Parents' and Children's Implicit Theories About Ability:

How and Under What Circumstances They Relate to Different Aspects of Children's Academic Success

Kumulative Inaugural-Dissertation zur Erlangung der Doktorwürde
der Fakultät für Humanwissenschaften
der Universität Regensburg

vorgelegt von
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Regensburg 2023

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Acknowledgements

Here, I would like to thank the individuals who have accompanied and supported me in the process of completing this dissertation. First, I would like to thank Prof. Dr. Heidrun Stoeger for supervising this work, for her helpful feedback and suggestions, for being a great mentor and role model—and for showing me that I can accomplish things that I never thought possible. Next, I would like to thank the entire team of the Chair for School Research, School Development, and Evaluation, from whom I have learned a great deal over the years. I would like to especially thank Dr. Daniel Patrick Balestrini, who was also an important role model to me, who taught me a lot about writing in English, about layout and how to organize things well—and who gave me a lot of encouragement when I was starting out. Likewise, I would like to thank Dr. Tobias Debatin, who was always willing to share his extensive methodological and statistical knowledge with me and whom I could ask for advice in all matters. I would also like to thank Sandra, my wonderful wife, for being so patient with me and for always taking such good care of me when I worked at home on weekends. Finally, I would like to thank my parents, who taught me that I could achieve anything I want if I really tried.

Contents

1. Frame Paper

1.1. Introduction

When individuals believe that human traits and abilities are malleable, as opposed to static, they have been shown to achieve better learning outcomes and greater academic success—and to be more effective at helping others learn and succeed academically. For example, such individuals tend to achieve greater learning gains (Jourden et al., 1991; Xu et al., 2021), to show a more positive trend in academic performance after transitioning to secondary school (Blackwell et al., 2007), to continue to challenge others who are struggling academically rather than comforting them about their supposed lack of ability (Rattan et al., 2012), and to provide more encouragement when others are faced with a difficult or frustrating task (Jose & Bellamy, 2012).

Such beliefs about the malleability of human attributes are the subject of Carol Dweck's implicit theory approach (Dweck, 2013; Dweck & Leggett, 1988). In the context of this approach, implicit theories (also referred to as mindsets; see Lüftenegger & Chen, 2017) are defined as laypersons' theories about the extent to which traits and abilities are changeable (see Molden & Dweck, 2006). The approach distinguishes between two such theories: an incremental theory (also called growth mindset), which assumes that traits and abilities can be fundamentally changed—and an entity theory (also called fixed mindset), which assumes that traits and abilities contain a large proportion that cannot be changed. The two theories are often conceived as opposite ends of a bipolar continuum (see Lüftenegger & Chen, 2017), that is, the more individuals endorse an incremental theory about an attribute, the less they endorse an entity theory about that attribute, and vice versa. The origin of the implicit theory approach lies in helplessness and attribution research (see Dweck & Yeager, 2019): The approach originated with the concern to explain why, among individuals with the same level of performance, some individuals attribute setbacks to a lack of effort and react in a mastery-oriented manner, whereas others attribute setbacks to a lack of ability and react in a helpless manner. An important tenet of the approach is that implicit theories form the core of a meaning system that organizes goals, beliefs, and behaviors (see Yeager & Dweck, 2020).

The implicit theory approach has been fruitfully applied to a variety of different human attributes, such as personality traits in general (Erdley & Dweck, 1993; Kammrath & Dweck, 2006; Plaks et al., 2001), moral character (Dweck et al., 1995a; Gervey et al., 1999), shyness (Beer, 2002), and even body weight (Burnette, 2010). In educational research, however, the approach is often applied to the attribute of ability. Most studies on implicit theories about ability and academic success focus on implicit theories about intelligence (see Costa & Faria, 2018), that is, about domain-general ability. In addition to that, the implicit theory approach has also been applied to more specific ability domains, such as mathematics (Bostwick et al., 2019; Degol et al., 2018), science (J. A. Chen, 2012; J. A. Chen & Pajares, 2010), writing (Karlen & Compagnoni, 2017; Limpo & Alves, 2014), and self-regulation (Hertel & Karlen, 2021; Stern & Hertel, 2020).

There is already a large body of research about the effect of learners' implicit theories about ability on learners' academic success, on beliefs and behaviors that are conducive to academic success—and about contextual influences on these effects (see Burnette et al., 2013; Costa & Faria, 2018). This research has demonstrated, among other things, that learners with a more incremental theory tend to exhibit slightly better academic achievement ($r = .10$ according to the meta-analysis of Sisk et al., 2018; however, Yeager & Dweck, 2020, based on the results of several large studies, argue that $r = .24$ might be a more realistic estimate). This effect of learners' implicit theories on their academic success is mediated by the meaning systems that are associated with the theories (i.e., what meaning learners attach to performance outcomes, setbacks, and effort), which in turn result in behaviors that are relevant for academic success (see Yeager & Dweck, 2020). Compared to learners with an entity theory, learners with an incremental theory tend to be more concerned with learning and improving their abilities, rather than with appearing competent and proving their abilities by outperforming others (learning goal orientation instead of performance goal orientation; J. A. Chen, 2012; J. A. Chen & Pajares, 2010), to see setbacks as indicators of inadequate effort or poor strategies, rather than as indicators of stable ability deficits (effort attributions instead of ability attributions that can result in helplessness; Hong et al., 1999; Robins & Pals, 2002), and to see effort as a prerequisite for mastery, rather than as a sign of low ability (positive instead of negative effort beliefs; Blackwell et al., 2007; Jones et al., 2012; Lin-Siegler et al., 2016; Tempelaar et al., 2015). A key contextual influence that affects the extent to which implicit theories have an impact is the presence of challenges or setbacks (see Burnette et al., 2013): This has been shown to increase the effect of implicit theories on other beliefs and behaviors—and is sometimes necessary for implicit theories to have an effect. Accordingly, it is especially important for at-risk and disadvantaged students to have an incremental theory instead of an entity theory (see Burnette et al., 2022). In light of this, implicit theory researchers have also developed interventions that teach learners an incremental theory (e.g., Aronson et al., 2002; Blackwell et al., 2007; Good et al., 2003; Moorman & Pomerantz, 2010; Yeager et al., 2016; Yeager et al., 2019; see Dweck & Yeager, 2019, for an overview).

Recently, however, some researchers have taken issue with the implicit theory approach (see Burgoyne et al., 2020; Li & Bates, 2019; Macnamara & Burgoyne, 2022; Sisk et al., 2018). Their critique centers on the robustness of the relationship of implicit theories with the corresponding meaning system and with academic achievement, as well as on the effectiveness of interventions aimed at changing students' implicit theories. Burgoyne et al. (2020) focused mainly on the magnitude of the relationships between strength of incremental theory and goal orientations. They argued that these relationships were too small for implicit theories to be a primary antecedent of goal orientations ($r = .19$ for learning goal orientation, $r = –.15$ for performance goal orientation in general, and $r = –.18$ for performance-avoidance goal orientation in particular, i.e., for the desire not to be seen as incompetent in front of others; see meta-analysis of Burnette et al., 2013). In their own study with 438 undergraduate students, Burgoyne et al. (2020) found even smaller relationships between strength of incremental theory and goal orientations ($r = .10$ for learning goal orientation, $r = –.11$ for performance goal orientation, and no

significant correlation for performance-avoidance goal orientation). They also found that implicit theories were not related to other beliefs and behaviors that one would expect to be related to them (i.e., the belief that talent alone will lead to success, persistence when trying to overcome challenges, and performance on a cognitive test after receiving failure feedback). Sisk et al. (2018) meta-analytically examined the relationship between implicit theories and academic achievement, as well as the effect of implicit theory interventions on academic achievement. They found a correlation of $r = .10$ between strength of incremental theory and academic achievement, which they interpreted as "very weak" (Sisk et al., 2018, p. 561). The effect of implicit theory interventions they observed was $d = .08$, which they judged to be "very small" (Sisk et al., 2018, p. 569). Regarding moderators, academic at-risk status was not found to be related to intervention effectiveness, but interventions were more effective when students had low socioeconomic status ($d = .31$). Macnamara and Burgoyne (2022) conducted further meta-analyses focusing on implicit theory interventions. They found that the effect of such interventions was no longer significant anymore when adjusted for publication bias, that studies conducted by authors whom they perceived as having a financial incentive to report positive findings obtained larger effects, and that many authors did not follow best practice guidelines for conducting intervention studies, limiting the conclusions that can be drawn from their findings. They also found no moderating effects for developmental stage, academic challenge status, or socioeconomic status.

Implicit theory researchers have presented a variety of evidence and arguments to counter these criticisms. Regarding the relationship between implicit theories and the corresponding meaning system, Yeager and Dweck (2020) argued that the low correlations with goal orientations found by Burgoyne et al. (2020) might be due in part to the fact that they had used different scales than previous studies. They also pointed out that the effects of implicit theories on goal orientations in the Burnette et al. (2013) meta-analysis were significantly stronger in contexts where individuals faced setbacks. Most importantly, they provided evidence for the relationship between implicit theories and the different parts of the meaning system based on data from three studies with representative samples of more than 23,000 students (Rege et al., 2021; Yeager et al., 2016; Yeager et al., 2019). These data showed the expected relationships between the strength of students' incremental theory and negative effort beliefs ($r = –.35$), helpless responses/attributions ($r = –.27$), and performance-avoidance goals ($r = –.20$). Regarding academic achievement, Yeager and Dweck (2020) pointed out that it was positively related to strength of incremental theory in this data ($r = .24$). They also referred to recent results from the Programme for International Student Assessment (PISA; OECD, 2019), based on a sample of more than 500,000 students, which showed a positive relationship between incremental theory and academic achievement for 72 of the 74 participating nations (with the correlation for the United States being similar to that found in their own data). In addition, they pointed to findings that, as expected, implicit theories were even more strongly related to academic achievement in both a sample of more than 49,000 medium-to-low-achieving students from the United States (Kanopka et al., 2020) and a sample of more than 240,000 socioeconomically disadvantaged students from Chile (Claro et al., 2016). Against the criticism of implicit theory interventions, several counterarguments can be put forward. First, it can be argued that effects that

appear rather small at first glance may well be large enough to make such an intervention worthwhile, as such effects can add up to a sizeable magnitude when larger groups of individuals are reached by the intervention (see Funder & Ozer, 2019; Götz et al., 2022). Consistent with this, the current versions of implicit theory interventions are very brief and can be delivered to groups of students in a web-based format—reaching many students with a relatively small investment of resources (see Tipton et al., 2022). Second, it is important to keep in mind that implicit theory interventions are primarily intended for disadvantaged and at-risk students and, therefore, are not expected to improve the academic achievement of high-achieving students—which is why the average effect for all students from all existing studies may not be the best estimate for the effectiveness of these interventions (see Burnette et al., 2022; Tipton et al., 2022). Third, the conclusions of the meta-analysis by Macnamara and Burgoyne (2022) have been heavily criticized (Tipton et al., 2022) and are partially at odds with the conclusions of other meta-analyses based on a similar set of studies (Burnette et al., 2022; Sisk et al., 2018). In particular, Tipton et al. (2022) argue that several of Macnamara and Burgoyne's (2022) key findings were artifacts resulting from their use of outdated meta-analytic techniques that were not particularly well suited to addressing the research questions, and that they used questionable procedures to assess study quality and conflict of interest. When reanalyzing Macnamara and Burgoyne's (2022) data with more modern meta-analytic techniques, they reached different conclusions than the original authors: Consistent with previous findings, implicit theory interventions now showed a significant positive effect on academic achievement, even after accounting for publication bias—and this positive effect was more pronounced among at-risk students. Therefore, the conclusions of Macnamara and Burgoyne (2022) seem debatable. Fourth and most importantly, it would be more helpful to explain the considerable heterogeneity in the size of the effects of these interventions—that is, under what circumstances the interventions are particularly effective—rather than arguing about exactly how large their effect is (see Burnette et al., 2022; Tipton et al., 2022; Walton & Yeager, 2020; Yeager & Dweck, 2020). Therefore, in addition to students' at-risk status, recent studies have examined contextual influences on students' implicit theories and the effectiveness of implicit theory interventions, such as whether teachers' implicit theories and instructional practices are consistent with an incremental theory (Yeager et al., 2022; Yu et al., 2022).

However, in the context of this controversy, relatively little consideration has been given to the behavioral effects of implicit theories, even though this is a critical issue for understanding the effects of implicit theories on academic achievement (see Burnette et al., 2022). There are already several studies showing that an incremental theory predicts several behaviors that are relevant to academic success. These behaviors include investing more effort in general (W.-W. Chen et al., 2018; Cury et al., 2008; Mouratidis et al., 2017), actively seeking out challenges (Nussbaum & Dweck, 2008), responding to challenges with increased effort (Dupeyrat & Mariné, 2005; Rickert et al., 2014), persevering despite setbacks (Jones et al., 2012), and taking action to address one's shortcomings (Dresel et al., 2013; Hong et al., 1999; Nussbaum & Dweck, 2008; Shively & Ryan, 2013) rather than self-handicapping (De Castella & Byrne, 2015; Schwinger et al., 2021; Yu & McLellan, 2020) or procrastinating (Howell & Buro, 2009; Mouratidis et al., 2017).

One of these learning-related behaviors that is more prevalent among learners with an incremental theory than among those with an entity theory is the use of effective learning strategies (e.g., Karlen & Compagnoni, 2017; Mega et al., 2014; Vermetten et al., 2001). This topic is important because effective learning strategy use predicts better academic achievement (Credé & Kuncel, 2008; Dent & Koenka, 2016; Hattie & Donoghue, 2016; Richardson et al., 2012). Also, although several studies on implicit theories and learning strategy use have already been conducted, most of them relied on broad-brush self-report measures of strategy use (Bråten & Olaussen, 1998; Dupeyrat & Mariné, 2005; Law, 2009; Martin et al., 2001; Martin et al., 2013; Mega et al., 2014; Ommundsen, 2003; Ommundsen et al., 2005; Stipek & Gralinski, 1996; Stump et al., 2014; Vermetten et al., 2001; Yan et al., 2014). This impairs their ecological validity, as it is well known that what such measures assess can deviate substantially from actual learning behavior (Schellings & van Hout-Wolters, 2011; Veenman, 2011a, 2011b). Moreover, only few of these studies have examined younger learners. This is an important research gap because implicit theories and the associated beliefs and behaviors are usually still in the process of formation during the primary school years (see Barger & Linnenbrink-Garcia, 2016; Dweck, 2002), which means that results obtained with older learners might not generalize to this population. In addition, although one might expect incremental theorists to make greater use of interventions that teach learning strategies (because they are more likely to make use of learning opportunities in general; Hong et al., 1999; Nussbaum & Dweck, 2008), I am not aware of any studies that have examined this.

Therefore, the first focus of this dissertation is the relationship between children's implicit theories and children's use of cognitive and metacognitive learning strategies. Specifically, the goal is to replicate existing results based on typical self-report measures of strategy use, and to test whether such results are also obtained when more behavior-proximal measures of strategy use are employed. An additional goal is to examine whether children's implicit theories are also related to how much use these children make of an intervention that teaches cognitive and metacognitive learning strategies, that is, to what extent they increase their strategy use over the course of such an intervention.

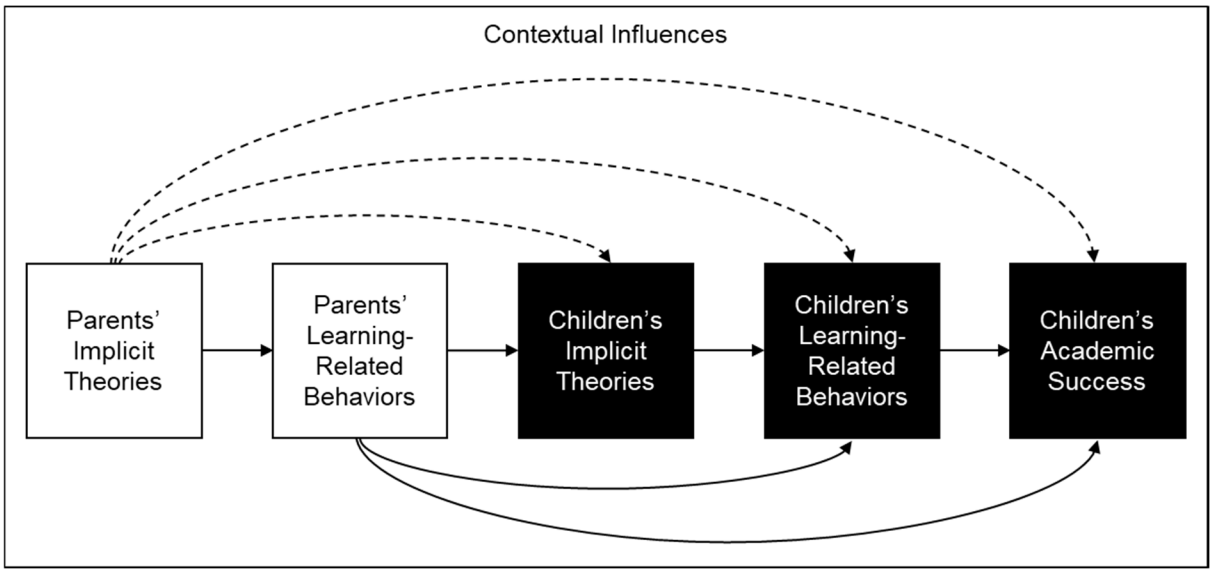
The second focus of this dissertation is how parents' implicit theories relate to children's academic success. This focus was chosen because the effects of parents' implicit theories have received very little attention compared to the extensive research on the effects of learners' implicit theories (see Matthes & Stoeger, 2022; Stern & Hertel, 2020). This represents an important research gap because parents' beliefs and behaviors are known to be crucial to their children's academic success (Gonzalez-DeHass et al., 2005; Jacobs & Eccles, 2000; Pomerantz et al., 2005; Pomerantz et al., 2007). In this context, the goals of this dissertation are to examine whether parents' learning-related behaviors mediate the relationship between parents' implicit theories and children's academic achievement—and whether and under what circumstances parents' implicit theories predict parents' educational decisions (in this case, parents' choice of secondary school type).

The connection between these two focal areas of the dissertation can be illustrated by situating them within the research landscape on implicit theories and academic success (see Figure 1 and Matthes & Stoeger,

2022). The first focus is on the relationship between children's implicit theories and children's learning-related behaviors (in this case, use of cognitive and metacognitive learning strategies). The second focus is on parents' implicit theories, parents' learning-related behaviors, children's implicit theories, and children's academic success. Specifically, I investigated (a) the relationship between parents' implicit theories and children's academic success (in this case, academic achievement), and the mediating role of parents' learning-related behaviors (in this case, controlling behavior and displays of negative affect) and children's implicit theories. In addition to this, I investigated (b) the relationship between parents' implicit theories and parents' learning-related behaviors (in this case, parents' choice of secondary school type), as well as contextual influences on this relationship (in this case, how close children came to not achieving the required grade average to attend the most prestigious secondary school type).

Figure 1

Research Landscape Regarding Implicit Theories and Academic Success



Note. Adapted from Matthes & Stoeger (2022) and slightly modified. Arrows with solid lines represent direct influences, whereas arrows with broken lines represent indirect influences of parents' implicit theories.

1.2. First Focus: Children's Implicit Theories and Learning Strategy Use

1.2.1. Theoretical Background

What might also play a role in the greater academic success of incremental theorists compared to entity theorists is the use of more effective learning strategies. Incremental theorists seem likely to use more effective strategies because they are known to take a more strategic and effortful approach to learning than entity theorists, who tend to believe that those who are competent should be able to succeed without deliberate strategies or too much effort (see Dweck & Master, 2008).

Two families of learning strategies that have received a great deal of research attention (see McCombs, 2017) and are linked to academic success are cognitive and metacognitive strategies (Credé &

Kuncel, 2008; Dent & Koenka, 2016; Hattie & Donoghue, 2016; Richardson et al., 2012). Cognitive learning strategies are techniques that improve learners' processing of information (see Zeidner & Stoeger, 2019). These include strategies such as summarizing the main ideas of a text in one's own words, graphically representing key concepts and how they relate to each other, completing practice tests on the materials, or explaining the materials to another person (see Fiorella & Mayer, 2016). Given the focus on younger learners (primary school students), cognitive strategies for text reduction and main idea identification were examined, which facilitate reading comprehension (Gajria & Jitendra, 2016) and therefore play an important role as early as in primary school (Williams, 1988). Metacognitive strategies, on the other hand, are techniques related to the metacognitive processes of goal setting, planning, self-monitoring, self-control, and self-evaluation (Dent & Koenka, 2016). The specific metacognitive strategies focused on in this dissertation were goal setting and monitoring, as these two play a key role in guiding the learning process (see Dent & Koenka, 2016; Zimmerman, 2008a; Zimmerman & Paulsen, 1995).

Although there are already several studies confirming that, when compared to entity theorists, incremental theorists tend to use both more cognitive learning strategies (Bråten & Olaussen, 1998; Law, 2009; Martin et al., 2001; Martin et al., 2013; Mega et al., 2014; Ommundsen, 2003; Ommundsen et al., 2005; Stipek & Gralinski, 1996) and more metacognitive learning strategies (Bråten & Olaussen, 1998; Dupeyrat & Mariné, 2005; Law, 2009; Mega et al., 2014; Ommundsen, 2003; Stipek & Gralinski, 1996; Stump et al., 2014; Vermetten et al., 2001), these studies show deficits in terms of their ecological validity. This is because almost all of them rely on broad-brush self-report measures of strategy use, that is, on items that ask respondents about the extent to which they use particular strategies when learning, which force respondents to generalize over a wide range of situations. Such measures have been criticized (see Schellings & van Hout-Wolters, 2011; Veenman, 2011a, 2011b), mainly due to the lack of correspondence between them and actual learning behavior (Artelt, 2000; Cromley & Azevedo, 2007; Howard-Rose & Winne, 1993). In addition, even most of the few studies that employed more behavior-proximal measures of strategy use have utilized laboratory tasks that bore little similarity to academic learning (Beckmann et al., 2012; Tabernero & Wood, 1999; Wood & Bandura, 1989). To my knowledge, only two studies have examined whether implicit theories predict behavior-proximal measures of strategy use in situations that might arise in academic learning (Greene et al., 2010; Karlen & Compagnoni, 2017)—and both studies found no relationship between implicit theories and learning strategy use. Moreover, I am aware of only two studies that have investigated younger students (Law, 2009; Stipek & Gralinski, 1996), and both have used broad-brush self-report measures of strategy use. This lack of studies with younger students represents another research gap, as examining predictors of learning strategy use for this population seems particularly interesting because primary school students represent an important target group for learning strategy instruction (see Dignath et al., 2008).

Finally, I am not aware of any study that has examined whether learners' implicit theories predict how well learners respond to learning strategy interventions—that is, whether learners with more of an incremental theory make better use of interventions that teach learning strategies. Given the

importance of learning strategy instruction (see Dignath et al., 2008), this constitutes another research gap. Such an effect of implicit theories seems plausible, as incremental theorists tend to approach their learning more strategically than entity theorists (see Dweck & Master, 2008), to focus more on the development of their competencies (Burnette et al., 2013), and to be more willing to take advantage of learning opportunities (Hong et al., 1999; Nussbaum & Dweck, 2008).

1.2.2. Research Questions

To address these research gaps, I first examined whether the strength of children's incremental theory was positively related to their extent of cognitive and metacognitive learning strategy use. To this end, I employed typical self-report measures of strategy use to replicate existing findings, as well as more behavior-proximal measures of strategy use.

Second, I investigated whether the strength of children's incremental theory was positively related to how much use these children made of an already evaluated intervention that teaches cognitive and metacognitive learning strategies (see Stoeger et al., 2014). The more children hold an incremental theory, the more they should increase their use of cognitive and metacognitive strategies (measured with both typical self-report scales and more behavior-proximal measures) over the course of such an intervention.

1.2.3. Method

The participants were third- and fourth-grade primary school students ($N = 436$; average age 9.7 years, $SD = 0.6$ years) from 20 classrooms at 19 schools in Bavaria. Of these students, 54% were female. In 15% of the cases, either the student or one of parent had been born outside Germany. In 22% of the cases, at least one of the student's parents had a university degree.

In terms of the study procedure, students completed self-report scales on cognitive and metacognitive strategy use prior to the intervention, as well as a scale assessing their implicit theories and a test of reading comprehension (which served as a control variable). Students were then introduced to the cognitive and metacognitive strategies under investigation by their teachers. They then tried out these strategies on five factual texts over the course of a week. All these texts were of comparable length and difficulty, and each contained ten main ideas that students attempted to identify using the cognitive strategies. During this week, students filled out a learning diary that provided the behavior-proximal measures for cognitive and metacognitive strategy use. Then, for the following four weeks, students participated in the intervention and completed the same tasks as in the first week. During these four weeks, students continued to fill out the learning diaries and received feedback from their teachers to proceduralize the strategies. After the intervention, students again completed the self-report scales for cognitive and metacognitive strategy use.

With regard to the measures, the strength of children's incremental theory was assessed using a version of Ziegler and Stoeger's (2010) 6-item scale that had been modified to refer to implicit theories about school-related ability (Cronbach's $\alpha = .68$). To measure reading comprehension, 24 items from the Hamburg Reading Test for Grades 3 and 4 (HAMLET 3–4; Lehmann et al., 2006) were

employed (Cronbach's α = .77). The self-report scales used to assess cognitive strategy use (4 items, Cronbach's α = .70 before the intervention) and metacognitive strategy use (24 slightly modified items from the FSL-7; Ziegler, Stoeger, & Grassinger, 2010; Cronbach's α = .84 before the intervention) targeted those strategies that had been introduced prior to the intervention. The behavior-proximal measure of cognitive strategy use was performance in the training task (weekly averages for number of correctly identified main ideas; Cronbach's α from .78 to .85). The behavior-proximal measures for metacognitive strategy use were strategy monitoring (weekly averages for a Likert-scale item that had been answered after working on the respective text; Cronbach's α from .91 to .96) and adequacy of goal setting (deviation between correctly identified main ideas and the goal recorded at the beginning of the respective week).

Mixed linear regression models were used to simultaneously examine whether children with a stronger incremental theory showed (a) higher values for learning strategy use and (b) greater increases in these values over the course of the intervention. In all models, I controlled for reading comprehension.

1.2.4. Results and Discussion

Regarding the relationship between children's implicit theories and pre-intervention learning strategy use, strength of incremental theory was unrelated to the self-report scale for cognitive strategy use, but positively related to the self-report scale for metacognitive strategy use. With respect to the behavior-proximal measures of strategy use, strength of incremental theory was positively related to pre-intervention performance in the training task (measure of cognitive strategy use) and pre-intervention strategy monitoring (first measure of metacognitive strategy use), but unrelated to pre-intervention adequacy of goal setting (second measure of metacognitive strategy use). In summary, these results are generally consistent with the assumption that children with a more incremental theory use more cognitive and metacognitive learning strategies. The null findings for the cognitive strategy scale and the measure for adequacy of goal setting might have occurred because most children had little experience with these strategies before the intervention.

Next, it was examined whether implicit theories predicted the extent to which children made use of the intervention, that is, whether implicit theories predicted growth rates for the five measures of strategy use. Here, none of the hypotheses was confirmed. Strength of incremental theory was unrelated to the magnitude of the increase in values for the cognitive and metacognitive strategy scales, as well as for strategy monitoring and adequacy of goal setting. There was even a negative relationship between strength of incremental theory and the magnitude of the increase in performance on the training task. This unexpected relationship might have to do with the fact that strength of incremental theory predicted higher values for correctly identified main ideas before the intervention, making further increases in performance during the intervention less likely. A possible reason for the general lack of a relationship between children's implicit theories and the extent to which children increased their use of cognitive and metacognitive learning strategy use could be the fact that an individual reference norm was

communicated as part of the intervention (see Stoeger et al., 2014): Students were told to focus on how their performance in the training task and their strategy use improved, rather than comparing themselves to other students—which might have overridden the effect of students' implicit theories.

1.3. Second Focus: How Parents' Implicit Theories Relate to Children's Academic Success

1.3.1. Theoretical Background

Given the importance of learners' implicit theories for their academic success, it seems reasonable to ask whether parents' implicit theories also affect their children's academic success. After all, it can be expected that parents with a more incremental theory will exhibit behaviors that facilitate their children's academic success for similar reasons that learners with a more incremental theory exhibit behaviors that facilitate their own academic success. However, compared to the impact of learners' implicit theories on their academic success, very little attention has been paid to this topic (see Matthes & Stoeger, 2022). With respect to strength of parent's incremental theory and child behaviors conducive to academic success, most of the few existing studies find a positive relationship. Jose and Bellamy (2012) found that the more strongly parents held an incremental theory, the less helplessly their children responded to failures they experienced on a puzzle task in the laboratory. In a similar vein, Đurović et al. (2019) found that the less parents held an entity theory, the more their children reported mastery-oriented behaviors instead of helpless behaviors. In addition, Schleider et al. (2016) found that the more strongly parents held an incremental theory, the less fearful their children were of being negatively evaluated by others. However, in Pomerantz and Dong's (2006) study, parents' implicit theories were not directly related to children's attributions for achievement outcomes and the strength of their preferences for challenging tasks, but acted as a moderator. Specifically, children whose mothers perceived their children's academic competence as low showed less favorable attributional styles and a lower preference for challenging tasks. However, when the mothers simultaneously held a strong incremental theory, children's attributions and preferences were more favorable.

Yet studies that examined the relationship between parents' incremental theory and children's academic achievement generally did not find the positive relationship that might be expected based on these findings about children's behaviors. Pomerantz and Dong (2006) found only the moderator effect they had also observed for attributions and preference for challenging tasks: A stronger incremental theory among mothers was positively related to children's academic achievement only if mothers exhibited simultaneously low ratings of their children's academic competence. Đurović et al. (2019) and Rautiainen et al. (2016) even found a negative relationship between parents' more incremental theory and their children's academic achievement (measured in the form of a cognitive school aptitude test and teacher judgements, respectively). The authors explained these counterintuitive results by suggesting

that parents of children who do not do well in school want to believe more strongly in the malleability of cognitive abilities and are therefore more inclined to adopt an incremental theory.

What Mediates the Relationship Between Parents' Implicit Theories and Children's Academic Success?

These mixed results point to the need to investigate possible mediators to understand how exactly parents' implicit theories are related to children's academic success: If such a relationship exists, it can be assumed that it is an indirect one (see Figure 1). One likely candidate for such a mediating mechanism is the transfer of implicit theories from parents to children through modeling, as such a transfer also seems to take place for several other motivationally relevant beliefs for which a positive correlation between parents' and children's beliefs can be observed (e.g., perceptions of the child's level of ability; Frome & Eccles, 1998; educational aspirations; Jodl et al., 2001; goal orientations; Friedel et al., 2007). Another likely candidate for a mediating mechanism consists of parents' learning-related behaviors with relevance to children's academic achievement (see Pomerantz et al., 2007). Initial evidence for this is provided by the only study I am aware of that examined whether parents' learning-related behaviors mediate the relationship between parent's implicit theories and children's academically relevant outcomes (Jose & Bellamy, 2012). This study found that the positive relationship between parents' more incremental theory and children's lower helplessness was mediated in part by parents reporting that they encouraged their children more in the face of difficult tasks.

There are several different learning-related parenting behaviors that are important for children's academic success (see Pomerantz et al., 2007) and that might also be related to parents' implicit theories. The first of these is exhibiting autonomy-supportive instead of controlling behavior, that is, letting the child initiate their own behavior and providing rationales for limitations of choice rather than taking over and applying pressure (see Reeve, 2009; Soenens & Vansteenkiste, 2010). The second behavior is displaying positive instead of negative affect, and the third behavior is providing process-focused rather than person-focused feedback, that is, stressing the importance of strategies and effort for achievement outcomes rather than the importance of rather stable traits like intelligence (see Gunderson et al., 2018; Kamins & Dweck, 1999).

It seems reasonable to expect that parents with a more incremental theory will exhibit more positive learning-related parenting behaviors because incremental theorists do not place as much importance on (poor) performance outcomes (Rattan et al., 2012) and instead focus more on the learning process itself (J. A. Chen, 2012; Dickhäuser et al., 2016). Also, because incremental theorists tend to view learning difficulties as surmountable (Rattan et al., 2012), parents who are incremental theorists should be more likely to remain calm and solution-oriented when challenges or setbacks arise in the context of learning (see also Grolnick, 2003, for a similar line of argument).

Accordingly, a few studies have already provided evidence that parents with a more incremental theory tend to exhibit less controlling behavior and negative affect toward their children. In a

study by Moorman and Pomerantz (2010), mothers helped their children solve tasks from an intelligence test in the laboratory. Prior to this, mothers received either an incremental theory manipulation or an entity theory manipulation. As a result, mothers who had received the incremental theory manipulation were less likely to intervene in a controlling manner and expressed less negative affect than mothers who had received the entity theory manipulation. In addition, mothers who had received the entity theory manipulation showed increased controlling behavior and displays of negative affect when their child exhibited frustration and helplessness. Finally, Muenks et al. (2015) found that parents with a stronger incremental theory reported more autonomy-supportive behaviors when asked how they would react if their child had difficulties in math and reading.

However, some of the studies about parents' implicit theories and parents' learning-related behaviors have yielded unexpected results—particularly those that assessed process-focused versus person-focused feedback. Similarly unexpected results have been obtained in studies that investigated whether parents' implicit theories predict children's implicit theories. Gunderson et al. (2013) coded naturally occurring remarks from parents and assessed how parents praised their children's successes based on these remarks. Contrary to expectations, the proportion of parents' process-focused praise did not correlate with parents' implicit theories. Haimovitz and Dweck (2016) also found no relationship between parents' implicit theories and their self-reported responses to their children's setbacks (learning- and process-focused vs. achievement- and person-focused). Boncquet et al. (2022) found that parents' implicit theories were mostly unrelated to children's reports of how much their parents utilized process-focused and person-focused feedback and either unrelated or weakly related to parents' reports of feedback behavior ($|r| = .08$ to $.15$). Also, in Gunderson et al. (2013), parents' implicit theories were unrelated to their children's implicit theories. The same finding was obtained by Haimovitz and Dweck (2016).

To explain these mixed results, Haimovitz and Dweck (2017) suggested that parents' implicit theories might play a greater role in situations that make children's intellectual potential salient to parents, such as when parents must make an educational decision for their child (e.g., when choosing which school to send their child to). Thus, if the goal is to examine the effect of parents' implicit theories on children's implicit theories, parents' learning-related behaviors, and children's academic success, it seems most fruitful to do so in the context of educational transitions (e.g., before the transition from primary to secondary school), when parents are contemplating their child's future academic path and therefore are increasingly likely to reflect on their child's intellectual potential.

The Role of Parents' Implicit Theories for Parents' Educational Decisions

When examining the relationship between parents' implicit theories and children's academic success, existing studies have operationalized academic success in terms of academic achievement (Pomerantz & Dong, 2006, assessed grades, Rautiainen et al., 2016, teacher' assessments of academic ability, and Đurović et al., 2019, performance on a standardized school aptitude test). Yet another important aspect

of educational success that has not been considered so far in the context of implicit theories is the trajectory of students' academic careers (e.g., whether they get to attend university). Crucial to the trajectory of students' academic careers are educational transitions, such as the transition from primary school to secondary school (see Dustmann, 2004; Schnepf, 2002). Such transitions frequently require a decision about which educational institution to attend. In this context, parents' choice of secondary school in particular has received considerable research attention (see Stocké et al., 2011). Such choices are important to children's academic success because they affect the development of children's competencies and their future educational opportunities (Dronkers & Robert, 2008; Schnepf, 2002). For example, in Germany, the decision to send one's child to the most prestigious and demanding secondary school type, the *Gymnasium*, has been shown to lead to better development of competencies than choosing one of the other school types (Becker et al., 2006; Becker et al., 2012; Guill et al., 2017; Köller & Baumert, 2001). In addition, the *Gymnasium* is the only school type that offers a direct path to university (see Entorf & Davoli, 2019)—and transferring to a *Gymnasium* from one of the other secondary school types later on is difficult and rare (see Schneider, 2008).

It seems very likely that parents' implicit theories play a role in parents' educational decisions, that is, that parents with a more incremental theory will make educational decisions that are more challenging to their children. This can be expected because incremental theorists tend to trust others to overcome challenges (Rattan et al., 2012), suggesting that parents who are incremental theorists should also tend to trust their children to overcome academic challenges. In addition, if parents have reasons to doubt their child's current academic ability, their implicit theories should influence their educational decisions even more. This is because the impact of implicit theories on beliefs and behaviors tends to be stronger when difficulties or setbacks occur (Burnette et al., 2013). In addition, there is a study which found that parents' implicit theories predicted children's academic functioning only when parents simultaneously rated their children's academic ability as low (Pomerantz & Dong, 2006).

1.3.2. Research Questions

To address the research gap regarding the mechanisms that mediate the relationship between parents' implicit theories and their children's academic success, I first investigated whether children of parents with a stronger incremental theory exhibited better academic achievement. Second, I investigated if parents' implicit theories predicted children's implicit theories. Third, I examined whether this relationship was partially mediated by (a) children's implicit theories—and by parents' learning-related behaviors that previous studies have shown to be correlated with implicit theories, that is, by (b) less controlling behavior and (c) less homework-related conflict (as a measure of negative affect).

To address the research gap on parents' implicit theories and educational decisions, I focused on the educational decisions that parents must make during the transition from primary to secondary school in the German federal state of Bavaria. Here, children can only transfer to a *Gymnasium* if they achieve a minimum grade average of 2.3. However, if children meet this threshold, it is their parents who decide

whether they send their child to a *Gymnasium*—and only about 75% of parents whose children are eligible actually do so (Staatsinstitut für Schulqualität und Bildungsforschung München, 2015). In this context, I examined if parents with a more incremental theory were more likely to send their children to a *Gymnasium* (provided that the child had achieved the required grade average). Moreover, I investigated whether this effect became stronger if children just barely reached the required grade average.

1.3.3. Method

Participants in the study examining the mediators between parents' implicit theories and children's academic success were 723 parents with children in fourth grade from 46 different Bavarian classrooms. These participants were part of the same sample as the participants of the study about children's implicit theories and learning strategy use. Parent questionnaires were addressed to the parent or guardian who had the most contact with the child. Most of these parent questionnaires were completed by the child's mother (87%).

Participants in the study that investigated the role of parents' implicit theories in parents' educational decisions were 578 fourth-graders from 38 classrooms in 27 Bavarian primary schools and their parents. They were part of the same sample as the participants from the study examining the mediators between parents' implicit theories and children's academic success. To test the hypotheses, all the children who had achieved the required grade average for *Gymnasium* were considered ($N = 305$).

The extent of parents' and children's incremental theory was assessed using two different versions of Ziegler and Stoeger's (2010) 6-item scale that had been modified to refer to (a) children's implicit theories about their school-related ability (Cronbach's $\alpha = .65$) and (b) parents' implicit theories about their children's school-related ability (Cronbach's $\alpha = .67$), respectively. Parents also reported the extent of their controlling behavior on a 5-item scale (Cronbach's $\alpha = .75$) from Wild et al. (2006) and the extent of homework-related conflict on a 3-item scale (Cronbach's $\alpha = .90$) from Niggli et al. (2007). In addition, parents' education was assessed with forced-choice items about the father's and mother's educational attainment, which were used to determine the highest educational attainment of both parents. Both children's academic achievement (grade average in German, mathematics, and basic science from the last report card) and parents' choice of school type were reported by the children's teachers.

A structural equation model was used to test the hypotheses about the mediators between parents' implicit theories and children's academic success. In this model, latent variables were employed to represent parents' incremental theory, children's incremental theory, parents' controlling behavior, and homework-related conflict. The hypotheses about the role of parents' implicit theories in parents' educational decisions were tested using logistic regression models to predict whether parents sent their child to a *Gymnasium*. Parents' education was used as a control variable in all these regression models because it had been shown to have strong predictive power for parents' educational decisions in previous studies (Ditton & Krüsken, 2006; Schnabel et al., 2002; Schneider, 2008).

1.3.4. Results and Discussion

As expected, the more parents held an incremental theory, the better their children's academic achievement was. Also, consistent with expectations, children of parents who held a more incremental theory also held a more incremental theory—and parents who held a more incremental theory reported both less controlling behavior and less homework-related conflict. Most importantly, the positive relationship between parents' incremental theory and children's academic achievement was mediated in part by (a) children holding a more incremental theory, as well as parents reporting (b) less controlling behavior and (c) less homework-related conflict. This suggests that children of parents who hold more of an incremental theory (compared to children of parents who hold more of an entity theory) might be more academically successful, in part because they tend to share their parents' incremental theory and because their parents tend to behave in a more patient and learning-oriented manner toward them.

Regarding parents' choice of school type, as in previous studies, parents with higher levels of education were much more likely to send their children to a *Gymnasium*. In addition, even when parents' education was controlled for, children with a better grade average were more likely to be sent to a *Gymnasium*. Confirming my hypothesis, even when controlling for parents' education and children's grade average, parents with a more incremental theory were more likely to send their child to a *Gymnasium*. Moreover, there was a significant interaction between children's grade average and parents' incremental theory (even when controlling for parents' education). Further examination of this interaction revealed that, as expected, the closer children's grades were to the threshold of not qualifying for a *Gymnasium*, the more strongly parents' incremental theory predicted parents' choice of *Gymnasium*. Consistent with expectations, when children easily met the threshold (i.e., when their grade average was one standard deviation above the sample mean), strength of parents' incremental theory was unrelated to parents' choice of school type. This implies that the effect of parents' incremental theory on school type choice might be stronger if parents have reasons to doubt that their children can succeed academically.

1.4. Concluding Discussion

1.4.1. Discussion of the Main Results

First Focus: Children's Implicit Theories and Learning Strategy Use

The results for the first focus provide further evidence that the more learners endorse an incremental theory, the more they use cognitive and metacognitive learning strategies. Thus, they confirm the findings of studies that have used broad-brush self-report measures to assess cognitive strategy use (Bråten & Olaussen, 1998; Karlen & Compagnoni, 2017; Law, 2009; Martin et al., 2001; Martin et al., 2013; Mega et al., 2014; Ommundsen, 2003; Ommundsen et al., 2005; Stipek & Gralinski, 1996; Yan et al., 2014) and metacognitive strategy use (Bråten & Olaussen, 1998; Dupeyrat & Mariné, 2005; Law, 2009; Mega et al., 2014; Ommundsen, 2003; Stipek & Gralinski, 1996; Stump et al., 2014; Vermetten et al.,

2001) with findings obtained in an ecologically valid setting and with more behavior-proximal measures of strategy use. Moreover, the results suggest that the positive relationship between a stronger incremental theory and the use of more cognitive and metacognitive learning strategies also exists among younger learners, for whom few studies exist (Law, 2009; Stipek & Gralinski, 1996). This is consistent with the notion that implicit theories can play a role as early as in primary school (Haimovitz et al., 2011; Kinlaw & Kurtz-Costes, 2007), even though the meaning system associated with implicit theories is not fully developed at that point (see Barger & Linnenbrink-Garcia, 2016; Dweck, 2002).

However, no relationship was found between children's implicit theories and the extent to which children increased their use of cognitive and metacognitive learning strategies over the course of an intervention that taught such strategies. This suggests that such interventions are effective even with children who lean more towards an entity theory.

Second Focus: How Parents' Implicit Theories Relate to Children's Academic Success

Regarding the implicit theories of parents, the first aim was to investigate what mediates the relationship between them and children's academic success. As expected, children of parents with a stronger incremental theory demonstrated better academic achievement. In addition, the stronger parents' incremental theory was, the less parents reported unconstructive learning-related behaviors, and the more their children held an incremental theory as well. Finally, the positive relationship between parents' endorsement of an incremental theory and their children's greater academic achievement was mediated in part by learning-related parenting behavior (i.e., by parents behaving in a less controlling manner and by exhibiting less negative affect), as well as by a stronger incremental theory among children. This has several implications. First, in contrast to previous studies (Đurović et al., 2019; Gunderson et al., 2013; Haimovitz & Dweck, 2016; Pomerantz & Dong, 2006; Rautiainen et al., 2016), the results provide evidence that children of parents with a more incremental theory might indeed be more likely to also adopt an incremental theory and to perform better in school—provided that the context under investigation makes children's intellectual potential salient to parents (as the impending transition to secondary school presumably did in my studies). This fits well with Haimovitz and Dweck's (2017) suggestion that parents' implicit theories might play a larger role in such salience-increasing situations. Moreover, these results confirm previous findings that parents with a more incremental theory tend to be less controlling and to express less negative affect toward their children in learning contexts (Moorman & Pomerantz, 2010; Muenks et al., 2015). Most importantly, the findings suggest that children of parents who adhere more to an incremental theory (compared to parents who adhere more to an entity theory) might be more academically successful in part because their parents tend to behave toward them in a more patient and learning-oriented manner. Therefore, these parental behaviors might be a better candidate for mediating mechanisms than whether parents provide person-focused or process-focused feedback, which was not predicted by parents' implicit theories in previous studies (Gunderson et al., 2013; Haimovitz & Dweck, 2016).

The second aim was to examine the role of parents' implicit theories in parents' educational decisions. As expected, among parents whose children had achieved the grade average required to attend a *Gymnasium*, parents were more likely to send their children to this type of school if they held a stronger incremental theory. This finding provides further evidence for the importance of parents' implicit theories for their children's academic success beyond academic achievement. Moreover, this finding adds to the list of behaviors that are more common among parents who hold a more incremental theory: It indicates that not only do these parents tend to be more encouraging of their children when they have to deal with difficult tasks (Jose & Bellamy, 2012), more autonomy supportive (Muenks et al., 2015), more likely to engage their children in math- and reading-related activities (Muenks et al., 2015), and more involved in their children's schooling in general (Jiang et al., 2019)—but that these parents also tend to make more ambitious educational decisions for their children.

Also, as expected, the effect of parents' incremental theory on parents' educational decisions was moderated by their children's grade average: The closer children were to the threshold of not being allowed to attend a *Gymnasium*, the more important parents' implicit theories were for their choice of school type. This fits well with evidence that the effect of implicit theories is amplified in situations that threaten a person's perceived abilities (see Burnette et al., 2013), as well as with evidence that such situations are sometimes necessary for implicit theories to have an impact (Davis et al., 2011; Dunning, 1995; Snyder et al., 2014). It also aligns well with some findings about the effects of parents' implicit theories. For instance, Pomerantz and Dong (2006) also found a moderation effect with respect to parents' implicit theories: Whereas children generally exhibited poorer academic functioning when parents perceived children's academic ability to be low, this negative effect was attenuated when parents held an incremental theory. Similarly, Moorman and Pomerantz (2010) found that mothers who received an entity theory manipulation (compared to mothers who received an incremental theory manipulation) responded with more controlling behavior and negative affect when their child exhibited helplessness while working on a challenging task in the laboratory.

1.4.2. Limitations

However, the studies in my dissertation also have some limitations. For instance, the specific context of the studies (Bavaria, Germany, at the end of primary school) limits generalization to other contexts. Therefore, particularly for the effects of parents' implicit theories, it is important to examine them in different school systems (e.g., in the United Kingdom and the United States) and at different points in students' academic careers (e.g., at the secondary school level and during the transition to university).

There are also limitations inherent in some of the measures. First, the behavior-proximal measures of learning strategy use could be improved. An issue of the measures of monitoring and goal setting is that they are reactive, that is, that students were prompted to record a goal at the beginning of each week and to report their amount of strategy monitoring after completing each text. This raises the question of whether this might have prompted students who did not use a particularly strategic

approach to nonetheless report the use of learning strategies. Also, the number of correctly identified main ideas cannot be considered a pure measure of the effectiveness of cognitive strategy use. Although reading comprehension was included as a covariate to partially mitigate this problem, the number of correctly identified main ideas probably also depends on students' general ability to identify main ideas (which might differ from reading comprehension). To address these issues, future studies could use even more sophisticated measures of strategy use. For example, they could have students verbalize their thoughts as they work on a learning task and code these verbalizations (as was done in the study of Greene et al., 2010). Another possible approach would be to analyze traces of students' learning as they navigate a virtual learning environment, such as which text passages they highlight an the extent to which they use supporting resources (see Zimmerman, 2008b).

Second, it remains to be seen whether the results can be replicated with different scales for implicit theories. The scale I employed exhibited a rather low reliability (Cronbach's αs of below .70) and has some characteristics that distinguish it from the scales used in most other studies. Specifically, the scale assessed implicit theories about school-related ability rather than intelligence, and about one's own ability (for the scale filled out by children) or about one's child's ability (for the scale filled out by parents) rather than about abilities in general. However, this also points to a general issue that occurs especially in research on parents' implicit theories, namely that the scales used to assess parents' theories are very heterogenous, which might contribute to the mixed findings in this area. Aside from whether studies assess general beliefs about the nature of abilities (e.g., Gunderson et al., 2013; Haimovitz & Dweck, 2016) or beliefs about the nature of the child's abilities (Jose & Bellamy, 2012; Rautiainen et al., 2016), assessments also differ in their degree of specificity. Whereas some studies ask very broadly about the extent to which parents believe intelligence is malleable (as Carol Dweck and her collaborators typically do; e.g., Gunderson et al., 2013; Haimovitz & Dweck, 2016), others ask about more specific domains such as the malleability of mathematical and verbal abilities (Muenks et al., 2015). Finally, many studies treat implicit theories as a bipolar continuum from entity theory to incremental theory, as we did in our studies. That is, these studies use only a single scale to assess implicit theories and interpret disagreement with entity theory items as indicating an incremental theory, and vice versa (e.g. Gunderson et al., 2013; Muenks et al., 2015). Less common are studies that treat incremental theory and entity theory as two distinct constructs and consequently use two separate scales to assess them (such as the study by Jose & Bellamy, 2012; see also Lüftenegger & Chen, 2017). However, treating implicit theories as a bipolar continuum is not without controversy, as the expected strong negative correlation between separate scales for incremental theory and for entity theory is often not found empirically (see Lüftenegger & Chen, 2017). To address these concerns, future studies should use Dweck's items for implicit theories about intelligence (see Blackwell et al., 2007; Hong et al., 1999) and calculate separate scores for the entity theory and incremental theory items, respectively. They might also include items for implicit theories about domain-specific abilities (such as verbal and mathematical ability) to test whether the results generalize to these more narrowly defined implicit theories.

In addition, the direction of causality is not clear because of the predominantly cross-sectional design of the studies. For example, it cannot be ruled out that children's learning strategy use might also influence children's implicit theories. Increased use of learning strategies might, for instance, lead to the realization that learning success is highly dependent on the chosen approach (see Zimmerman, 2000, 2008a)—and is not just a matter of innate ability. In addition, children's academic achievement might also influence parents' learning-related behaviors. The interpretation of the results would be especially complicated if children's academic achievement influenced parents' implicit theories. However, it is not clear what to expect regarding such an influence, as there is especially little research about the antecedents of parents' implicit theories (although there is some evidence that implicit theories are generally unrelated to education and broad personality traits; see Burnette et al., 2013). Also, adults' implicit theories exhibit some stability over time (Pomerantz & Dong, 2006; Robins & Pals, 2002), which suggests that implicit theories are an established part of a person's belief system. If children's academic achievement were indeed to affect the strength of parents' incremental theory, it seems unclear whether this influence would be positive or negative. On the one hand, children's poor academic performance might lead parents to adopt more of an incremental theory because this motivates them to attribute performance to modifiable causes (as argued by Rautiainen et al., 2016, who found a negative relationship between parents' incremental theory and children's academic achievement). On the other hand, repeated poor performance of their children might cause parents to partially lose their belief that ability deficits can be remedied, leading them to adopt more of an entity theory (consistent with the findings of Dai & Cromley, 2014, who found that students' poor performance in a biology course predicted that they would change their implicit theories about ability in biology toward an entity theory). Most importantly, although we cannot draw conclusions about the direction of effect in our studies, a causal influence of implicit theories would be consistent with previous experiments and interventions. There is evidence that manipulating individuals' implicit theories in the laboratory can produce the expected behavioral effects, such as that mothers who had received an entity manipulation show more unconstructive involvement in their children's work on a task than mothers who had received an incremental theory manipulation (Moorman & Pomerantz, 2010). Regarding interventions, Yeager et al. (2019) have shown that teaching an incremental theory can increase students' academic performance. However, drawing conclusions about the direction of causality would require longitudinal studies or intervention studies that alter implicit theories.

Finally, the studies in this dissertation feature several unobserved variables and possible third-variable influences. First, when examining the effects of parents' implicit theories, it would be helpful to also consider parents' beliefs about the extent of children's academic ability. However, although one might expect some overlap between these and parents' implicit theories, these two variables seem to be largely unrelated (Muenks et al., 2015). Second, it would be helpful to include a more nuanced assessment of children's actual abilities as a control variable. For example, a measure of children's general cognitive ability would have been a useful control variable both when predicting children's learning strategy use (where reading comprehension was used as a covariate) and when predicting parents' choice of school

type (where children's grades were used as a covariate). Third, when examining the effect of parents' implicit theories on parents' choice of school type, a more nuanced assessment of parents' socioeconomic status (as a control variable) would be helpful. In my third study, only a somewhat rough estimate of parents' educational level (highest educational attainment of both parents) was used as a control variable. In addition to using a more sophisticated indicator of parental education, future studies should also control for other aspects of socioeconomic status that predict students' academic achievement and parents' educational decisions, such as income and occupational prestige (Bosetti & Pyryt, 2007; Ditton et al., 2005; Goldring & Phillips, 2008; Schnabel et al., 2002; Sirin, 2005). It would also be helpful to control for other parental variables that are closely related to socioeconomic status when investigating the effect of parents' implicit theories, such as parents' home resources (Schnepf, 2002; Sirin, 2005; Wagner et al., 2010) and their educational aspirations and expectations for their children (Cabrera, 2001; Fan & Chen, 2001).

1.4.3. Future Research

The findings discussed above suggest several possible avenues for future research on how children's and parents' implicit theories are related to children's academic success and to behaviors that are relevant to academic success. The first of these avenues is broadening the focus from domain-general implicit theories to those about more specific ability domains. Whereas most studies that have examined the relationship between students' implicit theories and their academic achievement have assessed implicit theories about intelligence or domain-general ability, those that assessed implicit theories about more domain-specific abilities (e.g., mathematical and verbal ability) found stronger associations between implicit theories and academic achievement (Costa & Faria, 2018). Assessing implicit theories about domain-specific abilities would also be helpful in addressing the concern that measures of implicit theories about intelligence might be distorted by different respondents interpreting the term intelligence differently (Limeri et al., 2020). One type of domain-specific implicit theory that might be particular fruitful for predicting academic success and relevant behaviors is implicit theories about the ability for self-regulation (see Hertel & Karlen, 2021; Karlen et al., 2021; Stern & Hertel, 2020). Hertel and Karlen (2021), for instance, found that students who more strongly endorsed an incremental theory about self-regulation tended to have greater metacognitive knowledge and to report more metacognitive learning strategy use. In contrast, having an incremental theory about intelligence was unrelated to having an incremental theory about self-regulation, as well as to metacognitive knowledge and metacognitive strategy use. In a similar vein, Karlen et al. (2021) found that students who held more of an incremental theory about self-regulation performed better on a test of metacognitive knowledge, showed better academic achievement, and reported more positive learning-related emotions. Thus, parents' and children's implicit theories about self-regulatory ability might be particularly helpful in predicting the extent to which children use effective learning strategies.

In addition to considering implicit theories for specific domains, future studies could also use measures based on Ziegler and Stoeger's (2010) approach, which represents an extension and modification

of Dweck's (2013) conceptualization of implicit theories. Ziegler and Stoeger (2010) base their approach on their systemic Actiotope Model of Giftedness (see Ziegler, 2005), which posits that talent development entails a stepwise expansion of an individual's action repertoire that requires both individual and environmental resources, as well as a great number of well-planned and challenging learning episodes. With respect to beliefs about abilities, the authors point out that it should be adaptive to view abilities as changeable only when ability deficits are present, but that it should be adaptive to view existing abilities as stable. Accordingly, they differentiate between modifiability beliefs (i.e., the extent to which a learner believes that they can modify ability deficits) and stability beliefs (i.e., the extent to which a learner believes that they will retain newly acquired abilities over the long term). Whereas modifiability beliefs are similar to the incremental theory from Dweck's (2013) conceptualization (the main difference is that the corresponding items ask respondents about their believes regarding their own abilities instead of regarding abilities in general), stability beliefs represent a different type of implicit theory. In addition to emphasizing the importance of modifiability and stability beliefs per se for the maintenance of learning, Ziegler and Stoeger (2010) also argue that optimal learning requires high levels of both modifiability and stability beliefs (i.e., their predictive models also include the interaction between these two types of beliefs). Accordingly, they demonstrated that their measures showed higher predictive power than Dweck's items (Dweck et al., 1995b) for several academically relevant outcomes when all measures were applied to the domain of mathematics, such as greater academic achievement, more invested effort, greater learning goal orientation, more confidence in one's own abilities, greater aspirations, and less helplessness. When applying their approach to gifted students from four different countries and to the domain of general school-related abilities, Ziegler, Fidelman, et al. (2010) also showed higher predictive power for stability and modifiability beliefs than for Dweck's items regarding outcomes such as less helplessness, more adaptive reactions to setbacks, higher levels of interest, greater learning goal orientation, greater aspirations, and higher teacher-rated academic ability. Thus, application of this modified approach might increase the predictive power of implicit theories for academic success and related beliefs and behaviors. Also, in addition to applying the approach to the beliefs of learners about their own abilities, it might also be fruitful to apply it to parents' beliefs about their children's abilities.

Another type of implicit theory that seems worth investigating, particularly among parents and in the context of children's academic success, are failure mindsets (see Haimovitz & Dweck, 2016). Failure mindsets are beliefs about the meaning of failure, that is, whether failure interferes with learning and performance and should therefore be avoided, or whether failure promotes learning and performance (see Haimovitz & Dweck, 2017). Although one might initially expect there to be a strong positive relationship between having an incremental theory and a positive failure mindset, this relationship is only moderately strong (r = .29; Haimovitz & Dweck, 2016, Study 1), comparable to the relationship between incremental theory and positive effort beliefs (r = .35; see Yeager & Dweck, 2020). Haimovitz and Dweck (2017) argued that it is not parents' implicit theories that shape children's implicit theories and determine whether parents provide person- or process-focused feedback, but parents' failure beliefs (unless children's

intellectual potential is made salient to parents). Accordingly, they demonstrated that parents' implicit theories were unrelated to what implicit theories children had and whether they perceived their parents as ability-oriented and achievement-oriented or as learning-oriented—but that parents' positive failure mindset predicted that their children were more likely to have an incremental theory and to perceive parents as more learning-oriented and less ability-oriented and achievement-oriented (Haimovitz & Dweck, 2016). Also, in contrast to parents' implicit theories, parents' positive failure mindsets predicted learning-oriented rather than performance-oriented reactions to poor grades (Haimovitz & Dweck, 2016). Thus, it might be worthwhile to examine the role of failure mindsets as one of the beliefs that mediate the positive effects of a consistent incremental theory (similar to effort beliefs; see Yeager & Dweck, 2020).

A second possible avenue for future research is to further investigate potential mediators and moderators regarding the relationship between implicit theories and academic success. With respect to mediators for the effects of parents' implicit theories, researchers could consider other parental behaviors that are relevant for children's academic success and that should be more common among parents who hold an incremental theory than among parents who hold an entity theory. One set of behaviors that fits this description is various forms of parental involvement in children's learning. Whereas my second study focused on the quality of parental involvement (autonomy support versus control and positive versus negative affect; see Pomerantz et al., 2007), another fruitful approach might be to consider the quantity of different involvement behaviors. In this regard, researchers examining parental involvement broadly distinguish between school-based involvement (parental activities that require contact with the child's school) and home-based involvement (parental activities that occur outside of school; see Pomerantz et al., 2007). Home-based involvement can be further divided into activities that are only indirectly related to school (i.e., intellectual activities with children, such as reading books together or visiting a library or museum) and activities that are directly related to school (e.g., helping with school-related tasks such as homework; see Pomerantz et al., 2007). Such activities might also be one of the factors that mediate the relationship between parents' implicit theories and children's academic success, as most forms of parental involvement are generally positively related to children's academic achievement (Barger et al., 2019; Fan & Chen, 2001). Also, a positive relationship between strength of parents' incremental theory and amount of parental involvement is to be expected, as incremental theorists tend to place more emphasis on learning and improving one's abilities (see Dweck & Master, 2008). Consistent with this line of reasoning, some studies have demonstrated a positive relationship between parents' incremental theory and parental involvement. Jiang et al. (2019), focusing on a broader range of behaviors, found that parents with a more incremental theory scored higher on a scale that measured a variety of parental involvement practices (e.g., contact with the children's school, talking with their children about learning-related topics, helping children prepare for tests, engaging in intellectual activities with children, and home monitoring). Similarly, Sheffler and Cheung (2022) demonstrated that mothers who subscribed more to an incremental theory reported more academic involvement with their children (e.g., talking with their children about school-related topics). Muenks et al. (2015), focusing on more specific behaviors, showed that the more parents held an

incremental theory, the more they tended to engage in math- and reading-related activities with their children (e.g., counting objects and identifying the sounds of letters). Thus, future studies regarding the effect of parents' implicit theories on children's academic achievement should examine the mediating role of different forms of parental involvement—preferably in combination with different indicators of the quality of parental involvement (see Pomerantz et al., 2007).

In addition to considering different forms of parental involvement as mediators between parents' implicit theories and children's academic success, future studies could also examine whether parents' implicit theories moderate the relationship between parental involvement and children's academic success. Specifically, it could be examined if parents' home-based, direct involvement (especially with homework) has a more positive effect on academic achievement when parents have a more incremental theory. This is because this type of parental involvement is both very common and particularly prone to problems (see Pomerantz et al., 2007). Because parents' home-based, direct involvement is often triggered by poor academic performance or a sense of obligation, this context presents a difficult situation for parents that can easily lead to counterproductive involvement (e.g., involvement accompanied by negative affect; Pomerantz, Wang, & Ng, 2005) that can even harm children's academic performance (see Pomerantz et al., 2007). In such situations, implicit theories might be one of the factors that play a role in whether parents' efforts to support their children's learning are successful.

In addition, future studies on the effect of parents' implicit theories should not only include more forms of parental involvement, but also assess more possible mediators at the student level. This would allow a comprehensive examination of all levels of mediating variables between parents' implicit theories and children's academic success. Such a comprehensive examination seems to be lacking at present, as I am not aware of any study that has assessed parents' implicit theories, relevant parental behaviors, relevant child behaviors, and children's academic achievement (see Matthes & Stoeger, 2022)—and none of the studies in this dissertation considered all of these aspects at once. Therefore, future studies should consider the mediating role of children's achievement-related beliefs and behaviors. To decide which of children's beliefs and behaviors to assess, existing research on the effects of the parental behavior in question could be consulted. If the parental behavior under investigation is parental involvement in general, academically relevant student beliefs suggested by existing research are motivational aspects such as perceived competence and control, positive expectations, intrinsic motivation, learning goal orientation, academic aspirations, and valuing of school (Barger et al., 2019). If the parental behavior is providing process-focused instead of person-focused feedback, existing studies (Gunderson et al., 2013; Gunderson et al., 2018; Kamins & Dweck, 1999; Mueller & Dweck, 1998; Pomerantz & Kempner, 2013) suggest incorporating student beliefs such as incremental theory and learning goal orientation, and student behaviors such as making adaptive attributions and dealing effectively with setbacks. If the parental behavior is autonomy support instead of control, academically relevant motivational child outcomes are greater autonomous motivation, perceived

competence and control, as well as a more positive attitude towards school, whereas known behavioral outcomes are greater engagement, effort, and self-regulation (Vasquez et al., 2016).

In addition to exploring mediating mechanisms, future studies should also further investigate possible moderating influences that affect the predictive power of parents' implicit theories. The first moderator, which is suggested by research about the effects of learners' implicit theories, is the risk or occurrence of setbacks or failures (Burnette et al., 2013), such as when parents judge their children's academic ability to be low or have reasons to do so. This might manifest itself in children receiving lower grades (which I examined in my third study) or in parents judging their children's academic ability to be low (which Pomerantz & Dong, 2006, examined). Both these indicators are worth considering alongside different parental learning-related behaviors, such as school- and home-based parental involvement, autonomy-supportive instead of controlling behavior, and process-focused instead of person-focused feedback. The second moderator, which was suggested by Haimovitz and Dweck (2017), is whether children's intellectual potential is made salient to parents. To my knowledge, the impact of this possible moderator has not yet been examined systematically. This could be accomplished with an experiment that manipulates the extent to which children's intellectual potential is salient to parents. Following such a manipulation, it could be examined whether this affects the degree to which parents' implicit theories predict parental behaviors, such as controlling versus autonomy-supportive involvement. For example, one group of parents might be asked to answer questions about their educational aspirations for their child and related challenges, whereas another group answered questions that are unrelated to learning and achievement. Afterwards, the parents of both groups could work together with their child to solve difficult tasks, while their behavior as well as the child's behavior could be observed and coded (similar to the procedure of Moorman & Pomerantz, 2010). Such a study could also examine whether the effect of parents' implicit theories increases when children are intentionally confronted with setbacks as part of the experiment.

A third avenue for future research that could complement the investigation of possible mediators and moderators is to use a person-centered approach to implicit theories rather than the variable-centered approach that has been predominantly used (Barger et al., 2022; Stern & Hertel, 2020; Yu & McLellan, 2020). Instead of examining the effect of endorsing an incremental theory (typically about intelligence) on its own, this approach seeks to distinguish groups of individuals, who each exhibit a particular constellation of beliefs (e.g., regarding implicit theories about different ability domains, goal orientations, and effort beliefs) and then compares these groups in terms of the incidence of other beliefs, behaviors, or achievement. This approach has provided some evidence that individuals also need to possess certain related beliefs and goals for their incremental theory to have a positive effect. Barger et al. (2022) conducted three studies in which participants were grouped with respect to three variables: their endorsement of an incremental theory, the extent to which they believed that intelligence was due to effort rather than natural ability (effort vs. natural ability), and to what extent they believed a person could increase their ability to perform well on an intelligence test (ability flexibility). Although the latter two beliefs might be expected to be part of a consistent incremental theory, they showed only low to moderate

correlations with the incremental theory measure (r = .46 for effort vs. natural ability and r = .25 for ability flexibility in Study 1). The authors conducted three studies with three different samples (adults, undergraduate students, and teachers), examining implicit Ftheories about intelligence in Study 1 and about mathematical ability in Study 2 and Study 3—and identified the same groups in similar proportions each time. Of particular interest is the group they labeled "false growth mindset," which accounted for between 15% and 25% of the respective samples. This group was characterized by endorsement of the incremental theory items, but at the same time by low scores for effort vs. natural ability and ability flexibility (i.e., group members tended to believe that intelligence was strongly determined by natural ability and that individuals are not able to substantially increase their performance on intelligence tests). This false growth mindset group showed a similarly unfavorable motivational profile as the group that endorsed an entity theory in addition to low values for effort vs. natural ability and ability flexibility. The authors interpreted this as indicating that the false growth mindset group consists of individuals who hold only superficial incremental beliefs characterized by generic optimism that ability will improve, but who lack, among other things, the understanding that considerable effort might be required for such improvement. Thus, it is readily understandable that this group would not enjoy the motivational benefits of a consistent incremental theory—and that viewing these individuals as incremental theorists would attenuate the positive relationships between strength of incremental theory and adaptive beliefs, behaviors, and achievement. Stern and Hertel (2020) applied the person-centered approach to parents' beliefs about their children, focusing on implicit theories about intelligence and self-regulation, as well as ratings of the importance of intelligence and self-regulation for academic success. They identified three groups. The first group believed that their children's intelligence was changeable and moderately important for academic success, but that their children's self-regulation was more static and important for academic success (referred to by the authors as "entity theorists"). The second group showed moderate values for all four beliefs (referred to as "balanced"), whereas the third group strongly endorsed an incremental theory for self-regulation and placed a high importance on self-regulation for academic success, while showing moderate scores regarding incremental beliefs about intelligence and the relevance of intelligence (referred to as "incremental self-regulation theorists"). Among these three groups, the incremental self-regulation theorists exhibited the most adaptive profiles of beliefs and behaviors, such as stronger positive failure mindsets and less performance-avoidance goals, as well as the use of more mastery-oriented strategies when co-regulating their children's learning. This finding underscores the usefulness of considering implicit theories about different ability domains (including, in particular, self-regulation) in combination with beliefs about the relevance of these ability domains. Yu and McLellan (2020), in contrast, applied the person-centered approach to secondary school students. In terms of ability domains, they focused on the school subjects of mathematics and English. In determining the groups, they considered incremental theory, positive effort beliefs, goal orientations (learning, performance-approach, and performance-avoidance), perseverance, and self-handicapping for the respective school subject. The same four groups were identified for both school subjects. The first group

exhibited an adaptive profile consisting of an incremental theory combined with the corresponding beliefs and behaviors, namely positive effort beliefs, strong learning goals, weak performance-approach and performance-avoidance goals, high perseverance, and low self-handicapping (referred to by the authors as "growth-focused"). The second group exhibited a maladaptive profile consisting of an entity theory combined with the corresponding beliefs and behaviors, namely negative effort beliefs, weak learning goals, strong performance-approach and performance-avoidance goals, low perseverance, and high self-handicapping (referred to as "ability-focused"). In addition to these two groups, which were expected to emerge based on the predictions of the implicit theory approach, two additional groups were identified. The third group showed a similar profile as the growth-focused group, but displayed high levels of performance-approach and performance-avoidance goals and moderate levels of self-handicapping (referred to as "growth-competitive"). The fourth group, in contrast, resembled the ability-focused group in terms of their endorsement of an entity theory and their negative effort beliefs, but exhibited low values for all types of goal orientations (especially for learning goal orientation), very low perseverance, and moderate levels of self-handicapping (referred to as "disengaged"). When comparing the academic achievement of these four groups, the growth-focused and ability-focused groups performed better than the ability-focused and disengaged groups. Thus, these findings provide a more nuanced picture of the interplay between implicit theories and goal orientations (of particular interest is the emergence of the growth-competitive group and the high achievement level of this group).

Finally, future studies could also consider the implicit theories of other individuals in a child's environment, especially those of teachers and peers. As with parents' implicit theories, the effects of teachers' implicit theories are not as well studied as those of learners' implicit theories. In addition, there were unexpected findings, similar to those on parents' implicit theories, in the sense that teachers generally do not tend to pass on their implicit theories to their students (see Haimovitz & Dweck, 2017). However, there are also a few studies that document other positive effects of teachers' incremental theory on students. For instance, it has been shown that teachers who hold a more incremental theory tend to behave in a more autonomy-supportive manner toward their students when teaching (Leroy et al., 2007). Similarly, there is evidence that teachers who hold a more incremental theory are more likely to endorse active-learning practices that are known to benefit students (e.g., employing tasks that facilitate group discussion, using formative assessments, and helping to identify student misconceptions), as well as more likely to use such practices in the classroom (Aragón et al., 2018). The relevance of teachers' implicit theories to at-risk students is underscored by the finding that low-performing students reported lower levels of intrinsic motivation in mathematics if their mathematics teacher held an entity theory about mathematical ability (Heyder et al., 2019). These findings paint a similar picture as those on the effects of parents' implicit theories, and therefore also suggest an investigation of mediating mechanisms and moderating influences in terms of their effect on students' academic success. In addition, the implicit theories of teachers, along with peers' implicit theories, might also play an important role as a moderating influence when it comes to the effect of students' implicit theories. For instance, teachers' and peers'

implicit theories might be one of the factors that determine whether interventions that teach students an incremental theory increase students' academic achievement and facilitate adaptive behaviors. In response to criticisms regarding the effectiveness of such interventions (Macnamara & Burgoyne, 2022; Sisk et al., 2018), implicit theory researchers have begun to examine contextual influences to explain the large heterogeneity in the effects of these interventions (see Burnette et al., 2022; Tipton et al., 2022). Accordingly, there is already some evidence that the effectiveness of implicit theory interventions depends on whether teachers hold an incremental theory (Yeager et al., 2022)—and that these interventions are more effective in schools where positive attitudes toward challenge predominate among students (Yeager et al., 2019). These findings suggest that the implicit theories of important individuals in students' environment (e.g., parents, teachers, and peers) should be examined to determine whether they influence the strength of the association between students' implicit theories and their academic success as well as the behaviors that are relevant to success.

1.4.4. Conclusions and Practical Implications

The studies in this dissertation investigated the role of children's and parents' implicit theories in children's academic success, with each study examining different parts of the assumed causal chain consisting of parent's implicit theories, parents' learning-related behaviors, children's implicit theories, children's learning-related behaviors, and children's academic success (see Figure 1). They make three main contributions to the research on implicit theories. First, they show that previous findings that learners with a more incremental theory tend to use more cognitive and metacognitive learning strategies can be generalized to more ecologically valid settings and behavior-proximal measures of strategy use, as well as to primary school-aged learners. Second, they show that children of parents with a more incremental theory tend to achieve better grades—at least when this is examined in a situation where children's intellectual potential is as salient to parents as it is before the transition to secondary school in Bavaria. More importantly, the results provide evidence for mediating mechanisms by showing that this relationship exists partly because parents with a more incremental theory tend to behave in a more learning-oriented and patient manner and because their children tend to hold an incremental theory as well. Third, they demonstrate for the first time that parents with a more incremental theory tend to make educational decisions that are more challenging for their children. Moreover, they provide clues about moderating influences by showing that this effect is amplified when children's grades give their parents reason to doubt their children's capacity to succeed academically.

The results also have some practical implications. First, with respect to children's implicit theories, it seems reasonable to assume that interventions which influence implicit theories and trainings which teach learning strategies have potential to complement each other. On the one hand, implicit theory interventions might enhance the efficacy and sustainability of learning strategy trainings. The reason for this is that the use of learning strategies depends strongly on motivational variables such as interest, confidence in one's own abilities, and the aspiration to improve one's skills (see Pintrich, 2000; Zimmerman &

Schunk, 2008), which tend to decrease over the course of the educational career (Anderman & Midgley, 1997; Bong, 2009; Fredricks & Eccles, 2002; Gottfried et al., 2001; Jacobs et al., 2002; Lepper et al., 2005), while the probability of students endorsing an entity theory rises (see Dweck, 2002). On the other hand, learning strategy trainings might also enhance the efficacy and sustainability of implicit theory interventions. This is because teaching only beliefs that facilitate learning (e.g., beliefs about the meaning of achievement outcomes, effort, and setbacks) is often insufficient and can ultimately lead to demotivation if learners are not also taught appropriate strategies to achieve their goals (see Dweck & Yeager, 2019), a task for which a learning strategy training seems well suited.

Second, regarding parents' implicit theories, a logical future step would be to develop and test interventions that teach parents an incremental theory. Of course, this would require that several further studies first provide strong evidence for the importance of parents' implicit theories for children's academic success. In addition, because parents who hold an incremental theory often do not exhibit the adaptive beliefs and behaviors that would be expected given that theory (see Haimovitz & Dweck, 2017), it would be advisable to supplement such interventions with lessons that specifically teach these beliefs and behaviors. This conclusion can also be drawn from the finding that some individuals hold a false growth mindset, characterized by a superficial belief in the malleability of abilities but that lacks other important insights, such as how much effort is required to improve abilities (Barger et al., 2022). As a starting point for developing such interventions, already established interventions for students could be used (Aronson et al., 2002; Blackwell et al., 2007; Good et al., 2003; Paunesku et al., 2015). In addition, the implicit theory approach and the accompanying research provide a wealth of suggestions for strategies and beliefs that should be taught to parents as part of such an intervention. One such strategy is to comment on children's successes and failures in a process-focused rather than a person-focused manner (i.e., emphasizing the role of effort and strategies rather than the role of stable traits such as intelligence; see Gunderson et al., 2018; Kamins & Dweck, 1999). This style of providing feedback has been linked to more adaptive learning-related parenting behaviors and better academic outcomes in children (see Haimovitz & Dweck, 2017; Pomerantz et al., 2007), but is typically no more common among parents who hold an incremental theory than among parents who hold an entity theory (Boncquet et al., 2022; Gunderson et al., 2013; Haimovitz & Dweck, 2016), which is why it would be useful to teach this style directly. For example, parents should be taught not to respond to good grades with compliments about the child's intelligence, as this can convey an entity theory and lead to helpless reactions to future setbacks (Mueller & Dweck, 1998). Also, when parents are instructed on how to provide process-focused rather than person-focused feedback, they should also be warned about some of the mistakes that are often made when doing so. For example, they should be informed that the goal of process-focused feedback is to show children how the approach they choose and the amount of effort they invest affect their learning outcomes, and that it is therefore not advisable to praise efforts that were not conducive to learning in order to comfort the child (see Haimovitz & Dweck, 2017). In addition, they should be taught that praise for effort alone can be problematic depending on the age of the child in question (see Amemiya & Wang, 2018): Whereas this kind of praise usually

has a positive effect on younger learners, it can sometimes be taken by adolescent learners to mean that the person praising them does not think they are particularly competent. Therefore, process-focused praise should also include the message that children are trusted to improve their performance through more effort and better strategies (see Amemiya & Wang, 2018). One of the most important things to convey to parents as part of such an intervention is to emphasize that difficulties and setbacks should not be understood as evidence of incompetence, but as a normal and important part of learning (see Haimovitz & Dweck, 2016). When parents have this view of setbacks, they tend to give process-focused rather than person-focused feedback (Haimovitz & Dweck, 2016). In addition, parents should be made aware of their function as role models when they talk about their own setbacks and difficulties. Therefore, in such situations, parents should not emphasize their perceived deficits so much as talk about how to overcome difficulties and how to learn new things (see Haimovitz & Dweck, 2017).

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2. First Article: Do Implicit Theories About Ability Predict Self-Reports and Behavior-Proximal Measures of Primary School Students' In-Class Cognitive and Metacognitive Learning Strategy Use?

This is a pre-copyediting, author-produced version of an article published in *Frontiers in Psychology* following peer review. It is not the version of record. The official citation that should be used in referencing this material is: Matthes, B., & Stoeger, H. (2021). Do implicit theories about ability predict self-reports and behavior-proximal measures of primary school students' in-class cognitive and metacognitive learning strategy use? *Frontiers in Psychology*, *12*, Article 690271. https://doi.org/10.3389/fpsyg.2021.690271

2.1. Abstract

Although studies show relations between implicit theories about ability (ITs) and cognitive as well as metacognitive learning strategy use, existing studies suffer from an overreliance on broad-brush self-report measures of strategy use and limited ecological validity. Moreover, studies rarely examine younger students, and research on ITs and how much students benefit from interventions on learning strategies is lacking. Therefore, we investigated in ecologically valid settings (regular classroom instruction) whether primary school students' ITs are related to their use of cognitive strategies (text reduction strategies based on identifying a text's main ideas) and metacognitive strategies, assessed with (a) typical self-report scales and (b) more behavior-proximal measures. We also investigated whether students' ITs predict how much they benefit from a previously evaluated four-week intervention on cognitive and metacognitive strategies during regular classroom instruction (i.e., how much self-report scales and behavior-proximal measures for strategy use increase over the course of the intervention). Participants were 436 German primary school students (third and fourth graders). The data were analyzed using mixed linear regression analyses. Strength of students' incremental theory was positively related to metacognitive strategy use, but not cognitive strategy use, when measured with self-report scales. For behavior-proximal measures, strength of incremental theory was positively related to the effectiveness of students' cognitive strategy use and their extent of strategy monitoring (one of the two metacognitive strategies examined), but not to the quality of their goal setting (the second metacognitive strategy). Unexpectedly, students with a stronger incremental theory did not benefit more from the intervention.

2.2. Introduction

While some learners believe that their abilities can be greatly increased through practice, others believe that their abilities have a large static part that cannot be changed. Such beliefs, known as implicit theories about ability (ITs; see Dweck, 2000), have well-documented influences on learning and achievement

behavior (see Burnette et al., 2013). For example, learners who believe that their abilities can be greatly increased tend to appreciate learning (Dickhäuser et al., 2016) as well as challenges and effort (Lin-Siegler et al., 2016), and to see setbacks as learning opportunities (e.g., Smiley et al., 2016).

An important aspect of learning that seems to be related to ITs but that has not been comprehensively investigated is learning strategy use. Of interest here are both cognitive learning strategies (techniques that enhance information processing; Zeidner & Stoeger, 2019) and metacognitive learning strategies (techniques related to the metacognitive processes of goal setting, planning, self-monitoring, self-control, and self-evaluation; Dent & Koenka, 2016).

Existing studies on ITs and the use of cognitive and metacognitive learning strategies exhibit several weaknesses. First, they typically rely on broad-brush self-report measures. That is, these studies use items that ask learners about the extent to which they use particular strategies for learning in general or for a given subject or class, thereby requiring learners to generalize over a variety of learning episodes and contexts (e.g., Martin et al., 2013; Mega et al., 2014). This can be problematic due to the validity issues of such measures (see Schellings & van Hout-Wolters, 2011; Veenman, 2011a, 2011b).

Second, even among the studies that used more behavior-proximal measures than broad-brush self-report items asking about the extent of learners' strategy use (Beckmann et al., 2012; Greene et al., 2010; Karlen & Compagnoni, 2017; Tabernero & Wood, 1999; Wood & Bandura, 1989), the majority has limited ecological validity. Most of these studies were implemented in somewhat artificial contexts, with many employing laboratory tasks far removed from academic learning (Beckmann et al., 2012; Tabernero & Wood, 1999; Wood & Bandura, 1989).

Third, only few studies have examined younger students—and among these, all we are aware of have used broad-brush self-report scales to assess strategy use (Law, 2009; Stipek & Gralinski, 1996). This can be considered a research gap because investigating predictors of learning strategy use seems particularly interesting among younger students—who are an important target group for learning strategy instruction (Dignath et al., 2008).

These weaknesses of existing research call for further studies on this topic. But not only the relationships between ITs and cognitive and metacognitive strategy use are educationally relevant: It is equally important to investigate whether students' ITs influence how much they benefit from learning strategy interventions. However, to the best of our knowledge, this has not been investigated yet. Based on related research, we assume that students with more incremental beliefs should be more open to instruction in the use of learning strategies and benefit more from it. For example, incremental theorists tend to be more focused on increasing their competencies than entity theorists (e.g., Dupeyrat & Mariné, 2005; Lin-Siegler et al., 2016; Robins & Pals, 2002; see also Burnette et al., 2013), as well as more likely to avail themselves of learning opportunities (Hong et al., 1999; Nussbaum & Dweck, 2008).

Based on the abovementioned weaknesses and research gaps, our first aim was to investigate whether ITs predict the use of cognitive and metacognitive learning strategies of primary school students in an ecologically valid setting. In addition to typical broad-brush self-report scales, we included

behavior-proximal measures of strategy use that were collected while students worked with authentic learning materials (expository texts) on a daily basis over the course of one school week.

Our second aim was to investigate whether and to what extent students' ITs predict how much they benefit from a four-week intervention on cognitive and metacognitive strategies in their regular classroom context. We employed an intervention whose effectiveness had been demonstrated in an evaluation with a pre–post–follow-up control-group design (Stoeger et al., 2014) and analyzed whether students' ITs predict increases in strategy use and its effectiveness (self-reported and measured in a more behavior-proximal manner) when students continue to work on daily expository texts and receive feedback.

2.3. Theoretical Background

2.3.1. Cognitive and Metacognitive Learning Strategies

Cognitive learning strategies are techniques directly related to the accomplishment of a cognitive task (Alexander et al., 1998)—for example, the task of understanding the main ideas of an expository text about a scientific topic—and that enhance information processing (Zeidner & Stoeger, 2019). Because we investigated primary school students, we focused on cognitive strategies in the service of text reduction and the identification of a text's main ideas, which are essential for reading comprehension (Gajria & Jitendra, 2016) and therefore important from primary school on (Williams, 1988). Two effective cognitive strategies based on main idea identification are summarizing and mapping (see Fiorella & Mayer, 2016). Summarizing requires learners to locate a text's most essential pieces of information, to compress them into a short form, and to reformulate them in their own words (Westby et al., 2010). Mapping requires learners to spatially arrange a text's most essential pieces of information and to establish connections between them (Fiorella & Mayer, 2016), resulting in a graphical representation such as a concept map or mind map. Both summarizing and mapping depend on learners' ability to identify main ideas (Leopold & Leutner, 2015; Westby et al., 2010), making correct main idea identification a prerequisite for these strategies' effective application.

Metacognitive learning strategies refer, in the broadest sense, to the use of skills to control one's cognitive processes (Efklides, 2008) in service of regulating one's learning. Although several theoretical approaches exist that focus on different metacognitive processes (see Panadero, 2017, for an overview), there is some agreement on the key processes of goal setting, planning, self-monitoring, self-control, and self-evaluation (Dent & Koenka, 2016). Among these, goal setting is especially important due to its role in guiding subsequent metacognitive processes (Dent & Koenka, 2016). Specific and challenging goals serve as a standard for self-evaluation and provide feedback regarding the effectiveness of one's learning when combined with systematic self-monitoring (Zimmerman, 2008), which is another key metacognitive strategy (Zimmerman & Paulsen, 1995). Such metacognitive monitoring involves learners tracking their learning, its results, and its effectiveness (Zimmerman & Moylan, 2009), thereby enabling them to make the necessary changes to achieve their goals (Zimmerman & Paulsen, 1995).

2.3.2. Implicit Theories About Ability and General Approaches to Learning

Implicit theories (also called mindsets; Lüftenegger & Chen, 2017) are lay theories about the nature of traits and abilities (Molden & Dweck, 2006) that affect how learners approach potential learning situations (see Dweck & Master, 2008). Two theories can be distinguished (Dweck, 2000; Dweck & Leggett, 1988): an incremental theory (or growth mindset)—the belief that traits and abilities can be fundamentally changed, and an entity theory (or fixed mindset)—the belief that traits and abilities contain a large unchangeable part. These two theories are often understood as opposite ends of a bipolar continuum (e.g., Ehrlinger et al., 2015; Haimovitz & Dweck, 2016).

Whereas those who hold an incremental theory tend to believe that abilities can be greatly improved, those who hold an entity theory tend to believe that abilities have a large static component that cannot be improved (see Dweck & Master, 2008). Therefore, for incremental theorists, performance outcomes provide information about how to improve one's abilities (Mangels et al., 2006), whereas for entity theorists, performance outcomes provide information about the extent of one's fixed abilities (Rattan et al., 2012). Consequentially, incremental theorists tend to focus on learning and often want to improve their abilities by overcoming challenges (Chen, 2012; Dickhäuser et al., 2016), while entity theorists tend to focus on appearing competent, even at the expense of learning (Martin et al., 2013). Whereas incremental theorists tend to believe that setbacks indicate insufficient effort (Hong et al., 1999; Smiley et al., 2016) and that the need to invest effort signifies an optimally challenging learning situation (Lin-Siegler et al., 2016; Miele et al., 2013), entity theorists tend to believe that setbacks indicate stable deficits (Martin et al., 2001) and that the need to invest effort implies low ability (Baird et al., 2009; Tempelaar et al., 2015). Therefore, the more learners hold an incremental theory, the more effort they tend to invest (Cury et al., 2008; Mouratidis et al., 2017; Ziegler & Stoeger, 2010) and the more adaptively they react to setbacks. Whereas incremental theorists tend to look for ways to remedy their deficits (Dresel et al., 2013; Hong et al., 1999; Ziegler, Fidelman et al., 2010) and to increase their effort (Jones et al., 2012; Rickert et al., 2014), entity theorists tend to experience negative affect (Shih, 2011), to reduce their effort (Smiley et al., 2016), and to consider giving up (Robins & Pals, 2002).

2.3.3. Implicit Theories and Learning Strategies

Based on this, it can be hypothesized that individuals with a more incremental theory are more likely to use (cognitive and metacognitive) learning strategies (see Dweck & Master, 2008). There are also several studies that confirm these relations.

Implicit Theories and Learning Strategy Use. ***Studies Employing Broad-Brush Self-Report Measures.*** Several investigations with adults show that learners with more of an incremental theory tend to report using both more cognitive and metacognitive strategies. Bråten and Olaussen (1998) found that endorsing more of an incremental theory about intellectual qualities predicted greater scores on a self-report scale for both cognitive and metacognitive strategy use. In a study by Martin et al. (2001), learners with stronger incremental theories about scholastic abilities reported more metacognitive strategy use.

Vermetten et al. (2001) found learners with greater incremental beliefs about intelligence to score higher on most of their self-report scales for cognitive strategy use, but not on the one for metacognitive strategy use. In a study by Dupeyrat and Mariné (2005), agreement with incremental theory items about intelligence was related to reporting more cognitive strategy use, while agreement with entity theory items was unrelated to strategy use. Mega et al. (2014) found that incremental beliefs about intelligence predicted higher scores on several self-report scales measuring the use of different cognitive and metacognitive strategies. In a study by Stump et al. (2014), endorsing an incremental theory about intelligence was related to greater self-reported cognitive strategy use. Yan et al. (2014) found that learners with an incremental theory about intelligence reported more metacognitively sophisticated studying habits than learners with an entity theory. Finally, a study by Karlen and Compagnoni (2017) found that an incremental theory about writing ability predicted higher scores on most of their scales assessing metacognitive writing strategies.

Similar results were obtained in studies with high school students. Ommundsen (2003) found students with more incremental beliefs about athletic abilities to report using more cognitive and metacognitive strategies in physical education. In a study by Ommundsen et al. (2005), agreement with incremental theory items about academic ability predicted higher scores on a self-report scale about cognitive and metacognitive strategy use; agreement with entity theory items, however, was unrelated to strategy use. Martin et al. (2013) found that more incremental beliefs about intelligence were related to higher scores on a self-report scale for learning strategy use that focused on metacognitive strategies.

The two investigations with younger students we are aware of have also obtained comparable results. In a study by Stipek and Gralinski (1996), students from grades three to six scored higher on a self-report scale for cognitive and metacognitive strategy use the more they agreed to incremental theory items about ability; agreement to entity theory items, however, was unrelated to the strategy scale. Law (2009) found that the more primary school students held an incremental theory about reading ability, the higher they scored on a self-report scale for cognitive and metacognitive reading strategy use.

Studies Employing Behavior-Proximal Measures. However, few of the investigations about how ITs relate to cognitive and metacognitive strategy use have used behavior-proximal measures of strategy use. Even the few studies that did so employed learning situations that were laboratory tasks with little resemblance to academic learning—and all of them were conducted with adult learners. The study by Wood and Bandura (1989) featured a management simulation consisting of three trials. Compared to participants who had received an entity theory manipulation (about decision-making ability), those who had received an incremental theory manipulation set more challenging performance goals throughout the trials. Tabernero and Wood (1999) had their participants work on a 90-minute computer-based management simulation. Compared to participants who held an entity theory about the ability to manage work groups, participants who held an incremental theory set more challenging goals for their performance from the beginning. In a similar study by Beckmann et al. (2012), participants worked in groups of three on a computer-based management simulation with two blocks of trials. Each group consisted of either three persons with an incremental theory about managerial ability or of three persons

with an entity theory. The groups set goals for their performance before the first block of trials, before the second block, and after the second block. Compared to entity theorist groups, the incremental theorist groups set more challenging goals both before and after the second block.

We are aware of only two studies that have investigated how ITs relate to behavior-proximal measures of strategy use in situations that one might encounter in the context of academic learning. In both studies, the participants were adults, and both studies reported null results. Greene et al. (2010) gave their participants 30 minutes to complete a learning task in a hypermedia environment. While working, participants verbalized their thoughts. Afterwards, the self-regulated learning activities mentioned by the participants were counted. The learning activities under investigation mainly represented either cognitive or metacognitive strategies. Surprisingly, values for self-regulated learning activities were unrelated to how strongly participants held an incremental theory about intelligence. In a study by Karlen and Compagnoni (2017), participants had to answer open-ended questions about what they did before, during, and after writing an academic essay. The quality of participants' metacognitive strategy use was rated based on these responses. Unexpectedly, there was no relationship between participants' incremental beliefs about writing ability and the quality of their metacognitive strategies.

The studies on ITs and cognitive as well as metacognitive strategy use show that this research area suffers from an overreliance on broad-brush self-report scales. Despite the criticism that such measures have received (see Schellings & van Hout-Wolters, 2011; Veenman, 2011a, 2011b), only few of the aforementioned studies employed behavior-proximal measures of strategy use—and almost all of the studies that did were conducted in somewhat artificial situations far removed from academic learning, which limits their ecological validity. Another limitation is that most studies were conducted with adult learners. This tendency is particularly pronounced among those studies that employed behavior-proximal measures of strategy use.

ITs and the Use of Learning Strategy Interventions. Although it seems plausible that ITs might predict how much learners make use of interventions on learning strategies—that is, benefit from them—to the best of our knowledge, no studies exist on this topic. However, there is some indirect evidence. First, incremental theorists tend to be more strategic about their learning than entity theorists (see Dweck & Master, 2008), which is also reflected in their aforementioned tendency to report using more cognitive and metacognitive strategies. Thus, incremental theorists should also be more open to instruction in the use of such strategies. Second, with respect to learning situations in general, incremental theorists tend to be more focused on increasing their competencies than entity theorists (e.g., Dupeyrat & Mariné, 2005; Lin-Siegler et al., 2016; see Burnette et al., 2013) and more likely to avail themselves of learning opportunities (Hong et al., 1999; Nussbaum & Dweck, 2008). Thus, incremental theorists should also make more use of interventions that give them the opportunity to practice cognitive and metacognitive strategies. In other words, they should show greater increases in their amount of learning strategy use and its effectiveness over the course of such an intervention.

2.3.4. The Present Study

The first aim of this study was to investigate how primary school students' ITs relate to their use of cognitive and metacognitive learning strategies. To replicate previous findings obtained with older learners, we employed (a) typical self-report scales on cognitive and metacognitive learning strategy use. To broaden existing research, we employed (b) behavior-proximal measures of these strategies. In contrast to most existing studies, we analyzed these relations in authentic academic learning situations (regular classroom instruction) among primary school students. In addition to employing typical self-report scales, we investigated the baseline levels for the usage of cognitive and metacognitive strategies via behavior-proximal measures after the strategies had been introduced by the students' teachers. For one week (the baseline week), students tried to extract the 10 main ideas from one expository text per school day by using the text reduction strategies that had been introduced to them. In addition, they set goals and monitored their learning with the help of their learning diaries.

The second aim was to investigate how ITs relate to the extent to which primary school students make use of a previously evaluated four-week intervention in which the strategies introduced before the baseline week were proceduralized. In particular, we investigated how the measures of cognitive and metacognitive strategy use (self-report measures and behavior-proximal measures) changed over the course of the four-week intervention (the proceduralization weeks) that followed after the baseline week.

We examined students at the end of primary school (grades 3 and 4 in Germany) because learning strategies can and should be taught as early as primary school (Dignath et al., 2008), in part because of their increasing importance in secondary school (see Dent & Koenka, 2016). Therefore, it seems worthwhile to examine possible predictors for the use of learning strategies and learning strategy interventions in this age group. However, because ITs as well as related beliefs and behaviors are still taking shape during this developmental stage (see Dweck, 2002; Barger & Linnenbrink-Garcia, 2016), we were not sure whether a positive relationship already exists between holding an incremental theory and learning strategy use. Although it appears that some of the negative effects of holding an entity theory are already evident in this age group (Kinlaw & Kurtz-Costes, 2007; Haimovitz et al., 2011), the consolidation of the related network of beliefs and behaviors is thought to continue into early adolescence (Dweck, 2002; Haimovitz et al., 2011). Also, students' metacognitive skills are still in the process of developing at the end of primary school (see Veenman et al., 2006).

For the analyses related to both aims, we controlled for students' reading comprehension. This was done because of the great role that reading plays in the task of identifying a text's main ideas. Especially in this young age group, levels of reading comprehension might influence students' performance on the task, their use of cognitive and metacognitive strategies, and the extent to which they make use of the intervention.

Our first prediction is that the more children hold an incremental theory, the greater their values will be on both self-report scales and behavior-proximal measures for both cognitive and metacognitive learning strategy use. Our second prediction is that the more children hold an incremental theory, the

better use they will make of the four-week intervention on learning strategies, that is, the more both the self-report scales for strategy use and the behavior-proximal measures for strategy use and effectiveness will increase over the intervention. Thus, in addition to expecting increases on all these measures, we expect that strength of incremental theory will be positively related to each measure's growth rate.

2.4. Method

2.4.1. Participants

The participants were 436 students (369 fourth graders and 67 third graders) from 20 classrooms of 19 primary schools in Bavaria, Germany. Data collection was part of a larger investigation involving teachers, parents, and students (see Matthes & Stoeger, 2018). We limited our analyses to those 20 classrooms (out of 24) in which the intervention had been implemented as intended.[1] Our analyses included all students who had completed the implicit theory scale in the pre-intervention questionnaire, the reading comprehension test, and returned the learning diary introduced during the intervention program. Students' average age was 9.7 years (ranging from 8 to 11 years, *SD* = 0.60) and 54% were girls. In 15% of the cases, either the student or one of their parents was born outside of Germany. Of the 372 students for whom information on parents' educational level was available, 22% had at least one parent with a university degree.

2.4.2. Measures

Predictors. ***Incremental Theory.*** Students' ITs were assessed before the intervention with a modified version of the 6-item scale from Ziegler and Stoeger (2010). The original items (that queried strength of incremental theory for the domain of mathematics) were modified to assess school-related domain-general ITs. The items were answered on a six-point Likert scale with response options from 1 (*completely disagree*) to 6 (*completely agree*). A sample item reads: "What I am capable of in school is not fixed. I can learn new things and expand my abilities." The scale's Cronbach's alpha was .68.

Reading Comprehension. This covariate was assessed before the intervention with a shortened version of the first half of the two-part reading comprehension section of the HAMLET 3–4 (Hamburg Reading Test for Grades Three and Four; Lehmann et al., 2006). This part originally contained 10 short texts, each followed by four multiple-choice questions where participants had to choose the correct answer from four alternatives. Our version included six of the 10 texts (texts 1, 3, 4, 5, 6, and 7) and the corresponding questions, that is, 24 of the 40 original questions. For each of these, participants received one point for selecting the correct answer, resulting in a total score of up to 24 points. Cronbach's alpha for this total score was .77.

Self-Report Scales for Strategy Use. Self-report scales for cognitive and metacognitive strategies were completed before the baseline week and after the intervention.

[1] Two teachers did not implement the intervention regularly. Two other teachers did not implement the intervention in its entirety, with one of them not implementing the last proceduralization week and another one completing only four of the five texts per week with her students.

Cognitive Strategies Scale. Cognitive strategies were assessed using a four-item scale that asked to what extent participants used text reduction strategies that are based on main idea identification (underlining and excerpting main ideas, drawing mind maps containing them, and writing summaries based on them). A sample item reads: "When I read a text, I underline the most important aspects." Each item was answered on a six-point Likert scale ranging from 1 (*completely disagree*) to 6 (*completely agree*). Cronbach's alpha was .70 for the first measurement point and .50 for the second measurement point. The low alpha value for the second measurement point was not unexpected, as students might have found out during the intervention which of the three strategies they had been introduced to was most helpful to them, and thus might have reported mainly using this strategy (and not the other two) at the second measurement point.

Metacognitive Strategies Scale. Metacognitive strategies were measured with a shortened, slightly adapted version of the Questionnaire for Self-Regulated Learning (FSL-7; Ziegler, Stoeger, & Grassinger, 2010). The original questionnaire measured six metacognitive strategies (self-assessment, goal setting, strategic planning, strategy monitoring, strategy adjustment, and outcome evaluation) for four school-related situations (studying for school, preparing for the upcoming school year during the summer holidays, preparing for an in-class test, and catching up on schoolwork after an illness). Each of these four situations came with one item for each of the six metacognitive strategies (i.e., 24 items altogether). Our scale contained three of these situations (preparing for the upcoming school year was not included) and thus consisted of 18 items. For each, a forced-choice format required participants to choose one of three responses. The first response indicated use of a metacognitive strategy to regulate the respective aspect of one's learning (e.g., "When preparing for a test, I always set a specific goal as to what and how much I want to learn."). The second response indicated reliance on teachers or parents for regulation (e.g., "The teacher or my parents tell me what goals I should set for myself when preparing for a test."). The third response indicated disavowal of regulating the respective aspect (e.g., "When preparing for a test, I don't set any goals. I can fully rely on my intuition for this."). Students' values for this variable were determined by calculating the proportion of items for which they chose the response that represented metacognitive strategy use (relative to the number of items they had answered). The scale's Cronbach's alpha was .84 for the first measurement point and .93 for the second one.

Behavior-Proximal Measures of Strategy Use. Behavior-proximal measures for cognitive and metacognitive strategies were collected during the baseline week (to investigate the first aim) and during the four proceduralization weeks (to investigate the second aim).

Number of Correctly Identified Main Ideas. As an indicator for the effectiveness of cognitive strategy use, we used students' reports on how many of the 10 main ideas from each day's text they had correctly identified using the cognitive strategies (information which students recorded after they had corrected the respective text with their teacher). All texts were comparable regarding length and difficulty. During data entry, to ensure the validity of the students' records regarding the number of correctly identified main ideas, a random sample of them was compared with the corresponding materials

containing the main ideas that the students had identified. For our analyses, we averaged numbers of correct main ideas for the five texts of each week to reduce unsystematic variance. Cronbach's alpha values for these five weekly averages ranged from .78 to .85.

Strategy Monitoring. The extent to which students used the metacognitive strategy of monitoring while working on the texts was measured with an item in their learning diary that read "I have monitored myself while using my strategy." Students responded to this item each school day directly after having worked on the text—an approach that mitigates some of the problems that decontextualized, broad-brush self-report measures are prone to (see Veenman, 2011a). The item was answered on a six-point Likert scale from 1 (*completely disagree*) to 6 (*completely agree*). Again, the five values for each week were averaged. Cronbach's alpha for these five averages ranged from .91 to .96.

Goal Setting, Operationalized as Deviation From Week's Goal. To measure the effectiveness of students' goal setting, we examined the deviation of their weekly goal (how many main ideas they aimed to identify in the week's five texts) from the weekly average of their number of correctly identified main ideas. For this, we subtracted the week's goal from the week's average and calculated the result's absolute value. Consequently, lower values represent more realistic goals. Students set their weekly goal by completing the sentence "My goal for this week is to find __ out of 10 main ideas in the text" with a number from one to 10 at the beginning of the respective week.

2.4.3. Procedure

First, students filled out the incremental theory scale and the self-report scales for cognitive and metacognitive strategy use. To facilitate understanding of the items, they were read aloud to the students by the respective teacher before the students answered them. Next, the students completed the reading comprehension test. Second, their teachers introduced cognitive and metacognitive learning strategies to the students. Next, teachers let the students try out these strategies during the baseline week. After that, the students took part in a four-week learning strategy intervention, during which the strategies were proceduralized with the help of extensive feedback from their teachers (Stoeger & Ziegler, 2008). Finally, the students once again completed the self-report scales on their use of cognitive and metacognitive strategies.

During the introduction of the cognitive and metacognitive strategies, students were provided with declarative knowledge about these strategies during regular classroom instruction (for details, see Stoeger et al., 2014). They were explained why it is important to understand texts, what main ideas are, and how they can be recognized. Then, they were introduced to the three cognitive text reduction strategies and explained how to use them correctly. Students were also taught about metacognitive strategies (e.g., goal setting and strategy monitoring) and why these strategies are important. During this unit, each metacognitive strategy was introduced as part of an ongoing story about a person preparing for a sporting event. Afterwards, students were taught how all these metacognitive strategies could be transferred to school-based learning.

During the baseline week, the students tried out the cognitive and metacognitive strategies. At the start of the week, students set a goal regarding how many of the 10 main ideas in the texts they aimed to identify correctly on average. Then they worked on one expository text per school day (i.e., on five texts) and tried to identify each text's main ideas using the cognitive strategies that had been introduced to them before the baseline week. Immediately after working on each text, students rated the extent to which they had previously monitored themselves while using their cognitive strategy. Every day the teachers discussed with the students the text they had last completed and the 10 main ideas that this text contained. Students then recorded how many main ideas they had correctly identified in the respective text.

During the four-week intervention (the proceduralization weeks), the students systematically practiced and proceduralized the strategies that had been introduced to them before and that they had tried out during the baseline week. In each of the four proceduralization weeks, the students worked on five texts, as they had in the baseline week. As in the baseline week, students set themselves a goal at the beginning of each week, recorded in their learning diary the extent to which they had monitored their cognitive strategy use, corrected each text with their teacher, and recorded how many of its main ideas they had identified correctly. All these processes were supported by guided reflections of the students and extensive feedback from their teachers (see Stoeger et al., 2014, for more information about the intervention and its effectiveness).

2.4.4. Plan of Analysis

For the first aim of our study, to investigate the relationship between ITs and the use of learning strategies, we analyzed relations between ITs and (a) students' self-reported use of cognitive and metacognitive learning strategies (replication of existing research) and (b) the behavior-proximal measures of these strategies that had been gathered during the baseline week. For the second aim of our study, to investigate the relationship between ITs and the extent to which students benefit from the four-week intervention (proceduralization weeks), we analyzed how much students' strategy use increased, both on the self-report scales and on the behavior-proximal measures.

In order to investigate the questions related to the two aims simultaneously, we calculated mixed linear regression analyses (hierarchical linear models). To test whether students with a stronger incremental theory show higher values for the measures of learning strategy use (first aim), we examined whether ITs can predict the baseline level (intercept) for these measures. To test whether students with a stronger incremental theory profit more from the four-week intervention on learning strategies (second aim), we looked at whether ITs can predict the rate of growth for these measures. For these analyses, we used R (Version 3.6.3) and its lme4 package (Bates et al., 2015).

Due to the three-level structure of the data (with measurement points nested in students, and students nested in classrooms), we first investigated the extent to which we needed to take this structure into account in the form of including random effects. As all models ended up containing random effects,

we estimated the variance explained by fixed effects ($R^2_{Marginal}$) as well as the variance explained by both fixed and random effects ($R^2_{Conditional}$) using the MuMIn package (Barton, 2018).

Because we expected values for learning strategy use (self-report scales as well as behavior-proximal measures) to increase over the course of the learning strategy intervention, all our models included measurement point (i.e., linear change over time) as a predictor for strategy use. The two models predicting the self-report scales for strategy use contain two measurement points each (before and after the intervention; $T = 0$ and $T = 1$); the three models predicting the behavior-proximal measures for strategy use contain five measurement points each (one per week; $T = 0$ to $T = 4$; with $T = 0$ representing the baseline week). We also tested whether the models for behavior-proximal measures of strategy use with their five measurement points had a significant quadratic change component (T = 0, $T = 1$, $T = 4$, $T = 9$, and $T = 16$). This was done because students' increases in effectiveness of learning strategy use might either level off over the course of the intervention (a frequently occurring characteristic of learning trajectories; see K. M. Newell et al., 2001; A. Newell & Rosenbloom, 1981) or accelerate (as is common with learning tasks where the learner must first master the basics before more rapid improvement becomes possible; see Pusic et al., 2015).

Next, we added strength of incremental theory to the models. First, we included the variable in the form of a main effect. This was done to investigate whether students with a stronger incremental theory would already report more learning strategy use before the intervention and whether they would show higher values on the behavior-proximal measures of strategy use during the baseline week. Second, we included strength of incremental theory as part of an interaction effect with measurement point. This was done to investigate whether students with a stronger incremental theory would show greater increases on self-report scales and behavior-proximal measures of strategy use over the course of the intervention.[2]

Finally, we added reading comprehension as a covariate to all models. This was mainly done so that we could use the remaining variation in number of correctly identified main ideas as an indicator for how effectively students used the cognitive strategies. In addition to the main effect of reading comprehension, we also included its interaction effect with the measurement point. This was done to account for differences regarding the amount of increase in strategy use depending on students' levels of reading comprehension.

2.5. Results

2.5.1. Preliminary Analyses

First, we assessed the psychometric properties of all variables (see Table 1) and calculated the correlations for each pair of them before the intervention (i.e., for self-report scales of strategy use before the

[2] Whereas the widely-used software HLM (Raudenbusch et al., 2011) tests the effect of a predictor on rate of change if the user includes the predictor in the respective level-2 equation, the lme4 package instead requires the user to include an interaction effect between the predictor and the measurement point in the model.

intervention and for behavior-proximal measures of strategy use during the baseline week, see Table 2). Next, we checked the extent to which the three-level structure of the data needs to be considered. This was done by calculating an unconditional random effects model for each indicator of learning strategy use. The variance decomposition for each of these models can be found in Table 3; as most measures of strategy use showed a substantial amount of variance on both Level 2 (between students) and Level 3 (between classrooms), we included random intercepts for both levels in all of our models.

Table 1

Psychometric Properties of All Variables

Variable	Indicators	α	*M*	*SD*	Range	Skew	Kurtosis
Incremental theory	6	.68	4.86	0.72	1.83–6.00	–0.69	0.72
Reading comprehension	24	.77	18.36	3.91	2.00–24.00	–1.22	1.56
Cognitive strategies scale							
Before strategy introduction	4	.70	2.75	1.04	1.00–6.00	0.37	–0.45
After intervention	4	.50	3.69	1.05	1.00–6.00	–0.47	0.13
Metacognitive strategies scale							
Before strategy introduction	18	.84	0.35	0.23	0.00–1.00	0.49	–0.44
After intervention	18	.93	0.38	0.33	0.00–1.00	0.48	–1.03
Correctly identified main ideas							
First week (baseline week)	5	.78	6.90	1.34	2.20–10.00	–0.82	0.83
Second week	5	.81	6.48	1.47	0.80–9.80	–0.70	0.69
Third week	5	.84	7.10	1.64	0.60–10.00	–0.72	0.39
Fourth week	5	.85	7.11	1.56	0.75–10.00	–0.70	1.05
Fifth week	5	.82	7.50	1.46	2.20–10.00	–0.78	0.76
Strategy monitoring							
First week (baseline week)	5	.91	4.31	1.31	1.00–6.00	–0.86	0.57
Second week	5	.94	4.32	1.28	1.00–6.00	–0.93	0.43
Third week	5	.94	4.39	1.28	1.00–6.00	–0.94	0.48
Fourth week	5	.96	4.45	1.37	1.00–6.00	–1.21	0.62
Fifth week	5	.96	4.46	1.37	1.00–6.00	–1.04	0.46
Deviation from week's goal							
First week (baseline week)	1	–	1.59	1.13	0.00–5.80	0.68	0.13
Second week	1	–	1.39	1.23	0.00–7.80	1.57	3.34
Third week	1	–	1.58	1.28	0.00–7.00	1.33	1.33
Fourth week	1	–	1.38	1.18	0.00–6.00	1.24	1.24
Fifth week	1	–	1.23	1.10	0.00–7.20	1.63	1.63

Table 2

Pearson Correlation Matrix for All Variables Before the Intervention

Variable	1	2	3	4	5	6	7
1. Incremental theory	—						
2. Reading comprehension	.28**	—					
3. Cognitive strategies scale	.02	–.16*	—				
4. Metacognitive strategies scale	.15*	.03	.13*	—			
5. Correctly identified main ideas	.29**	.32**	–.01	.03	—		
6. Strategy monitoring	.18**	–.02	.08	.16*	.15*	—	
7. Deviation from week's goal	–.08	–.04	.08	–.03	.06	–.05	—

Note. $^{*}p < .01$. $^{**}p < .001$.

Table 3

Variance Decompositions for the Unconditional Random Effects Models

Dependent variable	Level 1 (within students)	Level 2 (between students)	Level 3 (between classrooms)
Cognitive strategies scale	91.0%	0.0%	9.0%
Metacognitive strategies scale	53.6%	38.0%	8.4%
Correctly identified main ideas	39.5%	45.5%	14.9%
Strategy monitoring	25.5%	67.2%	7.3%
Deviation from week's goal	80.8%	16.2%	3.0%

We then tested for each model whether there was a significant linear change component over the course of the intervention, and included this component if it was significant. In addition, for the three models predicting the behavior-proximal measures of strategy use (five measurement points), we also tested whether there was a significant quadratic change component, and included this component if it was significant. Next, we tested whether model fit could be improved by adding random slopes for measurement point (i.e., by allowing rates of change to differ between students and/or classrooms). As a result of this, we included random slopes (a) on Level 2 for the linear change component in the models for number of correctly identified main ideas, strategy monitoring, and deviation from week's goal, (b) on Level 3 for the linear change component in the models for the cognitive strategies scale, for number of correctly identified main ideas, and deviation from week's goal, and (c) on Level 2 for the quadratic change component in the model for number of correctly identified main ideas. Finally, we included both strength of incremental theory and reading comprehension in each of the models, followed by including the interaction effects between (a) strength of incremental theory and linear change and (b) reading comprehension and linear change.

2.5.2. Mixed Linear Regression Analyses

Predicting Learning Strategy Use. To address the first aim of our study, we examined whether students' ITs predict their use of cognitive and metacognitive strategies, assessed with (a) self-report scales and (b) behavior-proximal measures. The final mixed linear regression models for predicting the self-report scales (while controlling for reading comprehension) can be found in Table 4. Contrary to our expectations, strength of incremental theory was unrelated to cognitive strategy use measured by the self-report scale before the intervention ($b = 0.03$, $p = .549$). Yet as expected, strength of incremental theory was positively related to metacognitive strategy use measured by the self-report scale before the intervention ($b = 0.03$, $p = .021$).

Table 4

Linear Mixed-Effects Models Predicting the Self-Report Scales for Learning Strategy Use

Predictor	*b*	*SE*	*df*	*t*	*p*
Cognitive strategies scale; $R^2_{Marginal} = .191$; $R^2_{Conditional} = .541$					
γ_{00}	2.74	0.13	19.0	20.75	< .001
Linear change	0.96	0.15	19.1	6.48	< .001
Incremental theory	0.03	0.05	776.9	0.60	.549
Reading comprehension	–0.18	0.05	782.1	–3.60	< .001
Linear change × Incremental theory	–0.01	0.06	422.9	–0.23	.815
Linear change × Reading comprehension	0.05	0.06	426.7	0.90	.369
Metacognitive strategies scale; $R^2_{Marginal} = .011$; $R^2_{Conditional} = .470$					
γ_{00}	0.35	0.02	22.1	15.62	< .001
Linear change	0.03	0.01	431.8	2.21	.028
Incremental theory	0.03	0.01	716.4	2.31	.021
Reading comprehension	0.00	0.01	705.7	0.19	.850
Linear change × Incremental theory	–0.02	0.01	431.6	–1.15	.252
Linear change × Reading comprehension	–0.01	0.01	431.5	–0.67	.501

Note. $R^2_{Marginal}$ = Variance explained by fixed effects; $R^2_{Conditional}$ = Variance explained by both fixed and random effects. Both incremental theory and reading comprehension were *z*-standardized before the analyses.

The final models for predicting the three behavior-proximal measures of strategy use (while controlling for reading comprehension) can be found in Table 5. As expected, strength of incremental theory was positively related to the number of correctly identified main ideas during the baseline week ($b = 0.32$, $p < .001$). Also, as expected, strength of incremental theory was positively related to the amount of strategy monitoring during the baseline week ($b = 0.18$, $p = .002$). Yet unexpectedly, strength of incremental theory was not significantly related to students' effectiveness of goal setting

(i.e., how much the number of main ideas correctly identified in the daily texts during the baseline week deviated from the goals they had set at the beginning of that week; $b = –0.06$, $p = .189$).

Table 5

Linear Mixed-Effects Models Predicting the Behavior-Proximal Measures of Strategy Use

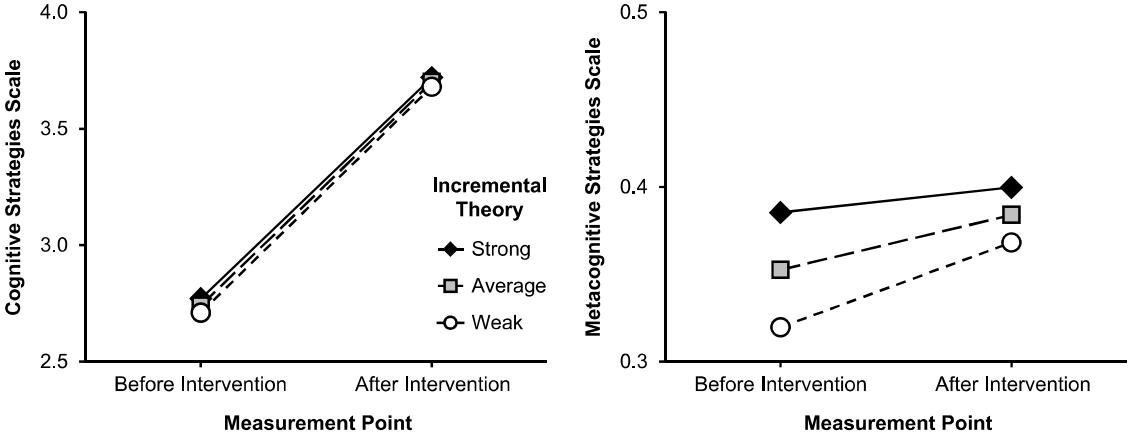
Predictor	*b*	*SE*	*df*	*t*	*p*
Correctly identified main ideas; $R^2_{Marginal} = .136$; $R^2_{Conditional} = .699$					
γ_{00}	6.79	0.11	18.8	63.46	< .001
Linear change	–0.10	0.05	235.6	–1.94	.054
Quadratic change	0.07	0.01	424.7	6.31	< .001
Incremental theory	0.32	0.06	424.6	5.30	< .001
Reading comprehension	0.34	0.06	429.4	5.42	< .001
Linear change × Incremental theory	–0.04	0.02	411.4	–2.26	.025
Linear change × Reading comprehension	0.01	0.02	397.1	0.56	.578
Strategy monitoring; $R^2_{Marginal} = .019$; $R^2_{Conditional} = .811$					
γ_{00}	4.31	0.08	20.2	50.94	< .001
Linear change	0.04	0.01	427.4	3.05	.002
Incremental theory	0.18	0.06	436.6	3.14	.002
Reading comprehension	–0.08	0.06	430.8	–1.33	.185
Linear change × Incremental theory	–0.01	0.01	433.7	–0.36	.718
Linear change × Reading comprehension	–0.01	0.01	435.5	–0.56	.575
Deviation from week's goal; $R^2_{Marginal} = .017$; $R^2_{Conditional} = .235$					
γ_{00}	1.58	0.09	18.8	18.43	< .001
Linear change	–0.08	0.03	19.9	–2.38	.027
Incremental theory	–0.06	0.05	625.3	–1.31	.189
Reading comprehension	–0.09	0.05	648.3	–1.71	.087
Linear change × Incremental theory	–0.00	0.02	1317.9	–0.22	.827
Linear change × Reading comprehension	0.01	0.02	1289.5	0.39	.699

Note. $R^2_{Marginal}$ = Variance explained by fixed effects; $R^2_{Conditional}$ = Variance explained by both fixed and random effects. Both incremental theory and reading comprehension were *z*-standardized before the analyses.

Increases in Learning Strategy Use. Before addressing the second aim of our study, we examined whether self-reported and behavior-proximal measures of learning strategy use actually increased over the course of the intervention. We found that this was the case for both the self-report scales (see Figure 1 for plots) and all behavior-proximal measures (see Figure 2 for plots). There was a significant positive linear change component for both the self-report scale for cognitive strategy use ($b = 0.96$, $p < .001$) and the one for metacognitive strategy use ($b = 0.03$, $p = .028$) from before to after the intervention.

Figure 1

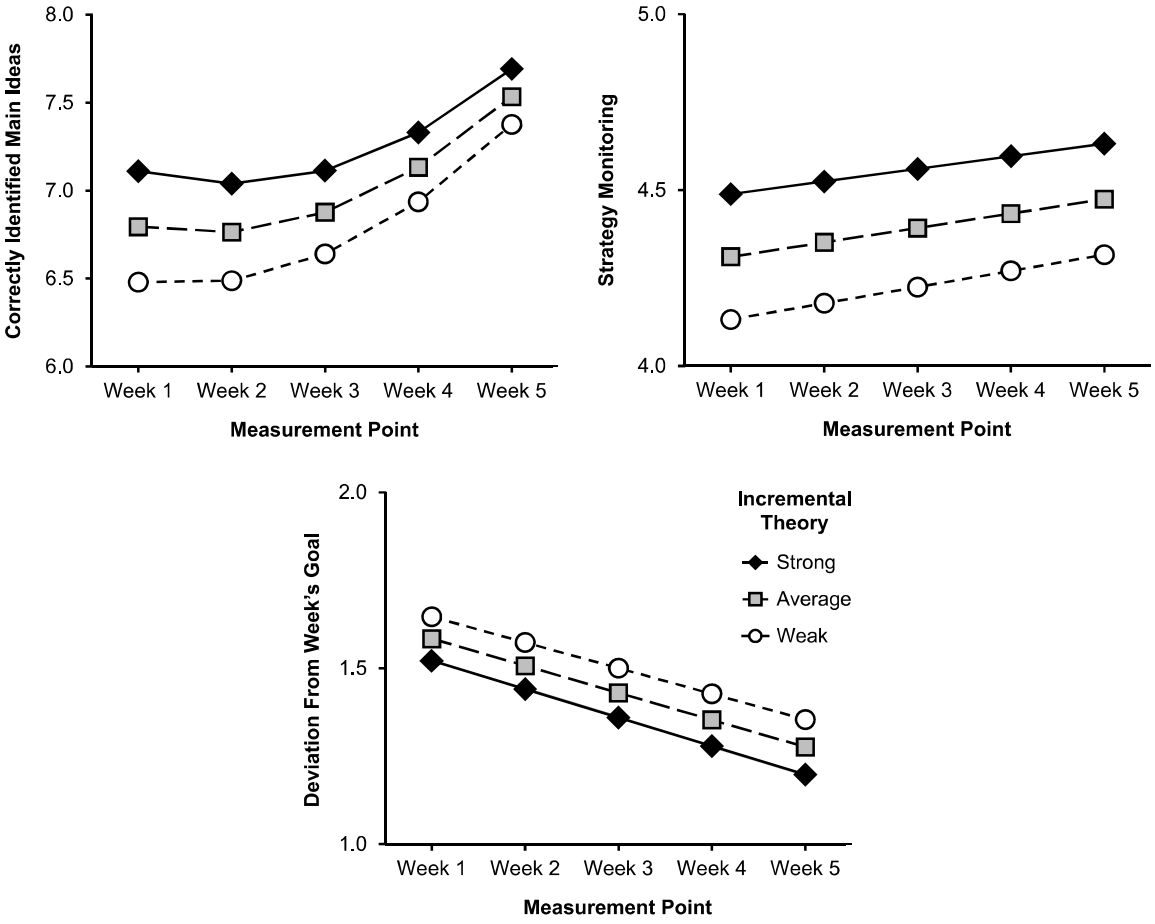
Predicted Values for Self-Report Scales of Learning Strategy Use



Note. The measures were predicted before and after the learning strategy intervention for different strengths of incremental theory (strong = one standard deviation above the mean, weak = one standard deviation below the mean). Values are based on the models from Table 4 that control for reading comprehension.

Figure 2

Predicted Values for Behavior-Proximal Measures of Learning Strategy Use



Note. The measures were predicted for the baseline week (week 1) and the four proceduralization weeks (weeks 2 to 5) for different strengths of incremental theory (strong = one standard deviation above the mean, weak = one standard deviation below the mean). Values are based on the models from Table 5 that control for reading comprehension.

For the behavior-proximal measure of cognitive learning strategies (correctly identified main ideas), there was no significant linear change component ($b = –0.10$, $p = .054$), but a significant quadratic change component ($b = 0.07$, $p < .001$), signifying an increasing rate of growth from the baseline week (Week 1) over the course of the four-week intervention. For the first behavior-proximal measure of metacognitive strategy use, monitoring, we found a significant positive linear change component ($b = 0.04$, $p = .002$). For the second behavior-proximal measure of metacognitive strategy use, deviation from week's goal, there was, as expected, a significant negative linear change component ($b = – 0.08$, $p = .027$), signifying that goal setting became increasingly realistic from the baseline week (Week 1) over the course of the four proceduralization weeks. Thus, cognitive and metacognitive learning strategy use increased over the course of the intervention.

Predicting Growth Rates for Learning Strategy Use. To address the second aim of our study, we investigated whether ITs predict the extent to which students benefit from the intervention, that is, whether ITs predict rates of growth for the measures of cognitive and metacognitive strategy use. Here, none of our hypotheses were supported. Contrary to our expectations, there was no interaction effect between strength of incremental theory and linear change for either the self-report scale for cognitive strategy use ($b = –0.01$, $p = .815$) or the one for metacognitive strategy use ($b = –0.02$, $p = .252$). Also, unexpectedly, strength of incremental theory was negatively related to linear change in number of correctly identified main ideas from the baseline week (Week 1) over the course of the four proceduralization weeks ($b = –0.04$, $p = .025$), signifying a smaller growth rate for students with a stronger incremental theory. Moreover, there was no interaction effect between strength of incremental theory and linear change for either strategy monitoring ($b = –0.01$, $p = .718$) or deviation from week's goal ($b = –0.00$, $p = .827$).

2.6. Discussion

This study had two aims. The first aim was to investigate the relationship between third and fourth graders' implicit theories about ability and their use of cognitive and metacognitive learning strategies, assessed with (a) typical broad-brush self-report scales and (b) behavior-proximal measures. The second aim was to investigate the relationship between implicit theories and the extent to which these students benefit from an intervention on cognitive and metacognitive learning strategies, that is, whether students with a more incremental theory show greater increases on self-report scales and behavior-proximal measures for cognitive and metacognitive strategy use when they participate in a four-week intervention. These measures were collected in the context of authentic academic learning situations.

With respect to the first aim, our predictions regarding the self-report scales were only partially confirmed. The prediction that children with a more incremental theory would report using more learning strategies was not supported for the self-report scale for cognitive strategies. However, it was supported for the self-report scale for metacognitive strategies.

The fact that we found no relationship between ITs and the self-report scale for cognitive strategy use was somewhat surprising in light of existing research. Several studies document the relationship

we had expected for adult learners (Bråten & Olaussen, 1998; Karlen & Compagnoni, 2017; Martin et al., 2001; Mega et al., 2014; Yan et al., 2014), high school students (Martin et al., 2013; Ommundsen, 2003; Ommundsen et al., 2005), and primary school students (Law, 2009; Stipek & Gralinski, 1996). One possible explanation for our null finding is that a large proportion of the children apparently had little experience with the specific cognitive strategies under investigation (that are focused on extracting a text's main ideas) at the first measurement point: The average value for the items querying cognitive strategy use was only 2.75, a value that can be located slightly below the response option *somewhat disagree* (value 3). It seems likely that most children who were not familiar with these strategies reported not using them, irrespective of how much they held an incremental theory, thereby weakening the relationship between ITs and the self-report scale for cognitive strategy use.

The finding that children with a stronger incremental theory showed higher values on the self-report scale for metacognitive strategy use, however, is in line with existing studies. Similar results have been obtained in numerous investigations with adult learners (Bråten & Olaussen, 1998; Dupeyrat & Mariné, 2005; Mega et al., 2014; Stump et al., 2014; Vermetten et al., 2001) and in some studies with high school students (Ommundsen, 2003; Stipek & Gralinski, 1996). However, we are aware of only one study that has investigated this relationship with younger learners (Law, 2009). Thus, our study contributes additional evidence that the positive relationship between holding more of an incremental theory about one's ability and reporting to use more metacognitive strategies also exists for younger students (i.e., third and fourth graders). Demonstrating this is important partly because the relationship between ITs and the beliefs typically associated with them (e.g., beliefs about the meaning of effort) are still in the process of solidifying at the end of the primary school years (see Dweck, 2002).

For the behavior-proximal measures of cognitive and metacognitive learning strategy use, our predictions regarding the first aim of our study were mostly confirmed: Children with a more incremental theory showed greater values for learning strategy use and effectiveness on most of these measures. Our predictions were supported for cognitive strategy use, operationalized in the form of correctly identified main ideas: Children with a more incremental theory correctly identified more main ideas in the five texts of the baseline week (even when controlling for reading comprehension, as we did in all models). With regard to metacognitive strategy use, children with a more incremental theory also monitored their learning behavior more while using the cognitive strategies. However, the second behavior-proximal measure of metacognitive strategy use, realistic goal setting, was unrelated to strength of incremental theory.

The finding that children with a stronger incremental theory showed higher values for our behavior-proximal measure of cognitive learning strategy use adds to the existing literature. We are aware of only one other study that has investigated the relationship between ITs and such a behavior-proximal measure (Greene et al., 2010)—that, in contrast to our study, has obtained a null result. Thus, our investigation complements the aforementioned studies that have used self-report scales and provides initial evidence that the positive relationship between strength of incremental theory and cognitive strategy use still holds when behavior-proximal measures of strategy use are employed in an ecologically valid setting.

The findings regarding the relation between strength of children's incremental theory and the behavior-proximal measures of metacognitive learning strategy use, namely monitoring and goal setting, were mixed. During the baseline week, the stronger students' incremental theory was, the more they monitored their strategies while working on the week's texts. There was, however, no relationship between strength of incremental theory and how realistic students' goals were. A possible explanation for this null result could be that during the baseline week, most children were probably not yet familiar with the task of setting realistic goals, resulting in children with a more incremental mindset performing no better than children with a less incremental mindset.

Our findings on the relationship between ITs and the behavior-proximal measures of metacognitive learning strategy use are new in several respects. First, all earlier studies investigating ITs in combination with such behavior-proximal measures we found were conducted with adult learners. In contrast, our study was conducted with primary school students. Second, only few studies have investigated these relationships with a focus on learning situations that one might encounter in an academic context (Greene et al., 2010; Karlen & Compagnoni, 2017). Our study contributes to this literature by employing behavior-proximal measures of metacognitive strategy use in a school-related setting where students worked on authentic learning tasks by trying to identify the main ideas in expository texts. Third, by assessing the extent to which children monitored their strategy and set realistic goals, our study sheds light on aspects of metacognitive strategy use that had hitherto, to our knowledge, not been investigated in combination with ITs. Previous studies with non-academic laboratory tasks that assessed indicators for the use of specific metacognitive strategies have found that participants who held more of an incremental theory set more challenging goals (Beckmann et al., 2012; Tabernero & Wood, 1999; Wood & Bandura, 1989). The two studies investigating overall indicators of metacognitive strategy use in learning situations that might be found in academic contexts have obtained null results (Greene et al., 2010, coded participants' verbalizations during a learning task, while Karlen and Compagnoni, 2017, coded participants' open-ended responses about what they did before, during, and after writing an academic essay).

Our predictions regarding the second aim of our study were not supported for any of the learning strategy measures under investigation. We had expected that children with a stronger incremental theory would benefit more from an intervention on cognitive and metacognitive learning strategies, that is, that their indicators of strategy use would increase more over the course of the intervention. This was not the case: Neither did children with a more incremental theory show greater increases on the self-report scales for cognitive or metacognitive learning strategy use, nor did they show greater increases on the behavior-proximal measures for such strategies. Although all indicators for students' use of cognitive and metacognitive learning strategies increased over the course of the intervention, the size of the change was, for almost all of the indicators, unrelated to children's ITs. The only exception was the unexpected negative relationship between strength of incremental theory and rate of growth for the behavior-proximal measure of cognitive learning strategies (i.e., the weekly number of correctly identified main ideas) that was present

although we had controlled for reading comprehension, indicating that gains in effectiveness of cognitive strategy use might have levelled off more quickly for children who held more of an incremental theory.

These findings may seem surprising at first because existing literature suggests that compared to entity theorists, incremental theorists are more likely to be oriented towards enhancing their competencies (see Burnette et al., 2013) and more likely to seize learning opportunities (Hong et al., 1999; Nussbaum & Dweck, 2008), which should also help them to make better use of a learning strategy intervention. One possible explanation for our findings could be the fact that the intervention strongly emphasized an individual reference norm (see Stoeger et al., 2014), which might have eclipsed the effect of ITs: The children were taught that they could all improve their learning strategies and thus their performance in identifying main ideas—regardless of their baseline levels. Perhaps this message, combined with the intervention's daily systematic feedback on learning gains, was so compelling that even children without an incremental theory were persuaded to fully engage with the strategies.

Particularly unexpected was the negative relationship between strength of incremental theory and rate of growth for correctly identified main ideas. The more children held an incremental theory, the weaker their improvements in performance were. This result might have to do with the fact that strength of incremental theory predicted higher values for correctly identified main ideas during the baseline week, thus making further increases in performance over the course of the proceduralization weeks less likely.

2.6.1 Limitations and Future Research

Although our investigation largely replicates the findings of previous studies and broadens the research on the relationships between ITs and the use of learning strategies, it also has several limitations. A first limitation concerns our behavior-proximal measures of strategy use. Although the measures of metacognitive strategy use are closer to actual learning behavior than the self-report scales employed in most studies that investigate ITs and learning strategy use, they nevertheless prompt participants to report their amount of strategy monitoring and their self-set goals. One might argue that students' responses to being prompted to record a goal at the beginning of each week and to report their amount of strategy monitoring after having worked on the respective text might differ markedly from responses to less reactive measures of goal setting and monitoring. Also, the number of correctly identified main ideas cannot be considered a pure measure for effectiveness of cognitive strategy use, but is likely to also depend on students' general ability to identify main ideas—although controlling for reading comprehension should have alleviated this problem. Nevertheless, we might have obtained a purer measure if we had also controlled for students' general cognitive ability. To provide even more robust measures of learning strategy use, further studies could code students' verbalizations during a learning task (as Greene et al., 2010, have done), or covertly collect trace data of students' strategy use while they work in a virtual learning environment.

A second limitation lies in the young age of the participants and the fact that the sample comes from a somewhat special population (i.e., primary school students from Bavaria, Germany). Both

sampling circumstances raise the question as to which extent the results can be generalized to older students and students from other populations (e.g., to high school students from the United States or Japan). At the end of German primary school (i.e., at the end of fourth grade), many students do not yet seem to have a particularly strategic approach to learning (Sontag et al., 2012), which might attenuate the relationships between learning strategy use and related constructs such as ITs. Thus, stronger relationships might be found, for example, in higher grades or more challenging school systems. Also, in this age group in general, many students tend to hold more of an incremental theory rather than an entity theory (see Dweck, 2002), which is in line with the rather high values for incremental theory that we observed in our study. Therefore, the relationship between ITs and learning strategy use might be somewhat weaker for such young students because older students might show greater variance in strategic learning and ITs due to the increasing academic demands during secondary education. Thus, further studies could investigate students from different school systems and focus on grades 5 and 6—another age group in which the relationship between ITs and learning strategy use has hardly been investigated.

A final limitation lies in the fact that the design of our study does not allow conclusions to be drawn about the directions of influence between the variables under investigation. For example, it is also plausible that frequent use of cognitive and metacognitive learning strategies might lead learners to develop a more incremental theory. If learners use more effective learning strategies, they are more likely to realize that their strategic approach greatly influences how successful they are (see Zimmerman, 2000, 2008)—and that success depends on more than just innate abilities. To allow for stronger conclusions, further studies could directly manipulate ITs. This might be done by letting half of the sample take part in an intervention that teaches an incremental theory (like the one described in Paunesku et al., 2015) before these students participate in a learning strategy intervention, and then investigating whether this IT intervention affects actual and effective strategy use and the development of strategy use over time.

2.6.2 Conclusions

In summary, our study provides initial evidence that the positive relationship between having more of an incremental theory and reporting to use more metacognitive learning strategies can be generalized to younger students in an ecologically valid setting. The study also provides some initial evidence that having more of an incremental theory predicts more actual and effective use of cognitive and metacognitive strategies for this age group. Although further studies are needed to provide more causal evidence, our findings are consistent with the idea that ITs are already related to learning behavior at the end of the primary school period—despite the fact that the network of beliefs associated with ITs has not yet fully solidified for most students at that point (see Dweck, 2002). Further studies about the relationship between ITs and learning strategy use with younger students could apply less reactive measures of strategy use (e.g., students' verbalization or trace data), investigate a slightly older sample of students in more challenging learning settings, and attempt to influence students' ITs directly and investigate the effect of such changes on learning strategy use.

In terms of practical recommendations regarding ITs and learning strategies, interventions that influence ITs (targeting motivational aspects of learning) and interventions that teach learning strategies (targeting strategic aspects of learning) might have potential for complementing each other—especially when aimed at students at the end of primary school: Since learning strategies should already be taught during the primary school period (see Dignath & Büttner, 2008) and since ITs and other learning-related and motivational beliefs are still taking shape during that time period (see Barger & Linnenbrink-Garcia, 2016), it seems appropriate to address strategies and beliefs together. When considering learning strategy interventions, it is important to note that students' effective use of strategies strongly depends on motivational characteristics such as interest, confidence in one's own competencies, and the desire to improve one's own abilities (see Pintrich, 2000; Zimmerman & Schunk, 2008). However, all these aspects of motivation tend to decrease over the course of students' school careers (Anderman & Midgley, 1997; Bong, 2009; Fredricks & Eccles, 2002; Gottfried et al., 2001; Jacobs et al., 2002; Lepper et al., 2005), accompanied by an increase in the prevalence of an entity mindset (see Dweck, 2002). Thus, an IT intervention (like the intervention confirmed as effective in Yeager et al., 2016) might improve the effectiveness and sustainability of learning strategy interventions, also and perhaps especially for older students. When considering IT interventions, it is important to note that merely teaching IT-related beliefs conducive to learning (i.e., that abilities can be substantially increased, that effort signifies optimal challenges, and that setbacks are learning opportunities) may often not be sufficient for learners to achieve their goals. This can result in frustration and demotivation in the long run unless learners are also taught the strategies necessary to achieve these goals (see Dweck & Yeager, 2019). Thus, a learning strategy intervention might improve the effectiveness and sustainability of an IT intervention by supplying learners with the strategies they need to translate their increased effort and desire to learn into achievement.

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3. Second Article: Influence of Parents' Implicit Theories About Ability on Parents' Learning-Related Behaviors, Children's Implicit Theories, and Children's Academic Achievement

This is a pre-copyediting, author-produced version of an article published in *Contemporary Educational Psychology* following peer review. It is not the version of record. The official citation that should be used in referencing this material is: Matthes, B., & Stoeger, H. (2018). Influence of parents' implicit theories about ability on parents' learning-related behaviors, children's implicit theories, and children's academic achievement. *Contemporary Educational Psychology, 54*, 271–280. https://doi.org/10.1016/j.cedpsych.2018.07.001

3.1. Abstract

Although students' implicit theories about ability are known to predict successful learning and achievement, parents' implicit theories about ability have received little attention. Thus, we investigated the influence of parents' theories about ability on their children's academic achievement and the mechanisms behind this influence. We used a structural equation model to examine data from parents and their fourth-grade children in Germany ($N = 723$). The extent of parents' incremental theories predicted (a) the extent of children's incremental theories ($\beta = .41$, $p < .001$), (b) parental learning-related behaviors (less homework-related conflict, $\beta = –.36$, $p < .001$, and less controlling behavior, $\beta = –.33$, $p < .001$), and—partially mediated by these two aspects—(c) their children achieving better grades ($\beta = .20$, $p < .001$). Thus, parents' endorsement of an incremental theory appears to increase children's achievement by reducing unconstructive learning-related parental behaviors and facilitating children's adoption of an incremental theory.

3.2. Introduction

Adaptive beliefs about learning and ability predict high-quality learning processes and academic success. For example, the belief that one's intellectual ability can be greatly improved through effort and practice predicts behavior conducive to successful learning, such as expressing a preference for challenging tasks and solution-oriented reactions to setbacks (e.g., Blackwell, Trzesniewski, & Dweck, 2007; Hong, Chiu, Dweck, Lin, & Wan, 1999). However, not only beliefs held by learners themselves are predictive of their successful learning—beliefs of pedagogical agents also play an important role. Among these agents, parents are considered key figures for the development of children's academic motivation and achievement (see Jacobs & Eccles, 2000; Pomerantz, Grolnick, & Price, 2005; Pomerantz, Moorman, & Litwack, 2007; Simpkins, 2015). For example, parents' beliefs that educational success is important correlates with their adolescent children's interest in school, motivation to master subject material, and academic achievement (Spera, 2006). Parents' beliefs can exert their influence on learners both by being transferred from parent to learner and by influencing the parents' own behaviors.

For example, mothers' beliefs about the level of their children's abilities in a given school subject predict children's corresponding beliefs about their abilities in this subject (Frome & Eccles, 1998). Also, mothers' adaptive beliefs regarding an academic domain (e.g., that the domain is important, that the child is competent in this domain, and that they can support their child regarding this domain) affect their own behavior (e.g., encouragement and joint practice), which in turn impacts children's motivation (Simpkins, Fredricks, & Eccles, 2012).

Hence, parental beliefs are undoubtedly important for children's academic success. The goal of this study is therefore to examine the effects of a specific set of parental beliefs that have received very little research attention: parents' beliefs about the nature of ability, that is, implicit theories about the extent to which abilities are amendable to change through effort and practice (Dweck, 1999; Dweck & Leggett, 1988). Although the effect of learners' beliefs about the nature of ability on their learning and achievement has received extensive research attention (see Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013), there is a dearth of studies examining the effect that such beliefs held by parents have on their children. Thus, we investigate how parents' beliefs about the nature of ability are related to their children's beliefs about the nature of ability and parents' own learning-related behaviors. Furthermore, we examine how parental beliefs about ability—mediated by these two aspects—are ultimately related to children's academic achievement.

3.2.1. Effect of Learners' Implicit Theories About Ability

Beliefs about the nature of ability have been conceptualized within the framework of implicit theories (ITs), that is, lay theories regarding traits and abilities (Molden & Dweck, 2006). Carol Dweck's model (Dweck, 1999; Dweck & Leggett, 1988) differentiates between two implicit theories: an entity theory and an incremental theory. Persons holding an entity theory believe ability to have a substantially large part that is static and immutable, while persons holding an incremental theory believe that there are no limits to developing ability through practice and effort. Entity theory and incremental theory are often seen as the two ends of a bipolar continuum (e.g., Blackwell et al., 2007; Ehrlinger, Mitchum, & Dweck, 2015; Kammrath & Dweck, 2006).

Holding an incremental theory about ability is an important prerequisite for successful learning. An incremental theory encourages persistence, effort, and strategic learning, which are necessary for high achievement. In contrast, individuals with an entity theory hold the maladaptive conviction that those possessing enough innate talent do not need to expend effort or to employ strategies in order to learn successfully. They, therefore, also assume that neither extra effort nor increased use of learning strategies can fundamentally improve a person's net effectiveness when he or she has difficulties (see Dweck & Master, 2008) and tend to assume that learning either occurs quickly or not at all (Bråten & Strømsø, 2004). Incremental theorists, on the other hand, are more persistent in the face of setbacks and challenges (e.g., Blackwell et al., 2007; Dai & Cromley, 2014), invest more effort (e.g., Mouratidis, Michou, & Vassiou, 2017), and employ more learning strategies (e.g., Bråten & Olaussen, 1998).

Consequently, several studies have documented the positive relationship between holding an incremental theory and academic achievement (Chen & Pajares, 2010; Cury, Da Fonseca, Zahn, & Elliot, 2008; Da Fonseca et al., 2009; Mouratidis et al., 2017; Stipek & Gralinski, 1996). Despite substantial research on the effects of learners' ITs on several relevant outcomes, findings are lacking on the role of pedagogical agents' ITs on learners' outcomes. Within this area, the lack of research on parental ITs is particularly conspicuous (Moorman & Pomerantz, 2010; Pomerantz & Dong, 2006).

3.2.2. Effect of Parental Implicit Theories About Ability on Child Outcomes

Few studies have investigated the effect of parental ITs on child outcomes. The findings of extant studies offer mixed results. Some studies have found parents' incremental theory to have beneficial effects on children. In one study, parents' endorsement of an incremental theory correlated with their children demonstrating less helplessness during several challenging puzzle tasks (Jose & Bellamy, 2012). In another study, researchers (Pomerantz & Dong, 2006) did not find a main effect of mothers' ITs on their children's academic and emotional functioning, but did detect an interaction effect of mothers' ITs and their perceptions of children's competencies on the outcome variables. Mothers' incremental theory buffered their children against the otherwise negative effects of mothers' beliefs that their children lacked competencies.

Other studies, however, found parents' incremental theory to have no beneficial effects on children. Rautiainen, Räty, and Kasanen (2016) found a negative relationship between parents' incremental theory and children's grades. The authors interpreted this finding as children's low academic achievement motivating parents to seek variable attributions for their children's failures by adopting an incremental theory. Both Gunderson et al. (2013) and Haimovitz and Dweck (2016) found that parents holding an incremental theory was not predictive of their children also adopting an incremental theory.

Overall, these mixed findings indicate a need for further investigation of the relations between parents' ITs and children's outcomes. In particular, it seems important to understand the mechanism by which parental ITs can influence child outcomes. Two possible mechanisms are (a) transfer of ITs from parents to children and (b) parents' ITs affecting parental learning-related behaviors.

3.2.3. Mechanism 1: Transfer of ITs From Parents to Children

The first proposed mechanism by which parental ITs might affect child outcomes is the transmission of ITs from parents to children via modelling—with children's ITs in turn affecting their own outcomes. Although two recent studies have failed to find evidence for a transfer of ITs from parents to children (Gunderson et al., 2013; Haimovitz & Dweck, 2016), this assumption still seems plausible in contexts where children's intellectual potential is made salient (see Haimovitz & Dweck, 2017).

The assumption that ITs get transferred from parents to children under certain circumstances can be based on the fact that such a transfer seems to happen for several other motivationally relevant beliefs. There is evidence, for example, for positive correlations between parents' and their children's educational aspirations (Jodl, Michael, Malanchuk, Eccles, & Sameroff, 2001), between parents' and

children's perceptions of child abilities (Frome & Eccles, 1998), and between parents' and children's goal orientations (Friedel, Cortina, Turner, & Midgley, 2007)—a construct closely related to ITs (see Dweck & Leggett, 1988; Payne, Youngcourt, & Beaubien, 2007).

A transfer of ITs from parents to their children might happen via modelling. Similarly, the self-efficacy literature identifies modelling (see Bandura, 1997) as an influence on how much confidence learners have in being able to successfully accomplish a certain task at a certain level of difficulty. This mechanism might also be at work when parents' ITs influence children's ITs. According to self-efficacy research, the message that a model has succeeded at a relevant task after some struggle can increase learners' self-efficacy (see Butz & Usher, 2015; Usher & Pajares, 2006). Parents with an incremental theory might send similar messages when they model for their children how to overcome a challenge or initial failure through sustained effort (see Haimovitz & Dweck, 2017), thus affecting children's implicit theories. In accordance with this line of reasoning, children are apparently able to pick up whether their parents think that failure facilitates learning and growth or that failure is something to be avoided (Haimovitz & Dweck, 2016). The parental assumption that failure facilitates learning and growth correlates with children adopting an incremental theory, while the parental assumption that failure is something to be avoided correlates with children adopting an entity theory (Haimovitz & Dweck, 2016).

In the case of Haimovitz and Dweck (2016), however, this mechanism was not confirmed. They did not find parents' ITs to be related to their children's ITs (see also Gunderson et al., 2013). Yet they also speculate that parental ITs might nevertheless influence practices that affect children's ITs in situations where children's intellectual ability or potential are made salient, such as in the face of tracking decisions (see Haimovitz & Dweck, 2017). Such a salience was not provided in the studies described by Haimovitz and Dweck (2016) and by Gunderson et al. (2013). Thus, parents' ITs might be transferred to their children in such situations.

3.2.4. Mechanism 2: Parental ITs and Parental Learning-Related Behaviors

A second mechanism by which parental ITs might affect child outcomes is through parental behaviors. Holding an incremental theory (instead of an entity theory) should predict adaptive parental behaviors for the same reason that holding an incremental theory predicts behaviors that are conducive to learning and achievement in students (e.g., focus on mastery instead of performance outcomes and persistence in the face of setbacks; see Dweck & Master, 2008): Parents with an incremental theory are more likely to assume that children's level of performance merely reflects their current stage of learning, while parents with an entity theory are more likely to assume that children's level of performance reflects some form of innate ability—which implies that children's initial difficulties might have implications for their future academic success (see Moorman & Pomerantz, 2010). Consequently, the more parents hold an incremental theory, the more likely they are in learning situations to remain calm and focused on helping children develop their ability—especially when their children struggle. This line of reasoning and existing empirical evidence (Jose & Bellamy, 2012; Moorman & Pomerantz, 2010) link parental

ITs to two parental behavior variables that have been identified as important predictors of children's motivation and achievement (see Pomerantz et al., 2007): (a) displaying positive versus negative affect during learning-related interactions and (b) employing strategies of autonomy support versus control.

Positive versus negative affect captures whether parents manage to make learning-related interactions with their children enjoyable or whether parents express irritation or annoyance (see Pomerantz et al., 2007). In the context of this research, operationalizations of negative affect often include confrontational behaviors, such as verbal expressions of criticism or frustration and raising one's voice (see Moorman & Pomerantz, 2008, 2010; Nolen-Hoeksema, Wolfson, Mumme, & Guskin, 1995). Incremental theorist parents are less likely to produce such conflict-laden interactions because of incremental theorists' tendency to see setbacks as learning opportunities instead of threats (see Dweck & Master, 2008). The more parents hold an incremental theory, the more likely they are to remain encouraging instead of confrontational when their children face difficulties in learning situations (Jose & Bellamy, 2012)—especially when learning outcomes have important consequences. This is because incremental theorists are unlikely to interpret setbacks as evidence of stable ability deficits (e.g., Rattan, Good, & Dweck, 2012) and instead tend to view setbacks as valuable information that can be used to optimize one's learning. Thus, they are less inclined than entity theorists to react to failure feedback with negative emotions (e.g., Niiya, Crocker, & Bartmess, 2004; Shih, 2011). Experimental findings corroborate this explanation. Mothers who had received an incremental theory manipulation (compared to mothers who had received an entity theory manipulation) had fewer conflict-laden interactions with their children during a subsequent joint learning task in the laboratory (Moorman & Pomerantz, 2010). This differential effect was especially pronounced when children displayed helplessness.

Another important parental behavior variable that can be connected to parents' ITs (see Grolnick, 2003) is autonomy support versus control. Controlling behavior in connection with learning is characterized by parents utilizing pressure to steer children towards academic success (see Pomerantz et al., 2007). This can imply behaviors such as intruding in children's actions (i.e., interrupting activities and redirecting them while using directive language; Reeve, 2009), neglecting to provide explanatory rationales (Cheon & Reeve, 2015), employing strategies of external control such as demands, rewards, and surveillance, or even resorting to psychological control measures such as guilt induction or anxiety instillment (Soenens & Vansteenkiste, 2010). Parents holding an incremental theory seem less likely to use such controlling strategies in learning-related situations because incremental theorists (compared to entity theorists) tend to emphasize mastery over outcomes (e.g., grades)—an outlook that runs counter to the usage of controlling strategies (see Grolnick, 2003). Thus, incremental-theorist parents are more likely to be aware of the importance of helping their children to learn (e.g., by counseling children on how to solve a homework-related problem on their own) instead of "taking over" and employing controlling strategies in an effort to make children achieve good grades at the expense of learning (Grolnick, 2003). This line of reasoning is substantiated by evidence that holding an incremental theory predicts

less controlling behaviors in both mothers (Moorman & Pomerantz, 2010) and teachers (Leroy, Bressoux, Sarrazin, & Trouilloud, 2007).

3.2.5. The Present Study

The aim of the present study is to learn more about the mechanisms behind the relationship between parental ITs and child outcomes. In particular, two mechanisms are investigated: (a) the transmission of parental ITs to children, with child ITs influencing child outcomes, and (b) the indirect influence of parental ITs on child outcomes by way of the parental-ITs-influenced parental behaviors. Whereas numerous studies show relations between child ITs and child outcomes, only few studies have investigated the transmission of parental ITs to children—and all of these reported null results. A small number of studies documents the effect of parental ITs on parental behaviors. However, there is a complete lack of systematic research on the mediating role of parental behavior for relationships between parental ITs and child outcomes.

Thus, the present study addresses this gap by examining how the ITs of parents relate to their children's ITs and parental behaviors. Furthermore, we examine whether the ITs of parents—mediated by children's ITs and parental behaviors—relate to children's academic achievement. To investigate these questions, we examined the parents of fourth-graders in the German federal state of Bavaria. This sample has several advantages. First, an impending tracking decision made during fourth grade can be expected to make children's intellectual potential salient to their parents.[1] These circumstances make it more likely that parental ITs will influence children's ITs and parents' learning-related behaviors (see Haimovitz & Dweck, 2017). Second, because this obligatory tracking decision has far-reaching consequences for children's future tertiary educational options and their career opportunities (see Bellenberg, Hovestadt, & Klemm, 2004), parents of fourth-grade students are particularly prone to providing their children with support for school-related learning (Wild & Remy, 2002). This frequently close cooperation between parents and children can be expected to further strengthen the effect of parental ITs on students' ITs as well as on parents' learning-related behaviors—and the effect of both on student outcomes. Third, this high-stakes situation is especially likely to confront parents and their children with challenges and setbacks. As learning becomes less exploratory, more outcome oriented, and grades become more important at this point, many children who did well so far will probably encounter their first learning-related setbacks (see Hössl & Vossler, 2006). A situation like this is well suited to investigate ITs, because their effects on related cognitions, emotions, and behaviors are especially pronounced in situations involving potential ego threats such as failure feedback (Burnette et al., 2013).

Our first prediction is that the more parents hold an incremental theory, the more their children also hold an incremental theory. This prediction is based on (a) evidence for a positive correlation

[1] In Bavaria, as in several other German states (see Einsiedler, Martschinke, & Kammermeyer, 2008), students are tracked into one of three forms of university-preparatory and non-university-preparatory secondary education as of fifth grade based on their grades in German, mathematics, and basic science during fourth grade (Bayerisches Kultusministerium, n.d.).

between several motivationally relevant beliefs of parents and their children's corresponding beliefs (Friedel et al., 2007; Frome & Eccles, 1998; Jodl et al., 2001) and (b) the assumption that parents are likely to communicate their ITs to their children via modeling (e.g., by talking about how they have overcome past difficulties of their own through practice and effort) when supporting their children during challenging learning tasks. Although ITs are often not transferred from parents to children (Gunderson et al., 2013; Haimovitz & Dweck, 2016), they nevertheless might be in our setting, because the high-stakes tracking decision can be expected to make children's intellectual potential salient (see Haimovitz & Dweck, 2017).

Our second prediction is that the more parents hold an incremental theory, the less unconstructive learning-related behaviors they exhibit. In our study, we focus on two such learning-related behaviors in particular: participating in homework-related conflict and employing controlling behavior. This choice is informed by the fact that existing evidence for the effect of parents' ITs on amounts of conflict and controlling behavior from the laboratory (Moorman & Pomerantz, 2010) has yet to be replicated in more ecologically valid settings—and has yet to be linked to child achievement outcomes. We predict that the more parents hold an incremental theory, the less they participate in homework-related conflict with their children. The homework context was chosen due to its high incidence of both parental support (see Pomerantz et al., 2007) and negative affect (Leone & Richards, 1989; Pomerantz, Wang, & Ng, 2005). In this challenging learning context, parents holding an incremental theory should participate in less conflict due to being more likely to remain calm and encouraging instead of expressing negative feelings when their children face setbacks (Moorman & Pomerantz, 2010). Incremental theorists tend to see setbacks as learning opportunities (see Dweck & Master, 2008) and thus to feel less negatively about them (Niiya et al., 2004; Shih, 2011).

We further predict that the more parents hold an incremental theory, the less controlling behavior they employ towards their children. We make this prediction in light of incremental theorists' tendency to focus on mastery instead of outcomes (see Dweck & Master, 2008). A mastery orientation runs counter to the usage of controlling strategies (see Grolnick, 2003). In agreement with this rationale, both parents and teachers holding an incremental theory resort to fewer controlling behaviors (Leroy et al., 2007; Moorman & Pomerantz, 2010).

Our third prediction is that parents' endorsement of an incremental theory—mediated by children's ITs and parents' learning-related behaviors (less homework-related conflict and less controlling behavior)—positively affects children's academic achievement. The basis for this expectation is evidence that high academic achievement is predicted by (a) learners endorsing an incremental theory (Chen & Pajares, 2010; Cury et al., 2008; Da Fonseca et al., 2009; Mouratidis et al., 2017; Stipek & Gralinski, 1996), (b) absence of parent–child conflict (Brković, Keresteš, & Levpušček, 2014; Dotterer, Hoffman, Crouter, & McHale, 2007), and (c) parents abstaining from controlling behavior (e.g., Aunola & Nurmi, 2004; Bean, Bush, McKenry, & Wilson, 2003; Cooper, Lindsay, & Nye, 2000).

3.3. Method

3.3.1. Participants

In order to test our three predictions, we queried the parents of fourth-graders attending public schools in the German federal state of Bavaria. The participants were 723 parents with children in fourth grade from 46 different classrooms. Participation was voluntary, and anonymity was guaranteed. Parents were asked to complete a questionnaire as part of a larger assessment involving their children (see Stoeger, Steinbach, Obergriesser, & Matthes, 2014). Parent questionnaires were addressed to the parent or guardian who had the most contact with the child. About 75% of these questionnaires were returned. The majority of the parent questionnaires were filled out by the child's mother (87%). Eight percent had been completed by the father, four percent by both mother and father. The remaining six questionnaires had been completed by another person. Due to the study's focus on parental ITs, we included all cases for which the mother, the father, or both the mother and father had completed the questionnaire. Parents' highest educational attainment was coded according to the International Standard Classification of Education 1997 (ISCED 1997, United Nations Educational, Scientific and Cultural Organization, 1997). Seven percent of parents reported an ISCED highest educational attainment of lower secondary education or below (Level 2 or below); 41% of parents reported their highest educational attainment as upper secondary education and/or post-secondary education (Level 3 or 4); 51% of parents indicated tertiary education (Level 5 or above); and eight parents (1%) did not provide valid information about their highest educational attainment.

The fourth-graders whose parents received the parent questionnaire had filled out a student questionnaire during regular classroom instruction. The students were, on average, 9.8 years old (ranging from 9 to 12 years, $SD = 0.50$ years). Fifty-three percent were girls. In 20% of the cases, either the student or at least one of his or her parents was born outside of Germany.

3.3.2. Measures

Parent Variables. ***Parents' Incremental Theory.*** We assessed parents' ITs with a modified version of the 6-item scale by Ziegler and Stoeger (2010), which queries the degree to which learners believe their ability deficits within a certain domain to be malleable through effort and practice. We modified the items from Ziegler and Stoeger (2010) to reflect parents' implicit theory about their child's ability for school in general with the intent of covering the main subjects in Bavarian elementary school that are relevant for the tracking decision (see Bayerisches Kultusministerium, n.d.). Parents were presented with the following instructions for completing the rating tasks: "Please rate the following statements in terms of your child's learning for school and in school." A sample item is: "What my child is capable of is not fixed. He or she can learn new things and expand his or her abilities." Parents answered these items on a six-point Likert scale ranging from 1 (*completely disagree*) to 6 (*completely agree*). Cronbach's alpha of the scale was .67 (which is a somewhat low, but acceptable value; see Nunnally, 1967).

Regarding parents' learning-related behaviors, we assessed two different constructs: homework-related conflict and controlling behavior. Parents responded to all items of these two scales on a six-point Likert scale ranging from 1 (*completely disagree*) to 6 (*completely agree*).

Homework-Related Conflict. We assessed the degree to which parents participated in homework-related conflict with their children via a 3-item scale (Niggli, Trautwein, Schnyder, Lüdtke, & Neumann, 2007). A sample item is: "Homework is time and again a cause of bickering in our family." Cronbach's alpha was .90.

Controlling Behavior. We measured the degree to which parents employed controlling behavior (in reaction to academic setbacks) with a 5-item scale (Wild, Rammert, & Siegmund, 2006) that queried parents' reactions to a bad grade received by their child. A sample item is: "When my child gets a poor grade, I scold him or her and demand that he or she studies more." Cronbach's alpha was .75.

Child Variables. ***Child's Incremental Theory.*** We assessed children's ITs with a modified version of the 6-item scale presented in Ziegler & Stoeger (2010). We modified the original items, which referred to the subject of mathematics, to refer to school in general with the intent of being applicable for all the main subjects taught in Bavarian elementary school (German, mathematics, and basic science). A sample item is: "What I am capable of in school is not fixed. I can learn new things and expand my abilities." Respondents answered all items on a six-point Likert scale ranging from 1 (*completely disagree*) to 6 (*completely agree*). Internal consistency (Cronbach's alpha) was .65 (which is again a somewhat low, but acceptable value; see Nunnally, 1967).

Child's Academic Achievement. We operationalized children's academic achievement as the average of the three grades in the main subjects in their year-end report cards, which were supplied by the respective teachers. In Bavarian primary school, students' main subjects are German, mathematics, and basic science. The average of these three grades determines which school track (university-preparatory or non-university-preparatory) the students will be able to attend as of fifth grade (see Bayerisches Kultusministerium, n.d.). In Germany, the highest possible grade is 1 and the lowest possible grade is 6, with a grade of 5 or worse indicating failure to reach the classroom goal. For easier interpretation, we inverted the grades before conducting our analysis so that a value of 6 indicates the highest possible level of academic achievement. Cronbach's alpha for this grade average was .87.

3.3.3. Plan of Analysis

To test our predictions, we calculated a structural equation model using version 6 of the software package Mplus (Muthén & Muthén, 2010b).[2] We represented each of the four scales under investigation as a latent variable. As several item scores exhibited a skewed distribution (see Table 1), we

[2] We calculated the intraclass correlation (ICC) for all variables included in the model in order to determine whether to account for the multilevel structure of the dataset (students nested within classrooms). However, since the ICC for all variables was below .10, we deemed it acceptable not to consider this multilevel structure in our analyses.

defined all items as categorical variables and used a robust weighted least squares estimator (WLSMV; see Muthén & Muthén, 2010a).

In order to judge the model fit, we calculated the indices recommended by Schermelleh-Engel, Moosbrugger, and Müller (2003):[3] (a) the ratio of the chi-square value and the number of degrees of freedom (χ^2/df) for which values below 2 indicate good fit and values between 2 and 3 indicate acceptable fit, (b) the comparative fit index (CFI), (c) the Tucker–Lewis index (TLI, also referred to as the nonnormed fit index, or NNFI), for both of which values above .97 indicate good fit and values between .97 and .95 indicate acceptable fit, (d) the root mean square error of approximation (RMSEA), for which values below .05 indicate good fit and values between .05 and .08 indicate acceptable fit.

3.4. Results

3.4.1. Preliminary Analyses

Before conducting our primary analyses, we assessed the psychometric properties for the manifest scores of our study variables (see Table 2). We also calculated the correlations for each pair of them (see Table 3).

Next, we calculated the amount of missing data for each of the 20 scale items and the three grades—and confirmed that missingness for each of the 20 scale items was unrelated to the dependent variable (child's academic achievement). Percentages of missing data for each of the individual variables can be found in Table 1. The total proportion of missing data for all of the 23 variables combined was around 2.3%. Subsequently, we investigated whether the missing values for each of the 20 scale items were systematically related to the dependent variable, that is, MNAR (missing not at random; see Tabachnick & Fidell, 2010). To test this, we calculated a *t* test for each of the 20 scale items, comparing the values for children's academic achievement between cases with a missing value and cases without a missing value for the respective item. We adjusted the required *p* values in accordance with the number of *t* tests run via the Holm–Bonferroni method (Holm, 1979). The tests revealed no significant differences in children's academic achievement between cases with a missing value and cases without a missing value for each of the 20 scale items. Thus, missing data were handled by pairwise deletion, because (a) all procedures for dealing with missing values tend to arrive at similar results if only 5% or less of all values are missing randomly from a large dataset (Tabachnick & Fidell, 2010) and (b) the WLSMV estimator does not support the full-information maximum likelihood method for dealing with missing values.

[3] The standardized root mean square residual (SRMR), which is also recommended by Schermelleh-Engel, Moosbrugger, and Müller (2003), is not available when categorical variables are included in the model.

Table 1

Factor Loadings, Descriptive Statistics, and Amount of Missing Data for All Manifest Variables

Manifest variable	Loading	*M*	*SD*	Skew	Kurtosis	Missing data
Parents' incremental theory						
Item 1	.60	4.94	0.75	–0.82	2.23	1.7%
Item 2	.30	4.31	1.07	–0.64	0.27	2.1%
Item 3 (inverted)	–.79	2.67	1.28	0.63	–0.13	1.2%
Item 4	.79	4.87	0.87	–0.90	1.59	1.4%
Item 5	.59	4.90	0.88	–1.17	2.84	2.4%
Item 6 (inverted)	–.53	2.39	1.20	0.84	0.36	2.1%
Homework-related conflict						
Item 1	.89	2.88	1.44	0.51	–0.59	1.1%
Item 2	.96	2.69	1.40	0.65	–0.39	2.5%
Item 3	.86	2.42	1.28	0.92	0.43	1.7%
Controlling behavior						
Item 1	.73	2.52	1.28	0.50	–0.64	2.2%
Item 2	.86	2.18	1.25	0.93	–0.05	1.4%
Item 3	.44	3.12	1.33	0.06	–0.80	3.7%
Item 4	.50	3.19	1.46	0.08	–1.00	1.9%
Item 5	.78	2.62	1.35	0.46	–0.73	1.9%
Child's incremental theory						
Item 1	.75	5.28	0.90	–1.45	2.68	2.8%
Item 2	.57	4.98	0.97	–1.10	1.72	2.6%
Item 3 (inverted)	–.64	2.51	1.32	0.74	–0.15	3.2%
Item 4	.69	5.36	0.85	–1.66	3.55	3.2%
Item 5	.62	4.89	0.98	–1.17	2.14	3.0%
Item 6 (inverted)	–.39	2.67	1.52	0.75	–0.44	4.8%
Child's academic achievement						
Grade in German	–	4.34	0.87	–0.24	–0.34	< 0.1%
Grade in mathematics	–	4.32	0.98	–0.32	–0.38	< 0.1%
Grade in basic science	–	4.54	0.91	–0.46	–0.22	< 0.1%

Table 2

Psychometric Properties of All Study Variables

Variable	Indicators	α	*M*	*SD*	Range	Skew	Kurtosis
Parents' incremental theory	6	.67	4.66	0.63	2.00–6.00	–0.31	0.27
Homework-related conflict	3	.90	2.67	1.26	1.00–6.00	0.66	–0.10
Controlling behavior	5	.75	2.72	0.95	1.00–6.00	0.25	–0.37
Child's incremental theory	6	.65	4.89	0.68	2.00–6.00	–0.61	0.63
Child's academic achievement	3	.87	4.40	0.82	2.00–6.00	–0.39	–0.36

Table 3

Manifest Correlation Matrix for All Study Variables

Variable	1	2	3	4
1. Parents' incremental theory				
2. Homework-related conflict	–.34**			
3. Controlling behavior	–.23**	.29**		
4. Child's incremental theory	.34**	–.20**	–.12*	
5. Child's academic achievement	.44**	–.35**	–.42**	.41**

Note. *$p < .01$. **$p < .001$.

3.4.2. Structural Equation Model

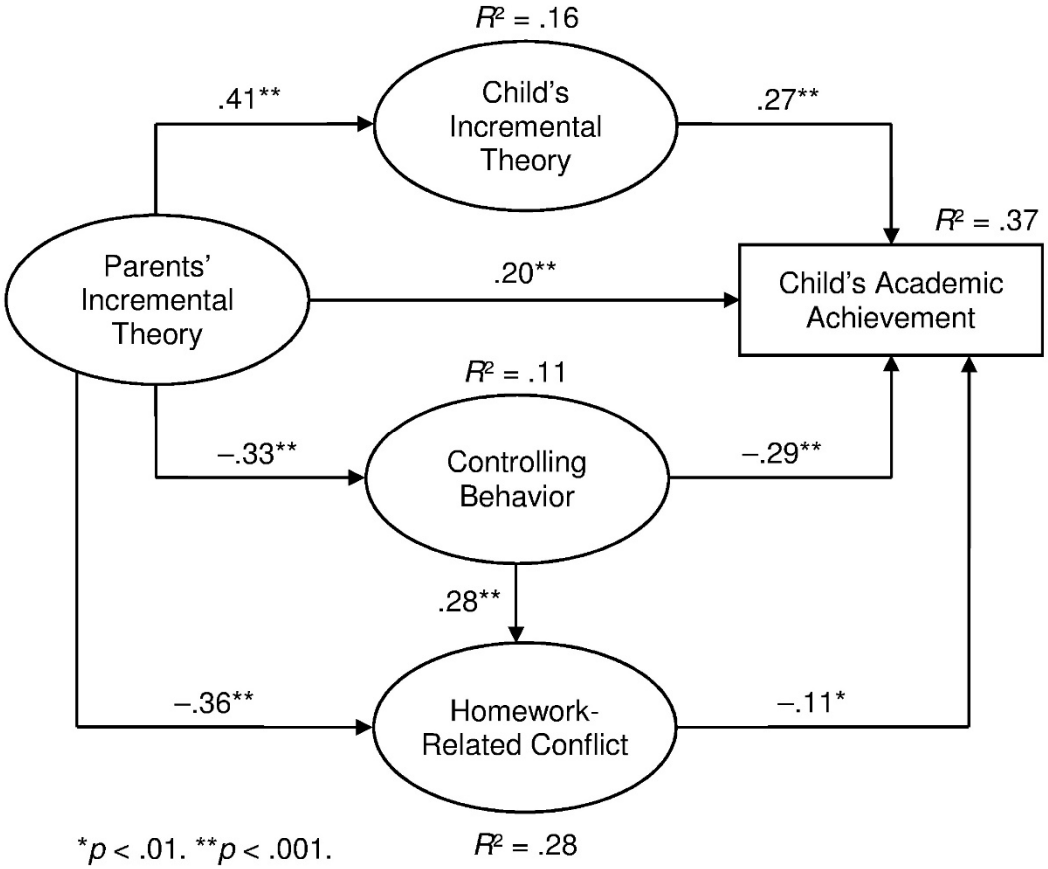
Before constructing our structural equation model, we tested the underlying measurement model—where all five study variables were allowed to correlate—and then compared it to the final model (see Kline, 2005). We allowed the inverted items in both the parents' and the children's incremental theory scale to correlate. Fit indices for the measurement model ($\chi^2(178, N = 723) = 1026.37$, $p < .001$) fell for the most part into the range considered acceptable (see Schermelleh-Engel et al., 2003) or slightly below that range ($\chi^2/df = 5.8$, CFI = .94, TLI = .93, RMSEA = .08).

Next, we compared this measurement model with our structural equation model. The standardized structural coefficients for this model are presented in Figure 1.[4] Fit indices for the proposed model ($\chi^2(180, N = 723) = 960.20$, $p < .001$) were slightly better than those of the measurement model ($\chi^2/df = 5.3$, CFI = .95, TLI = .94, RMSEA = .08). Table 1 contains the factor loadings and descriptive statistics for each individual manifest variable. A chi-square test confirmed that the structural equation model's fit was not worse than that of the less restrictive measurement model, $\chi^2(2, N = 723) = 2.16$, $p = .34$.

[4] In order to account for the positive correlation between controlling behavior and homework-related conflict, we added an additional path to the model. We expected this path to point from controlling behavior towards homework-related conflict (instead of the other way around) due to humans' tendency to react with opposition when they perceive infringements on their freedom of choice (see Brehm, 1966).

Figure 1

Parameter Estimates for the Proposed Model (Standardized Structural Coefficients and Percentage of Variance Explained in Each Variable)



In accordance with our first prediction, the extent of parents' incremental theory was positively related to the extent of their child's incremental theory (β = .41, $p < .001$). In accordance with our second prediction, the extent of parents' incremental theory was negatively related to both the amount of homework-related conflict (β = –.36, $p < .001$) and controlling behavior (β = –.33, $p < .001$).

In accordance with our third prediction, the extent of parents' incremental theory was positively related to children's academic achievement (β = .20, $p < .001$). As expected, the positive effect of parents' incremental theory on children's academic achievement was mediated by children's incremental theory, homework-related conflict, and controlling behavior. All predictors together were able to explain 37% of the variance in children's academic achievement. As the extent of children's incremental theory was positively related to children's academic achievement (β = .27, $p < .001$), a Sobel test was calculated that confirmed the significance of the indirect path from parents' incremental theory to children's academic achievement via children's incremental theory (β = .11, $p < .001$). As the amount of homework-related conflict was negatively related to children's academic achievement (β = –.11, $p < .01$), a Sobel test was calculated that confirmed the significance of the indirect path from parents' incremental theory to children's academic achievement via homework-related conflict

(β = .04, $p < .01$). Finally, as the amount of controlling behavior was negatively related to the children's academic achievement (β = –.29, $p < .001$), a Sobel test was calculated that confirmed the significance of the indirect path from parents' incremental theory to children's academic achievement via controlling behavior (β = .10, $p < .001$).

3.5. Discussion

In our study, we investigated parents' implicit theories about their children's academic abilities. We found that the more parents held an incremental theory (i.e., the more they believed that their children are capable of modifying ability deficits through effort and practice), (a) the more their children also held an incremental theory (regarding their own academic abilities) and (b) the less parents exhibited unhelpful learning-related behaviors. In particular, the more parents held an incremental theory, the less homework-related conflict they experienced and the less controlling behaviors they employed. We also found that the degree to which parents held an incremental theory was positively related to desirable child outcomes, namely, to children's academic achievement. The relationship was partially mediated by the degree to which children held an incremental theory and by parents' learning-related behaviors. Thus, this study contributes to the currently very limited research on the effects of parental ITs on child outcomes by shedding light on the mechanisms behind these relations.

The first finding was that parents' ITs were related to their children's ITs. The more parents held an incremental theory regarding their children's academic abilities, the more their children also held an incremental theory regarding their academic abilities. This finding expands on existing research about whether and in which situations ITs are transferred from parents to children (Haimovitz & Dweck, 2017). The few studies that have investigated this topic have found no evidence for such a transfer (Gunderson et al., 2013; Haimovitz & Dweck, 2016). Based on this lack of evidence, Haimovitz and Dweck (2017) have concluded that ITs are generally not transferred from parents to their children because parents' ITs are usually not visible to children and do not influence relevant parental behaviors. Yet they also point out that parents' ITs might influence children's ITs in situations that make children's intellectual potential salient, such as an upcoming tracking decision. In order to test this speculation, we conducted our study in a setting that can be expected to heighten the effects of parental ITs—fourth grade in the German federal state of Bavaria. In particular, this setting faces children with an obligatory tracking decision based on their grades that has far-reaching consequences (see Bellenberg et al., 2004). This situation is known to prompt extensive parental support for school-related learning (Wild & Remy, 2002) and to simultaneously confront some students with their first learning-related setbacks (Hössl & Vossler, 2006). Our study shows that in a setting like this, a transfer of ITs from parents to children might indeed take place. In this way, our study expands on the recent work of Haimovitz and Dweck (2017) by substantiating their speculation.

Our second finding was that the more parents held an incremental theory, the less counterproductive learning-related behavior they reported. In particular, they reported participating in less homework-related conflict with their children and employing less controlling behavior. These behaviors represent two variables with clear implications for children's motivation and achievement (i.e., displaying positive versus negative affect during learning-related interactions and employing strategies of autonomy support versus control; see Pomerantz et al., 2007). The results expand upon previous studies of the effect of parental ITs on similar parental behaviors (Jose & Bellamy, 2012; Moorman & Pomerantz, 2010). In particular, our results extend the findings of Moorman and Pomerantz (2010), who found that mothers who have been led to endorse an incremental theory (compared to mothers who have been led to endorse an entity theory) displayed less conflict and fewer controlling behaviors while working on a challenging joint task with their child in a laboratory setting. Our study replicates these findings in a more ecologically valid setting with naturally occurring challenges. Parental ITs were especially likely to influence parental behaviors in the setting of our study, as the increasing academic challenges at this point in children's academic careers usually result in heightened parental involvement and an increase in setbacks. These findings fit well with research about the general effects of ITs that has shown incremental theorists to react more adaptively to challenges and setbacks than entity theorists (see Dweck & Master, 2008). While entity theorists are quick to interpret setbacks as evidence of stable ability deficits (e.g., Rattan et al., 2012) and are thus likely to react to failure feedback with negative emotions (e.g., Niiya et al., 2004; Shih, 2011), maladaptive behaviors (e.g., Howell & Buro, 2009; Rhodewalt, 1994), or giving up (e.g., Blackwell et al., 2007), incremental theorists tend to view setbacks as valuable information that can be used to optimize one's (learning) behavior and thus react to such information more adaptively (e.g., Moser, Schroder, Heeter, Moran, & Lee, 2011).

Our third finding was that the more parents held an incremental theory, the better their children's grades were—and that this relationship was partially mediated by children's ITs and parents' learning-related behaviors. Thus, our results indicate a positive relationship between parents holding an incremental theory and desirable child outcomes. This finding corroborates evidence that parents who hold an incremental theory (instead of an entity theory) support their children more competently during difficult tasks (Moorman & Pomerantz, 2010).

Our results also raise the question of why the two other studies that have investigated the effect of parents' ITs on children's grades found non-significant (Pomerantz & Dong, 2006) or even negative relationships (Rautiainen et al., 2016). One explanation for the mixed results might be that the three studies (Pomerantz & Dong, 2006; Rautiainen et al., 2016; and our current study), while all examining somewhat similar grade levels, were conducted in three different countries with different school systems. While our study was conducted in the German federal state of Bavaria, the other two were conducted in Finland (Rautiainen et al., 2016) and the United States (Pomerantz & Dong, 2006), respectively. In contrast to the other two countries, the grades that children achieve in fourth grade in Bavaria have far-reaching consequences for their future educational and professional opportunities—thus, it is very common for parents

to support their children's learning efforts (Wild & Remy, 2002). The considerable amount of time Bavarian parents are spending supporting their fourth-grade children during homework and studying might help explain why parents' implicit theories about ability—mediated by children's ITs and parents' learning-related behaviors—affect their children's academic achievement in our sample. Additionally, the fact that the upcoming tracking decision should have made children's intellectual potential salient to parents might have increased the effect of parental ITs (see Haimovitz & Dweck, 2017). Thus, the three studies' different results may be reflecting differences related to the school systems and grade levels of the respective studies—the effect of parental ITs might be weaker when there are no impending tracking decisions, the stakes are lower, and parents support their children's learning less frequently.

More interesting than the evidence for a relationship between parental ITs and child outcomes are the insights our study provides into the mechanisms behind this relationship. To the best of our knowledge, our study is the first to provide evidence for such mechanisms. In particular, our results indicate that parents' incremental theory relates to children's academic achievement by (a) facilitating more patient and learning-oriented parental behaviors in learning-related situations and (b) leading their children to adopt an incremental theory. Earlier studies of the effects of parental ITs on parents' behavior towards their children corroborate our parental behaviors mechanism. Parents holding an incremental theory show more helpful learning-support behaviors (Moorman & Pomerantz, 2010) and offer more encouragement to their children in the face of difficulties (Jose & Bellamy, 2012). In contrast to our results for the parental behaviors mechanism, our results for the child-ITs mechanism differ from those of previous studies (Gunderson et al., 2013; Haimovitz & Dweck, 2016). Nevertheless, this difference is in line with current theoretical advances in IT research, as the upcoming high-stakes tracking decision can be expected to have made children's intellectual potential salient (see Haimovitz & Dweck, 2017) and—together with the generally substantial amount of parental learning support—facilitated a transfer of ITs from parents to children. Finally, there is a plethora of empirical support for the second part of the child-ITs mechanism, that is, for the effect of children's ITs on academic achievement (Chen & Pajares, 2010; Cury et al., 2008; Da Fonseca et al., 2009; Mouratidis et al., 2017; Stipek & Gralinski, 1996).

3.5.1. Limitations and Future Research

While our study provides several new insights about relations between parental ITs and child outcomes, a number of limitations should be kept in mind. One key limitation is the study's cross-sectional design, which does not allow for inferences regarding the direction of influence. While we have argued that parental ITs affect children's ITs and parental behaviors, which in turn affect children's academic achievement, one might also argue that high achievement might reduce the incidence of unhelpful parental behaviors and lead both parents and children to adopt an incremental theory. Nevertheless, since ITs' effects on achievement have been documented in several intervention studies (Aronson, Fried, & Good, 2002; Blackwell et al., 2007; Good, Aronson, & Inzlicht, 2003; Paunesku et al., 2015; Yeager et al., 2016), the direction of influence we assumed in our study is in line with existing findings and thus

highly plausible. In order to gain final insight into the direction of effects, studies with a cross-lagged panel design and intervention studies might be helpful. Cross-lagged panel studies could investigate whether a change in parental ITs predicts changes in parents' learning-related behaviors and child outcomes; intervention studies could try to effect changes in parents' ITs and investigate whether such changes affect parents' learning-related behaviors and child outcomes.

Another limitation of our study lies in the fact that academic achievement, the child outcome under investigation, is only indirectly related to children's ITs and parents' learning-related behavior. Theory and empirical research suggest that the effect of each of these two variables on academic achievement is mediated by learners' motivation and learning behavior (see Burnette et al., 2013; Pomerantz et al., 2007). For learners' ITs, their influence on goal orientations is considered a key motivational aspect (Burnette et al., 2013; Payne et al., 2007). Holding an incremental theory facilitates a desire to improve one's abilities, which constitutes a learning (or mastery) goal orientation (Burnette et al., 2013; Dupeyrat & Mariné, 2005; Payne et al., 2007; Schwinger, Steinmayr, & Spinath, 2016). This, in turn, engenders high achievement (e.g., Bouffard, Boisvert, Vezeau, & Larouche, 1995). Holding an incremental theory is also positively related to learning strategy usage (e.g., Bråten & Olaussen, 1998), which in turn has been shown to influence achievement (McInerney, Cheng, Mok, & Lam, 2012; Nota, Soresi, & Zimmerman, 2004). Despite not having such motivational and behavioral variables in our model, we assume that these mechanisms were also at work in our study. Research on the effects of parents' learning-related behaviors on children's academic achievement also points towards motivational and behavioral mediators (see Pomerantz et al., 2007). Positive parental behaviors are assumed to influence achievement by supplying both motivational resources (e.g., providing children with intrinsic reasons why learning and school are important as well as instilling them with a sense of control and positive beliefs regarding their capacities for learning and achievement; Pomerantz et al., 2007) and behavioral resources (e.g., enabling children to acquire cognitive and metacognitive strategies; Pomerantz et al., 2007). While it seems likely that the effects of parental behaviors on children's academic achievement were also mediated by these motivational and behavioral variables in our study, subsequent investigations into the effects of parental ITs within a cross-lagged panel framework should include such variables.

Another limitation is the somewhat low reliability of the items we have used to measure children's and parents' ITs (Cronbach's alpha was .65 for children and .67 for parents)—despite evidence for the reliability and validity of the scale our items are based on (Ziegler, Fidelman, Reutlinger, Vialle, & Stoeger, 2010; Ziegler & Stoeger, 2010). Although Cronbach's alpha values of this size are considered as acceptable in some standard references (see Nunnally, 1967), they cannot be classified as good. Yet it should be kept in mind that several other studies investigating parental ITs contain scales with comparable reliabilities (Gunderson et al., 2013; Haimovitz & Dweck, 2016). Furthermore, our scales' greatest lower bounds of reliability—a reliability measure less prone to underestimation than Cronbach's alpha (Jackson & Agunwamba, 1977; Ten Berge & Sočan, 2004)—reach an acceptable value of .75 for the parents' incremental theory scale and .72 for the children's incremental theory scale.

When considering this reliability measure it must be kept in mind, however, that the measure sometimes overestimates reliability (see Cho & Kim, 2015). The somewhat low reliabilities of our scales might be related to the fact that the scale the items are based on had never been previously used to assess (a) the ITs of children as young as the participants in our study and (b) parents' ITs about their children's general academic abilities. Finally, discussion of the scales' reliabilities must also consider the fact that both parents' and children's ITs were strongly related to the other variables in our model in ways that are in agreement with predictions from relevant theories—demonstrating these scales' predictive power despite their somewhat low reliabilities. Future studies with parents and young children may provide additional information on the validity of the scales for these groups of respondents and, perhaps, offer insights into options for improving the scales' items.

A final limitation of our results is that they cannot be easily generalized to (a) other nations with different school systems and (b) other phases of students' academic careers. It cannot be ruled out that the effect of parental ITs on child outcomes—and the surveyed mediators—only occurs in high-stakes situations where parents substantially support their children's learning efforts, such as in fourth grade within the Bavarian school system, where the far-reaching consequences of the upcoming tracking decision pose a special challenge for both children and parents. For this reason, the results might also not generalize to later points of students' academic career: Later on, the effects of parental ITs might be less pronounced due to (a) the absence of further tracking decision and (b) the reduction of parental learning support that is to be expected in higher grade levels (as the difficulty of subject matter increases). This study is nevertheless, to the best of our knowledge, the first to provide evidence that parental ITs might influence children's ITs. Further studies should aim at providing further evidence for both the child-ITs mechanism and the parental behaviors mechanism in situations that make children's intellectual potential salient (a) in different countries and (b) for students from different grade levels.

3.5.2. Conclusions

To the best of our knowledge, this study is the first to show that the more parents hold an incremental theory regarding their children's academic abilities, the better their children achieve academically. We also found that the relationship between parental ITs and child achievement is mediated by (a) children's ITs and (b) parental learning-related behaviors. Our study's findings should be replicated in other cultures for culture-specific high-stakes phases of children's primary and secondary education. Also, interventions should be developed that teach pedagogical agents not only how to optimally support their students' and children's learning behavior, but also to help stakeholders to develop and communicate incremental theories regarding abilities.

Such interventions for parents could be partly based on interventions for students (Aronson et al., 2002; Blackwell et al., 2007; Good et al., 2003) that have proved effective even in a very short web-based format (Paunesku et al., 2015). For example, students can be taught an incremental theory by instructing them to (a) read about how the brain gets smarter when working on challenging tasks by

forming new neural connections, (b) generate a personal example of mastering something despite a perception of initial ineptness, and (c) write a letter of encouragement for a student who is struggling in school (Yeager et al., 2016). However, for children to profit from their parents' incremental theories, parents should also be taught how to express their theories in words and deeds. This implies responding to both their children's successes and failures with comments that emphasize the role of effort and strategies instead of stable attributes (see Pomerantz et al., 2007; Gunderson et al., 2013; Kamins & Dweck, 1999; Mueller & Dweck, 1998; Pomerantz & Kempner, 2013). This information should be combined with advising parents against (a) praising effort that has been ineffective and (b) simply telling children to try harder when children actually need to adopt a different strategy or to seek help (see Haimovitz & Dweck, 2017). Finally, parents should be taught to communicate to their children that struggle is a normal and positive aspect of learning and that failure can be viewed not as debilitating but rather as enhancing (Haimovitz & Dweck, 2016).

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4. Third Article: Getting Into the University Track: Parents' Implicit Theories About Ability Predict Which Type of Secondary School Their Children Are Tracked Into

This is a pre-copyediting, author-produced version of an article published in *Social Psychology of Education* following peer review. It is not the version of record. The official citation that should be used in referencing this material is: Matthes, B., & Stoeger, H. (2023). Getting into the university track: Parents' implicit theories about ability predict which type of secondary school their children are tracked into. *Social Psychology of Education.* Advance online publication. https://doi.org/10.1007/s11218-023-09769-z

4.1. Abstract

The few studies about whether parents' implicit theories about ability (ITs) predict their children's academic success and relevant parental behavior have produced mixed results. In response, Haimovitz and Dweck suggested that parents' ITs might be more important in contexts that make children's intellectual potential salient. Therefore, we investigated the role of parents' ITs in such a situation: After fourth grade in Bavaria, Germany, students are tracked into one of three secondary school types (one university-track and two non-university-track) depending on their grades (in mathematics, German, and basic science). First, we examined if parents' ITs predict whether their children achieve the required grade average for a university-track school (that requires the highest grades). Second, because not all parents whose children achieve this threshold send them to university-track schools, we investigated among the parents whose children had achieved the university-track threshold grade average whether parents' ITs predict their track choice. Participants were 578 fourth-graders and their parents. Parents' educational level was controlled in all analyses. As expected, children of parents with a more incremental theory were more likely to achieve the university-track threshold grade average. For those children who achieved that threshold, parents with a more incremental theory were more likely to actually send their children to university-track schools. This effect was moderated by grade average. These results suggest that parents' ITs may indeed be more important in contexts that make children's intellectual potential salient, such as tracking decisions—especially if children's achievement raises even slight doubts about whether they will succeed.

4.2. Introduction

When individuals are confronted with challenges (see Blackwell et al., 2007) or must make learning-related decisions (Hong et al., 1999; Nussbaum & Dweck, 2008), it becomes increasingly important to

what extent they think that abilities are malleable. Such beliefs about the malleability of abilities have been systematized in Carol Dweck's framework (Dweck, 2013; Dweck & Leggett, 1988). According to this framework, individuals' implicit theories about ability (ITs) can be placed along a continuum from entity theory (also called fixed mindset) to incremental theory (also called growth mindset). An entity theory is the belief that abilities have a large static part that cannot be significantly changed. An incremental theory is the belief that abilities can be improved by effort and practice. These two theories are most often treated as mutually exclusive alternatives and as two ends of a bipolar continuum, assuming that someone who strongly endorses an incremental theory does not endorse an entity theory, and vice versa (see Lüftenegger & Chen, 2017). ITs show relations to different aspects of academic behavior and academic outcomes. For example, incremental theorists (compared to entity theorists) tend to be more open to challenges (Davis et al., 2011), to choose more demanding courses (Yeager et al., 2019), and to achieve better grades (see Yeager & Dweck, 2020). These and other influences of ITs on learning and achievement behavior and on academic outcomes, documented in numerous studies in which ITs have been experimentally manipulated (e.g., Ehrlinger et al., 2015; Hong et al., 1999; Moorman & Pomerantz, 2010) or altered through interventions (Aronson et al., 2002; Blackwell et al., 2007; Yeager et al., 2019), underscore the pedagogical importance of these beliefs.

However, although the effects of learners' ITs on their academic success and relevant behaviors are well understood (see Burnette et al., 2013; Yeager & Dweck, 2020), the same is not true for the ITs of pedagogical agents—especially parents (see Muenks et al., 2015; Stern & Hertel, 2020). Though some studies have shown that parents with a more incremental theory tend to engage in behaviors that are conducive to children's academic success (Jose & Bellamy, 2012; Moorman & Pomerantz, 2010; Muenks et al., 2015), the findings in this area are mixed (see Haimovitz & Dweck, 2017). In addition, we are aware of very few studies that examined how parents' ITs are related to their children's academic achievement—and of no studies that examined how they are related to the educational decisions that parents make for their children (e.g., decisions related to tracking or school choice). Given the pivotal role of parents in their children's academic development (see Gonzalez-DeHass et al., 2005; Grolnick & Kurowski, 1999; Jacobs & Eccles, 2000; Pomerantz et al., 2005; Pomerantz et al., 2007), it is warranted to further investigate whether parents' ITs predict their academically relevant behavior and their children's academic success.

One category of situations that are critical to children's academic success consists of educational transitions, such as the transition from primary school to secondary school (see Dustmann, 2004; Schnepf, 2002). These transitions frequently require decisions about which educational institution to attend. In some cases, choice is constrained by a required threshold grade average. The choice of secondary school in particular, which is mainly made by parents due to students' young age at that time, has received considerable attention from researchers (see Stocké et al., 2011). For example, in the United States, Australia, and the United Kingdom, this implies choosing between public and private schools with different focuses (see Triventi et al., 2016). In most of Germany, Austria, the

Netherlands, Belgium, and Switzerland, this implies choosing between university-track and non-university-track (vocational-track) schools (see Benavot & Resnik, 2006). These educational decisions derive importance from their impact on the extent of students' learning gains and their future educational and occupational opportunities (Dronkers & Robert, 2008; Schnepf, 2002). In Germany, for example, only university-track secondary schools offer students a direct route to university education, whereas the other types of secondary schools generally track students towards trades and less academically demanding forms of tertiary education (see Entorf & Davoli, 2019). Research examining the parental factors that predict parents' choice of university-track secondary school (see Stocké et al., 2011) has focused primarily on the role of parents' socioeconomic background, and found that parents with higher socioeconomic status (usually measured in the form of educational level, occupational prestige and income) are more likely to send their children to university-track schools (Ditton et al., 2005; Ditton & Krüsken, 2006; Pietsch & Stubbe, 2007; Schneider, 2008; Schnepf, 2002). Research suggests that the more ambitious educational decisions of parents with higher socioeconomic status at the secondary school level are primarily due to their greater educational aspirations for their children (Neuenschwander & Malti, 2009).

Parents' ITs might also play an important role in educational transitions. However, there is a lack of research on this topic. Educational transitions such as the one from primary school to secondary school seem well suited for examining the effect of parents' ITs—especially if children's admission to a particular type of school is contingent on achieving a threshold grade average. The rationale behind this assumption is researchers' suggestion that parents' ITs might be more likely to affect parents' behavior in situations where parents reflect on their children's intellectual potential, such as when a tracking decision has to be made (see Haimovitz & Dweck, 2017). Moreover, it seems plausible that parents' ITs will be even more likely to affect parents' behavior when their children only barely achieve the threshold grade average required for admission to the desired type of school.

We therefore examined the predictive power of parents' ITs regarding children's academic achievement and parents' educational decisions in such a context: the transition into secondary education in the German federal state of Bavaria. Here, after fourth grade, the vast majority of children is either tracked into a university-track school (*Gymnasium*), whose completion qualifies students to attend university, or into one of two non-university-track (vocational-track) school types (*Realschule* and *Mittelschule*; for more details about the German secondary school system, see Entorf & Davoli, 2019, and Powell & Solga, 2011). As a prerequisite for getting tracked into university-track secondary education in Bavaria, children need to achieve a minimum grade average in the subjects of German, mathematics, and basic science (see Staatsinstitut für Schulqualität und Bildungsforschung München, 2015). However, even if a child's grade average makes them eligible to attend a university-track secondary school, it is the parents who decide whether to send their children to such a school. As a result, on average, only about 75% of parents whose children are eligible for a university-track secondary school actually send them to such a school (see Staatsinstitut für Schulqualität und Bildungsforschung

München, 2015)—despite the fact that the vast majority of schools in Germany are public and therefore free of charge (roughly 94% of German students attend public schools; see Basteck et al., 2015).

We pursue three objectives. The first is to examine to what extent parents' ITs predict whether their children achieve the university-track threshold grade average. The second is to examine whether parents' ITs predict if they send their children to a university-track school given that their children have achieved the threshold grade average. The third is to examine whether the relationship of parents' ITs with this decision is moderated by children's grade average in the sense that the effect of parents' ITs is heightened when children's grades are just good enough to meet the university-track threshold.

4.2.1. Research on Correlates of Parents' Implicit Theories

Overall, the correlates of parents' ITs remain under-researched (see Matthes & Stoeger, 2022). In terms of possible antecedents, one of the two relevant studies found that parents with higher levels of education were more likely to endorse an entity theory (Muenks et al., 2015), whereas the other one found education and ITs to be unrelated (Pomerantz & Dong, 2006). Regarding possible effects of parents' ITs, we are aware of only a small number of studies. The three studies that examined the relationship between parents' ITs and their children's academic achievement yielded inconsistent results (Matthes & Stoeger, 2018; Pomerantz & Dong, 2006; Rautiainen et al., 2016). We are also not aware of a single study that has examined the relationship between parents' ITs and parents' educational decisions, a parental behavior that can be very important for children's academic success (e.g., Schnepf, 2002).

Despite the current lack of studies on parents' ITs in the context of educational transitions, studies on the correlates of parents' ITs suggest that they might also play a role in educational transitions. For example, one study showed that the more parents held an incremental theory, the more they reported to encourage their children when they worked on difficult or frustrating tasks, and the more persistence their children showed when working on a challenging problem (Jose & Bellamy, 2012). Also, mothers who had received an incremental theory manipulation (compared to mothers who had received an entity theory manipulation) exhibited fewer negative emotions and less controlling interference while their children worked on challenging tasks (Moorman & Pomerantz, 2010). The mothers in the incremental theory group were also less likely to respond with heightened negative emotions and controlling interference when their children expressed frustration and helplessness (Moorman & Pomerantz, 2010). Finally, parents who held a more incremental theory reported that they responded in a more mastery-oriented manner when their children experienced difficulties with school-related activities (Muenks et al., 2015).

However, several studies did not find the expected relationships between parents' ITs and parents' behaviors toward their children that might positively influence educational transitions, nor between parents' ITs and their children's academic success. Two studies (Gunderson et al., 2013; Haimovitz & Dweck, 2016) found no relationship between parents' ITs and the extent to which parents praised children (Gunderson et al., 2013) and commented on children's setbacks (Haimovitz &

Dweck, 2016) in ways that are conducive to learning. Pomerantz and Dong (2006) found no direct relation between mothers' ITs and their children's academic (and emotional) functioning, but only found that mothers having a strong incremental theory protected children against the otherwise negative influence of the mothers' belief that their children lacked academic ability. Rautiainen et al. (2016) found a negative relationship between the strength of parents' incremental theory and their children's teacher-rated academic competencies.

When comparing the studies in which parents' ITs were related to parental behaviors that might be relevant to their children's academic success or educational transitions to the studies that did not find such relations, a pattern seems to emerge (see also Haimovitz & Dweck, 2017): The investigations that found the expected relationships had been conducted mostly with reference to situations characterized by challenges or setbacks. For instance, Jose and Bellamy (2012) asked parents how they tried to teach their children to cope with difficult tasks. Muenks et al. (2015) asked parents how they would respond if their children had trouble with a task related to math or reading. Moorman and Pomerantz (2010) assessed mothers' behaviors while their children worked on a challenging puzzle task in their presence. And although no direct effect of parents' ITs was found in Pomerantz and Dong's (2006) study, mothers' endorsement of an entity theory was associated with poorer academic functioning of children in cases in which mothers also believed that their children's academic competencies were low. Observation of a similar pattern led Haimovitz and Dweck (2017) to suggest that parents' ITs might play a greater role in situations that make children's intellectual potential salient to their parents. However, this assumption has yet to be confirmed empirically.

One setting that is very likely to make children's intellectual potential salient is an educational transition—especially one that involves a high-stakes tracking decision. When parents have to make a consequential decision regarding their children's future educational careers, it seems likely that many of them will think about their children's intellectual potential, which should reinforce the effect of parents' ITs on their behavior (see Haimovitz & Dweck, 2017). This appears even more likely when a threshold grade average must be achieved in order to attend a more academically rigorous type of school. Such a threshold should provide parents with a salient benchmark against which to reflect on how likely their children are to succeed in that type of school. Given such a threshold, the extent to which parents' ITs predict their behavior should depend on how easily their children achieve the threshold. That is, in cases where children have excellent grades and easily achieve (i.e., far exceed) the threshold, parents' ITs are likely to be less relevant to parents' choice of school type. However, in cases where children only barely achieve the threshold, the more parents subscribe to an entity theory, the more hesitant they should be to send their children to a more challenging type of school. The reason for this is that entity theorists (compared to incremental theorists) should perceive such a situation, in which their children might experience difficulties or even failure, as more threatening. This can be assumed because entity theorists have been shown to feel more threatened by challenges (Liu et al., 2014), to judge the need for effort more negatively (Tempelaar et al., 2015), and to place

more importance on achievement outcomes (Robins & Pals, 2002)—and because parents with an entity theory are expected to be more concerned with demonstrating their children's competence and to feel more threatened by their children's poor academic performance (see Grolnick, 2003). Thus, in summary, educational transitions (especially ones that involve high-stakes decisions) are a context in which parents' ITs can be expected to predict parents' behavior—and in which the strength of this relationship can be expected to depend on children's academic achievement.

4.2.2. The Present Study

Our study is situated in the context of such an educational transition, namely the high-stakes tracking routine used in the German federal state of Bavaria. Here, students must achieve a minimum grade average for their parents to be permitted to send them to a university-track secondary school. We investigate three questions about the predictive power of parents' ITs in this context. The first question is whether parents' ITs predict if their children achieve the threshold grade average that would allow them to attend a university-track secondary school after fourth grade. We hypothesized that children whose parents hold a more incremental theory would be more likely to achieve this threshold grade average. This could be expected because parents with a more incremental theory tend to exhibit behaviors that are conducive to children's academic achievement, such as being more patient and learning-oriented and less controlling (Jose & Bellamy, 2012; Moorman & Pomerantz, 2010; Muenks et al., 2015). Consistent with this line of reasoning, we have already shown for a larger sample (of which the students and parents examined in this study constitute a subsample) that the children of parents with a more incremental theory tend to achieve better grades in those subjects that are relevant for the university-track threshold grade average (Matthes & Stoeger, 2018). Therefore, we aim to extend these results by showing that parents' ITs also predict whether their children's grade average for these subjects is above the university-track threshold.

The second question is whether, for those parents whose children have achieved the threshold grade average, parents' ITs predict whether they actually send their children to a university-track secondary school. We hypothesized that parents with a more incremental theory would be more likely to send their children to a university-track school (because they should be more likely to believe that their children will be able to meet this academic challenge). This could be expected because individuals with more incremental beliefs tend to perceive challenges as something that can be overcome through effort (Jones et al., 2012; Lin-Siegler et al., 2016) and consequently tend to have more confidence in the ability of others to do so (Rattan et al., 2012).

The third question is whether, among those parents whose children have achieved the threshold grade average, the effect of ITs on whether parents choose a university-track school is moderated by the grade average of their child. We hypothesized that the effect of parents' ITs would be stronger the closer the children were to just barely achieving the university-track threshold grade average, that is, the more parents had reasons to doubt their children's capacity to succeed. This hypothesis is based on the finding

that entity theorists are more likely than incremental theorists to conclude that an individual's ability is low when that individual achieves unfavorable performance outcomes (Rattan et al., 2012).

In addition to parents' ITs, we expected that parents' educational level would also play a role. More specifically, we expected that the children of parents with higher levels of education would be more likely to achieve the university-track threshold grade average, and that such children would also be more likely to be sent to a university-track secondary school by their parents (provided that the children have achieved the threshold). This could be expected based on research showing that the higher parents' level of education is, the better their children's grades tend to be (see Sirin, 2005) and the more likely the parents are to send their children to a university-track school (Ditton & Krüsken, 2006; Schnabel et al., 2002; Schneider, 2008). To demonstrate that the effect of ITs is present regardless of parents' level of education, it was used as a control variable in all models.

4.3. Method

4.3.1. Participants

The sample consisted of 578 fourth-graders from 38 classrooms in 27 primary schools in Bavaria, Germany, and their parents. Participation was voluntary and anonymity was ensured. Data collection was part of a larger survey that involved students, parents, and teachers (see Matthes & Stoeger, 2018). The average age of the children was 9.8 years (ranging from 9 to 11 years, $SD = 0.48$). Of the children, 54% were girls and 46% were boys. In 19% of cases, either the child themselves or at least one of their parents was not born in Germany.

The parent questionnaire was addressed to the parent or guardian who interacted the most with the child. Of these questionnaires, around 75% were returned. The parent questionnaire was mainly filled out by the mother (87% of the children, 503 cases). The remaining parent questionnaires were filled out either by the father (9%, 50 cases) or by the mother and father together (4%, 25 cases). For 26% of the children in the sample, either the mother or the father held a university degree. In 10% of cases, the father held a university degree, but the mother did not. In 6% of cases, the mother held a university degree, but the father did not. In 11% of cases, both parents held a university degree.

4.3.2. Measures

Parents' Education. The highest educational attainment of both parents was included in the form of two dummy variables. The reference category for these was that neither parent had obtained a university entrance qualification (*Abitur*; the secondary school leaving certificate that qualifies the holder to study at a university in Germany; see Entorf & Davoli, 2019). The first dummy variable indicated whether at least one parent had obtained a university entrance qualification while at the same time neither of them had obtained a university degree. The second dummy variable indicated whether at least one parent had obtained a university degree.

Child's Grade Average. Children's academic achievement was operationalized in the form of the average of their grades in the subjects of mathematics, German, and basic science from the year-end report cards they received on May 1. These grades were provided by the respective teacher. In Bavaria (as in the rest of Germany), grades can range from 1 (best grade) to 6 (worst grade). In Bavaria, the grade average from these three subjects determines whether students are allowed to attend a university-track secondary school after fourth grade: In order to be tracked into such a school in the regular way,[1] children require a grade average of 2.3 or better (see Staatsinstitut für Schulqualität und Bildungsforschung München, 2015). To make the results easier to interpret, we inverted the grades for our analyses so that higher values reflect greater academic achievement. As a result of this, a value of 6 represents the best possible grade average and a value of 4.7 the university-track threshold grade average.

Parents' Incremental Theory. The degree to which parents held an incremental theory was assessed with an adaptation of the 6-item scale from Ziegler and Stoeger (2010). The original scale assessed learners' ITs with regard to their mathematical abilities by asking them to what extent they believe that ability deficits in the domain of mathematics can be overcome through effort and practice. We modified these items so that they captured parents' ITs regarding their children's general school-related ability. The parent questionnaire that contained this scale was answered by parents in early May. Parents were given the following instructions for answering the items: "Please rate the following statements in terms of your child's learning for school and in school." A sample item read: "What my child is capable of is not fixed. They can learn new things and expand their abilities." The items were answered on a six-point Likert scale that ranged from 1 (*completely disagree*) to 6 (*completely agree*). The scale's Cronbach's alpha was .66.

University-Track Threshold Grade Average Achieved. The first outcome was whether children achieved the threshold grade average (i.e., a value of 4.7 on the grade average variable) that allows one to attend a university-track secondary school in Bavaria (dummy variable with 0 representing "no" and 1 representing "yes"). This variable was calculated from children's grade average that is based on the subjects of mathematics, German, and basic science. These grades originated from the year-end report cards and were provided by the teachers.

Parents Chose University-Track Secondary School. The second outcome was whether parents chose to send their children to a university-track secondary school (dummy variable with 0 representing "no" and 1 representing "yes"). This variable was based on information about the type of school each student was going to be tracked into, provided by the teachers at the very end of the school year. Parents made this decision between May 1 (when their children received the year-end report cards) and the end of the school year in late July.

[1] In addition to the regular way of transferring to a university-track secondary school, students in Bavaria can also transfer with a grade average that is worse than 2.3 if they take part in probationary lessons beforehand. However, in the year the study was conducted, over 97% of those students who transferred to a university-track school after fourth grade did achieve the required grade average (see Staatsinstitut für Schulqualität und Bildungsforschung München, 2015).

4.3.3. Plan of Analysis

We employed logistic regression analysis because we predicted the dichotomous outcomes of (a) whether children achieved the university-track threshold grade average and (b) whether parents of those children who achieved this threshold actually sent their children to a university-track school. To test our hypotheses, we calculated two series of models. The first series was based on the total sample of students ($N = 578$). The second series was based on the subsample of those students who qualified to attend a university-track school due to a value of 4.7 or higher on the grade average variable (53% of the total sample, $N = 305$). The two variables parents' incremental theory and child's academic achievement were *z*-standardized before calculating the models. This was done for ease of interpretation and because continuous variables need to be centered before calculating an interaction term for them (see Cohen et al., 2003).

For the models based on the total sample, the first variable we included was parents' education, followed by parents' incremental theory. This made it possible to test our first hypothesis, that the strength of parents' incremental theory should be positively related to whether their children achieved the university-track threshold grade average—above and beyond the well-known influences of parents' education on children's academic achievement.

For the models based on the sample of qualified students, the first variables we included were parents' education and child's grade average, followed by parents' incremental theory and the interaction effect between parents' incremental theory and child's grade average. Thus, we first included known predictors for secondary school choice in order to find out in the next step whether parents' incremental theory provides predictive power above and beyond them. Second, we included parents' incremental theory to test our second hypothesis that parents with a stronger incremental theory should be more likely to send their children to a university-track school. Third, we included the interaction effect between parents' incremental theory and child's grade average (i.e., the product of these two variables). This was done to test our third hypothesis that, the closer children's grade average was to not meeting the university-track threshold, the better parents' incremental theory should predict whether they send their children to such a school.

To examine this interaction effect in more detail by comparing the effect of parents' incremental theory for different levels of children's academic achievement, we used version 3.5 of the PROCESS macro for SPSS (Hayes, 2020). In the subsample of students who qualified for university-track school attendance because of achieving the threshold grade average, we tested the effect of parents' incremental theory at different levels of children's grade average (i.e., for the mean and for one standard deviation above and below it).

As recommended (Greenland et al., 2016), we used one-sided significance tests for all coefficients for which we had a clear, theory-based expectation regarding the direction of the respective effect. This applies to all significance tests except to those for the constants in the logistic regression models.

4.4. Results

4.4.1. Preliminary Analyses

First, we calculated descriptive statistics for all variables in our models. All these analyses were conducted both for the total sample and for the subsample of students who qualified for university-track school attendance by achieving the threshold grade average. Both samples showed somewhat similar values for both child's grade average (total sample: $M = 4.40$, $SD = 0.81$; subsample of qualified students: $M = 5.03$, $SD = 0.36$) and strength of parents' incremental theory (total sample: $M = 4.68$, $SD = 0.62$; subsample of qualified students: $M = 4.89$, $SD = 0.54$). There was a positive relationship between child's grade average and parents' incremental theory in both the total sample ($r = .43$, $p < .001$) and in the subsample of qualified students ($r = .15$, $p < .01$). This positive correlation was also evident in the group of the 273 students who were not qualified to attend a university-track school ($r = .30$, $p < .001$). The size of this correlation did not differ significantly between the group of students who were qualified to attend a university-track school and those who were not ($z = 1.89$, $p = .059$).

The proportion of children who were sent to a university-track secondary school was 38% in the total sample and 70% in the subsample of qualified students. In terms of parents' education, in the total sample, 10% of children had at least one parent with a university entrance qualification (but no parent with a university degree) and 26% had at least one parent with a university degree. In the subsample of qualified students, 10% had at least one parent with a university entrance qualification (but no parent with a university degree) and 41% had at least one parent with a university degree.

4.4.2. Logistic Regression Analyses

The two models based on the total sample that predict whether children achieved the university-track threshold grade average (Model 1a and Model 1b) can be found in Table 1. In Model 1a, the two indicators of parents' education (dummy variables for "only university entrance qualification" and for "university") were used as the only predictors. Here, as expected, children with at least one parent with a university entrance qualification (but without a parent with a university degree) were more likely to achieve the university-track threshold grade average than children without a parent with a university entrance qualification ($OR = 1.60$, $p = .047$). The same was true for children with at least one parent with a university degree compared to children without a parent with a university entrance qualification ($OR = 8.18$, $p < .001$). In Model 1b (after adding parents' incremental theory as a predictor), children with parents that held a stronger incremental theory were more likely to achieve the university-track threshold grade average ($OR = 2.37$, $p < .001$). This confirmed our first hypothesis.

Table 1

Logistic Regression Models for the Total Sample Predicting Whether Children Achieved the University-Track Threshold Grade Average

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*
Model 1a					
Parents' education: Only university entrance qualification [a]	0.47	0.28	.047	1.60	[0.92, 2.76]
Parents' education: University [a]	2.10	0.25	< .001	8.18	[5.01, 13.36]
Constant	–0.41	0.11	< .001	0.67	
Model 1b					
Parents' education: Only university entrance qualification [a]	0.19	0.30	.262	1.21	[0.67, 2.19]
Parents' education: University [a]	2.06	0.27	< .001	7.82	[4.66, 13.13]
Parents' incremental theory	0.86	0.11	< .001	2.37	[1.90, 2.96]
Constant	–0.35	0.11	.002	0.70	

Note. Cox & Snell R^2 = .25 and Nagelkerke R^2 = .33 for final model. All *p* values except for those of the constants are based on one-sided testing. All non-dummy variables were *z*-standardized before the analyses.
[a] Dummy variables representing the highest educational attainment of both parents (reference category: no university entrance qualification).

The four models based on the subsample of students qualified to attend a university-track secondary school that predict whether parents actually sent their children to such a school (Model 2a, Model 2b, Model 2c, and Model 2d) can be found in Table 2. When only the two indicators of parents' education were used in Model 2a, as expected, children with at least one parent holding a university entrance qualification (but without a parent holding a university degree) were much more likely to be sent to a university-track school (*OR* = 5.90, *p* = .001) than children without a parent holding a university entrance qualification. The same was true for children with at least one parent holding a university degree (*OR* = 5.24, *p* < .001). These effects remained significant after also including children's grade average in Model 2b. Here, the better the children's grade average was, the more likely their parents were to send them to a university-track school (*OR* = 2.34, *p* < .001). In Model 2c (after adding parents' incremental theory as predictor), the more parents held an incremental theory, the more likely they were to send their children to a university-track school (*OR* = 1.49, *p* = .003). This confirmed our second hypothesis. In Model 2d, after adding the interaction between strength of parents' incremental theory and children's grade average, we found that this interaction was significant and in the expected direction (*OR* = 0.73, *p* = .033; see Figure 1).

Table 2

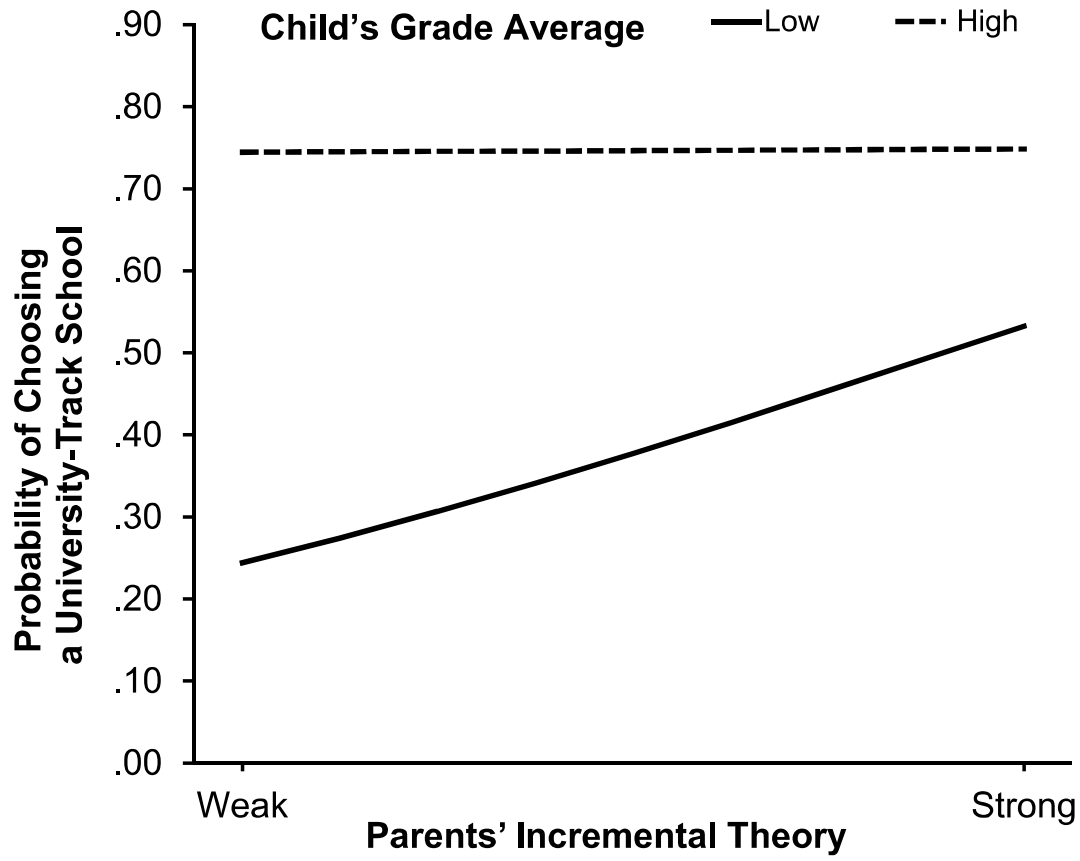
Logistic Regression Models for the Subsample of Qualified Students Predicting Whether Parents Sent Their Child to a University-Track Secondary School

Predictor	*B*	*SE*	*p*	*OR*	95% CI for *OR*
Model 2a					
Parents' education: Only university entrance qualification [a]	1.77	0.56	.001	5.90	[1.97, 17.69]
Parents' education: University [a]	1.66	0.30	< .001	5.24	[2.89, 9.50]
Constant	0.14	0.17	.411	1.15	
Model 2b					
Parents' education: Only university entrance qualification [a]	1.97	0.58	< .001	7.18	[2.30, 22.37]
Parents' education: University [a]	1.63	0.32	< .001	5.10	[2.74, 9.48]
Child's grade average	0.85	0.18	< .001	2.34	[1.63, 3.35]
Constant	0.28	0.18	.123	1.32	
Model 2c					
Parents' education: Only university entrance qualification [a]	1.98	0.59	< .001	7.22	[2.27, 22.95]
Parents' education: University [a]	1.71	0.32	< .001	5.50	[2.91, 10.39]
Child's grade average	0.80	0.19	< .001	2.23	[1.55, 3.21]
Parents' incremental theory	0.40	0.14	.003	1.49	[1.12, 1.97]
Constant	0.28	0.18	.125	1.32	
Model 2d					
Parents' education: Only university entrance qualification [a]	2.04	0.60	< .001	7.70	[2.37, 25.04]
Parents' education: University [a]	1.76	0.33	< .001	5.78	[3.02, 11.08]
Child's grade average	0.79	0.19	< .001	2.20	[1.53, 3.16]
Parents' incremental theory	0.32	0.15	.020	1.37	[1.02, 1.85]
Parents' incremental theory × child's grade average	–0.31	0.17	.033	0.73	[0.52, 1.02]
Constant	0.29	0.18	.115	1.33	

Note. Cox & Snell R^2 = .23 and Nagelkerke R^2 = .32 for final model. All *p* values except for those of the constants are based on one-sided testing. All non-dummy variables were *z*-standardized before the analyses.

Figure 1

Interaction Effect Between Strength of Parents' Incremental Theory and Children's Grade Average



Note. Values are based on Model 2d from Table 2 that controls for parents' education. Low/weak = one standard deviation below the mean, high/strong = one standard deviation above the mean.

Next, as recommended to illustrate interaction effects (see Cohen et al., 2003), we calculated the effects of the strength of parents' incremental theory on parents' decisions for grade averages of (a) one standard deviation above the mean, (b) equal to the mean, and (c) one standard deviation below the mean. Thus, we compared (a) children with above-average grades relative to the subsample mean (i.e., with a grade average value of around 5.3, which is one standard deviation above the subsample mean), (b) children with grades equal to the subsample mean (i.e., with a grade average value of around 5.0), and (c) children with the worst possible grade average that is still above the university-track threshold (i.e., with a grade average value of around 4.7, which is one standard deviation below the subsample mean). For children with above-average grades, strength of parents' incremental theory was unrelated to whether they sent their children to a university-track school ($OR = 1.00$, $p = .498$). Yet strength of parents' incremental theory was positively related to whether they sent their children to a university-track school for children whose grades were closer to the university-track threshold. This was the case for both children with grades equal to the subsample mean ($OR = 1.37$, $p = .020$) and for children with the worst possible grade average that is still above the university-track threshold ($OR = 1.87$, $p < .001$). Thus, the predictive power of parents'

incremental theory was stronger the closer the children's grade average was to not meeting the university-track threshold, which confirmed our third hypothesis.

4.5. Discussion

The goal of this study was to investigate the relationship between how strongly parents endorse an incremental theory about academic ability and whether their children are tracked into university-track secondary education after fourth grade—the most demanding and desirable of the three main secondary school types in the German school system, whose completion qualifies students to attend university and provides the best educational and occupational opportunities (see Pietsch & Stubbe, 2007; Schnepf, 2002). In this context, we addressed three questions. First, are the children of parents with a stronger incremental theory more likely to achieve the university-track threshold grade average? Second, are parents with a stronger incremental theory more likely to send their children to a university-track school, provided that the children have achieved the threshold grade average? Third, does the relationship between the strength of parents' incremental theory and their choice of a university-track secondary school become stronger the closer the child's grade average is to the threshold for admission to that type of school? To obtain more robust results, we controlled for parents' level of education in all analyses. The study was conducted in an effort to contribute to the limited literature on the relationship between parents' ITs and their children's academic success, and especially to examine more closely the conditions under which such relationships can be found.

Our first hypothesis was confirmed. The more parents endorsed an incremental theory, the more likely their children were to achieve the threshold grade average required to attend a university-track secondary school after fourth grade. This was to be expected, as our sample was based on that of a study in which parents' incremental theory predicted better grades (in the three subjects from which the threshold grade average is derived) for their children (Matthes & Stoeger, 2018). Extending the findings of this previous investigation, the current study shows that this positive relationship between the strength of parents' incremental theory and children's academic achievement makes children of incremental theorists more likely to achieve the university-track threshold grade average. The finding is also in line with researchers' suggestion that parents' ITs exert their influence primarily in situations that make children's academic potential salient (Haimovitz & Dweck, 2017), such as in the context of tracking decisions, as examined in our study.

The results also confirmed our second hypothesis about the parents of those 53% of children who had achieved the university-track threshold grade average. The more those parents endorsed an incremental theory, the more likely they were to be among the 70% of eligible parents who sent their children to a university-track school rather than a non-university-track school. This finding is in line with studies that show incremental theorists to be more likely to embrace challenges than entity theorists (Davis et al., 2011; Jones et al., 2012; Nussbaum & Dweck, 2008) and to have more confidence that other individuals can overcome challenges (Rattan et al., 2012). Our study extends this to the area

of parents' educational decisions by demonstrating that parents who endorse more of an incremental theory seem to be more likely to believe that their children will be able to cope with the increasing academic challenges of Germany's most demanding secondary school track. To the best of our knowledge, this is the first study to investigate the relationship between parents' ITs and their educational decisions. Thus, our finding is also consistent with the suggestion of Haimovitz and Dweck (2017) that parents' ITs should better predict parents' learning-related behavior in situations that highlight their children's intellectual potential—a suggestion that might help clarify the mixed findings in this area. It should be noted, however, that there are some study results that are inconsistent with this assumption. For example, Muenks and colleagues (Study 2 in Muenks et al., 2015) found a relationship between parents' ITs and parental behaviors despite an absence of specific challenges or setbacks. Furthermore, Haimovitz and Dweck (2016) found no such relationship despite querying parents' reactions to an imagined bad grade for their children. However, it seems conceivable that parents' reactions to an actual academic setback of their children depend more on parents' ITs than their reactions to an imagined setback. Still, given the paucity of existing studies on the relationship between parents' ITs and parents' behaviors, the observation of such patterns can merely be understood as hypotheses that need to be systematically tested in further studies.

Finally, the results confirmed our third hypothesis—that in the group of those children who qualified to attend a university-track secondary school, children's grade average should be related to how much parents' ITs predict whether they choose a university-track school. For those children who scored considerably above the university-track threshold grade average, it was irrelevant for parents' choice of school type how much parents endorsed an incremental theory. However, the closer their children were to not achieving the university-track threshold grade average, the more influential parents' ITs became. Among those children who barely achieved the university-track threshold grade average, the degree to which parents endorsed an incremental theory was a substantial predictor of whether they chose a university-track school for their children. These results are consistent both with evidence that the effect of ITs is enhanced in situations that threaten a person's perceived ability (see Burnette et al., 2013) and with evidence that such situations are sometimes necessary for ITs to take effect (Davis et al., 2011; Dunning, 1995; Snyder et al., 2014). As far as we know, our study is the first to show that the strength of this salience effect varies depending on the extent to which parents have reasons to doubt their children's capacity to succeed academically.

Although this was not the focus of our study, the results also contribute to the literature on the predictors of parents' decision to send their children to a university-track secondary school in Germany. Our results show that parents with a stronger incremental theory are more likely to send their children to a university-track school, provided that the children are qualified to attend such a school—even when controlling for parents' education and children's academic achievement. Our study thus provides evidence that parental beliefs (in our case, about the nature of abilities) can predict school type choice, whereas previous studies that considered parental characteristics focused mainly on

aspects such as parents' education (Ditton et al., 2005; Schneider, 2008; Schnepf, 2002), occupational prestige (Ditton et al., 2005; Ditton & Krüsken, 2006; Pietsch & Stubbe, 2007), ownership of cultural goods such as books (Schnepf, 2002; Wagner et al., 2010), and income (Pietsch & Stubbe, 2007). Consistent with these studies, we found that higher parental education was a strong positive predictor of the decision to send children to a university-track school. From a theoretical perspective, these effects are usually explained in terms of families with higher socioeconomic status being more interested in maintaining this status in the next generation through education and having more confidence in achieving challenging educational goals (see Stocké et al., 2011).

4.5.1. Limitations and Future Research

Although our study provides new insights into how parents' ITs are related to their children's academic success and under what circumstances such relationships can be observed, the study also has a number of limitations. One limitation is that the study design cannot rule out third-variable influences that might partially account for the relationships between parents' ITs and their children's achievement of the university-track threshold grade average and parents' choice of school type. To partially mitigate this problem, we included parents' level of education in all our models—a background variable known to predict both students' academic achievement (see Sirin, 2005) and parents' educational decisions (Bosetti & Pyryt, 2007; Goldring & Phillips, 2008; Maaz et al., 2008; Schnabel et al., 2002; Schneider, 2008; Triventi, 2013). In addition, children's grade average acted as a control variable in all models to account for the influence of children's actual academic ability. However, despite the predictive power of parents' education, this is only one of several relevant facets of parents' socioeconomic status. The other facets, namely parents' income and occupational prestige, are also known to predict children's academic achievement (see Sirin, 2005) and parents' educational decisions (Bosetti & Pyryt, 2007; Ditton et al., 2005; Goldring & Phillips, 2008; Schnabel et al., 2002). Therefore, further studies could investigate whether the relationships we have demonstrated still hold when controlling for these variables.

Another related limitation is that there might also be third-variable influences at the school level that we did not account for—in particular, influences on children's academic achievement that might also affect parents' ITs. However, although there are several well-documented predictors of students' academic achievement at the school level (e.g., effectiveness of the school administration, class size, and instructional methods used; see Hattie, 2008, for an overview), most of them seem unlikely to be strongly related to parents' ITs. Still, one school-level factor that might play a role and that should be included in further studies is the overall socioeconomic status of the student population, which has been shown to predict individual students' academic achievement (Perry & Mcconney, 2010) and that might also predict parents' choice of school type. However, there was little systematic variation at the school level in children's grade average (ICC = .08) and in whether children achieved the university-track threshold grade average (ICC = .06), which indicates that the relevant differences between schools in our sample were rather modest.

Another limitation is that our study did not include two belief variables that might play a role in parents' educational decisions, namely parents' perceptions of children's current level of academic ability and parents' educational aspirations. Parents' perceptions of their children's academic ability are an important aspect of parents' learning-related behaviors (see Pomerantz et al., 2007), predict children's academic success (see Pomerantz et al., 2005), and might therefore also affect parents' educational decisions. Similarly, parents' educational aspirations are a strong positive predictor of children's academic achievement (Fan & Chen, 2001) and have also been shown to predict educational decisions at the secondary school level (Neuenschwander & Malti, 2009). However, based on previous research, we are not sure to what extent these two belief variables, in combination with ITs, might contribute to explaining parents' decisions. Although one might expect some overlap between parents' assessment of their children's academic ability and parents' ITs, these two variables seem to be largely unrelated (Muenks et al., 2015). Furthermore, although we are not aware of any studies that have examined the relationship between parents' educational aspirations and parents' ITs, a study with students has demonstrated only a small positive correlation between endorsing a more incremental theory and having higher educational aspirations (Ahmavaara & Houston, 2007). Therefore, it seems likely that controlling for parents' beliefs about children's level of academic ability and parents' educational aspirations will have little impact on the relationship between parents' ITs and their educational decisions. Nevertheless, it would be advisable to consider these two belief variables and their possible interactions with parents' ITs in future studies.

A more general limitation is that our study does not allow conclusions to be drawn about the causal relationship between parents' ITs and children's academic success. This is because the study was essentially cross-sectional, with parents' ITs and children's grades assessed in the same timeframe. To draw causal conclusions, further studies that deliberately alter parents' ITs would be helpful. This could be done by conducting intervention studies where parents are taught an incremental theory and it is examined how this affects their learning-related behaviors and children's academic success. In addition, whether such an intervention affects parents' choice of school type could be investigated in a follow-up study.

Another limitation lies in the scale that was used in our study to assess parents' ITs. First, the scale's reliability (Cronbach's $\alpha = .66$) is at the lower end of what is considered acceptable (see Nunnally, 1967). However, a low reliability alone should only reduce the predictive power of parents' ITs. Therefore, it seems likely that our results underestimate their actual predictive power. Second, our scale takes a somewhat different approach to measuring ITs than the scales used in most other studies. The items of our scale ask about the extent to which respondents believe that their children's abilities are malleable or static, whereas the widely used three items proposed by Carol Dweck (see Hong et al., 1999) ask about the extent to which respondents think that abilities in general are malleable or static. However, because ITs are understood as key beliefs around which a whole system of allied beliefs and goals is organized (see Molden & Dweck, 2006), it seems very likely that individuals have the same

kind of IT about abilities in general that they have about their own abilities and the abilities of others. Also, there are other studies about parents' ITs that have asked about parents' beliefs about the nature of their children's abilities rather than about the nature of abilities in general (Jose & Bellamy, 2012; Rautiainen et al., 2016). Still, we would recommend that replication studies use both the scale we employed and well-established scales (see Blackwell et al., 2007; Hong et al., 1999) to assess parents' ITs.

A limitation related to our study's outcomes is that we only examined whether parents' ITs predict if students transfer to a university-track secondary school, but not how successfully they navigate this transition. This question merits investigation because the transition to secondary school is often accompanied by a decline in academic functioning (see Benner, 2011; Benner et al., 2017; Jindal-Snape et al., 2020) and because there is evidence that a more incremental theory may protect students from such a decline (Blackwell et al., 2007). Thus, parents' ITs might also play a role in this context. Because parents with a more incremental theory tend to behave toward their children in ways that facilitate academic success (Jose & Bellamy, 2012; Matthes & Stoeger, 2018; Moorman & Pomerantz, 2010; Muenks et al., 2015) and to be more involved in children's learning (Jiang et al., 2019; Muenks et al., 2015), these children might find it easier to adapt to the increasing academic demands of secondary school. Consistent with this, supportive parenting has been identified as a protective factor against decline in academic functioning during the transition to secondary school (Serbin et al., 2013). Thus, future studies on parents' ITs in the context of educational transitions could therefore also examine their predictive power for children's academic functioning after the respective transition.

A final limitation is that our study examined parents' educational decisions in the context of one particular educational system and for a specific educational transition, thus limiting generalizations to other educational systems and other educational decisions. The transition to secondary education might be more important for parents in countries with school systems that employ between-schools tracking (as in Germany and other European countries such as Austria, Belgium, the Netherlands, and Switzerland; see Benavot & Resnik, 2006) than for parents in countries without this type of tracking (such as the United States or the United Kingdom). For example, in countries that employ course-by-course tracking instead of between-schools tracking and that allow parents to choose among several public and private schools with different focuses (such as the United States; see Chmielewski, 2014; Triventi et al., 2016), secondary school choice might not be as critical as in countries with between-schools tracking. This could lead to parents' ITs having less predictive power for secondary school choice than was the case in our study. Still, in these countries, it might be worthwhile to examine the predictive power of parents' ITs for educational decisions such as course and track choices in the context of in-school tracking or for decisions about public or private schools. In addition, it would be interesting to examine the role that ITs play for later educational decisions, such as whether to attend university, where parents' socioeconomic status and related variables still have a major impact (see Giani, 2015; Lörz, 2017).

4.5.2. Conclusions

The main contribution of our study consists in providing additional evidence for the relevance of parents' implicit theories about ability to their children's academic success and parents' educational decisions for their children. More importantly, our results shed light on the circumstances in which parents' ITs might have an impact. It seems that the influence of parents' ITs on their academically relevant behavior, in the case of our study on their secondary school choice, becomes stronger the more parents are given reasons to doubt their children's current academic ability. Additional studies could further substantiate this conclusion by examining the predictive power of parents' ITs for various educational decisions (e.g., what courses parents choose for their children, or whether their children enroll in a university).

An important broader theoretical implication of our study is that it illustrates how the strength of IT's relationship to academically relevant variables depends on the presence or threat of adversity, challenges, and setbacks. This could also explain why the effects of ITs in situations without adversity, challenges, or setbacks tend to be somewhat smaller (see Burnette et al., 2013). For example, although some researchers have argued that the predictive power of learners' ITs for their academic achievement is not particularly strong (Sisk et al., 2018; but see Yeager & Dweck, 2020, for a reply), interventions that target students' ITs have been shown to improve the academic achievement of low-performing students (Yeager et al., 2019). ITs seem to be particularly important for individuals who are increasingly confronted with challenges and adversities, such as girls and women in male-dominated fields such as mathematics (Degol et al., 2018; Good et al., 2012) and members of minority or marginalized groups who are confronted with negative stereotypes (Aronson et al., 2002; Binning et al., 2019; Good et al., 2003). Thus, whereas under ideal circumstances, entity theorists might not experience major negative effects of their mindsets, those who are regularly confronted with challenges or who need to make decisions about other people's potential in such contexts seem to be well advised to adopt an incremental theory about ability.

In terms of practical implications, our findings suggest that parents' ITs and related parental behaviors might be a fruitful target for interventions directed at parents, assuming that additional, stronger evidence can be provided that an incremental theory among parents can facilitate children's academic success. Although the mechanisms by which parents' ITs are related to children's academic success are still poorly understood, existing studies suggest that parents with a more incremental theory tend to behave in a more learning-oriented and patient manner towards their children, rather than exhibiting controlling behavior or negative affect (Jose & Bellamy, 2012; Matthes & Stoeger, 2018; Moorman & Pomerantz, 2010; Muenks et al., 2015). Because these behaviors have been shown to facilitate children's academic success (see Pomerantz et al., 2007), interventions that teach parents an incremental theory might also have a positive impact on children's academic success. Because such interventions already exist for learners and have been shown to strengthen their incremental beliefs (see Yeager et al., 2019), these interventions could be adapted to target parents. However, because an incremental theory by itself is often insufficient to elicit beneficial parental behaviors (see Haimovitz

& Dweck, 2017), it would be helpful to supplement such interventions with units that teach those behaviors. One such behavior is framing failure as something beneficial (i.e., a learning opportunity) rather than something debilitating that needs to be avoided. Parents should also be taught to model solution-oriented responses to setbacks for their children and to treat difficulties as a normal and positive part of learning (see Haimovitz & Dweck, 2017). If parents are taught an incremental theory and behaviors that support children's learning, their children might be more successful academically and more likely to attend a university-track secondary school or participate in other challenging educational offerings. Moreover, these children should be better prepared for the setbacks they are likely to experience at some point during their academic careers.

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5. Appendix

5.1. First Student Questionnaire

Evaluationscode:
___ ___ ___ ___ ___ ___ ___

Mein Name:	_____
Datum:	_____
Meine Schule:	_____

Ich bin ein…	Mädchen ○	Junge ○
Mein Geburtsmonat:	_____	
Mein Geburtsjahr:	_____	

Ich habe heute einige **Fragen** an dich, die alle mit Schule und mit Lernen zu tun haben.

Es gibt immer Antworten zur Auswahl. Bitte entscheide dich immer für die Antwort, die am besten zu dir passt.

Du bekommst **keine Noten** auf die Beantwortung der Fragen und es gibt **keine richtigen oder falschen Antworten. Antworte bitte auf alle Fragen so gut und so ehrlich wie möglich.**

So… und schon geht's los…

❖ Wie ist das bei dir?

Im Folgenden findest du auf der linken Seite mehrere Aussagen. Jede der Aussagen kann mehr oder weniger auf dich zutreffen. Kreuze bitte in jeder Zeile *einen* Kreis an, je nachdem wie sehr die Aussage auf dich zutrifft.

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Ich kann auch die schwierigen Texte im Unterricht verstehen, wenn ich mich anstrenge.	○	○	○	○	○	○
Es fällt mir leicht, unbekannte Texte zu verstehen.	○	○	○	○	○	○
Wenn ich Fragen zu einem schwierigen Text im Unterricht mündlich beantworten soll, glaube ich, dass ich das schaffen werde.	○	○	○	○	○	○
Selbst wenn ich mal längere Zeit krank sein sollte, kann ich, wenn ich aus Texten lerne, immer noch gute Leistungen erzielen.	○	○	○	○	○	○
Auch wenn die Lehrkraft an meinen Fähigkeiten, Texte zu verstehen, zweifelt, bin ich mir sicher, dass ich gute Leistungen erzielen kann.	○	○	○	○	○	○

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Ich bin mir sicher, dass ich auch dann noch meine gewünschten Leistungen im Lesen erreichen kann, wenn ich mal eine schlechte Note dafür bekommen habe.	○	○	○	○	○	○

Zunächst interessiert uns, **wie du dich auf eine Probe vorbereitest**.
Entscheide für jede Zeile, welche der drei Aussagen am besten zu dir passt.
Bitte kreuze in jeder Zeile nur eine Aussage an!

1	Mir ist es am liebsten, dass der Lehrer oder meine Eltern mir sagen, was ich schon gut kann und worauf ich mich bei der Probe vorbereiten muss. ○	Ich überlege zuerst, was ich gut kann und was ich noch nicht so gut kann und was in der Probe dran kommen wird. ○	Bei der Vorbereitung auf die Probe denke ich nicht lange darüber nach, was ich gut kann und was ich nicht so gut kann. Ich lege lieber gleich los. ○
2	Ich setze mir bei den Vorbereitungen auf die Probe jedes Mal ein festes Ziel, was und wie viel ich lernen will. ○	Der Lehrer oder meine Eltern sagen mir, welche Ziele ich mir bei der Vorbereitung auf die Probe setzen soll. ○	Ich setze mir bei den Vorbereitungen auf die Probe kein bestimmtes Ziel. Ich kann mich da ganz auf mein Gefühl verlassen. ○
3	Der Lehrer oder meine Eltern können mir am besten sagen, wie ich bei der Vorbereitung auf die Probe vorgehen soll. ○	Ich habe die Erfahrung gemacht, dass es nicht viel bringt zu planen, wie man sich am besten auf eine Probe vorbereitet. Das mache ich ganz automatisch. ○	Ich überlege mir bei der Vorbereitung auf die Probe immer genau, wie ich am besten beim Lernen vorgehe. ○
4	Am besten bereitet man sich auf eine Probe vor, wie es einem spontan einfällt. ○	Nachdem ich mir überlegt habe, wie ich mich am besten auf die Probe vorbereite, gehe ich erst einmal genauso vor. ○	Ich bereite mich am besten so auf die Probe vor, wie es der Lehrer oder meine Eltern gesagt haben. ○
5	Während der Vorbereitungen auf die Probe überlege ich nicht, wie ich besser lernen könnte. Ich richte die Aufmerksamkeit auf den Lernstoff. ○	Ich achte während der Vorbereitungen auf die Probe immer darauf, ob ich auf eine andere Weise besser lernen könnte. ○	Ich finde es besser, wenn der Lehrer oder meine Eltern mir sagen, wie ich bei der Vorbereitung auf die Probe besser lernen kann. ○

6	Auch wenn ich bei den Vorbereitungen auf die Probe einmal nicht so gut vorankomme, behalte ich meinen Kurs bei. ○	Ich würde meine Vorbereitung auf die Probe nur dann umstellen, wenn mir der Lehrer oder meine Eltern das empfehlen würden. ○	Wenn mir während der Vorbereitung auf die Probe auffällt, wie ich besser lernen kann, dann stelle ich mein Lernen um. ○
7	Bei der Vorbereitung auf die Probe überprüfe ich am Schluss immer, ob ich das, was ich mir bei der Vorbereitung vorgenommen habe, auch erreicht habe. ○	Am liebsten ist es mir, der Lehrer oder meine Eltern sagen mir, ob ich mich genügend auf die Probe vorbereitet habe. ○	Ich habe das im Gefühl, ob ich mich genügend auf die Probe vorbereitet habe. Das brauche ich nicht extra zu überprüfen. ○

❖ Wie ist das bei dir?

Hier findest du auf der linken Seite wieder mehrere Aussagen. Kreuze bitte in jeder Zeile *einen* Kreis an, je nachdem wie sehr die Aussage auf dich zutrifft.

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Wenn ich einen Text lese, dann unterstreiche ich das Wichtigste.	○	○	○	○	○	○
Wenn ich einen Text lese, dann male ich eine Mindmap oder eine Grafik mit den Hauptaussagen.	○	○	○	○	○	○
Wenn ich einen Text lese, dann schreibe ich eine Zusammenfassung seiner Hauptaussagen in eigenen Worten.	○	○	○	○	○	○
Wenn ich einen Text lese, dann schreibe ich mir die wichtigsten Aussagen heraus.	○	○	○	○	○	○

❖ Wie ist das bei dir?

Die Arbeit mit Texten kann unterschiedliche Gefühle hervorrufen. Dieser Teil des Fragebogens bezieht sich auf Gefühle, die du erlebst, wenn du mit Texten arbeitest. Bevor du die Fragen beantwortest, stelle dir bitte Situationen vor, in denen du mit Texten gearbeitet hast.

Nimm auf dieser Seite bitte dein Lineal zu Hilfe, damit du nicht in der Zeile verrutschst. Kreuze bitte jeweils *einen* Kreis an, je nachdem wie sehr die Aussage auf dich zutrifft.

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Ich freue mich auf das Arbeiten mit Texten.	○	○	○	○	○	○
Ich finde das Arbeiten mit Texten langweilig.	○	○	○	○	○	○

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Nach dem Arbeiten mit Texten bin ich stolz auf mich.	○	○	○	○	○	○
Wenn ich an das Arbeiten mit Texten denke, bin ich nervös.	○	○	○	○	○	○
Wenn ich mit Texten gearbeitet habe, bin ich stolz auf das Ergebnis.	○	○	○	○	○	○
Wenn ich nur an das Arbeiten mit Texten denke, langweile ich mich schon.	○	○	○	○	○	○
Ich ärgere mich darüber, dass das Arbeiten mit Texten so schwer ist.	○	○	○	○	○	○
Wenn ich an das Arbeiten mit Texten denke, dann bekomme ich ein komisches Gefühl im Magen.	○	○	○	○	○	○
Ich denke mir oft während ich mit Texten arbeite: Das läuft ja prima!	○	○	○	○	○	○
Beim Arbeiten mit Texten bin ich genervt.	○	○	○	○	○	○
Das Arbeiten mit Texten macht mir so viel Spaß, dass ich am liebsten gar nicht mehr damit aufhören würde.	○	○	○	○	○	○
Wenn ich mit Texten arbeite, ärgere ich mich so sehr, dass ich am liebsten damit aufhören würde.	○	○	○	○	○	○
Wenn ich mit Texten arbeite, langweile ich mich so sehr, dass ich mich kaum wach halten kann.	○	○	○	○	○	○
Ich denke, dass ich auf mein Können beim Arbeiten mit Texten stolz sein kann.	○	○	○	○	○	○
Aus Angst vor dem Arbeiten mit Texten würde ich am liebsten gar nicht damit anfangen.	○	○	○	○	○	○
Ich bin stolz darauf, dass ich das Arbeiten mit Texten so gut hinbekomme.	○	○	○	○	○	○
Beim Arbeiten mit Texten werde ich vor Ärger ganz unruhig.	○	○	○	○	○	○
Das Arbeiten mit Texten ist so langweilig, dass ich dabei oft an etwas anderes denke.	○	○	○	○	○	○
Ich habe Angst, dass das Arbeiten mit Texten viel zu schwierig für mich ist.	○	○	○	○	○	○
Das Arbeiten mit Texten macht mir Spaß.	○	○	○	○	○	○
Es ist mir wichtig, gut mit Texten arbeiten zu können.	○	○	○	○	○	○
Das Arbeiten mit Texten habe ich im Griff.	○	○	○	○	○	○

Bitte überprüfe, ob du in jeder Zeile genau ein Kreuz gemacht hast!

So lerne ich für die Schule:	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Ich lege im Vorhinein fest, wie weit ich mit dem Durcharbeiten des Stoffes kommen möchte.	○	○	○	○	○	○
Ich lege bestimmte Zeiten fest, zu denen ich dann für die Schule lerne.	○	○	○	○	○	○
Ich lege die Stunden, die ich täglich mit Lernen verbringe, durch einen Zeitplan schriftlich fest.	○	○	○	○	○	○
Ich lege vor jedem Lernabschnitt eine bestimmte Zeitdauer fest.	○	○	○	○	○	○
Wenn ich für die Schule lerne, …						
... halte ich mich an einen bestimmten Zeitplan.	○	○	○	○	○	○

Bitte überprüfe, ob du in jeder Zeile genau ein Kreuz gemacht hast!

❖ Was ist dir wichtig?

Bei den folgenden Fragen geht es darum, was dir in der Schule wichtig ist, und was du dort gerne erreichen möchtest. In jeder Frage geht es um ein Ziel, das man in der Schule haben kann.

Kreuze bitte jeweils an, wie sehr die einzelnen Ziele für dich stimmen. Nimm bitte wieder dein Lineal zu Hilfe.

In der Schule will ich ...	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
... meine Fähigkeiten steigern.	○	○	○	○	○	○
... dass meine Lehrer nicht denken, dass ich Schwierigkeiten habe, im Unterricht mitzukommen.	○	○	○	○	○	○
... dass ich besser bin als meine Klassenkameraden.	○	○	○	○	○	○
... viele neue Dinge lernen.	○	○	○	○	○	○
... dass mein Lehrer nicht denkt, dass ich weniger weiß als meine Klassenkameraden.	○	○	○	○	○	○
... dass meine Klassenkameraden und Lehrer merken, dass mir die Schule leicht fällt.	○	○	○	○	○	○
... so viel lernen wie möglich.	○	○	○	○	○	○

In der Schule will ich ...	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
... dass meine Klassenkameraden und Lehrer denken, dass ich das, was wir in der Schule lernen, gut kann.	○	○	○	○	○	○
... knifflige Aufgaben machen, bei denen ich etwas dazulernen kann.	○	○	○	○	○	○
... dass meine Klassenkameraden nicht denken, dass ich Schwierigkeiten habe, im Unterricht mitzukommen.	○	○	○	○	○	○
... immer mehr können.	○	○	○	○	○	○
... verstehen, was ich da lerne.	○	○	○	○	○	○
... dass meine Klassenkameraden nicht denken, dass ich dumm bin.	○	○	○	○	○	○
... meinen Klassenkameraden zeigen, dass ich in der Schule gut bin.	○	○	○	○	○	○

Bitte überprüfe, ob du in jeder Zeile genau ein Kreuz gemacht hast!

Vielen Dank, dass du alle Fragen beantwortet hast!

5.2. Second Student Questionnaire

Evaluationscode:	Mein Name: _____
___ ___ ___ ___ ___ ___ ___	Datum: _____

Ich habe heute noch einmal einige **Fragen** an dich, die mit Schule und Lernen zu tun haben. Manche Fragen sind ganz leicht zu beantworten, bei manchen musst du etwas überlegen.

Es gibt immer Antworten zur Auswahl. Bitte entscheide dich immer für die Beispielantwort, die am besten zu dir passt.

Du bekommst **keine Noten** auf die Beantwortung der Fragen und es gibt **keine richtigen oder falschen Antworten. Antworte bitte auf alle Fragen so gut und so ehrlich wie möglich.**

So… und schon geht's los…

❖ **Wie ist das bei dir?**

Nimm auf dieser Seite bitte dein Lineal zu Hilfe, damit du nicht in der Zeile verrutschst. Kreuze bitte jeweils an, wie sehr die Aussage auf dich zutrifft.

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Man hat eine mehr oder weniger große Begabung für die Schule und kann wirklich nicht viel tun, um etwas daran zu verändern.	○	○	○	○	○	○
Die Begabung für die Schule ist etwas, das man nicht groß verändern kann.	○	○	○	○	○	○
Man kann neue Dinge lernen, aber die grundlegende Begabung für die Schule kann man nicht wirklich beeinflussen.	○	○	○	○	○	○
Wenn ich in der Schule einmal etwas kann, verlerne ich es auch nicht wieder.	○	○	○	○	○	○
Es kommt vor, dass ich in der Schule Dinge nicht mehr kann, die ich schon mal gekonnt habe.	○	○	○	○	○	○
Alles was ich in der Schule kann, kann ich auch wieder verlernen.	○	○	○	○	○	○
Wenn ich in der Schule einmal etwas beherrsche, mache ich es auch in Zukunft richtig.	○	○	○	○	○	○
Wenn ich in der Schule etwas verstanden habe, dann sitzt das auch für alle Zeiten.	○	○	○	○	○	○
Was ich in der Schule einmal kann, kann ich, das bleibt dann auch so.	○	○	○	○	○	○

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Ich kann in der Schule meine Fähigkeiten steigern.	○	○	○	○	○	○
Es liegt in meiner Hand, in der Schule meine Fähigkeiten zu verbessern.	○	○	○	○	○	○
Es fällt mir schwer, in der Schule etwas Neues zu lernen und die eigenen Fähigkeiten zu steigern.	○	○	○	○	○	○
Ich kann in der Schule viel Neues dazulernen.	○	○	○	○	○	○
Wie viel ich in der Schule kann, ist nicht festgelegt. Ich kann dazulernen und meine Fähigkeiten erweitern.	○	○	○	○	○	○
Ich kann nichts daran ändern, dass ich in der Schule bestimmte Dinge nicht kann.	○	○	○	○	○	○

Bitte überprüfe, ob du in jeder Zeile genau ein Kreuz gemacht hast!

❖ Wie ist das bei dir?

Du findest im Folgenden jeweils zwei gegensätzliche Aussagen – auf der linken und auf der rechten Seite. Lies dir bitte beide genau durch! Überlege nun, welche der beiden Aussagen eher auf dich zutrifft und wie stark.

Kreuze dementsprechend eine Zahl an. Wir sehen uns zuerst zusammen ein Beispiel an:

Ich spiele gerne draußen.	① ⊗ ③ ④ ⑤ ⑥	Ich spiele **nicht gerne** draußen.

Das Kind in diesem Beispiel spielt eigentlich lieber draußen, aber manchmal auch in der Wohnung. Deswegen hat es „2“ angekreuzt. Das Kreuz ist näher an der Aussage „Ich spiele gerne draußen“, aber nicht ganz nah, denn manchmal spielt das Kind auch drinnen.

Und los geht’s! Wie ist das bei dir?

Ich **zweifle daran**, ob ich für die Schule begabt bin.	① ② ③ ④ ⑤ ⑥	Ich **halte mich** für begabt für die Schule.
Ich bin mir **nicht sicher**, ob ich gut genug bin, um in der Schule erfolgreich zu sein.	① ② ③ ④ ⑤ ⑥	Ich bin mir **sicher**, dass ich gut genug bin, um in der Schule erfolgreich zu sein
Ich habe **nicht sonderlich viel Vertrauen** in meine Fähigkeiten für die Schule.	① ② ③ ④ ⑤ ⑥	Ich habe **vollstes Vertrauen** in meine Fähigkeiten für die Schule.
Wenn ich neues Lernmaterial vorgelegt bekomme, denke ich oft, dass ich vielleicht **nicht in der Lage** sein werde, dies zu verstehen.	① ② ③ ④ ⑤ ⑥	Wenn ich neues Lernmaterial vorgelegt bekomme, bin ich gewöhnlich **in der Lage**, dies zu verstehen.

Bitte überprüfe, ob du in jeder Zeile genau ein Kreuz gemacht hast!

Uns interessiert auch, **wie du den Unterrichtsstoff nachholst, wenn du einmal krank warst**. Entscheide wie zuvor für jede Zeile, welche der drei Aussagen am besten zu dir passt.

Bitte kreuze wieder nur eine Aussage pro Zeile an!

1	Vor dem Nachholen des Unterrichtsstoffs denke ich nicht lange darüber nach, was ich schon kann und was ich nicht kann. Da lege ich lieber gleich los. ○	Ich überlege zuerst, was ich schon kann und was ich noch nicht kann. Dann vergleiche ich das damit, was ich noch nachholen muss. ○	Mir ist es am liebsten, wenn der Lehrer oder meine Eltern mir sagen, was ich schon gut kann und was ich noch nachlernen muss. ○
2	Ich setze mir beim Nachholen des Unterrichtsstoffs immer ein festes Ziel, was und wie viel ich lernen will. ○	Der Lehrer oder meine Eltern sollten mir sagen, welche Ziele ich mir beim Nachlernen setzen sollte. ○	Ich setze mir beim Nachholen nie ein bestimmtes Ziel. Ich kann mich da ganz auf mein Gefühl verlassen. ○
3	Es bringt mir nichts, beim Nachholen des Unterrichtsstoffs jedes Mal zu planen, wie ich am besten lerne. So etwas mache ich automatisch. ○	Ich überlege mir beim Nachholen des Unterrichtsstoffs jedes Mal genau, wie ich am besten beim Lernen vorgehe. ○	Der Lehrer oder meine Eltern können mir am besten sagen, wie ich beim Nachholen des Unterrichtsstoffs vorgehen soll. ○
4	Ich hole den versäumten Unterrichtsstoff so nach, wie es der Lehrer oder meine Eltern mir gesagt haben. ○	Ich gestalte das Nachlernen am besten so, wie es mir spontan einfällt. ○	Nachdem ich mir genau überlegt habe, wie ich am besten das Nachholen des Unterrichtsstoffs gestalte, gehe ich erst einmal genauso vor. ○
5	Ich achte auch während des Nachholens immer darauf, ob ich auf andere Weise besser lernen könnte. ○	Ich finde es besser, wenn der Lehrer oder meine Eltern mir beim Nachholen des Unterrichtsstoffs sagen, wie ich beim Lernen einen besseren Weg finde. ○	Während des Nachlernens überlege ich nicht, wie ich besser lernen könnte. Ich richte die Aufmerksamkeit auf den Lernstoff. ○
6	Wenn mir während des Nachholens des Unterrichtsstoffs auffällt, wie ich besser lernen könnte, dann stelle ich mein Lernen um. ○	Auch wenn ich beim Nachlernen des Unterrichtsstoffs einmal nicht so gut vorankomme, behalte ich meinen Kurs bei. ○	Ich würde beim Nachholen des Unterrichtsstoffs mein Lernen nur dann umstellen, wenn mir der Lehrer oder meine Eltern das empfehlen würden. ○

7	Am liebsten ist es mir, der Lehrer oder meine Eltern sagen mir, ob ich den Unterrichtsstoff nun ausreichend nachgelernt habe. ○	Ich habe das im Gefühl, ob ich ausreichend nachgelernt habe. Das brauche ich nicht extra zu überprüfen. ○	Am Schluss des Nachholens überprüfe ich, ob ich das, was ich mir vorgenommen habe, auch erreicht habe. ○

Des Weiteren interessiert uns, wie du für die Schule lernst.
Entscheide für jede Zeile, welche der drei Aussagen am besten zu dir passt. Wie lernst du für die Schule?

Bitte kreuze wieder nur eine Aussage pro Zeile an!

1	Ich überlege zuerst, was ich schon kann und was ich noch nicht kann. Dann vergleiche ich das damit, was ich lernen will. ○	Vor dem Lernen denke ich nicht lange darüber nach, was ich schon kann und was ich nicht kann. Da lege ich lieber gleich los. ○	Mir ist es am liebsten, wenn der Lehrer oder meine Eltern mir sagen, was ich schon gut kann und was ich noch lernen muss. ○
2	Der Lehrer oder meine Eltern sollten mir sagen, welches Ziel ich mir beim Lernen setzen soll. ○	Ich setze mir ein festes Ziel, was und wie viel ich lernen will. ○	Ich setze mir beim Lernen kein bestimmtes Ziel. Ich kann mich da ganz auf mein Gefühl verlassen. ○
3	Es bringt mir nichts zu planen, wie ich am besten lerne. So etwas mache ich automatisch. ○	Der Lehrer oder meine Eltern können mir am besten sagen, wie ich beim Lernen vorgehen soll. ○	Ich überlege mir genau, wie ich am besten beim Lernen vorgehe. ○
4	Nachdem ich mir überlegt habe, wie ich am besten lerne, gehe ich erstmal genauso vor. ○	Ich lerne am besten so, wie es mir spontan einfällt. ○	Ich lerne so, wie der Lehrer oder meine Eltern gesagt haben, dass ich lernen soll. ○
5	Ich finde es besser, wenn der Lehrer oder meine Eltern mir sagen, wie ich beim Lernen einen besseren Weg finde. ○	Ich achte auch während des Lernens darauf, ob ich auf andere Weise besser lernen könnte. ○	Während des Lernens überlege ich nicht, wie ich besser lernen könnte. Ich richte die Aufmerksamkeit auf den Lernstoff ○
6	Auch wenn ich beim Lernen einmal nicht so gut vorankomme, behalte ich meinen Kurs bei. ○	Ich würde mein Lernen nur dann umstellen, wenn mir der Lehrer oder meine Eltern das empfehlen würden. ○	Wenn mir während des Lernens auffällt, wie ich besser lernen könnte, dann stelle ich mein Lernen um. ○

7	Am Schluss überprüfe ich immer, ob ich das, was ich mir vorgenommen habe, auch erreicht habe. ○	Ich habe das im Gefühl, ob ich genügend gelernt habe. Das brauche ich nicht extra zu überprüfen. ○	Am liebsten ist es mir, der Lehrer oder meine Eltern sagen mir, ob ich genügend gelernt habe. ○

Jetzt kommen ein paar Fragen zum Thema „Lesen“:

❖ Wie viele Bücher gibt es bei dir zu Hause ungefähr?

○ Keine oder nur sehr wenige (0-10 Bücher)
○ Genug, um ein Regalbrett zu füllen (11-25 Bücher)
○ Genug, um ein Regal zu füllen (26-100 Bücher)
○ Genug, um zwei Regale zu füllen (101-200 Bücher)
○ Genug, um drei oder mehr Regale zu füllen (über 200 Bücher)

❖ Wie ist das bei dir?

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Ich lese nur, wenn ich muss.	○	○	○	○	○	○
Ich würde mich freuen, wenn mir jemand ein Buch schenken würde.	○	○	○	○	○	○
Ich finde Lesen langweilig.	○	○	○	○	○	○
Ich lese gerne.	○	○	○	○	○	○

Jetzt kommen noch ein paar einfache Fragen zu dir und deiner Familie:

Bist du in Deutschland geboren?	○ Ja	○ Nein	○ Weiß nicht
Ist dein Vater in Deutschland geboren?	○ Ja	○ Nein	○ Weiß nicht
Ist deine Mutter in Deutschland geboren?	○ Ja	○ Nein	○ Weiß nicht

Welche Sprachen hast du sprechen gelernt, als du noch klein warst?

Wenn du gleichzeitig mehr als eine Sprache gelernt hast, als du noch klein warst, kannst du mehrere Sprachen ankreuzen.

☐ Deutsch ☐ Albanisch ☐ Arabisch ☐ Bosnisch ☐ Italienisch
☐ Polnisch ☐ Russisch ☐ Serbisch ☐ Tschechisch ☐ Türkisch
☐ Andere Sprache: _____

Wenn Deutsch nicht Deine Muttersprache ist: Wann hast Du angefangen, Deutsch zu lernen?

◯ Bevor ich 6 Jahre alt war
◯ Etwa mit 6-9 Jahren
◯ Später

Vielen Dank, dass du alle Fragen beantwortet hast!

5.3. Relevant Student Learning Diary Pages

Startblatt – Zykluswoche 1

Meine Selbsteinschätzung:

So gut bin ich im Finden von Hauptaussagen in Texten:

gar nicht gut	① ② ③ ④ ⑤ ⑥	sehr gut

In Lernzykluswoche 1 üben wir die Strategie Unterstreichen und Herausschreiben von Hauptaussagen.

So gut beherrsche ich diese Strategie:

gar nicht gut	① ② ③ ④ ⑤ ⑥	sehr gut

Meine Zielsetzung:

➔ Mein Ziel für diese Woche ist, ____ von 10 Hauptaussagen im Text zu finden.

Meine Strategieplanung:

Um ____ der zehn Hauptaussagen zu finden, wende ich die Strategie
Unterstreichen und Herausschreiben von Hauptaussagen an.

Diese Tipps helfen dir bei der Anwendung der Strategie. Nimm auch nochmal dein **Informationsblatt „Unterstreichen und Herausschreiben von Hauptaussagen“** zur Hand. Kreuze einen Tipp an, auf den du in Lernzykluswoche 1 besonders achten möchtest.

Tipp 1 ◯ Ich lese zuerst den gesamten Absatz durch, besser noch den ganzen Text.

Tipp 2 ◯ Falls ich nicht ganz sicher bin, lese ich den Absatz noch einmal.

Tipp 3 ◯ Ich achte darauf, nicht zu viel zu unterstreichen.

Tipp 4 ◯ Ich benutze zwei unterschiedliche Farben zum Unterstreichen.

Damit du überprüfen kannst, ob du dein Ziel erreichst und dir deine Strategie dabei hilft, fülle bitte jeden Tag dein Selbstbeobachtungsblatt aus.

Startblatt – Zykluswoche 2

Meine Selbsteinschätzung:

So gut bin ich im Finden von Hauptaussagen in Texten:

gar nicht gut	① ② ③ ④ ⑤ ⑥	sehr gut

In Lernzykluswoche 2 üben wir die Strategie Mindmaps zeichnen.

So gut beherrsche ich diese Strategie:

gar nicht gut	① ② ③ ④ ⑤ ⑥	sehr gut

Meine Zielsetzung:

➔ Mein Ziel für diese Woche ist, ____ von 10 Hauptaussagen im Text zu finden.

Meine Strategieplanung:

Um ____ der zehn Hauptaussagen zu finden, wende ich die Strategie
Mindmaps zeichnen an.

Diese Tipps helfen dir bei der Anwendung der Strategie. Nimm auch nochmal dein **Informationsblatt „Das Zeichnen von Mindmaps“** zur Hand. Kreuze einen Tipp an, auf den du in Lernzykluswoche 2 besonders achten möchtest.

Tipp 1 ○ Ich schneide kleine Zettel aus und schreibe die Hauptaussagen darauf. Dann lege ich mit den Zetteln so lange Mindmaps, bis ich zufrieden bin.

Tipp 2 ○ Ich erkläre einer anderen Person mit Hilfe meiner Mindmap, wovon der Text handelt.

Tipp 3 ○ Ich überlege mir nochmal ohne in den Text zu schauen, was die Hauptaussagen waren. Dann prüfe ich, ob ich sie in meine Mindmap aufgenommen habe.

Damit du überprüfen kannst, ob du dein Ziel erreichst und dir deine Strategie dabei hilft, fülle bitte jeden Tag dein Selbstbeobachtungsblatt aus.

Startblatt – Zykluswoche 3

Meine Selbsteinschätzung:

So gut bin ich im Finden von Hauptaussagen in Texten:

gar nicht gut	①	②	③	④	⑤	⑥	sehr gut

In Lernzykluswoche 3 üben wir die Strategie Zusammenfassungen schreiben.

So gut beherrsche ich diese Strategie:

gar nicht gut	①	②	③	④	⑤	⑥	sehr gut

Meine Zielsetzung:

➔ Mein Ziel für diese Woche ist, ____ von 10 Hauptaussagen im Text zu finden.

Meine Strategieplanung:

Um ____ der zehn Hauptaussagen zu finden, wende ich die Strategie
Zusammenfassungen schreiben an.

Diese Tipps helfen dir bei der Anwendung der Strategie. Nimm auch nochmal dein **Informationsblatt „Das Zusammenfassen von Hauptaussagen“** zur Hand. Kreuze einen Tipp an, auf den du in Lernzykluswoche 3 besonders achten möchtest.

Tipp 1 ○ Ich lese den Text zunächst nur durch und versuche ihn dann in Gedanken zusammenzufassen.

Tipp 2 ○ Ich denke daran nicht alles abzuschreiben.

Tipp 3 ○ Ich verwende für die Zusammenfassung meine eigenen Worte.

Tipp 4 ○ Ich achte darauf, nur die wichtigsten Aussagen in meiner Zusammenfassung aufzunehmen.

Damit du überprüfen kannst, ob du dein Ziel erreichst und dir deine Strategie dabei hilft, fülle bitte jeden Tag dein Selbstbeobachtungsblatt aus.

Startblatt – Zykluswoche 4

Meine Selbsteinschätzung:

So gut bin ich im Finden von Hauptaussagen in Texten:

gar nicht gut	① ② ③ ④ ⑤ ⑥	sehr gut

In Lernzykluswoche 4 übe ich die Strategie _____.

So gut beherrsche ich diese Strategie:

gar nicht gut	① ② ③ ④ ⑤ ⑥	sehr gut

Meine Zielsetzung:

➔ Mein Ziel für diese Woche ist, ____ von 10 Hauptaussagen im Text zu finden.

Meine Strategieplanung:

Um ____ der zehn Hauptaussagen zu finden, wende ich die oben genannte Strategie an.

Auf folgende/n Tipp/s möchte ich bei der Anwendung meiner gewählten Strategie besonders achten:
(Bitte trage mindestens einen Tipp ein.)

_____

_____

_____

_____

_____

Damit du überprüfen kannst, ob du dein Ziel erreichst und dir deine Strategie dabei hilft, fülle bitte jeden Tag dein Selbstbeobachtungsblatt aus.

Startblatt – Zykluswoche 5

Meine Selbsteinschätzung:

So gut bin ich im Finden von Hauptaussagen in Texten:

gar nicht gut	① ② ③ ④ ⑤ ⑥	sehr gut

In Lernzykluswoche 5 übe ich die Strategie _____.

So gut beherrsche ich diese Strategie:

gar nicht gut	① ② ③ ④ ⑤ ⑥	sehr gut

Meine Zielsetzung:

➔ Mein Ziel für diese Woche ist, ____ von 10 Hauptaussagen im Text zu finden.

Meine Strategieplanung:

Um ____ der zehn Hauptaussagen zu finden, wende ich die oben genannte Strategie an.

Auf folgende/n Tipp/s möchte ich bei der Anwendung meiner gewählten Strategie besonders achten:
(Bitte trage mindestens einen Tipp ein.)

_____

_____

_____

_____

_____

Damit du überprüfen kannst, ob du dein Ziel erreichst und dir deine Strategie dabei hilft, fülle bitte jeden Tag dein Selbstbeobachtungsblatt aus.

Selbstbeobachtungsblatt – Zykluswoche 1

	So viele Hauptaussagen werde ich finden:	Beginn der Textbearbeitung (Uhrzeit):	Ende der Textbearbeitung (Uhrzeit):	Ich fand den Text interessant.	Ich habe mich beim Anwenden meiner Strategie überwacht.	Meine Strategie hat gut geklappt.	Morgen ändere ich etwas an meiner Strategie.	Anzahl richtiger Hauptaussagen:
Text 1				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 2				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 3				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 4				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Quiz				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	

Selbstbeobachtungsblatt – Zykluswoche 2

	So viele Hauptaussagen werde ich finden:	Beginn der Textbearbeitung (Uhrzeit):	Ende der Textbearbeitung (Uhrzeit):	Ich fand den Text interessant.	Ich habe mich beim Anwenden meiner Strategie überwacht.	Meine Strategie hat gut geklappt.	Morgen ändere ich etwas an meiner Strategie.	Anzahl richtiger Hauptaussagen:
Text 1				◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ ja ◯ nein	
Text 2				◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ ja ◯ nein	
Text 3				◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ ja ◯ nein	
Text 4				◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ ja ◯ nein	
Quiz				◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ stimmt gar nicht ◯ stimmt nicht ◯ stimmt eher nicht ◯ stimmt eher ◯ stimmt ◯ stimmt völlig	◯ ja ◯ nein	

Selbstbeobachtungsblatt – Zykluswoche 3

	So viele Hauptaussagen werde ich finden:	Beginn der Textbearbeitung (Uhrzeit):	Ende der Textbearbeitung (Uhrzeit):	Ich fand den Text interessant.	Ich habe mich beim Anwenden meiner Strategie überwacht.	Meine Strategie hat gut geklappt.	Morgen ändere ich etwas an meiner Strategie.	Anzahl richtiger Hauptaussagen:
Text 1				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 2				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 3				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 4				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Quiz				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	

Selbstbeobachtungsblatt – Zykluswoche 4

	So viele Hauptaussagen werde ich finden:	Beginn der Textbearbeitung (Uhrzeit):	Ende der Textbearbeitung (Uhrzeit):	Ich fand den Text interessant.	Ich habe mich beim Anwenden meiner Strategie überwacht.	Meine Strategie hat gut geklappt.	Morgen ändere ich etwas an meiner Strategie.	Anzahl richtiger Hauptaussagen:
Text 1				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 2				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 3				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 4				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Quiz				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	

Selbstbeobachtungsblatt – Zykluswoche 5

	So viele Hauptaussagen werde ich finden:	Beginn der Textbearbeitung (Uhrzeit):	Ende der Textbearbeitung (Uhrzeit):	Ich fand den Text interessant.	Ich habe mich beim Anwenden meiner Strategie überwacht.	Meine Strategie hat gut geklappt.	Morgen ändere ich etwas an meiner Strategie.	Anzahl richtiger Hauptaussagen:
Text 1				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 2				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 3				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Text 4				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	
Quiz				○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ stimmt gar nicht ○ stimmt nicht ○ stimmt eher nicht ○ stimmt eher ○ stimmt ○ stimmt völlig	○ ja ○ nein	

5.4. Parent Questionnaire

Im folgenden Fragebogen geht es um das Lernverhalten Ihres Kindes. Bitte beachten Sie, dass es keine richtigen oder falschen Antworten gibt. Auch wenn Ihnen bei einigen Fragen die Entscheidung schwerfallen sollte, beantworten Sie diese bitte trotzdem − und zwar so, wie es am ehesten für Sie zutrifft.

Dieser Fragebogen sollte von der Person ausgefüllt werden, die am meisten Kontakt zum Kind hat. Bitte kreuzen Sie zuerst an, wer den Fragebogen bearbeitet.

Dieser Fragebogen wird ausgefüllt durch:

○ Mutter des Kindes

○ Vater des Kindes

○ Eine andere Person, und zwar: _____

Name des Kindes: _____

Geburtsmonat des Kindes: _____ Geburtsjahr des Kindes: _____

Das Kind besucht folgende Schule: _____

Dort besucht es die Klasse: _____ ○ a ○ b ○ c ○ d ○ e ○ f ○ g

Ich wünsche mir eine individuelle Rückmeldung in Bezug auf mein Kind. ○ ja ○ nein

Bitte kreuzen Sie an, welche Lernfertigkeiten Ihnen bei Ihrem Kind wichtig sind.

Es ist mir wichtig, dass mein Kind ...	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
... weiß, wo seine Stärken bei den zu lernenden fachlichen Inhalten liegen.	○	○	○	○	○	○
... weiß, wo seine Schwächen bei den zu lernenden fachlichen Inhalten sind.	○	○	○	○	○	○
... weiß, wo seine Stärken im Lernverhalten liegen.	○	○	○	○	○	○
... weiß, wo seine Schwächen im Lernverhalten sind.	○	○	○	○	○	○
... sich selbst geeignete inhaltliche Ziele setzt.	○	○	○	○	○	○
... sich selbst geeignete Lernziele setzt.	○	○	○	○	○	○
... genau überlegt, was es mit seinem Lernen erreichen will.	○	○	○	○	○	○
... in der Lage ist, sich geeignete Ziele bezüglich seines Lernens zu setzen.	○	○	○	○	○	○

Kreuzen Sie bitte bei den folgenden Aussagen an, inwieweit Sie diesen zustimmen. Jeweils drei Aussagen beziehen sich auf eine bestimmte Situation. Einige der folgenden Aussagen treffen auf Ihr Kind und Sie womöglich nicht zu. Beispielsweise könnte es sein, dass Ihr Kind noch keine Lernstrategien verwendet. In so einem Fall kreuzen Sie bitte „stimmt gar nicht" an.

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Ich schätze vor dem Lernen den Lernstand meines Kindes genau ein.	○	○	○	○	○	○
Mein Kind schätzt seinen Lernstand vor dem Lernen ohne meine Unterstützung selbstständig ein.	○	○	○	○	○	○
Mein Kind beginnt mit dem Lernen, ohne den eigenen Lernstand einzuschätzen. Es macht sich lieber gleich an die Arbeit.	○	○	○	○	○	○
Ich gebe meinem Kind vor dem Lernen genaue Lernziele vor.	○	○	○	○	○	○
Mein Kind setzt sich vor dem Lernen selbstständig ohne meine Unterstützung Lernziele.	○	○	○	○	○	○
Mein Kind setzt sich vor dem Lernen keine bestimmten Lernziele. Es kann sich da ganz auf sein Gefühl verlassen.	○	○	○	○	○	○
Ich plane für mein Kind den Lernprozess.	○	○	○	○	○	○
Mein Kind plant sein Lernen ohne meine Unterstützung.	○	○	○	○	○	○
Mein Kind plant seinen Lernprozess nicht genau. Das Lernen läuft bei ihm automatisch.	○	○	○	○	○	○
Ich schlage meinem Kind vor, wie es am besten lernen soll (bzw. welche Lernstrategien es verwenden soll).	○	○	○	○	○	○
Mein Kind überlegt selbst, wie es beim Lernen am besten vorgehen kann (bzw. welche Lernstrategien es verwendet).	○	○	○	○	○	○
Statt darüber nachzudenken, wie es lernt, konzentriert sich mein Kind lieber auf die Lerninhalte.	○	○	○	○	○	○
Ich kontrolliere für mein Kind, ob die Lernstrategien, die es verwendet, gut funktionieren.	○	○	○	○	○	○
Mein Kind überwacht selbstständig, ob seine Lernstrategien funktionieren.	○	○	○	○	○	○
Während dem Lernen überlegt mein Kind nicht, wie es besser lernen könnte. Es richtet seine Aufmerksamkeit auf den Lernstoff.	○	○	○	○	○	○

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Wenn mein Kind Probleme mit dem Lernen hat, mache ich Vorschläge, wie es sein Lernen verbessern kann.	○	○	○	○	○	○
Wenn mein Kind Probleme mit dem Lernen hat, überlegt es selbst, wie es sein Lernen verbessern kann.	○	○	○	○	○	○
Mein Kind nimmt keine Änderungen am eigenen Lernen vor.	○	○	○	○	○	○
Nach dem Lernen bewerte ich die Lernergebnisse für mein Kind.	○	○	○	○	○	○
Mein Kind bewertet seine Lernergebnisse ohne meine Unterstützung selbstständig.	○	○	○	○	○	○
Mein Kind weiß von selbst, ob das Lernen geklappt hat. Das braucht es nicht extra zu überprüfen.	○	○	○	○	○	○

Bitte beurteilen Sie die folgenden Sätze im Hinblick auf das Lernen Ihres Kindes <u>für die Schule und in der Schule</u>.

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Wenn mein Kind einmal etwas kann, verlernt es dies auch nicht wieder.	○	○	○	○	○	○
Es kommt vor, dass mein Kind Dinge nicht mehr kann, die es schon mal gekonnt hat.	○	○	○	○	○	○
Alles was mein Kind kann, kann es auch wieder verlernen.	○	○	○	○	○	○
Wenn mein Kind einmal etwas beherrscht, macht es dies auch in Zukunft richtig.	○	○	○	○	○	○
Wenn mein Kind etwas verstanden hat, dann sitzt das auch für alle Zeiten.	○	○	○	○	○	○
Was mein Kind einmal kann, kann es, das bleibt dann auch so.	○	○	○	○	○	○
Mein Kind kann seine Fähigkeiten steigern.	○	○	○	○	○	○
Es liegt in der Hand meines Kindes, seine Fähigkeiten zu verbessern.	○	○	○	○	○	○
Es fällt meinem Kind schwer, etwas Neues zu lernen und die eigenen Fähigkeiten zu steigern.	○	○	○	○	○	○
Mein Kind kann viel Neues dazulernen.	○	○	○	○	○	○

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Wie viel mein Kind kann, ist nicht festgelegt. Es kann dazulernen und seine Fähigkeiten erweitern.	○	○	○	○	○	○
Mein Kind kann nichts daran ändern, dass es bestimmte Dinge nicht kann.	○	○	○	○	○	○
Man hat eine mehr oder weniger große Begabung für die Schule und kann wirklich nicht viel tun, um etwas daran zu verändern.	○	○	○	○	○	○
Die Begabung für die Schule ist etwas, das man nicht groß verändern kann.	○	○	○	○	○	○
Man kann neue Dinge lernen, aber die grundlegende Begabung für die Schule kann man nicht wirklich beeinflussen.	○	○	○	○	○	○

Nun geht es noch einmal darum, welche Lernfertigkeiten Ihnen bei Ihrem Kind wichtig sind.

Es ist mir wichtig, dass mein Kind ...	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
... Schritt für Schritt sein Lernen festlegt.	○	○	○	○	○	○
... seinen Lernprozess strategisch plant.	○	○	○	○	○	○
... plant, welche Strategien es beim Lernen anwenden möchte.	○	○	○	○	○	○
... selbst plant, auf welche Weise das eigene Lernen ablaufen soll.	○	○	○	○	○	○
... in der Lage ist, Lernstrategien richtig anzuwenden.	○	○	○	○	○	○
... weiß, wie Lernstrategien richtig funktionieren.	○	○	○	○	○	○
... Lernstrategien richtig einsetzen kann.	○	○	○	○	○	○
... Lernstrategien auf konkrete Inhalte anwenden kann.	○	○	○	○	○	○

Stellen Sie sich nun bitte vor, Ihr Kind kommt mit einer schlechten Note nach Hause, die Sie nicht erwartet haben.

Bei einer schlechten Note ...	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
... frage ich mein Kind, wie ich ihm helfen könnte.	○	○	○	○	○	○

Bei einer schlechten Note ...	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
... schimpfe ich mit meinem Kind und verlange von ihm, mehr zu lernen.	○	○	○	○	○	○
... drohe ich meinem Kind ernste Konsequenzen (z.B. Fernsehverbot) an, wenn es in der nächsten Zeit nicht hart arbeitet und seine Noten verbessert.	○	○	○	○	○	○
... versuche ich, gemeinsam mit meinem Kind den Grund für die schlechte Note herauszufinden.	○	○	○	○	○	○
... lasse ich es von da an zu Hause lernen, bis es alle seine Aufgaben erledigt hat.	○	○	○	○	○	○
... spreche ich mit meinem Kind die Arbeit noch einmal durch, damit es die Fehler nicht noch einmal macht.	○	○	○	○	○	○
... höre ich mir erst einmal in Ruhe an, wie mein Kind selbst mit dieser Situation umgehen will.	○	○	○	○	○	○
... verspreche ich meinem Kind eine Belohnung, wenn sich seine Leistungen in Zukunft verbessern.	○	○	○	○	○	○
... rede ich meinem Kind aufmunternd zu.	○	○	○	○	○	○
... werfe ich meinem Kind vor, zu viele andere Dinge im Kopf zu haben und sich nicht genug um die Schule zu kümmern.	○	○	○	○	○	○

Jetzt geht es noch ein letztes Mal darum, welche Lernfertigkeiten Ihnen bei Ihrem Kind wichtig sind.

Es ist mir wichtig, dass mein Kind ...	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
... während des Lernens überwacht, wie gut sein Lernen funktioniert.	○	○	○	○	○	○
... während es lernt, im Auge behält, ob der Einsatz seiner Lernstrategie klappt.	○	○	○	○	○	○
... während es lernt, überwacht, ob es die Lernstrategien richtig anwendet.	○	○	○	○	○	○
... während es lernt, stetig kontrolliert, ob es beim Einsetzen der Lernstrategien alles richtig macht.	○	○	○	○	○	○
... die verwendete Lernstrategie immer wieder verbessert.	○	○	○	○	○	○
... bei Problemen beim Lernen seine Lernstrategien immer weiterentwickelt.	○	○	○	○	○	○

Es ist mir wichtig, dass mein Kind ...	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
... seine Lernstrategie mehrmals anpasst, während es lernt.	○	○	○	○	○	○
... sein Lernen durch eine Anpassung der Lernstrategie verbessern kann.	○	○	○	○	○	○
... nach Abschluss des Lernens bewertet, was gut geklappt hat und was nicht.	○	○	○	○	○	○
... bewertet, ob sein Lernen gut geklappt hat.	○	○	○	○	○	○
... bewertet, ob die gewählten Lernstrategien hilfreich waren.	○	○	○	○	○	○
... sein Lernergebnis rückblickend bewertet.	○	○	○	○	○	○

Im Folgenden finden Sie Fragen zum Thema Hausaufgaben und häusliches Lernen.

Wie häufig unterstützen Sie Ihr Kind bei den Hausaufgaben?

○ nie ○ selten ○ gelegentlich ○ oft ○ immer

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Ich erwarte, dass sich mein Kind bei den Hausaufgaben wirklich mit den Aufgaben auseinandersetzt.	○	○	○	○	○	○
Ich weiß, was zu tun ist, um meinem Kind zu helfen, wenn Schwierigkeiten bei der Hausaufgabenbearbeitung auftreten.	○	○	○	○	○	○
Ich finde es toll, wenn mein Kind Sachen, die es in der Schule gelernt hat, zu Hause ausprobiert.	○	○	○	○	○	○
Durch die Hausaufgaben werden Schulleistungen des Kindes gefördert.	○	○	○	○	○	○
Mir ist es sehr wichtig, dass mein Kind gute Noten bekommt.	○	○	○	○	○	○
Ich will, dass mein Kind Sachen wirklich versteht und sie nicht nur auswendig lernt.	○	○	○	○	○	○
Durch die Hausaufgaben wächst das Verständnis für den Unterrichtsstoff.	○	○	○	○	○	○
Hausaufgaben sind immer wieder ein Grund, warum es bei uns zu Hause Streit gibt.	○	○	○	○	○	○
Ich finde es wichtig, dass mein Kind nachfragt, wenn es etwas nicht versteht.	○	○	○	○	○	○

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Wenn mein Kind Schwierigkeiten mit der Hausaufgabenbearbeitung hat, dann weiß ich, wie ich damit umgehen kann.	○	○	○	○	○	○
Ich finde es wichtig, dass mein Kind im Unterricht aufpasst, damit es alles richtig versteht.	○	○	○	○	○	○
Durch die Hausaufgaben erfährt das Kind, dass sie nützlich sind.	○	○	○	○	○	○
Über eine schlechte Note meines Kindes ärgere ich mich.	○	○	○	○	○	○
Wenn mein Kind Schwierigkeiten beim Lernen hat, dann weiß ich, wie ich es unterstützen kann.	○	○	○	○	○	○
Ich ermuntere mein Kind, im Unterricht Fragen zu stellen, wenn es etwas nicht verstanden hat.	○	○	○	○	○	○
Hausaufgaben sind immer wieder ein unangenehmes Thema in unserer Familie.	○	○	○	○	○	○
Durch die Hausaufgaben erarbeitet sich das Kind neues Wissen.	○	○	○	○	○	○
Ich sehe es gerne, wenn sich mein Kind aus Interesse noch über die Hausaufgaben hinaus mit schulischen Dingen beschäftigt.	○	○	○	○	○	○
Ich möchte, dass mein Kind in der Schule gute Noten hat.	○	○	○	○	○	○
Hausaufgaben und ihre Erledigung stellen eine Belastung für unsere Familie dar.	○	○	○	○	○	○
Indem das Kind durch die Hausaufgaben übt, erreicht es zusätzliche Sicherheit.	○	○	○	○	○	○

So lernt mein Kind für die Schule:	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Es lernt an einem Platz, wo es sich gut auf den Stoff konzentrieren kann.	○	○	○	○	○	○
Es legt im Vorhinein fest, wie weit es mit dem Durcharbeiten des Stoffes kommen möchte.	○	○	○	○	○	○
Wenn mein Kind lernt, sorgt es dafür, dass es alles schnell finden kann.	○	○	○	○	○	○
Es legt bestimmte Zeiten fest, zu denen es dann für die Schule lernt.	○	○	○	○	○	○

So lernt mein Kind für die Schule:	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Es gestaltet seine Lernumgebung so, dass es möglichst wenig vom Lernen abgelenkt wird.	○	○	○	○	○	○
Es legt die Stunden, die es täglich mit Lernen verbringt, durch einen Zeitplan schriftlich fest.	○	○	○	○	○	○
Zum Lernen sitzt es immer am selben Platz.	○	○	○	○	○	○
Es legt vor jedem Lernabschnitt eine bestimmte Zeitdauer fest.	○	○	○	○	○	○
Der Arbeitsplatz meines Kindes ist so gestaltet, dass es alles schnell finden kann.	○	○	○	○	○	○
Es hält sich beim Lernen an einen bestimmten Zeitplan.	○	○	○	○	○	○
Mein Kind hat die wichtigsten Unterlagen an seinem Arbeitsplatz griffbereit.	○	○	○	○	○	○

Noch einige Fragen zu <u>Ihrem persönlichen Leseverhalten</u>.

Wie viel Zeit verwenden Sie in einer normalen Woche darauf, zu Hause für sich selbst zu lesen?

○ weniger als eine Stunde in der Woche

○ 1 - 5 Stunden pro Woche

○ 6 - 10 Stunden pro Woche

○ mehr als 10 Stunden pro Woche

	stimmt gar nicht	stimmt nicht	stimmt eher nicht	stimmt eher	stimmt	stimmt völlig
Ich lese nur, wenn es sein muss.	○	○	○	○	○	○
Ich rede gerne mit anderen Menschen über Bücher.	○	○	○	○	○	○
Ich verbringe meine Freizeit gerne mit Lesen.	○	○	○	○	○	○
Ich lese nur, um Informationen zu erhalten.	○	○	○	○	○	○

Bitte machen Sie abschließend noch einige allgemeine Angaben zur Familie des Kindes.

Ist das Kind in Deutschland geboren?	○ ja	○ nein
Ist die Mutter des Kindes in Deutschland geboren?	○ ja	○ nein
Ist der Vater des Kindes in Deutschland geboren?	○ ja	○ nein

Was wird in Ihrer Familie überwiegend gesprochen? ○ Deutsch ○ eine andere Sprache

Was ist der höchste Schulabschluss der Mutter des Kindes?

◯ kein Schulabschluss
◯ Volks-, Hauptschulabschluss
◯ Mittlere Reife, Realschulabschluss
◯ Abitur, Fachabitur
◯ Sonstiges: _____

Welche der folgenden Qualifikationen besitzt die Mutter des Kindes?

◯ Promotion (Doktorprüfung)
◯ Universitätsabschluss
◯ Fachhochschulabschluss
◯ Abschluss an einer Fachschule, Meisterschule, Technikerschule
◯ Abschluss an einer Berufsschule, Berufsfachschule
◯ Abgeschlossene Lehre, Abschluss an einer Handelsschule
◯ Sonstiges: _____

Was ist der höchste Schulabschluss des Vaters des Kindes?

◯ kein Schulabschluss
◯ Volks-, Hauptschulabschluss
◯ Mittlere Reife, Realschulabschluss
◯ Abitur, Fachabitur
◯ Sonstiges: _____

Welche der folgenden Qualifikationen besitzt der Vater des Kindes?

◯ Promotion (Doktorprüfung)
◯ Universitätsabschluss
◯ Fachhochschulabschluss
◯ Abschluss an einer Fachschule, Meisterschule, Technikerschule
◯ Abschluss an einer Berufsschule, Berufsfachschule
◯ Abgeschlossene Lehre, Abschluss an einer Handelsschule
◯ Sonstiges: _____

Vielen Dank für Ihre Mitarbeit!

5.5. Teacher Checklists

Schule, Lehrkraft, Klasse:	Schul- und Klassencode:

Name des Schülers	Schüler-Code	Noten des Übertrittszeugnisses (Schuljahr 2012/13)			Schwierigkeiten gesprochenes Deutsch zu verstehen ×	„LRS“ oder „Legasthenie“ ×
		Deutsch	Mathe	HSU		
	01					
	02					
	03					
	04					
	05					
	06					
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Schule, Lehrkraft, Klasse:	**Schul- und Klassencode:**

Name des Schülers	**Schüler-Code**	**Übertritt nach 4. Klasse auf... (Schuljahr 2013/14)**				
		Mittelschule	**Realschule**	**Gymnasium**	**Sonstiges**	**Nicht bekannt**
	01					
	02					
	03					
	04					
	05					
	06					
	07					
	08					
	09					
	10					
	11					
	12					
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