

Svenja Matheis | Lena Kristina Keller | Leonie Kronborg | Manfred Schmitt | Franzis Preckel

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Do stereotypes strike twice? Giftedness and gender stereotypes in pre-service teachers' beliefs about student characteristics in Australia

Svenja Matheis ^{a,b}, Lena Kristina Keller ^{c,d}, Leonie Kronborg ^e, Manfred Schmitt^b and Franzis Preckel ^f

^aDFG-Graduate School “Teaching and Learning Processes”, University of Koblenz-Landau, Landau, Germany; ^bDepartment of Psychology, Personality, Psychological Assessment, and Psychological Methods, University of Koblenz-Landau, Landau, Germany; ^cDepartment of Education and Psychology, Freie Universität Berlin, Berlin, Germany; ^dDepartment of Educational Sciences, University of Potsdam, Potsdam, Germany; ^eFaculty of Education, Monash University, Clayton, Australia; ^fDepartment of Psychology, Giftedness Research and Education, University of Trier, Trier, Germany

ABSTRACT

Stereotypes influence teachers' perception of and behaviour towards students, thus shaping students' learning opportunities. The present study investigated how 315 Australian pre-service teachers' stereotypes about giftedness and gender are related to their perception of students' intellectual ability, adjustment, and social-emotional ability, using an experimental vignette approach and controlling for social desirability in pre-service teachers' responses. Repeated-measures ANOVA showed that pre-service teachers associated giftedness with higher intellectual ability, but with less adjustment compared to average-ability students. Furthermore, pre-service teachers perceived male students as less socially and emotionally competent and less adjusted than female students. Additionally, pre-service teachers seemed to perceive female average-ability students' adjustment as most favourable compared to male average-ability students and gifted students. Findings point to discrepancies between actual characteristics of gifted female and male students and stereotypes in teachers' beliefs. Consequences of stereotyping and implications for teacher education are discussed.

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Introduction

Stereotypes help us to navigate through the wealth of information we encounter in everyday life by making generalizations of people based on their membership in social groups. While generalizations may be useful when making quick decisions, they may be flawed when applied to individuals (e.g., Ashmore & Del Boca, 1979). As teachers have an impact on the development of students' talents and personality, their stereotypes about specific groups of students, such as gifted students or boys and girls, are highly relevant. Current multidimensional models of teachers' professional competencies (e.g., COACTIV [Cognitive Activation in the Classroom]; Kunter et al., 2013) describe

CONTACT Svenja Matheis  matheis@uni-landau.de  DFG-Graduate School “Teaching and Learning Processes”, University of Koblenz-Landau, Thomas-Nast-Str. 44, Landau D-76829, Germany

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stereotypes as one core aspect of teachers' beliefs and thus, as a component of their professional competencies. In this manner, teachers' beliefs do not only cover beliefs about their subject, their teaching, or their own attitudes and role as a teacher, but also subjective theories about students such as stereotypes about male and female gifted students (Kunter et al., 2013). That is, teachers' stereotypes about gifted students comprise assumptions about giftedness, the characteristics of gifted boys and girls (e.g., regarding their personality traits or talent range), whether they need special support, or if their abilities are innate or learned.

Teachers play a pivotal role in the identification and education of gifted students. Consistent with giftedness models (for an overview, see Sternberg, Jarvin, & Grigorenko, 2011), teachers' identification of gifted students relies primarily on students' high intelligence and achievement (e.g., Endepohls-Ulpe & Ruf, 2006). However, teachers seem to have stereotypes about gifted students implying lower social and emotional skills (Baudson & Preckel, 2016) that are not in line with empirical findings (Neihart, Reis, Robinson, & Moon, 2002). Thus, these stereotypes may bias the identification of gifted students and hinder teachers from meeting their needs.

Research also shows that teachers' expectations for female and male students are biased by gender stereotypes (e.g., Keller, 2001). Because gender differences in psychological variables are small (Hyde, 2005), gender stereotypes exaggerate rather than reflect reality. Research has mostly focused on teachers' expectations for female and male students' ability, performance, and motivation, whereas research on teachers' gender stereotypes of gifted students is scarce.

Previous research showed that Australians tend to hold some reservations towards giftedness and gifted education (Gross, 1999; Lassig, 2009), reflecting egalitarian values of society (Hofstede, 2001) and the presumed incongruity of equity and excellence (Subotnik, Olszewski-Kubilius, & Worrell, 2011). Also, this was evident in recent studies of pre-service teachers concerning pre- and post- participation in a semester of studies in gifted education (Plunkett & Kronborg, 2011, *in press*). Although, there has been an increase of teacher education opportunities in gifted education in Australian universities in the past two decades with more exposure to learning about theories of giftedness and talent development (Jolly & Jarvis, 2018). Therefore, the aim of the present study was to investigate how Australian pre-service teachers' perception of gifted students' characteristics is influenced by stereotypes about giftedness and gender.

Theoretical background

Stereotypes

A stereotype is "a structured set of inferential relations that link a social category with personal attributes" (Ashmore & Del Boca, 1979, p. 225). Stereotypes influence social information processing and individuals' judgements and decisions and they are powerful predictors of behaviour and the interpretation of the behaviour of others (Pajares, 1992; Tiedemann, 2002). Applied to the school context, stereotypes influence teachers' beliefs about and behaviour towards students, and hence affect students' learning opportunities.

Stereotypes about the gifted

The “disharmony hypothesis” illustrates giftedness as a factor that increases vulnerability (e.g., Becker, 1978). That is, high intellectual ability comes at a cost for gifted individuals, such that they are less able in social-emotional domains compared to individuals with average-ability (Baudson, 2016; Gallagher, 1990; Neihart, 1999). Thus, on the one hand the disharmony hypothesis comprises a positive component of high intellectual ability, but on the other hand also a negative component of lack in non-cognitive abilities. Disadvantageous characteristics attributed to gifted students can be mapped on two dimensions. The first dimension reflects social and emotional (dis)ability such as having bad or no peer relationships and being self-contained and introverted (e.g., Busse, Dahme, Wagner, & Wiczerkowski, 1986a, 1986b). The second dimension includes maladjusted and disruptive behaviours such as absentmindedness and arrogance (e.g., Subotnik et al., 2011). Baudson and Preckel (2013, 2016) found this stereotype to be prevalent among German pre-service and in-service teachers, irrespective of their overall professional experience.

Importantly, empirical studies comparing high-ability students with average-ability students found no differences in social and emotional ability, mental health, and anti-social behaviour (e.g., Martin, Burns, & Schonlau, 2010; Neihart, Pfeiffer, & Cross, 2015; Neihart et al., 2002; Reis & Renzulli, 2004).

Gender stereotypes

Gender stereotypes are beliefs about differences between females and males. Frequently held stereotypes associate the female gender category with communion (being sensitive, warm, dependent, and caring) and the male gender category with agency (being dominant, independent, task-oriented, aggressive, ambitious, and selfish; Deaux & LaFrance, 1998).

An observational study by Chick, Heilman-Houser, and Hunter (2002) showed that teachers seem to engage in gender-typed behaviours in the classroom. For example, teachers paid less attention to girls, commented on girls’ appearance and ability to help others, expressed more emotions in communication with girls, and endorsed gender-typed classroom activities and playing with gender-typed toys (Chick et al., 2002).

Jones and Myhill (2004) found that teachers tend to perceive female students as more compliant and male students as more disruptive, less mature, and less diligent. According to Campbell’s (1967) “grain of truth” hypothesis, gender stereotypes may reflect actual gender differences to some extent. Krahé, Berger, and Möller (2007) found that male students scored higher on self-reported untidiness, laziness, and aggressiveness, whereas female students scored higher on diligence, sensitivity, and compassion. Female students also score higher on agreeableness and conscientiousness (De Bolle et al., 2015) and report higher levels of school engagement (Lam et al., 2012). However, effect sizes for gender differences were usually small.

Double strike? Teachers’ gender stereotypes of gifted students

Previous research on the effects of gifted students’ gender on teacher ratings of students’ non-cognitive characteristics yielded mixed findings. Some studies did not find gender differences in teachers’ beliefs about gifted students’ personality (Baudson & Preckel, 2013), prosociality, adjustment (Baudson & Preckel, 2016), work ethics, or social skills (Freund-Braier, 2009). Other studies found that teachers perceived gifted male students as more self-centred (Busse et al., 1986a, 1986b) and associated adjustment problems more strongly with gifted

male students compared to gifted female students (Preckel, Baudson, Krolak-Schwerdt, & Glock, 2015). Gifted female students were attributed higher social competencies, higher social integration (Endepohls-Ulpe, 2004), higher socio-emotional skills (Gagné, 1993), higher work ethics, and higher work quality (Siegle & Reis, 1998) than gifted male students.

Studies on actual gender differences in gifted students' non-cognitive characteristics indicate that gifted male and female students differ very little from each other in most psychological variables such as general self-concept, locus of control, test anxiety, mental health, and anxiety (Zeidner & Shani-Zinovich, 2011). However, a study examining the 5% most intelligent grade 10 students showed that gifted female students reported studying more, liking to work harder in school, and getting better grades than their male counterparts (Roznowski, Hong, & Reith, 2000). Yet again, most gender differences were small or at most medium in effect size. Finally, in a 40-year follow up study with students in the top 1% of mathematical reasoning ability, women and men rated their emotional well-being and psychological flourishing, their satisfaction with career success and direction, as well as their satisfaction with romantic relationships as equally high (Lubinski, Benbow, & Kell, 2014).

To summarise, if gender differences in teachers' beliefs about gifted male and female students were found, teachers perceived gifted male students less favourably than gifted female students. However, research findings are inconsistent and it remains unclear whether teachers' stereotypes about the gifted and about gender interact with each other.

The Australian context

Since the 1970s, it has been reported that the Australian education system has been grappling with reconciling gifted education within an egalitarian framework (Braggett, 1993; Kronborg, 2018). An Australian Senate Inquiry (Senate Employment, Workplace Relations, Small Business and Education References Committee, 2001) identified negative attitudes to high intellectual ability among school management, teachers, and the community at large. Furthermore, in a study of almost 600 pre-service teachers across campuses of a leading Australian university between 2008–2014, it was found that before engaging in a semester of gifted education studies, pre-service teacher survey participants indicated they were concerned that special programs for gifted students created elitism (Plunkett & Kronborg, *in press*). These observations suggest a prevailing pre-occupation to limit opportunities for individuals with high intellectual potential who could be perceived as having an unfair advantage for social and economic success in the Australian society.

The current Australian Professional Standards for Teachers (Australian Institute for Teaching and School Leadership [AITSL], 2011) recommend the implementation of strategies for differentiating teaching to meet specific learning needs of all students across the full range of abilities, including the education of gifted students. However, teachers' knowledge of gifted students varies greatly (Kronborg, 2018). Most Australian universities do not provide specialised studies in gifted education for teachers. Thus, selective classes can be taught by teachers without any exposure to studies in gifted education (Plunkett & Kronborg, 2007).

In addition, research has indicated negative attitudes towards gifted education. Pre-service teachers preferred teaching average students compared to gifted students (Carrington & Bailey, 2000), they believed most gifted children who were accelerated would have social

adjustment difficulties (Plunkett & Kronborg, *in press*), and teachers were found to have less positive attitudes towards fostering gifted students (Geake & Gross, 2008; Lassig, 2009).

Social desirability in explicit measures of stereotypes

Socially desirable responding is the tendency for people to present a favourable image of themselves on self-report measures. Research on stereotypes often covers socially sensitive topics, as it may be the case for stereotypes about gender and the gifted. When asking people directly about their beliefs, social desirability might therefore play an important role in their answers (e.g., Baumeister & Bushman, 2008). Social desirability might also occur when asking teachers not directly about their beliefs, but indirectly in ratings of students' characteristics (King & Bruner, 2000).

In this manner, including items to assess social desirability helps to control for socially desirable responding (Nederhof, 1985). The rationale is that individuals who score high on a social desirability scale are also likely to indicate socially acceptable answers to sensitive items – especially when their true beliefs are socially undesirable, as it might be the case when explicitly rating gifted male or female students' characteristics.

The present study

We aimed to examine stereotypes about giftedness and gender in the Australian context. We used a vignette design in which we varied the information about a student's ability level and gender and asked participants to rate students' characteristics on scales comprising the components of the disharmony hypothesis. To our knowledge, on the topic of teachers' beliefs about giftedness, this is the first experimental study that controlled for social desirable responding and took gender stereotyping of gifted students in the Australian context into account. We investigated the following research questions:

- (1) Are pre-service teachers' ratings on students' characteristics affected by students' giftedness?

Hypothesis: Based on previous findings on beliefs about the gifted (e.g., Baudson & Preckel, 2013, 2016), we expected to find support for the disharmony hypothesis according to which students' giftedness is associated with higher intellectual ability, but also with a higher lack of social-emotional abilities or more maladjustment compared to students' with average-ability.

- (2) Are pre-service teachers' ratings on students' characteristics affected by students' gender?

Hypothesis: With regard to gender stereotypes (e.g., Jones & Myhill, 2004), we expected that teachers perceive male students as less socially and emotionally able, as well as less adjusted in their behaviour compared to female students.

- (3) Do stereotypes about giftedness and gender interact with each other?

Regarding the interaction between giftedness and gender stereotypes, we considered two assumptions as most plausible.

Hypothesis a: Pre-service teachers' beliefs might be most favourable towards average-ability female students compared to average-ability male students and gifted students, because average-ability female students are not affected by any associated "stigma" of being gifted (e.g., being maladjusted) and because female students are in general supposed to be more compliant than male students (Deaux & LaFrance, 1998; Jones & Myhill, 2004). Thus, compared to the other groups, teachers' should rate female average-ability students as most socially and emotionally able and adjusted.

Hypothesis b: Pre-service teachers' beliefs might be least favourable towards gifted male students as compared to gifted females and average-ability students (e.g., Busse et al., 1986a, 1986b; Preckel et al., 2015). Pre-service teachers' negative beliefs about giftedness might be negatively reinforced for male students because of the association of male students with disruptive, immature, and disinclined behaviour in the classroom (Deaux & LaFrance, 1998; Jones & Myhill, 2004). Hence, they might rate gifted male students as least socially and emotionally able and least adjusted compared to the other groups.

Methods

Participants and procedure

We collected a sample of 315 Australian pre-service teachers from Monash University, Clayton Campus, Victoria, Australia (71% female; age $M = 23.52$ years, $SD = 6.21$). Most participants were enrolled in Bachelor courses ($n = 213$), whereas some participants were enrolled in non-consecutive Master of Teaching courses ($n = 92$).

In an experimental between-subjects vignette design, gender (Michael/Karen) and giftedness (gifted/average) were varied, resulting in four vignette types, i.e., experimental conditions. Participants were randomly assigned to one of four vignette types. Before administering this study, we obtained the approval of the Human Subjects and Ethics Committee. Participants were given informed consent forms before data collection. The participation was voluntary and took approximately 10 minutes.

Hard-copy questionnaires were distributed in regular university classes. Additionally, 46 participants were assessed online. Testing preliminary measurement invariance (MI) across online and hard-copy samples indicated at least partial scalar MI (see Appendix 1). Therefore, latent means were comparable in both samples and combined data were used for the main analyses. The number of participants for the four vignette conditions was $n_{gifted\ male} = 81$, $n_{average\ male} = 71$, $n_{gifted\ female} = 83$, and $n_{average\ female} = 80$.

Instruments

Pre-service teachers' demographics

Participants were asked for their age, gender, level of experience with gifted students, and knowledge about giftedness (5-point rating-scales with 1 = none to 5 = a lot).

Vignette

The vignette was taken from previous studies (Baudson & Preckel, 2013, 2016; Matheis, Kronborg, Schmitt, & Preckel, 2017) and was used as stimulus for pre-service teachers' ratings

on a student's characteristics (see Figure 1). The vignette comprised a brief description of a fictitious student in an everyday school situation. This situation was open to interpretation and therefore suitable to elicit stereotypes. That is, besides his or her ability level and gender, the vignette comprised no further information about students' characteristics. Because no additional information about the student was given, perceptions of the student should reflect stereotypes about giftedness and gender.

Questionnaire to assess stereotypes about giftedness and gender

After reading a vignette, participants rated students' characteristics on 13 items that captured the disharmony beliefs on three dimensions (see Table 1). Items were answered on a 6-point Likert scale (1 = *false* to 6 = *true*). The questionnaire was developed and validated within several Bachelor and Master Theses (Issa, 2016; Matheis, 2015; Rumanyika, 2016) and consisted of 21 items on five dimensions in total: three dimensions capture beliefs and two dimensions capture teacher motivation. To assess disharmony beliefs, we used the three student-related dimensions only.

Social desirability scale

We used four items from the Crowne-Marlow Social Desirability Scale (Crowne & Marlowe, 1960). Items were "I sometimes try to get even rather than to forgive and forget;" "There have been some occasions when I took advantage of someone;" "I like to gossip at times;" "I am always willing to admit when I made a mistake". Items were answered on 6-point Likert scales (1 = *false* to 6 = *true*).

Data analyses

We performed a repeated measures ANOVA with giftedness (gifted/average-ability) and gender (female/male) as independent variables and the ratings as one factor with three repeated measures (i.e., pre-service teachers' ratings on students' intellectual ability, lack of social-emotional ability, and maladjustment). Each participant rated those three student-related dimensions for one student described in one out of four vignette types. Therefore, ratings were not independent of each other; an issue we considered with the repeated measures ANOVA.

Following the significant main effects of repeated measures ANOVA, we conducted separate univariate analyses. Next, we identified the role of social desirability by including it as covariate. We conducted all analyses with IBM SPSS Statistics for Windows, Version 25 (2017).

Michael is a student at the school where you have been teaching for one year. Michael is twelve years old and gifted. Mr. Smith, the teacher who was supposed to teach the last period of the day, has called in sick. You take over this lesson and allow the children to do homework or keep themselves busy independently. Michael flicks through an atlas and then walks towards a big world map mounted on the classroom wall. Two other children are already standing in front of the map, giggling. Michael asks the two of them: "Do you know which continent has the most people?" One of the children replies: "Why would you want to know that?" The other child walks back to his seat. Michael replies: "Well, never mind. Doesn't matter." After a while, Michael walks up to you and asks: "When will Mr. Smith be back?"

Figure 1. Sample vignette with student described as male and gifted.

Table 1. The three dimensions and their items of the questionnaire to capture beliefs about students in the context of the disharmony hypothesis.

Dimension	Items
Intellectual ability	This child is smart. This child obtains good grades. This child is clever. This child is intelligent. This child is competent.
Lack of social-emotional ability	This child lacks social skills. This child is withdrawn. I rate the child's social-emotional ability rather negatively. I rate the child's social-emotional ability rather positively. [inverted item]
Maladjustment	Teaching this child is strenuous. This child is intolerant. This child considers himself/herself superior to everyone else. This child displays behavioural difficulty.

ω = McDonald's Omega. Intellectual ability: $.81 \leq \omega \leq .89$; lack of social-emotional ability: $.78 \leq \omega \leq .82$; maladjustment: $.66 \leq \omega \leq .73$.

Preliminary analysis: measurement invariance of the questionnaire

To draw valid comparisons, the questionnaire must measure the same constructs in all four vignette conditions. Therefore, we tested for measurement invariance (MI) by conducting a multi-group confirmatory factor analysis (MGCFA) with the statistical software Mplus 7.4 (Muthén & Muthén, 1998–2015). This approach compares less restricted with more restricted measurement models (configural, metric, scalar, strict MI; Steenkamp & Baumgartner, 1998). The comparison of factor means across vignette conditions requires at least scalar MI which is supported if there are only small changes in the comparative fit index (CFI) compared to the model that assumes metric MI, i.e., $\Delta CFI \leq .01$ (Chen, 2007). Moreover, valid comparisons can also be made if some indicators are partially invariant (Steenkamp & Baumgartner, 1998).

After establishing (partial) scalar MI (see Results), we used latent factor scores for each of the three dimensions of the questionnaire to examine the effect of giftedness and gender on ratings. Therefore, we simultaneously derived factor scores for each of the three dimensions from MGCFA across all four experimental conditions. MGCFA does not estimate the absolute values of factor means for each group but rather the differences in factor means between one reference group (here male/gifted) and each comparison group.

Results

Measurement invariance testing over vignette conditions

Partial scalar MI held for the questionnaire dimensions so that the comparison of latent factor means across vignette types was feasible ($\Delta CFI \leq .01$, see Appendix 2). For means, standard deviations of latent factor scores, and reliabilities for the four vignettes (McDonald's Omega; Brunner, Nagy, & Wilhelm, 2012) see Table 2.

Descriptive statistics

Pre-service teachers reported little experience with gifted students ($M = 2.53$, $SD = 0.96$) and low knowledge on the topic of giftedness ($M = 2.71$, $SD = 0.82$). Pre-service teachers'

Table 2. Reliabilities (McDonald's Omega), means, and standard deviations of the dependent variables based on (partial) scalar factor scores (reference group: gifted male fixed to zero).

Groups	n	INT			SOE			MAL		
		ω	M	SD	ω	M	SD	ω	M	SD
Giftedness										
Gifted	164		-0.02	0.61		-0.10	0.49		-0.05	0.45
Average	151		-0.44	0.57		-0.16	0.61		-0.46	0.48
Gender										
Female	163		-0.22	0.67		-0.28	0.56		-0.39	0.51
Male	152		-0.22	0.59		0.03	0.49		-0.09	0.46
Giftedness \times Gender										
Gifted male	81	.84	0.00	0.53	.78	0.00	0.48	.72	0.00	0.45
Average male	71	.84	-0.47	0.55	.78	0.07	0.52	.73	-0.20	0.45
Gifted female	83	.89	-0.03	0.68	.74	-0.20	0.48	.69	-0.11	0.45
Average female	80	.81	-0.42	0.59	.82	-0.35	0.63	.66	-0.69	0.39

$N = 315$. ω = McDonald's Omega. INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment.

experience and knowledge showed no significant or very small correlations with student ratings (Table 3). Therefore, these variables were not included in subsequent analyses. The correlation of social desirability with the lack of social-emotional ability and maladjustment indicated that pre-service teacher ratings on those student characteristics might be confounded with socially desirable responding (see Table 3).

Stereotyping

For the repeated-measures ANOVA we used Greenhouse-Geisser estimates of sphericity ($\epsilon = .77$) to correct degrees of freedom for sphericity violations (Mauchly's $W = .70$, $\chi^2(2) = 111.79$, $p < .001$). Repeated-measures ANOVA showed a significant main effect for the dimensions, $F(1.53, 475.62) = 5.09$, $p = .02$. Thus, we followed-up with separate univariate ANOVAs for each dimension (2×2 factorial ANOVAs), which included the main effects for giftedness and gender, and the interaction effect for those two independent variables. Table 4 displays statistics for the univariate ANOVAs and Figure 2 displays latent mean differences compared to the reference group (male/gifted).

Pre-service teachers' ratings on students' intellectual ability

There was a main effect for giftedness, $F(1, 310) = 40.83$, $p < .001$, partial $\eta^2 = .12$, indicating that pre-service teachers rated gifted students as significantly intellectually more able than average-ability students. The main effect of gender, $F(1, 310) = 0.03$, $p = .86$, and the interaction effect, $F(1, 310) = 0.40$, $p = .53$, were non-significant.

Pre-service teachers' ratings on students' lack of social-emotional ability

There was no main effect for giftedness, $F(1, 310) = 0.49$, $p = .49$. We found a main effect for gender, $F(1, 310) = 27.23$, $p < .001$, partial $\eta^2 = .08$, indicating that pre-service

Table 3. Correlations between (partial) scalar factor dimensions of the questionnaire, social desirability, experience with the gifted, knowledge about giftedness, and independent variables.

	INT	SOE	MAL
INT	–		
SOE	–.19***	–	
MAL	–.12*	.48***	–
Social desirability	.01	–.17**	–.16**
Experiences with the gifted (1 = none, 5 = a lot)	.07	.06*	.01
Knowledge about giftedness (1 = none, 5 = a lot)	.08	.11*	.02
Independent variables (vignette)			
Giftedness (0 = average, 1 = gifted)	.34***	.05	.40***
Gender (0 = female, 1 = male)	.00	.28***	.29***

INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment. $N = 315$.

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

Table 4. Giftedness \times gender univariate analyses of variance for the three dependent variables including social desirability as covariate.

Independent variables and covariate	Dimensions	ANOVA		ANCOVA controlled for social desirability	
		$F(1, 310)$	partial η^2	$F(1, 294)$	partial η^2
Social desirability	INT			0.24	
	SOE			8.50**	.03
	MAL			7.36**	.02
Giftedness	INT	40.83***	.12	39.50***	.12
	SOE	0.49		0.31	
	MAL	62.21***	.17	57.73***	.16
Gender	INT	0.03		0.01	
	SOE	27.23***	.08	22.81***	.07
	MAL	35.87***	.10	31.37***	.10
Giftedness \times Gender	INT	0.40		0.38	
	SOE	3.55		3.19	
	MAL	15.01***	.05	13.13***	.04

Explained variance for the ANOVA: INT $R^2 = .12$, SOE $R^2 = .09$, MAL $R^2 = .27$. Explained variance for the ANCOVA: INT $R^2 = .12$, SOE $R^2 = .11$, MAL $R^2 = .29$. INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment.

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

teachers rated male students as less social-emotionally able than female students. The interaction effect was not significant, $F(1, 310) = 3.55$, $p = .06$.

Pre-service teachers' ratings on students' maladjustment

We found both a main effect for giftedness, $F(1, 310) = 62.21$, $p < .001$, partial $\eta^2 = .17$, and for gender, $F(1, 310) = 35.87$, $p < .001$, partial $\eta^2 = .10$. The interaction effect was significant, $F(1, 310) = 15.01$, $p < .001$, partial $\eta^2 = .05$, indicating that pre-service teachers perceived female average-ability students as less maladjusted than male average-ability students, $F(1, 310) = 46.47$, $p < .001$, partial $\eta^2 = .13$, but gifted male and female students as equally maladjusted, $F(1, 310) = 2.35$, $p = .13$,

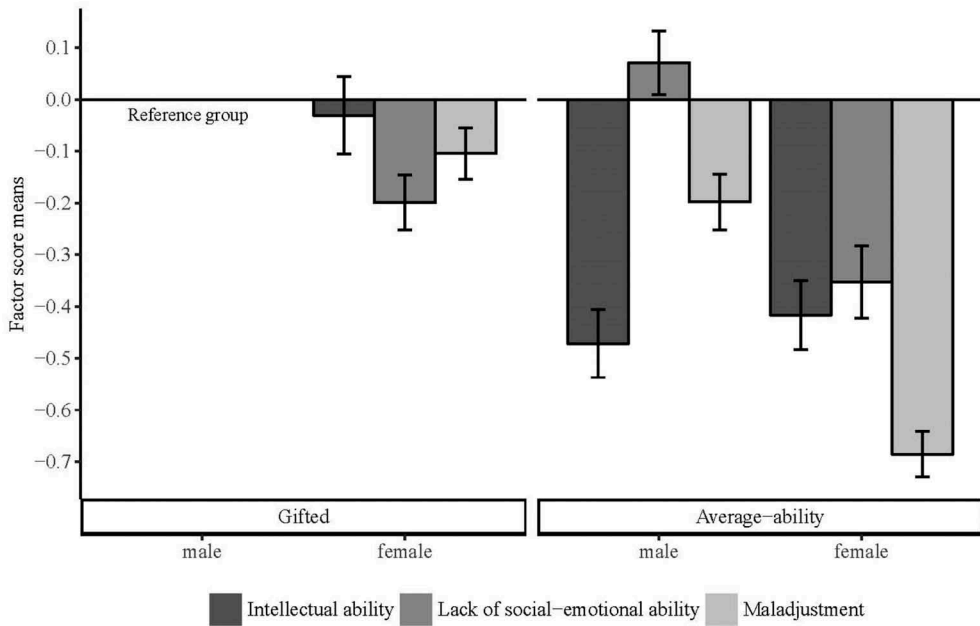


Figure 2. Factor score means of ratings on students' intellectual ability, lack of social-emotional ability, and maladjustment. The ratings on gifted male students served as the reference group.

and more maladjusted than average-ability students, $F(1, 310) = 62.21, p < .001$, partial $\eta^2 = .17$.

Control for social desirability

Social desirability as a covariate was significant for pre-service teachers' ratings on students' social-emotional ability, $F(1, 294) = 8.50, p = .004$, partial $\eta^2 = .03$, and adjustment, $F(1, 294) = 7.36, p = .01$, partial $\eta^2 = .02$, indicating that these ratings were affected by social desirability, but not the ratings on students' intellectual ability, $F(1, 294) = 0.24, p = .62$. When including the covariate, the explained variance increased slightly for all three dimensions (see Table 4).

Discussion

Stereotypes in teachers' beliefs are an important topic for teacher education because they might impair teachers providing for students' needs. Using a vignette approach, controlling for socially desirable responding, and applying rigorous statistical methods, this study investigated Australian pre-service teachers' stereotypes of gifted male and female students.

Our results showed that Australian pre-service teachers endorsed the disharmony hypothesis: They perceived gifted students as more intelligent but also as more maladjusted than average-ability students. This finding is in line with previous research in other countries (e.g., Baudson & Preckel, 2013, 2016) and consistent with an egalitarian

attitude that prevails in many democratic countries and particularly so in the Australian culture (e.g., Braggett, 1993; Gross, 1999; Kronborg, 2018; Plunkett & Kronborg, *in press*; Senate Employment, Workplace Relations, Small Business and Education References Committee, 2001).

Furthermore, we found evidence that Australian pre-service teachers endorsed gender stereotypes. Although Australian pre-service teachers rated male and female students' intellectual ability similarly, they rated male students' social-emotional abilities as lower and their maladjustment as higher compared to female students. This finding is in line with the "compliant girl" stereotype (Jones & Myhill, 2004).

Considering these findings so far, do stereotypes about giftedness and gender strike twice? We found that pre-service teachers perceived female average-ability students as less maladjusted than male average-ability students. However, gifted male and female students were perceived as equally more maladjusted compared to average-ability students. This finding is in contrast to the findings by Preckel et al. (2015) who found that pre-service teachers associated gifted male students most strongly with adjustment problems. However, Preckel et al. (2015) investigated implicit stereotypes, that is, beliefs of which people do not need to be aware, whereas we assessed explicit stereotypes, that is, beliefs that people consciously endorse. Explicit and implicit beliefs can be unrelated to each other (e.g., Gawronski & Bodenhausen, 2006). Thus, for giftedness and gender stereotypes, we conclude that stereotypes can strike twice in implicit beliefs, but for explicit beliefs, it seems that the disharmony belief overlies gender stereotypes.

With our vignette design, we implemented a standard approach that previous studies used to minimize socially desirable responding. Nevertheless, we found that social desirability affected pre-service teachers' ratings on students' non-cognitive characteristics. However, controlling for social desirability did not change the direction and significance of effects, but increased the percentage of explained variance. By accounting for pre-service teachers' social desirability, we decreased the error variance and hence increased the power of testing the effects of giftedness and gender. Future studies on stereotypes and giftedness (and other socially sensitive stereotypes) are well advised combining the vignette approach and the assessment and statistical control of individual differences in social desirability.

Limitations

Potential limitations of our study result from the unequal gender distribution in our sample. In today's Australian pre-service teachers, females are over-represented and thus in our sample as well. Due to the comparatively small number of male participants, it was not possible to include pre-service teachers' gender into our analyses. Follow-up studies should specifically recruit males to explore whether or not the teachers' own gender interacts with the gender of students when rating their ability and characteristics. Although previous research did not find such interactions (e.g., Preckel et al., 2015), they may show up in some cultures and under some conditions (e.g., in achievement domains where relevance for teachers' self-esteem might differ by gender).

We used a sample of pre-service teachers only. Thus, our results cannot be generalized to in-service teachers. However, previous research has shown that in-service and

pre-service teachers hold incorrect beliefs to a similar extent (e.g., Baudson & Preckel, 2013, 2016), but these findings need replication.

Implications for practice

Consequences: why teachers' stereotypes are challenging

Stereotypes often guide judgements and decisions because people believe in their accuracy (Smith, Mackie, & Claypool, 2014). People prefer stereotype confirming over disconfirming information and tend to interpret ambiguous information as stereotype-consistent (Smith et al., 2014). When making important judgements, such as identifying gifted students, teachers are at risk of preferring or putting more weight on information about individual students that is consistent with their stereotypes. Counteracting this bias requires knowledge about one's stereotypes, their (partial) incorrectness, as well as motivation and cognitive capacity to avoid these biases. Teachers who endorse the disharmony hypothesis are prone to identify students as gifted who are not only exceptionally bright but also maladjusted. Thus, exceptionally bright students who are not simultaneously maladjusted might be overlooked. Such false negative judgments will inevitably limit learning for gifted students who function well and do not lack social-emotional skills. Because maladjustment is implicitly associated with giftedness and being male (Preckel et al., 2015), gifted female students are particularly likely to be overlooked as being gifted. To the extent that parents and students themselves accept the disharmony hypothesis, biased judgments and decisions due to teacher stereotypes will be amplified (Berlin, 2009).

Stereotypes that are in line with the disharmony hypothesis might also influence teachers' expectations and behaviour towards students in class, thus shaping gifted students' learning opportunities. While attributing high intellectual ability to gifted students might lead to high achievement expectations for these students, the attribution of maladjustment might fuel the expectation of related difficulties, thereby enhancing gifted students' risk for negative development (for a profound discussion, see Preckel et al., 2015). In relation to this, a "stigma of giftedness" can have negative effects for gifted students' actualization of potential but can also contribute to feelings of stigmatization and thus to negative personality development (Cross, 2005; Rimm, 2002). To avoid the confrontation with negative stereotypes towards giftedness, gifted students can apply a variety of strategies such as hiding or denying their giftedness (Swiatek, 2001). Faced with stereotype-consistent expectations, students may also adapt to stereotypical role behaviour to fulfil the expectations that are placed on them (self-fulfilling prophecy; Jussim & Harber, 2005). Stereotypes can thus directly affect students' behaviour. As a consequence of gender stereotypes, female and male students may endorse gender stereotypes, as they try to fit in as a "real girl" or a "real boy", thus impairing the development of their "gender atypical" skills, interests, and personality.

Teacher education: how to overcome teachers' stereotypes

What could be done to enable Australian teachers to discard stereotypes and provide for gifted students' needs? Our findings stress the importance of teachers' knowledge of (1) giftedness and (2) the consequences of stereotyping students. Mandatory modules on the education of the gifted that provide a setting in which teachers learn about conceptions of

giftedness and can reflect on their stereotypes should be integrated in their curriculum. Several studies on teachers' attitudes towards the education of the gifted showed that stereotypes can be changed through information transfer and contact (e.g., Goodnough, 2001; Jung, 2014; Lassig, 2009; Plunkett & Kronborg, 2011). Whether such modules also have an effect on stereotypes about giftedness and gender still needs to be explored: For example, by comparing teachers who participated in a module on teaching gifted girls and boys, and learning about giftedness and its implications and teachers who did not. These modules should be mandatory because of self-selection effects: Teachers who are already very knowledgeable and/or do not hold stereotypes about gifted students in the first place are likely to self-select into these courses.

To break mechanisms that hinder stereotype change, such as attribution (explaining information away), subtyping, and contrast effects (Smith et al., 2014), contact with the stereotyped group, here gifted students, has proved to be effective (Kenworthy, Turner, Hewstone, & Voci, 2005). Thus, teacher education programmes should therefore (1) provide repeated contact with gifted students that makes stereotype-inconsistent experiences plentiful because counter-stereotypic behaviour could easily be explained away as unstable over time or as a result of special circumstances when only meeting once or twice. Moreover, teachers should (2) meet many gifted students to avoid teachers forming expectations and reassigning students to subtypes, while the initial giftedness stereotype remains the same. Furthermore, it must be ensured that (3) stereotype-disconfirming information comes from typical gifted students and provides strong and consistent reminders of their group membership (Smith et al., 2014). For example, this could be reached by letting pre- and in-service teachers teach, or at least observe in classes, for the gifted repeatedly.

Conclusion

Stereotypes are one core aspect of teachers' beliefs and thus, a component of their professional competencies (e.g., Kunter et al., 2013). Our study contributes to a deeper understanding of (pre-service) teachers' stereotypes about giftedness and gender. We found that pre-service teachers in Australia endorsed the disharmony hypothesis, suggesting that gifted individuals are equipped with high intellectual ability, but show adjustment difficulties compared to individuals with average-ability, and "typical" gender stereotypes. Those stereotypes are not in line with actual student characteristics, which implies a substantial risk for discrimination when relying on these stereotypes.

Stereotypes are linked to expectations about behaviour. As we know that expectations about behaviour have self-fulfilling power, students might eventually adapt to stereotypes they encounter, which would be highly undesirable. Therefore, teachers need to be informed about the incorrectness of their stereotypes. Furthermore, targeted supervision might be advised in order to assure that discrimination based on flawed stereotypes does not happen.

To change stereotypes, teachers need to understand the nature of giftedness, reflect on their beliefs to be aware of their own stereotypes, and know the possible effects of stereotypes on their behaviour in class as well as on students' development. Then, they have the opportunity to restructure their assumptions. Possible ways for successfully

reducing stereotypes are to provide contact with gifted students and to offer a setting that allows reflection on one's own stereotypes about giftedness and gender. Furthermore, we recommend that (pre-service) teacher education programmes integrate mandatory modules on the education of the gifted in the curriculum.

With our study, we hope to motivate further research in this vein to offer more evidence based means for changing inadequate stereotypes about gifted boys and girls.

Ethics statement included in body of manuscript

Before administering this study, we obtained the approval of the Human Subjects and Ethics Committee. Participants were given informed consent forms before data collection.

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Notes on contributors

Svenja Matheis, M.Sc., is currently obtaining her PhD at the DFG-Graduate School "Teaching & Learning Processes" (UpGrade), University of Koblenz-Landau, Germany. She is associated with the Department of Psychology, Research Group Personality, Psychological Assessment, and Psychological Methods. Her research focuses on giftedness, teacher motivation, and teacher personality.

Lena Kristina Keller, M.Sc., is currently a PhD student at the International Max Planck Research School on the Life Course (LIFE) and associated with the Department of Educational Science, research group for Quantitative Methods in Educational Science, Potsdam University, Germany, and the Department of Education and Psychology, Freie Universität Berlin, Germany. Her research focuses on individual differences in and effects of students' achievement and achievement motivation.

Leonie Kronborg, PhD, is a senior lecturer and coordinator of gifted education. She teaches gifted education and talent development to pre-service and postgraduate teachers at Monash University, Victoria, Australia. Her research focuses on education of gifted students, teacher education, talent development and gender.

Manfred Schmitt is full professor of personality and psychological assessment at the Department of Psychology and director of the Methodology Centre at the University of Koblenz-Landau, Germany. His research interests include social justice, moral emotions, prosocial behaviour, latent state-trait theory, dual process models of behaviour, personality and information processing.

Franzis Preckel is full professor of giftedness research and education at the Department of Psychology, University of Trier, Germany. Her research focuses on intelligence, giftedness, and psychological assessment. She is especially interested in factors influencing talent development.

ORCID

Svenja Matheis  <http://orcid.org/0000-0002-1189-5714>

Lena Kristina Keller  <http://orcid.org/0000-0002-3242-0208>

Leonie Kronborg  <http://orcid.org/0000-0002-7100-2164>

Franzis Preckel  <http://orcid.org/0000-0002-5768-8702>

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Appendix

Appendix 1. Tests for measurement invariance for the three dimensions of the questionnaire across online ($n = 46$) and random hard-copy sample ($n = 30$) for male vignette with Satorra-Bentler correction in χ^2 -difference testing for MLR estimator.

Model	χ^2	<i>df</i>	<i>p</i>	CFI	Comparison	Δ CFI	$\Delta\chi^2$	Δ <i>df</i>	$p(\Delta\chi^2)$
INT									
1. Configural	11.615	10	.312	.990					
2. Metric	13.819	14	.463	1.000	2 vs. 1	.001	2.295	4	.682
3. Partial Scalar	15.802	17	.538	1.000	3 vs. 2	.000	1.558	3	.669
4. Strict	24.552	22	.319	.985	4 vs. 3	.015	8.465	5	.132
SOE									
1. Configural	3.049	4	.550	1.000					
2. Metric	4.662	7	.701	1.000	2 vs. 1	.000	1.472	3	.689
3. Scalar	7.002	10	.725	1.000	3 vs. 2	.000	2.375	3	.498
4. Strict	13.049	14	.526	1.000	4 vs. 3	.000	5.643	4	.228
MAL									
1. Configural	1.115	4	.892	1.000					
2. Metric	7.048	7	.424	.999	2 vs. 1	.001	5.535	3	.137
3. Partial Scalar	6.191	8	.626	1.000	3 vs. 2	.001	1.967	1	.161
4. Strict	23.111	12	.027	.832	4 vs. 3	.168	18.918	4	.001

$N = 92$. *df* = degrees of freedom; CFI = comparative fit index. INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment.

Appendix 2. Tests for measurement invariance for the three dimensions of the questionnaire with MGCFA (four vignette groups) with Satorra-Bentler correction in χ^2 -difference testing for MLR estimator.

Model	χ^2	<i>df</i>	<i>p</i>	CFI	Comparison	Δ CFI	$\Delta\chi^2$	Δ <i>df</i>	$p(\Delta\chi^2)$
INT									
1. Configural	26.024	20	.165	.985					
2. Metric	34.664	32	.342	.993	2 vs. 1	.008	9.240	12	.682
3. Partial Scalar	48.148	41	.380	.995	3 vs. 2	.002	8.221	9	.512
4. Strict	73.691	56	.057	.955	4 vs. 3	.040	28.340	15	.020
SOE									
1. Configural	4.828	8	.776	1.000					
2. Metric	16.735	17	.473	1.000	2 vs. 1	.000	12.210	9	.202
3. Scalar	23.188	26	.622	1.000	3 vs. 2	.000	6.209	9	.719
4. Strict	41.112	38	.336	.986	4 vs. 3	.014	17.995	12	.116
MAL									
1. Configural	4.169	8	.842	1.000					
2. Metric	17.900	17	.395	.994	2 vs. 1	.006	13.657	9	.135
3. Partial Scalar	21.899	21	.405	.994	3 vs. 2	.000	3.984	4	.408
4. Strict	33.255	33	.455	.998	4 vs. 3	.004	11.364	12	.498

N = 315. MGCFA = multi-group confirmatory factor analysis; *df* = degrees of freedom; CFI = comparative fit index. INT = intellectual ability; SOE = lack of social-emotional ability; MAL = maladjustment.