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REVIEW ARTICLE

The Big-Fish-Little-Pond Effect: What Do We Know and Where Do We Go from Here?

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Abstract The big-fish-little-pond effect (BFLPE) refers to the theoretical prediction that equally able students will have lower academic self-concepts in higher-achieving or selective schools or programs than in lower-achieving or less selective schools or programs, largely due to social comparison based on local norms. While negative consequences of being in a more competitive educational setting are highlighted by the BFLPE, the exact nature of the BFLPE has not been closely scrutinized. This article provides a critique of the BFLPE in terms of its conceptualization, methodology, and practical implications. Our main argument is that the BFLPE, while having added to our understanding of the origins of self-concepts, disproportionately emphasizes one aspect of social comparison to the exclusion of many other intervening factors. In light of our critique, we suggest a broader conception of social comparison effects on academic self-concept that emphasizes a more active role of individuals in regulating their social cognition and motivation, as well as a more distinct effect of social-contextual influences. We also suggest alternative research designs that would incorporate contextual, developmental, and individual differences as potential moderators or mediators of the BFLPE.

Keywords Social comparison (imposed vs. self-engaged) · Academic self-concept · Coping · Academic motivation and achievement · School selectivity · Ability grouping

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What is the BFLPE?

The big-fish-little-pond effect (BFLPE) was proposed by Marsh and Parker (1984; Marsh 1984, 1987) based on the assumption that students use a local "frame of reference" to form their self-concepts on a relevant dimension of the self. Marsh and Parker operationalized the frame of reference or standard of comparison to be school-average ability level[1]. Thus, the general theoretical prediction based on the BFLPE is that equally able students will have lower academic self-concepts in higher average-ability schools but higher self-concepts in comparatively lower average-ability schools. In plain language, whether one perceives oneself as a big fish depends on the size of the other fish (more accurately, the average size of the other fish) in the pond. The stronger the peer group as a frame of reference, the lower one's academic self-concept. By the same token, weaker peer groups lead to higher academic self-concepts.

Since Marsh and his colleagues proposed the BFLPE model, numerous studies have been conducted to date (see Marsh and Hau 2003; Marsh *et al.* 2005; Marsh *et al.* 2007, for most recent studies), and the areas where the BFLPE is investigated have also been extended from academic to artistic and athletic, among others (e.g., Chanal *et al.* 2005). The research interest generated by the BFLPE model is largely due to its practical implications. Marsh (1987; Marsh *et al.* 2004) has repeatedly warned that parents who are eager to send their children to selective schools should be aware of possible negative consequences associated with the BFLPE. Moreover, based on the fact that people are constantly working in social settings that potentially provide social comparative information and salient cues for social comparison, the BFLPE should be ubiquitous. In any place where upward comparison is either forced or voluntarily engaged, such as attending selective schools, self-contained gifted programs or classes, academic acceleration, or other forms of advanced placement, mainstreaming or full inclusion of students with disabilities or other special needs, the BFLPE should be relevant. Indeed, Marsh and colleagues (e.g., Marsh *et al.* 2007) also alluded to the negative consequences of mainstreaming or full inclusion on academic self-concepts for students with special education needs (see Marsh *et al.* 2006 for an empirical study of students with mild intellectual disabilities).

With this background in mind, we will first provide an overview of the research literature pertaining to the BFLPE. This overview is not purported to be exhaustive but will point out discrepancies and raise questions about the BFLPE. We will then provide a critique of the BFLPE model in terms of its conceptualization (theory), methodology, and practical implications. Based on our critique, we will suggest a possible broadening of the research scope that would permit a more refined understanding of where, when, and why (and for whom) the BFLPE will or will not occur. We will discuss specific methodological ramifications and practical significance of these suggested changes.

What Do We Know About the BFLPE?

Evidence supporting the BFLPE

In Marsh and his colleagues' research, the BFLPE is typically operationalized as a negative effect of school-average ability (or achievement) on academic self-concept, controlling for the positive effect of individual student ability (or achievement) in a path model (see Marsh and Hau 2003; Marsh and Craven 2002).

In earlier studies, path analysis was used for this analysis (e.g., Marsh and Parker 1984; Marsh 1987). With the advent of more sophisticated analytic techniques, multi-level modeling (i.e., hierarchical linear modeling, HLM) has become a standard procedure (Marsh and Hau 2003; Marsh *et al.* 2007).

Evidence accumulated since 1984 based on this path model (from hereon the BFLPE paradigm) unequivocally supports the BFLPE hypothesis (see Marsh and Craven 2002 for review). Using the multi-level modeling of the opposite effects of individual student ability and school-average ability on academic self-concept, Marsh and Hau (2003) tested the cross-cultural generality of the BFLPE with data from 26 countries. They found consistent evidence of the BFLPE across nations examined. In a recent longitudinal modeling of the BFLPE, Marsh *et al.* (2007) not only found persistent negative effects of being in more selective high schools 2 years beyond graduation, these effects also seemed robust over gender and individual student achievement levels.

In addition to examining the BFLPE in the realm of academic ability or achievement and self-concept, other researchers have examined the BFLPE in such areas as physical abilities and artistic ability. These findings would seem to lend further support to the BFLPE model. For example, Chanal *et al.* (2005) examined the gymnastics self-concepts of 405 participants in 20 gymnastics classes. They found gymnastics self-concept was negatively predicted by class-average gymnastics skills and this negative relationship grew larger during the 10-week gymnastics program.

Marsh and colleagues argue that academic self-concept is important not only because it has consequences for one's general psychological well-being, but it also carries motivational properties. Academic self-concept has been shown to affect one's educational aspirations (Davis 1966; Marsh 1987), academic interest (Marsh *et al.* 2005; Marsh *et al.* 2007), course selection (Marsh and Yeung 1997a), and achievement over time (Marsh and Yeung 1997b). Although the causal predominance of academic achievement over academic self-concept or vice versa is a controversial issue (see Caslyn and Kenny 1977), it is likely that the relationship is bi-directional and reciprocal, rather than unidirectional (Hamachek 1995; House 2000), and mediated by motivational processes such as self-appraisal and self-motivation (Pajares 1996). Bandura and Jourden (1991) found, for example, different social comparative feedback (consistently surpassing others or progressively declining in performance) significantly impacted individuals' self-efficacy and performance aspirations (i.e., aspired-for levels of performance) in organizational decision making.

Evidence constraining the BFLPE

Marsh and colleagues also recognized the possibility that being with more competitive peers in school does not exclusively lead to declined self-concepts on relevant dimensions of comparison. Therefore, they labeled a positive "reflected glory" effect in contrast to the negative BFLPE. These two counterbalancing effects parallel what are typically called in the social comparison literature "assimilation effects" and "contrast effects." A contrast effect occurs when one sees oneself as different from a comparison target, and an assimilation effect occurs when one sees oneself as similar to a comparison target. Marsh *et al.* (2000) conducted a large-scale study of about 8,000 Hong Kong high school students, juxtaposing both the BFLPE and reflected glory effects. Using both a measure of school average ability and that of perceived school status, they were able to identify a "reflected

[1] In the BFLPE studies, Marsh used the terms ability and achievement interchangeably to indicate levels of academic performance students have attained or capable of attaining. Accordingly, they operationalized the BFLPE as caused sometimes by school-average ability and sometimes by school-average achievement. In this article, we follow this practice but will point out where the distinction becomes important.

glory" effect along with the BFLPE. However, their analysis supports a stronger BFLPE compared to a reflected glory effect.

Other research supports a more social-contextual view of contrast versus assimilation effects, rather than treating these effects as invariant. McFarland and Buehler (1995), for example, found the BFLPE was attenuated among people who value a social group to which they belong but was the strongest when there is a weak emotional bond toward the social group. Stapel and Koomen (2001) found, in a series of experiments, that whether social comparison has contrast or assimilation effects depends on activation of the personal or social self. Activation of the social self ("we") more likely induces assimilation effects, and activation of the personal self ("I") more likely induces contrast effects. Likewise, independent construal of the self leads to lower self-evaluation under upward comparison, but interdependent construal of the self reduces the contrast effect, and no difference in self-evaluative consequences between upward and downward comparison (Cheng and Lam 2007).

The BFLPE model assumes that except for a possible "reflected glory" effect, which is largely based on how one perceives the status of the school in which they find themselves, inevitable upward comparison in higher average-ability schools is always self-deflating; that is, leading to declined self-concepts. This assumption is challenged by several studies. Huguet *et al.* (2001) studied the social comparison behavior of students from two French middle school during transition to new schools. They found many students engaged in social comparison with academically "better-off" friends for the sake of self-evaluation and self-improvement. This upward comparison is not self-deflating as long as the comparer identifies with the comparison target and has an internal locus of control (i.e., one is able to catch up with the better-off targets through efforts). Blanton *et al.* (1999) argued that social comparison could occur at multiple levels. They asked a large sample of ninth grade students to report (a) how they compare with most of other students in specific academic subjects (this is the frame of reference assumed by the BFLPE hypothesis), and (b) who their most and least favorable comparison targets are (this is the self-selected comparison process and target beyond the radarscope of the BFLPE paradigm). They found that these two frames of reference are not conflicting, as both independently predicted improved academic performance. Of interest here is the finding that selection of peers who were doing well predicts improved achievement. This finding led the authors to argue that shifting comparison targets downward for self-enhancement is not productive academically. Even if it might temporarily protect one's well-being or self-worth, it does not facilitate self-improvement and, in the long run, will negatively affect academic achievement. In the same vein, Altermatt and Pomerantz (2005) studied a large sample of fifth, sixth, and seventh grade students and found that low achievers who established and maintained friendships with high-achieving friends evaluated themselves less positively, a variant of the BFLPE; but they performed better academically than low achievers with similarly low achieving friends, a tradeoff not captured by the BFLPE model. (See also later discussion of Burleson *et al.* 2005; for descriptive details of the BFLPE-related studies, see Appendices A and B).

Evidence that reveals the limitations of the BFLPE paradigm

In addition to the literature that shows a more complex pattern of social comparison effects than the BFLPE predicts, there is a bulk of social comparison research that does not provide direct evidence regarding the BFLPE per se, but nevertheless reveals important limitations of the BFLPE model. These limitations have to do with the lack of detailed mechanisms

between whether and how social comparison is made and whether and how it impacts self-concept formation or changes.

Butler (1992) conducted an experimental study of how mastery versus ability goal condition affects students' interest in different types of social comparison information. She was able to demonstrate that under mastery goal condition, students are more interested in social comparison information that is task-diagnostic; that is, what helps one improve their performance. In contrast, under ability goal condition, students are more interested in ability-diagnostic information, that is, how well one performs compared to others. Regner *et al.* (2007) observed similar patterns of relationships in natural settings. Their findings suggest that social information seeking is fundamentally selective, depending on the current needs, purposes, and concerns. The issue of self-concepts and self-perceptions becomes salient only when ability goal is activated; in other words, there is an ability-diagnostic focus (Bandura 1993). In a later study, Butler (1995) also found students' social comparative information seeking has both informational and motivational foci, and the two may co-exist, which echoes the findings of Blanton *et al.* (1999).

Ruble and Flett (1988) studied developmental trends of using social comparison for self-evaluation of academic competence with a cross-sectional sample of second, fourth, and sixth grade students representing high, medium, and low ability levels in arithmetic. They found that high ability children engaged in the most self-evaluative information seeking, and with increasing age, high ability children were more likely to engage in autonomous comparison (i.e., comparing products of one's own performance on several occasions) than social comparison. In contrast, low- and medium-ability children across ages showed a consistent interest in social comparison in terms of looking at others' works displayed in the room, labeled as representing different levels of ability. Ruble and Flett speculated that children of low- and medium ability are more likely than high-ability children to continually experience uncertainty of their levels of ability and therefore maintain a strong interest in social comparison. Social comparison information is more relevant than autonomous comparison to assessing relative ability as a stable, dispositional characteristic. As children become cognitively more mature through the elementary school years, there is an increasing recognition of ability as a stable trait (Rholes *et al.* 1990), a recognition crucial for forming enduring academic self-concepts. These findings do not contradict the BFLPE hypothesis. As a matter of fact, they provide a mechanism for the BFLPE in that when one moves to a high-ability school or program, one is more likely to experience uncertainty about one's ability, and thus more likely to engage in social comparison with available peers. However, these findings do reveal the theoretical gap left by the BFLPE paradigm.

Supporting Ruble and colleagues' finding on developmental trends in social comparison, Nicholls and Miller (1984) were able to show with a clinical interview technique that inferring ability as *capacity* is constrained by cognitive development. For example, only those who have developed the most differentiated conceptions of ability are able to infer that, with equal achievement outcomes, high effort implicates low ability and vice versa. Inferring a personal quality such as ability or making causal self-attributions is a process underlying academic self-concept formation (Marsh 1984). Although Marsh, in the early years of research on the BFLPE, also mentioned the possible developmental constraint on how self-concept is shaped (Marsh and Parker 1984; Marsh 1987), developmental considerations have not been a main concern in his research. Marsh (1987) speculated that the BFLPE is more likely to occur in elementary school years than later years, as children at that age are still in the formative years regarding self-concepts. This view is at variance with findings of research by Nicholls and Miller and by Ruble and her colleagues

on developmental underpinnings of social comparison and self-concept formation. Although the BFLPE and developmental research on social comparison have differing foci, and thus pitting one against the other may not be justified, it is fair to argue that without a clear understanding of developmental underpinnings of social comparison processes and consequences, the BFLPE hypothesis would be weak in its theoretical foundation.

The BFLPE hypothesis is based on the assumption that social comparison is situationally imposed, and the standard of comparison is the average ability or achievement of the peer group. However, in a study of spontaneous social comparison behaviors of first-year college students, Foddy and Crundall (1993) found most students compared themselves with either similar or better-off students. There was a distinct lack of interest in downward comparison, regardless of ability levels, presumably because downward comparison is not informative for performance evaluation, albeit its self-enhancing effect, a finding consistent with Ruble and Flett's (1988) suggestion that students' social information seeking is an active process, rather than a passive one. In a study of K-2 elementary school children, Pomerantz *et al.* (1995) found consistent evidence that with cognitive maturity, children become increasingly aware of positive and negative effects of social comparison; they adjust their social comparison behavior accordingly to suit their self-evaluation goals.

Although coming from different research traditions and drawing different conclusions, the above studies are similar in that they all involve detailed observations of social comparison behaviors *in situ*, where students were engaged in some academic tasks and demonstrated an emergent need for social comparison. Most of these studies also attempted to detail the developmental and cognitive underpinnings of how social comparison information is attended to and processed for self-evaluative, self-improvement, and self-protection purposes. Even though they do not necessarily directly support or refute the BFLPE hypothesis, they portrayed a more complex picture of how social comparison is made than the BFLPE hypothesis assumes.

Applications of the BFLPE theory to attending gifted programs

There have been several studies investigating the BFLPE in gifted programs. One can argue that gifted education provides an ideal test bed for the BFLPE theory, as participating in a self-contained or short-term gifted program, or getting accelerated into a more advanced class and grade level, gets close to the essence of the metaphor of a big fish in a little pond suddenly turned median or small when thrown into a big pond with many big or bigger fish. Marsh *et al.* (1995) conducted a quasi-experiment of 29 students participating in a gifted and talented (GT) class, and found a measurable decline in academic self-concept but not in non-academic self-concepts. However, to what extent the decline reflects an enduring change is still open to question. Gibbons *et al.* (1994) found that participating in a gifted program initially led to lowered self-concept, particularly for male students; however, the self-concept bounced back to the baseline 6 months after the program.

Zeidner and Schleyer (1998) found, with a large sample of fourth through sixth grade Israeli students, that students in the gifted programs had lower academic self-concepts than their counterparts in mixed ability classes, a finding in line with the BFLPE hypothesis. However, there is also evidence suggesting that there is no prevailing BFLPE of participating in gifted programs or schools as predicted by the theory. Cunningham and Rinn (2007) studied a group of adolescents who participated in a 3-week summer program. They measured their academic self-concepts at entry point and at the end of the program, and did not find significant changes in academic self-concept over time. They suggested that more than one reference group can be involved when students in gifted programs make

social comparison, which can balance out the BFLPE. Related to this issue are the effects of ability (homogeneous) grouping on self-concept as compared with that of heterogeneous grouping. Findings seem mixed in that regard (see Kulik and Kulik 1991, 1997). Since early research typically used measures of general self-concept or self-esteem rather than academic self-concepts as outcome measures, the findings in either way do not directly support or refute the BFLPE hypothesis, which emphasizes academic self-concepts as outcomes.

In comparing gifted college students who were enrolled in an honors program and gifted college students who were not enrolled in an honors program, Rinn (2007) found gifted college students who are enrolled in an honors program have significantly higher academic self-concepts than gifted college students who are not enrolled in an honors program, even after controlling for SAT scores. Although not a direct examination of the BFLPE, these findings lend some support to the notion that the BFLPE might not exist at the university level. Marsh (1987) noted that the BFLPE might be smaller for older students, as they "typically have some basis for the assessment of their own academic skills that is independent of the performances of their classmates, and they often know how the average ability level of their classmates compares with some broader frame of reference" (p. 282).

The mixed findings in gifted programs suggest, along with the research reviewed earlier, that the social comparison processes and consequences are more complex than the BFLPE theory predicts. In line with the social comparison literature, when the artistic ability self-concepts of 141 artistically talented adolescents during a 6-week program were examined, Burleson *et al.* (2005) found both support for the BFLPE and evidence that it is at variance with what is predicted by the BFLPE. Their findings suggest that mere exposure to highly talented peers does not predict a decrease in related self-concepts, but how individuals construe the social comparison information (the upward comparison target as inspiration versus as a source of the feeling of inferiority) affects positive and negative changes in self-concept, which is consistent with what is typically found in the social comparison literature, further implicating individual differences in how a given social situation is construed.

One enduring question regarding the BFLPE is whether the observed decline in self-concept is a temporary state or has an enduring impact on the individual's motivation and self-esteem (Dai *et al.* 1998). While Marsh and colleagues (e.g., Marsh *et al.* 2005; Marsh *et al.* 2007) argued that the negative effects tend to get worse over time, the long-term fallout of participating in gifted program does not seem in keeping with this prediction. Moon *et al.* (1994) noted that the short-term effects of a gifted program on the self-concepts of gifted students may be negative or non-existent, but the long-term effects may actually be positive. In their study of the long-term effects of an enrichment program for gifted elementary school students, Moon *et al.* found the long-term benefits of participating in a gifted program to be mostly positive, including an increased self-concept, increased motivation, an increase in basic thinking skills, and an increase in autonomous learning. Although Marsh *et al.* (1995) did identify a group of 9-year-old students suffering a decline in academic self-concept after being accelerated into a gifted class (indeed a decline in non-academic self-concepts as well), most studies of accelerated students do not find an consistent pattern of lowered self-concepts and prolonged negative motivational consequences (see Brody and Benbow 1987). In fact, long-term prospects based on research are quite positive (Lubinski 2004). Most of the accelerated students in the SMPY study, when reaching their adulthood, were satisfied with the decision of acceleration (Lubinski 2004). To be sure, it can be argued that research on the effects of gifted programs typically does not test the BFLPE hypothesis in a stringent manner. However, no apparent long-term negative self-related or motivation-related consequences of participating in gifted programs do challenge the external or ecological validity of the BFLPE model.

Discrepancies between the BFLPE paradigm and the social comparison literature

When research shows discrepancies in findings in a systematic way, it is natural to wonder whether it is merely a methodological artifact (e.g., different sample characteristics, different measurement tools) or reflects much deeper conceptual and methodological chasms or differing assumptions and premises. Dai (2004) pointed out the BFLPE research program has had minimal contact with the social comparison literature. This assessment is based on the extent to which the BFLPE researchers have integrated or incorporated empirical evidence as well as conceptual and methodological considerations in modifying and refining the BFLPE model or paradigm over time. Despite Marsh's (Marsh *et al.* 2004) argument to the contrary, discrepancies between the BFLPE paradigm and the social comparison literature are evident with respect to at least the following aspects of social comparison:

a) *Imposed vs. self-engendered social comparison.* The social comparison literature typically considers social comparison as an active process, though encountered or imposed social comparison that makes social comparison unavoidable is also considered as legitimate (Wood 1996). Festinger (1954), for example, argued that people seek social comparison information because they experience uncertainty and ambiguity in evaluating their own performance and verifying their own competence. In other words, if people are certain about their abilities, there is no need to engage in social comparative information seeking. Marsh *et al.* (2004) cited Diener and Fujita (1997) as supporting what they called "situationally imposed or forced comparison" (p. 270) underlying the BFLPE. However, although acknowledging the existence of imposed social comparison, Diener and Fujita argued that "to the extent people employ social comparison as a flexible coping strategy in the health domain as well as other areas, the effects of imposed social comparison diminish or disappear" (p. 330). Supporting this argument, Gibbons *et al.* (1994) found that students who did not compare favorably with others reduced the amount of social comparison they made or shifted their comparison targets, suggesting social comparison processes involve active coping, for good or ill. Although self-engendered social comparison was alluded to on various occasions in Marsh and colleagues' studies (e.g., Marsh *et al.* 2000), it has never been formally incorporated into their research design as an integral component.
b) *Directionality of social comparison.* In an imposed social comparison, one's academic standing among peers is uniformly gauged based on the local norms (presumed to be school-based according to Marsh 1987). The frame of reference is a given entity, imposed by the impinging environment, an assumption that justifies using the path coefficient from school-average ability or achievement to academic self-concepts as a proxy measure of the BFLPE (provided that average school ability varies from school to school). In contrast, in self-engendered models of social comparison, social comparison can be engaged in with similar others, upward with better-off peers, or downward with worse-off peers at any given point in time, depending on a host of contextual and individual difference variables, and comparison targets are selected based on internal standards, guides, and current concerns and motives (Banaji and Prentice 1994; Brown and Dutton 1995; Collins 1996; Wood 1996). Furthermore, effects of the directionality of social comparison also vary, with downward comparison more likely serving self-protection and upward comparison serving information and self-improvement needs. Thus, directionality of social comparison does not automatically produce positive or negative consequences on self-concept in a linear fashion, as the BFLPE hypothesis proposes.

c) *Mitigating conditions for the BFLPE and situational and individual moderators and mediators.* Except for pointing out a counterbalancing "reflected glory effect," Marsh and colleagues do not specify any other possible situational or personal variables that might moderate the BFLPE. What mediates the BFLPE is also implicitly assumed rather than explicitly tested (e.g., the social comparison processes). In general, the research strategy of the BFLPE program is to show generality and ubiquity of the BFLPE over gender, ability levels, and cultures (Marsh and Hau 2003; Marsh *et al.* 2007), rather than finding out details of how it works psychologically (i.e., addressing the issue of internal validity), as evidenced by their preference for large-scale data sets and statistical manipulation to tease out the effects (e.g., Marsh 1987, 1994; Marsh and Hau 2003; Marsh *et al.* 2007), rather than conducting carefully designed experimental or observational studies especially aimed at elucidating the nature of the BFLPE. This strategy differs from that of the mainstream social comparison research programs (typically conducted by social and personality psychologists), which tend to seek detailed understanding of contexts, motivations, mechanisms, and constraints of social comparison and related social cognition through experimentation (see Wood 1996).
d) *The role of self-motives and self-regulation.* The social comparison literature usually considers selective attention, differential perception, construal, and interpretation of social situations and social information as essential for understanding why and how people engage in social comparison (Taylor *et al.* 1996). Active regulation of social comparison behaviors based on motives and current concerns constitute an important aspect of social comparison, and also determines social information uptake and processing. This aspect of social comparison is ignored in the BFLPE paradigm. Instead, self-concept formation works like an impression imposed upon the individual's mind due to some assumed contrast effects of unspecified social encounters with information about one's academic standing. The construct of academic self-concept in the BFLPE paradigm is so remote from the person who is supposed to form and maintain this self-concept or self-perception that self-motives, purposes of self-evaluation, and self-regulation of social comparison become obscured. In short, the social comparison literature generally maintains a perspective of social comparison as an agent-based process, whereas the BFLPE paradigm conveys a mechanistic flavor.

Why is the BFLPE Paradigm Flawed?

So far, we have described the research on the BFLPE and identified the discrepancies and their sources. In this section, we provide a critique of the BFLPE. The purpose of this critique is not to discredit this valuable line of research efforts by Marsh and colleagues for almost a quarter of a century, but to point out areas where improvements and modifications can be made to further our understanding of the BFLPE in a broader context of research on academic achievement, self-concept, academic motivation, and general psychological well-being. Our critique starts with a conceptual analysis of three general models of social comparison, followed by a close look at the standard methodology adopted to investigate the BFLPE, including the path model for detecting the BFLPE (Fig. 1). Since Marsh and colleagues also make a strong argument about the disadvantages of being in a "big pond," so to speak, based on the BFLPE research, we also identify what is omitted or neglected in this argument.

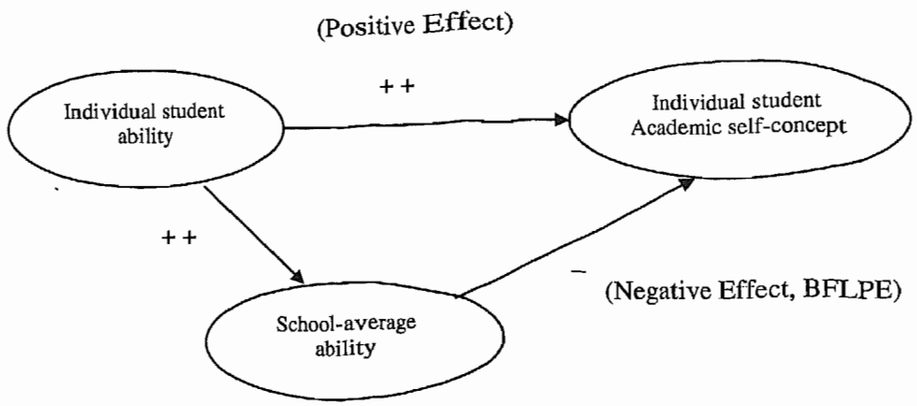

Fig. 1 Theoretical prediction of the big-fish-little-pond effect (BFLPE); the BFLPE is predicted to be smaller in effect size than the effect of individual student ability. Adapted from Marsh and Hau (2003)

Conceptual problems with the BFLPE theory

To simplify our conceptual analysis, we can roughly identify three models of social comparison processes in academic contexts: the situationally imposed model underlying the BFLPE hypothesis; the coping model, typically used in social comparison research; and the motivational model, which puts self-concept squarely in the context of many other self-related constructs such as self-efficacy, self-attribution, and self-theory in academic and other settings where personal performance or competence is at stake.

Situationally imposed models

Situationally imposed models of social comparison are not without some good foundation. Sometimes social information becomes so compelling that one cannot avoid but relate it to oneself in a way significantly impacting how one views her- or himself (Wood 1996). However, there is a set of conditions that constrain when situationally imposed models become viable. These may include contextual factors such as salience of comparison information, a performance-driven atmosphere, an ability-diagnostic focus, as well as cognitive sophistication that permits discerning enduring dispositions and ability as capacity (Nicholls 1984). This situationally imposed social comparison can get to the point that social comparison standards and cultural norms become the same (Diener and Fujita 1997). In general, a tightly structured social environment renders situationally imposed social comparison more likely. Conversely, in a loosely structured social environment, where no distinct centralized information control and dissemination exists, there is likely an array of information from which people can pick and choose, and individual differences are more likely to come into play. However, Marsh's BFLPE paradigm treats situationally imposed social comparison as applicable to all academic situations as long as they meet one condition: school-average ability or achievement differs across schools. This criterion does not consider how salient and predominant the social comparison cues are and how accessible social comparison information is. Consequently, defining frame of reference or standard of comparison as fixated at the school level (i.e., school-average ability) becomes a matter of research convenience rather than psychological necessity. The question of how school-average ability or achievement as a framework of

reference is psychologically mediated is assumed rather than explicated through evidence. One might argue, using the physical and social proximity and information accessibility as criteria, that the class level constitutes a more viable frame of reference for social comparison. Indeed, Marsh and colleagues' own research shows that it works just as well (e.g., Lűdtke *et al.* 2005).

While situationally imposed or forced comparisons may exist and impact self-concept to some extent, social psychology research also shows that individuals perceive and interpret their worlds and themselves differently, depending on different guides, standards, and goals, "normative guides" being only one of them (Higgins *et al.* 1986). Thus, a student's reference group can be viewed in several different ways. For example, Williams and Montgomery (1995) define one's frame of reference as his or her "particular learning environment" (p. 403). Kuh *et al.* (2000) developed a student typology based on the activities in which students engage while in college. Based on this typology, Kuh *et al.* argue that one's activities expose a person to different groups of people with whom to compare oneself. Thus, a student's typology is their reference group. The BFLPE is based on the assumption that people compare themselves externally only with a local norm in their immediate environment (e.g., school average). External comparison, however, could actually involve any number of people or groups or combinations of these.

In evaluating one's abilities, it would be helpful to know where one stands relative to all ability levels, instead of just where one stands relative to others of similar ability. In other words, it is possible to have multiple reference groups for social comparison. Bassis (1977) argues that students within a particular environment are likely to realize where their environment falls on the selectivity continuum, at least in a broad sense. "Thus the argument is that, to some extent at least...students extend the boundaries of their comparison reference groups beyond their local frog ponds" (p. 1322). Bassis found that college students, in forming their reference groups, are likely to incorporate across-institution comparisons when evaluating themselves. This effect was later labeled by Marsh (Marsh *et al.* 2000; Marsh *et al.* 2001) as the "reflected glory effect." Likewise, students in a gifted program might not experience the BFLPE if they extend their reference groups outside of their immediate peer group within the gifted program and assimilate with the members of the gifted program.

However, the implication of flexibility using comparison standards, local or global, goes beyond "reflected glory." It suggests that unless the social or cultural norms are extremely compelling, overwhelming individuals' flexible choice, people will selectively use varied comparison criteria under different circumstances that better serve self-evaluation purposes (Diener and Fujita 1997). A case in point is that people even create imaginary comparison targets to facilitate self-evaluative and motivational purposes (Levine *et al.* 1993; Wood 1996)! The use of imaginary targets convincingly indicates an active role of the person. Individual choices of comparison standards naturally lead to the second model of social comparison: the coping model.

Coping models

Coping models of social comparison are mainly used in the domain of health and psychological well-being (Buunk and Gibbons 1997). However, coping with academic challenges and unfavorable comparison and self-evaluation is also a main focus in the realm of educational psychology (e.g., Boekaerts 1993). Broadly defined, coping refers to situations where the challenges one faces seem to exceed the resources available to the person or threaten one's psychological well-being. Thus, Boekaerts suggested that students

always have dual concerns in academic settings, concerns about learning and self-improvement and concerns about subjective well-being. Her theory coincides with self-theory developed in social psychology, which highlights three self-motives: self-improvement, self-enhancement, and self-verification (Banaji and Prentice 1994). Of the three, social psychological researchers used to focus on self-verification and self-enhancement, and not until a decade ago did self-improvement resurface as a major focus (see Collins 1996), since the original, classic theory of social comparison proposed by Festinger (1954) stressed a "unidirectional drive upward" (p. 124) as underlying social comparative information seeking and self-verification. Therefore, in a coping model of social comparison, one would face a dilemma: upward social comparison is an optimal comparison strategy if self-improvement (along with self-verification) is the goal, but it potentially carries hedonistic costs (Brown and Dutton 1995). In contrast, downward comparison is an optimal strategy when self-enhancement is the goal (but see Taylor *et al.* 1996), but does not carry much informational value other than a comforting feeling that there are people worse off than oneself. Alternatively, people can also diminish and disengage from social comparison to protect themselves, and even downplay the importance of the dimension on which self-evaluation is made (Gibbons *et al.* 1994). Thus coping models produce a variety of scenarios regarding the fallout of social comparison. Consider successful coping in big-fish-little-pond situations: the person gets a "reality check" and repositions herself or himself in a productive manner ("there are always people better or stronger out there"), maintaining a focus on learning and self-improvement, or even better, uses better-off persons as an inspiration or as models to emulate (Burleson *et al.* 2005). In this case, the consequences of being in a "big pond" are benign, or even beneficial. There are, of course, many cases of failed coping. For example, for some individuals the "reality check" is truly a "reality shock": the contrast (self-other differences) is so sharp and the target is so out of reach that assimilation (i.e., identifying better-off peers as similar to oneself) is difficult to achieve. In other words, self-improvement or catching-up does not seem realistic and a sense of inferiority takes hold (Burleson *et al.*). This is an acute form of the BFLPE, which may lead to lowered self-efficacy, negative affective self-reactions, and lowered educational aspirations (Bandura and Jourden 1991). Of course, effects of upward social comparison can be moderated by self-esteem. Cancer patients with high self-esteem felt better about their chance of recovery when seeing better-off patients, while their counterparts with low self-esteem felt worse after seeing other patients recovering (Buunk *et al.* 1990). The same upward social comparison produces diametrically different outcomes.

When one takes a close look at self-motives and conflicting goals of making social comparison, and positive and negative consequences associated with them, one inevitably comes to a realization that the BFLPE paradigm vastly overlooked the coping aspect of social comparison. Diener and Fujita (1997) compared imposed social comparison models and coping models and concluded that

> the coping model appears to be more accurate primarily because people are so flexible in natural settings in the information they use to determine their satisfaction. In addition, the coping model recognizes the substantial individual differences that exist in the choice of comparison targets. (p. 330)

Motivational models

The term "motivational model" is used here to refer to a body of the literature that intersects social comparison and academic motivation. Defined as such, these models overlap with the

coping models discussed above (e.g., self-improvement vs. self-enhancement motives) but carry different theoretical backgrounds than the coping research and are developed predominantly in academic contexts. Weiner (1990) identified self and self-related motivational processes as the then dominant trend in motivational research in education. Therefore, it should be particularly relevant to the BFLPE hypothesis, which is mainly concerned with academic self-concept.

The self in the motivational research involves many self-related constructs, such as self-efficacy, self-expectancy, self-attribution, self-theory, and possible selves. Following the suggestion by William James, the motivation literature distinguishes between an enactive aspect of the self ("I want to do it" or "I can do it") and a reflective aspect of the self ("What does it say about me?"); constructs of self-efficacy and self-expectancy lean toward the former, and are typically considered situation- or task-specific and measured before performance, and self-attribution and self-concept belong to the latter, typically gauged after performance, and reflect a more enduring aspect of the self (Dai *et al.* 1998). Rather than studying self-concept as a stand-alone construct, the motivational researchers attempt to situate it in specific performance contexts, in conjunction with other self-related constructs to reveal both the enactive and reflective aspect of the self and their affective and motivational consequences (e.g., Pajares and Miller 1996; see Pajares 1996 for a review). These two aspects of the self are likely to have a reciprocal relationship. Enactive self-appraisal and expectations can influence or bias post-performance self-attributions and self-concepts (Feather and Simon 1971; Pajares and Miller 1996); and the latter, once becoming internalized, off-line tendencies, can also influence and bias situational, on-line self-appraisal and expectations, leading to direct behavioral consequences, such as course selection (Marsh and Yeung 1997a). Indeed, in early years, Marsh (1984) envisioned a dynamic equilibrium model in which academic achievement, academic self-concept, and self-attributions for the causes of success or failure form reciprocal relations, such that a change in one aspect leads to changes in the others. Marsh suggested that effects of moving from a lower ability school to a higher-ability one could be differential, some suffering declined self-concept, some developing an urgent need for protecting or maintaining their positive self-concept, and others may seek self-improvement. Thus, social comparison information is only one of many possible factors—new levels of academic challenges, direct and vicarious experiences with the task at hand, and social-evaluative feedback from others—that produce "disturbance" on this dynamic equilibrium. However, this vision has never been materialized in Marsh's research, surely not in the BFLPE research paradigm.

Social-cognitive and motivational underpinnings of self-concept become clearer when one realizes that self-concept formation is fundamentally a causal self-attribution process (i.e., inferring stable personal attributes); therefore, whether a personal attribute is perceived as stable and controllable influences future motivation and behavior (Weiner 1979). For example, Eccles (Parsons) *et al.* (1984) found adolescents to be more likely to perceive math as taking more ability (i.e., a stable, enduring personal attribute) than English. This finding suggests that students perceive difficulty of domains differentially, and therefore infer ability differentially, depending on domains of performance involved. Although Marsh also emphasizes domain-specificity of academic self-concepts and has engaged in several studies of the BFLPE with a focus on mathematics achievement and self-concept (e.g., Marsh *et al.* 2007), his domain-specificity argument is mainly based on empirical evidence from factor analysis of self-concepts. The BFLPE, indeed Marsh's general internal and external frames of reference, theory of self-concept has little to say about why people make differential domain-specific self-attributions.

Dweck's (1999) incremental versus entity theory of ability and self is one of the most influential motivational theories in education. According to this theory, self-attributions people make about themselves and others are partly determined by their implicit theories of whether things are static or dynamic, fixed or incremental. Thus, an incremental view of ability more likely induces mastery efforts and self-improvement motivation, and a fixed view of ability more likely induces a performance goal and, if the expectation is not favorable, an ego-protection motivation. From this point of view, the same social comparison information can lead to completely different construal. Construal of social comparison and self-evaluative information can be geared either toward a task focus and self-improvement, or toward an ability-diagnostic focus on relative ability. In the same vein, Markus and Nurius (1986) argued that people not only form self-representations of who they are, but also envisage who they can be (i.e., *possible selves*;), a distinct dynamic, future-oriented view of self. Thus, upward social comparison can truly be inspiring (Burleson *et al.* 2005). Related to this point are individual and cultural differences with regard to inferring *invariant* attributes from social comparison. To the extent people are predisposed to see personal attributes as either fixed and stable or fluid and malleable, the measure of self-concept may carry different meanings and valences for different individuals and across different cultures (Dai 2002; Dweck *et al.* 1995; Guimond *et al.* 2007). Marsh *et al.* (2004) acknowledged that cultural differences in conceptions of ability may affect the size of the BFLPE, but the BFLPE is robust across cultures. Marsh *et al.* (1995) also suggest that students with mastery versus performance or ego orientation may more likely use self-improvement as a basis for their academic self-concepts. However, the BFLPE paradigm does not grant a place for a dynamic construal of self to reveal itself. How one construes social comparative information is an issue of self-regulation of cognition and motivation. Part of social and intellectual maturity is to develop internal standards for one's personal strivings, and to become less dependent on external standards such as social norms. This means that comparison standards will developmentally become more autonomous (Zimmerman and Schunk 2004), more "criterion-based" (i.e., what the person tries to accomplish, regardless of what standards others hold), rather than "norm-referenced," which is more vulnerable to external disturbance. Indeed, this is the only way a dynamic but stable equilibrium of self can be maintained, not easily perturbed by external stimuli and changes.

We have discussed so far why the BFLPE reflects only part of much larger picture of how individuals make social comparison in academic and other settings, how cognitive and social development changes the way social comparison is engaged, how different motivations are involved in making social comparison. In the following section, we will look at the design and methodology Marsh and colleagues have consistently used for decades in studying the BFLPE.

Design and data analysis problems with the BFLPE paradigm

Since the first study of the BFLPE of which we know (Marsh and Parker 1984) up to the most recent one (Marsh *et al.* 2007), we have seen a consistent pattern of using large-scale data sets and a standard path model of estimating the BFLPE. Using large-scale national and international data sets has many advantages, such as generalizability of findings and statistical power, among others. Using a standard path model also has many advantages, such as ensuring comparability across studies, and accumulation of evidence over time. However, when it comes to the particular issue of how the BFLPE is estimated, the design and data analysis typically adopted in the BFLPE research reveals several weaknesses and flaws.

Lack of specification of contexts

There is no specification of contexts where the BFLPE is more likely or less likely to occur. The ability of Marsh and his colleagues to identify crucial contextual information is limited because the large-scale national or international data they have used typically do not provide detailed information about contextual information relevant to the BFLPE or self-concept in general, such as salience of social comparison information, degrees of academic competition, or critical transition points, developmentally or contextually. To be sure, using East and West Germany data during the transition period, and the related German educational system (e.g., Gymnasium schools; e.g., Marsh *et al.* 2001), or identifying a group of students in a gifted program (Marsh *et al.* 1995) represents good efforts to highlight the importance of contexts or contextual changes. However, most of the BFLPE studies are indiscriminative of contextual features other than school-average ability or achievement, which is typically the only basis for estimating the BFLPE. The levels of "school selectivity" are surely an important index, just like socioeconomic status (SES), different ethnic or cultural groups, or class size. But it is at best what Bronfenbrenner (1989) called a "social address (p. 193)." Relying on school selectivity as a basis for inferring the BFLPE is particularly problematic when we know that what reference group(s) students will use for self-evaluation is necessarily complex and depends on social-contextual, developmental, and personal factors, as we discussed earlier in our conceptual analysis. The dilemma of whether to use standardized test scores or school grades as a basis of student ability and achievement, discussed by Marsh *et al.* (2007) further reveals the ambiguity as to which index is more accessible and meaningful as a basis for the development of academic self-concept, and a dilemma for selecting proper achievement indices in research.

Social comparison is implicitly assumed rather than observed

The most problematic aspect of the BFLPE paradigm is that social comparison is inferred, not observed or measured; and explanation and interpretation of data is based on blanket assumptions rather than direct evidence. For example, it is difficult to know whether the BFLPE is due to more downward comparison in less selective schools or more upward comparison in more selective schools. The BFLPE hypothesis makes three default assumptions, namely, that (a) students engage in social comparison using the same frame of reference based on school norms and that (b) levels of engagement in social comparison are comparable across individuals, and (c) the directionality of social comparison is a function of individuals' ability or achievement in an academic subject vis-à-vis a related school norm. Only by making these assumptions can one interpret the relationship between school-average ability and academic self-concepts to indicate the BFLPE. However, to the extent the social comparison process is implicitly assumed rather articulated and measured, the interpretation of the BFLPE as caused by social comparison is largely a speculation rather than based on solid evidence.

The measurement of academic self-concept also exacerbates the problem. When self-concepts in specific academic subjects are measured, one might infer that it is based on their achievement. However, when broad academic self-concept is concerned (e.g., one item in the *Self-Description Questionnaire* reads "I learn things quickly in most school subjects"; see Marsh 1990), one is less certain that it is a result of social comparison, as people are more likely to give a biased opinion without any social comparison information as a basis (Diener and Fujita 1997). In general, self-enhancement biases are more likely to build into measures of traits that are vague and ambiguous. Statements implicating social comparison can be made without actual social comparison behavior (Wood 1996). Regardless, there is no sure

evidence in the BFLPE paradigm that individuals engage in social comparison. An observed correlation between achievement and related self-concept does not make it any clearer.

Problems with the statistical procedure used to tease out the BFLPE

Marsh and his colleagues have been able to produce a consistent pattern of findings with more than 20 years of research, pointing to the alleged BFLPE (Marsh 1987, 1991; Marsh *et al.* 2000; Marsh *et al.* 2005, Marsh *et al.* 2007; see Marsh and Craven 2002 for a review). In such a case, one could, of course, conclude that the robustness of the findings provides a solid empirical grounding for the BFLPE. Alternatively, however, one could also surmise that homogeneity of the methodology could also produce consistent data patterns, not because they reflect an important aspect of the reality, but because they are the product of its methodology. Of course, truth might as well stand somewhere in-between. However, a close look at the path model (Fig. 1) set up to test the BFLPE reveals a statistical procedure that is disconcerting, to say the least.

In most of the studies of the BFLPE conducted by Marsh and his colleagues, the BFLPE is operationalized as the effect of school-average ability (achievement data were often used as proxy measure of ability) on a relevant academic self-concept, along with the effect of individual-level student ability, which is assumed to be the comparative basis for individual self-concept, with individual-level ability (or achievement) also having a causal path onto school-average ability, as in most situations, the school-average ability (or achievement) is an aggregated measure derived from individual-level student ability or achievement; and thus the two are by nature positively correlated. A problem with the path model is that one cannot have any certainty that partialing out, or controlling for, the effect of the alleged "individual-level ability" would not simultaneously partial out positive effects of attending a more selective school, not just in terms of the "reflected glory" or assimilation effect, but in terms of the educational benefits of having a more rigorous curriculum and presumably better instruction on students' achievement, which is, as we point out above, typically used as a measure of individual student ability, and subsequently their academic self-concept. Indeed one should expect more selective schools to do better in this regard (otherwise why do so many parents pay a fortune to send their children to selective schools?). By partialing out individual student ability or achievement, potential credit due to attending more selective schools is taken away.

Not only so, at a technical level, multicollinearity occurs when two predictor variables are positively correlated, leading to unstable parameter estimates or even anomalies. Consider an early study of the BFLPE by Marsh (1987). Individual student ability had a correlation of 0.56 with school-average ability, and a correlation of 0.51 with academic self-concept. School-average ability had a correlation of 0.14 with academic self-concept. However, in the standard path analysis modeling the BFLPE, after controlling for the effect of individual-level student ability, the regression coefficient of school average ability on academic self-concept became negative (β=−0.23). This is a clear case of a suppression effect in multiple regression models because a simple (zero-order) positive correlation turned negative as a beta weight in multiple regression. Similar suppression effects can be seen when Marsh *et al.* (2000) found that when perceived school status (i.e., a measure of school selectivity) was entered into the standard BFLPE path model, school status had a positive effect on academic self-concept, but there was a measurable increase in the negative effects of school-average ability on academic self-concept. Marsh *et al.* argued that "[b]y including a separate measure of perceived school status, we partialed out some of the reflected glory effects associated with school-average achievement so that it became a better

(less confounded) basis for inferring social comparison contrast effects leading to a more negative BFLPE" (pp. 346–347). A problem with such an interpretation is again the suppression effect whereby the already suppressed effect of school-average ability got further suppressed (i.e., more negative) due its positive correlation with perceived school status. Although suppression in multiple regression is a complex statistical phenomenon that takes many forms and is subject to different interpretations (see Cohen *et al.* 2003), suffice it to say that when it happens, extra care needs to be taken to make sure that a statistical artifact is not taken as self-explanatory evidence for substantive arguments. Marsh (1987) argued that controlling for individual-level student ability is a necessary correction for individual ability in order to detect the BFLPE. Putting aside the issue of whether educational benefits of attending more selective schools get partialed out along the way, it begs the question of what this "negative effects" means. It is incumbent on the researchers to provide a detailed diagnostic analysis and data breakdowns to show that indeed a negative effect of school selectivity (a between-school effect) can be teased out from the positive effects of individual student ability (a within-school effect), rather than relying on a suppression effect to make the case.

Effect sizes do not warrant a strong argument for the BFLPE

Even if for the sake of discussion we disregard the aforementioned problem, an effect size of −0.20 or even −0.25 (one can visualize a scatterplot) does not make a compelling case. One can imagine that some data points on the scatterplot strongly indicates the BFLPE, but there are many individuals who deviate from the prediction, as the prediction is far from perfect. These cases of deviation should not be just taken as "statistical error" but as cases of not conforming to the BFLPE prediction. Another reason that the effect size does not make a compelling case is that a predictive relationship cannot be equated with a causal relationship based on correlational data. Thus, the predictive efficacy of school-average ability on academic self-concept should not be seen as automatically supporting a causal interpretation of the BFLPE nature. The relatively low effect sizes of the BFLPE typically found using the BFLPE methodology, even taken as a valid measure, suggest that between being in a higher ability school (or other settings with academically competitive peers) and academic self-concepts lie a host of intervening factors moderating and mitigating the alleged negative effects of school selectivity on academic self-concepts. The coping and motivational models discussed earlier have much bearing on this issue. Marsh seems to be satisfied with the effect sizes he has consistently obtained and argues for the robustness of the BFLPE. While the robustness of an effect is clearly desirable and comforting in science, we suggest that specification of where (e.g., under what circumstances), when (e.g., at what juncture of one's life), and who (e.g., what kinds of individuals are more susceptible to the BFLPE) in the methodology would increase the predictive efficacy of the model, permitting a stronger theoretical argument based on stronger quantitative evidence.

Summary

To summarize this critique of the methodology of the BFLPE paradigm, the contexts that produce the BFLPE are underspecified in most BFLPE research (with a few exceptions; e.g., Marsh *et al.* 1995); the processes of social comparison (e.g., making self-attributions in light of social comparative information) mediating self-concept formation are assumed rather than observed; and the statistical model that operationalizes and estimates the BFLPE

is open to serious challenges. The issues of causality are not adequately addressed in the research design. Marsh and his colleagues acknowledge on many occasions that due to the correlational nature of the data, causality and directionality of the causal relationships cannot be determined. Therefore, using a stringent criterion, the findings based on the path model of the BFLPE are suggestive rather than definitive (let alone conclusive). To enhance the internal validity of the BFLPE claim, more rigorous procedures need to be used. Although Marsh and his colleagues occasionally used alternative procedures (Marsh *et al.* 1995, 2000) that provided some convergent operations and innovative procedures and measurements, more needs to be done to improve the design and diversify the methodology. Indeed one might argue that except for Marsh's laudable efforts to generalize the BFLPE across gender, ability, and culture, the research program has provided fewer additional insights regarding the BFLPE than should be expected since its inception (e.g., compare Marsh and Parker 1984 and Marsh *et al.* 2007).

Problems with the policy argument based on the BFLPE research

Marsh *et al.* (2004) argued that the robustness of the BFLPE across the board is sufficient for a strong policy message regarding the advantages and disadvantages of attending a selective school or advanced programs. Dai (2004) argued that in order to make the practical implications of the BFLPE clear, the question of when and for whom it is likely to occur should be answered. These competing arguments represent very different assessments of the practical implications of the BFLPE. While acknowledging that the BFLPE is probably real and may take a toll on one's self-concept and motivation, we argue that it needs to be put in perspective rather than blown out of proportion. A one-sided argument based the BFLPE can be misleading in the following ways:

(a) It creates an impression that going to more selective schools or programs carries more disadvantages than advantages in terms of academic self-concept and motivation. The issue really depends on two factors based on the coping model discussed earlier: possible educational gains (including enhanced achievement and enhanced academic self-concept, which has strong empirical support; see Caslyn and Kenny 1977; Marsh and Yeung 1997b) and possible concerns about one's capabilities in light of social comparison or a situationally induced sense of inferiority. There are individual differences in terms of what kinds of educational and social environments constitute a sufficient, but not overwhelming, challenge, and how individuals cope in social situations while trying to maximize their educational gains. For some, it is a trade-off, and for others, coping will solve the problem (after all, there will always be bigger fish out there). This is why we argue that specification of where, when, and for whom provides crucial information for determining whether an individual is fit to take on the challenge of attending a selective school or program.

(b) The BFLPE model also sends out a message that besides "reflected glory," being with equally or more competent peers than oneself always hurts one's academic self-concept if one does not compare favorably with peers. The theory neglects the benefits of being with more competent peers, such as observational learning or using them as models or inspiration for self-improvement. Even when the BFLPE does occur, it may not be all negative, as it helps individuals get a "reality check" that is informative and helpful in the long run. The reality check after moving to a bigger pond could be painful to a fish, sometimes with a deflated self-image, but one would argue that it is better than to stay in a little pond and enjoy one's ignorance and complacence.

(c) An argument purely based on the BFLPE without qualification is in effect advocating a zero-sum game, leading to a path of no real practical solution. As one reviewer points out, if, to avoid the BFLPE, higher ability students were to decide to choose less competent or average ability ones as their peers (e.g., go to less selective schools or colleges), what would that do to their less competent peers? Some of the big fish there now suddenly turn small or median! Should they move to schools with still less competent peers? Where is an equilibrium that would satisfy everyone? For general education, Marsh *et al.* (2007) seemed to suggest that heterogeneous grouping would solve the problem. But would the contrast effect not even get greater in that arrangement? For special education, Marsh and his colleagues cautioned about putting students with special education needs in mainstreaming or full inclusion situations, yet do these students not know why they ended up in a self-contained classrooms? For good or ill, social comparison is integral part of distinguishing oneself from others, and its effects on self-concept, academic or otherwise, will sometimes be negative. While we agree that parents should be advised about a possible "reality shock" if they decide to send their children to selective schools, at the policy level, the practical utility of the BFLPE theory is limited, for decisions about appropriate placement should be made on an individual-by-individual basis.

Where Do We Go from Here?

A critical review would serve no good if it cannot build upon and extend the existing research, provide rich heuristics for future research, and point out possible avenues one might take. In the following concluding section, we attempt to provide a picture of how the BFLPE research can be broadened and refined in light of the relevant extant traditions of research and the inter-theoretical dialogue this review has attempted to promote.

General issues and principles guiding future research

A major issue revolving the assumption underlying the BFLPE is whether social comparison is imposed by an impinging environment, which carries information too compelling to ignore, as is presumably the case in many academic contexts; or whether social comparison is self-engendered by individuals who are motivated to make social comparison for specific self-evaluative or other adaptive purposes, and as a result wittingly or unwittingly pick specific comparison targets or particular comparison information. Realistically, two types of social comparison (e.g., how they compare with most others, and with whom they prefer to compare) can co-exist (Blanton *et al.* 1999). But we can posit a general rule for which one would be predominant, namely situational forces or individual dispositions. To the extent social or cultural norms are salient and dominating individuals' strivings and agendas, imposed social comparison is more likely to be predominant. To the extent multiple, competing values and norms exist, there will be more individual latitude of selectively attending to and interpreting social-evaluative or comparative information, hence a more salient role of individual differences. On the end of social context, it is important to identify cultural differences that regulate social and self-evaluative cognition; for example, collectivist versus individualistic cultures, interdependent versus independent construal of self (Burleson *et al.* 2005) or the correspondence bias in making causal attribution (Choi *et al.* 1999). On the end of individual differences, it will be informative to

examine for whom engagement in social comparison information seeking would be of particular informational and motivational value. Studying this way, we might be in a better position to tell when the BFLPE prevails regardless of individual dispositions and when coping and motivational models of social comparison better explain the data.

More specifically, the future research would do well to define and measure the social comparison processes mediating academic self-concept. For example, a new model could incorporate social comparison processes both as a mediator and as a moderator. As a mediator, social comparison explains how the BFLPE is cognitively mediated. As a moderator, depending on what kinds of social comparison one is engaged, the effects may be completely different. For those who report using a local norm, for example, achievement and academic self-concept will be more closely related than for those who do not use a local norm, but instead highlight the reflected glory as a self-enhancement strategy, or those whose purposes of social comparison is geared more toward self-improvement.

More generally, we need to better delineate how self-concept is formed and changed, and what tends to maintain its equilibrium (e.g., consistency and coherence) and what tends to change its equilibrium (e.g., conflicts and discrepancies; see Pervin 2000). Thus the former contributes to assimilation effects and the latter to contrast effects on self-concept. This implies the researchers take both macro-developmental and micro-developmental views of how one perceives himself or herself, both in terms of "who I am," and "what I can be" (i.e., possible selves; Markus and Nurius 1986) given new opportunities and challenges in development.

Methodological considerations and strategies

Although we have mentioned earlier that the default assumption of social comparison without evidence is the most problematic aspect of the BFLPE paradigm, in a larger scheme of things, we also view an exclusive use of a nomothetic approach to the self-concept research as a limitation of the BFLPE paradigm. Nomothetic approaches to psychological phenomena start with universal assumptions and use deductive logic to deduce specific consequences of some generality. Thus, the BFLPE can be naturally deduced from the assumption that people use their local frame of reference as a basis for their academic self-concept. In contrast, idiographic approaches start with particulars and emphasize unique individuality in how they construe social information (Allport 1962). The nomothetic versus idiographic orientation in many ways determines our methodology. We suggest that, when used properly, the two approaches can be complementary. Specific to the BFLPE research, we propose three levels of description or analysis.

At a nomothetic level, we suggest using individual growth modeling (IGM) as an alternative to multi-level modeling, because individual growth modeling captures individual differences in self-concept stability and changes, and directionality of the changes, if any (Willett and Sayer 1994; see also Singer and Willett 2003). Technically, it requires three waves of self-concept measures obtained at some critical junctures of one's life (e.g., the entry to a selective school). The IGM provides a measure of individual differences in self-concept at a baseline (intercept differences), and a measure of individual differences in self-concept trajectories or slopes (change upward, downward, or no change). Various antecedents such as gender, self-esteem, or the degree or kind of social comparison made, can all serve as predictors. When multiple schools with distinctly different cultures are studied, multi-group modeling can be run to see whether parameter estimates remain unchanged or reflect significant moderation effects.

At an idiographic level, we suggest conducting intensive case studies of individuals who are in various critical developmental transitions or facing life tasks such as

dealing with more competitive peers than they used to. One can argue that the more complex the statistical maneuvering based on some nomothetic assumptions, the more difficult the interpretation that ties statistics back to the immediate phenomenology under investigation. These idiographic accounts of individuals' construal and constructions of self will provide a more intimate picture of success and failure of coping and motivation in the face of challenges, the BFLPE being one of them. The BFLPE research mainly used Marsh's (1990) self-report measures of academic self-concepts (different versions of the SDQ), with a forced choice format (i.e., Likert-scale) based on the nomothetic assumption of academic self-concept as a trait or trait-like quality. In contrast, the research on "possible selves" uses a more idiographic, open-ended format (Cross and Markus 1991), which is more likely to generate authentic accounts of how individuals think about themselves and their own identity. Rather than isolating academic self-concept as a stand-alone entity, the idiographic approach puts it back as part of the selfhood or personhood, rendering academic self-concept meaningful only in that personal context.

A middle ground between the nomothetic and idiographic approaches can be found in latent class analysis (Muthén and Muthén 2000) that combine person-centered and variable-centered approaches. This non-parametric method is similar to cluster analysis in that it can identify homogeneous subgroups; thus, who suffered a decline in academic self-concept and who did not can be identified and characteristics of each group further investigated. However, different from traditional cluster analysis, the latent class analysis also permits detection of latent trajectory classes. Thus, for example, those who have a longitudinal pattern of instability can be differentiated from those who have a longitudinal pattern of stability in self-concept. This approach avoids the nomothetic tendency to isolating variables as if these variables function independently as entities; on the other hand, it also avoids the idiographic tendency to get lost in the details of numerous individual accounts and fails to identify regularities and principles.

Conclusion

To sum up, the research that modifies the BFLPE paradigm should allow us to identify situational circumstances and distal and proximal predictors of the BFLPE, and related mediators and moderators. In other words, it should address the issues of where, when, and for whom, as well as how and why it happens. It should facilitate identification of vulnerable groups of individuals who are susceptible to the BFLPE, and facilitate placement decisions and guide educational interventions. Only then does the practical utility of BFLPE become clear. But more importantly, research that goes beyond the BFLPE paradigm should allow us to see, given new life challenges and tasks, academically and socially, how one negotiates (or fails to negotiate) a path of optimal educational development that is maintaining a positive yet realistic self-concept and outlook for one's future, but also capitalizing on one's opportunity to learn and grow, and how one's coping and self-regulatory skills develop through cognitive and social development. The BFLPE is only part of this much larger story about personal and academic development.

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Appendix A

Table 1 A Summary of Research that Supports the Big-Fish-Little-Pond Effect (BFLPE)

Publication	Research focus	Data sources/ setting/sample	Design and data analysis	Results
Marsh *et al.* (2007)	Long-term BFLPE on math self-concept and negative related academic outcomes	Over 2,000 students from 147 German high schools (study 1) followed 2 years beyond graduation and 4 years beyond (study 2)	Individual- and school-level multi-level modeling of effects of achievement on academic self-concept, measured by SDQ Use of both standardized test scores and school grades Modeling long-term effects of school-average achievement	BFLPE present 2 years beyond high school graduation (study 1) Gender somewhat moderates the effects, with stronger effects for girls BFLPE as predictive efficacy of school-average achievement or school type on math self-concept ranged from −0.02 to −0.28, with a tendency of lesser effects over time (study 2)
Margas *et al.* (2006)	Are the BFLPE and Social Identity Theory (perceived social status, self-categorization) complementary?	46 physically gifted students participating in a high ability class and in regular classes	Questionnaires, correlational, 1 year longitudinal Social identification measured twice, prior to entry into the program and at the end of the study	Different variations of self-evaluations but same final self-evaluation High-ability class—strong positive social identification effect at first but decreases over time. Self-categorization mainly explains the variation in self-evaluation
Altermatt and Pomerantz (2005)	Achievement-related implications of establishing friendships with high-achieving versus low-achieving classmates	929 children from 5th, 6th and 7th grade, in the midwest	Report card grades of children and their friends were obtained and children completed Questionnaire measures of their self-evaluative beliefs and preference for challenge	Low achievers who established and maintained friendships with high-achieving friends evaluated themselves less positively, but performed better academically,

				than low achievers with similarly low-achieving friends. This tradeoff is less obvious for high achievers
Lüdtke *et al.* (2005)	BFLPE based on class-average mathematics achievement	A German sample of 2,150 of lower secondary students from 112 classes who participated in the TIMSS. Mathachievement and math self-concept data; video data on teachers' frame of reference (TFR)	HLM, multi-level analysis	Attending academically selective educational programs has a negative effect on academic self-concept. Effect grew over time. Negative effect of school-average ability was similar in size for relatively more and less able students
	Teachers' role in self-concept development		Mathematics self-concept was measured using a 4-item scale that is written in German and commonly used to measure self-concept with German-speaking samples	The extent to which teachers adapt individualized frame of reference has positive effects on self-concept
Marsh *et al.* (2005)	Juxtapose self-concept with academic interest Particularly on self-concept, interest and achievement in math. Integrates self-concept with the developmental motivation literature	German 7th-grade students (study 1: N=5,649 and study 2: N=2,264)	Structural Equation Modeling of two waves of data (Time 1 and Time 2) Self-concept was measured using a German adaptation of the SDQ-III	Prior self-concept significantly affected subsequent math interest, school grades, and standardized test score Prior math interest had only a small effect on subsequent math self-concept
Marsh and Hau (2003)	Test of cross-national generalizability	Approx 4,000 15-year-olds from each of the 26 countries (N=103,558)	Three-level multilevel model in which students (Level 1) were nested within schools (Level 2) and schools were nested within countries (Level 3) Academic self-concept was measured using the three best items from the academic self-concept subscale of the SDQ-II	The effects of school-average achievement on academic self-concept were negative (M=−0.20) in 26 countries

Table 1 (continued)

Publication	Research focus	Data sources/ setting/sample	Design and data analysis	Results
Catsambis *et al.* (2001)	Compared the social attributes of similar male and female students who attend schools with tracked versus untracked mathematics classes	NELS 1988 data; 1,052 eight-grade schools and 24,500 students	Correlations, and regression analyses Mathematics self-concept was measured by asking students if they "looked forward to mathematics class, whether they were afraid to ask questions in mathematics class, and whether mathematics would be useful to their future" (p. 91)	There was significant differences in students' attitudes towards mathematics, educational aspiration, self-esteem, locus of control, and engagement in school. When males were grouped with peers of similar high ability in a subject area that defines their competence, they seem to lose their competitive edge
Marsh *et al.* (2001)	To determine the size and direction of the BFLPE	2,778 seventh graders in 161 classrooms were tested at three measurement points: at the beginning, in the middle, and at the end of the 1991/1992 school year	Longitudinal data, multilevel modeling	Negative "big-fish-little-pond effect" (BFLPE)
		Reunification and differences in East and West German Schools	Mathematics self-concept was measured using a 4-item scale that is written in German that was also used by Lűdtke *et al.* (2005)	Attending classes where class-average math achievement was higher led to lower math self-concepts East German students had significantly lower academic self-concepts than did their West German counterparts
Tymms (2001)	Investigations of feelings toward math, reading, and school of 7-year-old pupils	Data from the PIPS Project which tracks the academic progress of pupils from the age of 4 to 11	Multivariate multi-level models Class as a unit for modeling BFLPE Feelings toward math, reading, and school were measured by students' responses to a series of statements that reflect a hybrid a attitude and self-concept measures	Positive feelings were predicted by individual achievement but negatively predicted by average class attainment (effect sizes=−0.06 to −0.11)
Marsh *et al.* (2000)	Juxtaposition of Big-fish-little-pond effect (BFLPE), and "Reflected glory effect"	7,997 students, 44 high schools, 4 years in Hong Kong	A measure of perceived school status to estimate "reflected glory effect"	Higher school-average achievements led to lower academic self-concepts (contrast effect)
			Longitudinal multi-level path models; academic self-concept was measured using a Chinese adaptation of the academic self-concept subscale of the SDQ-II	Higher perceived school status had a counterbalancing positive, "reflected-glory effect" on self-concept (assimilation effect) Assimilation effect is weaker than contrast effect based on statistical modeling
Zeidner and Schleyer 1998	BFLPE with test anxiety as a mediator of BFLPE on school grades	1,020 4–6 grade Israeli students	Comparing students in gifted programs within those in regular, mixed ability classes	BFLPE supported
			Academic self-concept was measured using an adaptation of Bracken's Multidimensional Self-Concept Scale	Test anxiety seemed to mediate academic self-concept and school grades
Butler (1995)	Performance vs. mastery goal condition, comparison motives, and consequences of children's attention to peers' work	Study 1—198 Jewish Israeli 4th and 5th graders in Jerusalem	Descriptive (study 1) and experimental study (study 2)	Regardless of goal conditions, children engaged in information seeking for both product improvement and self-evaluation Motivational and information foci seemed present in both conditions, associated with comparison motives of self-improvement, self-evaluation, and self-enhancement
Marsh *et al.* (1995)	Effects of gifted and talented programs on academic and nonacademic self-concept	29 students in a G&T class compared with a matching sample of 80 in regular classrooms (study 1)	Quasi-experimental	There was a measurable decline over time in academic but not non-academic self-concepts for students in gifted programs but not for comparison students
		24 students in G&T and 24 comparison students (study 2)	Self-concepts measured at years 4, 5, and 6 (year 6 without comparison group; study 1)	

Table 1 (continued)

Publication	Research focus	Data sources/ setting/sample	Design and data analysis	Results
			Self-concepts measured at the beginning of school and then several weeks after the next semester (study 2) Repeated measures MANOVA Self-concept measured using the SDQ-I in both studies	
Marsh (1994)	BFLPE in specific school subjects	17,544 NELS:88 US students and 1,147 SDQII Australian students	Structural equation models	BFLPE predictions generalized to self-concepts and achievement in particular school subjects. School-average mathematics achievement negatively affects Math self-concept but has less effect on English self-concept, whereas school-average English achievement negatively affects English self-concept but has less effect on Math self-concept
Marsh (1987)	To examine the influence of the BFLPE on academic self-concept and academic performance	Youth in Transition Study	One-way (ANOVA) was conducted to determine differences among the five subgroups on each of the study variables (Table I) A similar set of one-way ANOVAS was conducted in which each of the 87 schools served as the grouping variable A series of three-way ANOVAS, 3 (levels of ability or SES) x 3 (levels of school-average ability or SES) x 2 (White vs. non-White students), was performed on the academic self-concept and esteem stores Academic self-concept was measured by asking students to "rate themselves in comparison with others of overall school ability, reading ability, and intelligence" (p. 284) and self-esteem was measured with 10 items adapted from Rosenberg's (1965) self-esteem scale	Differences in the academic self-concepts of Black and White students, were explicable in terms of the BFLPE Equally able students earned higher grades in lower ability schools. This frame-of-reference effect for grades was distinct from, but contributed to, the BFLPE for academic self-concept. Academic self-concept had a direct effect on subsequent school performance beyond the effects of academic ability and prior school performance. About 25% of this effect could be explained in terms of the BFLPE
Marsh and Parker (1984)	Formally studying the BFLPE High vs. low SES schools, ability, and self-concept	305 sixth-grade pupils (48% female) from Sydney, Australia	Path analytic models An early version of the SDQ-I was used to measure self-concept	Students in low socioeconomic (SES)/low-ability schools had higher self-concepts than students in high-SES/high-ability schools. This negative effect was substantially larger after controlling for the effect of individual SES and academic ability

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Appendix B

Table 2 A Summary of Research that Either Does Not Support Or Constrains the Generality of the Big-Fish-Little-Pond Effect (BFLPE)

Publication	Research focus	Data sources/ setting/sample	Design and data analysis	Results
Cheng and Lam (2007)	Self-construal (independent or individualistic vs. interdependent or collective) as a moderator of the social comparison effects on self-evaluation. (cf. ego-involving conditions; Nicholls 1984)	96 Chinese seventh-grade students (41 male, 51 female and 4 unreported) in a secondary school in Hong Kong	Randomized environment A 2×2 between-subjects design based on 2 levels of self-construal (independent, interdependent) and 2 levels of comparison standard (upward comparison, downward comparison) The dependent variable was students' self-evaluation, which was measured with 8 self-evaluation items on a 7-point Likert scale	Significant interaction between self-construal and comparison standard on self-evaluation Independent self-construal led to higher self-evaluation in downward comparison but lower self-evaluation in upward comparison. Such a contrast effect was attenuated when the students' interdependent self-construal was activated. Students evaluated themselves equally competent under downward and upward comparison condition
Cunningham and Rinn (2007)	Whether adolescents' academic self-concepts would increase or decrease during time spent in a residential gifted summer program	140 gifted adolescents in a 3-week summer program	Gender and previous summer program participation were examined as potential moderators Self-concept was measured using the SDQ-II (Marsh 1990) Results were analyzed using a series of repeated measures ANOVAs	No significant change across time for academic self-concept A main effect was found for those with and without previous participation in a summer program
Butzer and Kuiper (2006)	Relationships between the frequency of social comparisons and self-concept clarity, intolerance of uncertainty, anxiety, and depression as moderators	166 undergraduates	Frequency and nature of social comparison measured by INCOM general scale and subscales of upward and downward comparison Path analysis mediating the effects of intolerance of uncertainty on social comparison	Overall level of uncertainty was negatively related to general and upward, but not downward, social comparisons. Intolerance of uncertainty was positively related to general, upward, and downward social comparisons. Higher levels of depression and anxiety were both related to a higher frequency of general and upward social comparisons
Schwinghammer and Stapel (2006)	Effects of different types of self-activation (self-referenced words and thoughts) on social comparison orientation, positive or negative (valence); role of affect	Study 1—234 students from the University of Groningen	Experimental manipulation of types of self-activation with controls Social comparison measured using the Social Comparison Orientation (SCO; Gibbons and Buunk 1999) ANOVA, simple effect analyses	A focus on positive self-cognitions was found to decrease the need for social comparison information. A focus on negative self-cognitions was found to increase this need
Burleson *et al.* (2005)	Inspiration vs. inferiority of upward comparison The role of construal	141 students of mixed ethnicity ranged between the ages of 13–18 with 26% male and 74% female adolescents in a summer school for high school artists in the western US	Social comparisons were measured just prior to, in the first week of, and at the end of a 6-week program Pre- and post-program questionnaires Self-concept was measured with a measure of artistic self-concept designed by the authors	Inferiority comparisons made during the program were associated with negative changes in self-concept Inspiration comparisons made during the program were associated with positive changes in self-concept Results suggest that the interpretation of the comparisons (construal) made in situ determines the favorability of such exposure
Stapel and Koomen (2001)	How self-construal ("I" vs. "we") level moderates social comparison effects (contrast vs. assimilation)	Study 1—90 students Study 2—196 students Study 3—126 students Study 4—126 students Study 5—214 students	Priming personal self ("I") vs. social self ("we") Between-subjects design, ANOVA	Self-evaluative comparison effects are more likely to occur when self-related cognitions are made cognitively accessible. Contrast occurs when personal self-construals are accessible, assimilation occurs when social self-construals are activated
Huguet *et al.* (2001)	Students' upward comparison tendency in classroom and its beneficial impact on performance	264 students (129 girls) from two French public schools (12–14 year old)	Questionnaires, correlational	Offers evidence that children compare upward with close friends with whom they identify as a means of self-improvement

Table 2 (continued)

Publication	Research focus	Data sources/ setting/sample	Design and data analysis	Results
		Study took place during a transition period—students' first year in a new school	Measures include grades, comparative evaluations, comparison-level choices	Identification more likely to happen when children perceive control over their standing relative to the comparison target
			Moderators: Closeness, identification, perception of academic control, self-relevance of the academic domains	Suggests that the effects of comparison-level choice diminish over time
			Comparative evaluations were measured by asking students "how good they were 'compared to most of your classmates' in each course" (p. 561)	
Blanton *et al.* (1999)	Choice of comparison and comparative evaluation as independent predictors of academic performance	876 ninth grade students from 4 schools in Netherlands Transition period, first year in a new school	*Comparative evaluation* measured by asking subjects how they compare with most of other students in specific academic subjects	Both variables independently predicted improved academic performance
			Comparison-level choice measured by asking subjects the most preferable and least preferable ones they prefer to compare with in class	The two tendencies did not conflict Effect sizes small. Statistically significant only with large samples
McFarland and Buehler (1995)	Frog-pond effect or BFLPE. This effect would be attenuated among people who value their social groups highly	Study 1—51 undergraduates Study 2—58 undergraduates Study 3—45 undergraduates Study 4—58 undergraduates	Self-esteem was measured using the Collective Self-Esteem Inventory and the Rosenberg Self-Esteem Scale (Rosenberg 1965)	Frog-pond effect was strongest among individuals with lower collective self-esteem, an individualistic cultural heritage, or a weaker bond toward a particular social group
Gibbons *et al.* (1994)	People will alter comparison behavior in response to threat	Study 1—200 13- and 14-year old adolescents in a university summer residential program for gifted	Study 1—self-perception of competence measured before, during, and 6 months after participation in the gifted program	Students who compared unfavorably with others lowered their comparison level as well as reduced the amount of comparison engaged, probably due to self-protection
		Study 2—college freshmen matriculating at a large university	Study 2—social comparison and academic self-concept measured at the beginning of their start of college and 6 month later	Lower-performing boys' academic self-concept decline at Time 2 but rebounded to baseline level at time 3
			Self-concept was measured using the Self-Concept Scale and the SDQ-II	Comparison levels shifted downward for college students (study 2) probably due to the competitive environment in college

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