



# The benefit of being a big fish in a big pond: Contrast and assimilation effects on academic self-concept

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## ABSTRACT

This study investigates the effects of class-average ability (intelligence) and class type (gifted vs. regular) on Math academic self-concept. The sample comprised 722 fifth-grade students (376 female) in a setting of full-time ability grouping at the top track of the German secondary high school system. Students came from 34 different classes at five schools; nine of these classes were part of a gifted track ( $n = 179$ ). Academic self-concept and school grades were assessed by a self-report questionnaire, intelligence by a standardized test. Higher class-average ability led to lower academic self-concepts after controlling for the positive influence of individual ability (contrast effect). Class type had a counterbalancing positive effect on self-concept (assimilation effect). For students in gifted classes, both effects were of comparable size. Thus, no evidence for a big-fish-little-pond effect (stronger contrast than assimilation effect) was found. Effects of individual and group level ability were partially mediated by school grades. Implications for educational practice of highly able students are discussed.

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## 1. Introduction

Grouping students at school according to their achievement or ability – also known as tracking or streaming – has been a hotly debated topic among educational researchers for many decades (e.g., Oakes, 1985), for example with respect to questions of equity and educational efficacy. A growing body of empirical studies has been contributing to our understanding of the effects of achievement or ability grouping on achievement-related as well as on socio-affective variables (e.g., Catsambis, Mulkey, & Crain, 1999, 2001; Marsh, Seaton, et al., 2008; Neihart, 2007). Nonetheless, or maybe because of that, the scientific debate on tracking has lost none of its vivacity. For example, one main controversial debate of the XXIX International Congress of Psychology 2008 in Berlin was on “Managing diversity at school: Should students be grouped by their ability?”.

In this paper, we examine the effects of full-time ability grouping on students' academic self-perceptions. In recent years, a wealth of empirical studies have addressed this question, and results show that the group's achievement level is *negatively* related to academic self-perceptions after controlling for the positive effect of individual achievement. This so-called “big-fish-little-pond effect” (BFLPE; Marsh, 1987) represents a (negative) net effect of a (stronger) negative contrast effect and a (weaker) positive assimilation effect (Marsh & Craven, 2002).<sup>1</sup> While with an increasing ability level of the reference-group academic self-perceptions of indi-

viduals decrease (contrast effect) belonging to a group of high ability at the same time positively influences academic self-perceptions (assimilation effect). Of note, there is an ample body of research on contrast effects in the context of BFLPE studies, whereas research on assimilation effects is rare (Marsh, Seaton, et al., 2008). The present study attempts to fill this gap. We separated contrast and assimilation effects by comparing fifth-grade students in regular classes and academically selective classes for the gifted in the most demanding school type of the tripartite German school system, the “Gymnasium” (that is, different class types within one school type). In addition, our study addresses another underresearched angle of BFLPE research, that is, the mediating role of teacher-assigned grades on academic self-concept (e.g., Trautwein, Lüdtke, Marsh, Köller, & Baumert, 2006). Last but not least, our study enhances research on the BFLPE by using intelligence as a measure for individual and group average ability (instead of standardized grades or scholastic achievement tests). To our knowledge, this has never been done before.

## 2. Ability grouping of highly able students and its effects on academic self-concept

There are many ways to group students according to their ability at school.<sup>2</sup> Generally, ability grouping can be defined as any

<sup>2</sup> In the research literature, the terms “ability grouping” and “achievement grouping” are frequently used interchangeably. Although the differentiation between ability and achievement grouping might be useful to mirror different criteria used for selecting students (e.g., intelligence test scores versus school grades), theoretically and empirically ability and achievement are hard to disentangle (Lohman, 2005). In the following we use the term ability grouping to comply to the majority of the research literature. However, most studies cited used school achievement as grouping criteria.

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<sup>1</sup> Wheeler and Suls (2005) therefore and maybe more accurately use the term “small-fish-in-a-big-pond effect”.

arrangement that attempts to place students of similar ability levels in instructional groups. Thus, ability grouping comprises all forms of within-class grouping, course- or class-level grouping, or school-level grouping. Within-class grouping is usually realized as part-time grouping; course- or class-level grouping can be part time or full time, and school-level grouping is commonly implemented in the form of full-time grouping of students.

In the present study, we investigated the effects of *full-time ability grouping of highly able students*, that is, students in the most demanding track of the tripartite German secondary school system. Within this track we compared students in two types of classes (regular vs. gifted), that is, students were separated into groups for all academic subjects (“school within a school”). Full-time ability grouping has been shown to have the most beneficial effects on the academic achievement of highly able students (Kulik & Kulik, 1997; Slavin, 1986) including the gifted (e.g., Goldring, 1990; Hattie, 2002; Rogers, 1993, 2007; Shields, 2002), compared to students of lower ability. On the other hand, grouping of highly able students has been critically discussed with respect to its psychosocial costs, first of all, its detrimental effects on students' academic self-concept.

### 2.1. Big-fish-little-pond effect

The BFLPE states that students of comparable ability have *lower* academic self-concepts in classes or schools where the average ability or achievement level of classmates is *high*, and *higher* academic self-concepts in classes or schools where the average ability or achievement level of classmates is *low* (Marsh, 1987). The BFLPE has received large empirical support across diverse populations, educational settings, and cultures (e.g., Marsh & Craven, 2002; Marsh & Hau, 2003; Marsh, Seaton, et al., 2008; Seaton, Marsh, & Craven, 2009) and has been shown to generalize across different student ability levels (Ireson & Hallam, 2009; Marsh, Seaton, et al., 2008; Seaton, 2007; Zeidner & Schleyer, 1998). A decrease in academic self-concept due to the BFLPE is of high practical concern, since academic self-concept has been found to have positive effects on a variety of outcomes, such as subsequent academic achievement (Marsh, Seaton, et al., 2008; Valentine, DuBois, & Cooper, 2004), academic choices (e.g., advanced coursework selection; Marsh, 1991), motivational variables (such as academic interest; Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2005; Trautwein, Lüdtke, Marsh, et al., 2006), learning intentions (students' intentions to continue studying a specific subject in the future) as well as educational and occupational aspirations (Ireson & Hallam, 2009; Marsh, 1991), and on academic emotions such as enjoyment (Goetz, Frenzel, Hall, & Pekrun, 2008) and test anxiety (Goetz, Preckel, Zeidner, & Schleyer, 2008).

Marsh and Parker (1984) proposed a social frame-of-reference model to explain the BFLPE on academic self-concept (see also Huguet et al., 2009). According to their model, self-perceptions in educational settings are largely shaped by the respective frame of reference. Students use the average level of achievement of their classmates or schoolmates as a frame of reference against which to evaluate their own academic standing via social comparison. In addition, other persons at school, such as teachers and peers, will compare individuals within the same class with intellectually more able classmates with increasing ability level of their reference group (school, class, etc.), which affects the feedback (e.g., grades, verbal feedback) students receive (Trautwein & Baeriswyl, 2007). Both social comparison processes, in turn, lead to contrast effects which result in lower academic self-concepts (for overviews see Köller, 2004; Marsh, 2005; Marsh, Seaton, et al., 2008).

As stated above, the BFLPE represents a net effect of (usually stronger) negative contrast effects and (usually weaker) positive assimilation effects. In general, assimilation effects describe that a target and a standard converge, i.e., the difference between them is reduced. In the context of grouping high-ability students, the

“basking-in-reflected-glory effect” (BIRGE; Cialdini et al., 1976) is of particular interest. Being grouped with students of higher ability or attending academically selective classes and feeling as a member of a group which is probably positively valued by the student is likely to cause feelings of pride and to improve academic self-concept. A student's academic self-concept in a high-ability class is enhanced by his or her basking in the reflected glory of the accomplishments and positive qualities of other classmates (e.g., “If I am a member of this class, I must be really smart.”; Marsh, Kong, & Hau, 2000.)

The consistency of the BFLPE in prior studies suggests that contrast effects are stronger than assimilation effects. Only very few studies have attempted to separate these two counterbalancing processes up to now. Köller, Schnabel, and Baumert (2000) and Köller, Trautwein, Lüdtke, and Baumert (2006) investigated students in upper secondary schools in Germany (cross-sectional and longitudinal studies) and found positive effects of course level on academic self-concept after controlling for the influence of individual and school-average achievement. Marsh et al. (2000) investigated high school students (grade 6 to 9) in Hong Kong. Because of the collectivist culture and the highly achievement-segregated school system, the authors expected reflected-glory effects to be particularly important. Testing models that included a juxtaposition of school-average achievement and students' ratings of school status, the authors were able to document significant positive effects of perceived school status on general academic self-concept ( $\beta = .17$ ; models 28 and 29). Again, contrast effects of school-average achievement on academic self-concept were stronger ( $\beta = -.31$  and  $-.33$ ; models 28 and 29) than assimilation effects (BFLPE). Of note, the size of contrast effects was larger in models that controlled for perceived school status than in models that did not control for status (without controlling for status:  $\beta$  around  $-.21$ ) which indicates that models that do not control for status might underestimate the size of negative contrast effects. Trautwein, Lüdtke, Marsh, et al. (2006) investigated contrast and assimilation effects of ability grouping with ninth-grade students in the German tripartite high school system, which is also highly achievement-segregated. They did not assess school status by students' ratings but by school type or track level, respectively. No assimilation effects of track level on Math academic self-concept were found after controlling for teacher-assigned school grades (full mediation). Thus, differences in Math self-concept of students in different tracks were explained as a consequence of differential grading practices.

### 2.2. Research on effects of ability grouping on gifted students' academic self-concept

As documented above, academic self-concept is a powerful predictor for a variety of variables related to achievement and learning, which also holds for gifted students (Kelly & Jordan, 1990; McCoach & Siegle, 2003; Van Boxtel & Mönks, 1992). Ireson and Hallam (2009) found that students' subject specific academic self-concept had a greater impact on learning intentions in that subject than students' achievement and that also affected the most able students. In addition, the BFLPE seems to be a persistent, long-lasting phenomenon (Marsh, Trautwein, Lüdtke, Baumert, & Köller, 2007). Given that the students investigated in the present study were at the beginning of their secondary education, these findings point out the importance of studying changes in academic self-concept of gifted students as a consequence of ability grouping.

Many studies documented a BFLPE on academic self-concept for gifted students after ability grouping (e.g., Craven, Marsh, & Print, 2000; Marsh, Chessor, Craven, & Roche, 1995; Preckel & Brüll, 2008; Shields, 2002; Zeidner & Schleyer, 1998). However, some studies of gifted education programs only showed short-term declines in academic self-concept, or even no decline at all (Dai & Rinn, 2008). Following a line of reasoning formulated by Hattie (2002), Marsh, Seaton, et al. (2008) assumed that other components of these

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