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Context-related Changes in Academic Self Concept Development:

On the Long-Term Persistence of Big-Fish-Little-Pond Effects

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Authors' note:

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Highlights

- We investigate effects of multiple school contexts on academic self-concept
- We investigate the transition from elementary to secondary school
- We test for the Big-Fish-Little-Pond Effect (BFLPE) before and after the transition
- Both school contexts yield BFLPEs on students' general academic self-concept
- The BFLPE from elementary school contexts successively diminishes in new contexts

Abstract

Academic self-concept (ASC) is subject to substantial change throughout the course of schooling. Besides individual factors, contextual characteristics play an important role in driving changes in self-perception. The abilities of classmates are especially important: Equally able students report lower ASCs when in high-achieving classrooms than when in low-achieving classrooms. This contextual effect is known as the Big-Fish-Little-Pond Effect (BFLPE). Although the BFLPE has been replicated in different settings, little is known about whether it is important across consecutive contexts. Therefore, we analyze the effects of various contexts on students' ASCs. We draw on a sample of fourth graders, who transitioned from elementary school to secondary school. Using contextual information from both elementary and secondary school, our results indicate that the BFLPE exists in both elementary-school and secondary-school contexts. Yet, when students moved to secondary-school, the BFLPE from elementary school successively diminished and was no longer discernible after one year.

Keywords: academic self-concept, big-fish-little-pond effect, context change, long-term effects, longitudinal study

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1. Introduction

Academic self-concept (ASC), i.e. the beliefs and self-perceptions of individuals about their competences and skills are considered one of the most prominent outcomes of schooling. While in the narrowest sense schooling is intended to foster students' learning in academic domains, it is also important that students perceive themselves as competent and motivated. Empirical studies have demonstrated that ASC is one of the core dimensions of learning, and is a relevant factor in the development of other learning-related dimensions—such as academic interest and educational aspirations (Nagengast & Marsh, 2012; Trautwein, Lüdtke, Marsh, Köller, & Baumert, 2006)—and for educational career decisions (Marsh & Yeung, 1997; Nagy, Trautwein, Köller, Baumert, & Garrett, 2006).

Therefore, the question of how self-perceptions develop and what causes changes in these perceptions is genuinely interesting. According to Gore and Cross (2014), one of the main drivers of change in self-perception is social comparison of individuals, as an individual's comparison with his social environment is a central source of information about himself. Research on the so-called *big-fish-little-pond* effect (BFLPE; Marsh, 1984, 1987) provided evidence that individuals who are exposed to a high-achieving reference group perceive themselves as academically less able and less competent than do equally able individuals who are exposed to a low-achieving reference group. Hence, changes in social environments drive changes in self-perception, since new and different contextual information is provided during the transition into the new context (see also Harter, 2003).

Although the BFLPE has been intensely studied and appears to be generalizable across different countries, cultural contexts, and school systems (Chmielewski, Dumont, & Trautwein, 2013; Marsh & Hau, 2003; Seaton, Marsh, & Craven, 2009), surprisingly few studies have investigated the BLFPE in longitudinal designs (Dai & Rinn, 2008). In particular, there are hardly any studies on the *trans*-contextual importance of the BFLPE, i.e. whether the effect transfers from one developmental context into the next consecutive one.

The present study addresses precisely this deficit in the research. We investigate how the BFLPE transfers from one context to the next and how two sequential contexts relate to each other over time for the development of ASC. We draw on a sample of students transitioning from elementary to secondary school. The specific design offers information about the class average achievement of both the old and the new learning contexts and allows us to examine the interplay between two BFLPEs and the relevance of the BFLPE for longitudinal development—in a nutshell, whether the BFLPE matters for long-term development.

1.1 Academic self-concept and BFLPE

The BFLPE (or contrast effect, Chmielewski et al., 2013) refers to a contextual sensitivity of individuals' self-perceptions. In the context of schooling, students' self-perceptions of their academic achievement and abilities are affected by the classroom and/or school context, in particular by the achievement of their peers: Students in high-achieving classrooms report a lower ASC than equally able students in comparatively low-achieving classrooms. In regression analyses, this BFLPE is represented by a negative regression coefficient of the mean achievement level of the class after controlling for individual achievement. The nature of this effect in academic settings is almost ubiquitous and has been replicated across diverse educational settings (Chmielewski et al., 2013; Marsh & Hau, 2003; Seaton et al., 2009).

Although there are various theoretical accounts of the BFLPE (for an overview see, e.g., Marsh & Hau, 2003; Marsh et al., 2008), the main mechanism involves social comparisons within reference groups, resulting in *contrast* effects. Within a school, and even more so within a classroom, students observe and learn about the performance of their peers, for example, via school grades and the feedback of teachers and peers. They gather information, deliberately or involuntarily, about the hierarchy of achievement and their specific position within their reference group. Huguet et al. (2009) showed that social comparisons can explain the BFLPE as it relates to ASC; after controlling for the students' perceptions of their own positions in the achievement hierarchy within a specific context, no additional BFLPE remains.

In line with this assumption, Chmielewski et al. (2013) showed that the degree of availability of comparison information influenced the visibility of BFLPEs in various school system structures. The BFLPE was most prominent in school systems in which students of different ability levels were separated into different school tracks. In contrast, in school systems in which students were grouped by ability within one school (via streaming or setting), the BFLPE was also present, but negative contrast effects were counterbalanced by *basking-in-reflected-glory* effects (BIRGE), i.e., positive effects based on the salience of knowledge of belonging to an elite group (also called assimilation effects; Chmielewski et al., 2013). Therefore, explicitly tracked school systems such as the German school system typically produce strong negative BFLPEs; the separation of students into different school types implies that information for overarching achievement comparisons are less available or not at all available (Becker et al., 2014; Chmielewski et al., 2013; Trautwein et al., 2006).

1.2 On the long-term dynamic and persistence of the BFLPE

Despite the relatively robust replicability of the BFLPE across various educational contexts and subgroups, there are intense debates about its dynamic nature and overarching long-term importance (see Dai, 2004; Dai & Rinn, 2008; Marsh et al., 2008). On the one hand, some studies point out that the BFLPE is not simply a single cross-sectional phenomenon that occurs after a student enters a new learning context; instead, it appears to develop and persist in the long-term within a certain reference system. For example, in one of the few existing longitudinal studies, Marsh, Köller, and Baumert (2001) showed that students who had recently entered a different learning environment (explicitly differentiated school tracks in this case) initially reported dissimilar self-concepts to their peers who had already been exposed to those school tracks for two years. Yet after one year of schooling, the entering students reported comparable self-concepts to those of the students who had been exposed to these specific contexts for a longer time. Drawing on this, Marsh and O'Mara (2010) concluded that BFLPEs persist or even increase over time for students within a stable educational setting (for an overview, see also Marsh et al., 2008).

In addition, some (but very few) studies have found that the BFLPE remains present in domain-specific ASCs even beyond the original high school context. For example, Marsh et al. (2007) showed that a domain-specific BFLPE persisted for two and four years after individuals left school and have entered vocational training, college education, or the job market. Other studies found evidence of the BFLPE in other psychosocial characteristics such as educational aspirations (Marsh, 1991; Marsh & O'Mara, 2010; Marsh, Trautwein, Lüdtke, Baumert, & Köller, 2007).

On the other hand, some studies have found no indication of context-related BFLPEs. For example, studies investigating the effects of students attending a summer camp failed repeatedly to show any change in ASC (Cunningham & Rinn, 2007; similarly Makel, Lee, Olszewki-Kubilius, & Putallaz, 2012). Disregarding the details about the specific interpretability of these results (for an overview and discussion, see Becker et al., 2014; Dai & Rinn, 2008; Marsh et al., 2008), what these studies highlight is that not all exposure to different contexts leads to changes in ASC. For instance, a short exposure to a different context (e.g., summer camp) seems irrelevant for changes in self-concept. Drawing on this, Dai and Rinn (2008) highlight the need for studies that allow for the longitudinal, dynamic modeling of BFLPEs in different contexts over time, so as to provide a better understanding of the conditions that lead to changes in ASC.

To our knowledge, Wouters, Fraine, Colpin, Van Damme, and Verschueren (2012) have provided the best example thus far for modeling the long-term dynamic of the BFLPE in changing learning environments. They used a longitudinal design that focused on students who changed school tracks in the Belgian secondary-school system. The study showed that students' ASCs shifted upward after transitioning to learning contexts with lower-achieving peers, i.e., they experienced a positive BFLPE, because the step down in the school tracks implied a step up in the achievement hierarchy within the consecutive classroom environments. This BFLPE seemed even more pronounced when students were older at the time of transition. After the first impact (i.e., the effect assessed after one year), the BFLPE seemed not to change any further in the consecutive years. Although this study shows that there is an impact of a new context and that it persisted in the long-term, it remains unclear to what extent the older environment still exerted an influence on the subsequent development of ASC in students.

Given that changes in self-concept seem to be strongly environmentally driven, and that self-concept development represents a history of one's learning in different contexts (Gore & Cross, 2014), it is crucial to know how two learning contexts relate to each other. Yet the question of whether a BFLPE persists trans-contextually remains open in the research. There is the possibility that a later BFLPE will dominate over preceding ones as soon as a student learns his place in the achievement hierarchy, but it may well be that an older context is still "kept in mind" after the student exits the context (e.g., class or school). The studies suggesting the persistence of the BFLPE beyond one specific context, for example, in the earlier years after high school graduation (Marsh & O'Mara, 2010; Marsh et al., 2007) point towards the latter hypothesis, but these studies also leave several questions unanswered. For example, they do not specify the achievement levels of the new contexts into which individuals transition. Additionally, it remains open whether contexts after high school provide information about the individual's positioning in the "achievement" hierarchy, whereas, during schooling, information about peers and their performance is usually available. The question of whether the persistence of the BFLPE beyond one context holds when another BFLPE emerges, at least during transitions within the compulsory school system remains to be explored. At the same time, to evaluate the importance of the BFLPE, it is necessary to know how these effects persist in development over time. If the BFLPE fails to show trans-contextual persistence, the developmental relevance and status of this effect in general can be questioned.

2. The present study

This study tests the trans-contextual importance of the BFLPE. It addresses the developmental impact of the exposure to different learning contexts, and therefore different BFLPEs, for the development of ASC. The study focuses on students who are transitioning from elementary to secondary school and therefore (should) experience different BFLPEs. Therefore, we examine whether earlier BFLPEs that emerge in elementary school persist in later ASCs alongside or despite the presence of the BFLPEs evoked by subsequent contexts in secondary schools. To our knowledge, no other study has assessed the relationship between various BFLPEs in different consecutive environments — a fact we find particularly astonishing, as we think this is an essential litmus test for exploring the educational and developmental importance of the BFLPE in general.

We draw on a sample of students who transition from elementary school (grade 4) to secondary school (grade 5), gaining early entrance to an academic track ("*Gymnasium*"), two years before students usually enter the secondary-school system. These early-academic-track students have been analyzed in previous studies (Arens & Watermann, 2015; Becker et al., 2014) that compared their development in psychosocial outcomes during grade 5 to students who remained in their (original) elementary schools. Both Arens and Watermann (2015) and Becker et al. (2014) were able to show that the transition into an academic track exerted a negative BFLPE on ASC, whereas comparable students remaining in their original learning environments in elementary school did not change their ASCs (cf., Becker et al., 2014). However, neither study differentiated between short- and long-term consequences in these changes nor, even more importantly, did either study specify how different learning environments relate to each other, in particular how earlier environments may impact later ASC.

Therefore, the present study extends previous studies by analyzing the BFLPE on ASC in both elementary schools and secondary schools, testing the long-term relationship between ASC and two distinct BFLPEs. We use three data points, one before the transition (end of grade 4) and two after transition (beginning and end of grade 5), providing information on both the individual and the contextual level. This allows us to model the respective BFLPEs—one BFLPE deriving from elementary school classrooms and one from secondary school classrooms. To our knowledge, this is the first study modeling two BFLPEs simultaneously, testing whether and to what extent the BFLPE of an earlier context persists into a consecutive context after considering the mean achievement level of the new context.

Our hypotheses are as follows. We expect to find the BFLPE in both elementary school and secondary school classrooms. We expect a negative BFLPE in elementary school classrooms, i.e., classrooms with higher average ability lead to lower general ASC, controlling for individual achievement. As studies have shown that these early-entry academic-track secondary schools have higher average achievement compared to the typical elementary school classroom from which these students come (see Baumert, Becker, Neumann, & Nikolova, 2009, 2010), we expect a decline in ASC after the transition, i.e., ASC is lower in higher-ability classrooms. Moreover, we expect some residual BFLPE from elementary school to remain after the transition, at least at measurement point T2 right after entering the new learning environment, as is suggested by previous studies on transitions involving older students (Marsh & O'Mara, 2010; Marsh et al., 2007). Yet, given the almost universal salience of the BFLPE, we expect that the main effect of the new context will exert a stronger influence on students' self-perception, at least in the longer term.

3. Method

3.1 Sample

We took our sample from the ELEMENT study, which was designed to evaluate achievement development in schools in Berlin, Germany (see Lehmann & Lenkeit, 2008). This was a longitudinal study with three assessment points, following students from grades 4 to 6 in elementary schools (sampling 70 elementary schools with two classrooms in each school) and early-entry *Gymnasium* (full assessment of this population), the latter being an academic track for high-achieving students, enrolling 7–8 percent of public school students. These students enter the secondary school system two years before the other "regular" students enter secondary schools, and they are schooled separately in specific early-entry classes in the academic track. *Generally*, the regular student assessment comprised three measurement points: The first measurement point (in the context of the original study labeled as "ELEMENT 4", Lehmann & Lenkeit, 2008) was at the end of grade 4 (for elementary school students) or the beginning of grade 5 (for early-entry *Gymnasium* students), the second point ("ELEMENT 5") was at the end of grade 5, and the third point ("ELEMENT 6") was at the end of grade 6 (see Table 1).

The present study focuses on a representative subsample of $N = 155$ students of the early-entry *Gymnasium* population. This subsample represents *every* student who was sampled in his or her original elementary school context and then reassessed as part of the full population of early-entry *Gymnasium* students (having left his or her "original" elementary school and entered the *Gymnasium* context). The subsample of *N* = 155 early-entry students came from 79 different classes in 52 elementary schools. As the elementary schools and, within these, the two classes were sampled randomly, the selected *N* = 155 students also represent a random and—most importantly—representative sample of the whole student population of early-academic-track students (see Appendix, Table A1, for a comparison of the selected *N* = 155 students with their *N* = 1602 early-entry *Gymnasium* classmates). As these students were already assessed in their elementary schools and, later on, as part of the academic-track sample, there are three points of assessment for analyzing their ASC development from grades 4 to 5 (see Table 1): at the end of grade 4 (assessment within their elementary schools); at the beginning of grade 5 (assessment within their new *Gymnasium*-track schools), and at the end of grade 5 (see Table 1). As the construct of interest—general academic self-concept—was only measured up to the end of grade 5, we use these first three assessments in the present analyses, excluding the fourth assessment point shown in the table.

As this subsample of *N* = 155 early-entry students was first assessed within their elementary school classrooms with their entire peer groups, and then similarly assessed along with all students from their new early-entry *Gymnasium*-track classes (for a description of the rest of this population, see Appendix, Table A1), we have precise information about the classroom environments for these *N* = 155 students for the old and the new schools. This is a unique situation that allows us to estimate two different educational contexts and their influence on development. For both elementary-school and early-entry-*Gymnasium* contexts, we have data on reading comprehension and orthography (in German, as the language of instruction) and math in both contexts (see section 3.3 *Statistical*

Analyses). Given that our study has a design that provides information on the individual and aggregate levels and both objective information on achievement and adequate information on ASC, it fulfills the requirements to estimate a BLFPE (Marsh et al., 2008).

3.2 Measures

Academic self-concept. General ASC was assessed at all three measurement points using a scale originally from the longitudinal study *Bildungsverläufe und psychosoziale Entwicklung im Jugend- und jungen Erwachsenenalter* (Educational careers and psychosocial development in adolescence and young adulthood; BIJU; Baumert, Gruehn, Heyn, Köller, & Schnabel, 1997). The scale, which has been used in various other large-scale studies (e.g., Bos & Pietsch, 2006), contains five items (sample item: "There are some things I just can't get into my head"), measured on a 4-point Likert scale (1 = *strongly agree* to 4 = *strongly disagree*). Across all three measurement points, the scales were coded such that higher scores represent a more positive self-concept. The scale shows a high internal consistency at all three points of measurement (Cronbach's α = 0.71 - 0.80) and re-test reliability was satisfactory ($r_{T1T2} = 0.52, p < 0.001$; $r_{T2T3} = 0.56, p < 0.001$).

Academic achievement measures. We used indicators for academic achievement in mathematics, reading comprehension, and orthography to estimate both individual and average classroom achievement. The tests of mathematics and reading comprehension consisted of items from the German assessments of the Third International Mathematics and Science Study (TIMSS) and the Progress in International Reading Literacy Study (PIRLS), as well as from the *Hamburger Schulleistungstest für vierte und fünfte Klassen* (HST 4/5; Hamburg School Achievement Test for Fourth and Fifth Grade); all tests were broadly vetted for their psychometric quality (Bos et al., 2003; for additional information about the test constructions see Lehmann & Lenkeit, 2008; Mietzel & Willeberg, 2001). The majority of items were multiple choice. Both tests conformed to the Rasch model and its extension as a partial-credit model, also allowing partially correct answers (Wu, Adams, & Wilson, 1998). The reliability was satisfactory for mathematics, with an internal consistency of r_{KR20} = 0.84, as well as for reading comprehension, with r_{KR20} = 0.85. Orthography was assessed using *Dortmunder Schriftkompetenz-Ermittlung* (DoSE; Dortmund Written Language Competencies Test; Löffler & Meyer-Schepers, 2001), which was developed for and validated within the German extension of the PIRLS 2001 assessment (see Valtin, Badel, Löffler, Meyer-Schepers, & Voss, 2003). It contains 45 words that have to be written orthographically correctly from an oral dictation. DoSE also conformed to the Rasch model and had a high internal consistency (r_{KR20} = 0.93). The three measures were used in a latent factor model to represent general academic achievement at both the individual level and the classroom level (see next section 3.3).

3.3 Statistical analyses

To test our hypotheses on the general development of ASC within students across the three measurement points, we used latent models in different specifications. As a first step, we specified latent measurement models for the general ASC scales. As some Likert items for ASC showed non-normal distributions, especially at the first assessment point, we used a latent change model for categorical data in order to relax the distributional assumptions. We tested whether it was possible to claim measurement invariance over the three assessment points while maintaining a satisfactory model fit. We used absolute fit criteria such as RMSEA, CFI, and TLI to evaluate model fit, testing whether the comparatively more restrictive models did not successively reduce model fit more than |0.01| and, at the same time, maintained satisfactory model fit at an absolute level (i.e., RMSEA < 0.08; CFI > 0.95, TLI > 0.95; following Byrne, 2012).

We estimated achievement at both the individual level and the classroom level using a latent factor model with three indicators: mathematics, reading comprehension, and orthography. Individual level achievement latent factors were measured (directly) by the three individual achievement indicators. In contrast, classroom level latent factors were estimated in two steps: First, we aggregated classroom mean achievement scores for all three measures. We did this for both the elementary and *Gymnasium* school classrooms (with T1 for elementary schools and T2 for *Gymnasium* schools, respectively). We then used these aggregated mean indicators to estimate classroom achievement as a latent factor for the respective elementary school and early-entry *Gymnasium* track classroom environments of the *N* = 155 early-entry *Gymnasium* students. This implies that data for the remaining individuals (*N* = 3169 elementary school students and *N* = 1602 early-entry *Gymnasium* students) were used to estimate achievement levels in classroom environments (allowing a correct estimation of classroom achievement, as is necessary to estimate BFLPE; Marsh et al., 2008), but they were not further considered in the analyses, due to the fact that one data point on the individual and the aggregate level, respectively, was missing for each of these two subgroups (note that the specific missing data differed between these groups, see Table 1). We chose the classroom level—and not the school level—to specify educational contexts, as classrooms are the proximal contexts for educational processes and consequently better suited to detecting BFLPE (van Ewijk & Sleegers, 2010).

We tested the hypotheses in two steps. First we estimated latent change scores to assess the average change in ASC. This tells us how much students' ASCs changed across the three measurement occasions. These change scores represent the net change, containing both BFLPEs. As we were interested in separating out the specific contextual effects, we analyzed, in a second step, all three outcome variables as time-specific outcome measures (and not change scores) in simultaneous multivariate latent regression analyses to disentangle the specific influence of the contexts at each measurement point (see Figure 1). It is worth noting that we specified correlations between dependent ASC variables that test the hypothesis of the trans-contextual BFLPE as total effects (not controlling for previous ASC in later measurement occasions), thus facilitating direct comparability with cross sectional tests of BLFPE (for an alternative specification, controlling for autocorrelative effects in ASC, see Appendix, Table A2).

The average number of the $N = 155$ *Gymnasium*-track students per elementary school classroom was $M_N = 2.8$, while the average number of the selected $N = 155$ students in the *Gymnasium* classrooms was similarly low at $M_N = 4.2$. As many students ($N = 63$) came from elementary school classrooms from which only one or two students entered the analytic sample, we specified latent regressions to model BFLPEs, taking into account the remaining hierarchical nature of the sampling procedure using the *type = complex* option in M*plus* (Muthén & Muthén, 1998-2013). Note that the fixed parameter estimations for both the individual and the aggregate levels deriving from this model are equivalent to the estimations from a multilevel model (see Raudenbush & Bryk, 2002) and are sufficient to estimate the BFLPE. All models were estimated using a WLSMV estimator in Mplus.

3.4 Treatment of missing values

Although this study was longitudinal, the attrition rate was relatively low as participation was compulsory. On average, across all three points of measurement, only 7.4 percent of all data were missing, with a slightly higher rate for the assessments at later measurement points (T1 = 5.3%; T2 = 7.1%; T3 = 9.8%). In order to include all $N = 155$ students, we used multiple data imputation, which is currently considered one of the most appropriate methods for handling missing data (Graham, 2009). We used the MICE package in R (van Buuren & Groothuis-Oudshoorn, 2011) to impute missing values. We included all analytical variables in the imputation model at the level of single indicators to allow for subsequent latent modeling with the imputed data. We imputed and summarized five datasets according to Rubin's (1987) rules, which can be implemented automatically in M*plus* with the analyses option *type* = *imputation* (Muthén & Muthén, 1998-2013).

4. Results

4.1 Descriptives

As Table 2 shows, it was possible to maintain measurement invariance across latent models for ASC. We obtained a similar model fit regardless of whether we assumed strong factorial measurement invariance across three measurement points, adopted only configural invariance (estimating both factor loadings and thresholds freely), or adopted weak invariance (restricting factor loading on equality across measurement points). Absolute model fit for the final model was satisfactory with RMSEA = 0.06, CFI = 0.96, and TLI = 0.96.

Table 3 shows the correlations between constructs at the latent level. At the individual level, both achievement and ASC correlated positively at all three measurement points. Individual achievement and class average achievement also correlated positively, but there was no statistically significant correlation between ASC and class average achievement, a typical finding because the effects of individual achievement and aggregate achievement cancel each other out. Furthermore, there was no correlation between the class average achievements in the two contexts, meaning that the transition from the elementary school context to the *Gymnasium* context was not systematically correlated.

4.2 Development of latent means of general ASC

Table 3 also contains the estimates for the latent means development, which show that students started out with a higher ASC level at the end of grade 4 in elementary school, which then declined toward the end of grade 5: Students began with a mean ASC of M = 0.00 (SE = 0.11) at the end of grade 4, declining to a mean of M = -0.08 (SE = 0.12) right after the transition into the new learning environments in *Gymnasium* schools, and then declining further to a mean of $M = -0.27$ ($SE = 0.11$) at the end of grade 5 (see Table 3). The change from T1 to T2 was about one tenth of a standard deviation, with $d = -0.12$, but the corresponding change score is not statistically significant, with $p = 0.159$ (without table). In contrast, the effect from T1 to T3 was larger, with $d = -0.39$, and the corresponding change score is statistically significant, with $p < 0.001$. This effect matches the typical pattern of a decline in academic self-concepts related to the BFLPE after individuals transition into higher-achieving environments.

4.3 Regression analyses: testing the BFLPE in multiple contexts

In the next step, we estimated a series of regression analyses to test how these changes in means were related to individual achievement and average class achievement in both elementary and *Gymnasium*-track schools. Model M1 in Table 4 shows that individual academic achievement is a good predictor of the general ASC at all three measurement points. At all measurement points, the effects of achievement on ASC were positive and statistically significant, with the effect at T1 on ASC $b^* = 0.50$ ($SE = 0.09$, $p < 0.001$) being (by tendency) higher than that at T2 $b^* = 0.38$ ($SE = 0.09$, $p < 0.001$) and that at T3 $b^* = 0.38$ ($SE = 0.10$, $p < 0.001$): Students with higher achievement reported more positive ASCs.

In the next step, we tested whether the average elementary school classroom achievement had a significant effect on ASC after controlling for individual achievement, i.e., the specification with which BFLPEs are to be tested. Model M2 of Table 4 contains the test of effects of average achievement of elementary classrooms on ASC: The results show a statistically significant negative effect of average elementary classroom achievement at T1, when students were still in these classrooms: $b^* = -0.24$, $SE = 0.11$, $p = 0.015$. After the transition, the effect of the elementary classroom achievement on ASC at T2 just failed to yield statistical significance, $b^*_{T2} = -0.13$, $SE = 0.09$, $p = 0.070$. At the end of grade 5, the effect was virtually zero, with b^*_{T3} = -0.03, *SE* = 0.11, *p* =0.401. Therefore, the results provide no indication of a BFLPE that transfers across contexts.

In a last step, we extended these models by incorporating the average classroom achievement of the new *Gymnasium* context and observed that there was no effect of the new environment present at T2 right after the transition: b^*_{T2} = 0.01, *SE* = 0.08, *p* = 0.473. But, by the end of grade 5, a BFLPE emerged: b^*_{T3} = -0.30, *SE* = 0.11, *p* = 0.002. The effects of the elementary school classroom context on ASC at the beginning and end of grade 5 remained virtually unchanged and statistically insignificant in Model 3, even when we additionally controlled for the effect of average *Gymnasium*-track classroom achievement.

5. Discussion

The present study investigated the development of general ASC and the longitudinal consequences of the BFLPE during the transition from elementary school to secondary school. It modeled the BFLPE within elementary school classrooms and its effects in the subsequent classroom environments into which students transition, as well as the BFLPE within the new (secondary) school context. The results showed that both contexts yielded effects: A BFLPE was present while students were still in their original elementary school context. Similarly, after the transition to secondary school, a BFLPE related to the new academic-track classroom context was discernible. This new BFLPE was not present immediately after the transition but emerged only at the end of the school year. Both BFLPEs were in line with our hypotheses. But with students transitioning into different contexts, the BFLPE from the elementary school classroom lost its importance. The results on the longitudinal BFLPE provide no evidence for the trans-contextual importance of the BFLPE after the transition from the elementary school environment for further consecutive development in secondary school contexts.

Our results are in line with general findings that indicate that the BFLPE is present in educational settings at various levels (Marsh et al., 2008); in this study, we find it in both elementary school and secondary school environments. Our results also confirm the finding of Becker et al. (2014) that high-achieving and gifted students are as susceptible to the BFLPE as are other students. Contrary to what Arens and Watermann (2015) assumed, we found no indication of assimilation effects after transitioning into the new learning context, as students' general ASC tended to decline after the transition to the new context. The results also confirm that a stable transition into a new learning environment triggers changes in self-perception (e.g., Marsh et al., 2001; Wouters et al., 2012). Strictly speaking, our results do not contradict the aforementioned summer camp studies, which usually do not find any changes in ASC (e.g., Cunningham & Rinn, 2007; Makel et al., 2012). Similar to their results, in our study, we find that students do not show statistically significant changes immediately after the transition, having been exposed to the new context for only a number of days and weeks; the BFLPE is only discernible after the first year. We surmise that the lack of a BFLPE following participation in summer camps may also be attributable to the short duration of such special programs.

Finally, regarding the sustainability of the BFLPE from one context to the next, the results presented here seem to differ from the three previous studies that implied lasting consequences of the BFLPE beyond a specific context, or, more specifically, from a school context to a post-high-school context (Marsh, 1991; Marsh & O'Mara, 2010; Marsh et al., 2007). There are, of course, some differences between the cited studies and the one presented here, which may explain the differing results. Two of these differences seem most central to our understanding: In our study, we compared two contexts that were similarly structured (classroom contexts, salience of comparison information), while in the aforementioned studies the specification of subsequent contexts remained unclear. Most likely these contexts were more diverse—e.g., vocational training, college education, or even entry into the job market—which may have produced more heterogeneous effects; it is also possible that information on ability and skills has been limited—with the result that most individuals were "stuck" with the BLFPE-influenced information from school. Furthermore, age may explain some of the differences. As Harter (2003) pointed out, it is in early adolescence that children start to master social comparison, but they still lack the ability to integrate different, opposing information about themselves. For older adolescents, keeping in mind one's individual learning history and integrating partly contradictory information obtained from different contexts may be within their capabilities, however, this may not apply for younger children. Therefore, the transition into different learning environments around the age of 11, as in our sample, occurs at an age at which students seem capable of social comparison but are not fully able to put it into perspective, a contrast to the experiences at the end of high school, when students are more cognitively advanced and emotionally mature.

5.1 Strengths and limitations of the present study

Among the strengths of the presented study are its longitudinal nature and the rich information on individuals and their contexts, the combination of which enables us to model the relationships over the duration of a year and to differentiate between the onset and timing of ASC and BFLPE development, respectively. The main limitation of our study is the relatively small sample size, which affects the statistical power of our tests. With a larger sample, the elementary school context may have yielded statistically significant effects into secondary schooling. Although we doubt that the general picture would have been substantially different, i.e., that the influence of the new context would dominate, there may be effects that are only discernible with larger sample sizes. Sample size may also be relevant with regard to statistical model robustness. Fortunately, the study itself provides additional data, which we used for other specifications of the models to test the robustness of the findings. We used data on the remaining $N = 1602$ *Gymnasium*-track students to assess the stability of the latent measurement model and the BFLPE in the *Gymnasium* context. Additionally, we used observed scores for both ASC and achievement measures. For the latter, we also used a reduced set of achievement assessments, combining the mathematics ability score with only one language score (instead of the two language scores). Each of these comparisons yielded virtually identical patterns of results on aspects that could be modeled in each of the specific submodels. Additionally, the pattern of results and conclusions remained similar when the analytical model included autoregressive connections between ASCs (see Appendix, Table A2). Following these additional analyses, the results of the study at hand seemed robust across various alternative specifications. Furthermore, it is worth noting that changes in the ASC as shown here are due to the transition into the new school environments, as comparable students in elementary schools showed no such changes—therefore, maturational effects can be ruled out as an explanation of effects (see Becker et al., 2014).

Two aspects may be relevant for both effect sizes and the generalization of findings. First, we used a measure of general ASC. Research has shown that subject-specific effects are stronger as they are more proximal to the comparison processes (cf., Marsh et al., 2008). Therefore, effects may have been different if a domain-specific ASC had been assessed (e.g., the BFLPE may have been stronger, and the relation between effects may also have been affected). As the present study provides no additional (i.e., subject-specific) information across the various measurement points, it remains an open question for future research. The second aspect concerns the population at hand. The student sample represents a population of high-achieving and gifted students, yet, as we have shown, the BFLPE for these students follows a very similar pattern to that for the general population (Becker et al., 2014).

However, it remains open whether the more detailed findings about the relations between contexts are generalizable to the entire population.

5.2 Outlook

The main goals of the analyses were to better understand the developmental dynamic of ASC and the interplay between different educational contexts and their relevance for development, and to put the educational and developmental importance of the BFLPE to the test. We show that trans-contextual effects do not (necessarily) happen. Although our results call into question the importance of the BFLPE for individual longitudinal development, the presented results do provide an explanation of why the BFLPE can be reproduced almost ubiquitously: As the BFLPE seems to have weak (or even no) trans-contextual influence, every (new) context provokes a change in ASC (at least at this early developmental stage). Therefore, each context yields a full effect that is neither relativized nor challenged by previous effects—making it easy to detect across diverse educational settings. Yet, after the intense work and ample literature on the existence of the BFLPE, there is a more fundamental question to be addressed, namely how relevant a BLFPE is for development over the life course if it fails to show trans-contextual persistence, at least at this age and stage. A similar question on the importance of the BFLPE was raised by a recent article, which shows that BFLPEs on achievement development via self-concept are much smaller and, most likely, a limited one-time affair rather than the direct continuous contextual effects of class achievement on individual achievement development (Stäbler, Dumont, Becker, & Baumert, 2016).

Hence, we remain ambivalent about the *educational* interpretation and consequences of such a replacement of earlier effects by subsequent effects. On the one hand, it is somewhat disconcerting that the higher-achieving students do not seem to take into account their former experiences but instead allow the new context to dictate their self-concept.

Older contexts seem to play hardly any role in bolstering students' ASC against new (negative) contextual experiences. This susceptibility to their environment may be especially worrying for children at risk of developing clinical psychological symptoms if these prior experiences lose their relevance and thus the ability to reinforce (realistic) self-perceptions. On the other hand, it may be good for lower-achieving students to be less aware of older contexts. In doing so, they may feel more confident about their learning and become more motivated—an effect that can be framed in terms of a positive and stimulating self-enhancement bias (see Marsh et al., 2008). Although there is scope for educators to mitigate negative effects (e.g., by providing more individually oriented feedback, see Lüdtke, Köller, Marsh, & Trautwein, 2005), research should further explore to what extent these effects play a desirable part in the developmental experiences that shape self-perception and drive its change—leading to a reflected and valid self-image—and examine to what extent and for whom this pattern of results is more undesirable than appropriate (Gore & Cross, 2014; Harter, 2003).

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Tables

Table 1.

Measurement points and differential involvement of subsamples of the ELEMENT 4-6 study, including the target sample of *N* = 155 students.

	Assessment			
	ELEMENT 4		ELEMENT 5	ELEMENT 6
Sample	End 4th gr. June 2003	Start 5th gr. Sept. 2003	End 5th gr. June 2004	End 6th gr. June 2005
Regular ESS (*N* = 3179)	**X**		**X**	**X**
Regular GSS (*N* = 1602)		**X**	**X**	**X**
Random subsample of GSS (*N* = 155) = target sample	**X**	**X**	**X**	**X**

Notes:

ESS: Elementary school students; GSS: early-entry *Gymnasium* school students; End 4th / 5th / 6th gr. = assessment at the end of 4th / 5th / 6th grade, respectively; Start 5th gr. = assessment at the beginning of 5th grade.

Table 2.

Overview of model fit statistics for the latent models of general academic self-concept across all three measurement points.

Assumption of invariance	RMSEA	CFI	TLI
Configural	0.060	0.964	0.957
Weak factorial	0.052	0.971	0.968
Strong factorial	0.057	0.955	0.961

Table 3.

Latent means, standard deviations, and correlations of general academic self-concept, individual achievement at T1, and average class achievement (at both T1 and T2).

	M	SD	ASC_{T1}	ASC_{T2}	ASC_{T3}	$iACH_{T1}$	$aACH_{T1}$
ASC_{T1}	0.00	0.70					
ASC_{T2}	-0.08	0.74	0.69***				
ASC_{T3}	-0.27	0.79	0.45***	0.63***			
$iACH_{T1}$	-0.07	8.42	0.50***	0.38***	0.39***		
$aACH_{T1}$	0.00	5.09	0.00	0.04	0.14	0.40***	
$aACH_{T2}$	0.00	3.00	0.15°	0.15°	-0.11	0.44***	0.13

Notes:

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; ° $p < 0.10$.

ASC_{T1-T3}: general academic self-concept at measurement points T1 to T3, respectively; $iACH_{T1}$: individual achievement at measurement point T1; $aACH_{T1}$: average class achievement of elementary school classrooms; $aACH_{T2}$: average class achievement of *Gymnasium* school classrooms.

Model fit characteristics of the joint model: RMSEA = 0.040; CFI = 0.948; TLI = 0.947.

Table 4.

Regressions of general academic self-concept on individual and average classroom achievement at all three measurement points (fully standardized solutions).

		T1				T2				T3			
		*b**	*SE*	*t*	*p*	*b**	*SE*	*t*	*p*	*b**	*SE*	*t*	*p*
M1	iACH	0.50	0.09	5.32	<0.001	0.38	0.09	4.04	<0.001	0.38	0.10	3.93	<0.001
	R^2	0.25				0.14				0.15			
M2	iACH	0.60	0.11	5.45	<0.001	0.43	0.10	4.21	<0.001	0.40	0.11	3.61	<0.001
	$aACH_{T1}$	-0.24	0.11	-2.18	0.015[a]	-0.13	0.09	-1.48	0.070[a]	-0.03	0.11	-0.25	0.401[a]
	R^2	0.30				0.16				0.15			
M3	iACH	0.55	0.11	4.78	<0.001	0.41	0.11	3.83	<0.001	0.50	0.11	3.83	<0.001
	$aACH_{T1}$	-0.21	0.11	-1.88	0.031[a]	-0.12	0.09	-1.32	0.095[a]	-0.02	0.11	-0.15	0.442[a]
	$aACH_{T2}$					0.01	0.08	0.07	0.473[a]	-0.30	0.11	-2.85	0.002[a]
	R^2	0.25				0.15				0.22			

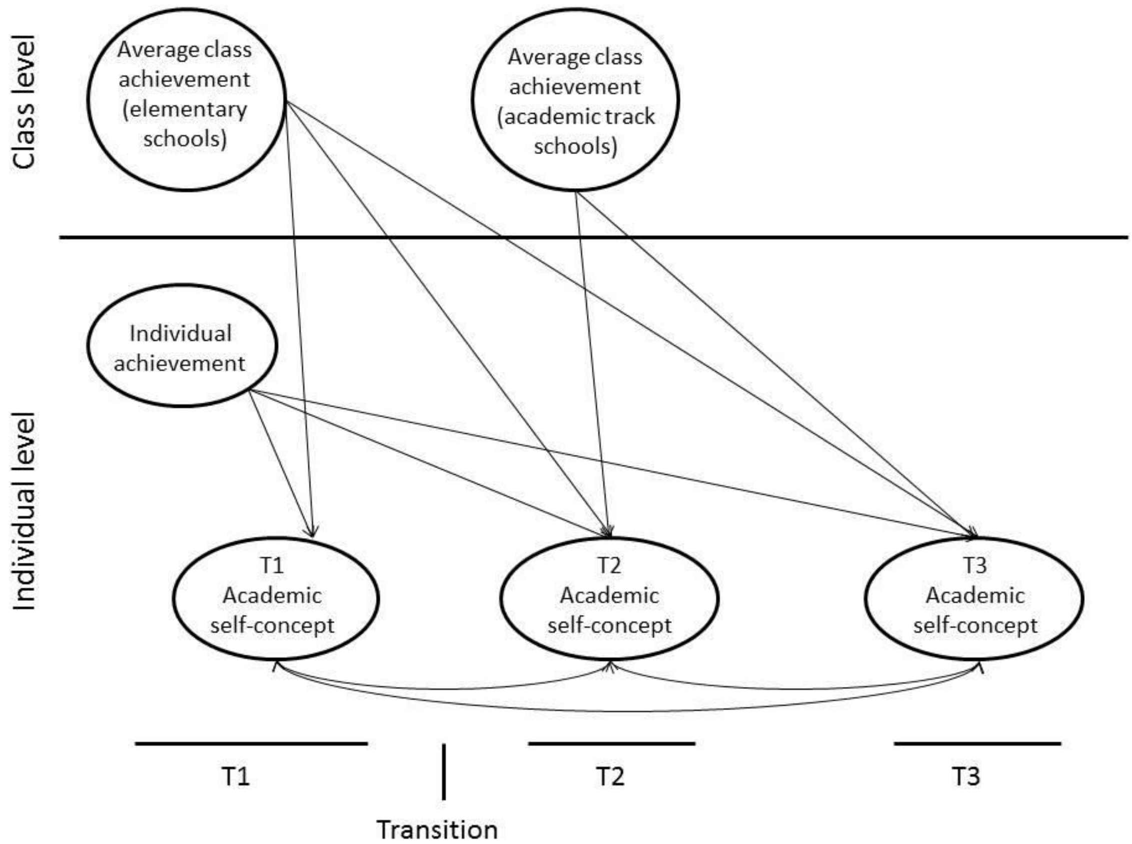
Notes:

iACH: individual achievement at measurement point T1 (grand mean centered); $aACH_{T1}$: average class achievement of elementary school classrooms; $aACH_{T2}$: average class achievement of *Gymnasium* school classrooms.

[a] *p*-values from single sided *t*-tests for directed hypotheses.

Figures

Figure 1. Multivariate simultaneous latent regression analysis for testing the two contextual BFLPEs from both contexts before transition (T1) and after transition (T2) (structural model only).



Appendix

Table A1.

Comparison of background characteristics of the sample of the *N* = 155 students (assessed in both elementary school and early-entry *Gymnasium* school) to the *N* = 1602 remaining early-entry *Gymnasium* students (assessed in *Gymnasium* context only).

	GY_{155}			GY_{1602}			
Construct	*Parameter*			*Parameter*			t^1
HISEI in family (*M* (*SE*) *SD*)	61.0	(0.72)	14.54	58.6	(1.22)	14.06	-1.68
Abitur (in %)	61.0			58.7			-0.48
University (in %)	58.2			54.2			-0.78
Immigrant backgr. (in %)	27.1			27.1			0.00
GPA (*M* (*SE*) *SD*)	1.6	(0.02)	0.37	1.6	(0.04)	0.39	0.09
Female student (in %)	51.5			60.0			1.82

Notes:

[1]*t*- values for categorical variables from logistic regressions (in M*plus*).

GPA = Grade point average from grade 4 mid-term report. HISEI: highest socioeconomic status in the family; highest school degree: immigrant background: 1 = at least one of the parents not born in Germany (reference group 0 = both parents born in Germany); Abitur = at least one parent has at least university entrance diploma; University = at least one parent has a university degree from a university of applied sciences (Fachhochschule) or university (Universität); GY_{155} = sample of the *N* = 155 early-entry *Gymnasium* students, assessed in both elementary school and *Gymnasium* context; GY_{1602} = sample of the *N* = 1602 early-entry *Gymnasium* students, assessed in *Gymnasium* context only.

Table A2.

Regressions of general academic self-concept on individual and average classroom achievement at all three measurement points with autoregressive paths for self-concept across all three waves of assessment (fully standardized solutions).

		AS-C											
		T1				T2				T3			
		b	*SE*	*t*	*p*	*b*	*SE*	*t*	*P*	*b*	*SE*	*t*	*p*
M1	iACH	0.50	0.09	5.15	<0.001	0.01	0.01	0.49	0.313	0.02	0.01	1.67	0.048
	AS-C$_{T1}$					0.69	0.12	5.89	<0.001				
	AS-C$_{T2}$									0.60	0.09	6.49	<0.001
	R^2	0.25				0.47				0.41			
M2	iACH	0.59	0.11	5.27	<0.001	0.07	0.15	0.04	0.967	0.15	0.12	1.55	0.122
	aACH$_{T1}$	-0.25	0.12	-2.04	0.022 [1]	0.02	0.10	0.15	0.442 [1]	0.04	0.10	0.37	0.261 [1]
	AS-C$_{T1}$					0.65	0.11	5.65	<0.001				
	AS-C$_{T2}$									0.56	0.09	6.42	<0.001
	R^2	0.29				0.46				0.41			
M3	iACH	0.53	0.11	4.63	<0.001	0.07	0.17	0.41	0.686	0.26	0.12	2.09	0.038
	aACH$_{T1}$	-0.21	0.12	-1.73	0.042 [1]	0.01	0.10	0.09	0.463 [1]	0.03	0.10	0.34	0.366 [1]
	aACH$_{T2}$					0.01	0.09	0.15	0.442 [1]	-0.29	0.10	-3.00	0.002 [1]
	AS-C$_{T1}$					0.64	0.10	6.44	<0.001				
	AS-C$_{T2}$									0.57	0.08	6.94	<0.001
	R^2	0.25				0.47				0.49			

Notes:

AS-C: Academic self-concept; iACH: individual achievement at measurement point T1 (grand mean centered); $aACH_{T1}$: average class achievement of elementary school classrooms; $aACH_{T2}$: average class achievement of *Gymnasium* school classrooms.

[1] *p*-values from single sided *t*-tests for directed hypotheses.