

# Parental educational aspirations and children's academic self-concept: Disentangling state and trait components on their dynamic interplay

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## Abstract

The dynamic interplay of parental educational aspirations and children's academic self-concept was examined from late childhood through mid-adolescence within a transactional socialization framework. Parental and child data were gained from a representative Swiss sample within 3-year intervals ( $N_{T1} = 1118$ ; 51% females; 28% migration background;  $M_{age\ T1} = 9.26$ ,  $M_{age\ T2} = 12.14$ ,  $M_{age\ T3} = 15.32$ ). Results from a random intercept cross-lagged panel model revealed positive associations between the two constructs at the between- and within-person level. Findings showed general and time-specific associations between children and parents and reciprocal spill-over effects, whereby higher than usual aspirations predicted higher than usual academic self-concept over time and vice versa, highlighting transactional processes in the context of educational transitions.

Previous research has gathered substantial evidence that educational expectations and aspirations parents hold for their offspring are associated with children's educational success (for a review, see Yamamoto & Holloway, 2010). Children's educational success is in turn a strong predictor of their income across the adult life (Tamborini et al., 2015). The same holds for children's academic self-concept and educational attainment, which represent longitudinal predictors for academic adjustment (Ehm et al., 2019; Lazarides et al., 2015; Marsh & Martin, 2011; Marsh et al., 2005; Weidinger et al., 2018). Although research points to the importance of both child academic beliefs and parental educational values, it is less clear how parental educational aspirations and child academic self-concept *reciprocally* relate to each other across childhood and adolescence. To shed light on this longitudinal relation is crucial for understanding the

dynamics involved in the development of parental educational aspirations for their child, defined as parents aspiring for their child to show high academic performance, and child academic competence beliefs, defined as child academic self-concept. These dynamics ultimately forge educational success.

Regarding potential directions of influence, studies devoted to the *transmission* of beliefs and values in the socialization process have well established that parents' perceptions of child ability, their educational expectations, and values are influential for child academic motivation and beliefs (Fredricks & Eccles, 2002). By contrast, the empirically less evidenced *transactional* approach to socialization asks whether educational aspirations parents hold for their child are *responsive* to their appraisal of child's academic competence beliefs, learning behaviors, and academic achievement (Briley et al.,

**Abbreviations:** CFI, comparative fit index; FIML, full information maximum likelihood; MAR, missing at random; MCAR, missingness completely at random; RI-CLPM, random intercept cross-lagged panel model; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; VET, vocational education training.

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2014; Loughlin-Presnal & Bierman, 2017). As research has extensively documented the declining trend in young people's academic competence beliefs from late childhood across adolescence (Gniewosz et al., 2012; Muenks et al., 2018), the question arises whether sensitive parents would adjust their educational aspirations to developmental changes in their child's academic self-concept. Thus, gathering evidence of the mutual influence of both constructs will increase the understanding of how these dynamics unfold and reveal whether the development of parental aspirations and child beliefs represents a process in the sense of a dynamic interplay.

This study attempts to contribute to these questions by asking how parental educational aspirations and child academic self-concept develop in relation to each other between mid-childhood (i.e., age 9), early adolescence (i.e., age 12), and mid-adolescence (i.e., age 15). Furthermore, the present study acknowledges that the development of both parental educational aspirations and child academic self-concept is embedded in the educational context in which these processes unfold. Institutional characteristics of the educational system that structure educational trajectories may shape the process of interest such that *time-specific differences* in the assumed patterns emerge. These mutual socialization processes may be heightened when anticipating educational transitions, for example, parents with high educational aspirations may put more effort into their child's learning while their children may be more sensitive to feedback from their parents during these times of heightened academic pressure. Accordingly, research has documented that school transitions are times of major changes in the development of academic beliefs and values (Gniewosz et al., 2012; Watt, 2004). Hence, the current study examines patterns of parent–child mutual influence during transitions in the context of a strongly stratified educational system (i.e., Switzerland), where tracking by ability characterizes educational transitions.

In particular, this study explores state and trait differences in parental educational aspirations and child academic self-concept in the context of time-specific educational demands (i.e., transitions), since recent research has distinguished between state and trait components in these constructs (Hamaker et al., 2015; Mulder & Hamaker, 2020). From a developmental perspective, the study of these complex processes across the period from late childhood to mid-adolescence allows for novel insights into how educational aspirations and academic self-concept shape each others' development longitudinally, and whether there are differences between childhood and adolescence.

## Parental educational aspirations and child academic self-concept

Previous research has predominantly investigated the two closely related, but *distinct* constructs of educational

expectations and educational aspirations parents hold in connection with young people's educational attainment (Fishman, 2019). Likewise, a large body of literature is devoted to the (longitudinal) associations between the construct of academic self-concept and educational achievement (Ehm et al., 2019; Marsh & Craven, 2006; Marsh & Martin, 2011; Marsh et al., 2005). Despite the evidence regarding the importance of parental educational expectations for their child's academic beliefs, little is known about the longitudinal relation between parental educational aspirations and child academic self-concept across childhood and adolescence. However, the study of these aspirations in relation to child academic self-concept is particularly important, as the former include a strong motivational undertone and the latter shows a declining trend across late childhood and adolescence (Fredricks & Eccles, 2002; Gaspard et al., 2019; Muenks et al., 2018; Nagy et al., 2010; Steinhoff & Buchmann, 2017).

Focusing on parental educational aspirations (i.e., parents wanting their child to show high academic performance), this study emphasizes a strong motivational component. Such aspirations incorporate goals parents set for their child regarding the importance of doing well in school and the desired educational attainment of the child. When theorizing the significance of school performance, research has framed the educational aspirations parents hold for the child as the extent to which they want their child to show interest and excel in specific academic domains (e.g., math; Frenzel et al., 2010). Although often neglected in the literature, (parental) educational aspirations need to be distinguished from parental educational expectations (Rutherford, 2015). The latter refer to the level of education parents *expect* their child to attain.

Much research has focused on the associations between parental educational expectations and child educational attainment, taking child academic self-concept as a mediating factor into account (Marsh & O'Mara, 2008; Neuenschwander et al., 2007). The preference of aspirations over expectations in this study is rooted in the assumption that parents who express the importance of education for their child by wanting their child to be among the top performers in class may instill these values in their child. The child may thus be inspired and motivated to adhere to these values, which is likely to promote effortful engagement in school, translating into higher academic self-concept (Gniewosz et al., 2012).

A large body of literature conceives of the construct of *academic self-concept* as mental representations of one's abilities in academic domains (Brunner et al., 2009). These representations are expressed in self-believed academic competencies based on one's evaluation of abilities in different academic domains (Marsh et al., 2005; Muenks et al., 2018). Domain-specific and domain-general academic self-concepts are distinguished, whereby the latter has been cast in a multidimensional structural model

that positions the domain-general self-concept at the apex of the self-concept hierarchy (Brunner et al., 2008). Consistent with the general definition of this concept, but not relying on individuals' ability evaluation of academic subjects, another research tradition conceptualizes this construct as general feelings of academic competence (Harter, 2006; Loughlin-Presnal & Bierman, 2017). Both definitions have in common that they tap into academic ability-related competence beliefs. The present study follows the latter tradition, assuming that parental educational aspirations may provoke an overall sense of being academically competent.

The importance of studying academic self-concept in childhood and adolescence also derives from the strong evidence that competence-related beliefs are linked to a range of behaviors that are highly relevant for learning such as cognitive engagement, effort, and persistence (Fredricks & Eccles, 2002). From a developmental perspective, these linkages gain in salience, as research documents that young people's academic competence beliefs, on one hand, become more stable; however, on the other, decline across adolescence (Fredricks & Eccles, 2002; Gaspard et al., 2019; Muenks et al., 2018; Nagy et al., 2010; Steinhoff & Buchmann, 2017). This decrease is part of the profound changes in the multidimensional self-concept experienced during this developmental period, including self-perception and self-evaluation of various aspects of the self (Gecas, 1982; Harter, 1999), and manifested in the decline in the positive self-concept (e.g., Hadley et al., 2008). Potential reasons for these developments of competence-related beliefs are the decreasing person-environment fit in schools (Gniewosz et al., 2012; Wigfield et al., 2015), the increasing importance of social comparison processes, particularly among peers in school (Muenks et al., 2018), and cognitive developmental processes leading to a growing awareness of one's strengths and weaknesses (Harter, 2006). In this context, an unanswered question is whether high parental educational aspirations are helpful in buffering or attenuating the decline. The current study addresses this research gap by providing empirical evidence on the dynamic interplay of parental educational encouragement and child academic competence beliefs across late childhood and mid-adolescence.

### **Transmission of parental educational aspirations to child academic self-concept**

A substantial body of research has cast the influence of parental educational expectations, beliefs, and values on child academic motivation, beliefs, and ultimate educational attainment in socialization theories that stress the transmission of beliefs and values from parents to children (Fredricks & Eccles, 2002; Gniewosz & Noack, 2012; Gniewosz & Watt, 2017; Lazarides et al., 2015; Pesu et al., 2016). In the sociological tradition, the Wisconsin

model of status attainment has claimed that parental educational aspiration is a critical mediator of the link between family social background and offspring educational attainment (Andrew & Hauser, 2011; Sewell et al., 2003). In psychological research, Eccles's expectancy-value theory is particularly prominent, maintaining that academic motivation in children stems from perceived academic competencies and the value attributed to education by their parents (Eccles & Wigfield, 2002; Fredricks & Eccles, 2002). Children's beliefs in their academic abilities and the importance of education are forged through parents' perceptions of their child's academic ability and their concomitant educational expectations (Fredricks & Eccles, 2002; Pesu et al., 2016).

A refinement of the expectancy-value model includes the differentiation of parental educational values into general beliefs and child-specific ones (Eccles, 2007). According to this model, parents' general educational beliefs, such as valuing school achievement, tend to translate into child-specific ones, but they are also linked to parenting behaviors expressed, for example, by active involvement with, and monitoring of, children's school work and time spent on other achievement-related activities (Eccles, 2007). This distinction helps to better understand achievement-related socialization processes, as parental considerations of the child's ability and competencies may help fine-tune child-specific educational aspirations. Overall, theoretical models built on the transmission of parental beliefs and values conceive of parents as socialization agents who instill ability-related competence beliefs and educational values in their children, who then internalize them. Such models regard parents as broadcasters and children as receivers in the socialization process (Briley et al., 2014).

The literature has provided several mechanisms for the transmission process, mostly based on parental educational expectations. Little is known, however, how parental educational aspirations affect child academic competence beliefs. The present study posits that high parental aspirations for the child may motivate parents to be strongly committed to and involved in the child's learning process, both at home and at school (Murayama et al., 2016; Simpkins et al., 2015). If children perceive higher parental involvement, they may show higher appreciation for schooling and be motivated to strive for educational success (Rutherford, 2015), thus enhancing their academic competence beliefs (Loughlin-Presnal & Bierman, 2017). In these views, parental involvement in child learning is thought to operate as a transmission belt, coupling parental aspirations with child beliefs (Gniewosz & Noack, 2012). In addition, the mechanism of parental aspirations to child academic self-concept may be rooted in the child's involvement in the learning process, consisting of a series of steps. Parents who value education highly for their child may specifically reinforce effortful learning behaviors (Briley et al., 2014), resulting in higher academic success, further enhancing

academic competence beliefs (Froiland et al., 2013; Neuenschwander et al., 2007).

Research documents that the transmission of educational beliefs and values from parents to child weakens, as the offspring grows older (Gniewosz & Watt, 2017). The developmental task of becoming reliable, responsible, and independent actors increases adolescents' urge for more autonomy and self-determination. In this process, social contexts outside the family become more influential, reducing parental influence on children (Branje, 2018). Furthermore, Sameroff (2010) argues that, because development becomes increasingly self-directed in adolescence, external influences on adolescent beliefs and behavior decline. This raises the question whether parents adjust their educational aspirations when they perceive these developmental changes in their child, as captured in transactional processes.

### **Parent–child mutual influence: Transactional processes**

If parents adjust their educational aspirations, they are not solely socialization agents of academically relevant child beliefs and behaviors. Sharing the same family context with intensive interactions, they are rather engaged in an ongoing process of mutual influence, where effects of parents and children co-occur. Such a bidirectional relation could represent a dynamic reciprocal interplay of potentially mutual reinforcement.

The dynamic reciprocal interplay of parental educational aspirations and child academic self-concept is captured best with a transactional framework of socialization (Briley et al., 2014; Bronfenbrenner & Ceci, 1994; Sameroff, 2009), stressing the dynamic roles of the actors involved. In this respect, children influence their own development by playing an active role for the academically relevant parenting they receive (Briley et al., 2014).

In the realm of educational expectations, academic beliefs, and educational attainment, the evidence for such reciprocal parent–child transactions is still scarce. We are aware of four studies that have investigated this question: Briley et al. (2014) approached the transactional process longitudinally and with genetically informed twin data. The results of their cross-lagged panel model supported a transactional framework for children from kindergarten age to fifth grade. Thus, parents are responsive to individual differences of their children, and children actively shape the educationally relevant parenting they receive. A second example is the four-wave panel study of Loughlin-Presnal and Bierman (2017), assessing children from low-income families when they attended grades 1, 2, 3, and 5. This study examined parental academic expectations and child academic outcomes (i.e., direct measurement of reading fluency). In contrast to Briley et al. (2014), their findings point to developmental changes in

parent–child influence patterns, revealing reciprocal influences in early elementary school, but not in later elementary school. With regard to older age groups (i.e., fifth to tenth graders), Murayama et al. (2016) showed positive reciprocal relations over time, linking parental aspirations and child math achievement. In their study, the child-to-parent influence was weaker than the parent-to-child effect. Lastly, Zhang et al. (2011) documented reciprocal relations among student and parental educational expectations and academic achievement based on a two-wave study with adolescents in 8th and 12th grades. Based on this limited longitudinal evidence on specific reciprocal relations, we expect bidirectional transaction processes between parents and children in the realm of academically relevant beliefs and values, forming a dynamic reciprocal interplay of mutual reinforcement. Extending this prior work, this study assumes that these associations are time-specific, depending on the context of developmental demands posed by the educational context, which may increase the salience of parental aspirations.

### **Parent–child reciprocal dynamics in the context of school transitions**

As institutional characteristics of educational systems structure educational trajectories, they may render particular schooling periods more in need of parental attention as well as student motivation and effort. For tracked and strongly stratified educational systems, previous research documented that educational transition periods marked by ability tracking trigger complex processes of agency activation in student academic interest and effortful engagement (Steinhoff & Buchmann, 2017). Similarly, Basler and Kriesi (2019) showed that students adapt their occupational aspirations before and after ability-tracked educational transitions. Likewise, Gniewosz et al. (2012) documented the short-term evolution of fluctuations in student academic self-concept before, during, and after secondary school transitions. Evidence also supports the assumption that school transitions are periods when students need increased information that may *temporarily* heighten the influence parents or other socialization agents exert on ability-related beliefs (Gniewosz & Watt, 2017), leading to time-specific fluctuations in parental aspirations and child academic self-concept.

Due to the heightened academic demands, transitions pose risks for students' social and emotional adjustment (e.g., Gasser et al., 2018). School transitions can be seen as critical life events (Meckelmann, 2004), which can be associated with high levels of experienced stress, posing a potential threat to students' concepts of their ability (Ball et al., 2006). Given the idea that parental aspirations positively predict a child's academic self-concept, parents may assume a protective role for their children's adjustment in transitions.

The period before an impending transition may also provoke a process of anticipatory socialization on the part of both students and their parents, as they become aware of upcoming tracked transitions. Particularly when school transitions involve tracking by ability, they realize what is at stake, as track placement greatly determines future educational chances (Buchmann et al., 2016). Upcoming streaming by ability set developmental deadlines (Heckhausen & Buchmann, 2019; Heckhausen & Tomasik, 2002). Impending developmental deadlines represent “urgent” phases of engagement, requiring that the involved actors adjust their beliefs and goal striving before the deadlines have arrived. If they are not in sync with the deadline, opportunities will be foregone.

## Current study

This study examined how parent educational aspirations and child academic self-concept develop in relation to each other between late-childhood (age 9), early adolescence (age 12), and mid-adolescence (age 15). The main assumption of a dynamic interplay between these two constructs was investigated in the context of the Swiss education system, in which ability tracking is institutionalized (Buchmann et al., 2016). The first tracking takes place at the end of sixth grade at the age of 12/13. Based on grades, teacher recommendation, and/or entry exams, which varies by cantons (i.e., states), students transition into one of three tracks of lower-secondary education. These three tracks are characterized by low, medium, and high academic demands (Neuenschwander et al., 2007). After completion of lower-secondary education, almost all students continue with post-obligatory, upper-secondary education, channeled again into tracks of vastly different academic demands. This second transition, around the age of 15/16, is again based on selection mechanisms that vary by states. Students are channeled to either vocational education (VET; duration of 2–4 years) or to one of several tracks of general education (e.g., gymnasium) that also vary in duration. Pronounced track differences in academic requirements exist both within VET tracks and tracks of general education (Basler & Kriesi, 2019). Research has shown that lower-secondary track allocation is rather decisive for tracking into upper-secondary education (Buchmann et al., 2016). The Swiss educational system is exemplary for studying the hypothesized dynamic interplay, as school transitions involving tracking by ability are likely to engender *time-specific* fluctuations in both parental educational aspirations and child academic competence beliefs. The panel design of this study has taken the timing of these transitions into account to assess the time-specific dynamics. This entails that both parental educational aspirations and child academic self-concept have been assessed *before* the occurrence of an ability-tracked transition. Given our focus on the time-sensitive

interplay of parental educational aspirations and child academic self-concept, we tested our hypothesized model by using cross-lagged panel modeling with latent random intercepts for each construct (RI-CLPM; Hamaker et al., 2015). We chose this procedure as it distinguishes trait-like (i.e., stable) from state-like (i.e., time-specific deviations from the stable parts) of each construct.

Based on the transactional framework of socialization (e.g., Briley et al., 2014; Bronfenbrenner & Ceci, 1994; Loughlin-Presnal & Bierman, 2017; Sameroff, 2009; Zhang et al., 2011), we hypothesized, at the trait level, a positive association between the stable, time-invariant latent intercepts of parental educational aspirations and child academic self-concept (i.e., parents with higher educational aspirations, in general, also had children with higher self-concept; *Hypothesis 1a*). Moreover, we also expected that these associations would operate at the time-specific level as well (i.e., time-specific covariation). Put differently, we hypothesized that higher than usual levels of parental aspirations would relate to higher than usual levels of academic self-concept *at the same time point* (*Hypothesis 1b*). We reasoned that parents and children share the same family environment, where they talk and interact with each other thereby exerting a reciprocal influence, which is particularly important in light of an upcoming ability-tracked educational transition.

In addition, we examined spill-over effects in which higher than usual levels of parental aspirations at time  $T$  would predict higher than usual the level of child academic self-concept at  $T + 1$  and vice versa. First, anticipating an upcoming ability-tracked transition, both parents and children, show time-specific changes (i.e., state-level) in educational aspirations and academic self-concept, respectively, that are above their dispositional tendencies across time. Hence, we hypothesized transactional processes (i.e., at the state level; *Hypothesis 2a*). Moreover, we assumed that the path from the state-like deviations of parental educational aspirations to the deviations of child academic self-concept at the subsequent time point would be stronger than the same path from child academic self-concept to later parental educational aspirations (*Hypothesis 2b*). Hypothesis 2b was based on socialization theory advocating the intergenerational transmission of academic values and beliefs from parents to children (e.g., Fredricks & Eccles, 2002; Simpkins et al., 2015). It also considered that parents may grasp better what it takes to handle upcoming developmental deadlines (Heckhausen & Tomasik, 2002), and findings pointing to the protective role of parents in times of stressful and demanding transitions (e.g., Gniewosz & Watt, 2017).

Finally, we assumed differences with respect to ability-tracked school transitions and developmental changes between children and adolescents. With regard to transitions, the first transition (i.e., age 12/13) decisively channels future educational opportunities as students in tracks of lower-secondary education with lower academic

requirements learn at a slower and less demanding pace. Thus, it gets more difficult at the second transition to make up for missed opportunities of having been assigned to an academically more demanding track at the first transition. As both parents and children are aware of this nexus, the transactional socialization processes may be less powerful at the second transition. With regard to developmental differences, adolescents may be less susceptible to parental influences, as their self-concept has stabilized (Muenks et al., 2018) and their need for self-determination and autonomy increases (Gniewosz & Watt, 2017). We hypothesized that the transactional (i.e., spill-over) associations between the state-like deviations of parental educational aspirations and child academic self-concept would be stronger at the first school transition than at the second one (*Hypothesis 3*). As our hypotheses are carefully developed based on the chosen theoretical framework, our analytical approach was confirmatory.

Since research provides ample evidence that both parental educational aspirations and child academic self-concept differ particularly by gender, migration background, parental education, and cognitive competence (Fredricks & Eccles, 2002; Loughlin-Presnal & Bierman, 2017; Wigfield et al., 2015), these aspects were controlled for in the analyses.

## METHODS

### Participants and design

Children and their parents were assessed at three time points with an interval of 3 years, starting at the age of 9. They were part of the COCON study, a multi-cohort panel research project with a representative sample for the German- and French-speaking parts of Switzerland. The child cohort was sampled in a two-step process (first step: 131 communities stratified by type and size; second step: random draw of 1905 households, response rate 78%). To control for potential non-response bias in sampling, we included a sampling weight in our analyses. This sampling weight controlled for the issue that some parents did not take part in the study due to lack of language skills or health issues. The child cohort was followed from the age of 6 through the age of 18.

The variables of interest for this specific study have been assessed at three waves. Importantly, the measurement occasions are located before the first and second transition. The assessments relevant for this study started at the age of 9, which refers to the first measurement time (T1). At T1, 1118 older children (51% females,  $M_{\text{ageT1}} = 9.26$  years,  $SD_{T1} = 0.20$ ) and 1112 of their primary caregivers (93.9% mothers, 5.9% fathers, 0.2% other caregivers,  $M_{\text{ageT1}} = 40.95$  years,  $SD_{T1} = 4.81$ , range = 28–60 years) participated, followed by 1038 early adolescents ( $M_{\text{ageT2}} = 12.14$  years,  $SD_{\text{ageT2}} = 0.21$  years) and 1024 of their primary caregivers at the second measurement time (T2), and 930 mid-adolescents ( $M_{\text{ageT3}} = 15.32$  years,

$SD_{\text{ageT3}} = 0.20$  years) and 874 primary caregivers at the third measurement time (T3). Parents' age was representative for the Swiss context (i.e., their age was measured when their child was 9 years old, so they were around 32 years old when the child was born; Swiss Federal Statistical Office, 2021). Regarding their social background, 28% of the children had a migration background (Italy: 25%, Germany: 13%, France: 10%, former Yugoslavia: 7%, Spain: 6%) and in 37% of the parents at least one party held a university degree.

This study was conducted in accordance with ethical standards of the American Psychological Association and the Helsinki Declaration. In addition, the study's adherence to the Human Research Act was monitored by the Swiss National Science Foundation. Parents and children were informed that this study addressed the development of children in different life situations and their educational tracks. Parents' informed consent for their and their child's participation was obtained before each interview (i.e., written consent for the first survey wave, followed by detailed written information and oral consent before each subsequent interview at each wave). In some rare cases, parents gave consent for the interview of their child, but did not participate in the primary caregiver interview (i.e., 0.1% at T1, 1% at T2, and 6% at T3). In addition, oral assent of the children was requested and they could withdraw from the study any time. Trained research assistants interviewed participants in face-to-face interviews in their homes.

### Attrition and missing data analysis

Out of the 1118 children and 1112 caregivers interviewed at the child's age of 9, 82% of the children ( $n = 930$ ) and 79% ( $n = 874$ ) of the primary caregivers remained in the sample until the third data collection 6 years later. When considering the percentage of missing data at each time point, 5% of the data of parental aspirations was missing at T1, 10% at T2, and 24% at T3. For academic self-concept, 0.2% of the data was missing at T1, 8% at T2, and 18% at T3. As Little's missingness completely at random (MCAR) test (Little, 1988) was significant, our data did not meet the strict criteria for MCAR (i.e., the missingness on one variable was unrelated to observed and unobserved variables). Thus, we examined whether we could predict missingness by demographic variables and the primary study variables at ages 9 and 12 using a binary logistic regression model.

The results showed that children from parents with higher parental education (odds ratio = 1.47,  $CI_{95\%}[1.05, 2.09]$ ) were significantly more likely to remain in the study than children from parents with lower education while none of the primary study variables were associated with missingness. Thus, we concluded that missing at random (MAR; i.e., the missingness was related to observed variables) was supported (see Enders (2010) for an in-depth discussion) and we accounted for missing data with full information maximum likelihood estimation

**TABLE 1** Descriptive statistics and correlations among the study variables

	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Sex	—	—	(—)									
2. Migration background	—	—	.01	(—)								
3. Parental education	—	—	.01	-.13***	(—)							
4. Cognitive competence <sup>T1</sup>	2.89	1.49	-.09**	-.01	.10***	(.69)						
5. Parental aspirations <sup>T1</sup>	2.95	0.72	.05†	-.25***	.11***	.10**	(.67)					
6. Academic self-concept <sup>T1</sup>	3.39	1.49	.02	.04	.11***	.17***	.17***	(.75)				
7. Parental aspirations <sup>T2</sup>	2.92	0.69	.05†	-.21***	.13***	.12***	.60***	.14***	(.71)			
8. Academic self-concept <sup>T2</sup>	3.23	1.48	.03	-.03	.17***	.19***	.21***	.42***	.26***	(.70)		
9. Parental aspirations <sup>T3</sup>	2.80	0.60	.08**	-.15***	.06†	.11**	.41***	.11**	.46***	.12***	(.71)	
10. Academic self-concept <sup>T3</sup>	2.77	1.41	.08**	-.08**	.09**	.19***	.15***	.30***	.18***	.38***	.25***	(.85)

Note: T1 = first measurement time (i.e., age 9); T2 = second measurement time (i.e., age 12); T3 = third measurement time (i.e., age 15); sex = 0 (female), 1 (male); migration background = 0 (no), 1 (yes); parental education = 0 (lower than tertiary), 1 (at minimum one parent held a tertiary degree); cognitive competence (range: 0 = no correct answer, 6 = all six matrices correctly solved). Reliability coefficients for academic self-concept (omega) and correlations for parental aspirations are reported on the main diagonal.

† ≤ .1.

\*p < .05; \*\*p < .01; \*\*\*p < .001, two-tailed.

(method: FIML) in *Mplus* 8.2 (Muthén & Muthén, 2017). Since all information is used to inform parameter values and standard errors, FIML results in unbiased parameter estimates under the assumption of MAR, particularly when the variables predicting study attrition are included in model estimation (Enders, 2010).

**Measures**

Descriptive statistics, correlations, and reliability coefficients of the study variables are shown in Table 1.

**Child academic self-concept**

Students rated their academic self-concept (1 = *not at all true* to 4 = *completely true*) using three items (i.e., “In school, I belong to the faster students,” “I am very good with exams,” “I almost always find the correct answer”), from the German version of Harter-Scale of perceived competence (Asendorpf & Aken, 1993). Omega reliability coefficients were .67, .71, and .71 at T1, T2, and T3, respectively.

**Parental educational aspirations**

Caregivers, using a six-point scale (1 = *not at all true* to 6 = *completely true*), were asked about their aspired achievement of their child in comparison to the other students in class for the two major subjects (Neuenschwander, 2003). The items were as follows: “I want my child to be among the best students in class (1) in Math and (2) in German (for the German-speaking part) or French (for the French-speaking part).” Omega reliability coefficients were .75, .70, and .85 at T1, T2, and T3, respectively.

**Control variables**

We controlled for *gender* (0 = female, 1 = male), *migration background* (0 = no, 1 = yes; yes = one parent was not born in Switzerland), *parental education* (0 = both parents lower than tertiary education, 1 = at least one has a tertiary degree), and cognitive competence (assessed at the age of 9 by the Culture Fair Intelligence Test-1 with the matrices subscale test, whereby higher values denote higher cognitive competence; Cattell et al., 1977).

**Data analytic approach**

In order to test our hypotheses about time-sensitive changes in parental aspirations and child academic self-concept and their association, we conducted a cross-lagged panel model

with latent random intercepts for each construct (Hamaker et al., 2015). While traditional CLPM does not distinguish between- and within-person effects, the RI-CLPM allows modeling both stable or dispositional (i.e., *trait-like*) aspects and time-specific changes taking place within participants (i.e., *state-like* aspects or fluctuations at a given point in time; Hamaker et al., 2015). In detail, the RI-CLPM decomposes the score of participant  $i$  at time  $t$  on the variable  $x$  into three components (Hamaker et al., 2015): the time-specific group mean ( $\mu_t$ ) of  $x$ ; a random intercept capturing the time-invariant, trait-like deviation ( $\kappa_i$ ) from the group-mean; and the temporal deviation ( $\rho_{it}$ ) of each participant at a specific time point (i.e.,  $x_{it} = \mu_t + \kappa_i + \rho_{it}$ ).

Hence, the correlation at the trait-level between parental aspirations and child academic self-concept represents the general, time-unspecific association between the two variables (Do parents with higher aspirations *in general* than their counterparts also have children with higher self-concept?). The within-level effects, by contrast, capture the relations between parents' and children's deviations from their expected level (Hamaker et al., 2015). They can be distinguished into (a) simultaneous, *time-specific covariations* (Are higher/lower than expected levels of parental aspirations related to higher/lower than expected levels of academic self-concepts at the same time point?); (b) *carry-over effects or inertia* (e.g., Do parents with higher/lower than expected levels of parental aspirations at time  $T$  still report higher/lower than expected levels of parental aspirations at time  $T + 1$ ?); and (c) *spill-over effects* (Do higher/lower than expected levels of parental aspirations at time  $T$  predict higher/lower than expected levels of academic self-concepts at time  $T + 1$  [i.e., the next academic transition] and vice-versa?).

Next, to increase the robustness of the results, we controlled for the child's gender, parental education, migration background, and child cognitive competence. For each control, we first determined (in separate models) whether it was a time-invariant covariate (i.e., at the trait level) or a time-varying covariate (i.e., at the state level). Following a stepwise procedure suggested by Mulder and Hamaker (2020), for each covariate, we compared a model in the control variable was regressed on the state aspects of both variables and in which parameters were allowed to be estimated freely to a model in which we constrained these regression parameters to be the same over time. If the constrained model fitted better, this would provide evidence for a time-invariant covariate (i.e., it would result in the same model as if the covariates were regressed on the trait level). To understand the hypothesized associations with and without the influence of the control variables, we modeled both in a stepwise procedure for each variable (for details, see Appendix S2).

We evaluated the fit of our models using conventional criteria for structural equation modeling (Kline, 2011). In detail, beyond a non-significant  $\chi^2$ , we also considered values of comparative fit index (CFI) higher than .90 as well as both root mean square error of approximation (RMSEA; with its 90% confidence interval) and standardized root-mean-square residual (SRMR) values lower than

.08 as indicative of an acceptable model fit. All parameters were estimated with maximum-likelihood with robust standard errors in *Mplus 8* (Muthén & Muthén, 2017).

## RESULTS

### Preliminary analyses

As a preliminary step, we tested the longitudinal measurement invariance of our instruments. For the specific purpose of our analysis (Mulder & Hamaker, 2020), longitudinal metric invariance (i.e., same factor structure and factor loadings over time) was of relevance for the proper interpretation of our findings. As reported in Supporting Information (see Appendix S1, Tables S1—A and S1—B), full metric invariance was reached for students' self-concept and parental aspirations.

Regarding the covariates, the initial analyses showed that gender and cognitive competence were time-invariant covariates, while migration background was a time-sensitive covariate. For parental educational background, a model in which the covariate was time-invariant for parental aspirations, but time-varying for child academic self-concept had the best fit. The results of these analyses are reported in the Appendix S2 (see Table S2). Therefore, the covariates gender and cognitive competence were regressed on the trait-components of both constructs while the covariate migration background was regressed on the state components of both constructs, while parental educational background was regressed on the trait-component of parental aspirations, but on the state components of academic self-concept.

### RI-CLPM

First, we tested an *unconstrained* RI-CLPM (M0), in which all parameters were freely estimated, showing an excellent fit to the data,  $\chi^2(1) = 0.533$ ,  $cf = .975$ ,  $p = .465$ , CFI = 1.000, RMSEA = .000, 90% CI (.000, .071), SRMR = .004. Next, before testing the hypotheses concerning the spill-over effects, we checked whether we could constrain the unstandardized parameters for the time-specific covariations and carry-over effects to equality over time. Since this model,  $\chi^2(5) = 27.344$ ,  $cf = 1.035$ ,  $p < .001$ , CFI = .976, RMSEA = .063, 90% CI (.041, .087), SRMR = .040, had a significantly worse fit to the data  $\Delta\chi^2(4) = 26.458$ ,  $p < .001$ , we freed the carry-over paths (i.e., parental aspirations at T1  $\rightarrow$  parental aspirations at T2  $\neq$  parental aspirations at T2  $\rightarrow$  parental aspirations at T3; academic self-concept at T1  $\rightarrow$  academic self-concept at T2  $\neq$  academic self-concept at T2  $\rightarrow$  academic self-concept at T3). This refined RI-CLPM showed a good fit to the data,  $\chi^2(3) = 2.896$ ,  $cf = 0.995$ ,  $p = .408$ , CFI = 1.000, RMSEA = .000, 90% CI (.000, .050), SRMR = .010 and was not statistically different

from the unconstrained model  $\Delta\chi^2(2) = 2.350, p = .309$ . Hence, this model was used as the baseline model (M1) on which we built further constraints.

Next, we tested whether there were significant differences between the regression parameters of the four spill-over paths, by specifying these differences as additional parameters with the “model constraints” option in *Mplus*. The results showed that the effects of the spill-over paths between the actors were not statistically different from each other. Hence, we constrained these four parameters to be equal, both over time and across actors. This final model (M2) showed an excellent fit,  $\chi^2(6) = 7.352, cf = 1.085, p = .290, CFI = .999, RMSEA = .014, 90\% CI (.000, .043), SRMR = .015$  and was not statistically different from the baseline model (M1)  $\Delta\chi^2(3) = 4.337, p = .227$ . Therefore, the conclusions regarding the study hypotheses were made based on this model (see Figure 1; Table 2).

As assumed in hypothesis 1a, the two latent traits were positively correlated (see Table 2) indicating that, in general, parents with higher academic aspirations also had children with higher academic self-concept. Thus, parental aspirations and child concept were consistently correlated over time, above and beyond time-specific variations and associations. When looking at specific time points (i.e., the state-level), we found positive time-specific correlations at the within-person level, namely, higher than expected levels of parental academic aspirations were associated with children reporting a self-concept higher than expected at the same time point (see Table 2). This finding is in line with hypothesis 1b.

Regarding hypothesis 2a, the model showed that higher than expected parental aspirations at time *T* predicted higher than expected children's self-concept at the next time point and vice versa (see Table 2). Hypothesis 2a was supported. However, there was no statistical evidence to assume that the paths from parental educational aspirations to child academic self-concept at *T + 1* were stronger than vice versa (i.e., Hypothesis 2b was not supported). Nor was there evidence to assume that the effects were stronger at the first transition than at the second one (i.e., Hypothesis 3 was not supported), as the differences between these parameters were not statistically different from each other. In conclusion, the results supported the assumption of a transactional process, which was not different in magnitude between the first and second transition, childhood and adolescence, respectively.

Interestingly, the carry-over effects were positive and statistically significant for both academic aspirations and children's self-concept from T1 to T2, but not later (see Figure 1; Table 2). Hence, fluctuations at the age of 9 were carried over to the age of 12 for both constructs. For example, children who reported higher than expected levels of academic self-concept carried these unusually high levels at the subsequent time point (i.e., at the age of 12) but not afterward (i.e., from 12 to 15 years of age).

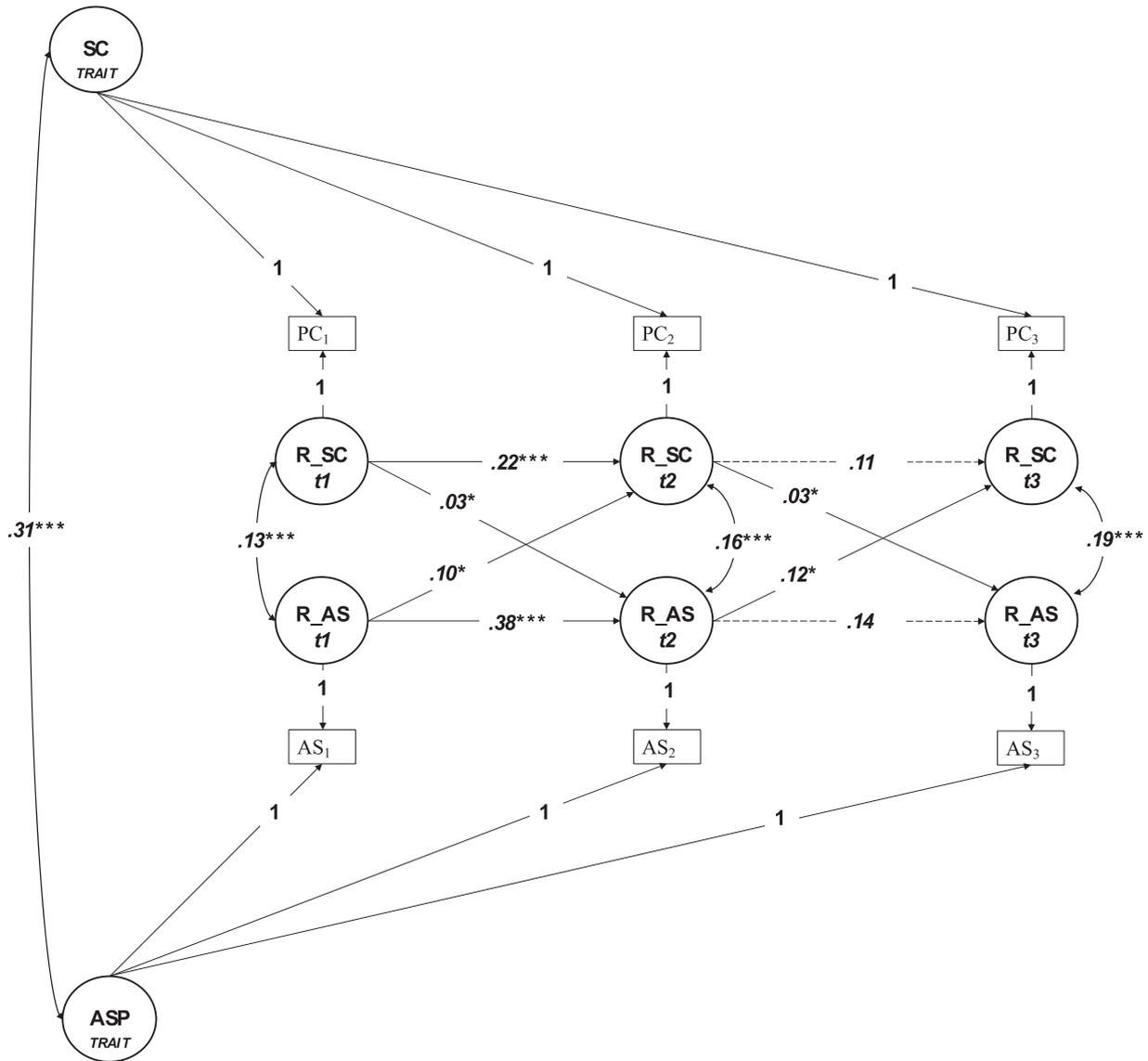
## Robustness check

Lastly, we tested the stability of these effects while controlling for the covariates gender, parental education, migration background, and cognitive competence. We included the covariates as predictors of the respective components identified earlier (i.e., trait- or state-level components of each construct) in the final model. This model (M3; see Figure 2) showed a good fit to the data,  $\chi^2(22) = 27.698, cf = 1.169, p = .186, CFI = .995, RMSEA = .015, 90\% CI (.000, .031), SRMR = .023$ . Importantly, with regard to the hypotheses, all findings were similar to the models without covariates (see Figure 2). When looking at the final model (i.e., the fully constrained model), the results showed that, first, the two latent traits were positively correlated as well as the within-time correlations. Second, regarding spill-over effects at the within-person level, higher than expected parental educational aspirations at time *T* predicted higher than expected children's academic self-concept at the next time point and vice versa (see Figure 2). Third, carry-over effects were significant from T1 to T2 for both academic aspirations and children's self-concept, but not from T2 to T3.

With regard to the control variables (see Table 3), parents of boys generally showed significantly higher educational aspirations than parents of girls; and boys showed a higher general academic self-concept (i.e., at the trait level). Moreover, children of parents with higher education background reported higher levels than usual regarding their academic self-concept at each time point; and parents with higher educational background expressed higher general educational aspirations. At each measurement time, parents of children with a migration background showed lower than usual aspirations than parents of children without migration background. Lastly, parents of children with higher cognitive competence had significantly higher aspirations compared to parents of children with lower cognitive competence at all time points. Similarly, children with lower cognitive competence showed a significantly lower academic self-concept at all time points.

## DISCUSSION

The current study investigated *time-sensitive* changes between parental educational aspirations and their children's academic self-concept across late childhood (i.e., age 9), early and mid-adolescence (i.e., ages 12 and 15). These processes were examined for Switzerland, an educational context whose ability-tracked transitions might be particularly relevant for time-specific fluctuations in parental values and child beliefs and their associations. Hence, the findings mostly speak for contexts with educational tracking systems, which can be found all over the world and imply that students are streamed according to their abilities.



**FIGURE 1** Random intercept cross-lagged panel model of parental educational aspirations and children's academic self-concept. *Note:* T1 = age 9; T2 = age 12; T3 = age 15. ASP = parental aspirations; SC = child academic self-concept; R\_ indicates the time-specific residual components of both ASP and SC. The spill-over paths have been constrained to be equal across time and actor. Non-significant paths are shown by dashed arrows and standardized estimates are reported on the straight and curved arrows. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , two-tailed

### Stable and dynamic associations between parental aspirations and child academic self-concept

Results from the RI-CLPM (Hamaker et al., 2015) showed a general (i.e., time-unspecific), positive association between parental educational aspirations and child academic self-concept (i.e., the between-level effect). Parents with higher aspirations in general compared to their counterparts tend to have children with higher academic self-concepts in general. The rather strong association between the time-invariant components of parental educational aspirations and child academic self-concept documents the trait-like stability across the time period investigated, spanning from late childhood to mid-adolescence.

The findings further revealed that the within-level effects (i.e., state-like aspects) of both concepts were significantly correlated at each time point, capturing the time-sensitive relations between parents' and children's *deviations* from their general trait level. Thus, at the ages of 9, 12, and 15, fluctuations in parents' educational aspirations and children's academic self-concept were significantly associated at each time point. This finding may point to a synchronized process between children and parents as they share the same family environment and may shape each other's expectations and beliefs. The significant associations at the ages of 12 and 15 of these within-time state effects were in line with the hypothesized temporary changes in anticipation of a transition. The findings also showed that this association was significant at the age of 9. The strength

**TABLE 2** Random intercept (RI) cross-lagged panel model of parental academic aspiration (AS) and child academic self-concept (SC)

	Unstd (SE)	Std	<i>p</i> -value
Between-level			
RI_AS ↔ RI_SC	.098 (.033)	.314	.003
Within-level			
Correlations			
R_AS T1 ↔ R_SC T1	.096 (.020)	.126	<.001
R_AS T2 ↔ R_SC T2	.096 (.020)	.159	<.001
R_AS T3 ↔ R_SC T3	.096 (.020)	.187	<.001
Carry-over effects			
R_AS T1 → R_AS T2	.359 (.065)	.376	<.001
R_AS T2 → R_AS T3	.131 (.086)	.141	.127
R_SC T1 → R_SC T2	.205 (.049)	.221	<.001
R_SC T2 → R_SC T3	.091 (.056)	.109	.106
Spill-over effects			
R_AS T1 → R_SC T2	.050 (.022)	.104	.021
R_AS T2 → R_SC T3	.050 (.022)	.119	.021
R_SC T1 → R_AS T2	.050 (.022)	.027	.021
R_SC T2 → R_AS T3	.050 (.022)	.027	.021

Note: Unstandardized (unstd) coefficients, their standard errors (SE), and standardized (std) effects are reported for the following parameters: Between-level covariation (↔) of the two random intercepts (RI) of AS and SC; within-level covariations (↔) between the residual components of AS (R\_AS) and SC (R\_SC) at time 1 (T1), time 2 (T2), and time 3 (T3); within-level carry-over effects (→) for R\_AS and R\_SC; within-level spill-over effects (→) for R\_AS and R\_SC.

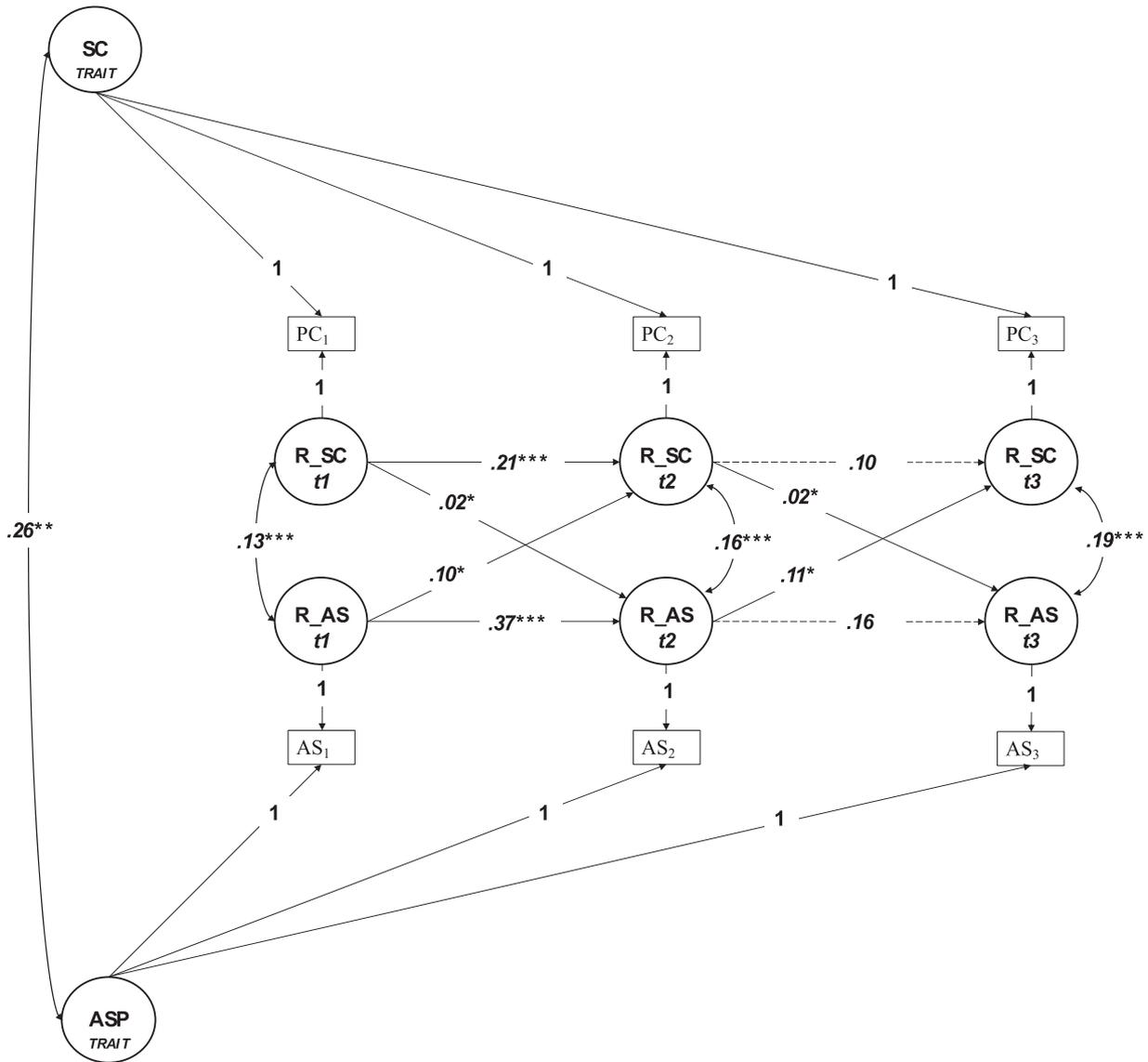
of these associations did not vary between time points (i.e., these coefficients could be constrained over time). Thus, at the age of 9, children and parents may be responsive to each other as well. When considering the specific context of the Swiss education system, most children change their teachers for the first time at this age, representing a smaller educational transition. Moreover, as previous work suggests (e.g., Loughlin-Presnal & Bierman, 2017), the synchronization process of parents and children may be calibrated at early phases of schooling, but remain sensitive to changes and demands of the educational context.

In addition to the within-time associations, the spill-over paths of these state-level components were significantly related. Thus, if parents revealed higher than expected educational aspirations, their children expressed higher than usual levels in their academic self-concept 3 years later and vice versa. Therefore, within-time fluctuations in one actor significantly predicted within-time fluctuations in the other actor 3 years later. In addition, contrary to our hypothesis, these spill-over paths did not significantly vary both across actors and over time. These within-person changes represented small effects and were substantively smaller than the between-person effect.

These novel findings contribute to the transactional framework for understanding socialization, in which parent-to-child and child-to-parent effects are assumed to co-occur (Sameroff, 2009, 2010). It provides, first, a nuanced view of the dynamic interplay of parental values and child beliefs, pertaining to the distinction between a dispositional, time-unspecific (i.e., trait-like) component of the process from a time-sensitive (i.e., state-like) component, catching temporary fluctuations. The literature has well established the importance of both parental educational aspirations and child academic self-concept, for child academic attainment (Marsh & O'Mara, 2008; Murayama et al., 2016). However, much less is known, about the *time-sensitive* reciprocal relations between these two constructs across the educational trajectory, ultimately forging educational achievement. Therefore, the current study provides first insights into temporary changes within parents and children from their usual level of educational aspirations and academic self-concept and the spill-over associations. Particularly, the bidirectional associations reveal that parents and children are both adaptive to relative changes within their counterparts and do not simply adhere to the once adopted values and beliefs, irrespective of fluctuations occurring in their counterparts at a given point in time. In detail, parents who have higher than usual levels of educational aspirations at the ages of 9 and 12 have children with higher academic self-concepts than what the children usually report at the ages of 12 and 15. Conversely, children reporting higher than usual levels of academic self-concepts at the ages of 9 and 12 have parents with higher levels of educational aspirations at the ages of 12 and 15.

On the one hand, these findings support the assumption that parental educational aspirations are conducive to children's positive academic self-concepts. As competence beliefs play such an important role for children's motivation (Fredricks & Eccles, 2002), these findings contribute to the identification of socialization factors that influence their development. On the other hand, they attest to parental sensitivity to the child's relative change in the academic self-concept, underscoring the view that children are actively influencing the educationally relevant parenting they receive (Briley et al., 2014). These bi-directional, time-sensitive relations thus speak for the presence of a socialization process in the realm of parental educational values and child competence beliefs that is characterized by transaction (Sameroff, 2009). They add a novel element to the transactional framework, as the limited existing longitudinal evidence focused primarily on parental and student educational expectations and academic achievement (Briley et al., 2014; Loughlin-Presnal & Bierman, 2017; Murayama et al., 2016; Zhang et al., 2011).

In contrast to our assumption, there was no statistical evidence for stronger parent-to-child effects as compared to child-to-parent effects. This is not in line with



**FIGURE 2** Random intercept cross-lagged panel model of parental educational aspirations and children's academic self-concept including control variables. *Note:* T1 = age 9; T2 = age 12; T3 = age 15. ASP = parental aspirations; SC = child academic self-concept; R\_ indicates the time-specific residual components of both ASP and SC. The spill-over paths have been constrained to be equal across time and actor. Non-significant paths are shown by dashed arrows and standardized estimates are reported on the straight and curved arrows. The specific associations with the control variables are displayed in Table 3. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ , two-tailed

the idea that the socialization process in the realm of parental values and child competence beliefs involves primarily a transmission of values from parents to children (Fredricks & Eccles, 2002; Gniewosz et al., 2012; Pesu et al., 2016). The evidence provided by previous longitudinal research in this regard is rather scarce and mixed. A recent study (Loughlin-Presnal & Bierman, 2017) found that transactional processes only unfolded in early elementary, but not later elementary grades (i.e., then only parental socialization effects were present) while another recent study with children in grades 5–10 found stronger effects from parents to children (Murayama et al., 2016). In contrast, two other previous studies conducted with children from kindergarten age to grade 5 (Briley et al., 2014) and adolescents from 8<sup>th</sup> to 12<sup>th</sup> grades

(Zhang et al., 2011) revealed no difference in the strength of relations between actors. Spanning the age range from grade 3 (i.e., age 9) to grade 9 (i.e., age 15), our study adds evidence for transactional processes that do not differ between actors. Furthermore, regarding the study content, the current findings extend these two studies that suggest reciprocal patterns between parental expectations, parental involvement and child achievement, and parental aspirations and academic achievement, respectively, with the domains of parental aspirations and children's conceptions of their own academic abilities. Taken together, if children signal positive beliefs in their own capacities, this may, in turn, stimulate parents to raise their aspirations and provide academic support and stimulation, resulting in higher academic achievement. And vice

TABLE 3 Parameter estimates for the control variables gender, migration background, parental education, and cognitive competence

	Intercept		Observed variable		Observed variable		Observed variable		Observed variable	
	parental aspirations	academic self-concept								
	B	CI 95%								
Sex	.131 [.04, .22]	.124 [.03, .22]	-.309 [-.39, -.23]	.062 [-.01, .13]	-.142 [-.23, -.05]	-.120 [-.23, -.01]				
Migration background										
Parental education	.090 [-.01, .18]			.105 [.04, .17]		.166 [.10, .23]				.067 [-.02, .15]
Cognitive competence <sup>T1</sup>	.154 [.06, .25]	.338 [.24, .43]								

Note: T1 = first measurement time (i.e., age 9); T2 = second measurement time (i.e., age 12); T3 = third measurement time (i.e., age 15); sex = 0 (female), 1 (male); migration background = 0 (no); 1 (yes); parental education = 0 (lower than tertiary), 1 (at minimum one parent held a tertiary degree); cognitive competence (range: 0 = no correct answer, 6 = all six matrices correctly solved). The covariate was either included on the trait or the state components of each construct. Non-significant associations that were not close to statistical significance were deleted in order to increase statistical power (Little, 2013).

versa, children seem to be sensitive to the academic aspirations their parents have for them and internalize it into their self-concept. In order to better understand the specific influence processes, future work could focus on educational aspirations of parents and specific behaviors of parents that may foster children's competence beliefs, effective learning, and promote academic achievement. Multiple influence processes may be at work, such as (1) parents and children shape each others' beliefs, whereby parental involvement may heighten children's motivation for educational success (and vice versa; e.g., Murayama et al., 2016) or (2) parents may reinforce effective learning, resulting in higher academic success, and in turn shaping children's and parents' beliefs (e.g., Briley et al., 2014; Neuenschwander et al., 2007). In the current study, cognitive competence at the age of 9 was positively related to parental aspirations and child academic self-concept. Thus, parents' and children's beliefs may evolve in light of the child's earlier achievement, which, in turn, is likely related to cognitive competence.

In contrast to the study of Loughlin-Presnal and Bierman (2017), the reciprocal effects between parent and child measures regarding academic domains were also significant at later points in development. Based on their study, the authors suggested that the dynamic interplay between child academic performance and parental expectations would be calibrated in early phases of schooling, and was less meaningful later on, as parents would become less responsive to feedback from teachers later on. However, in contrast to their study, our work, to our knowledge, was the first to disentangle the relations between children and parents in the context of educational demands at both the between- and within-person level and to cover students all the way from late childhood (age 9) through mid-adolescence (age 15). However, to develop a comprehensive understanding of how this dynamic process unfolds, future research can look at how this process evolves from kindergarten to adolescence. Moreover, as this study specifically measured the variables of interest *before* academic transitions, a phase in which adjustments in parental aspirations and child academic self-concept are likely to occur, future research could compare these associations with times in which such high educational demands were less salient. This might help to understand whether the early calibration of parent-child regulation patterns as suggested by Loughlin-Presnal and Bierman (2017) might become weaker later on, but increasing in strength in phases of heightened developmental demands.

### Transactional processes in the context of ability-tracked transitions

Importantly, since no robust evidence is available about the relevance of the context in which these processes unfold for shaping the time-sensitive reciprocal

associations, the current study highlights how demands of the educational system may induce time-sensitive adaptations, provoking fluctuations from the usual levels of parental educational aspirations or child academic self-concept. Thus, it is critical to study transactional processes within the context of time-specific developmental demands, such as those posed by upcoming ability-tracked transitions in the educational system. Asking the question of whether earlier transitions may provoke different patterns of reciprocal relations than later ones, the study produced insights regarding transactional processes at different phases of development (i.e., transitioning to lower- vs. upper-secondary education). The fact that these patterns (i.e., the spill-over effects) did not differ across time suggests that transitions may shape parental aspirations and academic self-concept, as fluctuations in both concepts were related. However, one ability-tracked transition does not matter more than another: Such transitions matter equally for the dynamic interplay of interest, that is, independent of whether it is the first transition or a subsequent one. These findings echo those of Gniewosz et al. (2012) and Watt (2004), documenting that school transitions are times of major changes in the development of academic beliefs and values. In this respect, Gniewosz et al. (2012) found that student academic self-concept fluctuates before, during, and after secondary school transitions. Taking this evidence into account, our findings support the idea that, because educational opportunities are at stake at each ability-tracked transition, parents and children reciprocally adjust their values and beliefs *in time* to best meet the educational demands of each approaching transition (Heckhausen & Buchmann, 2019). Moreover, the findings of the current study are significant with regard to academic adjustment: Ability-tracked transitions may be associated with high levels of stress due to the heightened academic demands and given what is at stake in terms of educational opportunities (Ball et al., 2006). In this context, time-sensitive influences between parental educational aspirations and child academic self-concept may assume a protective role for children's adjustment in transitions. Arguing from this angle, such a protection is likely to be helpful for adjustment irrespective of whether the transition is the first or a subsequent one.

### Fluctuations and stability in parental aspirations and child academic self-concept from childhood to adolescence

We also found positive carry-over effects for both parental educational aspirations and child academic self-concept from children's ages of 9–12, but not afterward (i.e., from ages 12 to 15). In detail, children with higher than expected levels of academic self-concept at age 9 carried higher than expected levels of academic self-concept 3 years later (similarly, parents with higher than

expected levels of educational aspirations at children's age of 9 carried these unusual high expectations 3 years later). As Hamaker et al. (2015) note, these effects *should not be interpreted* as the rank-order stability of the constructs over time like in the classic cross-lagged panel model. Rather, they represent the extent to which these unusually high levels tend to persist over time (i.e., inertia): the stronger the size of the carry-over effect, the longer the individuals take to return to their equilibrium (Hamaker et al., 2015). Hence, our results indicated that—during the transition from late childhood to early adolescence (i.e., from ages 9 to 12)—parents and children are sensitive to temporal boosts (or drops) in their aspirations and academic self-concept, respectively. For parents, this may signal some difficulties that they experience in regulating their educational aspirations. For students, instead, the persistence of these fluctuations may indicate that the development of their academic self-concept is still *in fieri* and more information is likely needed (e.g., peer comparison in more challenging educational settings) to help them build a coherent and structured representation of their academic skills and competence. Interestingly, these carry-over effects were no longer significant from the second time point (age of 12) to the third one (age of 15). From a developmental lens, this result is in line with previous conceptualizations about the stabilization of academic self-concept during adolescence (Muenks et al., 2018). Thus, their self-concept may be less susceptible to new educational demands and situational changes. Similarly, parents may have calibrated their educational aspirations by this point, as they either may have more trust in their child's academic competence or may have adapted their aspirations to more realistic expectations regarding their child's academic achievement.

### Associations of parental aspirations and child academic self-concept with covariates

Concerning the controls, parents' significantly higher educational aspirations for their sons and boys' higher general academic self-concept attest to the still astonishingly strong presence of gender-specific socialization processes. The gender specificity is embedded in the traditional view that education is more important for boys than for girls, as the former will be the future breadwinners (Eccles et al., 2000). This translates into the assumed superiority of boys over girls and is reflected in boys' higher self-attributed competency beliefs. As parents with higher educational background expressed higher general educational aspirations and their children reported higher than usual academic self-concept at each time point, social inequality in aspirations and competency beliefs prevails as well. This extends to migration background, as immigrant parents exhibited, at each measurement time, lower than usual educational

aspirations compared to their native counterparts. In contrast to other contexts, parents with a migration background may find the Swiss educational system rather complex, as it belongs to the ones with tracks for both general education and vocational training. As parents with migration background are often not familiar with this system, they may not easily grasp the consequences of transitions (Buchmann et al., 2016). However, parental aspirations for parents with a migration background may also differ depending on how long they have been living in Switzerland, which is an important area for future research.

## Strengths and limitations

This study used a novel methodological approach to examine dynamic bidirectional associations between parental aspirations and their children's academic self-concept, spanning a large developmental period from late childhood to mid-adolescence that includes two educational transitions. The methodological framework allowed to identify a strong and significant general association between the two constructs, representing the stable parts, and to distinguish these stable parts from time-specific associations between the two constructs (Keijsers, 2016). The study thus shed new light on how the time-specific variations within each construct were associated and related to the specific demands of the educational context, in which they were assessed. Still, despite these methodological advancements compared to previous studies, we did not control for child characteristics before the age of 9. However, as previously mentioned, parents likely form educational aspirations based on earlier child academic interest and performance (Briley et al., 2014; Loughlin-Presnal & Bierman, 2017). Thus, to better understand how these processes emerge, earlier assessments are encouraged.

Concerning effect sizes, the associations at the within level (i.e., the spill-over effects) were small in size. This is not surprising, as these effects represent associations between variations within individuals over a 3-year lag. Moreover, when looking at other results that found evidence for transactional processes between parents and their children in the academic domain, effect sizes of bidirectional associations were small (e.g., Briley et al., 2014). Yet, the size of these effects also indicates that intervention programs aimed to build a stronger academic self-concept among students should not exclusively rely on fostering parents' aspirations as a key driving force. For instance, previous studies highlighted the importance of the students' ability to cope with increasingly challenging academic demands, and the promotion of self-regulated learning skills in the school domain (e.g., Zuffianò et al., 2013).

Another limitation concerns the measurement of parental educational aspirations in this study, as the

measure was operationalized as the average of two academic domains (i.e., math, language). This approach was chosen in order to have the measures of both parents and children, representing generalized expectations of competence. Child academic self-concept was measured, following Harter (1982), as generalized competence beliefs. A different approach would be to capture specific aspects of parental aspirations and academic self-concept, as both concepts may be domain-specific (Gaspard et al., 2019; Lazarides et al., 2015). Thus, in contrast to our approach of measuring the general self-concept, future research could investigate whether the effects of the current study differ between math or verbal domains. Lastly, it is important to note that parents are not the only sources of socialization for children, whereby future research might disentangle specific socialization patterns between parents, teachers, and peers (Muenks et al., 2018).

Moreover, parental aspirations captured parents aspiring for their child to show high academic performance (i.e., belonging to the best students in class). As the reference to the child's class is also used for assessing child academic self-concept, this common reference is regarded as an advantage when examining transactional processes. However, the chosen measurement of parental educational aspirations may be considered as narrowly focused. Future research could examine whether effects would differ when using broader measures of parental educational aspirations. Moreover, the data did not allow distinguishing parents' general educational values from the child-specific ones as suggested by Eccles (2007). Although the two facets of parental aspirations are related, the inclusion of both in future research would help gain deeper insights into how these two aspirational components may influence the dynamic interplay of parental values and child ability concepts differently.

Finally, future work may shed more light on the specific processes through which parental educational aspirations and child academic self-concept influence each other while specifically including academic achievement. This would enable a more in-depth understanding on the role of academic achievement in this process.

## CONCLUSION

Developmental demands imposed by educational transitions offer rich opportunities to study the time-sensitive interplay of parent and child adjustment processes in educational aspirations and academic beliefs (Gniewosz et al., 2014). Despite the benefits of examining these adjustments when contextual demands make them a time-sensitive necessity, such longitudinal studies are still scarce. This study aimed at examining the mutual influence of parental educational aspirations and child's academic self-concept, studying their interplay in the Swiss educational context from late childhood to mid-adolescence, a period intercepted with

two ability-tracked educational transitions. The findings contribute to the transactional framework of socialization (Briley et al., 2014; Sameroff, 2009), showing that both parents and children are adaptive to relative changes within their counterparts in the context of upcoming educational transitions. Confronted with these urgent phases of engagement, they do not simply adhere to the once adopted aspirations and competence beliefs, irrespective of time-specific fluctuations occurring in their counterparts. These findings further advance transactional socialization theory, as the time-sensitive changes were unearthed by using an analytical approach that disentangles between- and within-person effects (RI\_CLPM; Hamaker et al., 2015). This study also helps to better understand the role of educational transitions for child development by providing insights into transactional processes at different phases of development (i.e., transitions to lower- and upper-secondary education). That parent-child patterns do not vary across these transitions attests to their unbroken importance. Educational opportunities are at stake independent of whether it is the first transition or a subsequent one.

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## CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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