AILEEN EDELE AND PETRA STANAT

PISA’S POTENTIAL FOR ANALYSES OF IMMIGRANT STUDENTS’ EDUCATIONAL SUCCESS

The German Case

INTRODUCTION

Migration is a universal reality. The United Nations estimated that, in 2010, approximately every tenth person living in the more developed regions of the world was born in another country (United Nations Department of Economic and Social Affairs [UN DESA], 2009). Accordingly, the integration of immigrants and their descendants is of considerable concern worldwide. School systems play a central role in the integration process. They are in charge of developing knowledge and skills relevant for participation in the receiving countries’ economic and socio-political systems, they grant school leaving certificates channeling career options, and they help to transmit norms and values relevant for social cohesion.

Immigrant students lag behind their peers from native families in terms of achievement and school success in many countries. In Germany, for instance, students from immigrant families are much more likely to quit school without a school leaving certificate and much less likely to reach the general qualification for university admission (“Abitur”) than students from native families (Statistisches Bundesamt, 2010). For a long time, the conditions of these disparities were poorly understood. Large-scale assessment studies on student achievement, such as PISA, have advanced our understanding of immigrant students’ educational disadvantage considerably. The present article illustrates this for the German case. We start by describing what was known about the situation of immigrant students in the German school system before PISA. Subsequently, we discuss how the study improved our understanding of this situation. The final section of the article addresses the types of questions PISA cannot answer. As a monitoring device, studies like PISA are powerful tools for identifying strengths and weaknesses of school systems and possible target points for interventions. However, it is impossible to infer what measures should be taken to remedy the problems identified by the data.

THE STATE OF KNOWLEDGE BEFORE PISA

Before PISA and other international large-scale assessment studies such as TIMMS (Third International Mathematics and Science Study) or PIRLS (Progress in International Reading Literacy Study) were carried out, little was known about the outcomes of the German school system in general, and about the situation of...
immigrant students in particular. Prior to these studies, analyses exploring the situation of immigrant students had to rely on data bases with limited potential in this regard. Until 2005, the official statistics (Microcensus) only recorded respondents’ nationality, so that it was impossible to identify naturalized immigrants (Statistisches Bundesamt, 2006). Similarly, the German Socio-Economic Panel Study (SOEP), which was introduced in 1984, failed to collect comprehensive information on the migration background of its participants for a long time. Before 2001, immigrants born in Germany and possessing German citizenship could not be identified reliably in the data set (Lohmann, Spieß, Groh-Samberg & Schupp, 2008).

Moreover, although the SOEP oversampled immigrants from five countries from its start in 1984 and, in 1994, added a sample of immigrants who had migrated to Germany after 1984, immigrants from other countries as well as recent migrants are not sufficiently represented in the data set. In addition, the SOEP focuses on households as sampling units and the sample sizes of children and adolescents living in these households within each cohort are too small for in-depth analyses.

Even more importantly, none of the data sets available in Germany before large-scale assessment studies were carried out contained information on students’ levels of achievement. In order to explore determinants of disparities in educational success between immigrant students and students without an immigrant background, however, such information is essential. Moreover, international comparisons of disparities in school success need to be based on achievement data. As school leaving certificates vary across countries, it is difficult to compare them internationally.

PISA provides representative data on students’ achievement levels in reading, mathematics, and science for a large number of countries. The study also collects background information related to migration, such as students’ age at the time they moved to the receiving country, the first language they learned as a child, and the languages they speak at home. In addition, the assessments include measures of students’ school-related motivation, attitudes, and aspirations. The assessment design makes it possible to compare the magnitude of disparities between immigrant students and students from native families internationally and to explore the relative role of potential determinants of immigrant students’ achievement within and – to a more limited extent – between countries.

In the following section we first describe what Germany has learned from PISA about the size and composition of immigrant student groups in secondary schools. After a short summary of the knowledge we have gained about the determinants of these students’ disadvantages in terms of track attendance, the section presents findings on potential causes of achievement differences between students from immigrant families and students from native families at different levels of analysis.

PISA’S POTENTIAL: WHAT WE HAVE LEARNED FROM PISA ABOUT IMMIGRANT STUDENTS’ EDUCATIONAL DISADVANTAGES

Immigrant students in Germany

At present, approximately one fifth of the population in Germany has an immigration background (Statistisches Bundesamt, 2010). Germany’s immigrant
population is composed of four major groups and their descendants: the so-called Guest Workers, who were recruited by the German government from the 1950s to the 1970s in Southern and South-Eastern Europe to overcome the shortage of labour; asylum seekers and refugees, who mostly entered the country before the asylum laws became more restrictive in 1993; ethnic Germans, who came from the former Soviet Union and Eastern European countries (Aussiedler); and immigrants from European Union (EU) countries, who are allowed to settle in Germany due to the right of free movement of EU citizens within the EU. The Guest Workers as well as asylum seekers and refugees were initially expected to return to their countries after a temporary stay in Germany. Yet, many of these immigrants continued to reside in Germany and brought their family members to join them. For the Aussiedler, in contrast, permanent residence was intended from the start. Unlike members of other immigrant groups, they were automatically granted German citizenship and various measures were taken to support their integration.

The fact that Germany is an immigration country was denied for a long time. To some extent, this was possible because the actual number of immigrants living in the country was unknown. As pointed out above, the Microcensus used to define immigrants strictly on grounds of their citizenship rather than on the basis of their migration history (Statistisches Bundesamt, 2006). As a result, a large proportion of immigrants remained invisible. Aussiedler and their descendants, who are automatically granted German citizenship, as well as other naturalized immigrants and their children could not be identified in the data. Similarly, the school statistics distinguished between students with German citizenship and students holding the citizenship of another country (referred to as “foreign students” in the remainder of this article). In 2000, the Microcensus reported a proportion of 8 per cent foreign students in German schools (Statistisches Bundesamt, 2001).

The PISA study established a more comprehensive indicator of immigration background by recording students’ and their parents’ countries of birth. Based on these data, the study revealed a much higher proportion of immigrant students attending German schools than the official statistics. In the first PISA cycle, Baumert and Schümer (2001) found that 22% of 15-year-old students in Germany had at least one foreign-born parent. This number was largely confirmed in the more recent PISA assessments. For instance, PISA 2006 reported a proportion of 19% immigrant students (Walter & Taskinen, 2007).

The Microcensus survey subsequently adapted the questions it uses to capture respondents’ immigration background. Since 2005, it identifies immigrants on the basis of their own, their parents’, and their grandparents’ country of birth, independent of citizenship (Statistisches Bundesamt, 2009). The survey showed that, in 2009, 32 per cent of the population in Germany under 15 years of age had an immigration background (Statistisches Bundesamt, 2010).

Partly due to the relatively high numbers of immigrants revealed by PISA and subsequently the Microcensus, it became more difficult to uphold the claim that Germany is not an immigration country. As a result, public debate has shifted to the question of integration, asking how well integrated immigrants are in Germany and what should be done to improve their integration. Despite this shift in focus, the discussions continue to be controversial and heated.
Determinants of disparities in track attendance

It was evident long before PISA that foreign students were considerably less successful in terms of track attendance and school-leaving certificates than students with German citizenship. In the school year 2000/2001, for instance, only 14 per cent of the foreign students living in Germany attended the highest track (Gymnasium) of the tripartite secondary school system in comparison to 32 per cent of the German students. Approximately 44 per cent of the foreign students, in contrast, visited the lowest secondary school track (Hauptschule) while only 19 per cent of the Germans attended this track. Every fifth foreign student but only every tenth German student left the school system without a school leaving certificate in the year 2000 (Statistisches Bundesamt, 2001).

Analyses of the Socio-Economic Panel (SOEP) data revealed some factors that partly explain these disparities between students from immigrant families and students from native families. In addition to the socio-economic status of the families, the educational level of the parents, and their duration of stay in Germany, the intention to return to the country of origin as well as cultural orientations emerged as important factors predicting immigrant students’ track attendance (Diefenbach, 2002). However, because the SOEP does not include achievement data, the claim that tracks attendance differences may also be due to discrimination, with immigrant students having a lower chance of attending the highest tracks even when their achievement levels are comparable to those of German students (Gomolla & Radtke, 2002), could not be explored.

Based on data of the first PISA cycle, Baumert and Schümer (2001) showed that 15-year-old students whose parents were both born in Germany had a 4.4 times higher chance of attending the academic track (Gymnasium) than did immigrant students whose parents were both born abroad. In line with analyses of the SOEP data, these disparities could partly be explained by the lower socio-economic status of the immigrant families. Yet, when adolescents with the same socio-economic background were compared, students from native families were still 2.7 times more likely to attend the Gymnasium than their peers from immigrant families. Comparing students with the same level of reading achievement in German, however, did not reveal any significant differences between immigrant students and adolescents from native families in their chances of attending a Gymnasium (see also Walter & Taskinen, 2007). This pattern of findings suggests that immigrant students’ disadvantages in track attendance are primarily due to their disadvantages in achievement, and it thus contradicts the idea that secondary school track decisions are systematically biased against immigrant students (e.g., Gomolla & Radtke, 2002).

Subsequent longitudinal studies clearly confirm this conclusion. A study conducted by the Max Planck Institute for Human Development examined a representative sample of elementary school students at the transition from elementary school to secondary school in Germany (Maaaz, Baumert, Gresch & McElvany, 2010). Using data from this study, Gresch and Becker (2010) compared the chances of making the transition to the highest secondary school track (Gymnasium) for students from the two largest immigrant groups in Germany (children of Turkish descent and Aussiedler) and students from native families. As expected, they found that
children from both immigrant groups had lower chances of entering the Gymnasium than their peers from native families. This disparity could be accounted for by the lower socio-economic status of the immigrant families. Given the same socio-economic status, immigrant children’s transitions did not significantly differ from their non-immigrant peers. When the students’ achievement levels were additionally taken into account, the effect was even reversed. Given the same level of achievement, children from families of Turkish descent had a higher chance of attending the Gymnasium than students from native families ($OR^2 = 3.35, p < .05$). For students with an Aussiedler background, the effect tended into the same direction but failed to reach significance ($OR = 1.32$, n.s.). When socio-economic status, achievement level, and the school’s recommendation for future track attendance were simultaneously taken into account, both immigrant groups had significantly higher chances of attending a Gymnasium ($OR = 4.83, p < .05$ for students from Turkish families; $OR = 2.38, p < .05$ for students from Aussiedler families).

This pattern of results thus corroborates that immigrant students’ underrepresentation in higher school tracks can be explained by their disadvantages in socio-economic status and achievement rather than biased track decisions (see also Kristen & Dollmann, 2009; Müller & Stanat, 2006). However, it certainly is possible that immigrant students are systematically disadvantaged at the level of instruction. Teachers tend to adapt their instruction to the average achievement level of the class (Hattie, 2001). In addition to students’ actual achievement level, stereotypes may influence their instruction (Walter & Stanat, 2008). There is some indication that negative stereotypes about Turkish immigrants exist in Germany (Schofield, 2006). As social psychological research has shown, such schematic views of groups can influence behaviour even in persons who do not actually believe that the stereotypes are true (e.g., Nelson, 2002). Teachers may, for example, have lower expectations for students of Turkish descent, which, in turn, might affect what they demand from these students in daily instruction. This could result in reduced learning outcomes and, consequently, lower these students' chances of making the transition to the higher tracks. The extent to which this is in fact the case, however, has yet to be explored.

Determinants of immigrant students’ disadvantages in achievement

In order to examine the conditions of immigrant students’ disadvantages in achievement systematically, multiple levels of analysis need to be taken into account. To organize the analyses, it is helpful to draw on a conceptual framework that differentiates between distal and proximal factors determining school-related competence development (Stanat, 2006a). The framework conceptualizes the developing individual as embedded in several interacting layers of his or her environment (see figure 1). Ultimately based on Bronfenbrenner’s (1979) ecological model of human development, it was developed by an OECD task force on teaching and learning (cf. Baumert, Blum & Neubrand, 2004). In this article, we will focus on four of the layers included in the model: the national/societal level, the school level, the individual student level, and the level of teaching and learning. For the first three layers, we will present analyses of the PISA data on determinants
of immigrant student success. For the teaching and learning layer, we will demonstrate that other study designs than international student achievement studies such as PISA are more informative.

Figure 1. Levels of analyses exploring disparities between students from immigrant families and students from native families.

National/Societal level. Past PISA studies demonstrated that, in most countries, immigrant students reached lower levels of reading literacy than students from native families. At the same time, the disparities varied considerably between countries, with the gap being particularly large in Germany (Baumert & Schümer, 2001; OECD, 2007; Stanat & Christensen, 2006). The PISA metric is calibrated such that the mean across participating OECD countries is 500 points with a standard deviation of 100 points. In PISA 2006, first generation immigrant students (both student and parents born in another country) in Germany lagged 70 points behind their native peers in reading, and second generation immigrant students (student born in Germany, parents born in another country) reached 83 points less than students from native families (OECD, 2007). The performance gap across all OECD countries amounted to 52 points for the first generation and 42 points for the second generation of immigrants. In some countries, especially in traditional immigration countries, the disadvantages were considerably smaller or non-existing. In Australia, for instance, first generation immigrant students reached exactly the same average scores as native students and second generation immigrant students scored even 7 points higher than students from native families. First generation
immigrant students in Canada reached only 19 points less than their native peers, while the second generation scored exactly the same as students without an immigrant background.

It is sometimes assumed that the international variations in performance gaps between immigrant students and students from native families are due to differences in integration policies and practices. These arguments frequently fail to take into account that countries also differ in terms of their immigration policies and practices, which are likely to affect the integration process considerably. Immigration policies determine the composition of immigrant populations by defining who is allowed to move to a given country for what reasons and for how long. Bourhis and colleagues stress the interdependence of immigration and integration policies (Bourhis, Moise, Perreault & Senécal, 1997). According to these authors, immigration policies and practices shape the context in which the integration and acculturation of immigrant populations take place.

Immigration policies differ considerably between countries. Traditional immigration countries, such as Canada or Australia, base immigration decisions on indicators of qualifications immigrants will bring to the labour market. Canada, for instance, has a highly restrictive immigration policy and admits immigrants based on a system assigning points to such characteristics as level of education and English language proficiency. Immigrants are only admitted if they reach a specified number of points. In Germany and other central European countries, by contrast, no comparable systems are in place. In fact, many immigrants in Germany are unskilled workers who were recruited as Guest Workers to carry out physically demanding work in industry, such as assembly line production, requiring low qualification levels. As a consequence, the immigrant populations in different countries vary considerably in terms of resources crucial for successful participation in the labour market and in the educational system.

Although it is impossible to separate clearly the effects of immigration policies from the effects of integration policies within a country, PISA can give some indication of their relative importance. The extent to which immigrant populations differ in terms of relevant resources can be estimated based on their socio-economic background and level of education. Especially for the first generation of immigrants, these indicators should to a large degree reflect the position of the families at the time they entered the receiving country. The reduction in disparities between immigrant students and students from native families that results after statistically controlling for these factors can be attributed to the composition of immigrant populations which, in turn, is at least partly determined by immigration policies and practices.

Using data from PISA 2006, Figure 2 shows the results of regression analyses with the language spoken at home as the predictor and reading literacy as the outcome. The dark bars depict the size of the achievement gap between students speaking another language at home and students speaking the test language at home. The differences vary considerably between countries, with nearly 110 points on the PISA scale in Belgium and only 16 points in Australia. After controlling for the socio-economic status and educational background of the families, the disparities are reduced. As the shaded bars show, however, the gap between the
groups continues to be substantial in some countries. This suggests that the international variations in disparities between immigrant students and students without an immigrant background cannot be fully attributed to countries’ immigration policies and, hence, the composition of their immigrant populations. Integration policies and practices are likely to play a role as well. For example, countries differ in the approaches they employ to support second language acquisition for immigrant students (Stanat & Christensen, 2006). However - because school systems vary with regard to a large number of confounded factors - to what extent these and other practices related to integration explain the relative achievement levels of immigrant students is difficult to determine.

School level. In addition to features of the national/societal and system levels, school level factors influence student achievement as well. It can be expected that some schools are more successful than others in facilitating immigrant students’ educational success. One aspect of the school context that research has explored systematically is the composition of the student body.

Theoretical frameworks of integration and acculturation describe these processes along two dimensions: integration into the majority community and integration into the ethnic community within the receiving country (Berry, 1980; Esser, 2006). A situation in which immigrants are not integrated into the majority community but well integrated into their ethnic community is referred to as segregation. At the residential and school levels, a high concentration of immigrants of the same origin and a low proportion of persons without an immigrant background is often used as an indicator. Esser (2001, 2006) proposes that such a pattern impedes social integration and school success of immigrants, as segregated environments are associated with fewer opportunities and reduced motivation for the acquisition of the majority language. This, in turn, is expected to hinder school-related competence development.

Based on German data from the PISA 2000 study, Stanat (2006b) explored the extent to which the proportion of immigrant students not speaking German at home influences student achievement over and above the effects associated with family background characteristics (factors controlled for at the individual level: socio-economic status, parental level of education, material possessions, cultural resources, cultural activities, communicative practices, home language, and age at migration). In addition, students’ basic cognitive abilities were controlled as a proxy for their prior knowledge at the time they entered the respective school6 (see also Baumert, Stanat & Watermann, 2006). Results of multi-level analyses initially seemed to support the hypothesis that a higher proportion of immigrant students speaking another language than the language of instruction at home is negatively related to competence development: reading achievement tended to be lower in schools with higher proportions of students whose home language is not German. The size of this effect was small, however. A one per cent increase in the proportion of students not speaking German at home was associated with a decrease in achievement of only half a point on the PISA scale. Even more importantly, further analyses indicated that the effect was not specifically tied to
the linguistic composition of the student body. In Germany, immigrant status and social status are typically confounded, such that the student body in schools with high proportions of immigrant students also tends to be socially disadvantaged. Controlling for the mean socio-economic status of students’ families as an indicator for the social composition of the school reduced the effect of linguistic composition considerably. The social composition effect was significant indicating that, all other things equal, students tend to reach lower levels of achievement in schools with higher proportions of students from families with low socio-economic status (see also Bryk, Lee & Holland, 1993; Coleman, 1966; Sammons, Thomas & Mortimore, 1997; Zimmer & Toma, 2000). Further controlling for mean cognitive ability at the school level reduced both the linguistic and the social composition effects, such that they were no longer significant. The effect of the cognitive composition of the class, in contrast, was large. This suggests that the average level of prior knowledge within a school mediates the effects associated with the proportion of students not speaking German at home and the proportion of students from socially disadvantaged families.

According to Esser’s (2006) argument, it should be especially detrimental for competence development of immigrants if students with the same linguistic background attend the same school. To explore this assumption, Walter and Stanat (2008) examined whether the proportion of students from particular immigrant groups in schools exerts an independent effect on students’ reading achievement over and above family background factors controlled for at the individual level and the attended school type controlled for at the school level. No independent effect of
the proportion of students whose parents were born in the former Soviet Union was found. However, a negative effect of the proportion of students of Turkish descent emerged. Further controlling for the proportion of students speaking Turkish at home did not reduce this effect. This finding contradicts Esser’s assumption that composition effects occur when immigrant students within a school or class share the same language background. After the mean socio-economic status and cognitive abilities within schools were also taken into account, the proportion of students of Turkish descent still had a significant effect on achievement, but only if it reached or exceeded 40 per cent.

Apart from the composition effect associated with high proportions of students from Turkish families, Stanat, Schwippert and Gröhlich (2010) largely confirmed these findings based on data from a large-scale longitudinal study which was carried out in Hamburg (Bos, et al., 2007). The unit of analysis in this investigation was the classroom. In the analysis, the authors also examined the impact of the proportion of immigrant students in classrooms on the development of reading competence. Reading competence was assessed at the end of grade four and again at the beginning of grade seven. In Hamburg, students change school after grade four as they transit from the comprehensive elementary school to the tracked system of secondary school. Thus, the study included an assessment of reading competence shortly before students entered the school in which they were tested again in grade seven. Results of multi-level analyses, controlling for prior achievement and family background factors at the student level (migration status, family language, socio-economic background, parents’ level of education, material possessions, cultural resources, and cultural activities), showed that the proportion of students in a classroom speaking another language than German at home as well as the proportion of students having at least one foreign-born parent exerted negative effects on reading achievement. When these two composition effects were included in the analysis simultaneously, only the effect of the linguistic composition was significant. This finding seemed to confirm the language-related mechanisms proposed by Esser in predicting composition effects. However, the impact of the proportion of students not speaking German at home was considerably reduced when the families’ socio-economic status at the class level was taken into account as well. After the average level of students’ prior reading achievement in classrooms was also controlled, the linguistic composition effect was no longer significant. The size of the socio-economic composition effect decreased considerably as well, yet it continued to be significant.

To examine the assumption that the effect of linguistic composition should be most pronounced when immigrant students in a school share the same first language, the analyses were repeated focusing on the proportion of Turkish-speaking students. The same pattern of results emerged: no linguistic composition effects occurred after the socio-economic composition of the class and students’ mean prior level of reading achievement were controlled.

Taken together, there is little evidence for the assumption that high proportions of immigrant students, students not speaking the language of instruction at home, or immigrant students speaking a particular language at home affect student achievement above and beyond the effects of social composition and average prior
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achievement of the student body. Analyses of the PISA data and subsequent longitudinal analyses confirming the findings thus helped to qualify an assumption that is frequently made by educational research, educational policy and practice as well as by the general public.

Individual level: Family background and language spoken at home. The PISA data also allow for analyses exploring different individual and family-level explanations for immigrant students’ disadvantages in competence development. PISA identified pronounced achievement disparities between immigrant students and students from native families (Baumert & Schümer, 2001). In the first PISA cycle, students whose parents were both born abroad scored more than two thirds of a standard deviation (73 points) below students whose parents were both born in Germany on the reading literacy scale. This disparity is equivalent to the learning development of approximately almost two school years. Controlling for the socio-economic status of their families and the students’ duration of stay in Germany reduced the difference to 33 points, which still amounts to about one year of competence development. Only after the language spoken at home was also taken into account did the disparities between immigrant students and their native-language peers vanish. Thus, the family language seems to be an important determinant of immigrant students’ disadvantage in achievement.

The results from more recent PISA cycles confirmed and further qualified these findings. Due to a national extension involving an oversampling of immigrant students, the German PISA 2003 data allow for analyses distinguishing between different immigrant groups. Walter, Stanat and Segeritz (in press) differentiated immigrants according to their country of origin (former Soviet Union, Turkey, Poland, former Yugoslavia, and Italy) and generation status (first generation immigrant students and second generation immigrant students). Regression analyses of the data revealed significant disadvantages in reading achievement7 for almost all immigrant students, the only exception being second generation immigrant students whose families came from the former Soviet Union or Poland (see table 1, model I). The disadvantages were especially pronounced for immigrant students whose families had emigrated from Turkey, the former Yugoslavia, or Italy.

Comparisons of first generation and second generation immigrant students revealed very different patterns for the five immigrant groups. For students whose families emigrated from the former Soviet Union and the former Yugoslavia, the achievement gaps were considerably smaller in the second generation of immigrants than in the first generation. This indicates that structural assimilation processes in educational outcomes occurred (Alba & Nee, 2003; Esser, 2001 and 2006). For students whose families came from Turkey or Italy, in contrast, the achievement gap continues to be large in the second immigrant generation. These findings could potentially reflect segmented assimilation processes (Segeritz, Walter & Stanat, 2010). Unlike classical assimilation theory (e.g. Gordon, 1964) and new assimilation theory (e.g. Alba & Nee, 2003), which assume that immigrants continually adapt to the mainstream society of the receiving society over the course of generations, the theory of segmented assimilation (Portes & Rumbaut, 2001; Zhou, 1997) suggests that assimilation can occur into different segments of receiving societies. One path –
the so-called downward assimilation – leads to socially disadvantaged segments. According to this view, then, ethnic disparities between immigrants and members of the mainstream receiving society will not necessarily vanish over time but may also consolidate. The stagnation of some immigrant groups in Germany might reflect such a downward assimilation process. To determine whether this is in fact the case, however, would require data on third immigrant generation students which are not yet available in sufficient amounts.

In the attempt to identify determinants of disparities between immigrant students and students from native families, Walter, Stanat and Segeritz (in press) included various individual background variables into a series of regression models (see Table 1).

Table 1. Results of regression analyses predicting students' reading achievement (PISA 2003)

<table>
<thead>
<tr>
<th></th>
<th>Model I</th>
<th>Model II</th>
<th>Model III</th>
<th>Model IV</th>
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<td>515 (1)</td>
<td>528 (2)</td>
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</tr>
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<td>14 (15)</td>
<td>15 (16)</td>
<td>14 (17)</td>
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<td>-52 (7)</td>
<td>-50 (8)</td>
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<td>0 (11)</td>
<td>-1 (10)</td>
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<td>-48 (17)</td>
<td>-19 (15)</td>
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Note. Adapted from Walter, Stanat & Segeritz (in press).  
\(^1\): HISEI, z-standardized.  
\(^2\): in years of education.  
Coefficients significantly different from zero are in bold type (p < .05).
For the whole chapter: house style on T for table? Confirming results from the first PISA cycle, the language spoken at home emerged as a powerful predictor of reading achievement (model II). After the language spoken at home was controlled, the achievement disadvantages associated with an immigration background were reduced for 14 to 26 points on the PISA reading scale for all immigrant groups except for second generation students from the former Soviet Union and Poland. The introduction of families’ socio-economic status and parents’ level of education decreased the effects of students’ immigrant background substantially (model III). Further taking cultural possessions, material possessions, and the number of children in the family into account did not add much to the explanation of the disparities observed between immigrant students and students from native families (model IV). When all background variables were considered simultaneously, the language spoken at home was the strongest single predictor of immigrant students’ reading achievement. Again, this finding indicates that the learning opportunities for acquiring the language of instruction are crucial for the emergence of disadvantages associated with an immigration background (Stanat, 2008), suggesting that schools and other educational institutions need to strengthen their efforts aimed at developing students’ proficiency in German as a second language (see below).

Individual level: Motivation and aspirations. Additional factors that have been shown to influence educational success are school-related motivational orientations and aspirations. The immigrant optimism hypothesis suggests that immigrants – especially when they were socio-economically disadvantaged in their country of origin – perceive migration as an opportunity for social advancement (Kao & Tienda, 1995). To the extent that they consider education important for reaching this goal, individuals who recently immigrated should display particularly high levels of school-related motivation and aspiration. In analyses of the immigrant students’ school experiences and outcomes, these factors have rarely been explored. As the PISA data set contains comprehensive information on motivational orientations and aspirations, it is possible to take them into account.

Using data from the national extension of PISA 2003, Stanat, Segeritz and Christensen (2010) examined students’ instrumental motivation for learning mathematics, their aspiration to complete tertiary education, and their occupational aspirations. The findings revealed general evidence for immigrant optimism. Given the same achievement level and socio-economic background, students of Turkish descent showed higher levels of instrumental motivation, were more likely to aim for tertiary education, and were reported to strive for an occupation with higher social prestige than students from native families. While students of Polish origin were not more motivated in mathematics, their educational and occupational aspirations were also higher than those of students from native families. For students whose families had emigrated from the former Soviet Union, finally, higher levels of instrumental motivation in mathematics as well higher aspirations were found to be most consistent in the first immigrant generation.

A similar pattern emerged in most other countries participating in the PISA study with substantial proportions of immigrant students. Given the same level of
achievement, immigrant students were often more motivated for learning mathematics as well as more likely to aspire for tertiary education and higher-status occupations than their peers from native families (Stanat et al., 2010). Thus, the achievement disadvantages of immigrant students do not seem to be due to a lack of motivation or aspirations. In fact, the positive motivational orientation of adolescents from immigrant families represents a resource on which schools can build in the attempt to reduce these students’ disadvantages in achievement and educational success in general.

PISA’S LIMITATIONS: WHAT THE STUDY CANNOT TELL US

Methodological constraints of cross-sectional designs

Cross-sectional studies on student achievement like PISA can provide valuable information on the situation of immigrant students and on potential determinants of their educational success. However, cross-sectional designs are limited in several respects. Data from cross-sectional studies offer a snap-shot of individuals’ learning outcomes, but they do not capture the processes that led up to these outcomes (Blossfeld, Schneider & Dollmann, 2009). Panel studies focusing on educational processes, in contrast, allow for analyses of developments over time. With such longitudinal data it is possible to explore how characteristics of learners and learning environments shape learning developments as well as how the effects of life-events and interventions unfold. Moreover, transition processes, which are crucial for educational success over the lifespan (Ditton & Krüsken, 2006; Maaz, Baumert, Gresch & McElvany, 2010), can best be studied with longitudinal research designs examining the situation before and after the transition.

A related shortcoming of cross-sectional designs consists in its limited potential for drawing causal inferences. Based on cross-sectional data, causality can only be established in terms of Causation as Robust Dependence, i.e., by way of controlling potentially confounded variables (Blalock, 1970). According to this approach, a causal relationship is assumed if a relationship between two variables persists even after additional variables considered relevant in this context were introduced in the statistical model. Yet, it is impossible to ensure that all relevant third variables have been taken into account. Therefore, inferences about causality can only be drawn provisionally from such findings (Shadish, Cook & Campell, 2002; Goldthorpe, 2001). Experimental designs with random assignment to treatment and control groups are generally regarded as the best approach to establishing causal relationships (e.g., Holland, 1986; Rubin, 1974). However, for practical or ethical reasons, randomization is often impossible in educational research. Therefore, several statistical techniques have been developed that allow for causal inferences based on cross-sectional data. For instance, propensity score matching (Rosenbaum & Rubin, 1983; Pearl, 2009) or regression discontinuity analyses (Cook & Campbell, 1979; Thistlethwaite & Campbell, 1960) aim at providing unbiased estimates of treatment effects even when the group exposed to the treatment and the control group differ in terms of relevant covariates. Thus, cross-sectional designs may produce valuable indications for potential causal
relationships. To the extent possible, however, the findings from these analyses should be confirmed with longitudinal and experimental studies (Blossfeld, 2009; Blossfeld, et al., 2009; Boruch, de Moya & Snyder, 2002). As pointed out above, some of the most important findings on the educational situation of immigrant students in Germany identified with the PISA data could be replicated in longitudinal analyses.

Improving immigrant students’ achievement: Measures at the teaching and learning level

Student achievement studies such as PISA aim primarily at identifying relative strengths and weaknesses of school systems. They are, however, limited in helping to determine what can and should be done to improve teaching and learning processes to overcome observed problems. Accordingly, PISA does not tell us how effective efforts aimed at improving the achievement of immigrant students should be designed. Answering this question requires empirical evidence from different types of studies. Approaches to supporting immigrant students need to be developed on the basis of theories and evidence on teaching and learning processes. Subsequently, these approaches need to be operationalized and tested in the field. To gain reliable information on their effectiveness, finally, randomized field trials are the preferred method as they combine high levels of experimental control with high levels of external validity (Shadish, Cook & Campbell, 2002).

As pointed out above, an important target point for interventions aimed at improving the educational situation of immigrant students seems to be the development of students’ proficiency in German as a second language. Reading literacy in the language of instruction proved to be an important predictor of attending a higher track in secondary schooling. Furthermore, the learning opportunities for German language acquisition in students’ families seem to affect their achievement in reading as well as in other domains. Therefore, educational institutions need to provide high-quality support for immigrant students with limited proficiency in the language of instruction. Which approach to second language teaching and learning will be most promising, however, is largely unclear.

Most international research addressing this issue in the past has focused on comparing bilingual and transitional programs on the one hand with submersion and immersion approaches on the other hand. While bilingual and transitional programs provide – either permanently or temporarily – instruction to immigrant students in their native language (L1) as well as in the language of instruction (L2), submersion and immersion approaches use only the L2 in instruction (with or without additional support in L2). The studies that have been carried out to explore the relative effectiveness of these approaches typically have serious methodological limitations that impair their interpretability (Limbird & Stanat, 2006; Rossell & Kuder, 2005; Slavin & Cheung, 2005; Söhn, 2005). The evidence is mixed and allows only the tentative conclusion that bilingual instruction has neither negative effects nor particularly positive effects on L2 development (Limbird & Stanat, 2006; Rossell & Baker, 1996; Söhn, 2005).
In Germany, as well as in most other OECD countries, bilingual support programs for immigrant students are rare (Stanat & Christensen, 2006). By far the most widely applied approach is immersion/submersion with systematic support in L2. Currently, a multitude of monolingual support programs aimed at promoting immigrant students’ second language competence are implemented in German schools. Yet, little is known about the effectiveness of the different approaches and their underlying mechanisms (Limbird & Stanat, 2006; Redder et al., 2010). Although the situation of immigrant students in Germany seems to be improving somewhat over time, they continue to be highly disadvantaged in terms of educational achievement and attainment. Therefore, systematic intervention studies examining the processes and effects of different monolingual support programs are urgently needed.

A first intervention study exploring the effects of second language support was the Jacobs Summer Camp Project which compared the outcomes of two monolingual approaches to L2 teaching and learning with a randomized field trial. Immigrant students who had recently finished third grade attended the programs for three weeks during the summer break. The literature on foreign language teaching and learning distinguishes between implicit and explicit approaches to instruction (DeKeyser, 2003; Hulstijn, 2005; Nunan, 1999). While implicit approaches (or “Focus on Meaning”) emanate from the assumption that learners acquire language competences without a deliberate focus on rules, explicit approaches (or “Focus on Form(s)”) draw the learners’ attention to language structures and rules. In the summer camp, one of the two implemented programs was designed to promote language learning implicitly, by engaging students in active and meaningful communication. This approach was operationalized with improvisational theatre activities in which students participated in the mornings and in the afternoons. The second approach involved explicit language learning. In this program, the children also participated in the theatre activities in the afternoons, yet they received systematic grammar instruction in the afternoons.

At the simplest level, it can be corrected by saying “…. In the afternoons, but they also received…..” However I simply do not know if this is true, in actuality: in the experiments and research practice itself. The baseline group included in the study, finally, did not attend the summer camp at all.

The results of the Jacobs Summer Camp Project indicate that the combination of implicit and explicit language support was more effective than the purely implicit approach. Students who attended the combined program outperformed students of the untreated baseline group in grammar and reading at the beginning of fourth grade. Students who received the implicit program only, in contrast, did not significantly differ in their L2 performance from the baseline group. In the direct comparison, students with explicit support outperformed students with implicit support in grammar but not in reading and vocabulary. After three months, the advantage of the explicit approach was still visible in terms of effect sizes, yet the differences between the treatment group with explicit support and the baseline group reached significance only in reading, and no significant differences in the outcomes of the implicit and explicit support emerged (Stanat, Baumert & Müller,
PISA’S POTENTIAL FOR ANALYSES OF IMMIGRANT STUDENTS’ EDUCATIONAL SUCCESS

Building on the Jacobs Summer Camp Project, another project is currently carried out. It aims at further developing the two approaches to language support in L2 and to test its effectiveness as it is implemented in school settings over a longer period of time (Rösch & Stanat, in press).

CONCLUSION

As illustrated in this chapter, international large-scale assessment studies on student achievement, such as PISA, offer valuable information on the status of immigrant students’ educational integration. The data allow for comparisons of this situation across countries participating in the studies. Moreover, the conditions of immigrant students’ educational success can be explored at various levels of analyses, helping to identify possible target points for interventions. However, at the level of teaching and learning, the analytical potential of large-scale assessments is limited. As proficiency in the language of instruction seems crucial for immigrant students’ educational success, further high-quality studies are needed that examine the effectiveness of different approaches to second language support.

Another important feature of PISA is that assessments are carried out every three years. This allows for estimations of the extent to which outcomes of school systems have changed over time. Each cycle of the project focuses on one of the three assessments domains (reading, mathematics, and science) which is measured more comprehensively than the other two. The major domains were reading in 2000, mathematics in 2003, and science in 2006. In 2009, the project came full circle and the data can be expected to yield a reliable estimate of the extent to which school systems were able to improve achievement levels and to reduce achievement gaps over the last nine years. The publication of these results is scheduled for December 2010.

NOTES

1 In this article, the term “immigrant” refers to persons who themselves immigrated to the receiving country (first generation) as well as to persons whose parents immigrated but who themselves were born in the receiving country (second generation). The new Microcensus (see below) also identifies the third generation as immigrants (persons whose grandparents immigrated but who themselves and whose parents were born in the receiving country). In the existing PISA data sets, however, this group is too small to be analysed separately.
2 OR = odds ratio.
3 Adapted from Stanat, 2006a, p. 101
4 The finding that second generation immigrant students reached lower test scores than first generation immigrant students does not imply that the situation of immigrants in Germany is getting worse across generations. Instead, the pattern is largely due to the composition of the two immigrant groups. The second generation includes many children of Guest Workers who are predominantly of Turkish descent and tend to be particularly disadvantaged in terms of socio-economic background,
education, and achievement. The first generation, in contrast, largely consists of Aussiedler whose situation tends to be more favourable overall (e.g., Segeritz, Walter, & Stanat, 2010). The longer a family has lived in a country, the more its socio-economic and educational situation should also be affected by the country’s integration policies and practices. Thus, depending on how long ago the immigration took place, controlling for socio-economic status and educational background will to some extent also capture these effects. Such an analysis is therefore prone to overestimate the impact of immigration policies and to underestimate the impact of integration policies.

As a cross-sectional study, the PISA data set does not contain information on students’ prior achievement at the time they entered the school. This information, however, is necessary to estimate the effects of school-level factors on students’ learning outcomes over time. Using basic cognitive ability as a proxy for prior achievement is based on the assumption that it is a good predictor of learning development and highly stable over time. Yet, basic cognitive ability is certainly also affected by schooling (Ceci, 1991) so that controlling for this factor should result in an underestimation of composition effects. Results from longitudinal analyses reported by Baumert, Stanat and Watermann (2006), however, indicate that the degree of underestimation is negligible.

The results for mathematics achievement are very similar to those for reading achievement.

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A. EDELE AND P. STANAT


Aileen Edele
Department of Education and Psychology
Freie Universität Berlin

Petra Stanat
Institute for Educational Quality Improvement
Humboldt-Universität zu Berlin