

From Frogs to Fish: »The Big-Fish-Little-Pond« Effect Then and Now

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Abstract: This paper traces the development of »the big-fish-little-pond« effect (BFLPE), which asserts that students in high-ability classes and schools have lower academic self-concepts than their equally able counterparts in low- and mixed-ability environments. The paper begins with a description of the problem outlined in the BFLPE model and continues by examining early BFLPE research and by tracing advances in the field. Criticisms of the BFLPE are outlined and research is described that addresses these criticisms. The paper concludes by presenting suggestions for future BFLPE studies.

Key words: academic achievement, self-concept, social comparison

Od žab k ribi: preučevanje učinka »velike ribe v majhnem ribniku«

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Povzetek: V prispevku je predstavljen razvoj učinka »velike ribe v majhnem ribniku« (ang. Big-Fish-Little-Pond-Effect), ki ugotavlja, da imajo učenci v oddelkih na najvišjem nivoju nižjo učno samopodobo kot njihovi enako sposobni vrstniki v oddelkih na nižjih nivojih in heterogenih oddelkih. Uvodoma je v prispevku opisan izpostavljeni problem BFLPE modela, nato pa doprinosi na področju njegovega zgodnjega raziskovanja. Na osnovi raziskovalnih spoznanj je predstavljena tudi kritika BFLPE modela ter smernice oziroma predlogi za raziskovanje obravnavanega učinka v prihodnje.

Ključne besede: učni uspeh, samopodoba, socialne primerjave

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In the first study to demonstrate the big-fish-little-pond effect (BFLPE), Davis (1966) reviewed the career decisions of college men attending colleges of different academic standards. He found that students who were high achievers had higher career ambitions if good grades were easily obtained in the college they attended compared to equally able students who attended colleges where good grades were harder to receive. Using the maxim “It is better to be a big frog in a small pond than a small frog in a big pond” (Davis, 1966, p. 31), he warned parents against sending their sons to top performing colleges if they thought their sons would be among the poorer performing students. Hence, the first reference in the literature pertaining to the effect now known as the BFLPE did not mention fish; rather it talked about frogs!

Since Davis’s (1966) study was published, the phenomenon that he noted has been widely researched, especially by Marsh and his colleagues (e.g., Craven, Marsh, & Print, 2000; Marsh & Hau, 2003; Marsh, Kong, & Hau, 2000; Marsh & Parker, 1984; Marsh et al., 2008) and is now known as “the big-fish-little-pond effect” (BFLPE). This paper begins with a description of the problem outlined in the BFLPE model, examines early BFLPE research, traces advances in the field, addresses some criticisms of the BFLPE, and finishes by presenting options for future BFLPE studies.

The BFLPE Model

Overview

The BFLPE model links academic self-concept (defined as one’s knowledge and perceptions about one’s academic ability; Bong & Skaalvik, 2003), with individual and school or class-average achievement. The model posits that individual ability and academic self-concept are both positively associated with academic self-concept, but that school- and class-average ability are negatively related to academic self-concept (see Figure 1). According to this model, one’s academic self-concept partly depends on one’s own ability and partly on the ability of other students in one’s class or school. This comparison with classmates is at the heart of the BFLPE, as it is postulated that students use this frame of reference as one basis for forming their academic self-concepts.

An example may help elucidate the underlying relations posited in the BFLPE model. Consider two equally able female students who are in their first year of high school. Both were at the top of their year group in primary school, having excelled in school-based tests, standardised state-wide tests, and external academic competitions. Since they both have high-ability, their academic self-concepts are high. However, one student attends the local comprehensive high school, a school that does not select students based on academic merit, while the other student attends an academically selective school in the next suburb. The student in the comprehensive high school is performing well academically and so feels good about her abilities. Also, compared to the other students in the school, this student is among the most intelligent, being at the top of the year group

(a big fish in a little pond). The student who attends the academically selective high school is performing around the middle of the year group. There are many other extremely intelligent students at this school, and competition for grades is fierce. Compared to these other students, this student feels that she is not very intelligent (a little fish in a big pond). Compared to the student who attends the local comprehensive school, the academic self-concept of the student who attends the academically selective school is lower: The environment of the academically selective school has had a negative effect on this student's academic self-concept (the BFLPE). Hence, while individual ability is positively related to one's level of academic self-concept, in classes or schools where the ability level is higher, equally able students tend to have lower academic self-concepts than students who are educated in settings where the average ability or achievement levels of classmates is lower. This positive relation between individual ability and academic self-concept and the negative relation between class- and school-average ability and academic self-concept are depicted in Figure 1.

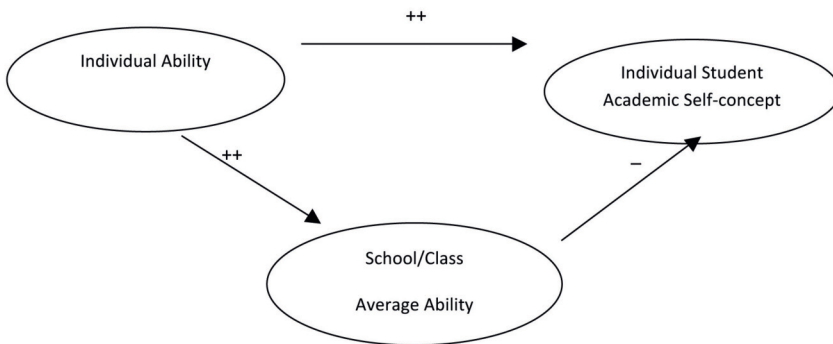


Figure 1. The Big-Fish-Little-Pond Effect. Adapted from “Big-fish-little-pond-effect on academic self-concept. A cross-cultural (26 country) test of the negative effects of academically selective schools”, by H. W. Marsh, & K. Hau, 2003, *American Psychologist*, 58(5), p. 369. Copyright 2003 by the American Psychological Association.

Does the BFLPE Matter?

Does it matter if students do not have an accurate perception of their abilities – an accurate self-concept? Self-concept research, especially research pertaining to the reciprocal effects model (REM; for review see Marsh & Craven, 2006), would suggest that having a lower self-concept does matter. REM research has demonstrated that academic self-concept and achievement have a dynamic and mutually reinforcing relation whereby self-concept shares a causal relation with subsequent achievement and achievement shares a causal relation with subsequent academic self-concept (see Figure 2). As such, prior academic achievement is significantly positively associated with subsequent academic self-concept and

controlling for individual ability, prior self-concept is also significantly positively related to subsequent achievement (e.g., Guay, Marsh, & Boivin, 2003; Marsh & Craven, 2006; Marsh, Trautwein, Lüdtke, Köller, & Baumert, 2005; Marsh & Yeung, 1997; Muijs, 1997; Valentine & Dubois, 2005).

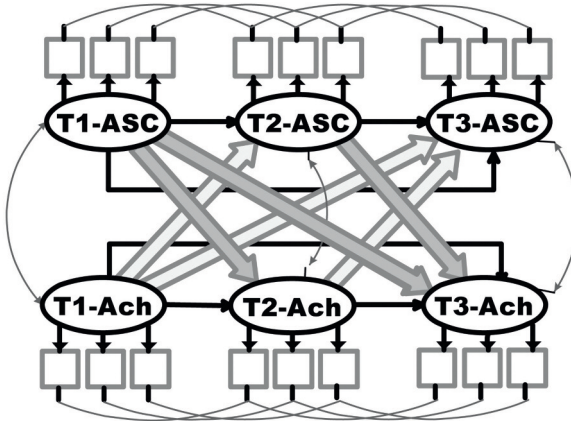


Figure 2. Reciprocal Effects Model. Adapted from “Self-concept theory, measurement and research into practice: The role of self-concept in Educational Psychology”, by H. W. Marsh, 2007. Copyright 2007 by British Psychological Society.

The implications of the REM for educational interventions are clear. To maximise the full potential of students and ensure achievement gains are enduring, both academic self-concept in a specific domain (e.g., mathematics) and achievement (e.g., skills training in solving a mathematical problem) need to be targeted simultaneously. Hence, if attending high-ability schools lowers academic self-concept as in the BFLPE and lower academic self-concept has been associated with lower achievement as in the REM, then having a lower self-concept of one’s abilities does matter, as self-concept shares a causal relation with subsequent achievement. As such, high-ability students who attend high-ability schools may not be performing to their potential. Moreover, despite the pervasive significance of a positive self-concept in obtaining favourable achievement outcomes, research has shown that when compared with similar ability students in average- and low-ability schools, students in high-ability schools are more likely to have lower general self-concepts, lower grade point averages, and lower educational and occupational aspirations (Marsh, 1991). This is of concern as these high ability students are the future of tomorrow.

Criticisms of BFLPE Research

Dai and Rinn (2008) have been the most notable critics of the BFLPE paradigm. Inter alia, they have argued that the BFLPE paradigm implicitly assumes

that social comparison is involved in the effect, rather than directly measuring it. They have also contended that BFLPE research has not focused on potential BFLPE mediators or moderators, that the effect is short-lived, and that the effect sizes associated with the BFLPE are not large enough to warrant attention. While a full discussion of these and the other issues raised by Dai and Rinn is outside the scope of this article and have been addressed elsewhere (Marsh et al., 2008), as will be seen in the ensuing discussion, these criticisms have been the focus of BFLPE research and are in the process of being addressed by BFLPE researchers.

BFLPE Research

Early Research

In their meta-analysis investigating the effects of ability grouping on high school students, Kulik and Kulik (1982) located 15 studies that reported self-concept results. Their analyses indicated that the average effect of grouping on self-concept was almost zero, which they considered trivial and concluded that ability grouping had little effect on self-concept. However, Marsh (1984) argued that this conclusion was based on average results and that if different ability groupings (e.g., high-ability students in high-ability schools versus high-ability students in low-ability schools) were considered, then the effect of ability grouping on self-concept would be substantially greater. In support of this argument, Marsh described a study – the Marsh and Parker (1984) study – that was designed to replicate previous research that had displayed a “paradoxically negative correlation between school-average SES and self-concept” (Marsh, 1987, pp. 282 – 283).

The Marsh and Parker (1984) study assessed the self-concepts of 305 sixth grade Australian students from high and low SES schools. On average, students in the high SES schools had slightly above average IQ scores ($M=109$, $SD = 13.1$), while those in the low SES schools had IQ scores slightly below average ($M = 96$, $SD = 13.1$). Thus, these students were not explicitly streamed according to ability, but de facto ability grouping occurred as a consequence of differing SES levels. Their results showed that whereas academic ability had a positive impact on academic self-concept, when individual ability was controlled, the effect of school-average ability on academic self-concept was negative – a BFLPE. Equally able students in the high-ability/high SES schools had lower academic self-concepts than students in the low-ability/low SES schools. This study was one of the first to provide evidence of the negative effects of school-average achievement on academic self-concept – the BFLPE. This early research has spawned numerous BFLPE studies examining the BFLPE for different levels of education, testing its impact on different educational outcomes, its lasting effects, the generalisability of the BFLPE, studies examining how students may bask in the reflected glory of attending a high-ability school, and an assessment of potential moderating constructs. In the following sections we provide an overview of some aspects of this research.

The BFLPE at Different Levels of Education

In addition to the Marsh and Parker (1984) study that demonstrated the existence of the BFLPE at the high school level, many other studies have shown that the BFLPE exists for high school students (e.g., 7th graders (Marsh, Köller, & Baumert, 2001); 10th graders, (Marsh, 1987); senior high students (Marsh, 1991)). However, the BFLPE has also been shown to be evident at the class level in primary schools. For example, Craven et al. (2000) contrasted the academic self-concepts of gifted students who attended streamed and mixed ability primary classes with those of students who attended special Gifted and Talented primary classes. Craven et al. (2000) found that compared to the gifted students in streamed and mixed ability classes, a greater decline in academic self-concept over time was reported by students in the special Gifted and Talented classes.

Relations between the BFLPE and Other Educational Outcomes

In a re-analysis of the Youth in Transition data, Marsh (1987) demonstrated the BFLPE, and observed that equally able students in low-ability schools had higher grade point averages compared to students in high-ability schools. Marsh suggested that this frame of reference effect for grades, although separate, was a contributing factor to the BFLPE for academic self-concept. Additionally, as noted previously, compared to attending an average- or low-ability school, attending a high-ability school can have detrimental effects on general self-concept, grade point average, educational and occupational aspirations, and the likelihood of taking advanced English and math classes (Marsh, 1991). Furthermore, in their evaluation of students in Gifted and Talented classes and streamed and mixed ability primary classes, Craven et al. (2000) also examined student achievement and motivation. The Gifted and Talented students' scores were significantly more negative than those of the other two groups (streamed and mixed ability) for three of six motivational orientations, and the groups did not differ on achievement.

Lasting Effects of the BFLPE

Dain and Rinn (2008) claimed that there was no evidence to show that the BFLPE was long-lasting. However, studies have shown that the BFLPE is not a short-term effect (e.g., Marsh 1991; Marsh et al., 2001). For example, Marsh, Trautwein, Lüdtke, Baumert, and Köller (2007) conducted two large longitudinal studies examining the long-term stability and persistence of the BFLPE on German high school students. In the first study, 2,306 students were assessed in their last high school year and again two years later. At Time 1, the final year of high school, school-average achievement negatively predicted math self-concept. This was also the case at Time 2, two years after graduation from high school. Furthermore, controlling for the negative effect of school-average achievement on math self-concept at Time 1, school-average achievement continued to

significantly negatively predict math self-concept at Time 2, although the effect was small. Marsh et al. also demonstrated that the BFLPE was still occurring four years after students had left high school, attesting to the long lasting effects of the BFLPE.

Generalisability of the BFLPE

One way to test the external validity of research findings is to establish whether they can be supported in different cultural settings. The BFLPE has been shown to be evident in Australia (e.g., Craven et al., 2000; Marsh, 2004; Marsh & Parker, 1984; Marsh, Chessor, Craven, & Roche, 1995), the United States (e.g., Marsh, 1987, 1991; Mulkey, Catsambis, Steelman, & Crain, 2005), Israel (Zeidner & Schleyer, 1998), Germany (Marsh et al., 2001), the United Kingdom (Ireson, Hallam, & Plewis, 2001; Tymms, 2001), and Hong Kong (Marsh et al., 2000). The validity of BFLPE findings was also supported by Marsh and Hau (2003), who undertook an extensive study of the BFLPE across 26 countries. However, most of the countries in this sample were economically developed and individualist nations. Seaton, Marsh, and Craven (2009) overcame this limitation by examining the BFLPE in 41 countries that included nations that were culturally and economically diverse. Results indicated that there was evidence of the BFLPE in both collectivist and individualist cultures and in economically developing and developed nations, thereby validating its place as a pan-human theory. Interestingly, the effect size found in this study for the BFLPE was $-.49$. Although Dain and Rinn (2008) argued that BFLPE effect sizes “do not warrant a strong argument for the BFLPE” (p. 299), this effect size was “clearly large enough to be of theoretical and practical importance” (Seaton et al., 2009, p. 410).

Reflected Glory

Marsh and his colleagues have also posited that the academic self-concepts of students attending academically selective schools may actually be enhanced simply because they had gained entry into such an academically elite school. Their reasoning was that these students might consider themselves intelligent by virtue of the fact that they were in a school where the other students are highly intelligent (e.g., “If I am good enough to be in this selective school with all these other very smart students, then I must be very smart” (Marsh et al., 2000, p. 338)). They referred to this identification process as an assimilation or reflected glory effect. Conversely, students in academically selective schools may also use their classmates as a basis of comparison (e.g., “There are a lot of students better than I am so I must not be as good a student as I thought” (Marsh et al., 2000, p.338)), resulting in lower academic self-concepts. This contrast effect is the classic BFLPE.

This reflected-glory effect was investigated in a longitudinal study by Marsh et al. (2000). The study took place in Hong Kong where high schools are highly segregated on the basis of academic achievement. At the end of primary schooling, students are grouped according to ability on the basis of a public placement test (Wong

& Watkins, 2001), and admission to one of Hong Kong's most prestigious high schools is much sought after. Marsh et al. surmised that the increase in social status gained for oneself and one's family by being admitted to one of these prestigious high schools (reflected glory) should outweigh the contrast effect (lower self-concepts in comparison to other higher ability students). However, consistent with other BFLPE research, they found that attending a high ability school had a negative effect on academic self-concept (a contrast effect). They also found a positive, but weaker, counterbalancing effect. They concluded that this was an assimilation or reflected-glory effect from attending a school of higher status and that the BFLPE was the net result of the contrast and the assimilation effects. Moreover, Marsh et al. found that controlling for reflected-glory also resulted in a more negative BFLPE. This led these authors to advocate to BFLPE researchers that future studies should include measures of reflected glory.

Moderators of the BFLPE

Dai and Rinn (2008) criticized the BFLPE for not specifying "possible situational or personal variables that might moderate the BFLPE" (p. 291). However, this is not the case. The most often examined moderator of the BFLPE is individual ability. However, results generally show small or non-significant moderating effects that are not always consistent in direction. For example, Reuman (1989) demonstrated that for students of low-ability, between-class ability grouping resulted in higher academic self-concepts, but for high-ability students that type of grouping led to lower academic self-concepts. Conversely, although students of all ability levels displayed a BFLPE, Marsh and Rowe (1996) reported that it was average ability students who suffered the most. The general conclusion from studies investigating individual ability as a moderator has been that the BFLPE generalises across all ability levels.

Seaton, Marsh, and Craven (2010) conducted a comprehensive study of BFLPE moderators, in which the generalizability and robustness of the BFLPE was evaluated across 16 individual student characteristics. The 16 constructs covered two broad areas: socio-economic status and academic self-regulation (e.g., motivation, self-efficacy, study methods, and behaviour; see Zimmerman, 1994, 1998, for the theoretical framework used). Of the 16 constructs, only three were found to moderate the BFLPE. Results indicated that students who reported being highly anxious, who used surface learning as a method of self-regulation, or who endorsed a cooperative orientation suffered more from the BFLPE. Overall, the authors concluded that results provided "support for the generalizability of the BFLPE and suggest that students are more similar than different in relation to the BFLPE" (p. 36).

Social Comparison

Another of Dai and Rinn's (2008) criticisms was that "the BFLPE research program has had minimal contact with the social comparison literature" (p. 290).

However, one of the most important advances in BFLPE research has been to link it with social comparison theory. Researchers (e.g., Marsh & Hau, 2003) have claimed that social comparison is at the heart of the BFLPE. It was argued that students used comparisons of achievement with their classmates as one way to evaluate their performance. Moreover, it was further hypothesised that it was these comparisons with classmates, forced on students by virtue of attending schools where ability levels are high, which led to lowered self-concepts. Given students in high-ability classes and schools have other high-ability classmates with whom to compare their achievements (upward comparisons), it was argued that these upward comparisons with high-achieving classmates were at the root of the BFLPE.

The first study to investigate the link between the two theories was made in 2008. This study (Seaton et al., 2008) reanalysed two social comparison studies from a BFLPE perspective. These studies (Blanton, Buunk, Gibbons, & Kuyper, 1999; Huguet, Dumas, Monteil, & Genestoux, 2001) had shown that students who made comparisons with classmates whose performance was better than theirs' (upward comparisons) performed better themselves on subsequent tests, but the comparisons had no effect on self-evaluations. Herein lay the problem: If upward comparisons can have positive benefits (better performance) how can they also be associated with lower academic self-concepts (the BFLPE)? Results from the reanalysis of the data from these two studies indicated that the negative effects of the BFLPE co-existed with, but were not moderated by, selected upward comparisons with individual students that improved performance.

The Seaton et al. (2008) study was limited as it did not include appropriate measures of academic self-concept or achievement. Hence, a further study was conducted by Huguet et al. (2009) to address these limitations. Huguet et al. found that when students' comparisons with their classmates as a whole were controlled for, the BFLPE was eliminated. Additionally, the BFLPE co-existed with assimilative and contrastive effects of selected upward social comparisons with individuals on academic self-concept. As Huguet et al. concluded, the BFLPE "is rooted in *how students compare with their class taken as a whole*, a comparison which proved to be more invidious as class average ability increased" (p. 26). This study is important as it was the first study to demonstrate that the roots of the BFLPE were in social comparison.

Experimental BFLPE Studies

Due to the nature of the sample in BFLPE studies it is very difficult, if not impossible, to undertake experimental empirical research: Random assignment of students to either an academically selective school or a non-selective school is, ethically (among other considerations), not an option. However, some experimental studies have been conducted. While school aged students have not been the participants in these studies, studies that utilise an experimental methodology are

nonetheless important in advancing knowledge of the BFLPE.

McFarland and Buehler (1995) were intrigued by the paradox that they saw in BFLPE findings that showed that high-performing students in a poorly performing peer group (a school that performs less well academically) had higher self-evaluations than students of similar ability in a well performing peer group (a school that performs well academically). Using university students as participants, they performed four laboratory studies in which they manipulated feedback about the performance of individuals within a group and the overall group's performance. They found that the BFLPE was strongest among people "with lower collective self-esteem, an individualistic cultural heritage, or a weaker bond toward a particular social group" (p. 1055). Furthermore, an asymmetry occurred for those who had a strong bond towards their group. These people seemed able to focus on their own performance when they themselves performed well in comparison to the group and to focus on the group's performance when they did poorly compared to the group. The authors concluded that this ability to re-focus depending on one's standing vis-a-vis the group may be protective of self-concept. This finding may be especially important for future intervention studies aimed at reducing the negative consequences of the BFLPE.

Alicke, Zell, and Bloom (2010) conceptualised the BFLPE within what they termed the *local dominance effect*. The tendency of people to rely more heavily on easily accessible local comparison information when self-evaluating rather than on more general comparison data from a larger population. Their participants were university students. Performance feedback for a local group (5 people) and a more general group (10 people) was manipulated. Results indicated that people favoured the local information over that of the larger group. Moreover, within the local groups, those who were told that they had performed well in a low-ability group had significantly higher self-evaluations than participants of (bogus) equal ability who had performed poorly in a high-ability group. Hence, Alicke et al. were able to demonstrate the existence of the BFLPE experimentally.

Directions for Future Research

The BFLPE has come a long way since Davis' frog pond study. Although the BFLPE has been extended to other areas (e.g., Chanal, Marsh, Sarrazin, & Bois, 2005 demonstrated the BFLPE in gymnastics and Trautwein et al., 2006 showed that the BFLPE occurred for academic interest), there are still many questions that remain unanswered. For example, in regard to social comparison processes Marsh et al. (2008) have suggested that BFLPE studies should place more emphasis on comparison strategies used when students select an individual for comparison. Perhaps focussing on how individuals actively regulate their comparisons and how developmental trends affect the BFLPE may prove fruitful. Additional moderators could also be examined. Perhaps the BFLPE may be moderated by different psychosocial constructs (e.g., motivational orientations, academic resilience, sense of

school belonging, personality, mental health). For example, perhaps students who are more neurotic will suffer more from the BFLPE, but those who are more conscientious or open to new experiences will suffer less. Perhaps the BFLPE will be reduced for more resilient students, but be heightened for those who are generally highly anxious or depressed. Further research is needed to elucidate these issues. In addition, it would be useful to extend BFLPE research into other settings such as universities and employment settings.

Concluding Comments

Since the Marsh and Parker study of 1984, we have learned a great deal about the BFLPE. We now know that it affects children at all stages of their academic life whether they hail from a collectivist or an individualist culture, or an economically developing or developed nation. The BFLPE is also long-lasting, has effects on other academic outcomes, and is not ameliorated by any of the constructs that have been tested to date. Moreover, there is an element of reflected glory within the BFLPE and the existence of the BFLPE has been demonstrated experimentally. Finally, the BFLPE has been shown to have its theoretical basis in how students compare with their classmates as a whole and in a recent paper it was described, not just as an effect, but as a theory (Seaton et al., 2009). Throughout the years, the BFLPE has been a topical and controversial subject in education circles and much more remains to be done to fully understand and address its effects.

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