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How values relate to student achievement in upper secondary education: Integrating interdisciplinary perspectives on value beliefs in the school context

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Abstract
Educational research often refers to the subjective values assigned to aspects of education. Theoretical frameworks from the related disciplines of psychology and sociology applied to the context of education aim to better describe why some students are more motivated in school than others to understand differences in academic outcomes. In the current study, we followed an interdisciplinary approach that aimed to integrate psychological views regarding domain-specific value beliefs (i.e., intrinsic, attainment, utility, cost) and sociological views regarding domain-general values of education (i.e., stimulation, comfort, status, behavioral confirmation) and to investigate how they relate to academic success in upper secondary education. In a sample of 3,775 upper secondary school students in Germany, we found evidence that combining the two perspectives had incremental effects when predicting domain-specific achievement and GPA. We discuss how integrating interdisciplinary theoretical perspectives could foster communication between scientific disciplines and benefit future research in the field of motivation.

Keywords Academic motivation · Academic achievement · Interdisciplinary · Values of education

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1 Introduction

As a precursor of achievement and educational decisions, academic motivation is relevant in both educational psychology and the sociology of education. More specifically, in the theoretical perspectives of both disciplines, the perceived value of different aspects of education plays a major role in explaining why students differ in their academic-related achievement and choices (e.g., for psychology: Eccles & Wigfield, 2002; for sociology: Boudon, 1974; Esser, 1999; Becker, 2003). In this article, we argue that bringing together value conceptualizations from both disciplines—which have rarely been integrated before—can foster interdisciplinary cooperation on educational research questions with the aim of better understanding and solving societal issues. While the parallel development of theoretical models in each discipline is both valid and valuable to foster theoretical progress, it can sometimes hinder communication between disciplines due to the differences in both the terminology and the theoretical assumptions.

In the case of educational research, sociology commonly focuses on the interplay between institutions and individuals on macro, meso, and micro levels, adopting more of a bird's eye perspective on educational processes (see Becker, 2019, for an overview), whereas psychology is often concerned with the individual perceptions and experiences (e.g., James, 1890; Myers, 2007) of the specific stakeholders within that system (see Oishi & Graham, 2010, for an overview of socioecological approaches in psychology). Bringing together these perspectives could be useful to better investigate relevant research questions and understand the associated processes, for example, why a system might be beneficial for the academic progress of some students but not of others. This could lead to a new—and, ideally, to a more comprehensive—understanding of learner variability and educational disparities. In this way, educational research could benefit from working in interdisciplinary teams by gaining deeper insights into relevant societal issues.

In this article, we first take a closer look at central theoretical frameworks of each discipline that focus on conceptualizations of value beliefs or value orientations regarding aspects of education. Although they were largely developed independently, the theoretical frameworks we concentrate on share common concepts. Our focus is on the situated expectancy-value theory (SEVT; Eccles & Wigfield, 2020) and the concept of values of education (VoE; Scharf et al., 2019); these frameworks represent two approaches to conceptualizing value orientation in different aspects of education (for recent applications of the theoretical approaches in empirical studies, see e.g., Grund et al., 2024; Busemeyer & Guillaud, 2023). As we will show, there are both overlaps and differences between the concepts. We compare how both theoretical assumptions can be brought together in an overarching description of value beliefs regarding education and what the added value of the complementary triangulation could be.

In the second part of our article, on the basis of our considerations and the integration of both theoretical concepts, we conducted an empirical investigation of how value beliefs relate to academic achievement. We investigated the extent to which value beliefs conceptualized at two levels (values of education at the domain-general level and values of mathematics and English as a foreign language at the domain-

specific level) predict domain-general and domain-specific achievement outcomes, explaining incremental variance depending on the outcome variable. We discuss the findings by considering the following two questions: How might the value students assign to aspects of education be relevant for different academic outcomes? How might combining both perspectives help researchers to better understand why some students are less motivated in school and how to address this problem? Thus, our goal is twofold: We aim to provide more insights into the topic of education and into educational theories. In doing so, we also highlight how comparing and discussing theories from different disciplines and contexts might improve understanding of discipline-specific conceptualizations.

1.1 Theorizing how students value (certain aspects of) education: integrating two conceptual perspectives

In the following, we briefly introduce each of the two theoretical frameworks, outlining their basic assumptions before highlighting their similarities and differences. Then, we discuss how aspects of the theories can be brought together in useful ways without undermining the individual value of each theoretical perspective. Before we begin, we would like to state that this article does not aim to replace or change one of the theoretical approaches; instead, it aims to enhance understanding of the concepts across the two disciplines and to investigate whether combining both theories can be useful to address interdisciplinary research questions in education. We believe that while theoretical diversity and multiple discipline-specific perspectives are important in describing and understanding phenomena, experimenting with bringing the theories together can have its own merit (see Frodeman et al., 2017; Aldrich, 2014). Our brief overviews include a short summary of how each theory developed, what is meant by the concept of value beliefs in each theory, and what mechanisms each theory assumes are behind the development of value beliefs among students.

1.2 The situated expectancy-value theory in educational psychology

In the educational psychology literature, motivation is often defined as "the process whereby goal-directed academic activity is instigated and sustained" (Koenka, 2020, p. 3; see also Schunk et al., 2014). As such, academic motivation comprises internal (personal) processes that manifest themselves in goal-directed actions. This definition highlights a psychological perspective by focusing on the experience of a situation by an individual. For example, students can perceive a value of an activity or action in a given academic situation and act accordingly.

From such a psychological perspective, expectancy-value theory (EVT) is one of the most widely applied theories in motivational research in education. According to EVT, achievement and achievement-related behavior depend on students' expectancy and value beliefs in a specific task or subject domain (Atkinson, 1957; Eccles et al., 1983; Wigfield & Eccles, 1992; Wigfield, 1994), differentiating between several value beliefs. According to Eccles et al. (1983), attainment value describes the personal importance of engaging in a task, intrinsic value refers to deriving enjoyment or interest from a task, utility value reflects the perceived personal usefulness of

successfully engaging in a task, and cost is defined as the perceived negative consequences of engaging in a task (see also Eccles & Wigfield, 2002). Recently, the theory has been renamed situated expectancy-value theory (SEVT; see Eccles & Wigfield, 2020), which is why we use this name throughout the rest of the article.

The SEVT (Eccles et al., 1983; Wigfield & Eccles, 1992; Wigfield, 1994; Eccles & Wigfield, 2020) proposes that a multitude of factors and their interaction contribute to the development of students' value beliefs. Notably, socializers such as parents and teachers play an important role in these factors. A lot of research on gender differences in STEM subjects has been inspired by the SEVT; such research has investigated the role of socializers and other societal influences in attempts to explain why girls might be less likely to choose careers in STEM domains (e.g., Smith et al., 2015). According to SEVT scholars and the empirical literature based on the theory, the development of differentiated value beliefs regarding school subjects starts early. Findings show that first graders already make domain-specific distinctions (Eccles et al., 1993) and that the task value components of attainment, intrinsic, and utility value form as separate but highly related factors by the end of elementary school (Eccles & Wigfield, 1995; see also Eccles & Wigfield, 2020). Such a view highlights the domain-specific nature of the SEVT.

Over the highly fruitful history of the theory, which has resulted in many empirical studies and relevant insights, the SEVT has been applied to a variety of different contexts and domains. However, to the best of our knowledge, there have been few attempts to use the SEVT for the broader domain of education (for related exceptions, see Goegan et al., 2021 for a study on education courses in college; Perez-Brena et al., 2017 for a study on educational attainment; Becker & Tetzner, 2021 for a study on socioeconomic success; and Parr & Bonitz, 2015 for a study on high-school dropout). We argue that by combining the SEVT with the conceptualization of value orientations in the sociological literature (Scharf et al., 2019), a broader perspective on value beliefs can be gained, which could provide new insights into how value beliefs that target different aspects of education might relate to students' academic achievement.

1.3 The values of education concept in sociology

The sociology of education may extend the perspective of psychology on motivation, as the aim of the sociology of education is to systematically describe educational processes and their institutionalization in the social context, including the consequences for individuals, institutions, and society (Becker, 2019). In studying educational inequalities, sociological approaches often consider how the perception of the utility or benefit of education is group-specific (e.g., Erikson & Jonsson, 1996).

In the sociological literature, the benefit of education is mainly regarded as the monetary returns of reaching certain positions in the labor market, which differ depending on social origin (Becker, 2003). Going beyond this extrinsic motivation, Scharf et al. (2019) conceptualized values of education as a broader concept of value orientations towards education that helps to describe the mechanisms behind primary and secondary effects, and thus, behind social inequalities in educational decisions and educational trajectories. Moreover, they argued that the VoE also impacts students' behavior, which then can cause achievement differences (Hadjar et al., 2021).

On the basis of the principles of the social production function theory (Lindenberg & Frey, 1993; Ormel et al., 1999), Scharf and colleagues distinguish between different instrumental goals—viewed as value orientations (Scharf et al., 2019)—that help people achieve universal objectives. The VoE concept (Scharf et al., 2019) describes the individual significance of education and the authors distinguish between five dimensions of values that individuals can attach to education to a greater or lesser extent.

According to Scharf et al. (2019), *stimulation* describes activation through the desire for learning and activities in school. Stimulation is associated with being intrinsically motivated to learn and with the absence of boredom when engaging in school-related activities. Students who value education for their stimulation feel that engaging themselves in educational contexts will provide them with positive, activated states. For example, a student who values stimulation through education believes that going to college to continue their education will make them feel challenged and excited. *Comfort* is a value assigned to education because future financial stability and social security are often tied to academic success. The same applies to social *status* as a positional good within society because it is linked to educational credentials that carry prestige. A student could value going to school or college because getting a degree will help them get a secure and stable job, which will enable them to provide for a family (comfort) or to become, for example, a successful surgeon who is well respected in their community (status). *Behavioral confirmation* describes how students perceive the expectations of significant others, that is, family, peers, and teachers, regarding the importance of schooling and academic success. As such, engaging in education can be of value to students in order to meet the expectations of others. Students who believe a college degree will help them to fulfill the expectations of their parents, for example, value education for its potential to help them gain behavioral confirmation from these significant others. Moreover, the school environment facilitates *affection* in relationships and interactions with teachers and peers. In this respect, schooling is valued as an emotional setting. Educational outcomes such as learning outcomes—which are also affected by the degree of social integration and bonding—are not at the core of this value. For further reading on the determinants of socialized values, we refer readers to Scharf et al. (2019) for a more detailed description.

1.4 Integrating the two perspectives on the values of education

In this section, we aim to integrate the features of both theoretical conceptualizations of values regarding aspects of education and to provide an interdisciplinary view on educational values. On the basis of our understanding and the descriptions above, we provide an overview of the similarities and differences between both frameworks, aiming to highlight the perspective of each theory, the assumptions they have regarding the development of how students value (aspects of) education, and the content and definition of what is termed value beliefs/orientations in the respective framework. Table 1 provides a comparison of the two frameworks, which we outline in more detail in the following. First of all, we would like to note that the terminology differs across the two frameworks. The SEVT refers to values as *value beliefs*, or task

Table 1 Similarities and Differences Between SEVT and VoE

	SEVT	VoE
Differences		
Research discipline	Educational psychology	Sociology of education
Unit of interest	Academic task, often domain-specific (i.e., English, mathematics)	Education in general
Variability across time	Situation-specific, highly variable, context dependency	More time stable
Determinates of students' value beliefs/orientations	Important role of socializers	Important role of socializers
Subcomponents of value beliefs/orientations	Utility value, cost, attainment value, intrinsic value	Stimulation, comfort, status, behavioral confirmation, affection
Target question of value beliefs/orientations	"Do I want to do this task and why?"	"How or to what extent can education help me reach my goals/fulfill my needs?"
Similarities		
General aim	Both theories provide reasons why students engage in specific types of academic activities	
Aspects of intrinsic motivation	Both intrinsic value (SEVT) and stimulation (VoE) refer to positive (psychological) arousal gained from engaging in a task or domain, and in education in general, respectively	
Aspects of extrinsic motivation	Utility value (SEVT) and comfort, status, and behavioral confirmation (VoE) as extrinsic aspects of value beliefs	

Note SEVT = Situated expectancy-value theory; VoE = Values of education

values, whereas the VoE concept uses the term *value orientations*. We use these terms interchangeably in the current article.

Both theories focus on reasons why students engage in different academic activities. First, the SEVT and the VoE concept apply similar conceptualizations of value beliefs about aspects of education but at a different level of analysis. The SEVT provides a more situated and task-specific perspective on motivation in achievement-related situations (Eccles & Wigfield, 2020). The VoE concept looks at value orientations that address a broader educational domain: Instead of referring to task-specific values, the framework focuses on education in general, that is, as a resource to reach individual (educational) goals (Scharf et al., 2019).

Second, the two conceptualizations can be contrasted regarding the level on which the differentiation of value beliefs occurs. In the SEVT, the differentiation occurs on the level of task value beliefs, that is, different values that are related to students' engagement in a task are differentiated. According to Eccles and Wigfield (2002), it matters whether students view a task as being inherently enjoyable (intrinsic value), as being important for their identity (attainment value), or as being useful for another purpose (today or in the future; utility value), or whether they perceive negative consequences from engaging in a task (cost). Similarly, the VoE concept proposes several dimensions to distinguish between values regarding education in general that, at first sight, might seem similar to the values that are proposed by the SEVT: stimulation, comfort, status, behavioral confirmation, and affection. These dimensions can be divided into more intrinsic and extrinsic values (Hadjar et al., 2021). Stimulation

and affection represent intrinsically motivated values. Comfort, status, and behavioral confirmation can be described as extrinsic values. According to the VoE concept, values of education focus on value orientations assigned to education that can fulfill different needs (see Scharf et al., 2019).

Therefore, we conclude that both theories provide reasons why students engage in specific types of academic activities but they distinguish between different types of reasons. To highlight what we mean by this, we now describe in more detail how the value components of the two theories differ from each other, starting with the example of intrinsic value and stimulation. In the SEVT (Eccles & Wigfield, 2020), intrinsic value is conceptualized as the value of engaging in a task instead of the value that the task has with regard to reaching other goals. The VoE concept defines the value of stimulation as a goal that can be reached through education (Scharf et al., 2019). This means that an individual can value education for what they gain from it regarding their arousal. These theoretical differences are quite subtle and, due to the intrinsic aspects of motivation that are at the core of both conceptualizations, they describe similar values that students may attach to education and that students consider to be inherent to their current education situation. The same applies to affection in the VoE concept, which comprises the value of social interaction in educational settings.

Looking at the other aspects of value beliefs, we found clearer differences between the two theoretical approaches. Both comfort and status are more extrinsic values that refer to the monetary benefit of education, fulfilling fundamental human needs for physical security and social status in the future (Scharf et al., 2019). They can be described as being closely related to what is understood by utility value in the SEVT (Eccles & Wigfield, 2020), that is, seeing the task or, more broadly, education as a means to an end. For example, students can be motivated to engage in mathematics assignments to get good grades but also to achieve future goals such as getting into college and having a future job that provides financial security and a certain social position (e.g., Hulleman & Harackiewicz, 2009). This conceptualization is in line with the assumptions of the VoE concept, which are that students can value education in general because they understand education as an important prerequisite to having a financially secure occupation (comfort), getting a certain prestigious job, or ensuring the socioeconomic status of their parents (status). However, utility value, as described in the SEVT, does not distinguish between different goals that might be reached in the future, whereas the VoE concept differentiates between comfort and status as two distinct goals. Therefore, we argue that comfort and status might be further differentiations of utility value beliefs regarding education.

Similarly, behavioral confirmation can also be seen as another distinct aspect of the utility value that a task can have: behavioral confirmation, according to the VoE concept (Scharf et al., 2019), reflects an important social aspect of human needs, which is the need for approval from others (e.g., Harter et al., 1998; Rudolph et al., 2005). Thus, as a value orientation regarding education in general, behavioral confirmation can be construed as a more social aspect of the SEVT's utility value. It should be noted that, in contrast to the SEVT, cost is not explicitly reflected in the VoE concept. However, given that the VoE concept is based on a rational choice paradigm, cost-benefit considerations can play an important role in value considerations for each of the value components (Lindenberg & Frey, 1993). Attainment value, refer-

ring to the role that a specific task or domain plays in a person's identity (Eccles & Wigfield, 2020), is also not reflected in the VoE concept.

Beyond these conceptual differences, we would like to highlight that both theoretical perspectives share common conceptualizations of value beliefs. At their core, both theories provide reasons why students engage in specific types of academic activities; however, they do so by focusing on different units of interest: both stimulation and intrinsic value refer to positive (psychological) arousal gained from engaging in a task or domain (SEVT) or education in general (VoE), respectively. Similarly, both theoretical approaches describe extrinsic aspects of motivation: utility value, as well as comfort, status, and behavioral confirmation describe reasons why engaging in an activity, domain, or education in general might have benefits that can be instrumentalized for reaching goals beyond the activity in itself.

In summary, we propose that, in order to integrate these two theoretical perspectives, the unit of interest on which value beliefs are conceptualized can first be broadened: The integrated framework thus combines a perspective on value beliefs as (mainly) task- or domain-specific from the SEVT (e.g., by focusing on specific tasks in mathematics or language subjects) with the perspective described in the VoE concept that considers education in general as a domain to which students can attach more or less value. By extension, students are then posited to have value beliefs toward engaging in situations associated with education. Broadening the scope of the term "value beliefs", we argue that the concept of value beliefs described in the SEVT provides an overarching framework for the specific value beliefs discussed here. Specifically, extending the SEVT framework, we include comfort, status, and behavioral conformation as aspects of value beliefs described in the VoE concept as specifications and differentiations of utility value as defined in the SEVT. Accordingly, the VoE concept provides the opportunity to distinguish between three specific types of utility value, which allows for a more detailed description of what individuals can value education for with regard to its utility.

With this integration, we argue that the VoE concept might help SEVT researchers to describe what the utility of education can entail in more detail. For instance, behavioral confirmation is not an explicit aspect of utility value in the SEVT, but it might be an important reason why some students engage in certain academic tasks but not in others. Similarly, examining the aspect of engaging in activities that align with one's identity, that is, activities of personal importance—described in the SEVT as attainment value—could be useful to better understand why some students value education in general to a greater degree than others do; however, this has not yet been conceptualized within the VoE concept.

Thus, by considering the specific differences and the overarching similarity of how both theories conceptualize value beliefs/orientations and by taking both the individual and the societal perspective of the two disciplines into account, we believe that an integration of both perspectives can provide a more conceptually comprehensive view on value beliefs in academic contexts, compared to one theory taken alone. In the same vein, we argue that integrating both frameworks constitutes an important contribution to the literature of both disciplines.

2 The present study

The main goal of this study was to conceptually integrate theoretical assumptions on what constitutes value beliefs regarding aspects of education from the perspectives of both psychology and sociology. We considered the similarities and differences between the SEVT and the VoE concept and how the two theoretical frameworks might be integrated. On the basis of the described considerations, we further aimed to conduct a descriptive investigation of how both the value beliefs described by the SEVT (in a domain-specific way) and the values orientations conceptualized by the VoE concept (in a domain-general way) relate to the academic achievement of students in upper secondary education. Applying the VoE concept, we examined four of the five value orientations regarding education that are associated with academic achievement, that is, stimulation, comfort, status, and behavioral confirmation. The goal was to attempt a first step towards integrating both theories by investigating whether the approaches of each theory can support each other when it comes to the prediction of student outcomes.

We assumed that the socialized values of education would be well suited to explaining differences in academic achievement. More specifically, we investigated whether there is evidence that the VoE concept has incremental predictive power beyond domain-specific value beliefs (attainment value, intrinsic value, utility value, and cost), considering the significance of the regression coefficients (Research Question [RQ] 1). To further assess the predictive value of integrating the concepts, we also considered the amount of variance explained by the different frameworks (RQ 2). We expected that considering both frameworks simultaneously would allow us to explain substantially more variance than considering just one framework. Following the specificity-matching principle (Brunner et al., 2012), we expected to find that *domain-general concepts* (here: socialized values of education) would explain larger amounts of variance in *domain-general outcomes* such as GPA and that *domain-specific concepts* (here: value beliefs according to SEVT) would explain more variance in *domain-specific outcomes* such as grades and standardized test scores. We would like to note that throughout our paper we summarize the VoE versus SEVT approach under *domain-general* versus *domain-specific*. However, these approaches diverge not only based on this dimension but also in targeting specific constructs such as stimulation, comfort, status, and behavioral confirmation, versus intrinsic value, attainment value, utility value, and costs. Therefore, it is unclear whether significant results are driven solely by the domain generality versus specificity or by the underlying specific constructs[1].

In our analyses, we acknowledge that educational processes can be affected by a variety of different variables. We investigated the robustness of our findings by also considering the role of important covariates that are often used in studies that focus on the predictive value of variables for school achievement to assess the incremental predictive value of the constructs of interest. Among the most commonly used variables are gender, socioeconomic status (SES), and cognitive ability (e.g., Becker & Tetzner, 2021; Hübner et al., 2022; Meyer et

[1] We would like to thank an anonymous reviewer for their constructive discussion regarding this point.

al., 2019). In explorative analyses, we also considered whether the effects of value beliefs would be moderated by these covariates (RQ 3). Further, to examine academic achievement broadly and to test the robustness of our results across different measures and domains, we investigated GPA, grades reflecting teacher expectations and observations, work habits, and standardized test scores as a more objective academic measure (Hübner et al., 2022). We specifically considered the achievement domain, focusing on mathematics and English as a foreign language, to make it possible to generalize our findings across domains. Such a differential approach is necessary given that domain-specific predictors such as expectancy-value beliefs best predict domain-specific outcomes (see above; Brunner et al., 2012).

3 Methods

The present study was based on secondary data analyses with data from the LISA6 study (3,775; see Leucht et al., 2016), which were gathered in upper secondary schools in the German federal state of Schleswig-Holstein. This data set is now publicly available upon request from the Research Data Centre for Education (FDZ Bildung; for further information, see https://www.dipf.de/en/knowledge-resources/research-data-centre-education). The education system under study selects students into an academic or a vocational track in upper secondary education. The academic track represents the traditional *Gymnasium*, which offers a variety of academic disciplines, whereas the vocational track focuses on different applied fields of study (e.g., economics, agriculture, or social sciences) in addition to obligatory subjects (such as languages and mathematics). The *Abitur*, or university entrance qualification, can be obtained in both tracks. In this study, achievement tests were obligatory for all students in Grade 13 in randomly drawn academic-track schools (1,433 students from 17 schools) and all vocational-track schools (2,342 students from 27 schools).

The academic-track schools were randomly drawn in a multiple-step stratification cluster sampling procedure, following established approaches that are used in other large-scale education studies. The sampling was conducted by the Data Processing and Research Center of the International Association for the Evaluation of Educational Achievement in Hamburg. The lower number of vocational-track schools in Schleswig-Holstein made it possible to obtain data from nearly all vocational-track schools (27 out of 29; two were under private administration). Participation in the questionnaires was voluntary.

The research was approved by the Ministry of Education, Science, Research and Culture in Schleswig-Holstein. All students gave their informed consent before they participated in the study and they were informed that adequate steps would be taken to ensure confidentiality (i.e., data collection in schools was conducted anonymously using student IDs that did not enable links to be made to the student's identity).

3.1 Measures

3.1.1 Socialized values of education

We assessed the socialized values of education using 11 items adapted from the TOSCA (Transformation of the secondary school system and academic careers) study that covered the importance of various aspects for educational trajectories subsequent to upper secondary education (Köller et al., 2004). The reliability was mostly satisfactory with $\alpha = 0.70$ (*stimulation*, three items; example item: "It is important to me have a career that involves activities matching my interests"), $\alpha = 0.61$ (*status*, two items; example item: "It is important to me to improve my career chances"), and $\alpha = 0.85$ (*behavioral confirmation*, three items; example item: "It is important to me personally to meet the expectations of my parents"). However, the reliability for *comfort* was less than acceptable, with $\alpha = 0.51$ (three items; example item: "It is important to me to earn a lot of money"). Because of this reliability issue, we used a single-indicator approach to correct for measurement error (Hayduk & Littvay, 2012; Savalei, 2019). In the single-indicator approach, the latent variable is measured by a composite indicator, and the error variance is fixed to the measurement error variance. We set the loading of the composite indicator to one and fixed the measurement error variance to $s^2(1 - \text{Rel.})$, where s^2 is the observed variance of the indicator and Rel. is an estimate of the composite scores' internal reliability (Cronbach's alpha).

3.1.2 Domain-specific academic motivation: expectancy-value beliefs

Dispositional domain-specific task values in mathematics and English were measured with 18 items adapted from the TOSCA-Repeat study (Trautwein et al., 2012). Seven items were used to measure *intrinsic value* (e.g., "If I can learn something new in mathematics/English, I'm prepared to use my free time to do so"), six items to measure *attainment value* (e.g., "Mathematics/English is important to me personally"), and three to measure *utility value* (e.g., "Good grades in mathematics/English can be of great value to me later"). *Cost* was measured with two items (e.g., "In mathematics/English I would have to invest a lot of time to get a good grade"). All scales exhibited acceptable to good internal consistency ($\alpha = 0.67$–0.90).

3.1.3 School achievement

3.1.3.1 Report card grades Domain-specific end-of-the-year report card grades (Grade 13; mathematics and English) were collected via school administration lists. Report card grades in upper secondary school in Germany range from zero to 15 points. Higher values indicate better grades. Grade point average (GPA) was collected from school administrations at the end of the school year.

3.1.3.2 Standardized tests Mathematics achievement was measured with a test from the National Educational Panel Study (NEPS; 20 items). The test assesses mathematics competencies based on the literacy concept and covers the content areas

of both lower and upper secondary levels (Neumann et al., 2013). In line with the NEPS framework, the test's major aim is to cover the literacy aspect of mathematical competence relevant for future life. Thus, tasks include mathematical concepts and procedures embedded in everyday life contexts that are typical for a particular age group and applicable across the lifespan. The quality and appropriateness of the items were ensured by extensive pilot studies conducted by the NEPS team (see Neumann et al., 2013). English achievement was measured with listening and reading comprehension tests, using a subset of items from the German National Assessment. This assessment was designed to monitor the implementation of educational standards in Germany (see Köller et al., 2010) and therefore assess competencies covered by national curricula for the English language classroom. Previous studies have shown the reliability and validity of this test; the results can be linked to similar standardized tests such as PISA (Programme for International Student Assessment; see Fleckenstein et al., 2016).

3.1.4 Control variables

Information on the gender of participants was collected from school administrations. SES was measured by the parents' occupational status. This was obtained in a student questionnaire to compute parents' position on the Highest International Socio-Economic Index of Occupational Status (Ganzeboom et al., 1992). General cognitive ability was assessed using the verbal and figural reasoning subscales of the Cognitive Abilities Test (KFT4-12R; Heller & Perleth, 2000).

3.2 Statistical analyses

All analyses were conducted in M*plus* (Version 8; Muthén & Muthén, 1998, 2018) with *z*-standardized indicators to enhance the interpretability of our findings. We did not standardize dichotomous items (i.e., gender). To address our main research question, we used a single-indicator approach (to correct for measurement error in the values of education, see above; Hayduk & Littvay, 2012; Savalei, 2019) in a multiple regression framework. As students were nested in schools, we estimated cluster-robust standard errors to control for this dependency in our data (see Muthén & Satorra, 1995). Specifically, we conducted multiple regression analyses, which considered different sets of predictors, to investigate the predictive value of variables on achievement in mathematics and English using the different achievement indicators in the same model (i.e., grades, test scores, and GPA). We investigated models with three different sets of predictors and covariates. First, we considered the socialized values of education (M1a) and domain-specific value beliefs (M1b) individually. Second, we investigated the socialized values and domain-specific values simultaneously in M2. Third, to conduct our robustness checks, we added covariates (i.e., cognitive ability, SES, and gender) in M3. We considered the statistical significance of each of the different coefficients in the regression models and the amount of the overall variance explained to assess whether a set of predictors contributed to explaining the outcome measure, after controlling for the respective set of covariates. Additionally, to assess whether the VoE concept explained differences

in achievement over and above domain-specific value beliefs, we also considered differences in the amount of explained variance when comparing the models with different sets of predictors. Further, in explorative analyses, we investigated whether the effects of value beliefs were moderated by the covariates (cognitive ability, SES, and gender). The syntax for all the analyses can be found at OSF under: https://osf.io/9p4cw/.

3.3 Missing values

We dealt with missing values by using full information maximum likelihood (FIML) estimation (e.g., Enders, 2010; Graham, 2009). The amount of missing data ranged from zero to 60% per construct. Detailed information on the amount of missing data for each variable can be found in Supplement Table 2. To assess the role of missing values, we also investigated the selectivity of the sample regarding the missing values on the socialized value constructs (see Supplement Table 3); we found an indication of a small positive selection bias. Prior research has suggested that, even if data are not missing at random, FIML achieves superior results compared to traditional missing data techniques such as listwise deletion (e.g., Newman, 2003).

4 Results

We first report the predictive value of the motivational concepts investigated, considering the significance of the coefficients from the regression models with different sets of predictors. Here, we will first report our findings on the predictive value of the VoE concept, second, on the predictive value of the SEVT's domain-specific value beliefs, and, third, on the combined predictive value. Then, we will assess the amount of variance explained by the different sets of predictors, comparing domain-specific and domain-general outcomes.

4.1 The predictive value of motivational concepts (RQ 1)

First, we focused on how the dimensions of the VoE concept that we measured in this study (i.e., stimulation, comfort, status, and behavioral confirmation) related to students' achievement outcomes in English and mathematics and to their final GPA. For English grades, we found positive coefficients for stimulation and behavioral confirmation. For English test scores, we found a significant positive coefficient for stimulation. For mathematics grades, we found positive associations with status and negative associations with comfort, as well as a positive association with stimulation. For mathematics test scores, we found a positive association with status and a negative coefficient for comfort. For GPA, we found positive associations with stimulation and behavioral confirmation. For the full results, see models M1a in Tables 2 and 3.

Second, we investigated the associations of domain-specific value beliefs (M1b). For English grades, we found positive associations with attainment value, intrinsic value, and utility value, as well as negative associations with cost. For mathematics grades, we found the same pattern, but associations with attainment value were

Table 2 Results from Regression Models Predicting Academic Achievement (English)

	Grades				Test Scores				GPA			
	M1a	M1b	M2	M3	M1a	M1b	M2	M3	M1a	M1b	M2	M3
Stimulation	.22***		.09**	.04	.21***		.10**	.07*	.23***		.18***	.15***
	(.04)		(.03)	(.03)	(.04)		(.03)	(.03)	(.04)		(.04)	(.04)
Comfort	−.10		.02	.09	−.18		−.10	.08	−.25		−.21	−.13
	(.15)		(.12)	(.11)	(.15)		(.14)	(.12)	(.15)		(.15)	(.14)
Status	−.07		−.12	−.13	−.07		−.10	−.20	.09		.06	.03
	(.14)		(.12)	(.10)	(.15)		(.13)	(.11)	(.14)		(.14)	(.13)
Behavioral conf.	.14***		.06	.06*	.06		.00	.02	.12**		.09*	.10*
	(.04)		(.03)	(.03)	(.03)		(.03)	(.03)	(.04)		(.04)	(.04)
Intrinsic value		.09*	.11*	.15***		−.02	−.02	.08*		−.13**	−.12**	−.06
		(.04)	(.04)	(.04)		(.04)	(.04)	(.04)		(.04)	(.05)	(.05)
Attainment value		.21***	.19***	.09*		.20***	.21***	.15***		.15**	.12*	.09
		(.05)	(.05)	(.05)		(.05)	(.05)	(.05)		(.05)	(.06)	(.06)
Utility value		.09**	.10**	.07*		.10**	.12**	.08*		.13***	.11**	.09*
		(.03)	(.04)	(.03)		(.04)	(.04)	(.04)		(.04)	(.04)	(.04)
Cost		−.38***	−.36***	−.28***		−.39***	−.35***	−.29***		−.12***	−.10***	−.06*
		(.02)	(.02)	(.02)		(.03´)	(.03)	(.02)		(.03)	(.03)	(.03)
Cognitive ability				.13***				.47***				.27***
				(.02)				(.02)				(.03)
SES				.39***				.05				−.21***
				(.03)				(.03)				(.03)
Gender				−.04*				.01				−.02
				(.02)				(.02)				(.02)
R^2	.06	.39	.40	.55	.06	.29	.32	.54	.06	.06	.09	.16

Note Behavioral conf. = behavioral confirmation; SES=Socioeconomic status, Gender (2=male, 1=female). Domain-specific values were assessed for English as a foreign language. GPA was recoded with higher values representing higher achievement. We report standardized regression coefficients as well as standard errors in parenthesis

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

Table 3 Results from Regression Models Predicting Academic Achievement (Mathematics)

	Grades				Test Scores				GPA			
	M1a	M1b	M2	M3	M1a	M1b	M2	M3	M1a	M1b	M2	M3
Stimulation	.09*		.14***	.06*	.03		.07*	.06*	.23***		.25***	.21***
	(.04)		(.03)	(.03)	(.04)		(.03)	(.03)	(.04)		(.04)	(.04)
Comfort	−.37*		−.06	.01	−.43**		−.28	−.05	−.25		−.10	−.05
	(.16)		(.14)	(.12)	(.23)		(.15)	(.10)	(.15)		(.16)	(.16)
Status	.32*		−.03	−.04	.33*		.01	.02	.09		−.08	−.07
	(.15)		(.14)	(.12)	(.15)		(.15)	(.10)	(.14)		(.16)	(.16)
Behavioral conf.	.08		.07**	.05	−.04		−.05	.02	.12**		.12***	.12**
	(.05)		(.03)	(.03)	(.04)		(.03)	(.03)	(.04)		(.04)	(.04)
Intrinsic value		.19*	.20*	.20*		.11	.06	.17*		.01	.04	.07
		(.08)	(.10)	(.08)		(.09)	(.10)	(.07)		(.08)	(.10)	(.10)
Attainment value		.05	.02	−.02		−.03	.01	−.17		.13	.07	.02
		(.10)	(.12)	(.10)		(.11)	(.14)	(.09)		(.11)	(.13)	(.13)
Utility value		.13*	.15*	.13*		.23***	.26***	.17**		.03	.07	.06
		(.05)	(.07)	(.06)		(.05)	(.08)	(.05)		(.06)	(.08)	(.08)
Cost		−.34***	−.35***	−.27***		−.26***	−.24***	−.14****		−.19***	−.21***	−.17***
		(.03)	(.03)	(.02)		(.03)	(.03)	(.02)		(.03)	(.03)	(.03)
Cognitive ability				.11***				.59***				.21***
				(.02)				(.01)				(.03)
SES				.37***				.06**				−.15***
				(.03)				(.02)				(.03)
Gender				−.11***				.35***				−.04
				(.02)				(.01)				(.03)
R^2	.04	.35	.37	.49	.05	.21	.24	.73	.06	.10	.16	.20

Note Behavioral conf. = behavioral confirmation; SES=Socioeconomic status, Gender (2=male, 1=female). Domain-specific values were assessed for English as a foreign language. GPA was recoded with higher values representing higher achievement. We report standardized regression coefficients as well as standard errors in parenthesis

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

nonsignificant. For English test scores, we found positive associations with attainment value and utility value and negative associations with cost. For mathematics test scores, we found positive associations with utility value and negative associations with cost. When using domain-specific value beliefs to predict GPA, we found negative associations between intrinsic value in English and GPA. The other coefficients showed positive associations for attainment value and utility value, and negative associations for cost. For the associations of domain-specific value beliefs in mathematics with GPA, we found negative associations between cost in mathematics and GPA.

Third, we investigated the combined predictive validity of domain-specific and domain-general value beliefs by including both sets of predictors (M2). For English grades, we found incremental positive associations of stimulation beyond domain-specific value beliefs. For mathematics grades, we found incremental positive associations of stimulation and behavioral confirmation beyond domain-specific value beliefs. For test scores, we found incremental positive associations of stimulation in both domains. For GPA, in both models (i.e., when including either mathematics or English value beliefs), we found incremental positive associations with stimulation and behavioral confirmation beyond the domain-specific value beliefs. The associations of domain-specific value beliefs we had found in the individual model remained consistent in the combined model for all outcomes.

As described above, we investigated the robustness of our results by repeating our analyses with the full model (M3), including cognitive ability, SES, and gender as potentially relevant covariates. Within these robustness checks, the pattern remained largely similar across all models. However, there were some differences in significance across the models, which is why we chose to interpret only those coefficients that showed a stable pattern across at least two of the different models. The stable results across the different models for VoE and SEVT value beliefs are displayed in Fig. 1. The results show that the positive associations of stimulation with achievement were relatively consistent across all outcomes and models. Further, behavioral confirmation had consistently positive coefficients for English grades and GPA.

For domain-specific value beliefs, we found relatively consistent associations of utility value across all models and outcomes, except for mathematics utility value on GPA. Associations of intrinsic value were consistent for grades in both domains, but not for test scores and not for mathematics intrinsic value on GPA. Cost showed the most consistent (negative) associations across all models and outcomes. Attainment value had consistent associations with English, but its coefficients were nonsignificant in mathematics.

4.2 Comparing the amount of explained Variance for domain-specific and domain-general outcomes (RQ 2)

As described in The Present Study section, we expected that the VoE concept would explain more variance in GPA than in domain-specific outcomes and that SEVT value beliefs would explain more variance in domain-specific outcomes than in GPA. An overview of the results of our analyses can be found in Table 4. Domain-specific value beliefs explained more variance in domain-specific achievement (consistently

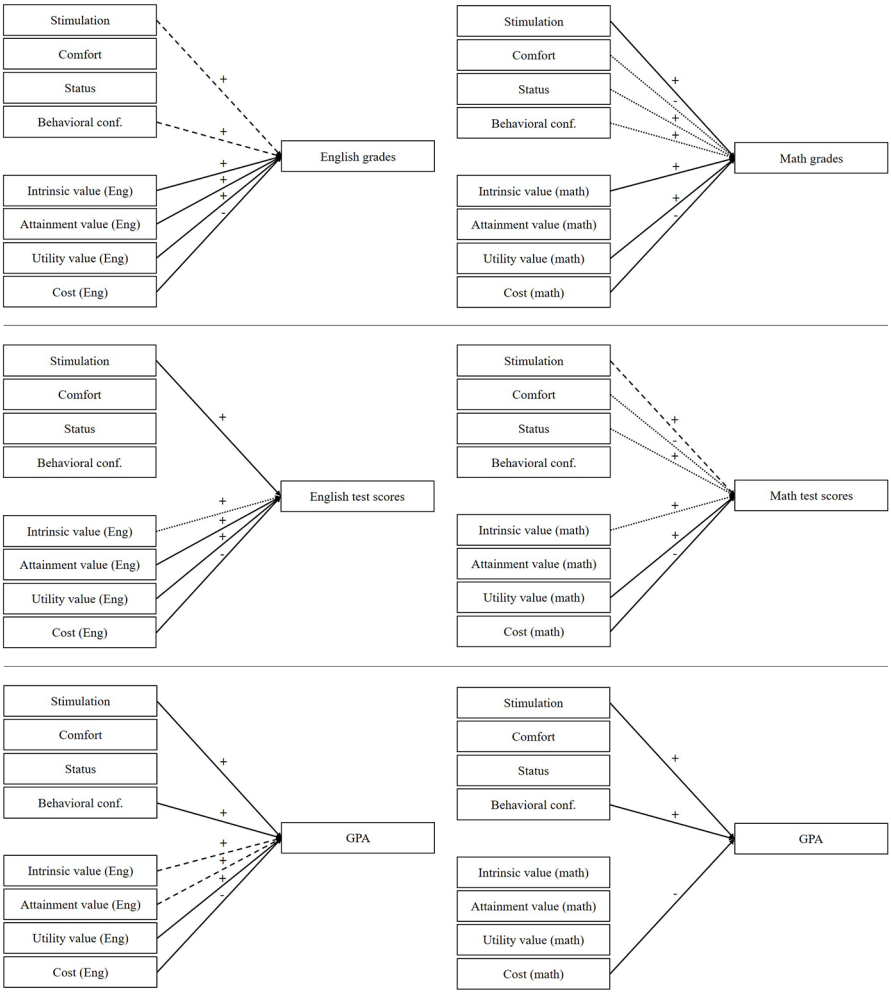

Fig. 1 Overview of Main Results. *Note* The figure displays the main results across the different models, that is, which coefficients were significant across the models with different sets of predictors. To illustrate the robustness of the findings, coefficients with statistically significant associations across all models are displayed with a black line, coefficients that were statistically significant across two of the three models are displayed with a dashed black line, and coefficients that were significant in one model are displayed with a dotted black line. Covariates (cognitive ability, SES, and gender) were included in the models but are not displayed in the figure for reasons of conciseness.

across measures and domains). For GPA, we found that both concepts only predicted a small amount of variance, that the different value beliefs explained a similar amount of variance when considering value beliefs in English as a domain, and that, when considering mathematics, the difference between domain-general and domain-specific values was not as large as for the domain-specific outcomes. We considered the change in explained variance when combining the constructs from both theoretical approaches and found increases in the R^2 ranges from $\Delta R^2 = 0.01–0.03$ for domain-

Table 4 *Overview of Explained Variance for the Different Outcomes and Domains Across the Different Sets of Value Beliefs as Predictors*

	Grades		Test scores		GPA	
	English	Mathematics	English	Mathematics	English	Mathematics
M1a: VoE/domain-general	0.06	0.04	0.06	0.05	0.06	0.06
M1b: SEVT/domain-specific	0.39	0.35	0.29	0.21	0.06	0.10
M2: combined predictive value	0.40	0.37	0.32	0.24	0.09	0.16
Amount of explained variance	+ Domain-specific value beliefs explained more variance than VoE	+ Domain-specific value beliefs explained more variance than VoE	+ Domain-specific value beliefs explained more variance than VoE	+ Domain-specific value beliefs explained more variance than VoE	(+) VoE did not explain more variance than domain-specific beliefs, but the amount of variance explained was similar	(+) VoE did not explain more variance than domain-specific beliefs, but the difference between the amount of variance explained in domain-general outcomes by domain-specific value beliefs was smaller compared to the domain-specific outcomes

Note + = results were in support of our assumptions, (+) results were partly in support of our assumptions.

specific outcomes to $\Delta R^2 = 0.03–0.06$ for GPA. This highlights that the incremental variance explained by the VoE concept might be more relevant for domain-general outcomes.

4.3 Explorative moderator analyses (RQ 3)

To better understand whether the pattern of results applied to different groups of students similarly, we performed explorative moderator analyses. To do this, we investigated interaction effects between the different value beliefs and central covariates (i.e., cognitive ability, SES, and gender) on the respective outcomes. Due to the large number of tests per model (8 per model and covariate), we adjusted the alpha error levels using Bonferroni correction and only considered coefficients as statistically significant at the $\alpha = 0.00625$ level. An overview of the different coefficients for the interaction terms can be found in Table 4 in the supplementary materials.

Overall, the pattern of interaction effects of *cognitive ability with VoE* differed across the achievement measures, showing relatively stable interaction effects for stimulation and domain-specific values on grades and GPA, as well as for behavioral confirmation on GPA. This pattern suggests that, for students with higher cognitive ability, the association between stimulation/behavioral confirmation and achievement outcomes was stronger than for students with lower cognitive ability (and vice versa). Overall, the pattern of interaction effects of *cognitive ability with domain-specific value beliefs* was rather stable for grades in both domains and for GPA when considering English value beliefs.

For *SES and value beliefs* we found mixed results: Regarding the interaction effects of *SES and VoE*, we found relatively stable interactions with stimulation and comfort across the different outcomes (5/6 significant coefficients, respectively). For status and behavioral confirmation, the pattern was less consistent but also showed mainly significant negative interactions between SES and status/behavioral confirmation, especially when considering mathematics outcomes and GPA. This suggests that having high VoE could help students compensate for low SES regarding their achievement outcomes, especially in mathematics and for GPA. However, note that the pattern was different for behavioral confirmation on mathematics test scores, suggesting a synergistic interaction. For the interaction effects of *SES with domain-specific value beliefs*, we found consistent effects for GPA and mathematics test scores across all aspects of domain-specific value beliefs. Notably, the direction of effects was negative in mathematics (positive for cost), and positive in English (negative for cost). This suggests that students with higher SES benefited more from having positive English value beliefs regarding their GPA outcomes, and students with lower SES could compensate by having high value beliefs in mathematics regarding their mathematics test scores and GPA outcomes.

For the interactions of *value beliefs and gender*, we found no significant coefficients. This indicates that there was no evidence that the associations between value beliefs and achievement outcomes differed between male and female students.

5 Discussion

Educational research often refers to the subjective values assigned to aspects of education. Theoretical frameworks from multiple disciplines aim to better describe why some students are more motivated in school than others, which can help to explain differences in academic behavior and achievement. In the current study, we followed an interdisciplinary approach that aimed to integrate sociological and psychological views on value beliefs to investigate how they relate to academic success in upper secondary education. In the empirical part of the investigation, we focused on the predictive value of socialized values of education (i.e., stimulation, comfort, status, and behavioral confirmation: four components of the VoE concept; Scharf et al., 2019) and of domain-specific value beliefs based on the SEVT (i.e., intrinsic value, attainment value, utility value, and cost; Eccles & Wigfield, 2020) while considering other established predictors of achievement as covariates (i.e., cognitive ability, gender, and SES).

To sum up our main results, regarding the predictive value of the VoE concept, and addressing RQ 1, we found that stimulation and behavioral confirmation had predictive value beyond domain-specific value beliefs for GPA and grades in English. Stimulation was also related to grades in mathematics and to standardized test scores in English and mathematics. Regarding the amount of variance explained by VoE and the SEVT as sets of predictors, and addressing RQ 2, we found that domain-specific value beliefs explained more variance than VoE in domain-specific achievement measures. This was in line with our assumptions. Further, we found that VoE did not explain more variance than domain-specific beliefs in domain-general outcomes, but the difference between the amount of variance explained by domain-specific value beliefs in domain-general outcomes was smaller compared to the domain-specific outcomes (mathematics) or was similar (English) for domain-specific and domain-general predictors. This was partly in line with our assumption that the amount of variance explained by VoE would be larger for domain-general compared to domain-specific outcomes. In summary, our findings suggest that some dimensions of the VoE concept might explain small amounts of incremental variance beyond domain-specific value beliefs.

We will now discuss the implications of our proposed integration of the two theoretical frameworks and how such an interdisciplinary perspective on value beliefs might benefit further research. On the basis of our considerations and our empirical findings, this study has two main outcomes:

First, we highlighted the distinction between the two perspectives, namely, that the SEVT addresses more domain-specific tasks as aspects of education and the VoE concept addresses the more general value associated with education. On the basis of this distinction, we combined these two perspectives in our empirical investigation. Our findings showed that the values in both conceptualizations and the according levels of specificity (domain-specific tasks/education in general) can contribute to explaining differences in achievement outcomes, depending on the domain-specificity of the outcome. Specifically, we found that students who valued education for stimulation and behavioral confirmation had a higher GPA at the end of upper secondary school. For domain-specific achievement, we also found relatively consistent positive effects

of stimulation, even beyond domain-specific value beliefs and covariates. This finding highlights that intrinsic motivation to engage in a school context is beneficial for students even beyond their domain-specific value beliefs. This pattern of findings might suggest that fostering the general value of education by enhancing the extent to which stimulation is perceived by students in academic situations in addition to domain-specific value beliefs might also be related to increased student achievement. However, since our findings are purely correlational and cannot be interpreted causally (Hübner et al., 2023), experiments would be necessary to validate such practical implications. Specifically, to investigate this potential implication, intervention studies targeting values of education specifically would have to be evaluated in randomized controlled trials.

Second, and in light of this finding, we believe that integrating conceptualizations of values based on the VoE concept into the SEVT can provide new directions for utility value intervention research. A lot of important research has been conducted from an SEVT perspective, focusing on how utility value beliefs can be targeted by short interventions that aim to help students see value in their academic tasks, often in STEM domains (for overviews, see Lazowski & Hulleman, 2016; Rosenzweig et al., 2022). Such interventions can be helpful, especially in reducing socialized gaps: For example, in the context of the SEVT, utility value interventions were particularly successful in improving first-generation students' performance because they managed to reduce the achievement gap between those students and students from the majority group in the STEM domain (Harackiewicz et al., 2016). Suggestions have been made that motivation could be fostered by targeting the other value belief components of the SEVT (see Rosenzweig et al., 2022) but, so far, educational researchers have largely focused on utility value as "an ideal target for interventions to improve student motivation and achievement" (Priniski et al., 2019, p. 4).

On the basis of our results, we argue that it might be worthwhile to use targeted interventions that focus on education more broadly. Such interventions could benefit students by helping them see how education can be valuable to them and increasing their interest in school-related tasks even in a domain-general context. This could be especially relevant for students who come from social backgrounds where less emphasis is placed on the value of education. Such interventions could then reduce educational inequalities that are induced by social status and upbringing. By integrating the approaches of the two disciplines, the current study provides an extension of existing theoretical perspectives that might be useful for the development of new motivation interventions that address the value of education from another perspective. For example, behavioral confirmation is not an explicit aspect of utility value in the SEVT, but it might be an important reason why some students engage in some academic tasks but not in others. Similarly, investigating how engaging in activities that align with one's identity, that is, activities of personal importance—described in the SEVT as attainment value—could help to better determine why some people value education in general to a greater degree than others, but this is not conceptualized within the VoE concept.

Regarding our results, it is important to stress that especially stimulation and behavioral confirmation emerged as relevant predictors, whereas comfort and status did not predict achievement outcomes beyond domain-specific value beliefs in our

study. However, it should be noted that the sample only consisted of upper secondary school students: this means that all of the participating students were part of a selective group that stayed in school voluntarily after completing lower secondary education, which suggests that they might have had a higher value for education in general as compared to students who chose to leave school after completing lower secondary education. This selectivity most likely affected our results, which is why our findings need to be replicated in a more general population of younger students. However, if the values of the VoE concept are indeed an important predictor of academic behavior and achievement, we expect that, in more diverse samples, these values will play a greater role in predicting academic achievement, given the greater natural variance between students. Further, even though some of the VoE dimensions did not predict achievement in this study, it is possible that status, comfort, and behavioral confirmation (as possible differentiations of the utility of education) could explain students' achievement-related choices (Hadjar et al., 2021). This could be relevant as, for example, even students who perform similarly in an academic domain might opt for or against a career in STEM, and there is a need to better understand why even high-performing students do not choose STEM careers and what can be done to recruit students (especially underserved students) in these fields. Future research should explore these potential benefits of the VoE concept.

Regarding the interpretation of our findings, it should be noted that the VoE concept refers to which aspects of education students value and what they believe education can help them achieve, regarding their goals. This perspective needs to be distinguished from a needs-fulfillment perspective (e.g., Ryan & Deci, 2000), which might focus on the extent to which students' fundamental needs are fulfilled in their current school situation, for example, how they feel during classes, whether they feel supported by their teacher and peers, whether they feel that the classes are stimulating to them, whether they feel comfortable during class due to physical circumstances such as heat, food, etc. However, in this study, we did not examine students' current situation in school but, instead, investigated the extent to which students' value of education (as a way to fulfill their needs or reach their goals) related to their school achievement. The expectation of how valuable education is in fulfilling students' needs and the extent to which students' needs are actually fulfilled in the current situation can differ to a great degree, which is why we cannot draw any conclusions about how students' expectations regarding the value of education were fulfilled in our study. However, it is plausible to assume that the extent to which students' expectations are fulfilled in the current situation might influence students' expectations of the value of education for their future, which is what we assessed in this study. Future research should consider these assumptions and investigate how current educational circumstances *actually* help students reach their goals and fulfill their needs and not just whether they *believe* that education can generally help them fulfill these needs in the future.

In our investigation, we were not able to address the determinants of the different value beliefs, for example, how students value education for different reasons depending on their social upbringing or the values that parents and teachers (as important socializers) hold. These are questions that need to be addressed within both disciplines and from the respective theoretical perspectives to increase under-

standing of the determinants of value beliefs. In other words, more research is needed that addresses the processes and mechanisms that determine how students think about the importance of education and certain domains depending on their social backgrounds and contexts. Eccles and Wigfield (2020) noted that understanding the broader classroom and school context is important when attempting to increase student motivation. We hope that, with our integrative approach that used perspectives from sociology, we have taken the first step in that direction by incorporating the socialized values that target education more broadly. At the very least, we believe that, with the integrative framework presented in the current article, we have illustrated the potential of an approach that combines perspectives to foster interdisciplinary research on these highly relevant questions. We hope that researchers from both disciplines can see value in our work, as we aimed to bridge differences between both the theory and the terminology of the two disciplines to gain a common understanding of how values of education can be important for students' achievement from different perspectives.

In explorative moderator analyses (RQ 3), we found interesting patterns that suggested that the degree to which students' motivational beliefs relate to their achievement outcomes depends on their cognitive abilities and their socioeconomic background. Generally, the effect sizes of the interactions were small, and they tended to be smaller for cognitive ability than for SES. Overall, the pattern of interaction effects of cognitive ability with the different value beliefs suggests that, for students with higher cognitive ability, the association between value beliefs and achievement outcomes is stronger than for students with lower cognitive ability. Accordingly, our findings indicate that both domain-specific and domain-general value beliefs interact synergistically with cognitive ability: students who have high academic motivation benefit more from their cognitive abilities (or vice versa) than their peers who have lower motivation. For example, this could be explained by different types of learning behavior that results from higher motivation and thus, higher effort: when students are engaged in a subject, they might be able to make better use of the same learning opportunities that require cognitive ability than their peers, and this is reflected in higher achievement outcomes (see Meyer et al., 2024 for a similar pattern of results regarding the interaction of cognitive ability and conscientiousness). This pattern of results highlights the importance of educational value beliefs as they help students engage in behavior that supports them in developing their full academic potential.

For the interaction between SES and value beliefs, we found a more differentiated pattern, suggesting that having high VoE could help students compensate for low SES regarding their achievement outcomes. For domain-specific value beliefs, our findings differed across domains, suggesting that students with higher SES benefited more from having positive English value beliefs regarding their GPA outcomes, but that students with high value beliefs in mathematics could compensate for lower SES regarding their mathematics test scores and GPA outcomes. Finally, across the different value beliefs, for interactions of value beliefs and gender, we found no significant coefficients, indicating that there was no evidence that the association between value beliefs and achievement outcomes differed substantially with gender.

5.1 Limitations

Our study has some limitations that need to be considered when interpreting our results. First, our empirical approach did not fully account for the VoE concept proposed by Scharf et al. (2019). As described above, affection in educational settings is one important dimension of the VoE concept (Hadjar et al., 2021). However, we did not take affection into account here as educational outcomes are not seen to be at the core of this value. Given that the role of emotional needs is well known from other motivation theories (e.g., the self-determination theory; Ryan & Deci, 2020), it might be helpful to consider it more fully in future research that combines motivational constructs across disciplines.

Second, the operationalization of values of education in this study was based on items that refer to trajectories after schooling. Students were asked what was important to them in their future education and careers (Köller et al., 2004). Considering that the students in our sample were about to transition into postsecondary education, this does not appear to be a major limitation. However, our operationalization of the VoE concept was supposed to address the value assigned to education in general, for example, the question of why education—independent of certain pathways—matters to students or not. Moreover, school achievement may be affected by values related to the current learning environment, which is why future research should analyze the role that our conceptualization of values of education plays in educational choices. It should also be noted that the instrument we used to measure comfort in this study had a rather low internal consistency. This is a limitation of the current study. However, we argue that the reasons why this scale is low in internal consistency are situated in the heterogeneity of the construct. Comfort taps into different aspects of psychological circumstances that can play a role in how certain career choices are valued (Scharf et al., 2019). They can relate to the physical aspects of the space and can describe how safe and stable the job is in itself (e.g., no physical danger when working, the monetary outcomes of a certain career, including financial and, accordingly, social security, enabling the individual to provide for a family). These aspects of comfort as a value of education might not be equally important for a particular student, but they still refer to crucial aspects of comfort as an educational value, even if they manifest themselves in different preferences within one student between different items measuring comfort. Thus, we believed it was feasible to use the scale to assess comfort as an educational value in this study.

Further, the population we studied was highly selective compared to the initial student population attending secondary school, that is, it was more homogeneous in regard to social characteristics, achievement levels, and school-related experiences and attitudes, which—in turn—might affect more stable value orientations (Maaz et al., 2008). This has implications for the interpretation of our analyses and may explain why comfort and status—two dimensions that emphasize socioeconomic benefits—appeared to be less important predictors. The correlations that we found in the present study did not support the assumption that comfort and status are associated with parental socioeconomic status.

In addition, a substantial amount of data was missing on the student questionnaire, which might have influenced our results to some degree. To be able to better under-

stand missing data patterns and their potential influence on our results, we carefully investigated the selectivity of the students who took part in the student questionnaire and found that the sample that participated seemed to be a slightly positively selected group of students compared to the students who did not participate in the questionnaire (see Supplement 3). Students who responded to the questionnaire had a higher achievement test score in both English and mathematics, as well as higher mathematics grades and a higher GPA. The effect sizes ranged from $d = 0.08$ to $d = 0.16$, indicating small differences.

Thus, potential biases that might have been introduced due to the high number of missing values and the selectivity of our sample with regard to higher grades need to be considered. However, we addressed these concerns by using FIML (e.g., Enders, 2010; Graham, 2009). Still, our findings do not make it possible to draw conclusions for less selective student populations. It is possible that the selectivity of our sample led to an underestimation of the effect sizes, as the variance in the achievement measures might have been restricted to a certain degree compared to a more representative sample. This reduced variability can make it challenging to detect statistically significant associations between these variables because there might not be enough variation to observe meaningful relationships. This means that reduced variance might have led to an underestimation of how the VoE concepts predict achievement, as more selective students might be more likely to score high on these motivational aspects compared to less selective students. This also applies to the exploratory interaction analyses. More research is needed to understand whether the same pattern would be found in less selective samples.

At the same time, the selectivity of our sample might have led to an overestimation of the findings, as the relationships we found might not apply to less selective student groups. This would mean that, for students with lower achievement, educational values might play a less important role in their educational outcomes. Under these circumstances, it can be challenging to identify the true association of students' value beliefs with achievement outcomes, as value beliefs may not be the primary driver of their high grades. Other factors, such as cognitive ability, prior knowledge, or access to resources, might play a more substantial role. However, as we controlled for relevant covariates such as cognitive ability as a factor closely related to achievement outcomes, we argue that our findings might be (at least to a certain degree) robust to such alternative explanations. Nonetheless, our findings should be interpreted carefully, and they need to be replicated in further research with more heterogeneous samples.

We would like to note again that the test of the predictive value of the theoretical approaches was somewhat confounded with the domain-specificity of the measurement in the data set that we used. As emphasized throughout this article, we refer to the VoE concept as a rather domain-general conceptualization of academic value beliefs, whereas the SEVT includes a rather domain-specific conceptualization. This is a limitation of our study as we could not investigate whether socialized values would also predict achievement outcomes when controlling for value beliefs measured in a domain-general way. On the one hand, due to the theoretical nature of the VoE concept, we think that it would, at least, be very difficult or not possible to operationalize it in a domain-specific way, as it specifically conceptualizes different

reasons why individuals value education, that is, see it as instrumental for their own individual goals. Regarding the SEVT, on the other hand, the idea of conceptualizing value beliefs on the level of education instead of the task level might not be fully in line with how the SEVT conceptualizes value beliefs, especially with the recent emphasis on the situated nature of academic motivation (Eccles & Wigfield, 2020). Even though such a broad conceptualization might be reasonable for specific research questions, we argue that value beliefs are conceptualized by the SEVT as reflecting how students consider a specific task or domain, and the processes of considering a task might differ if the subject of interest is on a very broad level, such as education. Thus, we argue that the conceptualization of the theoretical approaches is, by definition, related to the unit of analysis of the motivational processes they are targeting in the respective theoretical frameworks. At the same time, we acknowledge that this results in a certain degree of confounding that could not be isolated in the present study. Thus, as described above, it is unclear whether significant results were driven solely by the domain generality versus specificity or by the underlying specific constructs. Future studies could develop and validate items that aim to assess domain-specific VoE and in a next step theorize further.

6 Conclusion

We took an interdisciplinary perspective on students' value beliefs regarding aspects of education. We showed how the SEVT as one of the most influential theories in educational psychology can be integrated with the concept of VoE as a sociological perspective that focuses on the instrumental value of education for individuals in a domain-general way. We argue that the VoE concept provides new perspectives on the value beliefs that are described in the SEVT as utility value and that the concepts of comfort, status, and behavioral confirmation might allow us to differentiate between different aspects of utility value. We believe that, based on our theoretical considerations and our empirical findings, future research could benefit from our interdisciplinary perspective, for example, in the field of utility value intervention research.

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Declarations

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