Grouping the Gifted and Talented: Are Gifted Girls Most Likely to Suffer the Consequences?

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This study analyzes the effects of ability grouping on self-concept measures in a sample of 211 German students in their 1st year at the top track of secondary school (grade level 5; mean age: 10.46 years). 156 students, 55% of whom were female, attended regular classes, while 46 students, of whom 33% were female, attended special classes for the gifted. Students in both groups were assessed repeatedly, 3 times via self-report questionnaires and once by applying a standardized IQ test. In line with our hypotheses, we found that the students in the gifted classes reported a comparable decrease in general academic self-concept, math academic self-concept, and German academic self-concept over time. Decreases were largest early in the academic year. There was no decrease in social self-concept but instead an increase for the students in the gifted group. However, this increase did not persist, so that by the time of the last measurement the gifted reported lower social self-concept than the nongifted. Also in line with our expectations, the decrease in academic self-concept was largest for girls attending special gifted classes. It is worth noting that the largest decrease in academic self-concept of gifted girls occurred before students received any teacher-assigned school grades. As one possible explanation for this finding, the minority status of girls in gifted classes is discussed.

Full-time ability grouping in special classrooms has been shown to have most beneficial effects for the academic achievement of high-ability students (Kulik & Kulik, 1987; Slavin, 1986), including the gifted (Goldring, 1990; Rogers, 1993; Shields, 2002), as compared to students of lower ability. However, the grouping of high-ability and gifted students also has been critically discussed with respect to costs for academic self-concept. For example, Marsh, Hau, and Craven (2004) stated that many gifted students will suffer lower academic

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self-concept when attending academically selective classes or schools (a contrast effect or big-fish-little-pond effect; BFLPE). This loss in academic self-concept is of high practical concern because academic self-concept is one of the main predictors for academic achievement and learning (besides cognitive variables like intelligence or prior knowledge; Köller & Baumert, 2001; Schöne, Dickhäuser, Spinath, & Stiensmeier-Pelster, 2003). For example, prior academic self-concept has not only been found to have a positive effect on subsequent academic achievement (Valentine, DuBois, & Cooper, 2004) but also on motivational variables like academic interest (Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2005) and on academic emotions like test anxiety (Goetz, Preckel, Zeidner, & Schleyer, 2008). However, there is hardly any empirical evidence detailing under what conditions and for whom the BFLPE will outweigh the benefits of ability grouping. Not all high-ability or gifted students are negatively influenced in their academic self-concept by ability grouping. That is to say, there are individual or subgroup differences with respect to the extent that students are influenced by the BFLPE. But little is known about the factors that are related to these differences, because only a few studies have been carried out. Some studies show that the BFLPE holds for students of all ability levels (Marsh & Craven, 2002; Zeidner & Schleyer, 1998). Thus, ability differences are unlikely to contribute to individual differences in the strength of the BFLPE. Four studies by McFarland and Buehler (1995) showed collective self-esteem to be a moderating variable for the BFLPE: The BFLPE was strongest for individuals with lower collective self-esteem, an individualistic orientation, and weaker social relations. A recent study by Burleson, Leach, and Harrington (2005) with artistically gifted students found that the way in which upward social comparisons were interpreted to be associated with the direction of self-concept changes after ability grouping. Other factors that are discussed are cultural differences, achievement goals, general level of self-esteem, and the presence or absence of encouraging environments (Dai, 2004; Plucker et al., 2004). Although it is of high practical importance, so far there is no systematic research program (e.g., replication studies) on key variables associated with individual differences in the strength of the BFLPE. This study makes a contribution to fill in this research gap: It aims to investigate one factor that might be related to individual

or subgroup differences with respect to the strength of the BFLPE, student gender.

Because the BFLPE is a rather well-known phenomenon, in the following, only a short overview of the theory and research of BFLPE is given. Next, we will discuss findings on differential effects of gender on changes in academic self-concept as a consequence of ability grouping.

The Big-Fish-Little-Pond Effect on Self-Concept

According to the BFLPE, it is better for academic self-concept to be a big fish in a little pond (i.e., good student in a reference group of average ability) than to be a small fish in a big pond (i.e., good student in a reference group of high ability). The BFLPE does not typically hold for nonacademic facets of self-concept such as social self-concept (self-perceptions of one's social competence with respect to social interaction with others; Marsh, Chessor, Craven, & Roche, 1995; Preckel, Zeidner, Goetz, & Schleyer, 2008). Marsh and Parker (1984) proposed a social frame of reference model to explain the BFLPE on academic self-concept. According to this model, self-perceptions in educational settings are largely shaped by the process of social comparison. With increasing ability level of a reference group (e.g., school, class), students often compare themselves with high-ability peers and are compared by their teachers with more intellectually able peers, which in turn affects the feedback (e.g., grades) students receive. Thus, the likelihood for upward social comparisons with more able students, as well as the likelihood to get lower grades, increases with the ability level of the reference group. This, in turn, results in lower academic self-perceptions (for overviews, see Köller, 2004; Marsh, 2005; Marsh & Craven, 2002).

There is a vast amount of empirical evidence in support of the BFLPE across diverse educational settings, populations, and cultures (e.g., Marsh & Craven, 2002; Marsh & Hau, 2003). The BFLPE also has been repeatedly attested to in gifted student populations, both when comparing gifted students in regular classes with gifted students in special classes for the gifted (e.g., Craven, Marsh, & Print, 2000; Marsh et al., 1995; Rindermann & Heller, 2005; Shields, 2002;

Zeidner & Schleyer, 1998) and also when investigating the BFLPE exclusively within gifted classes of varying levels of achievement (Preckel et al., 2008). The replication of the BFLPE *within* gifted classes indicates that for students of very high ability, the achievement level of the reference group also plays a crucial role in the formation of academic self-perceptions. In other words, there seems to be no threshold for the BFLPE. Of note, the BFLPE is not the only plausible reference group effect. Being grouped with students of higher ability or attending selective gifted classes is likely to cause feelings of pride and to improve academic self-concept (assimilation or "basking-in-reflected-glory"; Cialdini et al., 1976). However, the negative effects on academic self-perceptions of high-achieving environments due to the BFLPE seem to be stronger than positive assimilation effects (see also Marsh, Kong, & Hau, 2000).

The BFLPE can be observed within stable learning groups. However, when new homogeneous ability groups are formed for students previously studying in regular classes, social comparison effects, and thus the BFLPE, may be largest. For example, Festinger (1954) stated at least two conditions in which social comparisons would be activated: (a) uncertainty about one's ability in comparison to a reference group, and (b) competitive situations. In the new classroom, students have to adjust to new procedures; classmates; and ,when being grouped in high-ability groups, to a more challenging curriculum and possibly to a more competitive climate. Thus, there is a transition period in which students need to cope with uncertainty regarding their academic standing (Wagner, 1999). Studying students in their first year of secondary school, Huguet, Dumas, Monteil, and Genestoux (2001) found the effects of social comparisons to be largest early in the first year at the new school and to diminish over time. Also, Burleson (2005) found that students who are gifted in art were most susceptible to the BFLPE during the initial transition into an advanced academic program. Moreover, Wagner (2001) provided evidence for a decrement of certainty ratings about academic self-concept of students when joining secondary school.

Gender Effects of High-Ability Grouping on Academic Self-Concept

Why should gender influence the effects of ability grouping on self-concept measures for high-ability and gifted students? Within this article, we would like to discuss three possible reasons: (a) gender-related differences in assimilation and contrast effects of social comparisons, (b) the consequences of the tendency to compare oneself to members of the same sex, and (c) the consequences of females being a minority in gifted classes.

Gender-Related Differences in Assimilation and Contrast Effects of Social Comparisons

There is some empirical evidence that female students might be more affected by assimilation or reflected-glory effects than by contrast effects like the BFLPE. In two large-scale studies by Catsambis, Mulkey, and Crain (1999, 2001) on the effects of gender and ability grouping in mathematics and English, strong interactions of various effects of ability grouping by gender and propensity for a high or low track (predicted by grades, standardized achievement scores, teacher evaluations, socioeconomic status, etc.) were found. High-ability female students were more positively affected by tracking than comparable males, while low-ability female students were more negatively affected by tracking than comparable males. On the other hand, findings for males supported the BFLPE: High-ability male students were more negatively affected by tracking, while low-ability male students were more positively affected by tracking. Thus, assimilation effects (reflected glory) and contrast effects (BFLPE) might vary in strength as a function of gender group membership. Catsambis et al. (2001) argued that because of the heightened sensitivity of girls to external cues, assimilation effects of ability grouping might be more influential for girls than for boys.

Consequences of Same-Sex Comparisons

Students in academic settings prefer same-sex social comparisons and this preference is independent of school subject (Blanton, Buunk,

Gibbons, & Kuyper, 1999; Huguet et al., 2001; Möller & Köller, 1998; Wheeler & Miyake, 1992). Even in settings where gender does not seem to be relevant for social comparisons, people show a preference for same-sex comparisons (for an overview, see Blanton, 2001). In addition, the preference for same-sex comparisons holds for elementary students as well as for high school students (Meisel & Blumberg, 1990). To our knowledge, there are no studies showing that this preference varies with ability level. Thus, it can be assumed that also the gifted prefer same-sex comparisons when forming their academic self-perceptions. When females in gifted classes compare themselves to other females, it has to be taken into account that females in gifted classes are often a highly selective group: There are many potential hurdles that prevent females from participating in selective gifted programs,[1] and those girls who attend special gifted classes are often particularly intellectually capable, highly motivated, high achievers; show multiple talents; and receive higher mean grades than gifted boys in the classroom (Freeman, 2004; Kerr, 1997; Lubinski & Benbow, 1992). Therefore, social comparisons of girls in gifted classes with a high standard reference group could serve to strengthen the BFLPE on academic self-perceptions. In a recent study of students in special gifted classes in Israel, Preckel et al. (2008), using hierarchical linear modeling (HLM) methodology,[2] found that when controlling for individual achievement and mean achievement of the reference group, gifted females reported a lower academic self-concept than the male students in those classes. In other words, although females in the gifted classes earned better grades than males, both genders reported a comparable mean level of academic self-concept. This finding could be interpreted as a strong BFLPE for gifted girls.

Consequences of Minority Status of Females in Gifted Classes

Gifted females are the minority in many programs or classrooms for the gifted (Feldhusen & Jarvan, 2000). This minority status is likely to enhance gender as one dimension that is particularly salient when females make social comparisons. This is because people preferably describe themselves with respect to dimensions that are underrepresented in their reference group (McGuire & McGuire, 1988; Smith & Leach, 2004). If the minority status of girls in gifted classes activates

gender as a salient self-schema, related gender stereotypes that still view males as outperforming females in many academic achievement areas (e.g., Herbert & Stipek, 2005; Holling & Preckel, 2005; Lips, 2004) might also be more active in the formation of self-perceptions. In addition, the minority status of females in gifted classes also could be interpreted by females as an indication of a higher suitability of these classes for boys. In the study by Preckel et al. (2008) mentioned previously, it was found that academic self-concept of gifted girls decreased with an increasing percentage of boys in class or a greater minority status of females, respectively.

To sum up, the benefits of assimilation or reflected glory effects for academic self-concept might be stronger for female than for male students when being placed into a high-ability group. On the other hand, females in gifted classes might experience stronger contrast effects (BFLPE) than boys because of social comparisons with a reference group that has higher standards and because of the consequences of belonging to a minority.

Research Questions and Hypotheses

The present study investigated students longitudinally during the transition period from elementary school (regular, heterogeneous classes) to the top track of the German school system (either regular classes that are more homogeneous than elementary school classes or special classes for the gifted). Based on social comparison theory and on the review of the literature, the following research hypotheses were tested in the present study:

1. Students will prefer same-sex comparisons independent of ability.
2. For students attending more selective classes, academic self-concept will decrease due to the BFLPE. For the groups under study (top track and gifted), this effect is assumed to be independent of the level of ability group because both groups represent high levels of ability grouping.
3. No decrease will be observed for social self-concept because ability grouping in academic settings does not typically affect nonacademic facets of self-concept. However, for students in gifted classes, there might be an increase in social

self-concept due to being with more equal peers (Cross, 2005; Gross, 2000).

4. The decrease in academic self-concept will be largest early in the year because students need to cope with uncertainty regarding their academic standing, and students seem to be most susceptible to the BFLPE during the initial transition into more selective classes (e.g., Burleson, 2005; Huguet et al., 2001).
5. The decrease in academic self-concept will be largest for girls in special gifted classes: While assimilation effects might be stronger for female than for male students when being grouped into a high-ability group, these effects might operate most efficiently when the information about belonging to a top track is most salient. This is likely to be the case when a student finds out that he or she is admitted to a high-ability track or right at the beginning of tracking. Over time, contrast effects might outweigh assimilation effects for high-ability female students because of social comparisons with a high-standard reference group and because of the effects of minority status. For those reasons, we would expect a stronger decrease in academic self-perceptions for girls in gifted classes as compared to boys in gifted classes or to girls in the regular classes of the top track, which have a balanced gender-ratio (about 50% females in class).

Method

Participants

The sample of this study consists of $N = 211$ fifth-grade students (9 students did not specify their sex; 50% of the remaining 202 students were female). The mean age of the sample was 10.46 years ($SD = .50$; range: 8.42 to 11.32 years). Students came from seven different classes at two schools that belong to the top track of the German school system (German Gymnasium). In the German school system, after elementary school, or fourth grade, students are placed into one of three tracks

(lower, middle, and top track) according to their level of achievement. "Top track" does not refer to a track reserved for gifted students because up to 50% of the general student population attends this track. Two of the seven classes belonged to a gifted track within this top track. That is, these classes (n = 46; 33% female) were special homogeneous classes for the gifted (one at each Gymnasium); the other classes were regular classes of the German Gymnasium (n = 156; 55% female; 9 students gave no information on the type of class attended). Students were selected for gifted classes by multiple criteria: parent nominations, IQ, school grades, and teacher evaluations. Students in gifted classes had significantly higher IQs: Mean IQ for students in gifted classes was M = 120.32 (SD = 9.97; n = 38), and, for students in regular classes of the top track, the mean IQ was M = 107.18 (SD = 9.59; n = 141). In addition, students in gifted classes had a significantly higher GPA in elementary school (t = -2.09, df = 189, p = .03, effect size d = -.36; German grades range from 1 to 6, with 1 indicating high achievement and 6 indicating low achievement).

Design

Data collection was conducted during the first half of the school year. It took place during a transition period. That is, it was the students' first year in a new school, and they were adjusting to new procedures, classmates, and a more challenging curriculum than they knew from elementary school. Demographic and psychological data was gathered by a self-report instrument that was group administered during regular classroom period. Students responded to the self-report instrument three times: once within the first week in the new class, 10 weeks later, and finally at the end of the term. The questions from the first wave of data referred to the students' experiences in their old class, that is, up to fourth grade in elementary school. Four months after the start of the school year, the students' IQs were assessed by a standardized group-administered test.

Variables and Measures

The following variables were assessed and analyzed in the course of this study: general academic self-concept as well as academic self-

concept in mathematics and German. General academic self-concept (e.g., "I do very well in most subjects at school") as well as academic self-concept in mathematics or German (e.g., "Math/German is one of my best subjects") were assessed with the respective short versions of the German translation of the Self-Description Questionnaire (SDQ) developed by Marsh (1990). Marsh developed a set of Self-Description Questionnaires with reference to the Shavelson, Hubner, and Stanton (1976) model of self-concept, which is a hierarchical and multidimensional model of the self-concept. Therefore, the SDQs capture multiple dimensions of self-concept (physical ability, physical appearance, peer relationships, parental relationships, mathematics, reading, and general school). In this study, we consider the three academic scales (school, math, reading) from the adolescent version of the instrument. Participants responded to three items (general academic self-concept) or five items (academic self-concept in math or German) on a 1 (*strongly disagree*) to 5 (*strongly agree*) Likert scale. Reliabilities (Cronbach's alpha) for all three waves of data were general academic self-concept scale α = .77/.76/.82; mathematics-related academic self-concept scale α = .87/.85/.87; and German-related academic self-concept scale α = .86/.88/.81.

Social self-concept. Social self-concept was assessed with the three-item short version of the social self-concept scale developed by Fend and Prester (1986). Items were: "I often get ignored when others do something together during the school breaks. / Regardless of what I do, I am not accepted as a member by the others. / In class I sometimes feel like an outsider." Participants responded on a 1 (*strongly disagree*) to 5 (*strongly agree*) Likert scale. The reliability of scale was α = .78/.69/.83. For further analyses, item coding was reversed such that higher scores reflect a better social self-concept.

Social comparison choices. Students' social comparison choices in math and German were assessed in accordance to Reuman (1989): Students were asked "Make believe you just got a math test / German test back from your teacher. If you could look at someone else's test in your classroom, whose test would you want to look at?" Students could either write "Nobody" or indicate if they would compare themselves with a female or male classmate. Those students who did

nominate a classmate next indicated whether "This person is *Not as good as me in Math/German* (1), *About the same at Math/German as me* (2), or *Better at Math/German than me* (3)."

Intelligence. Intelligence (verbal, numerical, and figural reasoning as well as IQ as composite score) was assessed with the KFT 4-12+R (Heller & Perleth, 2000; $M = 100$; $SD = 15$). The KFT 4-12+R is a German adaptation of the Cognitive Abilities Test developed by Thorndike and Hagen (1971), with a last revision in 1996. In Germany, the KFT 4-12+R is one of the most frequently used intelligence tests, particularly in research on giftedness and education. The test was presented in a paper-and-pencil format. Correlations of test results with teacher-assigned school grades (1 being the best and 6 being the worst grade) in the current sample were: grade math and numerical reasoning $r = -.43$ ($n = 171$); grade German and verbal reasoning $r = -.43$ ($n = 168$); and IQ and grade point average (GPA) $r = -.37$ ($n = 172$). Sample alpha was .93 for IQ (whole scale), .81 for verbal reasoning, .79 for numerical reasoning, and .92 for nonverbal reasoning.

School grades. Students self-reported their school grades from their final record in fourth grade (first wave) and their first term record in fifth grade (third wave). Thus, self-reported grades did not reflect grades from single tests but instead are accumulations of achievements of a whole school year or term. For further analyses, grades in mathematics, German, and GPA were used.

Data Analyses

First, as preliminary results, we report gender differences in grades (by giving the effect sizes d [3]) as well as correlations of self-concept measures. Next, descriptive statistics for the self-concept variables under study are given separately for ability group or type of class, respectively, gender, and wave of measurement. Third, Hypothesis 1, which states that the preference for same-sex social comparisons does not vary with ability level, was tested separately for math and German and the three waves of measurement. The evaluation of this hypothesis was carried out in two steps. First, the hypothesis

that students prefer same-sex social comparisons was tested by six χ^2 tests. In a second step, six *t*-tests for independent samples with IQ as the dependent variable and kind of comparison (same-sex vs. opposite-sex) as the independent variable were conducted to test if these social comparisons vary with ability level. To eliminate the risk of alpha accumulation, a Bonferroni adjustment was included. Fourth, Hypotheses 2 (decreases in academic self-concept), 3 (no decrease in social self-concept), and 5 (largest decrease in academic self-concept for girls in gifted classes) were analyzed by separate analyses of variance with repeated measures for each facet of self-concept. Hypothesis 4, which states that decreases in academic self-concept are most pronounced at the beginning of the school year, was investigated by comparing effect sizes *d* of self-concept changes between the three waves of measurement.

Results

At the end of fourth grade in elementary school and at the end of the first term of fifth grade in secondary school, female students had better grades than male students in German (fourth grade/fifth grade: gifted: $d = .68/.54$; regular classes top track: $d = .46/.71$) and a better GPA (fourth grade/fifth grade: gifted: $d = 1.16/.54$; regular classes top track: $d = .63/.58$). In math, females in the gifted group had only better grades in fourth grade, while female in the regular classes of the top track had only better grades in fifth grade (fourth grade/fifth grade: gifted: $d = .29/-.17$; regular classes top track: $d = -.05/.28$). In Table 1, the correlations of self-concept measures are depicted.

Correlations between measures are sufficiently low to exclude multicollinearity. Within each area of academic self-concept (general, math, and German), measures are significantly and positively correlated over the three waves of measurement. As can be expected with regard to hierarchical models of self-concept (e.g., Byrne & Shavelson, 1996; Shavelson et al., 1976), general academic self-concept is positively correlated to math academic self-concept and German academic self-concept. In addition, in accordance with the internal-external frame of reference model (Marsh, 1987) Math academic self-concept and German academic self-concept are unrelated.

Table 1

Zero-Order Correlation Coefficients Among Self-Concept Measures for All Three Waves of Measurement

		Gen. ASC 1	Gen. ASC 2	Gen. ASC 3	Math ASC 1	Math ASC 2	Math ASC 3	Germ. ASC 1	Germ. ASC 2	Germ. ASC 3	Social SC 1	Social SC 2
Gen. ASC 2	*r*	.53**	1									
	n	176	185									
Gen. ASC 3	*r*	.57**	.64**	1								
	n	168	168	179								
Math ASC 1	*r*	.55**	.42**	.32**	1							
	n	184	177	170	188							
Math ASC 2	*r*	.37**	.54**	.44**	.67**	1						
	n	175	184	167	176	184						
Math ASC 3	*r*	.33**	.33**	.41**	.58**	.61**	1					
	n	163	163	173	164	162	173					
Germ. ASC 1	*r*	.54**	.37**	.45**	.16*	.11	.12	1				
	n	183	175	169	184	174	163	186				
Germ. ASC 2	*r*	.31**	.47**	.43**	-.01	.06	-.02	.57**	1			
	n	174	182	165	175	181	160	172	182			
Germ. ASC 3	*r*	.38**	.38**	.46**	.02	.03	.05	.57**	.65**	1		
	n	165	165	175	166	164	173	165	162	175		
Social SC 1	*r*	.17*	.08	.22**	.09	-.02	.14	.25**	.15*	.10	1	
	n	184	176	169	185	175	163	184	173	165	187	
Social SC 2	*r*	.25**	.19**	.24**	.12	.13	.08	.22**	.26**	.16*	.43**	1
	n	176	185	168	177	184	163	175	182	165	176	185
Social SC 3	*r*	.10	.18*	.24**	.01	.17*	.08	.12	.18*	-.02	.45**	.24**
	n	167	167	178	169	166	172	168	164	174	168	167

Note. Numbers 1–3 represent waves of measurement. Differences in *n* are due to missing data. ASC = academic self-concept, SC = self-concept, Gen. = General, Germ. = German. * $p < .05$. ** $p < .01$.

Besides one exception (math academic self-concept in the second wave and social self-concept in the third wave of data collection), there are no significant correlations between social self-concept and math academic self-concept, but there are a few positive and significant correlations between social self-concept and general academic self-concept and German academic self-concept. These positive correlations might be again explained with reference to models of self-concept, which assume that self-evaluations of more specific self-concepts (e.g., academic and social self-concept) can be located in a hierarchical structure on a level below general self-concept. In Table 2, the descriptive statistics for the self-concept variables under study are provided separately for ability group or type of class, gender, and wave of measurement.

As predicted in Hypothesis 1, students preferred same-sex comparisons independent of ability. The first step to test Hypothesis 1 led to six highly significant χ^2 results (uniformly distribution hypotheses). Thus, students prefer same-sex comparisons both in math and in German at each wave of measurement. Separately for the three waves (1/2/3) of measurement, the χ^2-values for math are 49.79/65.63/65.82; for German the χ^2-values are 43.09/43.33/66.56 (all $df = 1$, all $p < .001$). The second step to test Hypothesis 1 led to six nonsignificant *t*-tests. There is no large interrelation between the type of comparison (same-sex vs. opposite-sex) and ability (i.e., IQ). The *t*-values, corresponding degrees of freedom, and *p*-values as well as the statistical power [4] for the three comparisons (waves 1/2/3 of measurement) in math are as follows: $t = -.42$, $df = 102$, $p = .67$, $1 - \beta = .86$ / $t = -.14$, $df = 103$, $p = .89$, $1 - \beta = .76$ / $t = -.47$, $df = 101$, $p = .64$, $1 - \beta = .76$. For the three comparisons (waves 1/2/3 of measurement) in German, the values are as follows: $t = -.72$, $df = 102$, $p = .48$, $1 - \beta = .89$ / $t = -1.59$, $df = 108$, $p = .12$, $1 - \beta = .93$ / $t = -.95$, $df = 103$, $p = .35$, $1 - \beta = .79$.

Table 3 documents the results of the analyses of variance with repeated measure to test Hypotheses 2, 3, and 5. As predicted, academic self-concept decreased over time. This effect was independent of gender or ability group (no significant interactions between time and gender or ability group) and, as can be taken from the effect sizes, most pronounced for general academic self-concept and German academic self-concept. In accordance with Hypothesis 3, there was

Table 2

Descriptive Statistics for Self-Concept Measures by Wave, Ability Group (Gifted Classes and Regular Classes of the Top Track), and Gender

	Wave 1			Wave 2			Wave 3		
	All	Boys	Girls	All	Boys	Girls	All	Boys	Girls
General ASC *M* (*SD*) range: 0–15	12.92 (1.89)	12.83 (1.89)	13.01 (1.89)	12.26 (1.86)	12.25 (1.78)	12.28 (1.95)	12.26 (1.97)	12.06 (1.98)	12.45 (1.96)
Gifted classes	13.60 (1.93)	13.33 (2.20)	14.18 (.98)	12.77 (1.75)	13.08 (1.41)	12.09 (2.26)	12.54 (2.23)	12.67 (2.16)	12.27 (2.45)
Regular classes	12.74 (1.84)	12.60 (1.71)	12.83 (1.94)	12.12 (1.88)	11.87 (1.81)	12.31 (1.92)	12.18 (1.89)	11.79 (1.84)	12.47 (1.89)
Math ASC *M* (*SD*) range: 0–25	20.97 (3.80)	21.92 (3.52)	20.10 (3.85)	20.35 (3.72)	21.28 (3.41)	19.50 (3.81)	19.99 (4.16)	20.27 (4.33)	19.74 (4.01)
Gifted classes	22.64 (3.19)	22.86 (2.81)	22.18 (3.95)	21.12 (3.71)	21.82 (3.08)	19.73 (4.58)	20.76 (3.78)	21.59 (3.40)	19.09 (4.09)
Regular classes	20.52 (3.84)	21.53 (3.74)	19.77 (3.76)	20.14 (3.71)	21.06 (3.54)	19.46 (3.72)	19.79 (4.25)	19.71 (4.58)	19.84 (4.02)
German ASC *M* (*SD*) range: 0–25	20.57 (3.64)	19.67 (4.03)	21.38 (3.07)	19.48 (3.99)	18.96 (4.03)	19.94 (3.92)	18.41 (4.11)	17.29 (4.23)	19.40 (3.74)
Gifted classes	21.19 (3.17)	20.52 (3.46)	22.45 (2.11)	20.28 (3.73)	20.52 (3.44)	19.82 (4.35)	19.06 (3.33)	19.05 (3.65)	19.09 (2.77)
Regular classes	20.41 (3.75)	19.33 (4.22)	21.21 (3.17)	19.27 (4.04)	18.33 (4.11)	19.96 (3.88)	18.24 (4.28)	16.58 (4.28)	19.45 (3.88)
Social SC *M* (*SD*) range: 0–15	10.93 (2.35)	10.43 (2.46)	11.38 (2.16)	11.61 (2.19)	11.31 (2.35)	11.88 (2.01)	11.16 (2.52)	11.03 (2.59)	11.27 (2.46)
Gifted classes	9.69 (2.86)	9.42 (2.84)	10.27 (2.94)	11.43 (2.07)	11.21 (2.23)	11.91 (1.70)	10.37 (3.30)	10.50 (3.18)	10.09 (3.70)
Regular classes	11.28 (2.06)	10.90 (2.12)	11.55 (1.99)	11.66 (2.23)	11.35 (2.42)	11.88 (2.07)	11.38 (2.21)	11.27 (2.26)	11.45 (2.19)

Note. ASC = academic self-concept, SC = self-concept.

Table 3

Results of the Analyses of Variance With Repeated Measures to Test the Effects of Time Over the Three Waves of Measurement, Ability Group (Gifted Classes and Regular Classes of the Top Track), and Gender on Self-Concept Measures

	General ASC [a]			Math ASC [b]			German ASC [c]			Social SC [d]		
	F [e]	p [e]	*part.* η^2 [e]	F [e]	p [e]	*part.* η^2 [e]	F [e]	p [e]	*part.* η^2 [e]	F [e]	p [e]	*part.* η^2 [e]
Time	18.58	< .01	.11	10.10	< .01	.06	20.49	< .01	.12	8.09	< .01	.05
Time x Gender	2.75	.07	.02	.57	.56	.00	2.05	.13	.01	1.49	.23	.01
Time x Ability Group	2.23	.11	.01	2.45	.09	.02	.04	.96	.00	3.29	.04	.02
Time x Ability Group x Gender	4.94	.01	.03	3.56	.03	.02	2.22	.11	.01	.35	.69	.00

Note. Differences in n are due to missing data. ASC = academic self-concept, SC = social self-concept, part. = partial. [a] $n = 160$. [b] $n = 155$. [c] $n = 155$. [d] $n = 159$. [e] All reported values refer to statistical results obtained with Greenhouse-Geisser corrected degrees of freedom. Concerning the significance of F-values, exact p-values are depicted in the case that they are not below 0.01.

no decrease in social self-concept but an increase, which was qualified by gains in social self-concept for students in gifted classes (see the significant interaction between time and ability group; see also Figure 1). Results also support Hypothesis 5 for general academic self-concept and math academic self-concept: The decrease in academic self-concept significantly interacted with class membership and gender. As can be taken from Figure 1, the decrease in academic self-concept was largest for girls in special gifted classes. Although the three-way interaction did not gain significance for German academic self-concept, the inspection of Figure 1 descriptively reveals the largest decrease in this facet of self-concept for gifted girls, too.

The inspection of effect sizes *d* supports the assumption that the decrease in academic self-concept is largest early in the year. The effect sizes characterizing the change in academic self-concept between the first and the second wave of measurement were: .37/.21/.31 (general ASC/math ASC/German ASC). The effect sizes characterizing the decrease between the second and the third wave of measurement were: .02/.09/.26 (general ASC/math ASC/German ASC).

Discussion

The present study investigated the effects of ability grouping on academic and social self-concept of students in special gifted classes and classes of the top track of the German secondary school system. One strength of the study is that students were assessed three times during a transition period from elementary school, where all students attended regular mixed-ability classrooms, to the first year in secondary school, where students were tracked either in more homogeneous high-ability classrooms (regular classrooms of the top track of the German secondary school system) or special classes for the gifted. Thus, we could investigate developments over time. Based on social comparison theory and findings on the BFLPE, we expected that students would report a decrease in academic self-perceptions (i.e., general academic self-concept as well as academic self-concept in math and German) when attending more selective classes. We assumed that for both groups under study this decrease would be of comparable size. Moreover, we expected that the decrease in academic

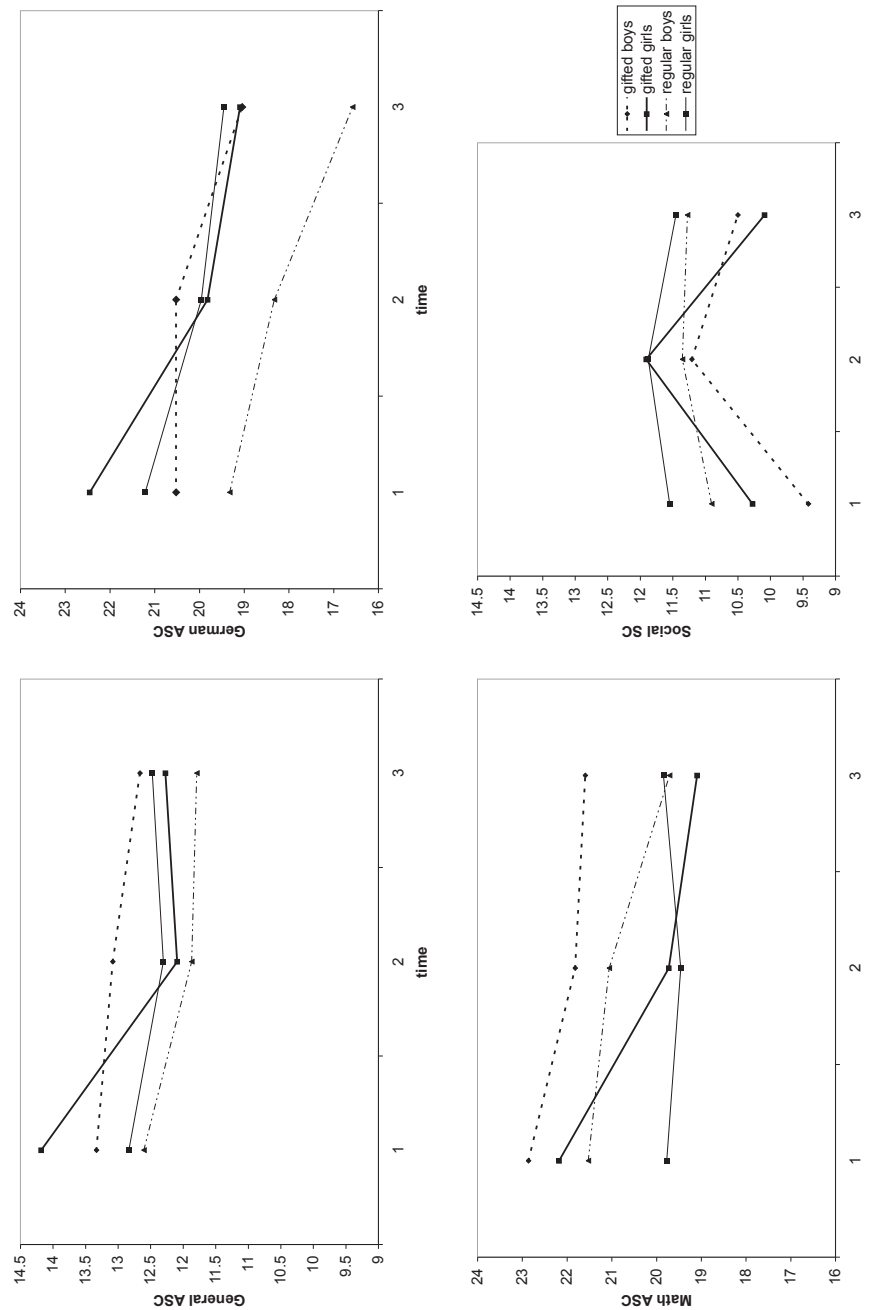

Figure 1. Differences in self-concept measures between boys and girls in gifted classes and in regular classes of the top track.

self-concept would be largest early in the year because during this time students need to cope with larger uncertainty regarding their academic standing in the new class than later in the school year. We expected no decrease for social self-concept because ability grouping in academic settings does not typically affect nonacademic facets of self-concept. However, being grouped with other gifted students has been found to have positive effects for the social development of gifted students. Thus, we assumed that there might be an increase in social self-concept for the gifted.

A further aim of this study was the investigation of gender as one possible factor that might moderate the extent to which the BFLPE affects individuals or certain subgroups of students. Although of high practical concern, little is know about individual differences with regard to the BFLPE. After confirming the assumption that students prefer same-sex comparisons independent of ability, we tested our hypotheses that the decrease in academic self-concept would be largest for girls in special gifted classes because of social comparisons with a high-standard reference group and because of the effects of minority status.

Limitations

Before discussing our findings, we would like to stress that there are some limitations of our study. Most measures employed in our study (except IQ tests) were self-reports. These self-reports might have been influenced by factors like social desirability and stereotyping. Furthermore, when interpreting the findings of this study, it should be taken into account that the sample consisted of fifth-grade German students. Further studies are needed to investigate whether our findings can be replicated in other cultures and in students of different ages. Last, but not least, because of the sample size of the present study, we could not take the cluster structure of the data into account (students were grouped in their classrooms). Thus, we could not carry out the optimal test of the BFLPE by applying HLM methodology and looking for positive correlations between achievement and self-concept on an individual level and, when controlling for this effect, negative correlations between group-level achievement and self-concept. However, in the present study we assessed repeated measures of

self-concept variables during a transition period that could very well be interpreted on the background of the BFLPE literature.

Changes in Self-Concept Over Time

All of our hypotheses on changes in self-concept measures could be supported by our data: Students in regular classes of the top track and in gifted classes reported a comparable decrease in general academic self-concept, math academic self-concept, and German academic self-concept over time. Decreases were largest early in the year. There was no decrease but instead an increase in social self-concept for the gifted. Thus, our results support the assumption that ability grouping of the gifted has positive effects for their social self-concept (this finding was independent of student gender). A number of explanations may be offered for this development. These include an assimilation effect like "basking-in-reflected-glory" (Cialdini et al., 1976), the (probably) new experience of belonging to a majority (Fiedler, Lange, & Winebrenner, 2002), the social/emotional experience of not being different (Morelock & Feldman, 2003), and a lower risk of being rejected by peers because of high achievements (Coleman & Cross, 2000; Goldring, 1990). However, after the increase in social self-concept at the beginning of the fifth grade, social self-concept decreased for all gifted students until the end of the first half of the school year, such that at the last wave of measurement gifted students reported a significantly lower social self-concept than the nongifted students (d = -.43). One possible explanation might be habituation. That is, all the aforementioned explanations for the increase might come into question only at the beginning of the school year. But the effects possibly do not persist because students get used to the new situation. Another explanation might be that the gifted develop a more sophisticated view of themselves and their (social) situation. Maybe due to this development, they give more down-to-earth evaluations. Last, but not least Preckel et al. (2008) found a decreasing level of social self-concept coupled with an increasing level of achievement within gifted classes. The authors argued that gifted students—even when attending special gifted classes—possibly pay a greater social cost in terms of negative stereotyping, labeling, and social exclusion the more they stand out in their achievements. It cannot be excluded

that negative stereotyping, labeling, and social exclusion because of exceptional achievements also take place within classes for the gifted (i.e., between gifted students in and educational environment that fosters exceptional achievement) and not only between nongifted and gifted students in regular classrooms. However, with the current data, this finding is hard to explain and it remains to be seen if this result can be replicated.

Our data can be interpreted as supporting the BFLPE on academic self-concept. We found that decreases in academic self-concept were not larger for the students in gifted classes than for students in the top track of the German secondary school system. Also, Preckel et al. (2008) found the BFLPE within gifted classes to be of comparable size to the BFLPE found with unselected students in heterogeneous classrooms. One could argue that the BFLPE might be stronger for the gifted because of being grouped with other students of exceptional ability. On the other hand, being grouped with other gifted students is likely to foster academic self-concept by an assimilation or "basking-in-reflected-glory" effect. Maybe the stronger BFLPE is partly counterbalanced by an assimilation effect, such that the losses in academic self-concept are of comparable size in both groups. However, with our data we could not disentangle both effects.

Our data is in support of studies that show that most self-concept decreases happen shortly after the subject is placed in the new reference group (e.g., Burleson, 2005; Huguet et al., 2001; Wagner, 2001). We found that decreases in academic self-concepts were largest during the first 10 weeks in the new class. But a closer look at the data revealed gender differences. This finding only applied to girls in both types of classes (especially to gifted girls) while, for boys in gifted classes, it only applied to math academic self-concept, and, for boys in regular classes of the top track, it only applied to general academic self-concept. For the other facets of boys' academic self-concept, decreases were somewhat larger between the second and third wave of measurement. Notably, none of the students in our sample received any teacher-assigned school grades during the first 10 weeks in the new class. The grades students received later during the school term were significantly lower than the ones they received in elementary school (while the girls still received significantly higher school grades than boys). Maybe feedback through teacher-assigned school

grades plays a different role in the formation of academic self-perceptions for boys and girls. But this assumption is rather speculative and further research is needed here. Our results indicate that decreases in academic self-concept as a consequence of changing to a higher ability reference group takes place without teacher-assigned school grades.

Effects of Ability Grouping for Gifted Girls

As expected, the decrease in academic self-concept was largest for girls in special gifted classes as compared to girls in regular classes of the top track or as compared to boys in both class types. In addition, for all facets of academic self-concept, this decrease in academic self-concept of gifted girls was largest between the first and second wave of measurement (effect sizes *d* were .99/.69/.64 for general/math/German ASC). For academic self-concept in math and German, there was another small decrease between the second and third wave of measurement ($d = .15/.20$), but not for general academic self-concept ($d = -.08$). That is, most changes in self-concept of gifted girls occurred during the first 10 weeks in the new class.

We confirmed our assumption that students prefer same-sex comparisons independent of ability. Thus, girls in gifted classes mostly referred to the other girls in class when comparing their scholastic achievements. The female students in both types of classes (top track and gifted) received better grades than male students. This held for grades in German and GPA in fourth and fifth grade. In math, females in the gifted group only had better grades in fourth grade, while there were no gender differences in fifth grade. Of note, despite of lower academic self-concepts, gifted girls had better grades than gifted boys in most subjects. One could argue that the losses in academic self-concepts of gifted girls could be neglected because their actual achievement is still high. However, *in the long run,* academic self-concept is one of the main predictors for academic achievement, motivational variables associated with learning like academic interest, and academic emotions like test anxiety and enjoyment (see the literature review). In addition, academic self-perceptions influence educational and vocational choices (Eccles, 1983). For example, lower participation rates of females in the math-science domain (courses

and vocations) result in part from girls', as compared to boys', lower rating of their abilities in math and science (Eccles, Adler, & Meece, 1984). In addition, the so-called impostor syndrome [5] (e.g., Harvey & Katz, 1985) seems to be particularly common among successful girls and women (Reis, 1987, 1998). Thus, we think that decreases in academic self-perceptions should be taken seriously, even if the decrease is not mirrored in actual achievement. Within this context, we would like to quote some work of Carol Dweck (1986) that she published more than 20 years ago:

> . . . the earlier discussion suggests that some of the brightest students, who in grade school as yet show little or no obvious impairment in the school environment, may be prime candidates for such motivational interventions. Among these are children (e.g., bright girls) who have had early, consistent, and abundant success yet, despite this (or perhaps even because of this), do no relish the present or prospect of challenge. (p. 1046)

Interventions could comprise attributional retrainings (Heller & Ziegler, 1996) or the provision of role models and mentoring (Le Maistre & Kanevsky, 1996).

In the present study, we expected that the better grades of gifted female students would contribute to a larger BFLPE because gifted female students compare themselves to a high-achieving reference group. However, the largest decreases in academic self-concept of gifted girls occurred between the first and the second wave of measurement when students did not receive any teacher-assigned school grades. Thus, students must have relied on other information like their own observations of their standing in class, their own judgments about the other students' abilities, or the informal feedback teachers gave orally in class. We also assume that belonging to a minority might contribute to the losses in academic self-concept. Preckel et al. (2008) found that academic self-concept of girls decreased with an increasing percentage of boys in class or a greater minority status of females, respectively. Within their study, Preckel et al. could not disentangle the influence of gender and minority status because all groups comprised more males than females so that gender and minority status were confounded. In the present study, we

could compare girls in gifted classes (female minority) with girls in regular classes of the top track of the German secondary school system (equal proportion of boys and girls or a slight female majority). Within those regular classes, there were no gender differences in the decrease of academic self-concepts. This finding can be interpreted as a first hint that the minority status of girls in gifted classes contributes to the strong BFLPE. However, further research is needed in which gender-ratio in (gifted) classes is systematically varied before making statements about causal relations and before deducing practical implications for the education of the gifted.

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End Notes

1. These include, for example, a stronger tendency of gifted females, as compared to gifted males, to conceal or hide one's intellectual capabilities (Reis, 1998), gender bias in favor of males on standardized achievement tests at the highest levels of achievement (Kerr & Nicpon, 2003), or a tendency of parents to be more overprotective of their daughters than of their sons (e.g., Carter & Wojtkiewicz, 2000; Muller, 1998).

2. HLM (hierarchical linear modeling or multilevel analysis) is a statistical tool that allows one to analyze variance in outcome variables at multiple hierarchical levels, like effects of individual data and data aggregated across groups. Thus, HLM is used for the analyses of nested data that are typical in educational research (e.g., pupils are nested within classrooms which again are nested within schools).

3. The effect size Cohen's d is used here to determine whether a statistically significant difference is of practical concern. Usually effect sizes of $d = .2$ are interpreted as small effects, of $d = .5$ as medium effects, and of $d = .8$ as large effects.

4. For the power analyses, the program G*Power was used (e.g., Erdfelder, Faul, & Buchner, 1996) while assuming a large effect size $d = 0.8$ and an alpha-error probability of .05.

5. The impostor syndrome describes the inability of individuals to internalize their accomplishment so that successes and high achievements are experienced as something that one does not deserve.