

Explaining the academic achievement gap of immigrant youth in Austria

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ABSTRACT

Informed by a risk and resilience developmental perspective, this study tests individual, family and school level processes as potential explanations of the immigrant academic achievement gap. In total, 1155 adolescents (48% girls; 20% immigrants, 11–14 years) attending grades 5, 6, 7 and 8 in secondary schools participated. Controlling for gender, age, citizenship, country of birth, SES, and school type, immigrant adolescents had lower levels of academic achievement compared to non-immigrants. High levels of scholastic anxiety, low levels of scholastic self-concept, high levels of parental performance expectations, and high school performance expectations helped to explain these associations. In the full model, only scholastic anxiety and self-concept remained significant mediators. Recommendations are to implement positive and growth-oriented student-centred teaching styles to reduce the immigrant academic achievement gap.

Introduction

There is ample evidence that immigrant youth in European countries do not perform as well in school as do their non-immigrant peers (Dimitrova, Chasiotis, & van de Vijver, 2016; Motti-Stefanidi, 2015). Even after controlling for socio-economic adversity, immigrant youth have a substantial disadvantage regarding their academic success in nearly all member countries of the Organization for Economic Cooperation and Development (OECD; European Commission, 2017). Thus, immigrant status constitutes a risk factor for lower academic achievement in most European countries (Dimitrova et al., 2016; Motti-Stefanidi, 2018). This finding is worrisome, because lower academic engagement has long term negative consequences for adult educational and employment outcomes (Symonds, D'Urso, & Schoon, 2022). To capitalize on the talents and strengths of immigrants and to create learning environments in which all students can reach their full potential, it is important to better understand the processes that underly the immigrant academic achievement gap. Processes on different socio-ecological levels might be responsible for this pattern (Motti-Stefanidi & Masten, 2013). However, there is a dearth of empirical studies capturing these multi-system complexities and it is not known which processes on the individual, family and school level underly the academic achievement gap of immigrant youth and they have rarely been investigated simultaneously. Informed by a risk and resilience developmental perspective (Masten, 2014; Motti-Stefanidi, 2015), the present

study fills this gap and tests potential mechanisms at the individual, family, and school levels, in order to explain the academic achievement gap of immigrant adolescents residing in Austria. We utilized a secondary school sample spanning grades 5 to 8, which aligns with a period of increasing misfit between adolescents' needs and their school environments and with a period of well-documented decline in academic attainment and aspirations (Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). In Austria, adolescents make far-reaching decisions regarding their educational and occupational futures during these secondary school years, prior to experiencing a major educational transition after grade 8. Thus, there is scientific and societal value in understanding this age group, and this knowledge has the potential to inform policies and programmes that aim to diminish the immigrant achievement gap during this important developmental period.

Socio-ecological risk and resilience perspective

Resilience – the capacity of a dynamic system to withstand and rebound from disruptive challenges – has become an important concept in developmental science over the recent years (Masten, 2014). Resilience is applied to systems of many kinds and involves multilevel and dynamic processes and outcomes that foster adaptation, recovery or even growth from serious challenges (Masten & Cicchetti, 2016). Considering the social-ecological nature of resilience, processes operating on different but interrelated systemic levels need to be investigated

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simultaneously (Ungar, Ghazinour, & Richter, 2013). Moving to another country (e.g., immigration) represents a challenge that is associated with a multitude of adaptation processes (Motti-Stefanidi, Berry, Chrysochoou, Sam, & Phinney, 2012). Thus, a socio-ecological resilience perspective is well-suited to better understand the positive development of immigrant children and youth (Motti-Stefanidi, 2015). A multisystemic socio-ecological resilience perspective assumes that the development of an individual unfolds as result of person-related characteristics and complex associations at the ontogenetic, micro-, meso-, exo-, macro-, and chronosystem levels (Bronfenbrenner, 1979). The biological and person-related factors influencing development are located on the ontogenetic level. Systems surrounding the individual, like the family, peers, or school are considered microsystems. The mesosystem involves interactions between two or more microsystems (e.g., family and school), while the exosystem includes the social settings that affect the developing individual indirectly (e.g., the organization of the parents' workplace). Finally, the macro-system influences the individual by means of culture, norms, belief systems, and material resources. The chronosystem level includes consistency or change (e.g., historical or life events) of the individual and the environment (Bronfenbrenner & Morris, 2006). Importantly, resilience is not only an individual capacity, but also a quality of the individual's social and physical ecologies (Ungar, 2011). As Ungar (2008, p. 225) explained:

...in the context of exposure to significant adversity, resilience is both the capacity of individuals to *navigate* their way to psychological, social, cultural, and physiological resources that sustain their well-being, and their capacity individually and collectively to *negotiate* for these resources to be provided and experienced in culturally meaningful ways.

An important assumption is that when growing up under adversity, the locus of change does not reside in either the individual or the environment alone, but in the *processes* by which environments provide meaningful resources that are accessible by individuals. Advantaged environments, therefore, are characterized by a multitude of promotive socio-ecological processes that allow more individual potential to be realized. Thus, outcomes at the individual level are understood as results of interrelated adaptive processes caused by individual and system level capacities (Ungar, 2011; Ungar et al., 2013). According to the Stage-

Environment Fit Theory (Eccles et al., 1993), adolescents can reach their full potential when their surrounding environments appropriately meet their developmental needs (Wang & Eccles, 2012; Wigfield et al., 2006) which is less the case for disadvantaged newcomer immigrant youth in the U.S. (Suárez-Orozco, Bang, & Onaga, 2010).

Applying the socio-ecological perspective, we investigated risk and resilience processes on the individual, family and school level simultaneously to better understand the immigrant academic achievement gap. On the individual level, we considered behavioral, cognitive and emotional aspects of school engagement, on the family level we investigated parental performance expectations and parental academic involvement, while on the school level we examined school performance expectations, peer performance motivation, teacher pedagogical support and teacher support as possible mediators to explain the immigrant academic achievement gap (see Fig. 1). While the existing evidence summarized below is highly fragmented, we adopted such a holistic perspective in this investigation, seeking to bridge gaps in this diffuse literature.

The importance of individual level processes

On the individual level, we focused on school engagement as a promising explanatory factor for explaining the academic achievement gap. There is consensus that school engagement is a multi-dimensional construct (Dotterer & Wehrspann, 2016; Fredricks, Blumenfeld, & Paris, 2004; Wang & Eccles, 2012), comprised of various behavioral, cognitive, and emotional aspects. Yet to date, studies investigating the academic success of immigrant adolescents have predominantly focused on the behavioral dimensions of school engagement and investigated processes like truancy, school absenteeism or homework preparation (Motti-Stefanidi, Masten, & Asendorpf, 2015; Suárez-Orozco et al., 2010). In a Greek longitudinal secondary school sample, behavioral engagement was conceptualized as teacher ratings of motivation and homework preparation as well as of unexcused absences retrieved from school records. This study revealed that lower levels of academic achievement more strongly predicted lower levels of behavioral school engagement over time than the other way around (Motti-Stefanidi et al., 2015). Over time, academic achievement was highly stable, while both aspects of behavioral engagement were rather instable. Academic

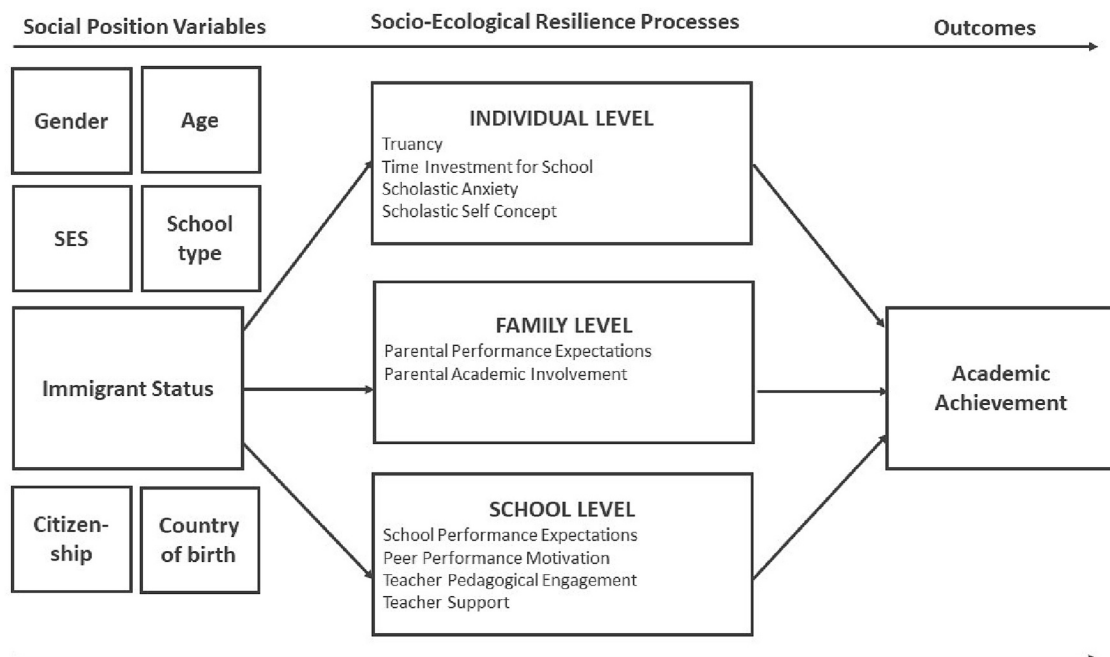


Fig. 1. Hypothesized mediation model.

achievement strongly predicted teacher ratings of behavioral engagement longitudinally, while the longitudinal associations between teacher ratings of behavioral engagement and academic achievement were much lower. Thus, lower school grades preceded higher levels of behavioral disengagement over time. Importantly, this pattern was found for both immigrant and non-immigrant adolescents alike. In another longitudinal study conducted in Greece, self-efficacy was investigated as one cognitive aspect of school engagement (Motti-Stefanidi, Asendorpf, & Masten, 2012). It was found that high levels of academic achievement were associated with initial high levels and changes of self-efficacy. Again, immigrant status did not moderate these associations, indicating that high self-efficacy had a similar positive effect on academic achievement among both immigrant and non-immigrant adolescents. To the best of our knowledge, no study to date examined whether school-related emotions can explain the immigrant academic achievement gap. Considering the multi-dimensionality of school engagement, it is also important to investigate emotional aspects like for instance scholastic anxiety, because there is ample evidence that higher levels of anxiety are associated with lower school achievement (D'Agostino, Schirripa Spagnolo, & Salvati, 2022). Furthermore, immigrant adolescents show higher levels of anxiety compared to non-immigrants (Strohmeier & Doğan, 2012). Extending previous research, we considered truancy and time investment for school as two indicators of behavioral school engagement, scholastic self-esteem as one indicator of cognitive school engagement, and scholastic anxiety as an indicator of emotional school engagement in the present study (see Fig. 1).

The importance of family level processes

On the family level, high parental academic performance expectations and high parental academic involvement might create a family environment that fosters high academic achievement among immigrant and non-immigrant youth. For many immigrant families, upward intergenerational social mobility constitutes an important migration motive (Hagelskamp, Suárez-Orozco, & Hughes, 2010; Leyendecker et al., 2018). Thus, immigrant parents tend to have high levels of academic aspirations for their children, and they collectively put a strong emphasis on their education (Fuligni, 1997, 2001). However, in immigrant families these high academic expectations do not necessarily translate into high parental academic involvement (Leyendecker et al., 2018). Parental involvement is a multifaceted construct comprising school-based and home-based behavior like for instance attending school meetings or supervising homework (Day & Dotterer, 2018; Dotterer & Wehrspann, 2016). Compelling evidence demonstrated a positive effect of parental academic involvement on academic achievement (Fan & Chen, 2001; Leyendecker et al., 2018; Wilder, 2014). However, a study that compared non-immigrant Greek students and immigrant Albanian students found lower levels of parental school involvement among the immigrant group (Anagnostaki, Pavlopoulos, Obradovic, Masten and Motti-Stefanidi, 2016). Likewise, in one study in the U.S., both Asian and Latino immigrant children relied more on siblings for homework help in comparison to their parents (Lanunza, 2017). Another study that was conducted over the first three years in secondary schools in Greece showed that immigrant adolescents with highly involved parents had higher levels of achievement in all three data collection points compared to immigrant adolescents with less involved parents (Motti-Stefanidi, Asendorpf, & Masten, 2012). Thus, a family that is characterized by high levels of academic expectations, but low levels of supportive behavior might offer a sub-optimal context for high academic achievement. Because such a dynamic might characterize immigrant families, we investigate these two processes simultaneously and examine whether they are able to help explaining the immigrant youth achievement gap (see Fig. 1).

The importance of school level processes

National integration policies shape the quality of the receiving contexts and have a distal influence on the positive development and academic success of immigrant students (Suárez-Orozco, Motti-Stefanidi, Marks, & Katsiaficas, 2018). Schools as institutions of the receiving countries are structured and organized according to these policies and often lack the resources that would be necessary to foster the academic success of immigrant students. In many countries including Austria, schools with a high proportion of immigrant students tend to have a negative public reputation and their academic achievement levels are lower than the national average (Biedermann, Weber, Herzog-Punzenberger and Nagel, 2016). Thus, immigrant students are often enrolled in schools with less-than-optimal characteristics for high academic achievement like high school performance expectations, high peer performance motivation, high levels of teacher pedagogical engagement and high levels of teacher support. However, to date only a few studies have focused on aspects of motivational climate and teacher support, while instead, aspects like mastering the national language (Kim & Suárez-Orozco, 2014) and the social and diversity climate have been investigated more heavily. For example, in one study it was found that schools that are characterized by a positive cultural diversity climate and high levels of social inclusion also promotes the academic achievement of immigrant students (Schachner, Schwarzenthal, van de Vijver, & Noack, 2019). In contrast, schools that are characterized by high levels of peer victimization and feelings of loneliness among immigrant adolescents foster their intentions to quit upper secondary education and to drop out of the educational system entirely (Fandrem, Tvedt, Virtanen, & Bru, 2021). Peers and teachers also generate a motivational climate that might be associated with the academic achievement of immigrant students who were found to have high levels of academic motivation and positive attitudes towards school and teachers in studies conducted in the U.S. (Fuligni, 2001). Schools that are characterized by high standards of achievement (e.g., where students are highly motivated to learn, and where teachers are perceived as adequately responding to the scholastic needs of their students and as supportive, motivated, and fair) offer highly resourceful contexts for high academic achievement (Bardach, Oczlon, Pietschnig, & Lüftenecker, 2020). Importantly, these positive processes might be able to reduce the achievement gap between non-immigrant and immigrant adolescents as well. Therefore, the present study examines whether school performance expectations, peer performance motivation, teacher pedagogical engagement and teacher support are able to explain the immigrant youth achievement gap (see Fig. 1).

The Austrian context

Austria is an interesting context for this research. In 2020, 25.4% of the Austrian population were first- or second-generation immigrants (Statistik Austria, 2021). These immigrants have many different nationalities representing European Union (EU) and non-EU citizens, with the largest immigrant groups coming from Germany, Romania, Serbia, Turkey, and Bosnia-Herzegovina. Regarding the integration policies, Austria was categorized as offering "halfway favourable" conditions and a "temporary integration" regime for immigrants (Migrant Integration Policy Index [MIPEX], 2022). This classification resulted after aggregating the quality of eight integration policy fields. Out of 100 possible points, Austria got 46 points and was ranked 37 out of 52 countries investigated. Overall, it was found that there are about the same number of constraints and chances for immigrant integration in Austria with major obstacles emerging in family reunion, access to citizenship and political participation. Importantly, non-EU citizens are not given a permanent future perspective in Austria. Instead, they are left most insecure of all countries investigated and it is very difficult for them to become Austrian citizens. Overall, these suboptimal policies encourage a negative public view of immigrants as permanent foreigners who are

not equals to native citizens (Migrant Integration Policy Index [MIPEX], 2022; Statistik Austria, 2021). As discussed above, this perception has implications for policies that impact the schools attended by many immigrant youth.

For youth in Austria, compulsory school starts with a child's 6th birthday and lasts nine years. All children are enrolled in primary school for four years (grade 1 to grade 4). Starting in grade 5, students can be enrolled in two different school types, and they are usually grouped according to their academic ability, in either academic or vocational secondary schools. Students attend eight years of academic secondary schools before they are qualified to enter universities. Students attending vocational secondary schools do so for four years before they qualify for either pre-vocational or vocational high schools, which they may attend for one to five years. Whilst one-year pre-vocational schools qualify for vocational training, the five-year vocational high schools certify students to enter universities. Especially in cities, immigrant students are overrepresented in vocational secondary and pre-vocational schools (Statistik Austria, 2021).

The present study

This study has three research goals. To begin with, we investigated whether there is an immigrant achievement gap in the present sample (e.g., a negative association between immigrant status and academic achievement). Second, we compared the developmental patterns of academic achievement between immigrant and non-immigrant students who were enrolled in grades 5, 6, 7 and 8. Third, we examined processes at the individual, family, and school level, seeking to explain the immigrant achievement gap (see Fig. 1).

Hypothesis 1. Immigrant Academic Achievement Gap.

The academic achievement gap of immigrant youth has also been documented in Austria (European Commission, 2017). Therefore, we hypothesized that immigrant youth will have lower levels of academic achievement compared to non-immigrant youth also in the present sample. We controlled for gender, age, citizenship, country of birth, SES, and school type, because these variables might covary with academic achievement, and we aimed to rule out their potential effects.

Hypothesis 2. Developmental Patterns.

We explore the differences in academic achievement between immigrant and non-immigrant adolescence attending grades 5, 6, 7, and 8 to shed light on developmental patterns. Because immigrant adolescents might be particularly vulnerable for the decline of academic achievement over the course of secondary schooling (Suárez-Orozco et al., 2010), but conclusive literature on this topic is lacking, we investigate whether the differences in academic achievement between immigrant and non-immigrant adolescents are the same in the four grades.

Hypothesis 3. Individual Level Processes as Predictors and Possible Mediators.

On the individual level, two aspects of behavioral engagement (i.e., truancy and time investment for school), scholastic anxiety, and scholastic self-concept are investigated simultaneously. Based on previous studies, it was hypothesized that low levels of truancy, high levels of time investment for school, low levels of scholastic anxiety and high levels of scholastic self-concept will be associated with high levels of academic achievement (Hypothesis 3a) and that these variables will also help in explaining the immigrant achievement gap (Hypothesis 3b).

Hypothesis 4. Family Level Processes as Predictors and Possible Mediators.

On the family level, parental performance expectations and parental academic involvement are examined. Based on previous studies, it was hypothesized that the combination of high parental expectations, but

low parental involvement creates a sub-optimal environment in immigrant families (Hypothesis 4a) that might also help explaining the immigrant achievement gap (Hypothesis 4b).

Hypothesis 5. School Level Processes as Predictors and Possible Mediators.

On the school level, four processes were examined that are hypothesized to constitute a positive motivational climate that is assumed to be associated with high achievement: school performance expectations, peer performance motivation, teacher pedagogical engagement, and teacher support. We anticipated that high levels of these processes would be associated with high achievement (Hypothesis 5a) and that the negative association between immigrant status and academic achievement would be at least partly explained by these processes (Hypothesis 5b).

Method

Procedure

After all necessary ethical permissions were obtained and the directorate of education of the federal state of Upper Austria approved the study, a convenience sample of 13 secondary schools serving grade 5 to 8 students were invited and agreed to participate. For students, participation was voluntary, confidential, and based on active consent. We obtained active parental consent and > 85% of eligible students participated. >95% of these students completed the paper and pencil questionnaire during one regular school lesson under the supervision of trained research assistants. The questionnaire was provided in the German language.

Participants

Data were collected from 5th to 8th graders in eight vocational and five academic secondary schools. Overall, 1155 adolescents (552 girls, 603 boys) participated in the study. In total, 675 (58%; 332 girls, 343 boys) adolescents attended vocational secondary schools, 480 (42%; 220 girls, 260 boys) attended academic secondary schools. There were 270 fifth-graders, 293 sixth-graders, 305 seventh-graders, and 287 eighth-graders. The average age of the adolescents was 12.7 years ($SD = 1.28$ years). The majority of adolescents (92%) were between 11 and 14 years old, 2.4% were 10 years old, 4.7% were 15 years old, nine adolescents (0.8%) were 16 years old, and one adolescent was 17 years old.

The students who nominated another first language than German and who or at least one of their parents were born outside Austria were classified as immigrants, while students who nominated German as their first language and who and both of their parents were born in Austria were classified as non-immigrants. This classification resulted in 920 non-immigrant (436 girls, 484 boys) and 235 immigrant youth (116 girls, 119 boys). In total, 160 immigrant adolescents (68.4%) were second-generation immigrants, because they were born in Austria, while 75 were first generation immigrants, because they were born abroad. The three biggest immigrant groups were students speaking Bosnian, Serbian, Croatian (45%), Turkish (20%), or Albanian (14%). The other students spoke either one European (13%) or Asian language (8%), and only one student spoke an African language.

As shown in Table 1, on average immigrant adolescents were older compared to non-immigrant adolescents. Immigrant adolescents and their parents were less likely to be Austrian citizens compared to non-immigrants. On average, immigrant students reported a significantly worse financial situation compared to their non-immigrant counterparts. The educational level of mothers, $\chi^2(4) = 98.64, p < .01$, and fathers, $\chi^2(4) = 69.79, p < .01$, differed between non-immigrant and immigrant youth. In particular, immigrant mothers were more likely than non-immigrant mothers to have no educational (9.9% vs. 0.8%) or only general secondary education credentials (41.1% vs. 15.8%). Non-

Table 1
Sample characteristics.

	Whole Sample (n = 1155)	Non-Immigrant Adolescents (n = 920)	Immigrant Adolescents (n = 235)	<i>t</i> / χ^2
% female	47.8%	47.4%	49.4%	0.29
Age, <i>M</i> (<i>SD</i>)	12.70 (1.28)	12.63 (1.26)	12.99 (1.31)	-3.95**
% Austrian citizenship	88.2%	99.8%	56.9%	410.69**
% born in Austria	93.1%	99.8%	68.4%	298.17**
Financial situation, <i>M</i> (<i>SD</i>)	2.85 (0.67)	2.83 (0.61)	2.73 (0.85)	1.73*
% academic secondary schools	41.6%	45.2%	27.2%	24.93**
% parents born in Austria	83.5%	97.7%	16.8%	535.96**
% parents Austrian citizens	91.6%	99.5%	55.3%	295.38**
% parents married	81.1%	80%	85.6%	2.63

Note. * $p < .05$, ** $p < .01$.

immigrant mothers were more likely to report attendance at vocational middle schools relative to immigrant mothers (53.9% vs. 23.4%). No differences were found between the two groups of mothers in the likelihood of holding high school degrees (19.3% vs. 17%) or university degrees (10.2% vs. 8.5%). Similar results were observed for fathers. Immigrant fathers were more likely than non-immigrant fathers to have no educational (8.3% vs. 1%) or only general secondary educational credentials (28.8% vs. 9.8%). Relative to immigrant fathers, non-immigrant fathers were more likely to report attendance at vocational middle schools (56.6% vs. 34.1%) and at university (15.1% vs. 8.3%). No differences between the two groups of fathers were found regarding high school degrees (17.5% vs. 20.5%).

Measures

Socio-demographic variables

Adolescents reported their gender (1 = *girl*, 2 = *boy*), age in years, school type (1 = *vocational*, 2 = *academic*), first language (1 = *German*, 2 = *other*), their own and their parents' citizenship (1 = *Austria*, 2 = *other*), their own and their parents' country of birth (1 = *Austria*, 2 = *other*), their parents' marital status (1 = *married*, 2 = *other*), and the financial situation of the family. The family's financial situation was measured by the question "Overall, how do you rate the financial situation of your family?". Adolescents responded using a 4-point Likert scale ranging from 1 (*We need to count every Euro*) to 4 (*We can afford everything*). Maternal and paternal education was measured on a 5-point Likert scale ranging from 1 (*no formal education*) to 5 (*university degree*).

Academic achievement

The grades of three subjects (i.e., German, mathematics, and English) were taken from the last school report and were averaged. Grades were recoded (1 = *failed*, 2 = *passed*, 3 = *satisfactory*, 4 = *good*, 5 = *excellent*) and the three manifest indicators were used to build a latent academic achievement variable. The factor loadings of the three manifest indicators ranged between 0.72 and 0.83. The model was just saturated, $\chi^2(0) = 0.00$, $p < .01$, CFI = 1.00, RMSEA = 0.00.

Truancy

Students answered one item "I already played truant". The response options ranged from 1 (*never*) to 4 (*often*) on a four-point Likert scale.

Time investment for school

Students answered three items, e.g., "Because of homework or learning, I have too little leisure time", on a four-point Likert scale ranging from 1 (*never*) to 4 (*often*) that were averaged. These items were developed and validated by Wagner, Hirtenlehner, Bacher, and Schober (2010). The reliability was acceptable, $\alpha = 0.66$.

Scholastic anxiety

Students answered four items taken from the Test Anxiety Inventory (Wiczerkowski, Nickel, Janowski, Fittkau, & Rauer, 1979). The students responded on a four-point Likert ranging from 1 (*never*) to 4 (*often*) to items such as "I am frightened of getting a bad grade". The items were averaged and formed a reliable scale, $\alpha = 0.74$.

Scholastic self concept

Students answered three validated items that were developed by Deusinger (1986), e.g., "I am certainly as good in school like all other students." on a four-point-Likert scale ranging from 1 (*not at all true*) to 4 (*very true*) that were averaged. The scale was reliable, $\alpha = 0.72$.

Parental performance expectations

Students answered five validated items (Wagner, 2005), e.g., "If I have worse grades than expected, my parents are disappointed.", "My parents expect me to be one of the best students in my class.". Adolescents answered on a four-point Likert scale ranging from 1 (*not at all true*) to 4 (*very true*) that were averaged. The reliability was acceptable, $\alpha = 0.69$.

Parental academic involvement

Students answered four items, e.g., "During an average school week, how often do you do your homework together with your mother, your father or both?" on a four-point Likert scale ranging from 1 (*never*) to 4 (*often*). The items were averaged and formed a reliable scale, $\alpha = 0.81$.

School performance expectations

This construct was measured with four items (Wagner, 2005), e.g., "In my school high standards of achievement are expected." Adolescents answered on a four-point Likert scale ranging from 1 (*not at all true*) to 4 (*very true*) that were averaged. The reliability was acceptable, $\alpha = 0.69$.

Peer performance motivation

This construct was measured with three items (Eder & Mayr, 2000), e.g., "Most of the students in my class like to learn." Adolescents answered on a four-point Likert scale ranging from 1 (*not at all true*) to 4 (*very true*) that were averaged. The reliability was acceptable, $\alpha = 0.64$.

Teacher pedagogical engagement

This construct was measured with six items (Wagner et al., 2010), e.g., "My teachers take my personal needs and academic interests into account." Adolescents answered on a four-point Likert scale ranging from 1 (*not at all true*) to 4 (*very true*). The items were averaged and formed a reliable scale, $\alpha = 0.71$.

Teacher support

Adolescents were asked "How do you perceive your teacher?" and gave their answers using a newly developed polarity profile. Students responded to seven items using a four-point rating scale, with low scores corresponding to low levels and high scores to high levels of teacher support. The items included (1) unfriendly vs. friendly, (2) not supportive vs. supportive, (3) not understandable vs. understandable, (4) not forgiving vs. forgiving, (5) not cooperative vs. cooperative, (6) not fair vs. fair, (7) unmotivated vs. motivated. The items were averaged, such that high values were indicative of high teacher support, and formed a highly reliable scale, $\alpha = 0.90$.

Analytic strategy

The data quality in this data set was exceptionally good, with <0.5% of missing cases in any of the study variables. Missing data were handled using Full information maximum likelihood (FIML) for all analyses that were computed in Mplus 8.4, and listwise deletion was used for all analyses that were conducted in SPSS 28.

For descriptive analyses, *t*-tests and bivariate correlations were calculated in SPSS 28 (see Table S1). To explore developmental patterns, a 2 × 4 ANOVA was calculated in SPSS 28.

The associations between immigrant status, the individual, family, and school level variables, and academic achievement were tested with a concurrent structural equation model using Mplus 8.4. Maximum likelihood estimation using the MLR estimator of Mplus was used, because it provides standard errors and test statistics that are robust to non-normality of the data and to nonindependence of observations (Muthén & Muthén, 1998-2012). In addition, we controlled for the nested data structure on class level. To evaluate the model fit three criteria were used: the chi-square fit test, the Comparative Fit Index (CFI; Bentler, 1990), and the root mean squared error of approximation (RMSEA; Steiger, 1990). Nonsignificant chi-square values indicate good model fit. However, because chi-square is known to be sensitive to sample size, CFI and RMSEA indices of fit were also important to examine. CFI ranges from 0 to 1.00 with values above 0.95 indicate good fit, while values above 0.90 indicate adequate fit. RMSEA ranges from 0 to ∞, with values below 0.05 indicating good fit, and values below 0.08 indicating adequate fit (McDonald & Ho, 2002). In each of the five models, we regressed a latent academic achievement dependent variable upon blocks of predictors (i.e., social position variables in Model 1, individual-level variables in Model 2, family-level variables in Model 3, school-level variables in Model 4, and all variables in Model 5). In models 2 to 5, we allowed the mediators to correlate to avoid a seriously misspecified model (e.g., truancy, time investment for school, scholastic anxiety, and scholastic self-concept were allowed to correlate). In models, 2 to 5, we simultaneously estimated the indirect effect of immigrant status on achievement via each of the predictors. Total indirect, specific indirect, and total effects were specified. Total effects included all indirect effects and the direct effect. Because we modelled a multi-level structure to control for the nested data on class level, we did not use bootstrapping.

Results

Descriptive analyses

The mean level differences of all study variables were tested between non-immigrants and immigrants applying *t*-tests. As shown in Table 2, we found significant differences between groups for all study variables. As expected, immigrants had substantially lower levels of academic achievement compared to non-immigrants. Regarding individual level variables, immigrants showed higher levels of truancy, higher levels of time investment for school, higher levels of scholastic anxiety and lower levels of scholastic self-concept compared to non-immigrants. Regarding family level variables, immigrants reported higher levels of parental performance expectations, but lower levels of parental academic involvement compared to non-immigrants. Regarding school level variables, immigrants reported higher levels of school performance expectations, higher levels of peer performance motivation, but also higher levels of teacher pedagogical engagement and teacher support compared to non-immigrants. All effect sizes (Cohen's *d*) were substantial, and the differences between immigrants and non-immigrants was largest regarding parental performance expectations.

Immigrant academic achievement gap (Hypothesis 1)

Model 1 tested the effects of the social position variables (see

Table 2

Mean (SD) differences between immigrant and non-immigrant youth.

	Non-Immigrants (<i>n</i> = 920)	Immigrants (<i>n</i> = 235)	<i>t</i>	Cohens <i>d</i>
Academic achievement	3.40 (0.82)	2.98 (0.82)	6.75**	0.51
Truancy	1.28 (0.68)	1.44 (0.82)	-2.52*	-0.21
Time investment for school	2.12 (0.75)	2.38 (0.69)	-5.18**	-0.36
Scholastic anxiety	2.19 (0.73)	2.64 (0.77)	-8.19**	-0.60
Scholastic self-concept	3.09 (0.64)	2.79 (0.64)	6.48**	0.47
Parental performance expectations	2.38 (0.64)	3.13 (0.60)	-16.44**	-1.21
Parental academic involvement	2.44 (0.85)	2.19 (0.93)	3.80**	0.28
School performance expectations	2.44 (0.66)	2.78 (0.59)	-7.05**	-0.54
Peer performance motivation	2.42 (0.60)	2.55 (0.64)	-2.92**	-0.21
Teacher pedagogical engagement	2.71 (0.73)	3.08 (0.75)	-6.93**	-0.50
Teacher support	2.80 (0.69)	2.94 (0.78)	-2.38*	-0.19

Note. * *p* < .05, ** *p* < .01.

Table 3). This model had a good fit, $\chi^2(14) = 55.72, p < .01, CFI = 0.94, RMSEA = 0.05, 90\% CI [0.04, 0.07]$. Immigrants, boys, older adolescents, and adolescents reporting lower levels of SES had lower academic achievement scores compared to non-immigrants, girls, younger adolescents, and adolescents reporting higher levels of SES. Thus, there was an immigrant achievement gap after controlling for all other social position variables in the model.

Developmental patterns (Hypothesis 2)

To test for developmental patterns, a 2 × 4 ANOVA was conducted in SPSS 28 with immigrant status (yes, no) and grade (5, 6, 7, 8) as the independent variables and academic achievement as the dependent variable. There were significant main effects of immigrant status, $F(1, 1153) = 41.64, p < .01, \eta^2 = 0.04$, and grade, $F(3, 1153) = 8.01, p < .01, \eta^2 = 0.02$, while no significant interaction effect immigrant x grade was detected, $F(3, 1153) = 0.35, p = .79, \eta^2 < 0.001$. As shown in Table 4, the data revealed a general developmental pattern. For both non-immigrants and immigrants, grade 5 students had higher levels of school achievement than grade 6 students who had higher levels of school achievement than grade 7 students. For both groups, grade 8 students had similarly high levels of academic achievement compared to grade 5 students.

Individual level processes as predictors and possible mediators (Hypothesis 3)

Model 2 tested the effects of individual level variables in addition to the social position variables (see Table 3). This model had a good fit, $\chi^2(30) = 100.45, p < .01, CFI = 0.96, RMSEA = 0.05, 90\% CI [0.04, 0.06]$. When entering the individual level variables, immigrant status, age, and SES were no longer significant predictors of academic achievement anymore, while boys still showed lower levels of school achievement compared to girls. Higher levels of scholastic anxiety and lower levels of scholastic self-concept significantly predicted lower levels of scholastic achievement, while truancy and time investment for school were not associated with achievement. The total indirect effect from being an immigrant to lower school achievement was substantial ($\beta = -0.12, p < .001$). Looking at the specific indirect effects, scholastic anxiety ($\beta = -0.03, p < .01$) and scholastic self-concept ($\beta = -0.09, p < .01$) were statistically significant.

Table 3
Prediction of academic achievement.

Predictor	Model 1 Social Position Variables		Model 2 Individual Level Variables		Model 3 Family Level Variables		Model 4 School Level Variables		Model 5 Full Model	
	B	SE	B	SE	B	SE	B	SE	B	SE
Immigrant	-0.17**	0.06	-0.01	0.04	-0.11	0.06	-0.13*	0.06	-0.01	0.05
Gender	-0.11**	0.03	-0.14**	0.03	-0.09**	0.03	-0.09**	0.03	-0.13**	0.04
Age in years	-0.20**	0.05	-0.11*	0.05	-0.23**	0.05	-0.18**	0.05	-0.14**	0.05
Austrian citizenship	0.01	0.05	-0.02	0.04	0.01	0.06	-0.01	0.05	0.02	0.04
Country of birth	0.03	0.04	-0.03	0.03	0.03	0.04	0.03	0.04	-0.03	0.03
SES	0.10**	0.04	-0.05	0.03	0.10*	0.04	0.06	0.04	-0.04	0.04
School type	0.08	0.05	0.05	0.04	0.06	0.05	0.12*	0.05	0.04	0.05
Truancy			-0.01	0.04					-0.02	0.03
Time investment for school			0.04	0.03					0.07	0.04
Scholastic anxiety			-0.18**	0.04					-0.15**	0.04
Scholastic self-concept			0.59**	0.04					0.59**	0.04
Parental performance expectations					-0.18**	0.04			-0.06	0.03
Parental academic involvement					-0.10**	0.04			-0.09**	0.03
School performance expectations							-0.23**	0.04	-0.03	0.04
Peer performance motivation							-0.06	0.04	-0.03	0.03
Teacher pedagogical engagement							-0.02	0.05	-0.01	0.04
Teacher support							-0.09	0.05	0.03	0.04
Explained variance (R ²)	10.9%		51.7%		14.9%		17.6%		52.9%	

Note. * $p < .05$, ** $p < .01$. STDYX standardized regression coefficients are reported.

Table 4
Developmental patterns of academic achievement (M, SD).

	Non-Immigrants (n = 920)	Immigrants (n = 235)
Grade 5 (n = 270)	3.58 (0.77)	3.18 (0.88)
Grade 6 (n = 293)	3.41 (0.83)	2.97 (0.81)
Grade 7 (n = 305)	3.21 (0.88)	2.73 (0.83)
Grade 8 (n = 287)	3.42 (0.77)	3.12 (0.62)

Family level processes as predictors and possible mediators (Hypothesis 4)

Model 3 tested the effects of family level variables in addition to the social position variables (see Table 3). This model had a good fit, $\chi^2(22) = 70.88, p < .01, CFI = 0.96, RMSEA = 0.05, 90\% CI [0.03, 0.06]$. With the addition of the family level variables, immigrant status was not a significant predictor of academic achievement anymore, while boys, older adolescents, and adolescents at lower levels of SES still showed lower levels of school achievement compared to girls, young adolescents and adolescents at higher levels of SES. Higher levels of parental performance expectations and higher levels of parental academic involvement predicted lower levels of scholastic achievement. The total indirect effect from being an immigrant to lower school achievement was significant ($\beta = -0.06, p < .001$). Regarding the specific indirect effects, only parental performance expectations ($\beta = -0.06, p < .01$) was statistically significant.

School level processes as predictors and possible mediators (Hypothesis 5)

Model 4 tested the effects of school level variables in addition to the social position variables (see Table 3). This model had a good fit, $\chi^2(30) = 82.45, p < .01, CFI = 0.96, RMSEA = 0.04, 90\% CI [0.03, 0.05]$. When entering the school level variables, immigrant adolescents, boys, older adolescents, and adolescents attending vocational secondary schools still reported lower levels of school achievement compared to non-immigrants, girls, young adolescents and adolescents attending academic secondary schools. Higher levels of school performance expectations predicted lower levels of scholastic achievement, while there were no associations for peer performance motivation, teacher pedagogical engagement, and teacher support. The total indirect effect from being an immigrant to lower school achievement was significant ($\beta = -0.04, p < .001$). Looking at the specific indirect effects, only school performance expectations ($\beta = -0.04, p < .01$) was statistically

significant.

Individual, family and school level processes as predictors and possible mediators (full model)

Model 5 tested the effects of all variables shown in Fig. 1. This model had a good fit, $\chi^2(54) = 129.92, p < .01, CFI = 0.98, RMSEA = 0.04, 90\% CI [0.03, 0.04]$. In the full model, boys and older adolescents reported lower levels of school achievement compared to girls and younger adolescents. Lower levels of scholastic anxiety, higher levels of scholastic self-concept and lower levels of parental involvement significantly predicted higher levels of scholastic achievement, all other variables were not significant. The total indirect effect from being an immigrant to lower school achievement traveling through the hypothesized mediators was substantial ($\beta = -0.12, p < .001$). Scholastic anxiety ($\beta = -0.03, p < .01$) and scholastic self-concept ($\beta = -0.09, p < .01$) were the statistically significant indirect effects.

Discussion

Although the immigrant achievement gap has been widely documented (Dimitrova et al., 2016), only very few studies investigated individual, family, and school level processes to better understand which processes might underlie these differences. Extending previous studies, several processes on different socio-ecological levels were investigated simultaneously with the goal to capture some multi-system complexities. Grounded in a socio-ecological understanding of development (Bronfenbrenner, 1979), the present study offers a refined conceptual and analytical framework to better understand the processes that might help to close the immigrant academic achievement gap. This knowledge is of high scientific and societal importance given the long-term consequences of academic achievement for adult educational and employment aspirations and outcomes (Symonds et al., 2022). The immigrant achievement gap was observed in all four grades of secondary schooling in Austria, demonstrating that immigrants had lower levels of academic achievement compared to non-immigrants in grade 5, 6, 7 and 8 in a concurrent dataset.

Differences between immigrant and non-immigrant youth

Immigrants and non-immigrant adolescents differed in all variables that were hypothesized to be processes that might explain the immigrant achievement gap. The effect sizes were small to medium, and the

inspection of the means revealed interesting complexities. On the individual level, immigrants showed higher levels of truancy, but also higher levels of time investment for school compared to non-immigrants. Both results have already been reported in the literature (Fuligni, 1997; Motti-Stefanidi, Asendorpf, & Masten, 2012), but they have never been investigated simultaneously in one study. In line with previous studies (Motti-Stefanidi, Asendorpf, & Masten, 2012; Strohmeier & Doğan, 2012), immigrants had higher levels of scholastic anxiety and lower levels of scholastic self-concept compared to non-immigrants. Taken together, this pattern of findings indicates that behavioral, cognitive, and affective aspects of school engagement are differently associated with academic achievement. In line with explanations of upward intergenerational social mobility (Fuligni, 1997), immigrant youth reported higher levels of parental performance expectations, but also lower levels of parental academic involvement compared to non-immigrants. This pattern might create a sub-optimal family environment because immigrant parents might not be as able as non-immigrant parents to translate their high academic expectations into supportive behavior (Leyendecker et al., 2018). Regarding school level variables, immigrants reported higher levels of school performance expectations, higher levels of peer performance motivation, but also higher levels of teacher pedagogical engagement and teacher support compared to non-immigrants. To the best of our knowledge, these school level variables have not been studied among immigrant adolescents yet. Studies comprising immigrant adolescents have typically focused on other variables like for instance the cultural diversity climate (Schachner et al., 2019), drop-out rates (Fandrem et al., 2021) or mastering the national language (Kim & Suárez-Orozco, 2014). Thus, the present study revealed that immigrant youth have a very positive view both on their peers and their teachers which is indicative of a rather resourceful school environment.

Predictors of academic achievement

The results of the structural equation models showed that not all hypothesized variables were significant predictors of academic achievement. On the individual level, the two indicators of behavioral engagement - truancy and time investment for school - were not associated with academic achievement which is inconsistent with prior studies (Motti-Stefanidi, Asendorpf, & Masten, 2012). In line with the literature (D'Agostino et al., 2022; Motti-Stefanidi, Asendorpf, & Masten, 2012), higher scholastic anxiety and lower levels of scholastic self-concept were associated with lower levels of achievement. These results underscore that affective and cognitive aspects of school engagement are highly relevant, and they should be simultaneously studied with behavioral aspects. Thus, the present findings suggest in future studies, scholars should not focus exclusively on behavioral aspects of school engagement (Motti-Stefanidi et al., 2015; Suárez-Orozco, Bang, & Onaga, 2010) or cluster the three aspects of school engagement together into one indicator, as these strategies may obscure complexities such as those demonstrated here.

At the family level, high parental performance expectations and high levels of parental academic involvement were associated with lower academic achievement. This is an unexpected result given that most studies indicate that both parental expectations and parental academic involvement are beneficial resources for academic achievement (Fan & Chen, 2001; Leyendecker et al., 2018; Wilder, 2014). Our findings – which certainly need to be replicated in future studies - suggest, however, that these two processes are risks. One explanation is that parents might help their children more with the homework as a reactive strategy to compensate for low grades after they have already been obtained. It is also possible that parents communicate their achievement expectations more clearly to their children after negative grades have been earned. If parents offer help and communicate expectations as reactive strategies, these talks might not have a positive, aspirational nature, but might be intended to function as coercive strategy. Parents who closely monitor

their children's homework after failures and who want to convince their adolescents that they need to work harder for school to avoid even lower grades in the future likely create a sub-optimal family environment that has the potential to produce coercive cycles (Moed, 2022). Thus, future studies should seek to elucidate the context and the affective undertone in which parental help is offered and high expectations are communicated in order to shed light on such potential coercive cycles.

On the school level, high school performance expectancies were associated with lower levels of achievement, while the perceptions of peers and teacher were unrelated to academic achievement. This is also an unexpected result that might indicate that high performance expectancies are an indicator of a negative and competitive environment where it is very hard to gain high academic grades. Thus, unlike suggested in previous studies (Fuligni, 1997), both parental and school academic achievement expectations did not function as a resource for high academic achievement in the present study.

Processes explaining the immigrant achievement gap

Because we also estimated indirect effects in the full structural model, we were able to identify the mediators that help explaining the worse academic achievement of immigrant youth. Because our data was entirely concurrent, it is important to note that we investigated mediators in a statistical, but not in a causal or temporal sense (Agler & De Boeck, 2017). When looking at the three levels separately, immigrant adolescents did worse academically when they reported high levels of scholastic anxiety, low levels of scholastic self-concept, as well as high levels of parental and school performance expectations. When putting all variables in one model, only the two variables on the personal level - high levels of scholastic anxiety and low levels of scholastic self-concept - remained significant and were able to fully explain the immigrant academic achievement gap.

Study strengths and limitations

The present sample consists of grade 5 to 8 students and therefore captures the whole secondary school period in Austria. However, our data are not longitudinal, and therefore we could examine mediation only in a statistical, but not in a temporal sense. The large number of processes at the personal, family, and school levels that we considered in reference to the immigrant achievement gap is a strength of the present study. However, we were only able to collect students' self-assessments, which is another limitation due to common method bias. We used validated, but rather short, measures which resulted in just acceptable but rather low reliabilities of some scales. To avoid these rather low reliabilities, it is advisable to use longer measures in future studies. Further, although the present sample consisted of approximately 20% immigrants (i.e., a percentage close to the national immigrant population), our provision of the questionnaire only in German systematically excluded newly arrived immigrants. Additionally, we were unable to differentiate first- and second-generation immigrants because this would have resulted in rather small sample sizes, and our decision to collapse these into one group likely obscured the identification of relevant acculturative processes. This possibility should be examined in future studies. Ideally, future studies should collect longitudinal data, use teacher, or parent ratings in addition to students' self-assessments and provide the questionnaires also in languages that might be spoken by newly arrived immigrants.

Practical implications

The present study suggests that in order to reduce the academic achievement gap of immigrant adolescents, strategies that help to reduce scholastic anxiety and to promote scholastic self-concept would be most beneficial. Positive and growth-oriented student-centred

teaching styles that focus on competence development and on learning from failures (rather than on feelings of incompetence), and parents who offer help and communicate high expectations in a positive, aspirational way (rather than through perceived coercion) could help in this respect. In a learning situation that is already perceived as highly challenging and characterized by failures, parents need to communicate high achievement expectations very sensitively to avoid fostering even more anxiety and the perception of threat. Ideally, teachers should create learning situations in which students are able to perceive their growing competencies and can experience successes. Although we were unable to consider these elements in the present study, there may be added value in simultaneously combining these methods with evidence-based practices that communicate a positive view on cultural pluralism and diversity (Schachner et al., 2019). Preventive interventions that target teachers would be most promising, because teachers can successfully instill a growth mindset in their students (Yeager & Dweck, 2020) and they are also able to implement teaching methods like project-based or group-based learning that are also able to foster positive intercultural peer relations (Strohmeier, Stefanek, Yanagida, & Solomontos-Kountouri, 2020).

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Data availability statement

The data can be obtained from the first author.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.appdev.2023.101560>.

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