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Grade Skipping From the Perspective of Teachers in Germany: The Links Between Teachers' Decisions, Acceptance, and Perceived Knowledge

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Abstract

The present study explored teachers' perspectives on one specific type of acceleration, namely, grade skipping. In addition, we investigated the extent to which teachers' beliefs about students' academic, motivational, and social development after grade skipping may explain teachers' acceptance of this accelerative strategy. Moreover, we examined whether teachers' acceptance is linked to their decisions about using this intervention. Using data from the PARS project, which included 316 teachers from 18 secondary schools in the German federal state of North Rhine-Westphalia, we assessed teachers' acceptance, beliefs, and perceived knowledge about grade skipping using 4-point rating scales. Teachers also reported whether they had advised a student to skip a grade. Multilevel regression analyses indicated that teachers' beliefs about students' social, motivational, and academic development largely explained their acceptance. Teachers who showed a higher level of acceptance and perceived knowledge were more likely to have recommended grade skipping before. Educational implications are discussed.

Keywords

grade skipping, teacher knowledge, teacher beliefs and practices, teacher attitudes, acceleration

While teachers play a crucial role in the success of grade skipping, the extent of teachers' acceptance of, beliefs in and knowledge about such measures, especially in Germany, remains unclear. A recent study concluded that “teachers in the field [of gifted education] may have begun to accept the research that supports the use of acceleration for high-ability students” (Siegle, Wilson, & Little, 2013, p. 44). The results of this study showed that the beliefs and attitudes of a sample of gifted educators were generally in favor of accelerative strategies, but the authors pointed out that these attitudes might not necessarily produce behaviors that promote accelerative practices for gifted students. Moreover, when asked about specific accelerative practices, gifted educators were less enthusiastic about one practice that “has shown the most positive effects across acceleration techniques” (Cross, Andersen, & Mammadov, 2015, p. 40), namely, grade skipping. We examined teachers' acceptance of and beliefs about this specific form of acceleration in the present article using a sample of German secondary teachers. More precisely, we focused on teachers' beliefs about different aspects of students' development after skipping a grade and how these beliefs are related to teachers' acceptance of this practice. In addition, we investigated whether teachers who expressed more positive attitudes about grade skipping were also more likely to have previously recommended grade skipping, and we considered the roles that teachers' perceived knowledge

and their experience with teaching students who had skipped a grade might play in this regard.

The Idea of Grade Skipping, Its Prevalence, and Its Effects on Students' Development

Acceleration is understood as proceeding through school or any other educational training at a faster pace than typical (Pressey, 1949). Grade skipping is one of the most well-known forms of acceleration and is, like other acceleration measures (for an overview, see Southern & Jones, 2004, 2015), believed to establish a better fit between a gifted student's needs and the learning environment. Thus, it is aimed at creating an optimal placement that offers an appropriate level of challenge. Grade skipping may be indicated for students who show academic achievement that is higher than the average level of the next grade, a high motivation for learning, and no severe social or emotional adjustment problems (Culross, Jolly, & Winkler, 2013). It is

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also believed to counteract the underachievement that might result from cognitive underload. In general, empirical studies have confirmed the expected positive effects of grade skipping on students' academic achievement (for reviews and meta-analyses, see Kulik, 2004; Rogers, 2015; Steenbergen-Hu & Moon, 2011; for a recent study using propensity score matching, see Kretschmann, Vock, & Lüdtke, 2014a). These studies indicate that students who have skipped a grade outperform their same age and same ability peers who did not skip a grade and that accelerated students are able to keep up with their equally intelligent, older classmates. Results on the social and emotional development of students who have skipped a grade are more controversial, which may be partly attributable to the great variety of social and psychological outcomes under investigation. Whereas some studies have found no or slightly positive overall effects (Kulik, 2004; Steenbergen-Hu & Moon, 2011), a recent meta-analysis concluded that there appear to be moderate positive effects on students' socio-emotional well-being (Rogers, 2015). Therefore, grade skipping can be an effective way of supporting gifted students and students with excellent academic achievements.

In Germany, skipping a grade level is rooted in the Schulgesetze (Education Acts) of all federal states as a possible intervention method. Along with increased flexibility in laws during the past two decades, there has been a considerable increase in grade skipping (Heinbokel, 2001). In the 2011-2012 school year, approximately 0.04% ($N = 2,576$) of the student population in Germany skipped a grade (Heinbokel, n.d.; Statistical Offices of the Federation and the Länder, 2012). The incidence of grade skipping in Germany is in line with international rates. There is only a little information about the rate of grade skipping in the United States. However, a study by Wells, Lohman, and Marron (2009) showed, for example, that in 2002, 0.6% of a nationally representative sample of 10th-grade students in the United States had skipped a grade at some point during their school career.

Teachers' Roles in Implementing Grade Skipping and Their Acceptance of This Strategy

When grade skipping might be an option for a specific student, teachers play a crucial role. First, teachers' perceptions of grade skipping might determine whether they communicate to parents and students that the option of skipping a grade even exists. Second, if students or parents themselves know about grade skipping and view it as a possible option, teachers who are not convinced that grade skipping is a feasible strategy might emphasize the potential negative effects of grade skipping, and this could in turn keep students and parents from considering it as an option (Southern & Jones, 2004). These first two points underscore the importance of teachers' acceptance of acceleration for its implementation. Third, a favorable attitude of the teacher of the new grade toward academic acceleration can be a critical factor that

contributes to the success of this intervention; conversely, a negative attitude can play a role in its failure (Bailey, 2004; Benbow, 1998; Davis & Rimm, 2004; Vock, Preckel, & Holling, 2007). Consequently, the first question that must be asked prior to any supportive measure that is offered to gifted students is: What are the teachers' attitudes toward grade skipping (Davis & Rimm, 2004)?

Internationally, teachers still regard grade skipping with some reservation (Colangelo, Assouline, & Lupkowski-Shoplik, 2004). In a sample of 300 Dutch secondary teachers, almost all evaluated grade skipping (occasionally or always) as an appropriate intervention for gifted students (Hoogeveen, van Hell, & Verhoeven, 2005), but recent studies from the United States showed somewhat different results. McCoach and Siegle (2007) surveyed 272 American teachers: Although providing gifted education was usually viewed positively, approximately 67% were ambivalent and 24% had negative attitudes toward skipping a grade. Apparently, teachers view grade skipping as riskier than other forms of acceleration. Similarly, in a sample of gifted educators who were generally in favor of accelerative measures, Siegle et al. (2013) found that, although grade skipping was viewed quite positively overall, it was still the least favored fast-tracking option besides early entrance to kindergarten. Consequently, U.S. guidance counselors recommended grade skipping less frequently than other fast-tracking options such as dual enrollment or advanced placement (Wood, Portman, Cigrand, & Colangelo, 2010). The authors interpreted these findings as indicating that skipping a grade is seen as a more "radical" measure, which carries the risk of negative consequences for social and emotional adjustment because a return to the former class is virtually impossible or would at least constitute a public failure. Grade skipping in the United States is apparently considered only when all other available options have already been exhausted, or as Southern and Jones (1992) stated, "like surgery, it is viewed as a treatment of last resort" (p. 35).

According to Heinbokel (1997), grade skipping has predominantly been seen as an unfavorable action among German teachers. Nevertheless, German teachers' interest in grade skipping has increased, and opinions toward it have become more positive ever since grade skipping became possible in all states (Heinbokel, 1997). A study by Sparfeldt, Schilling, and Rost (2004) revealed that in a sample of 185 teachers who had a highly intelligent student in their third-grade classroom, attitudes toward grade skipping were rather favorable. However, there was one limitation to these positive attitudes: In general, grade skipping was seen as a desirable measure, but when teachers were asked to rate whether grade skipping would be desirable for specific students in their classroom, they revealed a largely negative attitude (Sparfeldt et al., 2004). Although these findings are intriguing, the data presented in these studies had been collected more than a decade ago, in the 1990s. During the past decade, more research-based literature on gifted education has been

available in Germany (Heinbokel, 2001; Preckel & Vock, 2013; Vock, 2008). However, there is a need to determine whether the teachers are familiar with this literature and whether it has affected their perspectives on this accelerative technique.

Toward a Better Understanding of Teachers' Beliefs, Their Acceptance of Grade Skipping, and Their Decision to Implement It

Obtaining a more detailed understanding of educators' beliefs about grade skipping may be relevant for creating teacher training programs on acceleration. More specifically, such an understanding may enable professionals to determine which attitudes need to be addressed and what kinds of knowledge and skills need to be promoted to enable educators to develop a professional understanding of acceleration (Croft & Wood, 2015). Previous research has shown that educators hold differentiated beliefs about grade skipping. Southern, Jones, and Fiscus (1989) reported four general concerns that educators associate with grade skipping or early admission to primary school: They are especially worried about the academic performance difficulties as well as the social and emotional difficulties that students might face. Socioemotional difficulties are suspected because students are younger than their classmates and might not have sufficient physical and emotional resources to cope with the additional stress. There is also concern that students would fail to gain any leadership experience. Similarly, Hoogeveen et al. (2005) identified four dimensions underlying Dutch teachers' beliefs about grade skipping, which the authors referred to as opinions about "school motivation and achievement," "social competence," "emotional problems," and "isolation." These beliefs were positively correlated with the acceptance of grade skipping.

Moreover, in a more recent study, Siegle et al. (2013) developed a 67-item survey by asking teachers and researchers to list beliefs that had prevented the educators from implementing various forms of acceleration. The authors administered this survey in a sample of gifted educators and examined which of these beliefs about various accelerative strategies contributed the most to teachers' acceptance of grade skipping. They found that five specific beliefs predicted 37% of the variance in educators' attitudes toward grade skipping, three of which were clearly social concerns ("suffer socially," "miss old friends," "not able to relate to new classmates") and a fourth one that pointed in that direction as well ("put into situations that are not safe"). Teachers' attitudes were also closely linked to teachers' beliefs about academic challenges.

These studies are insightful and informative. As different accelerative strategies may diverge in the pacing of instruction and their salience (Southern & Jones, 2015), educators might hold different beliefs about grade skipping as compared with other accelerative practices. In addition,

educators' beliefs may have changed in the past decade, and it might also be interesting to explore teachers' beliefs in the context of another educational system. Moreover, there is a need for more evidence about how these beliefs affect teachers' acceptance. Therefore, the focus of our study was on examining German teachers' beliefs about different aspects of students' development after grade skipping and how these beliefs would be related to teachers' acceptance of this accelerative strategy.

Whereas teachers' acceptance of grade skipping may closely rely on what teachers believe about students' development after skipping a grade, there might also be other aspects that play a role. As such, teachers' acceptance of an educational policy might depend heavily on their beliefs about it but also on their knowledge (Drake, 2006). Often, teachers' negatively tinged attitudes toward giftedness and gifted education can primarily be attributed to a lack of knowledge and understanding (Clark, 2002; Gross, 1994; Vock et al., 2007), and there is evidence that informing teachers about grade skipping might improve their acceptance of it (Hoogeveen et al., 2005). In addition, as Vock et al. (2007) argue, increases in the frequency of grade skipping that have been reported in Germany might in fact have led to increases in awareness and in turn to more favorable attitudes. Thus, the amount of experience that teachers have with students who have skipped a grade may contribute to teachers' acceptance, too. Accordingly, Hoogeveen et al. (2005) showed that teachers' attitudes toward grade skipping were associated with the extent to which they had experience in dealing with accelerated students. Therefore, in the current study, we took into account teachers' perceptions of their knowledge and their experience with students who had skipped a grade when exploring the role that teachers' beliefs about students' development after grade skipping play in teachers' acceptance.

Finally, Croft and Wood (2015) proposed that the development of teachers' attitudes may potentially lead teachers to use accelerative strategies more often. However, in the literature, there has been some concern about whether a better acceptance of accelerative strategies actually translates into more frequent use of these strategies for students who may benefit from it (Siegle et al., 2013). In addition, it has been argued that providing teachers with relevant knowledge and information about acceleration may be crucial for its implementation (Croft & Wood, 2015). Moreover, teachers who are familiar with and have been involved in teaching students who had skipped a grade may be more likely to implement this strategy themselves. Although we could not test these ideas in the present study, we used a proxy for teachers' decisions to implement grade skipping, namely, teachers' previous recommendations for grade skipping, in order to examine how closely teachers' acceptance, their perceived knowledge, and their experience with grade skipping would be related to teachers' recommendations for students to skip a grade.

The Present Research

Most of the research on teachers' perspectives on grade skipping in Germany was conducted more than a decade ago when much less research-based information about this strategy was available. Thus, one purpose of the current study was to examine teachers' current acceptance of grade skipping, their experience with teaching students who had skipped a grade, and teachers' perceptions of their own level of knowledge about grade skipping in a sample of German secondary teachers. In addition, the present study was aimed at increasing our understanding of teachers' specific beliefs about different aspects of students' development after grade skipping. We hypothesized that these beliefs would differentially explain teachers' acceptance of grade skipping. Finally, with this study, we attempted to clarify how teachers who had previously recommended grade skipping differed from teachers who had not in terms of their acceptance of the measure, the extent of their experience, and their perceived knowledge about grade skipping.

Method

Sample

The study was based on data from the PARS project (Panel Study at the Research School Education and Capabilities; Bos et al., in press), which was conducted in the German federal state of North Rhine-Westphalia. The PARS study was aimed at evaluating the effects of variability in learning conditions on students' achievement. As part of the study, teachers were surveyed on their knowledge, experience, and attitudes toward grade skipping. The study was designed longitudinally. We present results from the first online survey of teachers conducted in the spring of 2010. Participation was voluntary for schools and the teachers within these schools. Our sample included 316 secondary teachers (60% female; $M = 15$ years of teaching experience, $SD = 11.8$; see Table 1 for teacher demographics) who taught different subjects (main subject: 24% German, 18% mathematics, 15% English, 15% science, 7% social science, 10% other foreign language, 11% other subjects). In Germany, secondary schools follow different tracks, and the college-bound academic track is called the Gymnasium. Some federal states additionally offer comprehensive schools, which follow no specific tracks but provide courses of various difficulty levels for each subject. In PARS, teachers from 15 academic-track secondary schools (Gymnasien; 87%) and three comprehensive schools (Gesamtschulen; 13%) participated. The average participation rate of teachers per school was 21%. Principals of 15 participating schools reported a mean rate of grade skipping. While there was one school with an outlying rate of 11% skippers, the mean rate of the other 14 schools was 0.03% and therefore very similar to the rate found in the student population in Germany (0.04%; Heinbokel, n.d.; Statistical Offices of the Federation and the Länder, 2012) and to the rate for secondary schools in North

Table 1. Demographic Information.

	N	%
Gender		
Male	128	40.5
Female	188	59.5
Years of teaching experience		
Less than 5	71	22.5
5 to 10	79	25.0
11 to 20	66	20.9
More than 20	100	31.6
Main subject		
German	77	24.4
Mathematics	58	18.4
English	46	14.6
Science	47	14.9
Social science	22	7.0
Other foreign language	32	10.1
Other subject	34	10.8
Type of secondary school		
Academic-track school	274	86.7
Comprehensive school	42	13.3
Number of students per school ^a		
400 to 800	30	9.4
801 to 1,200	195	61.7
1,201 to 1,650	82	25.9

Note. Statistics are based on the imputed data ($N = 316$).

^aReported by principals, missing for one school ($n = 9$ teachers).

Rhine-Westphalia (0.03%; Heinbokel, n.d.; Statistical Offices of the Federation and the Länder, 2012).

Measures

The online survey that we administered comprised (a) 10 items on the acceptance of grade skipping, (b) 17 items on beliefs about students' development after skipping a grade, (c) 4 items on teachers' perceptions of their level of knowledge, (d) 3 items on teachers' previous experience teaching students who skipped a grade, and (e) 2 items on teachers' previous recommendations for grade skipping. These items and scales were specifically developed for our study. The items were derived from the authors' own experiences in teacher training for gifted education and from the research literature (see Table 2 for key articles and instruments that helped inform the items). In order to ensure content validity, our research group discussed the items intensively in terms of their clarity and comprehensibility, and we carefully checked whether the items accurately reflected the construct we intended to measure. In the following section, we present our instruments and evidence for their internal reliability and factorial validity.

Acceptance of Grade Skipping. A widely used scale that measures teachers' attitudes about gifted education is Gagné and Nadeau's (1991) "Opinions About the Gifted and Their

Table 2. Instruments and Key Articles Considered for the Development of the Items.

Instruments				
Opinions about the gifted and their education instrument (Gagné & Nadeau, 1991)				
Questionnaire on teacher attitudes about acceleration and accelerated students (Hooegeveen et al., 2005)				
Questionnaire on the presumed effects of acceleration (Southern et al., 1989)				
Research articles				
First author	Year	Country	Type of article	Dimension
Heinbokel	2001	Germany	Empirical	a + s + e/m
Hooegeveen	2009	Netherlands	Empirical	s + e/m
Kulik	2004	United States	Meta-analytic	a + s + e/m
Robinson	2004	United States	Meta-analytic	s + e/m
Rogers	2004	United States	Meta-analytic	a
Vock	2007	Germany	Review	a + s + e/m

Note. a = academic development; s = social development; e/m = emotional or motivational development.

Table 3. Results of the Factor Analysis of the Items Measuring Teachers' Acceptance.

Items	Factor 1
Appropriate way to foster high-achieving students	0.78
Better alternative than skipping a grade	-0.72
Can be helpful for some students	0.76
Not in favor of letting students skip a grade	-0.75
The best solution in some cases	0.74
Teachers should adapt their teaching to foster gifted students instead of recommending that students skip a grade	-0.55
Appropriate way to foster high-achieving students in some grade levels	0.78
If a student skips a grade, the teachers have failed	-0.32
Should only be considered if all other options have been exhausted	-0.48
More students should be encouraged to skip a grade	0.55

Education" instrument, which also comprises a subscale that captures attitudes toward acceleration. However, this subscale includes items on educators' general acceptance of and beliefs about students' development after grade skipping. We therefore decided to create a scale that would be more appropriate for the purposes of our study. We developed 10 items to measure teachers' general acceptance of grade skipping (e.g., "In my opinion, grade skipping is an appropriate way to foster high-achieving students"). Items had a 4-point response scale (1 = *disagree*, 4 = *agree*). We conducted an exploratory factor analysis¹ on the 10 items. Using principal component analysis and applying parallel analysis (O'Connor, 2000), we extracted one factor that explained 43.6% of the total variance of the 10 items (see Table 3 for factor loadings). Cronbach's alpha was .89.

Beliefs About Students' Development After Skipping a Grade. Using the research literature on the effects of grade

skipping on students' development, we identified three relevant dimensions, namely, students' academic development, students' social development, and their motivational and emotional development after skipping a grade (e.g., Robinson, 2004; Rogers, 2004, 2015). We also reviewed the scales used in previous studies on teachers' concerns about acceleration (Hooegeveen et al., 2005; Southern et al., 1989). The focus of these studies was slightly different than ours as the items additionally captured beliefs about early admission to primary school (Southern et al., 1989; e.g., ". . . will be deprived of necessary early childhood experiences") and grade skipping in primary school (Hooegeveen et al., 2005; e.g., "Not accelerate a gifted student in primary school leads to problems in secondary school"). In addition, some of the items assessed a general acceptance of acceleration instead of more specific beliefs about students' development after grade skipping (e.g., "acceleration is unnecessary," "acceleration is not as suitable as enrichment"). Thus, we decided to design items specifically for our study while adapting some of the aspects captured by Southern et al.'s (1989) and Hooegeveen et al.'s (2005) instruments. To assess teachers' beliefs about possible effects of grade skipping on students' development, we created 17 items (e.g., "After the acceleration, the student will show good achievement in school"). Teachers rated the items on a 4-point response scale (1 = *unlikely*, 4 = *probable*). We applied exploratory factor analysis¹ to the 17 items. Using principal component analysis, we extracted three factors that accounted for 44.0% of the total variance of the 17 items. We made use of parallel analysis (O'Connor, 2000) to determine the number of factors to extract. We used an oblique rotation because we expected the factors to be correlated. The rotated solution resulted in three interpretable factors: (a) beliefs about students' social integration, (b) beliefs about students' academic development, and (c) beliefs about students' motivational development. Individually, the three factors explained 25.1% (beliefs about students' social integration), 10.1% (beliefs about students' academic development), and 8.8%

Table 4. Results of the Factor Analysis of the Items Measuring Teachers' Beliefs About Students' Development After Skipping a Grade.

Items	Factors		
	1	2	3
Factor I: Beliefs about social integration			
Accepted in new class	0.71	-0.10	-0.23
Not accepted in new class	-0.75	0.18	0.08
Trouble finding friends in new class	-0.66	0.09	0.20
Find friends more easily	0.21	-0.06	-0.38
Suffer emotional adjustment problems	-0.57	0.22	0.49
Arrogant because of unusual position	-0.52	0.08	0.15
Difficulties because of his or her younger age	-0.64	0.36	0.25
Less socially adjusted in the long term	-0.63	0.32	0.45
Factor II: Beliefs about academic development			
Difficulties catching up	0.07	-0.64	-0.12
Still good academic performance	0.08	0.59	0.40
Worse academic performance	0.15	-0.76	-0.11
Suffer from cognitive strain	0.15	-0.62	0.03
No time for leisure because of academic pressure	0.31	-0.53	-0.31
Still not challenged mentally	0.16	0.03	0.11
Factor III: Beliefs about motivational development			
Greater motivation for learning	-0.11	0.20	0.76
Greater enjoyment of learning	-0.16	0.22	0.80
More self-confidence	-0.29	0.13	0.68

Table 5. Results of the Factor Analysis of the Items Measuring Teachers' Perceived Knowledge.

Items	Factor I
Knowledge about statutory school regulations involving grade skipping	0.81
Knowledge about personal attributes a student needs to successfully skip a grade	0.82
Competence to consult parents and students about grade skipping	0.67
Level of training on grade skipping	0.83

(beliefs about students' motivational development) of the variance that existed before rotation. The item loadings on each respective factor were above 0.52 with the exception of two items that showed factor loadings of 0.21 ("After the acceleration, the student will find friends more easily") and 0.03 ("After the acceleration, the student will still not be challenged mentally"; see Table 4 for factor loadings after oblique rotation). The latter item was subsequently excluded. The Cronbach's alpha values of these scales ranged from .71 (beliefs about academic development) to .86 (beliefs about social integration; see Table 6).

Perceived Knowledge About Grade Skipping. Four items were developed to assess teachers' perceptions of their knowledge about grade skipping. This instrument covered teachers' self-reported knowledge about statutory school regulations involving grade skipping, personal attributes a student needs

to successfully skip a grade, consulting competence, and level of training. Teachers rated the four items on a 4-point response scale (1 = *disagree*, 4 = *agree*). Exploratory factor analysis¹ was applied to the four items, and one factor was extracted with principal component analysis. We used parallel analysis (O'Connor, 2000) to determine the number of factors to retain. The one extracted factor accounted for 61.8% of the total variance of the four items (see Table 5 for factor loadings). Cronbach's alpha was .86.

Personal Experience With Students Who Skipped a Grade. Teachers' experience teaching students who skipped a grade was measured by asking "Have you already taught students who skipped a grade?" (0 = *no*, 1 = *yes*). Teachers who had experience reported the number of skippers they had taught. In addition, teachers with previous experience rated their experience (1 = *mostly negative*, 2 = *sometimes positive, sometimes negative*, 3 = *mostly positive*).

Recommendation Decision. Whether teachers had recommended grade skipping themselves was assessed by the item "Have you ever recommended that a student should skip a grade?" (0 = *no*, 1 = *yes*). Teachers who had recommended skipping reported the number of students they had advised to skip a grade.

Statistical Analyses and Missing Values

As our data had a hierarchical structure with teachers nested in schools, the assumption of independent observations

Table 6. Descriptive Statistics and Correlations for Study Variables.

Variable	M	SD	N _{Items}	Cronbach's alpha ^a	1	2	3	4	5	6	7	8	9	10	11
Social beliefs	2.69	0.40	8	.86	—	.44	.34	.14	.49	-.28	-.42	.61	.08	.23	.09
Motivational beliefs	3.01	0.46	3	.80			.27	.10	.34	-.17	-.33	.52	.01	.12	.03
Academic beliefs	2.94	0.34	5	.71				.20	.29	-.22	-.14	.37	.09	.18	.07
Perceived knowledge	2.37	0.75	4	.86				.09	.09	-.12	.04	.10	.25	.38	.40
Positive experience ^b	0.68	0.44	1 ^c	—						-.85	-.40	.56	.03	.20	.03
Mixed experience ^b	0.25	0.26	1 ^c	—							-.13	-.36	-.02	-.16	-.05
Negative experience ^b	0.07	0.47	1 ^c	—								-.41	-.03	-.08	.03
Acceptance	2.99	0.48	10	.89									.01	.18	.10
Number of skipped students taught	5.12	11.17	1	—										.53	.18
Number of students advised to skip a grade	1.12	3.50	1	—											.21
Years of teaching experience	15.08	11.80	1	—											—

Note. Statistics were computed on the scale scores of the imputed data (N = 316). Significant values are printed in bold ($p < .05$).

^aCronbach's alpha values were computed on the original data, before multiple imputation was applied. ^bInformation based on $n = 227$ teachers with previous experience teaching grade skippers. ^cOne item with three response options: positive versus mixed versus negative experience.

required for ordinary least-squares regression (Cohen, Cohen, West, & Aiken, 2003) was not met. This could potentially lead to an underestimation of standard errors and exaggerated p values (Snijders & Bosker, 1999). Therefore, we conducted multilevel regression analyses that took the nested data structure into account and divided the variance of the dependent variable into two levels (variance accounted for on the teacher level vs. on the school level). Consistent with our research questions, we report findings only on the teacher level. Prior to the analyses, the continuous outcome variable and all continuous predictors were z -standardized by the means and standard deviations of the respective variables in our sample. In the analyses, we grand mean centered all continuous predictors.

First, descriptive statistics will be presented to describe teachers' perspectives on grade skipping. Second, to test the extent to which teachers' acceptance of grade skipping could be explained by teachers' beliefs, perceived knowledge, and amount of experience teaching students who skipped a grade, we performed hierarchical linear modeling with teachers' acceptance as the dependent variable (averaged across items) in HLM 6.08 (Raudenbush, Bryk, & Congdon, 2009). In the first step, we created a baseline model that we also used to estimate the intraclass correlation. In the second step, we included teachers' beliefs, perceived knowledge, and the number of grade-skipping students the teachers had taught to estimate the effects of these variables in comparison with teachers' beliefs. In this model, we also controlled for teachers' gender and years of teaching experience as they may be important for teachers' acceptance of grade skipping. This model can be described by the following equation:

$$Y_{ij} = \gamma_{00} + \gamma_{10}(\text{Gender}) + \gamma_{20}(\text{Years}) + \gamma_{30}(\text{Nr_Skip}) \\ + \gamma_{40}(\text{Bel_Soc}) + \gamma_{50}(\text{Bel_Mot}) + \gamma_{60}(\text{Bel_Aca}) \\ + \gamma_{70}(\text{Knowl}) + u_{0j} + r_{ij}.$$

Using the formulas suggested by Raudenbush and Bryk's (2002), we calculated the pseudo R^2 to examine the proportion of variance explained by our model. Finally, to investigate our last research question regarding differences in the acceptance, experience, and perceived knowledge of teachers who had previously advised students to skip a grade and teachers who had not, we employed hierarchical generalized linear modeling, which is appropriate for binary outcomes. First, we calculated a baseline model for teachers' recommendation decision. Next, we estimated a Level-I model by including teachers' acceptance of grade skipping, the number of grade skippers they had taught, and their perceived knowledge as independent variables. Again, we controlled for teacher demographics. The equation describing this model is as follows:

$$\text{Log}[\phi / (1-\phi)] = \eta_{ij} = \gamma_{00} + \gamma_{10}(\text{Gender}) + \gamma_{20}(\text{Years}) \\ + \gamma_{30}(\text{Nr_Skip}) + \gamma_{40}(\text{Knowl}) + \gamma_{50}(\text{Accept}) + u_{0j} + r_{ij}.$$

Of the 316 teachers who voluntarily participated, 16% dropped out before answering the questions on grade skipping. That is an acceptable dropout rate in comparison with other online surveys (Musch & Reips, 2000). However, uncorrected estimates that are based on complete data (i.e., leaving out participants who did not complete essential parts of the online survey) might be biased (Zhang, 2014). To treat the missing values, we applied Multivariate Imputation with Chained Equations (Van Buuren & Oudshoorn, 1999) using the program R 2.15.0 (R Development Core Team, 2012). Multilevel regressions were computed separately for each imputed data set and aggregated according to Rubin's (1987) guidelines. The findings presented in the Results section are based on the imputed data.

Results

Descriptive Statistics for Teachers' Perspectives on Grade Skipping

Teachers' acceptance of grade skipping was moderate or perhaps rather high with a mean on this scale of 2.99 ($SD = 0.48$; see Table 6 for descriptives). Teachers' beliefs about students' academic ($M = 2.94$, $SD = 0.34$) and motivational development ($M = 3.01$, $SD = 0.46$) were slightly positive, whereas teachers' beliefs about students' social integration were neutral ($M = 2.69$, $SD = 0.40$). Teachers in the sample perceived their knowledge about grade skipping as mediocre ($M = 2.37$, $SD = 0.75$). In particular, collapsing the percentages of teachers who *agreed* or *rather agreed* with the items, 53% of teachers stated that they knew the statutory school regulations ($n = 167$), 70% stated that they knew the personal attributes a student needs to be able to skip a grade successfully ($n = 222$), 24% stated that they had informed themselves about grade skipping by attending a training course or by reading about it ($n = 75$), and 35% of teachers felt informed enough to competently advise parents with regard to whether their child should skip a grade ($n = 111$). Regarding teachers' experience with acceleration, 72% of the teachers in the sample (across all 18 schools) had already taught students who had skipped a grade ($n = 227$). Of these teachers, 24% had previous experience teaching more than five students who had skipped a grade ($n = 54$). Sixty-eight percent of teachers with experience judged this to be predominantly positive ($n = 154$), 25% reported mixed experiences ($n = 58$), and 7% reported negative experiences ($n = 16$). Furthermore, 30% of teachers had personally already advised a student to skip a grade ($n = 95$), and 5% of the whole sample had advised five or more students to do so ($n = 15$).

Explaining Teachers' Acceptance of Grade Skipping

The results of the hierarchical linear regression analyses on teachers' acceptance of grade skipping are displayed in Table 7. We initially specified a baseline model with no predictors. This unconditional model indicated substantial variation

Table 7. Results of the HLM Analyses Predicting Teachers' Acceptance of Grade Skipping.

	Unconditional model		Level-I model	
	Estimate	SE	Estimate	SE
Intercept (γ_{00})	-0.05	0.12	-0.02	0.09
Gender ^a (γ_{10})			-0.02	0.08
Years of teaching experience (γ_{20})			0.08	0.05
Number of students taught ^b (γ_{30})			-0.07	0.04
Social beliefs (γ_{40})			0.40***	0.06
Motivational beliefs (γ_{50})			0.28***	0.05
Academic beliefs (γ_{60})			0.14**	0.04
Perceived knowledge (γ_{70})			-0.04	0.04
Variance components				
Within-school variance (σ^2)	0.82		0.49	
Intercept variance (τ_{00})	0.21		0.05	
Effect sizes (pseudo R^2)				
Level I	—		.40	
Level II	—		.76	

Note. HLM = hierarchical linear modeling; SE = standard error. The outcome variable and the regression coefficients of the continuous predictors are standardized.

^aReference = male. ^bWho skipped one or more grades.

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

between schools for teachers' acceptance (intraclass correlation = .20). In a next step, we included teachers' beliefs, their perceived knowledge, and their experience with teaching grade skippers in the model. We simultaneously controlled for teachers' gender and teaching experience. This Level-I model showed that teachers' beliefs about students' social integration after skipping a grade had the strongest effect on teachers' acceptance of the intervention with a γ_{40} value of 0.40. Thus, after controlling for perceived knowledge, experience, and beliefs about academic and motivational development, teachers whose beliefs about social integration after grade skipping were 1 *SD* above the mean reported an acceptance of grade skipping that was almost half a standard deviation higher. Teachers' beliefs about students' motivational ($\gamma_{50} = 0.28$) and academic ($\gamma_{60} = 0.14$) development were also statistically significant predictors of teachers' acceptance of grade skipping. That is, teachers whose beliefs about students' motivational and academic development were more favorable reported a higher acceptance of grade skipping. Teachers' perceived knowledge ($\gamma_{70} = -0.04$) or their experience with teaching students who had skipped a grade ($\gamma_{30} = -0.07$) did not add to the prediction of their acceptance. The model explained 40% of the within-school variance and 76% of the between-school variance in teachers' acceptance of grade skipping.

Explaining the Odds of Teachers' Recommendations for Grade Skipping

The results of the hierarchical general linear models on teachers' recommendations for grade skipping are presented in Table 8. First, we calculated a baseline model. Next, we entered

teachers' acceptance, self-assessed knowledge, and the number of grade-skipping students they had taught into the model. Again, teachers' gender and years of teaching experience were included as control variables. Teachers' acceptance ($\gamma_{40} = 0.90$, $p < .001$, odds ratio [*OR*] = 2.46) and their perceived knowledge ($\gamma_{50} = 1.08$, $p < .001$, *OR* = 2.95) were statistically significant predictors. This indicates that for an increase in teachers' acceptance of 1 *SD*, the log odds increased by an average of 0.90. The odds of recommending that a student skip a grade increased by a factor of 2.46 when teachers' acceptance increased by 1 *SD*. Similarly, an increase in teachers' perceived knowledge of 1 *SD* resulted in an average increase in the log odds of 1.08, and the odds of a recommendation increased by a factor of 2.95 when teachers' perceived knowledge increased by 1 *SD*. The number of grade-skipping students that teachers had taught did not further predict their recommendation behavior ($\gamma_{30} = 0.17$, $p > .05$, *OR* = 1.18). The model reduced the error variance τ_{00} to 0.01 versus 0.23 in the unconditional model. Table 9 further illustrates how teachers' recommendations for grade skipping were related to their acceptance of it as an appropriate measure. A large percentage of teachers (56%) who had already advised a student to skip a grade reported a higher acceptance of grade skipping (0.5 *SD* above average). However, only a small percentage of teachers (12%) who had already advised a student to skip a grade reported a lower acceptance of grade skipping (0.5 *SD* below average).

Discussion

Croft and Wood's (2015) model of the professional development of educators around accelerative strategies highlights

Table 8. Results of the HGLM Analysis Predicting Teachers' Recommendations for Grade Skipping.

	Unconditional model				Level-I model			
	Estimate	SE	OR	95% CI	Estimate	SE	OR	95% CI
Intercept (γ_{00})	-1.02***	0.17	0.36	[0.25, 0.51]	-1.50***	0.31	0.22	[0.12, 0.43]
Gender ^a (γ_{10})					0.13	0.38	1.13	[0.53, 2.42]
Years of teaching experience (γ_{20})					0.31	0.19	1.36	[0.92, 2.01]
Number of students taught ^b (γ_{30})					0.17	0.25	1.18	[0.65, 2.17]
Acceptance (γ_{40})					0.90***	0.18	2.46	[1.72, 3.51]
Perceived knowledge (γ_{50})					1.08***	0.17	2.95	[2.11, 4.13]
Variance components								
Intercept variance (τ_{00})		0.23				0.01		

Note. HGLM = hierarchical generalized linear modeling; SE = standard error; OR = odds ratio; 95% CI = 95% confidence interval. Regression coefficients of continuous predictors are standardized.

^aReference = male. ^bWho skipped one or more grades.

*** $p < .001$.

Table 9. Frequency and Probability of Teachers' Recommendations for Grade Skipping by Their Acceptance of Grade Skipping.

Advised a student to skip a grade	Acceptance of grade skipping			Total
	0.5 SD below average	Average	0.5 SD above average	
Yes	11 (11.6%)	31 (32.6%)	53 (55.8%)	95
No	73 (33.0%)	102 (46.2%)	46 (20.8%)	221
Total	84	133	99	316

how important it is for teachers to challenge existing attitudes and to inform themselves about research-based findings on acceleration. Whereas educators' attitudes toward accelerative strategies seem to be falling more in line with empirical findings about the effectiveness of these techniques, educators appear to remain somewhat reluctant to grade skipping (McCoach & Siegle, 2007; Siegle et al., 2013). The purpose of the present study was to describe the current perspectives on grade skipping in a sample of German secondary teachers. Moreover, we focused on teachers' beliefs about students' development after skipping a grade to obtain a better understanding of teachers' general acceptance of this particular accelerative strategy. A final goal was to learn what is special about teachers who had previously recommended grade skipping.

First, teachers in our sample reported an overall moderate acceptance of grade skipping. However, there was a large amount of variability. Whereas some teachers were highly convinced about this technique, others were more skeptical. This result is in line with McCoach and Siegle's (2007) findings as they noted that professionals in the field of gifted education should evaluate individual teachers' beliefs rather than conclude that there is a uniform approval or rejection of acceleration. In addition, three quarters of our sample had previously taught students who had skipped a grade, and the overwhelming majority of teachers experienced this as positive or at least as not exclusively negative. This finding is congruent with the overall positive effects of grade skipping

on students' development as reported in empirical studies (Kulik, 2004; Rogers, 2015; Steenbergen-Hu & Moon, 2011). Still, teachers' positive experiences are encouraging given that Vock, Penk, and Köller (2014) had previously shown in a large unselected German student sample that a substantial proportion of students who had skipped a grade had cognitive abilities only slightly above average and only modest scores on standardized achievement tests; apparently, teachers had encouraged or at least allowed many students to skip a grade when the students did not have the necessary preconditions for acceleration and among whom the authors subsequently found a significantly increased rate of class repeaters. In accordance with these results, teachers in our sample perceived their knowledge about grade skipping to be mediocre, and most teachers did not feel well-enough informed to competently advise parents and students. This is especially intriguing because the national standards for teacher training in Germany (KMK, 2004) require teachers to be able to identify gifted students, to understand the possibilities of gifted education, and to be capable of counseling students and parents at the end of their university-based and school-based studies and preparatory phases. Thus, although some teachers in our sample seemed to have reviewed the research-based findings on grade skipping or attended courses on this topic, there still seems to be a need for further training.

Moreover, teachers held differentiated beliefs about students' development after skipping a grade. More specifically,

they discriminated between the social, motivational, and academic consequences that grade skipping may have on students. Whereas teachers were less concerned that students might struggle academically or might suffer from motivational problems, teachers had overall neutral attitudes about students' social integration into the new class. Teachers' beliefs also largely explained their acceptance of grade skipping. In particular, beliefs about students' social development as well as their motivational development were closely related to teachers' acceptance, whereas beliefs about students' academic development were also of significance, but to a smaller extent. The factor structure of teachers' beliefs found in our study is in accordance with previous results on teachers' concerns (Hoogeveen et al., 2005; Southern et al., 1989) as the content was similar, and the number of factors we found was limited as well. Our factors also reflect the main dimensions reported by Siegle et al. (2013) with the exception that in our study, concerns about students being younger than their peers did not load on a separate factor but were associated with beliefs about students' social integration; concerns about students missing out on extracurricular activities were associated with beliefs about academic development and the additional time needed to catch up in our study. Furthermore, teachers' beliefs about students' social integration seemed to be particularly relevant for teachers' acceptance of grade skipping. The strong association between teachers' beliefs about students' social integration and teachers' acceptance of grade skipping may indicate that teachers view the social well-being of potential candidates (i.e., highly intelligent or high-achieving students) as even more important than academic development, about which the teachers worry a little less. This finding replicates and expands Siegle et al.'s (2013) findings as they reported similar results for a sample of gifted educators. Our results are also in line with the conclusion drawn by Hoogeveen (2015), who emphasized the importance of socioemotional concerns of educators as a reason for negative attitudes toward acceleration. The relevance of these beliefs and teachers' neutral stance toward students' social integration after grade skipping are also at least partially consistent with the research literature. Although Rogers (2015) found an overall positive moderate effect size for students' social development after grade skipping in her meta-analysis (see also Robinson, 2004), there is some evidence that grade skipping may sometimes have a negative effect on students' social self-concept and their social status, especially for boys (Hoogeveen, van Hell, & Verhoeven, 2009; Kretschmann, Vock, & Lütke, 2014b). Although, on the basis of the literature, it would have been plausible that teachers' experience with teaching students who skipped a grade and teachers' perceived knowledge would be of some importance for teachers' attitudes, these variables did not explain any additional variance in the acceptance of grade skipping.

Finally, a substantial number of teachers in our sample had already advised a student to skip a grade. We found that

teachers who had previously recommended grade skipping perceived their knowledge about grade skipping to be higher and expressed a greater acceptance of grade skipping than teachers who have not previously recommended it. These results indicate that teachers' acceptance of grade skipping is indeed associated with the implementation of the measure. Therefore, whether teachers have recommended grade skipping is related not only to what they think they know about grade skipping but also to what they think about the appropriateness of grade skipping to support gifted students. It is notable that teachers' professional experience and their experience with teaching students who had skipped a grade did not account for incremental variance in teachers' recommendations.

Educational Implications

Considering that our data were cross-sectional, the results need to be interpreted carefully. Nonetheless, we would like to highlight potential implications for educational practice. Grade skipping has been shown to be an effective way to support gifted students (Kulik, 2004; Rogers, 2015; Steenbergen-Hu & Moon, 2011) that requires comparably little public expense and effort. Our results could be interpreted as support for the idea that providing teachers with relevant knowledge or making sure they feel informed about grade skipping might enable them to implement grade skipping (Croft & Wood, 2015). However, our results could also imply that teachers who advise their students to skip a grade inform themselves about grade skipping during this process. Thus, providing relevant research-based information about grade skipping may be crucial to either facilitate teachers to implement the measure or enable them to adequately support students who are about to skip a grade. It may potentially be relevant to highlight previous results that show that grade skipping is mostly beneficial for students' social development and to provide teachers with more information as to how they can adequately support their students' integration into the new classroom. Information or examples about students who have successfully skipped a grade may also be important because teachers might specifically remember negative cases, whereas students who were successfully integrated into a new class might not be noticed by teachers or might not be as memorable. Moreover, our findings indicate the general need for further training around grade skipping.

Limitations

There are some drawbacks of our study. First, the generalizability of our results is limited in several ways. The data were collected with an online survey that was filled out voluntarily by teachers at schools that had also agreed to participate voluntarily. Thus, we may have oversampled teachers who are particularly dedicated to their work, and our results may have overestimated teachers' perceived knowledge,

acceptance, and recommendations. In addition, the data were collected in one specific German federal state. As the educational system and the rates of grade skipping vary to some extent across states, teachers' perspectives on grade skipping might diverge. In addition, we sampled only secondary school teachers, particularly in the academic track. As the challenges for grade skipping in primary school differ from those in secondary school (there is less material to learn, for instance), primary and secondary school teachers may have differing experiences in teaching students who skip a grade. Secondary teachers can better observe the long-term effects of grade skipping and might therefore think about it differently. Therefore, our results cannot be generalized to primary school teachers or to comprehensive school teachers.

Second, teachers' perceived knowledge about grade skipping was gathered economically by the use of self-reports; objective assessment data about teachers' actual knowledge are still lacking. Moreover, students who had successfully skipped a grade and ended up being well-integrated into the class might not be identified by teachers as "students who skipped a grade." Thus, teachers' self-reports on the number of grade-skipping students they had taught might not be accurate. In addition, we assessed explicit beliefs and the acceptance of grade skipping, which might reflect socially desirable responding to some degree. An implicit test may yield different results.

Finally, our data were cross-sectional. Therefore, we were not able to determine the direction of the relations we found. The literature on teachers' beliefs suggests that critical episodes, which might stem from a person's own experience, books, or other media, create beliefs that act like screens that filter new information (Pajares, 1992). Therefore, it might be the case that personal experience and knowledge shape beliefs that in turn affect teachers' acceptance and their recommendations. However, it would be equally plausible that teachers are more likely to recommend grade skipping if they have more extensive knowledge about it or instead gather information in advance of an actual acceleration.

Conclusion

To conclude, the present study indicated that, in a sample of secondary school teachers in Germany, the acceptance of grade skipping is moderate and teachers perceive their knowledge about this accelerative technique to be mediocre. Moreover, teachers hold differential beliefs about students' academic, motivational, and social development after grade skipping, which are independently related to teachers' acceptance of this accelerative strategy. Teachers' acceptance of and their perceived knowledge about grade skipping seem to be associated with whether teachers recommend it. An area for future research will be to study teachers' implementation of grade skipping with a longitudinal design, for instance, in an intervention study.

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Note

1. The results of the exploratory factor analyses on teachers' perceived knowledge, beliefs about students' development, and acceptance of grade skipping were presented only for the first imputed data set. The results from the other imputed data sets were virtually identical.

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