoch mehrere signifikante Zusammenhänge. Erstens verspürten die Schüler:innen weniger Leistungsdruck, je länger sie am

Nachhilfeunterricht teilnahmen. Zweitens war die Verwendung eines individuellen Bezugsrahmens durch die Nachhilfelehrkraft mit mehr proaktiver Beteiligung im Regelunterricht verbunden. Drittens hing eine hohe Eigenmotivation für die Nutzung der Nachhilfe mit mehr proaktiver Unterrichtsbeteiligung zusammen, während eine hohe Fremdmotivation mit weniger proaktiver Unterrichtsbeteiligung und mehr Testangst einherging. Während diese Ergebnisse nur im Fach Mathematik statistisch signifikant waren, zeigte sich ein Ergebnis in allen drei Fächern: Sowohl eine hohe Eigenmotivation als auch eine hohe Fremdmotivation waren mit mehr Leistungsdruck durch den Nachhilfeunterricht verbunden. Insgesamt deuten die Daten nicht darauf hin, dass Nachhilfe generell eine geeignete Maßnahme darstellt, um die Motivation und die leistungsbezogenen Emotionen von Schüler:innen zu verbessern. Unter bestimmten Bedingungen kann er jedoch potenziell förderlich (bzw. schädlich) für gewisse motivational-affektive Merkmale sein.

Gesamtdiskussion

Auf der Grundlage eines angepassten Angebots-Nutzungs-Modells (z. B. Helmke & Weinert, 1997; Seidel, 2014) untersuchte die vorliegende Dissertation die Wirksamkeit außerunterrichtlicher fachlicher Unterstützung in drei Kontexten, nämlich der elterlichen Hausaufgabenhilfe, der schulischen Hausaufgabenhilfe und der privaten Nachhilfe. Im Rahmen des Angebots-Nutzungs-Modells fokussierte sie sich auf (1) die Unterstützungsqualität, insbesondere im Hinblick auf die Unterstützung der psychologischen Bedürfnisse von Schüler:innen (Ryan & Deci, 2000), (2) die individuellen Merkmale von Schüler:innen und (3) das Zusammenspiel zwischen Unterstützungsqualität und individuellen Merkmalen.

Bezüglich der Beziehung zwischen Unterstützungsqualität und den Lernergebnissen der Schüler:innen (Fragestellung 1) variierte die Stärke der Beziehungen stark zwischen den drei Unterstützungskontexten, es zeigten sich jedoch zwei Befundmuster über Kontexte hinweg. Erstens wiesen die Ergebnisse darauf hin, dass sich qualitativ hochwertige Unterstützungsformen (z. B. Ansprechbarkeit, Struktur, Verwendung einer individuellen Bezugsnormorientierung) positiv auf das Lernverhalten von Schüler:innen (z. B. Hausaufgabenverhalten, proaktive Unterrichtsbeteiligung) auswirken können. Allerdings zeigte sich dieses Bild nur in den Studien 2 und 3 (Sekundarschule) und nicht in Studie 1 (Grundschule). Zweitens legen die Befunde nahe, dass ungünstige Unterstützungsformen wie kontrollierendes Verhalten einen negativen Einfluss auf unterschiedliche Lernergebnisse (z. B. Hausaufgabenverhalten und Leistung) haben können. Allerdings zeigten sich hier ebenfalls Unterschiede zwischen der Grundschule und der Sekundarschule, da Kontrolle unterschiedliche

Lernergebnisse vorhersagte (d. h. niedrige Schulleistungen in der Grundschule und unvorteilhaftes Hausaufgabenverhalten in der Sekundarschule). Zusammengefasst unterstützen die Ergebnisse potenziell die Annahme des Angebots-Nutzungs-Modells, dass Schüler:innen von qualitativ hochwertiger außerunterrichtlicher Unterstützung profitieren. Allerdings scheint der Nutzen zwischen Unterstützungskontexten, Altersgruppen und Indikatoren der Unterstützungsqualität zu variieren.

In Bezug auf die individuellen Merkmale der Schüler:innen weisen die Ergebnisse darauf hin, dass diese durchaus einen Einfluss auf die Wirksamkeit außerunterrichtlicher Unterstützung haben können. So hing beispielsweise die Klassenstufe der Schüler:innen mit der Qualität elterlicher Hausaufgabenhilfe zusammen, während die Eigen- und Fremdmotivation zur Inanspruchnahme von Nachhilfeunterricht dessen Wirksamkeit für die Entwicklung bestimmter Variablen beeinflussten (z. B. proaktive Unterrichtsbeteiligung). Diese Ergebnisse unterstützten die Annahme des Angebots-Nutzungs-Modells und verschiedener entwicklungspsychologischer Theorien (z. B. Eccles et al., 1993), dass Schüler:innen aktive, sich entwickelnde Nutzer:innen außerunterrichtlicher Unterstützung sind, die dessen Ausgestaltung maßgeblich beeinflussen.

Schließlich untersuchte die vorliegende Dissertation reziproke Beziehungen zwischen der Unterstützungsqualität und individuellen Merkmalen der Schüler:innen (hier gemessen als Hausaufgabenverhalten und Leistung). Dabei zeigte sich, dass sich kontrollierende Hausaufgabenhilfe und geringe schulische Leistungen wechselseitig beeinflussten; allerdings war dieses Ergebnis ebenfalls kontextspezifisch und trat nur im Kontext der elterlichen Hausaufgabenhilfe auf.

Zusammenfassend sind die Ergebnisse der vorliegenden Dissertation vielschichtig und kontextabhängig. Sie deuten darauf hin, dass die Wirksamkeit außerunterrichtlicher Unterstützung durch ein komplexes und kontextspezifisches Zusammenspiel zwischen der Unterstützungsqualität und den individuellen Merkmalen der Schüler:innen beeinflusst werden kann. Bei der Interpretation dieser Ergebnisse sollten jedoch Limitationen der vorliegenden Arbeit berücksichtigt werden. So handelte es sich zum einen bei der Mehrheit der Messinstrumente um Selbstberichte der Schüler:innen, was potenziell zu einem Same-Rater-Bias und zu verzerrten Einschätzungen der Unterstützungsqualität führen kann. Zum anderen konnte die theoretische Annahme, dass die Beziehungen innerhalb des Modells durch die Befriedigung der Bedürfnisse nach Autonomie, Kompetenz und Verbundenheit, mediiert werden, nicht getestet werden. Schließlich konnte die Generalisierbarkeit über die Unterstützungskontexte nur eingeschränkt getestet werden, da es Unterschiede in der Datenlage

bezüglich der einzelnen Kontexte gab (z. B. in der Stichprobengröße oder der Operationalisierung von Unterstützungsqualität).

Trotz des komplexen Befundmusters und der Limitationen der vorliegenden Arbeit, können die Ergebnisse zu der effektiveren Gestaltung von außerunterrichtlichen Unterstützungsangeboten beitragen. So könnte, beispielsweise im Rahmen von Trainings oder Informationsveranstaltungen, Eltern, Hausaufgabenbetreuer:innen und Nachhilfelehrkräften das Potenzial bedürfnisorientierter Unterstützung nahegelegt werden. Hierbei sollten die unterstützenden Personen außerdem darüber informiert werden, dass sich Schüler:innen-Merkmale auf die Qualität außerunterrichtlicher Unterstützung auswirken. So ist es zum Beispiel von hoher praktischer Relevanz Personen, die in den Hausaufgabenprozess involviert sind, darüber zu informieren, dass Schüler:innen in höheren Klassen weniger förderliche Unterstützungsformen (d. h. Ansprechbarkeit und Struktur) erhalten, obwohl sich diese potenziell förderlich für ihr Hausaufgabenverhalten auswirken könnten.

Zukünftige Studien sollten vor allem in Erwägung ziehen, neben Selbstberichten der Schüler:innen weitere Messinstrumente heranzuziehen, um die Unterstützungsqualität zu messen (z. B. Beobachtungen: Hyde et al., 2006) oder das Lernverhalten von Schüler:innen zu operationalisieren (z. B. Trace data: Baker & Inventado, 2014; Hilz et al., 2023). Ebenfalls erscheint es aufgrund der voranschreitenden Digitalisierung sinnvoll, zu untersuchen, wie Schüler:innen bei der effektiven Nutzung von Lernprogrammen am Nachmittag unterstützt werden können.

Literaturangaben

- Baker, R. S., & Inventado, P. S. (2014). Educational data mining and learning analytics. In J. A. Larusson & B. White (Eds.), *Learning Analytics* (pp. 61–75). Springer New York. https://doi.org/10.1007/978-1-4614-3305-7_4
- Barger, M. M., Kim, E. M., Kuncel, N. R., & Pomerantz, E. M. (2019). The relation between parents' involvement in children's schooling and children's adjustment: A meta-analysis. *Psychological Bulletin*, 145(9), 855–890. <https://doi.org/10.1037/bul0000201>
- Brisson, B. M., & Theis, D. (2020). Traditionelle Hausaufgaben oder integrierte Lernzeiten? Ein Vergleich der Erfahrungen und Leistungsentwicklungen von Schülerinnen und Schülern mit unterschiedlichen Übungsformaten. *Psychologie in Erziehung Und Unterricht*, 67(4), 294–312. <https://doi.org/10.2378/peu2020.art22d>
- Cosden, M., Morrison, G., Gutierrez, L., & Brown, M. (2004). The effects of homework programs and after-school activities on school success. *Theory into Practice*, 43(3), 220–226. https://doi.org/10.1207/s15430421tip4303_8

- Dumont, H., Trautwein, U., Nagy, G., & Nagengast, B. (2014). Quality of parental homework involvement: Predictors and reciprocal relations with academic functioning in the reading domain. *Journal of Educational Psychology, 106*(1), 144–161.
<https://doi.org/10.1037/a0034100>
- Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist, 48*(2), 90–101. <https://doi.org/10.1037/0003-066X.48.2.90>
- Fernández-Alonso, R., Álvarez-Díaz, M., García-Crespo, F. J., Woitschach, P., & Muñiz, J. (2022). Should we help our children with homework? A meta-analysis using PISA data. *Psicothema, 34*(1), 56–65. <https://doi.org/10.7334/psicothema2021.65>
- Fischer, N., Kuhn, H. P., & Klieme, E. (2009). Was kann die Ganztagsschule leisten? Wirkungen ganztägiger Beschulung auf die Entwicklung von Lernmotivation und schulischer Performance nach dem Übergang in die Sekundarstufe. *Ganztägige Bildung und Betreuung, Zeitschrift für Pädagogik*. <https://doi.org/10.25656/01:6963>
- Gordon, C. S., Pink, M., & Jones, S. C. (2020). Children and tutor's perspectives on a homework support program in Melbourne: A university-school partnership. *Health & Social Care in the Community, 28*(5), 1611–1621. <https://doi.org/10.1111/hsc.12986>
- Green, C. L., Walker, J. M. T., Hoover-Dempsey, K. V., & Sandler, H. M. (2007). Parents' motivations for involvement in children's education: An empirical test of a theoretical model of parental involvement. *Journal of Educational Psychology, 99*(3), 532–544. <https://doi.org/10.1037/0022-0663.99.3.532>
- Guill, K., Bahr, I., & Ömeroğulları, M. (2020). Qualität der Hausaufgabenhilfe in Elternhaus und Nachhilfeunterricht als Prädiktoren des hausaufgabenbezogenen Arbeitsverhaltens. *Psychologie in Erziehung Und Unterricht, 67*(4).
<https://doi.org/10.2378/peu2020.art08d>
- Guill, K., Lüdtke, O., & Köller, O. (2020). Assessing the instructional quality of private tutoring and its effects on student outcomes: Analyses from the German National Educational Panel Study. *The British Journal of Educational Psychology, 90*(2), 282–300. <https://doi.org/10.1111/bjep.12281>
- Guill, K., Ömeroğulları, M., & Köller, O. (2021). Intensity and content of private tutoring lessons during German secondary schooling: effects on students' grades and test achievement. *European Journal of Psychology of Education, 37*(4), 1093–1114.
<https://doi.org/10.1007/s10212-021-00581-x>

- Guo, Y., Chen, Q., Zhai, S., & Pei, C. (2020). Does private tutoring improve student learning in China? Evidence from the China Education Panel Survey. *Asia & the Pacific Policy Studies*, 7(3), 322–343. <https://doi.org/10.1002/app5.310>
- Helmke, A., & Weinert, F. E. (1997). Bedingungsfaktoren schulischer Leistungen. In F. E. Weinert (Ed.), *Enzyklopädie der Psychologie, Bd. 3: Psychologie des Unterrichts und der Schule* (pp. 71–176). Hogrefe.
- Hilz, A., Hofman, A., Jansen, B., & Aldrup, K. (2023). *Taking advantage of trace data: A multidimensional investigation of math anxiety and practice behavior in a math learning program on students' math performance*. <https://doi.org/10.17605/OSF.IO/38GFN>
- Hoover-Dempsey, V. K., & Sandler, M. H. (1995). Parental involvement in children's education: Why does it make a difference? *Teachers College Record*, 97(2), 310–331.
- Huang, D., & Cho, J. (2009). Academic enrichment in high-functioning homework afterschool programs. *Journal of Research in Childhood Education*, 23(3), 382–392. <https://doi.org/10.1080/02568540909594668>
- Hyde, J. S., Else-Quest, N. M., Alibali, M. W., Knuth, E., & Romberg, T. (2006). Mathematics in the home: Homework practices and mother–child interactions doing mathematics. *The Journal of Mathematical Behavior*, 25(2), 136–152. <https://doi.org/10.1016/j.jmathb.2006.02.003>
- Kuan, P.-Y. (2011). Effects of cram schooling on mathematics performance: Evidence from junior high students in Taiwan. *Comparative Education Review*, 55(3), 342–368. <https://doi.org/10.1086/659142>
- Little, T. D. (2013). *Longitudinal structural equation modeling*. Guilford Press.
- Lohaus, A., & Wild, E. (2020). Extracurriculare Förderangebote für benachteiligte Kinder und deren Eltern: Ein Angebot-Aneignungs-Modell zur Inanspruchnahme und Wirkung. *Zeitschrift Für Pädagogische Psychologie*, 35(1), 1–10. <https://doi.org/10.1024/1010-0652/a000268>
- Mischo, C., & Haag, L. (2002). Expansion and effectiveness of private tutoring. *European Journal of Psychology of Education*, 17(3), 263–273.
- Mischo, C., & van Kessel, M. (2005). Wie wirkt Nachhilfe? Mögliche Wirkfaktoren im Wissen der Nachhilfelehrer. *Empirische Pädagogik*, 19(1), 28–46.
- Moroni, S., Dumont, H., Trautwein, U., Niggli, A., & Baeriswyl, F. (2015). The need to distinguish between quantity and quality in research on parental involvement: The

- example of parental help with homework. *The Journal of Educational Research*, 108(5), 417–431. <https://doi.org/10.1080/00220671.2014.901283>
- Núñez, J. C., Suárez, N., Rosário, P., Vallejo, G., Valle, A., & Epstein, J. L. (2015). Relationships between perceived parental involvement in homework, student homework behaviors, and academic achievement: differences among elementary, junior high, and high school students. *Metacognition and Learning*, 10(3), 375–406. <https://doi.org/10.1007/s11409-015-9135-5>
- Ömeroğulları, M., Guill, K., & Köller, O. (2020). Effectiveness of private tutoring during secondary schooling in Germany: Do the duration of private tutoring and tutor qualification affect school achievement? *Learning and Instruction*, 66. <https://doi.org/10.1016/j.learninstruc.2020.101306>
- Park, H., Buchmann, C., Choi, J., & Merry, J. J. (2016). Learning beyond the school walls: Trends and implications. *Annual Review of Sociology*, 42(1), 231–252. <https://doi.org/10.1146/annurev-soc-081715-074341>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>
- Sauerwein, M., & Rother, P. (2022). Hilfestellung in der Hausaufgabenbetreuung und den Lernzeiten aus der Perspektive von Schüler*innen. *Zeitschrift Für Erziehungswissenschaft*. <https://doi.org/10.1007/s11618-022-01071-6>
- Seidel, T. (2014). Angebots-Nutzungs-Modelle in der Unterrichtspsychologie. Integration von Struktur- und Prozessparadigma. <https://doi.org/10.25656/01:14686>
- Silinskas, G., Niemi, P., Lerkkanen, M.-K., & Nurmi, J.-E. (2013). Children's poor academic performance evokes parental homework assistance—but does it help? *International Journal of Behavioral Development*, 37(1), 44–56. <https://doi.org/10.1177/0165025412456146>
- Steiner, C. (2009). *Mehr Chancengleichheit durch die Ganztagschule?* Beltz.
- Steinmann, I., Strietholt, R., & Caro, D. (2019). Participation in extracurricular activities and student achievement: Evidence from German all-day schools. *School Effectiveness and School Improvement*, 30(2), 155–176. <https://doi.org/10.1080/09243453.2018.1540435>
- Vieluf, S., Praetorius, A.-K., Rakoczy, K., Kleinknecht, M., & Pietsch, M. (2020). Angebots-Nutzungs-Modelle der Wirkweise des Unterrichts. Ein kritischer Vergleich verschiedener Modellvarianten. *Empirische Forschung zu Unterrichtsqualität*.

Theoretische Grundfragen und quantitative Modellierungen, Zeitschrift für Pädagogik. <https://doi.org/10.25656/01:25864>

- Walker, J., Hoover-Dempsey, K., Whetsel, D., & Green, C. (2004). Parental involvement in homework: A review of current research and its implications for teachers, after school program staff, and parent leaders.
- Xu, J., Du, J., Wu, S., Ripple, H., & Cosgriff, A. (2018). Reciprocal effects among parental homework support, effort, and achievement? An empirical investigation. *Frontiers in Psychology*, 9, 2334. <https://doi.org/10.3389/fpsyg.2018.02334>