Threat or challenge? Teacher beliefs about gifted students and their relationship to teacher motivation

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ABSTRACT
This study investigated the relationship between teachers’ beliefs about gifted students’ characteristics compared to students with average-ability and the teachers’ motivation (i.e., enthusiasm, self-efficacy). We investigated pre-service teachers’ beliefs and motivational orientations as substantial components of their professional competencies and aimed to make an empirical contribution to the discussion on the professionalization of teachers in gifted education. We expected that beliefs about the gifted would be in line with the dissonance hypothesis assuming they were intellectually strong, but deficient in non-cognitive domains. German (n = 375) and Australian (n = 315) pre-service teachers participated in a between-subjects experimental design that used student vignettes varying in ability and gender. Repeated-measures ANOVAs showed that besides a high intellect, pre-service teachers from both countries associated maladjustment with giftedness and showed lower self-efficacy for teaching the gifted. Results from structural equation modeling indicated that high intelligence ratings when paired with high maladjustment ratings were associated with lower teacher motivation. This result is of high practical relevance as perceived self-efficacy relates to actual teaching behavior in a classroom. Implications for teacher education in gifted education are discussed.

What kinds of competencies do teachers need to be successful in their profession, especially for teaching certain student groups such as gifted and talented students? Numerous researchers have contributed to the concept of teacher competence (e.g., Klieme & Leutner, 2006; Shulman, 1986, 1987; Weinert, 2001). A current multidimensional model of teachers’ professional competencies was developed by Kunter and colleagues (i.e., COACTIV, Cognitive Activation in the Classroom; Kunter et al., 2013; see also Kunter, Frenzel, Nagy, Baumert, & Pekrun, 2011; Kunter et al., 2008). Besides professional knowledge of pedagogy, subject-specific didactics, and self-regulatory abilities to cope with job demands, this model suggests motivational orientations as well as beliefs as substantial components of teachers’ professional competencies (Kunter et al., 2013). The motivational orientations of teachers comprise cognitive components such as self-efficacy and affective components such as enthusiasm, which can be related to actual classroom behavior (Frenzel, Goetz, Lüdtke, Pekrun, & Sutton, 2009; Kunter et al., 2008). Teachers’ beliefs involve subjective theories of teaching and learning as well as subjective theories about students’ characteristics, which play an important role for the interaction with students in the school context (Voss, Kleckmann, Kunter, & Hachfeld, 2013). A case in point is teachers’ subjective theory of gifted students’ characteristics. Previous research revealed that both in-service and pre-service teachers can hold incorrect beliefs about gifted students combining positive attributes of high intellectual ability with social, emotional, or behavioral difficulties (e.g., Baudson & Preckel, 2013, 2016; Preckel, Baudson, Krolak-Schwerdt, & Glock, 2015). Subjective beliefs can negatively affect the expectations that teachers hold and can affect how they behave toward these students. Additionally, beliefs might relate to teachers’ motivation. The present study investigated the relation between teachers’ beliefs and teachers’
motivational orientations with regard to gifted students. Using an experimental vignette approach, we examined the relation of student ability level to pre-service teachers’ beliefs about gifted versus average-ability students’ characteristics, to their motivational orientations for teaching these students, and we examined how beliefs were related to motivational orientations (i.e., self-efficacy and enthusiasm). Previous research in this field was mostly limited to teachers of only one country. This study collected data in two countries (i.e., Australia and Germany) and examined whether we can generalize the findings on beliefs and motivational orientations over country.

**Teachers’ motivational orientations: Self-efficacy and enthusiasm**

When defining teachers’ motivational orientations as a component of their professional competence (Kunter et al., 2013, 2011, 2008; Tschannen-Moran & Woolfolk Hoy, 2001), two vital aspects need to be considered: Teachers’ self-related cognitive perspective, such as self-efficacy beliefs and teachers’ intrinsic motivational orientation, also known as enthusiasm.

**Teachers’ self-efficacy**

Self-efficacy relates to individuals’ beliefs of their capabilities to undertake successfully a particular action (Bandura, 1997). The COACTIV model (i.e., Kunter et al., 2013, 2011, 2008) used Bandura’s (1997) theory of self-efficacy for defining teachers’ self-efficacy as teachers’ personal view of how effective and successful they are in dealing with students in learning situations. Moreover, self-efficacy determines the initiation of certain teaching actions and affects the intensity, quality, and duration of effort (Bandura, 1977; Mitchell, 1997). Especially when teaching is strenuous as might be the case with difficult or unmotivated students (Tschannen-Moran & Woolfolk Hoy, 2001), teachers’ self-efficacy beliefs enable teachers to deal with challenging educational settings in an effective and competent way (Schwarzer & Jerusalem, 2002). Empirical findings in educational research support the assumption that high self-efficacy beliefs help teachers to cope with situational demands. For instance, high self-efficacy leads to higher teaching quality, the use of more effective or innovative methods to better meet the needs of their students, a higher level of teachers’ occupational engagement, and less stressful symptoms (e.g., Brouwers & Tomic, 2000; Caprara, Barbaranelli, Borgogni, & Steca, 2003; Morris-Rothschild & Brassard, 2006; Schmitz & Schwarzer, 2000; Skaalvik & Skaalvik, 2007; Wolters & Daugherty, 2007). Moreover, teachers’ self-efficacy is associated with student factors, such as achievement and motivation (Caprara, Barbaranelli, Steca, & Malone, 2006). This emerging body of research suggests that teacher self-efficacy beliefs are a central component of teachers’ professional competence and therefore of high significance for teaching students. However, we do not know any study that has assessed teachers’ self-efficacy for teaching gifted students compared to their self-efficacy to teach average-ability students within an experimental design.

**Teachers’ enthusiasm**

Keller, Woolfolk Hoy, Goetz, and Frenzel (2016) reviewed the research on teacher enthusiasm conducted within the last four decades. They conceptualized teacher enthusiasm as comprising two aspects: displayed and experienced enthusiasm. While displayed enthusiasm refers to behavioral components including nonverbal expressiveness and instructional behavior, experienced enthusiasm refers to teachers’ affective characteristics to which we will refer when using the term teacher enthusiasm. In this manner, experienced enthusiasm is defined as habitual, recurring teaching-related enjoyment and excitement (Keller et al., 2016). Kunter and colleagues (i.e., Kunter et al., 2013, 2011, 2008) applied the approach of experienced enthusiasm to consider the affective component of teacher enthusiasm and further draw a theoretical and empirical distinction between two forms: activity-related (i.e., enthusiasm for teaching and interacting with students) and topic-related (i.e., enthusiasm for teaching a subject). This conceptualization might be relatively new, but it has been used in further investigations (e.g., Decker, Kunter, & Voss, 2015; Hachfeld,
Hahn, Schroeder, Anders, & Kunter, 2015; Hachfeld, Schroeder, Anders, Hahn, & Kunter, 2012; Keller, Goetz, Becker, Morger, & Hensley, 2014; Richter et al., 2013).

Kunter and colleagues (i.e., Kunter et al., 2013, 2011, 2008) considered teacher enthusiasm as part of teachers’ professional competence, which defines high-quality teaching and has an impact on student outcomes as it fosters students’ level of interest, learning, and motivation. In this manner, empirical studies suggested that experienced enthusiasm serves as a precursor of teachers’ displayed behavior in the classroom as it can motivate behavior (Frenzel et al., 2009; Kunter et al., 2008). According to Kunter and Holzberger (2014), teachers spend greater effort and resolution on teaching if they perceive their actions as valuable and important. Thus enthusiasm is one cause of effective teaching (Brophy & Good, 1986). Especially enthusiasm for teaching and interacting with students, rather than enthusiasm for a subject, seems to be a crucial factor for student achievement and motivation (Kunter et al., 2008). However, we do not know any study that has assessed teachers’ enthusiasm for teaching gifted students compared to their enthusiasm to teach average-ability students.

**Teachers’ beliefs about gifted students**

Beliefs filter how people perceive and interact with the world (e.g., Richardson, 1996). Thus it is not surprising that a teacher’s belief system represents a cognitive component of their professional competence (Fives & Buehl, 2012). A teacher’s belief system is multifaceted, including conceptions, beliefs, attitudes, worldviews, and subjective theories (Calderhead, 1996; Pajares, 1992). Subjective theories, also known as lay theories, are based on people’s individual assumptions including stereotypes, of which people may not always be aware (Preckel et al., 2015).

Within research on subjective theories about gifted students’ characteristics, the disharmony hypothesis (Gallagher, 1990; Neihart, 1999), arising from the mad genius stereotype (Becker, 1978), ascribes overall negative assumptions about non-cognitive characteristics to intellectually highly able persons. People who adhere to the disharmony hypothesis perceive intelligence rather positively; however, they combine giftedness with a perception of low social, emotional, or behavioral competencies. In this manner, the disharmony hypothesis states that the high intelligence comes at a cost, resulting in negative perceptions of non-cognitive characteristics. In two recent studies with German in-service and pre-service teachers, Baudson and Preckel (2013, 2016) found evidence consistent with the disharmony hypothesis, showing teachers’ ambivalent beliefs toward gifted students. First, the researchers found that irrespective of professional experience, both pre-service and in-service teachers perceived gifted students as higher in intellect but as more introverted, less emotionally stable, and less agreeable than average-ability students. Second, gifted students were considered less prosocial and more maladjusted than average-ability students. Preckel et al. (2015) reported comparable findings for implicit measures (i.e., implicit association test and affective priming tasks). Implicit associations and beliefs of pre-service teachers were in line with the disharmony hypothesis—but only for boys. In an Australian study, Carrington and Bailey (2000) asked pre-service teachers to rank hypothetical students in terms of their desirability, and gifted students were ranked lowest. Likewise, Lassig (2009) found negative attitudes toward fostering gifted children as teachers indicated limited support for the main gifted education provisions (ability grouping and acceleration) for Australian in-service teachers. In terms of acceleration, teachers reported concerns regarding social value and social adjustment. However, Lassig (2009) showed that teachers with teacher education in gifted education were more likely to have favorable attitudes toward gifted education provisions than teachers without training. In line with this finding, others have also shown these positive effects of teacher education programs and, moreover, evidence of teacher education on the nature of giftedness (for attitudes toward fostering opinions, see Cashon & Sullenger, 2000; Goodnough, 2001; Gross, 1994; Hansen & Feldhusen, 1994; Pedersen & Kronborg, 2014; Plunkett & Kronborg, 2011). Unlike specific teacher education in gifted education programs, previous research has revealed that
teachers’ beliefs are unrelated to their general degree of professional experience (Baudson & Preckel, 2013, 2016; Lee, Cramond, & Lee, 2004; McCoach & Siegle, 2007). Thus findings for pre-service teachers seem to be generalizable for in-service teachers.

Given the widespread adherence to the disharmony hypothesis among teachers, how correct is this hypothesis in light of empirical research findings? While high cognitive ability is a fundamental characteristic of gifted students (e.g., Sternberg & Davidson, 2005), gifted and average-ability students do not differ systematically in their social and emotional abilities and adjustment (e.g., Neihart, Reis, Robinson, & Moon, 2002; Rost, 1993). Moreover, research has shown that giftedness does not relate to psychological disorders (Freund-Braier, 2009; Martin, Burns, & Schonlau, 2009). A comparison of empirical findings for the gifted with teachers’ beliefs about gifted students indicates that those beliefs are negatively biased. However, further research is required to investigate the implications of negative beliefs about gifted students’ characteristics for teachers’ motivation and, thus, behavior in classroom.

Findings on the potential impact of students’ gender on teacher beliefs about the gifted are inconsistent. While some studies found no effect of students’ gender (e.g., Baudson & Preckel, 2013), others have shown gender differences in teacher judgments and attitudes with more positive ratings of social-emotional components for gifted girls than for gifted boys. For instance, Busse, Dahme, Wagner, and Wieczorkowski (1986a, 1986b) showed that teachers judged gifted boys as more self-centered. Endepohls-Ulpe (2004) found ratings of social competence and integration that are more favorable for gifted girls than boys. Preckel et al. (2015) found implicit associations of intellectual strength and maladjustment for boys only. Matheis, Keller, Kronborg, Schmitt, and Preckel (2018) investigated the interaction effects of teachers’ stereotypes about giftedness and gender. In this manner, gender stereotypes are beliefs about differences between girls and boys. While being a girl is associated with communion, being a boy is linked with agency (Deaux & LaFrance, 1998), and girls are perceived as more compliant and males as more disruptive, less mature, and less diligent (Jones & Myhill, 2004). In addition to disharmony beliefs (highly intelligent but maladjusted), Matheis et al. (2018) found “typical” gender stereotypes. That is, male students were perceived as less socially and emotionally competent and less adjusted than female students, which is very much in line with the “compliant girl” stereotype (Jones & Myhill, 2004). Moreover, adjustment of girls with average ability was perceived as most favorable compared to boys with average ability and gifted students in general. Therefore, Matheis et al. (2018) concluded that for gifted girls and boys, the disharmony belief overrules gender stereotypes, and, consequently, gifted male and female students are perceived as equally more maladjusted compared to average-ability students.

Cross-country comparison

Studies that focused on individual countries provide detailed insights into beliefs about giftedness and gifted education for each country. The phenomenon of ambivalent beliefs seems not to be limited to specific countries. Several studies with pre-service as well as in-service teachers from different countries have found evidence for an overall ambivalent view of the gifted (Australia: Matheis et al., 2018; see also Carrington, 1993; Carrington & Bailey, 2000; Kronborg & Plunkett, 2012; Lassig, 2009; England, Scotland, and Australia: Geake & Gross, 2008; Germany: Baudson & Preckel, 2013, 2016; Korea: Lee et al., 2004; New Zealand: Needham, 2012; Nigeria: Awanbor, 1991; US: Bain, Choate, & Bliss, 2006; Cramond & Martin, 1987; Rizza & Morrison, 2003). However, cross-country comparison studies are rarely conducted in gifted education, especially cross-country studies about teachers’ professional competencies when teaching the gifted, which could address the generalizability of findings over country. Geake and Gross (2008) suggested that cross-cultural comparison studies on beliefs about gifted students would reveal similar findings of negative teacher beliefs for different countries. So far, most cross-country studies have addressed teachers’ beliefs about gifted education; i.e., creating challenging learning opportunities for the gifted, ability grouping, acceleration rather than beliefs about gifted students’ characteristics (see for Australia and England: Larsson, 1990;
Finland and England: Ojanen & Freeman, 1994; Finland, England, and Hong Kong: Tirri, Tallent-Runnels, Adams, Yuen, & Lau, 2002; see also Tallent-Runnels, Tirri, & Adams, 2000). Only few studies compared teachers’ beliefs about students’ characteristics between countries. Busse et al. (1986a, 1986b) asked US and German teachers to rate actual gifted students’ characteristics. In both countries, they found higher ratings in neuroticism and self-centredness for the gifted, but slightly higher ratings given by German teachers. However, in this study, the researchers did not use standardized stimuli (teachers rated students of their own choice) and did not use a control group of average-ability students. Moreover, Geake and Gross (2008) examined teachers’ beliefs about gifted students in England, Scotland, and Australia. Using a semantic differential, they found high cognitive ability, social misfit, and antisocial leadership as the three main characteristics associated with a gifted student. However, this study was not a “classic” cross-country comparison study as the authors used one mixed international sample for their analysis.

It is important to note that none of those cross-country studies tested for measurement invariance over country of their measures. However, measurement invariance is a precondition for ensuring the comparability of findings across countries. Thus the cultural validity of the instruments used in prior studies is at least questionable, and, therefore, the results need to be interpreted with caution.

The current study addresses a cross-country comparison for reason of generalization on the relation of teachers’ professional competencies when teaching gifted students compared to teaching average-ability students. Of note, we ensured measurement invariance of measures before comparing findings over country.

Relations between teachers’ motivational orientations and beliefs about gifted students

Several studies have found teachers’ motivational orientations to be associated with teachers’ belief system. For example, Hachfeld et al. (2012) investigated pre-service teachers’ enthusiasm, self-efficacy, and prejudices toward students with immigrant backgrounds and found a positive correlation of enthusiasm and multicultural beliefs about teaching immigrants. Moreover, findings on attitudes toward inclusive education stressed the association of pre-service teachers’ motivation to engage in inclusive educational provisions and their attitudes toward inclusive education (Hellmich, Görel, & Schwab, 2016).

Regarding gifted education, previous findings on teachers’ motivation (Long & Woolfolk Hoy, 2006; Tschannen-Moran & Woolfolk Hoy, 2001) lead us to the assumption that teachers’ beliefs about gifted students relate to teachers’ motivational orientations. Furthermore, teachers’ self-efficacy has been found to be linked with classroom actions (e.g., Klassen, Tze, Betts, & Gordon, 2011; Muijs & Reynolds, 2002). Enthusiasm for teaching can also relate to classroom characteristics. In this manner, Kunter et al. (2011) found positive correlations for students’ motivation and teachers’ enthusiasm for teaching, whereas students’ disciplinary problems were negatively correlated with teachers’ enthusiasm. Therefore, we conclude that the investigation of the relations between teachers’ beliefs about gifted students’ characteristics and their motivational orientations is of high practical relevance for the professionalization of teachers in gifted education.

The present study: Aims and research questions

Teachers’ beliefs and motivational orientations are important parts of their professional competencies. In the present research, we aimed to investigate the following research questions: Are teachers’ beliefs about students’ characteristics and their motivational orientations for teaching a student affected by students’ ability level (i.e., gifted vs. average-ability)? Are teachers’ beliefs related to teachers’ motivational orientations?

Based on our extensive literature review on teacher beliefs about gifted students, we assumed that students’ ability level would relate to teachers’ ratings of students’ characteristics:

a. Comparing teachers’ ratings of gifted students’ and of average-ability students’ characteristics, we expected that teachers would
adhere to the ambivalence of the disharmony hypothesis, according to which giftedness is associated with high intellectual ability, but at the same time with social, emotional, or behavioral deficits (Lee et al., 2004; McCoach & Siegle, 2007; Needham, 2012; Preckel et al., 2015). That is, we expected higher ratings on all dimensions of the disharmony hypothesis (i.e., intellectual ability, lack of social-emotional ability or maladjustment) for a gifted student as compared to a student with average ability.

b. Given the lack of empirical evidence, we investigated if teachers’ motivational orientations (i.e., enthusiasm and self-efficacy) vary with students’ ability level as a research question without formulating hypotheses.

Teachers’ beliefs are associated with their motivational orientations (Hachfeld et al., 2015, 2012; Hellmich et al., 2016; Tschannen-Moran & Woolfolk Hoy, 2001). Therefore, we investigated how teachers’ beliefs about the gifted are related to teachers’ motivational orientations to teach these students. Given that beliefs in accordance with the disharmony hypothesis comprise positive assumptions (i.e., high intellectual ability) as well as negative assumptions (i.e., lack of social-emotional ability, maladjustment), it might be plausible to assume differential relations between teachers’ beliefs and teachers’ motivational orientations. Previous research has found disciplinary problems in class to be negatively associated with teacher motivation, whereas student motivation for achievement has shown positive associations (Kunter et al., 2011):

a. We investigated if high ratings of students’ intellectual ability are positively associated with teachers’ self-efficacy and enthusiasm for teaching that student and if high ratings of students’ lack of social-emotional ability or maladjustment are negatively related to teachers’ self-efficacy and enthusiasm.

Of note, we investigated our research questions in a sample of pre-service teachers and not in-service teachers. However, prior studies found that beliefs about gifted students do not vary between in-service and pre-service teachers (Baudson & Preckel, 2013; Lee et al., 2004; McCoach & Siegle, 2007).

We used an experimental design (i.e., vignette study), and asked pre-service teachers to rate a (gifted or average ability; female or male) student described in the vignette on three scales capturing the dimensions of the disharmony hypothesis and to rate their motivational orientations for teaching this student. In our analyses, we focused on the effects of the variation of the ability level (i.e., gifted vs. average ability). A distinct hypothesis about the relationship of students’ gender with pre-service teachers’ beliefs about the gifted would be rather vague because research findings are quite heterogeneous. Therefore, we specified no hypothesis but included gender as an independent variable to see if beliefs are consistent for boys and girls. However, given the high theoretical and practical relevance of gender differences, we investigated this issue in more depth in another article (Matheis et al., 2018).

Most studies on teachers’ beliefs about the gifted rely on data from a single country. Thus we conducted a cross-country comparison to substantiate the findings by replication in a convenience sample of Australian and German pre-service teachers. Research on pre-service and in-service teachers’ beliefs about the gifted and their education conducted in Germany (e.g., Baudson & Preckel, 2013, 2016; Busse et al., 1986a) and Australia (e.g., Carrington, 1993; Carrington & Bailey, 2000; Geake & Gross, 2008; Kronborg & Plunkett, 2012; Lassig, 2009) indicated an overall ambivalent view in line with the disharmony hypothesis in both countries. Therefore, we expected to find teacher beliefs about the gifted in line with the disharmony hypothesis in both countries. We always examined the cross-country comparison together with Hypothesis 1a and Research Question 1b and 2.

We ensured that all scales were comparable over countries (i.e., measurement invariant) and applied multigroup structural equation modeling to compare findings over groups. By doing so, we aimed to make a methodologically sound
empirical contribution to the research on the professionalization of teachers in gifted education.

To situate our study and for a better understanding of the nature of our sample, we provide some basic information about the educational settings of pre-service teacher education in Germany and Australia.

**Teacher education in Germany**

German teacher education is divided into two consecutive parts. First, the academic learning phase at university (3.5–4.5 years), and, second, the practical training phase at school (1.5–2 years; Cortina & Thames, 2013). Moreover, strands of secondary teacher education are typically separated according to school type (higher secondary or academic track, Gymnasium; lower secondary or intermediate track, Realschule; vocational track, Hauptschule) with separate academic curricula and a different type of diploma. Pre-service teachers in training for the higher secondary track would typically emphasize content knowledge over pedagogic subjects in comparison to pre-service teachers in the intermediate or vocational track.

**Teacher education in Victoria, Australia**

In Victoria (Australia), university provides three different paths to teacher education. First, pre-service teachers can graduate within four years and obtain a single degree in education. Students do not need a consecutive Master of Education to become an in-service teacher. Second, students can combine their studies in education with a second course: Pre-service teachers study this double-degree course concurrently, in such a manner that university students will graduate after four years with two degrees (e.g., one degree in education and one in science). Third, university students can graduate in a different discipline and follow up on their first degree with a two-year teacher education program (Master of Teaching).

**Method**

**Sample**

The cross-country sample included $N = 690$ pre-service teachers from Germany and Australia. The German sample consisted of $n = 375$ (61.8 % female; age $M = 22.05$ years, $SD = 3.58$) pre-service teachers from the University of Trier and the University of Duisburg-Essen, whereas the Australian pre-service teachers were enrolled at Monash University, Victoria ($n = 315$, 71.3 % female; age $M = 23.52$ years, $SD = 6.21$). Within the German sample, we assessed undergraduate student teachers within the Bachelor of Education courses. In Germany, teachers need to complete their consecutive Master of Education to be in-service, but some are working as a student teacher during their Master of Education courses; hence we included only students within the Bachelor of Education course to ensure comparability with the Australian sample. Pre-service teachers within the Australian sample could be either students within the Bachelor of Education courses ($n = 213$) or students within the Master of Teaching courses ($n = 92$). Students enrolled in the Master of Teaching course have not been in-service yet, but there are no students in a consecutive Master of Education.

**Material**

**Vignettes**

We used a short text or vignette, respectively, as stimulus for teachers’ ratings of a student’s characteristics (see Figure 1) following the approach of

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**Figure 1.** Vignette with condition boy (Michael) described as gifted.
The text described a student in an everyday school situation who first engages in an individual activity (book) and later on in a social activity (asking other students a question who react with a counter question). The situation is open to interpretation and therefore suitable to elicit stereotypes. In particular, the text contained no relevant information about the student’s characteristics besides his or her ability level or gender. By doing so, we reduced possible bias introduced by other information (e.g., student’s socioeconomic status or behaviors) and enforced participants to rely on their subjective beliefs or stereotypes about gifted or average-ability students when rating the student’s characteristics.

Beliefs and motivational orientations

We used a newly created questionnaire, which was developed and piloted within several Bachelor and Master theses (Matheis, 2015; see also Issa, 2016; Rumaniya, 2016; Schmitt, 2016). The questionnaire consists of 21 items rated on a 6-point Likert-scale (1 = *false* and 6 = *true*). It assesses five dimensions. Three dimensions capture beliefs in the context of the disharmony hypothesis (i.e., intellectual ability, lack of social-emotional ability, maladjustment). Two dimensions capture the motivational orientations (i.e., enthusiasm, self-efficacy); items for these dimensions were adapted from a pre-existing questionnaire (Hachfeld et al., 2012). (1) Five items assessed the belief about students’ intellectual ability (“This child is smart; ... obtains good grades; ... is clever; ... is intelligent; ... is competent”). (2) Four items assessed the belief about students’ lack of social-emotional ability (This child lacks social skills; ... is withdrawn; I rate the child’s social-emotional ability rather negatively; I rate the child’s social-emotional ability rather positively [inverted item]). (3) The belief about students’ maladjustment was assessed by four items that describe behavioral or adjustment difficulty (Teaching this child is strenuous; This child is intolerant; This child considers himself/herself superior to everyone else; This child controlling for their beliefs about average-ability students, which might resemble their general beliefs related to students. Further, interpreting ratings of a gifted student relative to ratings of an average-ability student described with the identical text controls for a possible biasing impact of the text.

### Table 1. Internal consistencies (McDonald’s omega), means, and standard deviations of the five dimensions of the questionnaire based on latent factor scores by vignettes and countries.

<table>
<thead>
<tr>
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<th>Germany$^a$</th>
<th></th>
<th>Australia$^b$</th>
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<tr>
<td></td>
<td>Average boy</td>
<td>Gifted boy</td>
<td>Average girl</td>
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<tr>
<td></td>
<td>(n = 97)</td>
<td>(n = 98)</td>
<td>(n = 91)</td>
</tr>
<tr>
<td>$\omega$</td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
<td>$M$ (SD)</td>
</tr>
<tr>
<td>INT</td>
<td>0.81</td>
<td>-0.49 (0.53)</td>
<td>0.89 0.00 (0.69)</td>
</tr>
<tr>
<td>SOE</td>
<td>0.81</td>
<td>-0.11 (0.59)</td>
<td>0.75 0.00 (0.49)</td>
</tr>
<tr>
<td>MAL</td>
<td>0.74</td>
<td>-0.23 (0.54)</td>
<td>0.76 0.00 (0.50)</td>
</tr>
<tr>
<td>ENT</td>
<td>0.87</td>
<td>-0.02 (0.72)</td>
<td>0.85 0.00 (0.62)</td>
</tr>
<tr>
<td>SEL</td>
<td>0.76</td>
<td>0.26 (0.54)</td>
<td>0.64 0.00 (0.33)</td>
</tr>
</tbody>
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Note. $^a\text{German sample size} = 375$. $^b\text{German sample size} = 315$. $\omega =$ McDonald’s omega. INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment; ENT = enthusiasm for teaching the student; SEL = self-efficacy for teaching the student.

Comparable empirical vignette studies (Baudon & Preckel, 2013, 2016). The text described a student in a pre-existing questionnaire (Hachfeld et al., 2012). The vignette was neutral regarding the student’s characteristics under study in a pilot study by demonstrating that participants gave neutral ratings (i.e., used the neutral middle category of a scale) when rating the same student without the information on his ability level (see Appendix A for results). We experimentally manipulated the two factors ability level (gifted vs. average) and gender (girl named Michaela$^a$ (Germany)/Karen (Australia) versus boy named Michael$^b$ (both countries)), resulting in four different experimental conditions or vignette types used in a between-subjects design (that is, one vignette type per participant). By evaluating teachers’ ratings of a gifted student relative to their ratings of an average-ability student in this experiment, we were able to assess their specific beliefs about gifted students while controlling for their beliefs about average-ability students, which might resemble their general beliefs related to students. Further, interpreting ratings of a gifted student relative to ratings of an average-ability student described with the identical text controls for a possible biasing impact of the text.
displays behavioral difficulty). (4) Teachers’ experienced enthusiasm to teach the child was assessed by four items (I would enjoy teaching this child; I think it would be fun to work with this child; I would like to teach this child; I rate this child rather positively). (5) Four items assessed teachers’ perceived self-efficacy to teach the child (I think myself capable to adapt my teaching to the needs of this child; I am confident that I’d be able to provide challenging tasks and support for this child; ...that I can cater for this child’s individual needs; ...that I could spark enthusiasm in this child for the subject I teach.). The reliabilities (McDonald’s omega) and descriptive statistics of the scales for each of these dimensions are given in Table 1.

Demographics
Pre-service teachers indicated their level of experience with gifted students and knowledge on the subject of giftedness on a 5-point Likert-scale (1 = none and 5 = a lot). Further, they reported their age and gender.

Design and procedure
We randomly assigned pre-service teachers to one of the four vignette conditions in each country, which ascribed 71 to 98 pre-service teachers per country to each condition. After reading the vignette, participants started with the questionnaire assessing their beliefs about gifted students as well as their enthusiasm and self-efficacy when teaching that student. Finally, pre-service teachers reported their demographic data. We distributed hard-copy questionnaires as part of pre-service teachers’ regular university classes. The participation was voluntary and took approximately 10 minutes. As the sample size showed fewer participants for the male vignette in Australia, we additionally assessed 46 participants online. A preliminary measurement invariance testing across online and hard-copy samples indicated at least partial scalar measurement invariance (Appendix B; see Data Analyses for further explanations); therefore, latent means of both subgroups were comparable. Hence, we combined data for further analysis.

Preliminary steps
Using the back-translation method (Brislin, 1986), we ensured accuracy of the translation for the vignette and the questionnaire: First, the German questionnaire version was translated into English by the first author. Second, third parties cross-checked the translation, and an Australian researcher (second author; native English speaker) proofread it to account for correct English. Third, an independent third party (native German speaker) back translated the questionnaire into German. In addition, we conducted a pilot study with a group of pre-service teachers at Monash University, Victoria. Wording was further refined to ensure clarity in meaning.

Data analyses
Measurement invariance tests
When comparing groups from different countries or across experimental conditions inter alia vignettes, researchers must ensure that the instrument measures the same psychological construct in all groups (see Milfont & Fischer, 2010). Therefore, the establishment of measurement invariance (MI) is required to produce valid comparisons and meaningful interpretations. We tested the assumption of MI empirically with multigroup confirmatory factor analysis (MGCFA; Jöreskog, 1971; Steenkamp & Baumgartner, 1998) as this approach is typically used to test for cross-country equivalence (Davidov, Meuleman, Cieciuch, Schmidt, & Billiet, 2014). The MGCFA approach compares the less restricted with models that are more restricted by adapting the measurement parameters. Several hierarchically ordered levels of MI can be distinguished (Steenkamp & Baumgartner, 1998): configural, metric, scalar, and strict equivalence. (1) Configural invariance is defined as the same factorial structure. (2) Metric invariance is given when there are equal factor loadings across groups. (3) Scalar invariance is required to compare latent means (Marsh et al., 2010, 2009). It is defined as identical intercepts of items across groups and implies equal difficulties of the items across groups. (4) With strict invariance—also known as error variance invariance (see Milfont & Fischer, 2010)—the comparison of manifest scale means across groups is valid. Of note, not all parameters
need to be equal across groups: Valid comparisons can also be made if some parameters are invariant (Byrne, Shavelson, & Muthén, 1989; Steenkamp & Baumgartner, 1998). This so-called partial MI is supported when parameters of at least one indicator besides the marker indicator are equal across groups. We used a stepwise strategy of testing increasing MI levels against each other. A more restrictive model (higher level of MI) was supported if there were only small changes in the comparative fit index (CFI), i.e., if differences between the CFI of two models are .01 or less (Chen, 2007; Cheung & Rensvold, 2002).

The comparison of factor means across groups is meaningful only if the factor loadings and item intercepts are invariant (Brown, 2015). Thus after establishing (partial) scalar MI (see Results), we used latent factor scores assuming (partial) scalar MI for each of the five dimensions (intellectual ability, lack of social-emotional ability, maladjustment, self-efficacy, enthusiasm) in our main analysis to examine the effect of ability, country, and gender. Therefore, we derived factor scores for each of the five dimensions from MGCFA across all eight groups; i.e., four experimental conditions (Ability × Gender) and country (Germany and Australia). MGCFA does not estimate the absolute values of factor means for each group, but rather the differences in factor means between one reference group and each comparison group (Byrne, 2006). Hence, the factor means of the reference group (i.e., boy/gifted within Germany) were fixed to zero and the factor means of the comparison groups were estimated as free parameters.

Analysis of variance
We investigated our first research question on the relation of students’ ability level with teachers’ ratings of students’ characteristics and their motivational orientations using analyses of variance with IBM SPSS Statistics for Windows, Version 23 (2015). First, we ran the analysis for the cross-country sample including all participants. Second and third, we computed the same analysis for the German and Australian samples separately. We used repeated-measures analysis of variance (ANOVA) to analyze the five dimensions (three scales for students’ characteristics, two motivational scales) as one participant repeatedly rated one vignette on several dimensions of the questionnaire. Thus the ratings of the five dimensions were not independent, an issue that we considered with the

![Figure 2. MGSEM for the four groups (boy/Germany, boy/Australia, girl/Germany, girl/Australia. INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment; ENT = enthusiasm for teaching the student; SEL = self-efficacy for teaching the student.](image-url)
repeated-measures ANOVA. Hence, our dependent variable was one factor with five repeated measures. The two vignette conditions (ability, gender) and teachers’ country were included as between-group independent variables. Following the significant main effects of repeated-measures ANOVAs, we conducted separate univariate ANOVAs for each dimension with students’ ability and gender as well as pre-service teachers’ country as predictors.

**Multigroup structural equation modeling**

For assessing the relation between students’ ability level, teachers’ beliefs, and motivational orientations (see Figure 2), we used regression analysis within a multigroup structural equation model (MGSEM). Certain parameters in MGSEM can be restricted to be equal, while others are allowed to vary across groups. We tested equality and differences of regression parameters across multiple groups for examining whether functional relations between variables in our four groups (boy/Germany, girl/Germany, boy/Australia, girl/Australia) were comparable (Hayduk, 1987). First, we freely estimated the same model within each of the four groups defined on a grouping variable. Second, we performed multiple group comparisons over the four groups to investigate possible differences in regression paths. We tested the significance of the difference of every path coefficient between the class types by Wald confidence intervals (Cheung, 2009). Third, we tested direct and indirect effects of students’ ability level on pre-service teachers’ enthusiasm and perceived self-efficacy via their belief dimensions across the four groups.

For both, measurement invariance testing (MGCFA) and MGSEM, we used the statistical software Mplus 7.4 (Muthén & Muthén, 1998–2015). Considering that the distributions of item scores differed from multivariate normality, we chose a robust maximum likelihood estimation (MLR estimator). When robust estimators for model estimation are used, the model χ² statistics cannot be directly compared (Muthén & Muthén, 1998–2015). Thus we computed scale differences in χ² values for nested model comparisons. We evaluated model fits according to criteria suggested by Hu and Bentler (1999).

**Results**

**Preliminary findings**

**Measurement invariance**

Strict MI across countries and vignettes (i.e., ability and gender) held only for the dimension “lack of social-emotional ability” (difference between the CFI ≤.01 and nonsignificant χ² difference tests; see Appendix C). However, (partial) scalar MI held for all dimensions so that the comparison of latent factor means across countries and vignettes was feasible. Subsequently, we estimated factor scores assuming (partial) scalar MI for each of the five dimensions with MGCFA across all eight groups. We employed the German vignette of a gifted boy as reference group (latent means of zero). Table 1 reports descriptive statistics including means, standard deviations of latent factor scores, and reliabilities (McDonald’s omega; Brunner, Nagy, & Wilhelm, 2012) for the five dimensions of our questionnaire.

**Demographics**

Participants reported little experience with gifted students (Germany: M = 1.99, SD = 0.90; Australia: M = 2.35, SD = 0.96) and little knowledge about the subject of giftedness (Germany: M = 2.22, SD = 0.69; Australia: M = 2.71, SD = 0.82). The Australian sample reported significantly more experience with gifted students, t(644.06) = –4.95, p ≤ .001, and more knowledge about giftedness, t(597.73) = –8.47, p ≤ .001. Neither experience or knowledge nor other demographic variables (i.e., age and gender) correlated highly with the five dimensions of our questionnaire (Table 2; strongest correlation of –.27—that is, maximum of 7% shared variance). Therefore, we did not include these variables in further analysis. Table 2 reports correlations in detail.

**Impact of students’ ability on teachers’ beliefs and motivational orientations**

While examining the impact of students’ ability on teachers’ beliefs (Hypothesis 1a) and motivational orientations (Research Question 1b), we always test for cross-country replicability. Table 3 displays statistical values of repeated-measures and
univariate ANOVAs for the cross-country, German, and Australian samples. Figure 3 illustrates means.

**Intellectual ability**

As expected (Hypothesis 1a), the three separate ANOVAs for cross-country, German, and Australian samples indicated significant main effects of ability. Gifted students received higher intellectual ability ratings than average-ability students (Cross-country: $d = 0.72$, medium effect; Germany: $d = 0.74$, medium effect; Australia: $d = 0.70$, medium effect). For the cross-country sample, a significant main effect for gender was found with lower ratings for boys than for girls ($d = 0.20$, small effect). The significant main effect for country indicated overall higher ratings in Australia than in Germany ($d = 0.40$, small effect). Additionally, the significant interaction of country and gender indicated differences in ratings for boys and girls between countries. In this manner, separate ANOVAs by country showed that gender did affect ratings in Germany only (Germany: $d = 0.31$, small effect; Australia: $d = 0.00$, no effect).

**Lack of social-emotional ability**

Analysis for the cross-country sample yielded a significant main effect for gender with higher ratings for boys than for girls ($d = 0.31$, small effect). Furthermore, country had a significant main effect. German pre-service teachers indicated an overall higher rating than the Australians did ($d = 0.50$, medium effect). Moreover, country and gender interacted significantly. In this manner, separate analysis for countries clarified that only Australian pre-service teachers ascribed a higher lack of social-emotional ability to boys than to girls (Germany: $d = 0.11$, no effect; Australia: $d = 0.53$, medium effect). Against our expectation (Hypothesis 1a), there was no significant main effect of ability (see Table 3).

**Maladjustment**

In line with our expectation (Hypothesis 1a), the three separate ANOVAs for the cross-country sample, German sample, and Australian sample indicated significant main effects of ability. Gifted students were rated as significantly less adjusted compared to students with average ability (Cross-
country: $d = 0.69$, medium effect; Germany: $d = 0.48$, medium effect, Australia: $d = 0.93$, large effect), whereas the significant interaction of country and ability indicated that this difference was greater in the Australian sample. Moreover, the cross-country analysis indicated a significant main effect for gender with higher ratings for boys than for girls ($d = 0.42$, small effect). The

<p>| Table 3. Repeated-measures and univariate analysis of variance for the effects of ability, gender, and country on pre-service teachers’ rating on students’ intellectual ability, lack of social-emotional ability, maladjustment, enthusiasm, and self-efficacy for teaching the student. |</p>
<table>
<thead>
<tr>
<th>Cross-country</th>
<th>Germany</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Repeated-Measures</strong></td>
<td><strong>F(2,62,1781.72) $\eta^2$</strong></td>
<td><strong>F(2,56,946.41) $\eta^2$</strong></td>
</tr>
<tr>
<td>Dimensions (D)</td>
<td>172.66***</td>
<td>27.23***</td>
</tr>
<tr>
<td>D × Ability (A)</td>
<td>45.48***</td>
<td>27.71***</td>
</tr>
<tr>
<td>D × Gender (G)</td>
<td>19.46***</td>
<td>5.06**</td>
</tr>
<tr>
<td>D × Country (C)</td>
<td>50.94***</td>
<td></td>
</tr>
<tr>
<td>D × A × G</td>
<td>2.60</td>
<td>0.83</td>
</tr>
<tr>
<td>D × C × A</td>
<td>1.68</td>
<td></td>
</tr>
<tr>
<td>D × C × G</td>
<td>3.16*</td>
<td></td>
</tr>
<tr>
<td>D × A × G × C</td>
<td>1.39</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Univariate Analysis</th>
<th>Cross-country</th>
<th>Germany</th>
<th>Australia</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>F(1,680) $\eta^2$</strong></td>
<td><strong>F(1,370) $\eta^2$</strong></td>
<td><strong>F(1,310) $\eta^2$</strong></td>
<td></td>
</tr>
<tr>
<td>INT Ability (A)</td>
<td>90.12***</td>
<td>52.79***</td>
<td>38.79***</td>
</tr>
<tr>
<td>Gender (G)</td>
<td>5.33$^*$</td>
<td>10.30**</td>
<td>0.03</td>
</tr>
<tr>
<td>Country (C)</td>
<td>27.02***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A × G</td>
<td>0.57</td>
<td>0.27</td>
<td>0.23</td>
</tr>
<tr>
<td>C × A</td>
<td>0.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C × G</td>
<td>4.29*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A × G × C</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note.** Degrees of freedom ($df$) for repeated ANOVAs were corrected using Greenhouse-Geisser estimates of sphericity; Cross-country: $N = 690$, Mauchly’s $W = .40$, $\chi^2(9) = 628.39$, $p \leq .001$, $\epsilon = .66$; Germany: $N = 375$, Mauchly’s $W = .36$, $\chi^2(9) = 369.71$, $p \leq .001$, $\epsilon = .64$; Australia: $N = 315$, Mauchly’s $W = .36$, $\chi^2(9) = 315.03$, $p \leq .001$, $\epsilon = .64$; INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment; ENT = enthusiasm for teaching the student; SEL = self-efficacy for teaching the student. $^*p \leq .05$. $^{**}p \leq .01$. $^{***}p \leq .001$.  


significant interaction of country and gender and separate country specific ANOVAs showed that differences in ratings between boys and girls were valid for the Australian sample, but not for the German sample (Germany: $d = 0.17$, no effect; Australia: $d = 0.70$, medium effect). The significant interaction of ability and gender within the cross-country sample showed that when a boy or girl was labeled as gifted, both were perceived as having high adjustment problems, whereas average-ability girls received lower maladjustment ratings than average-ability boys (gifted: $d = 0.17$, no effect; average: $d = 0.70$, medium effect). Separate analysis for country showed that this significant interaction effect was valid for Australia only (see Table 3). Moreover, we observed a significant three-way interaction with ability, gender, and country. This interaction showed that gender differences in the Australian sample were found for gifted and average-ability students, whereby gifted boys were rated highest and average-ability girls lowest.

**Enthusiasm**

Analysis of the cross-country sample yielded no significant main effect of ability (Research Question 1b). The significant main effect for gender indicated higher enthusiasm for teaching a girl than for teaching a boy ($d = 0.23$, small effect). Moreover, country yielded a significant main effect with overall higher enthusiasm ratings in Australia ($d = 0.59$, small effect).
medium effect). Furthermore, we observed a significant three-way interaction of ability, gender, and country. Using the results from country-specific ANOVAs, which yielded a significant main effect of gender for Australian pre-service teachers only (\(d = 0.27\), small effect), this interaction showed that in Germany gender was unrelated to enthusiasm ratings for the gifted but was related to enthusiasm ratings for average-ability students (\(d = 0.37\), small effect). In this manner, German pre-service teachers reported comparable enthusiasm for teaching a gifted boy, a gifted girl, and an average-ability boy, but their enthusiasm was highest for teaching an average-ability girl. Opposite to this, Australian pre-service teachers reported lower enthusiasm for teaching boys than for girls (\(d = 0.27\), small effect), but their enthusiasm did not depend on student ability.

**Self-efficacy**

The three separate ANOVAs for the cross-country sample, German sample, and Australian sample indicated significant main effects of ability (Research Question 1b) with higher self-efficacy for teaching an average-ability student than a gifted student (Cross-country: \(d = 0.42\), small effect; Germany: \(d = 0.65\), medium effect; Australia: \(d = 0.32\), small effect). ANOVA with the cross-country sample showed a significant main effect for gender, with higher self-efficacy ratings for teaching girls than boys (\(d = 0.31\), small effect). Country showed a significant main effect indicating that Australian pre-service teachers reported higher self-efficacy than German pre-service teachers did (\(d = 0.87\), large effect). The significant three-way interaction of ability, gender, and country showed that in Australia self-efficacy ratings for teaching gifted girls and average-ability boys were similar (\(d = 0.02\), no effect), whereas ratings for average-ability girls and gifted boys showed a marked difference with more favorable ratings for average-ability girls (\(d = 0.57\), medium effect).

**Teachers’ beliefs and their relation to teachers’ motivational orientations**

To investigate Research Question 2 on relations of teachers’ beliefs with their motivational orientations as well as their cross-country replicability, we performed a MGSEM analysis based on the overall data from the 690 pre-service teachers (see Figure 2). We started by establishing a baseline SEM for each of the four groups separately (i.e., boy/Germany, boy/Australia, girl/Germany, girl/Australia). Reflecting the criteria of Hu and Bentler (1999), we evaluated the fit of the baseline model for all four groups as acceptable (boy/Germany: \(N = 195\), \(\chi^2 = 40.360\), \(df = 30\), CFI = .986, RMSEA = .042, SRMR = .035; boy/Australia: \(N = 152\), \(\chi^2 = 65.075\), \(df = 30\), CFI = .953, RMSEA = .088, SRMR = .035; girl/Germany: \(N = 180\), \(\chi^2 = 76.638\), \(df = 30\), CFI = .936, RMSEA = .093, SRMR = .050; girl/Australia: \(N = 163\), \(\chi^2 = 63.623\), \(df = 30\), CFI = .918, RMSEA = .083, SRMR = .056). Next,

| Table 4. Model regression results for the groups with ability, latent factor scores of student variables (INT, SOE, MAL), and latent teacher variables (ENT, SEL). |
|---|---|---|---|---|
| \(\beta_1\) | \(0.483***\) | \([0.275, 0.690]\) | \(0.453***\) | \([0.243, 0.664]\) |
| \(\beta_2\) | \(0.112\) | \([-0.103, 0.326]\) | \(-0.102\) | \([-0.342, 0.139]\) |
| \(\beta_3\) | \(0.366***\) | \([0.111, 0.620]\) | \(0.174\) | \([-0.085, 0.434]\) |
| \(\beta_4\) | \(0.239***\) | \([0.097, 0.381]\) | \(0.573***\) | \([0.311, 0.835]\) |
| \(\beta_5\) | \(0.445***\) | \([0.272, 0.618]\) | \(0.668***\) | \([0.449, 0.887]\) |
| \(\beta_6\) | \(0.216\) | \([-0.044, 0.477]\) | \(0.005\) | \([-0.391, 0.402]\) |
| \(\beta_7\) | \(0.079\) | \([-0.137, 0.295]\) | \(-0.063\) | \([-0.314, 0.189]\) |
| \(\beta_8\) | \(-0.363***\) | \([-0.565, -0.162]\) | \(-0.244\) | \([-0.744, 0.256]\) |
| \(\beta_9\) | \(-0.571***\) | \([-0.794, -0.348]\) | \(-0.375*\) | \([-0.693, -0.057]\) |
| \(\beta_{10}\) | \(-0.156\) | \([-0.328, 0.016]\) | \(-0.456**\) | \([-0.722, -0.189]\) |
| \(\beta_{10}^*\) | \(0.019\) | \([-0.165, 0.203]\) | \(-0.220^*\) | \([-0.425, -0.014]\) |

Note. \(N = 690\). Numbers in brackets are 95% confidence intervals of the regression coefficients. GER = Germany; AUS = Australia; INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment; ENT = enthusiasm for teaching the student; SEL = self-efficacy for teaching the student. \(\beta_1 = \) INT on ability; \(\beta_2 = \) SOE on ability; \(\beta_3 = \) MAL on ability; \(\beta_4 = \) ENT on INT; \(\beta_5 = \) SEL on INT; \(\beta_6 = \) ENT on SOE; \(\beta_7 = \) SEL on SOE; \(\beta_8 = \) ENT on MAL; \(\beta_9 = \) SEL on MAL; \(\beta_{10} = \) ENT on ability; \(\beta_{10}^* = \) SEL on ability.

*p < .05. **p < .01. ***p < .001.
we simultaneously estimated the model within each group in a multi-group comparison, and again, model fit was acceptable ($N = 690$, $\chi^2 = 315.816$, $df = 150$, $CFI = .935$, $RMSEA = .080$, $SRMR = .063$). The inspection of confidence intervals revealed that all regression paths were comparable across groups.

Students’ ability level was positively related to intelligence and maladjustment ratings—except for boys in the Australian teacher sample—but not significantly related to ratings of students’ lack of social-emotional ability (see $\beta_1$, $\beta_2$, and $\beta_3$ in Table 4). Higher intelligence ratings were positively related to teachers’ enthusiasm (exception: girls in the Australian sample) and teachers’ self-efficacy (see $\beta_4$ and $\beta_5$ in Table 4). Ratings of students’ lack of social-emotional ability were unrelated to teachers’ motivational orientations (see $\beta_6$ and $\beta_7$ in Table 4). Furthermore, ratings of students’ maladjustment were negatively related to teachers’ enthusiasm (exception: boys in the Australian sample) and self-efficacy (see $\beta_8$ and $\beta_9$ in Table 4). Moreover, students’ ability level had a significant negative direct effect on teachers’ enthusiasm (see $\beta_{10}$ in Table 4)—except for girls in the Australian sample. Only for boys in the Australian sample, higher ability ratings went along with lower ratings of teachers’ self-efficacy (see $\beta_{11}$ in Table 4).

Next, we tested indirect effects from students’ ability level on enthusiasm and self-efficacy via intellectual ability, lack of social-emotional ability, and maladjustment (see Table 5). Specific indirect effects for ability level and enthusiasm were found via intellectual ability (exception: girls in the Australian sample) and via maladjustment for boys and girls in the German sample. We found specific indirect effects for ability level and self-efficacy via intellectual ability (all four groups) and via maladjustment (exception: boys in the Australian sample). Overall, in both countries, the models explained a significant amount of variance in pre-service teachers’ enthusiasm (boy/Germany: $R^2 = .269$, $p = .002$; boy/Australia: $R^2 = .333$, $p = .001$; girl/Germany: $R^2 = .332$, $p = .000$; girl/Australia: $R^2 = .243$, $p = .004$), and perceived self-efficacy (boy/Germany: $R^2 = .534$, $p = .000$; boy/Australia: $R^2 = .674$, $p = .000$; girl/Germany: $R^2 = .600$, $p = .000$; girl/Australia: $R^2 = .626$, $p = .000$).

**Discussion**

The evaluation of teachers’ professional competence is of high practical relevance in order to meet the complex demands of the teaching profession. Hence, in this article we aimed to make an empirical contribution to the discussion of teacher professionalization for gifted education. We investigated the student ability level (i.e., gifted vs. average ability) in relation to teachers’ beliefs about students’ cognitive and non-cognitive characteristics and their motivational orientations (i.e.,

Table 5. Model results (MGSEM) for the direct and indirect effects of students’ ability on teacher enthusiasm and self-efficacy.

<table>
<thead>
<tr>
<th></th>
<th>Boy/GER</th>
<th>Boy/AUS</th>
<th>Girl/GER</th>
<th>Girl/AUS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Enthusiasm</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific indirect</td>
<td>$024 [-031,080]$</td>
<td>$001 [-041,040]$</td>
<td>$004 [-018,026]$</td>
<td>$-032 [-103,038]$</td>
</tr>
<tr>
<td><strong>Self-efficacy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$033 [-163,230]$</td>
<td>$024 [-202,250]$</td>
<td>$-174 [-393,046]$</td>
<td>$071 [-121,264]$</td>
</tr>
</tbody>
</table>

Note. $N = 690$. Numbers in brackets are 95% confidence intervals of the regression coefficients. 0 = average, 1 = gifted. GER = Germany; AUS = Australia; INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment.

*p ≤ .05. **p ≤ .01. ***p ≤ .001.
self-efficacy and enthusiasm) for teaching them. Furthermore, we examined how those beliefs relate to motivational orientations to teach gifted students. Beside these main objectives, this study conducted a cross-country comparison for two convenience samples from Germany and Australia with the aim to test generalizability of the findings in different countries.

We used solid methods to conduct this cross-country study. We applied an experimental vignette design and ensured comparability of finding by establishing (partial) scalar measurement invariance of scales over country and by applying confirmatory data analytic methods. The dependent variables in our models were latent variables. This approach is preferred over traditional analysis of variance with manifest variables, as it takes measurement errors into account (Wang & Wang, 2012). The established (partial) scalar MI has many potential practical applications for the psychometric development of questionnaires. Hence, we confirmed the equivalence of all measurement and structural parameters of the factor model across all groups. Thus our questionnaire measures the same psychological constructs across vignettes and countries, so that we could generalize belief dimensions and motivational dimensions across Germany and Australia.

**Beliefs about the gifted**

In summary and in line with expectations, we observed ambivalent teacher beliefs about gifted students in both countries. That is, pre-service teachers from Germany as well as Australia, in which the overall knowledge and experience with the gifted was higher (but still low), rated gifted students in line with the disharmony hypothesis. Besides high intellectual ability, pre-service teachers from both countries incorrectly associated maladjustment with giftedness. This is in line with past research of teachers’ beliefs about gifted students (e.g., Baudson & Preckel, 2013, 2016; Copenhaver & McIntyre, 1992). In fact, empirical findings do not support behavioral difficulty as a characteristic of gifted children (e.g., Neihart et al., 2002).

Regarding the lack of social-emotional ability, there was only descriptive evidence for negative beliefs about the gifted, a finding not in line with our expectation. Past research found gifted students to be seen as self-contained, emotionally unstable, and disagreeable (e.g., Baudson & Preckel, 2013; Busse et al., 1986a, 1986b). Moreover, Baudson and Preckel (2016) found gifted students to be seen as less socially oriented than others, which could reflect the assumption of incompetent self-centered emotions. In our study, we focused on interpersonal social-emotional behavior that is seen to be undesirable; i.e., a lack of social skills and being withdrawn, rather than on intrapersonal social-emotional characteristics. Hence, the nonsignificant result can indicate that the negative beliefs about the social-emotional ability of gifted students do not refer to an inadequate social interaction with peers, but rather to a personal emotional disadvantaged disposition likewise found by Baudson and Preckel (2016).

Furthermore, we explored gender differences in pre-service teachers’ beliefs about the gifted. We observed stronger ratings for gifted boys that would disadvantage them, as pre-service teachers perceived them as both less intelligent and more maladjusted in comparison to gifted girls. These findings on gender differences in (pre-service) teachers’ maladjustment judgements of the gifted are well aligned with those of other studies (Busse et al., 1986a; Endepohls-Ulpe, 2004; Preckel et al., 2015). We observed country-specific differences between Germany and Australia for gender only. The Australian sample rated maladjustment higher for gifted students and lower for average-ability students than the German sample, whereas the Australian pre-service teachers described the highest ratings for gifted boys and the lowest ratings for average-ability girls. Moreover, apart from a more positive evaluation of social-emotional ability for girls in the Australian sample, the marginal significant three-way interaction between country, ability, and gender suggested that Australian pre-service teachers rated gifted boys as exhibiting the highest lack of social-emotional competencies, while average ability girls displayed the lowest deficit. Overall, results indicate preliminary but yet speculative evidence for a stronger negative stereotyping of the gifted within Australia.
Motivational orientations for teaching gifted students

To our knowledge, this study was the first that examined (pre-service) teachers’ enthusiasm and self-efficacy for teaching a gifted student compared to an average-ability student. Pre-service teachers in both countries indicated lower self-efficacy for teaching a gifted student. When discussing these findings, it is important to keep in mind that teachers’ self-efficacy can serve as an indicator for how effective and successful they feel as teachers with students in their class. Moreover, self-efficacy seems to relate to actual classroom behavior (Frenzel et al., 2009; Kunter et al., 2008) and, in general, serves as a reliable predictor for professional behavior and academic as well as professional achievement (e.g., Caprara, Vecchione, Alessandri, Gerbino, & Barbaranelli, 2011; Lent, Brown, & Larkin, 1987; Multron, Brown, & Lent, 1991; Schneider & Preckel, 2017). Hence, the perceived lack of self-efficacy indicates that pre-service teachers believe that they are not well prepared to deal with gifted students. Consequently, this suggests that pre-service teachers do not consider themselves able to provide adequate educational provision for the gifted, and they believe that they do not know how to foster and handle the gifted successfully.

Moreover, in the Australian sample, student gender seemed to bias pre-service teachers’ motivational orientations for teaching the gifted. Self-efficacy for teaching a girl was not affected by her ability, while pre-service teachers’ self-efficacy in teaching a boy depended on his ability. Besides an overall higher enthusiasm rating in Australia, the enthusiasm for teaching a gifted boy was lowest and highest for a gifted girl. These results may reflect once more a stronger gender stereotyping in Australia than in Germany.

Relations between beliefs and motivational orientations

Beliefs are strong predictors of behavior (Ajzen & Fishbein, 1980). They activate expectations (e.g., motivational orientations), which lead to behaviors that can facilitate or constrain support of students in class. Results from MGSEM illustrated the importance of enthusiasm and self-efficacy beliefs for teaching gifted students. The model with beliefs as predictors for motivational orientations was successful in explaining a significant amount of the variability of pre-service teachers’ enthusiasm and self-efficacy. Students’ ability level was directly related to pre-service teachers’ enthusiasm, except when teaching a girl within the Australian sample. Moreover, only for the Australian sample, students’ ability level had a significant direct effect on self-efficacy when a boy was described. These findings underline our speculation that there might be more persistent gender stereotyping with favorable attitudes for girls present in Australia.

The effective management of students’ undesirable behavior in class is an important but challenging demand for teachers (Kokkinos, Panayiotou, & Davazoglou, 2004). At the same time, coping with students’ strenuous behavior can be perceived as stressful (Travers & Cooper, 1996), and therefore it can affect teachers’ cognitive and affective motivational orientations; findings of our study point to this direction. Ratings of intellectual ability and maladjustment significantly explained pre-service teachers’ motivational orientations. In both countries, pre-service teachers’ ratings of a student’s intellectual ability had significant positive regression weights, which indicate that pre-service teachers with high ratings of student intellect can be expected to exhibit a higher enthusiasm and higher self-efficacy for teaching this student. Rating of students’ maladjustment, in turn, had significant negative regression weights, which suggest that these pre-service teachers with higher ratings of maladjustment possessed a lower enthusiasm and self-efficacy. In summary, pre-service teachers’ enthusiasm and self-efficacy decreases by high maladjustment ratings, whereas high intelligence ratings have positive effects. Hence, high ratings of students’ intelligence alone did not appear to be detrimental to pre-service teachers’ enthusiasm and self-efficacy, but in association with high ratings of students’ maladjustment.

As professional teaching is a complex activity that requires a high degree of self-regulation, it is not intrinsically motivating by itself (Lortie, 1975). To conclude, our results demonstrate that teachers’ enjoyment of interacting with gifted...
students and their confidence in teaching them relates to the beliefs they hold toward these students.

**Limitations**

We did not aim to address the causal relationship between students’ ability level and teachers’ beliefs about students’ characteristics and, in turn, their motivational orientations. The results of this study can be seen as indicators for an association between beliefs and motivational orientations. However, longitudinal studies need to confirm causality and the impact of those variables.

Regarding our cross-country comparison, we found preliminary, but speculative, evidence for a negative gender bias and a stronger gifted stereotyping in the Australian sample. Referring to a discussion on the sources of negative beliefs, Gross (1999) mentioned sociopolitical attitudes toward gifted education in Australia and argued that intellectual excellence is often seen as elitist. However, neither the aim of this study was to discuss possible explanations of a (stronger) gifted or gender stereotype in Australia, nor did we assume an explicit hypothesis about cultural differences between Germany and Australia. Whether gender bias and strong negative beliefs about the gifted are related or due to Australia’s culture, history, or society will need to be investigated in further research.

We used pre-service teacher ratings to assess beliefs and motivational orientations. At the same time, past research has shown that teachers’ beliefs about the gifted are fairly constant throughout their career (Baudson & Preckel, 2013; Guskin, Peng, & Simon, 1992; Lee et al., 2004; McCoach & Siegle, 2007; Sahin & Düzên, 1994), which suggest that the findings of pre-service and in-service teachers do not differ largely. However, in order to generalize from current findings on motivational orientations and beliefs of pre-service teachers on the teaching profession at large, one would need to confirm the assumption by assessing an in-service teacher sample.

We assessed experience with the gifted and knowledge about giftedness with one item measures only, which calls into question the validity and reliability of this assessment. In addition, our participants were pre-service teachers who showed little variation in their experiences and knowledge. Future studies could investigate the effects of experience and knowledge on beliefs and motivational orientation by using (1) more comprehensive measures and (2) a sample of in-service teachers with various experiences and knowledge.

Moreover, we assessed perceived enthusiasm for teaching the gifted rather than displayed enthusiasm in a teaching setting. Despite that the assessment of displayed enthusiasm in a teaching setting would cause practical difficulties, the relations between teachers’ beliefs about the gifted and their actual, displayed enthusiasm in classroom still need to be explored.

We hold a preliminary assumption that low motivational orientations for teaching the gifted serve as a predictor for actual behavior in class. However, further research on the question, if and how enthusiasm and self-efficacy beliefs for teaching gifted students is decoded into behavior, is still required. We would expect that teachers who were highly enthusiastic about teaching the gifted and who perceived high self-efficacy for teaching them also demonstrate more functional behavior, e.g., higher instructional quality (i.e., classroom management, cognitive activation, support; see Kunter et al., 2008). This in turn, can affect student motivation, achievement, and personality development. However, the present study did not have to account to that question. Neither did we examine teachers’ actual behavior in the field, nor did we have any student data to connect with teacher variables.

**Theoretical and practical implications**

Beliefs identified can relate to expectations that (pre-service) teachers hold toward gifted students and, consequently, to how they behave toward these students. Incorrect beliefs about student characteristics can lead to negative evaluation of the gifted (Preckel et al., 2015) and to an incorrect bias in the identification of gifted students if they show adjustment difficulties at the same time (see Baudson & Preckel, 2016, for in-depth discussion). Furthermore, research has shown that inappropriate reactions in the social environment and school setting toward gifted children are assumed to be a risk factor that might foster maladaptive development (Fiedler, 1999; National Association for...
Gifted Children, 2009; Vaivre-Douret, 2011). Reflecting on these concerns about teachers’ beliefs in line with the disharmony hypothesis, it seems to be obvious that teachers can have an important influence on the educational and personal development of the gifted. Accordingly, the study outcome contributes to a deeper understanding of the structure of beliefs about gifted students’ characteristics, which can serve as a component in successful teacher education programs (Rimm, Siegle, & Davis, 2018).

Nevertheless, as previously discussed by Baudson and Preckel (2016), the reasons why teachers hold that belief structure is still not clear. To best of our knowledge, no empirical study has investigated the underlying processes of those ambivalent beliefs so far. Therefore, further research could explore the mechanism underlying the effects of the disharmony hypothesis. We would like to take account of this aspect in a follow-up study on teachers’ personality traits explaining the disharmony hypothesis.

Overall, our findings point to a number of consequences for pre-service teacher education and in-service teacher professional development, especially as our results showed that beliefs about gifted students’ characteristics are associated with motivational orientations. Although further research is needed to examine the causal relation between beliefs, motivational orientations, teacher behavior, and student issues (e.g., by linking student and teacher data), we propose that initial teacher education on giftedness should be devoted to both beliefs about gifted students’ characteristics and teachers’ motivational orientations. Hence, teacher education should aim to improve knowledge of gifted students’ characteristics and identification of the gifted, with an intention to foster motivation to engage with the gifted and raise self-efficacy for teaching them.

Inclusion as a current educational objective strengthens the relevance of our findings. Pre-service and in-service teachers need to be prepared to teach students with different intellectual abilities in order to ensure that all students are taught and supported according to their individual needs. Hence, professional teacher competence also needs to include skills and a willingness to deal with the demands of diverse students in a given situation (Weinert, 2001). In the light of a growing heterogeneity in the classroom (see Unesco, 2009 for the demand for inclusive education), our findings on giftedness stress the importance of this topic within teacher education. Fostering the adequate inclusion of gifted students in mixed-ability classes involves the strengthening of teachers’ self-efficacy beliefs about teaching the gifted. Thus we recommend that, besides beliefs about the gifted, teacher education programs need to instruct them on how to foster students with diverse intellectual abilities. This knowledge and skills could enhance teachers’ self-efficacy for teaching them.

Conclusion

We aimed to make an empirical contribution to the discussion on the professionalization of teachers in gifted education. Beside positive ratings of gifted students’ intellect, we have found inaccurate negative beliefs about gifted students’ non-cognitive characteristics in relation to teachers’ motivational orientations for teaching them. Our comparison between Germany and Australia strengthened the assumption that those beliefs about gifted students are generalizable over countries. Reflecting on the importance of a teacher’s motivational orientation for actual classroom behavior, the association of high intellect and maladjustment with teachers’ motivation, we strongly emphasize the need for educational provision on giftedness and gifted education within teacher education courses.

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Appendix

To ensure that the text was neutral regarding the student’s characteristics under study we ran a pilot study. Participants rated the vignette without experimental manipulation (i.e., not naming the ability level of the student; for boys only). The idea was that the vignette by itself should not enable participants to assess students’ actual characteristics, as there was not enough information available to do so. If so, then in our main study pre-service teachers’ rating on gifted students would reflect their personal beliefs about students’ characteristics. We asked participants to rate all belief dimensions, which served as dependent variables in our main study and students’ socioeconomic status, which was considered to be associated with belief dimensions. Australian pre-service teachers (N = 26) rated the vignette on a 5-point continuum scale with two divergent poles from 1 to 5. Means with middle distribution (2.0 to 4.0) indicated neutral ratings; i.e., the vignette had no or few information to allow assessment of those characteristics (see Appendix A). German pre-service teachers (N = 44) rated the vignette on a 6-point scale with means around 3 indicating neutral ratings.

Appendix A

Preliminary Rating of Vignette Without Ability Label to Check Neutrality

<table>
<thead>
<tr>
<th></th>
<th>Australia (n = 26)</th>
<th></th>
<th>Germany (n = 44)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Intellectual ability</td>
<td>4.08</td>
<td>.74</td>
<td>3.66</td>
<td>.65</td>
</tr>
<tr>
<td>Social-emotional ability</td>
<td>2.58</td>
<td>.81</td>
<td>2.70</td>
<td>.85</td>
</tr>
<tr>
<td>Maladjustment</td>
<td>3.92</td>
<td>.74</td>
<td>2.93</td>
<td>.70</td>
</tr>
<tr>
<td>Socio-economic status</td>
<td>3.00</td>
<td>.40</td>
<td>2.84</td>
<td>.57</td>
</tr>
</tbody>
</table>

Note. Response format for the Australian sample ranged from 1 (low) to 5 (high); Response format for the German sample ranged from 1 (low) to 6 (high).

Appendix B

Tests for Measurement Invariance of the Scales for the Five Dimensions Across Online (n = 46), and Random Hard-Copy Sample (n = 30) for Australian Male Vignette

<table>
<thead>
<tr>
<th>Model</th>
<th>χ²</th>
<th>df</th>
<th>p</th>
<th>CFI</th>
<th>Comparison</th>
<th>ΔCFI</th>
<th>Δχ²</th>
<th>Δdf</th>
<th>p(Δχ²)</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configural</td>
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<td>10</td>
<td>.312</td>
<td>.990</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metric</td>
<td>13.819</td>
<td>14</td>
<td>.463</td>
<td>1.000</td>
<td>2 vs. 1</td>
<td>.001</td>
<td>2.295</td>
<td>4</td>
<td>.682</td>
</tr>
<tr>
<td>Part. Scalar</td>
<td>15.802</td>
<td>17</td>
<td>.538</td>
<td>1.000</td>
<td>3 vs. 2</td>
<td>.000</td>
<td>1.558</td>
<td>3</td>
<td>.669</td>
</tr>
<tr>
<td>Strict</td>
<td>24.552</td>
<td>22</td>
<td>.319</td>
<td>.985</td>
<td>4 vs. 3</td>
<td>.015</td>
<td>8.465</td>
<td>5</td>
<td>.132</td>
</tr>
<tr>
<td>SOE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configural</td>
<td>3.049</td>
<td>4</td>
<td>.550</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metric</td>
<td>4.662</td>
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<td>.701</td>
<td>1.000</td>
<td>2 vs. 1</td>
<td>.000</td>
<td>1.472</td>
<td>3</td>
<td>.689</td>
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<tr>
<td>Scalar</td>
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<td>10</td>
<td>.725</td>
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<td>3 vs. 2</td>
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<tr>
<td>Strict</td>
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<td>14</td>
<td>.526</td>
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<td>4 vs. 3</td>
<td>.000</td>
<td>5.643</td>
<td>4</td>
<td>.228</td>
</tr>
<tr>
<td>MAL</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configural</td>
<td>1.115</td>
<td>4</td>
<td>.892</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metric</td>
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<td>7</td>
<td>.424</td>
<td>.999</td>
<td>2 vs. 1</td>
<td>.001</td>
<td>5.535</td>
<td>3</td>
<td>.137</td>
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<tr>
<td>Part. Scalar</td>
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<td>8</td>
<td>.626</td>
<td>1.000</td>
<td>3 vs. 2</td>
<td>.001</td>
<td>1.967</td>
<td>1</td>
<td>.161</td>
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<tr>
<td>Strict</td>
<td>23.111</td>
<td>12</td>
<td>.027</td>
<td>.832</td>
<td>4 vs. 3</td>
<td>.168</td>
<td>18.918</td>
<td>4</td>
<td>.001</td>
</tr>
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<td>ENT</td>
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<td></td>
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<td></td>
<td></td>
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<tr>
<td>Configural</td>
<td>1.932</td>
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<td>Metric</td>
<td>8.082</td>
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<td>.325</td>
<td>.993</td>
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<td>.089</td>
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<td>Scalar</td>
<td>9.886</td>
<td>10</td>
<td>.451</td>
<td>1.000</td>
<td>3 vs. 2</td>
<td>.007</td>
<td>1.705</td>
<td>3</td>
<td>.636</td>
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<td>Strict</td>
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<td>.400</td>
<td>.995</td>
<td>4 vs. 3</td>
<td>.005</td>
<td>6.480</td>
<td>7</td>
<td>.485</td>
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<tr>
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<td>4</td>
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</tr>
<tr>
<td>Metric</td>
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<td>7</td>
<td>.000</td>
<td>.911</td>
<td>2 vs. 1</td>
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<td>6.704</td>
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<td>.082</td>
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<tr>
<td>Scalar</td>
<td>29.754</td>
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<td>.000</td>
<td>.908</td>
<td>3 vs. 2</td>
<td>.003</td>
<td>10.311</td>
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<td>.333</td>
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<tr>
<td>Strict</td>
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<td>14</td>
<td>.004</td>
<td>.917</td>
<td>4 vs. 3</td>
<td>.009</td>
<td>3.340</td>
<td>4</td>
<td>.503</td>
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</tbody>
</table>

Note. N = 92. df = degrees of freedom; CFI = comparative fit index. INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment; ENT = enthusiasm for teaching the student; SEL = self-efficacy for teaching the student.
Appendix C

Tests for Measurement Invariance of the Scales with MGCFA (Eight Groups) for the Five Dimensions With Satorra-Bentler Correction in $\chi^2$-Difference Testing for MLR Estimator ($N = 690$)

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>$df$</th>
<th>$p$</th>
<th>CFI</th>
<th>Comparison</th>
<th>$\Delta$CFI</th>
<th>$\Delta\chi^2$</th>
<th>$\Delta df$</th>
<th>$p(\Delta\chi^2)$</th>
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<td>INT</td>
<td></td>
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<td></td>
<td></td>
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<td>.998</td>
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<tr>
<td>Metric</td>
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<td>.466</td>
<td>1.000</td>
<td>2 vs. 1</td>
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<td>27.027</td>
<td>28</td>
<td>.517</td>
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<td>Part. Scalar</td>
<td>100.383</td>
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<td>.258</td>
<td>.990</td>
<td>3 vs. 2</td>
<td>.010</td>
<td>33.590</td>
<td>24</td>
<td>.092</td>
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<tr>
<td>Strict</td>
<td>149.028</td>
<td>120</td>
<td>.037</td>
<td>.966</td>
<td>4 vs. 3</td>
<td>.024</td>
<td>43.012</td>
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Note. $df =$ degrees of freedom; CFI = comparative fit index; INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment; ENT = enthusiasm for teaching the student; SEL = self-efficacy for teaching the student.