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The Development of Cognitive, Language, and Cultural Skills From Age 3 to 6: A Comparison Between Children of Turkish Origin and Children of Native-Born German Parents and the Role of Immigrant Parents' Acculturation to the Receiving Society

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This article analyzes the longitudinal development of differences in academic skills between children of Turkish origin and children of native-born German parents from age 3 to 6 in Germany with a focus on the role of immigrant parents' acculturation to the receiving society. Growth curve models show that Turkish-origin children start with lower test scores at the age of 3 regarding German language skills and cultural knowledge

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but not with respect to cognitive skills. The difference in the language domain decreases until the age of 6 while it increases regarding children's cultural knowledge. Immigrant parents' acculturation to the receiving country is positively related with all three academic skill domains. The results point to the importance of early intervention strategies.

KEYWORDS: child development, children of immigrants, acculturation, cognitive skills, language skills

Educational inequality between children of immigrants and children of native-born parents is an established phenomenon in most Western countries (for an overview, see Heath & Brinbaum, 2007). On average, children of immigrants show lower levels of school performance and educational attainment than children of native-born parents although there are large differences between various ethnic groups and countries (Levels, Dronkers, & Kraaykamp, 2008; OECD, 2006). This finding attracts the attention of educational researchers as well as policymakers since children of immigrants are a growing population in many Western countries and their educational attainment influences their later success in the labor market (Granato & Kalter, 2001).

In Western societies, the educational system demands and rewards certain academic skills in children (e.g., linguistic competence in the dominant language of the country; Bourdieu, 1977). These academic skills are tied to the dominant culture of a society and include the way of thinking and interacting that are deemed appropriate and valuable. Such academic skills are unevenly distributed between different groups of children right from the start—which is one key mechanism of the reproduction of social inequality (Bourdieu, 1977). It is a well-known finding that children's academic skills at the time of school entry are systematically associated with their social background (Crosnoe & Cooper, 2010; West, Denton, & Germino-Hausken, 2000). There is also some evidence that differences in academic skills between children of immigrants and children of native-born parents, too, are already present at this age (Crosnoe, 2007; Magnuson, Lahaie, & Waldfogel, 2006; Reardon & Galindo, 2009). However, little is known about the development of such differences between children of immigrants and children without migration background in the age period *before* elementary school.

The present article analyzes the development of cognitive, language, and cultural skills by children of Turkish origin and children of native-born German parents in Germany from age 3 to 6. We refer to Bronfenbrenner's (1977) bio-ecological theory of human development and combine this theoretical framework with Berry's (1997) acculturation scheme and the concept of the society-specificity of skills (Chiswick, 2009; Kalter, 2003). Immigrant parents may engage in activities that are specific for the receiving country (RC) and/or in ones that are specific for their

country of origin (CO; see Berry, 1997). We assume that this type of parental acculturation strategy affects the familial learning context, which in turn influences children's academic skill development (Bronfenbrenner, 1994). However, this association probably depends on the *type* of skill under consideration. We differentiate between skills that are "general" (e.g., nonverbal intelligence) from skills that are "specific" for either the receiving country (RC-specific skills) or the country of origin (CO-specific skills; e.g., language proficiency). Concretely, we examine the following research questions in this article:

Research Question 1: Controlling for the families' socioeconomic status and some other relevant child and family characteristics, do children of Turkish origin differ from children of native-born German parents regarding their cognitive, language, and cultural skills at the early age of 36 months? We expect to find such differences in the domains of German language skills and knowledge about the Western culture (two RC-specific skills) but not in the domain of cognitive skills (a general skill).

Research Question 2: Are the RC-acculturation practices of Turkish-origin parents positively associated with their children's cognitive, language, and cultural skills? We expect such associations in the domains of German language skills and cultural knowledge but not in the domain of cognitive skills.

Research Question 3: Do the differences between children of Turkish origin and children of native-born German parents regarding their RC-specific skills still exist at the age of 78 months?

Research Question 4: Does the association between Turkish-origin parents' RC-acculturation practices and their children's RC-specific skills change during the period between 36 and 78 months?

To examine these research questions empirically, we estimate linear growth curve models of the children's academic skill development using the data of the longitudinal German project Preschool Education and Educational Careers Among Migrant Children.

The importance of children's cognitive and language skills for their educational performance may be self-evident and is also confirmed in many studies (e.g., Deary, Strand, Smith, & Fernandes, 2007; Durham, Farkas, Hammer, Tomblin, & Catts, 2007). In this article we additionally address the development of cultural skills in early childhood that may also be relevant for later educational outcomes. Bourdieu (1977) argues that the educational system requires an "initial familiarity with the dominant culture" (p. 494). Several empirical studies have found an association between specific forms of cultural participation and cultural skills with children's educational outcomes (e.g., Aschaffenburg & Maas, 1997; Dumais, 2002; Scherger & Savage, 2010). A very detailed study in this respect is the study of Sullivan (2001) who finds a strong significant association between pupils' cultural knowledge and their educational performance at age 16.

This article clearly adds to the existing literature on educational inequality between children of immigrants and native-borns by focusing on the early period before school start that has been rather neglected in the literature so far. The use of longitudinal data allows tracing different growth trajectories of children's academic skills by families' migration background. Until now, it is mostly unknown whether differences between children of immigrants and children of native-born parents already exist at a very early age and then remain stable or if they increase or decrease until school starts and whether this pattern is identical for different types of skills. Especially the development of cultural knowledge in early childhood has not been addressed in other studies so far. Explicitly considering the role of parents' RAcculturation for the development of academic skills by children of immigrants is also a new contribution of the present article. It allows investigating whether a high familial acculturation to the receiving society constitutes an advantage in school readiness for children of immigrants.

The outline of the remaining part of this article is as follows: The next section gives a very brief description of the German educational system and the situation of Turkish immigrants in the German context followed by an overview of previous studies on differences in academic skills between children of immigrants and native-borns in early childhood. Next, we describe our theoretical framework and focus of the present work. We then present the data and method, followed by the results. The last section discusses the findings.

The German Context

In Germany, children usually start elementary school at the age of 6. The transition to different secondary school tracks is after Grade 4 (at 10 years of age) in most of the German federal states. There is no mandatory preschool before elementary school, but 94% of all 3- to 6-year-olds in 2011 attended a "Kindergarten" (see Autorengruppe Bildungsberichterstattung, 2012, Tab. C3-1A). This is a preschool for 3- to 6-year-old children that is not part of the school system and has no uniform curriculum. It is usually operated by the community or by nonprofit organizations and heavily subsidized so that the costs for parents are low (in some federal states even free of charge). The quality is generally regulated at the state level with a focus on structural features such as staff-to-child ratios, but the composition of children (e.g., proportion of children from low socioeconomic status families) may greatly vary by region. Child care institutions for younger children ("Kinderkrippe") are far less often used—they are more expensive and less available.

Focusing on children of Turkish origin in Germany is a well-suited example to study the early educational disadvantage of immigrant children since the educational inequality between children of immigrants and native-borns is particularly large in Germany (OECD, 2006), with the greatest

disadvantages for children of Turkish immigrants (Kristen & Granato, 2007; von Below, 2007). They are in most cases the descendants of the so-called guestworkers. In the 1960s, the German industry was in need of low-skilled labor and started to recruit guestworkers, many of them from Turkey. Most of these Turkish labor migrants came from rural areas and had little formal education (Crul & Vermeulen, 2003). After the immigration stop in 1974 as a result of the oil crisis, a period of family reunion followed. In the 1980s and 1990s, a new migration upturn occurred when the next generation reached marriage age and quite a high proportion chose spouses from Turkey (Crul & Vermeulen, 2003). About 2.5 million individuals of Turkish origin (including naturalized individuals) lived in Germany in 2010, constituting the largest migrant group in Germany (Statistisches Bundesamt Deutschland, 2011). They have to face serious disadvantages in the German society, especially in the labor market. For example, they are more likely to be unemployed or to work in unskilled jobs in comparison to native-borns but also in comparison to other migrant groups (Kalter, Granato, & Kristen, 2007; Kogan, 2007). Besides these disadvantages regarding their socioeconomic situation, several studies report that Turkish immigrants are the least integrated migrant group in Germany. For example, the share of Turkish immigrants with a good command of German is lower than in other labor migrant groups (Diehl & Schnell, 2006; Nauck, 2001). They are also least likely to have a German person among their best friends (Diehl & Schnell, 2006) or to consider a native-born German as a marriage partner for their children (Nauck, 2001).

Studies on Immigrant Children's Development in Early Childhood

Several scholars have used the data of the Early Childhood Longitudinal Study, Kindergarten Class (ECLS-K) to investigate the academic skills of children at the beginning of their educational career. The ECLS-K consists of a nationally representative sample of kindergartners throughout the United States that also includes children of immigrants (see U.S. Department of Education, 2001). Children were administered standardized tests on reading, math, and general knowledge. An English screening test was conducted with children of a non-English language background. If children failed this screening test, the reading and knowledge assessment was not administered but the math test was also available in Spanish (see U.S. Department of Education, 2001, Table 2-2). In addition, teachers rated children's skills and behaviors in different domains.

Using the ECLS-K data, Crosnoe (2007) shows that children of Mexican immigrants have lower test results in math than children of U.S.-born parents but fewer symptoms of externalizing problem behavior. A large part of these differences can be explained by the parents' socioeconomic status and the home learning environment (Crosnoe, 2007). In the study of Magnuson

et al. (2006), all children with mothers born abroad are collapsed into one category and compared to children of U.S.-born mothers. They find that children of immigrant mothers have lower levels of English proficiency and lower math scores than children of native-borns while the reading test scores are comparable in both groups. However, only children who had passed the English screening test were administered the reading test: The group of immigrant children who took the reading test is therefore selective with respect to English language skills. The differences in English and math between children of immigrants and native-borns are strongly reduced when the socioeconomic background and further demographic variables are taken into account but remain significant (Magnuson et al., 2006). Lahaie (2008) also finds that children of immigrants have lower test scores in math than children of native-borns. In addition, she can show that this is especially true for immigrant children whose parents both speak a language other than English (Lahaie, 2008). Rumberger and Tran (2006) differentiate between language minority and non-language minority children. They report lower reading and math test scores of language minority children with children from Spanish-dominant homes being particularly disadvantaged. However, the selectivity of test taking has to be considered again. Thus, the results of the teacher ratings that included all children are of special interest: The authors show that language minority children get lower ratings with respect to literacy and math skills by their teachers compared to children from families where only English is spoken (Rumberger & Tran, 2006). In contrast to the results in the academic domain, they find only very small differences with respect to social skills. In addition to the previous studies, Han (2006) also distinguishes between several regions of immigrants' origin. She finds pronounced differences in children's reading and math skills between these countries of origin: Children from Latin American countries tend to have lower test results than White children of native-borns while some groups, especially from Asian countries, tend to have higher test scores (Han, 2006).

A few studies also compare academic skills of children of immigrants and native-borns at an earlier age. In a sample of 4-year-old preschoolers from families with low income levels, De Feyter and Winsler (2009) find that immigrant children have lower test scores than nonimmigrant children with respect to cognitive and language tests but show fewer behavioral problems. However, the authors also describe a great variety in test results of immigrant children depending on their country of origin. In the German study Educational Processes, Competence Development and Selective Decisions in Pre- and Primary School Age (German acronym: BiKS), Dubowy, Ebert, von Maurice, and Weinert (2008) find differences between children of immigrant and native-born parents in different academic skill domains at the age of 3 to 4. Children of immigrants show a lower test performance in all domains of this study (verbal skills, nonverbal skills,

general knowledge) with especially pronounced differences in German language skills. Also at an even younger age, disadvantages of immigrant children have been observed: Using the data of the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), Glick, Batesa, and Yabikua (2009) analyze the cognitive development of 2-year-old children by their mother's age at arrival in the United States. The shortened form of the Bayley Scales of Infant Development, Second Edition (BSID-II) was used in this study, which includes tasks on memory, problem solving, and language (Andreassen, Fletcher, & Park, 2007). Children of U.S.-born mothers achieve better test results than all groups of children with foreign-born mothers (Glick et al., 2009). Taking into account social and demographic family characteristics strongly reduces these differences.

Since most children of immigrants grow up with two (or more) languages, the literature on bilingualism is also of relevance here. Several studies show that bilingual children in preschool age have advantages regarding certain cognitive aspects compared to monolingual children (for an overview, see Bialystok, 2001; Adesope, Lavin, Thompson, & Ungerleider, 2010). For example, bilingual children have an increased attention control and metalinguistic awareness compared to monolingual children (Bialystok, 1999; Campbell & Sais, 1995). On the other side, bilingual children are usually slower in developing vocabulary and often have a smaller lexicon in each language at an early age (see Bialystok, 2001). Thus, the difference between bilingual and monolingual children depends on the concrete type of skill under consideration and children's age.

To sum up, several studies show that children of immigrants have, on average, lower scores in academic tests compared to children of native-born parents in early childhood although there is a large variety between immigrant children from different countries of origin. These differences are usually strongly (but not fully) reduced by taking into account the socio-economic and demographic characteristics of the families. However, the results seem to differ by skill domain: The strongest disadvantages for children of immigrants appear in certain verbal tests like vocabulary tests in the language of the receiving country. Only small differences or even advantages for children of immigrants are found for some cognitive tests. Finally, it should be noted that all these cited studies share the problem of a possible cultural bias of the test situation (see the methods section for a discussion on test fairness).

Most previously presented findings about the academic skills of immigrant children are from the United States. What can be expected for children of Turkish origin in Germany? Since the socioeconomic status of Turkish immigrants in Germany is, on average, lower than that of native-borns (Kalter et al., 2007), lower scores in academic skill tests can also be expected. The previously cited literature suggests that this difference may be larger in the domain of language skills than in the domain of nonverbal cognitive skills.

These expectations are in line with results of the Progress in International Reading Literacy Study (PIRLS) for children in Grade 4 in Germany: Kristen (2008) shows that children of Turkish immigrants have lower test results in reading and math than children of German-born parents. These differences are strongly reduced by taking into account the socioeconomic situation of the families. In the case of the math test, they completely disappear when the language use at home is additionally considered. However, residual differences remain with respect to reading. The relevance of the familial language environment in the study of Kristen and in other studies (Dollmann, 2010; von Below, 2007) with school-aged children in Germany also suggests that parents' acculturation may be an important explaining factor also for the early academic skills of children with a Turkish migration background.

The Development of Academic Skills by Children of Immigrants

Bronfenbrenner's Bio-Ecological Theory of Human Development

As a theoretical framework for the development of academic skills in early childhood, we use Bronfenbrenner's (1977) bio-ecological theory of human development. Bronfenbrenner states that interactions in the immediate environment on a regular basis (which are termed *proximal processes*) affect an individual's development. However, these influences "vary systematically as a joint function of the characteristics of the developing person; of the environment . . . ; and the nature of the developmental outcomes under consideration" (Bronfenbrenner, 1994, p. 1644). Bronfenbrenner further differentiates the ecological environment into several environmental systems that are nested in each other. The innermost system is the "microsystem." It is within the microsystem that proximal processes produce development, but Bronfenbrenner again emphasizes that "their power to do so depends on the content and structure of the microsystem" (Bronfenbrenner, 1994, p. 1645).

We concentrate on the family as the most important microsystem for children's development in early childhood. The application of two of Bronfenbrenner's main propositions constitutes the basis for our theoretical model: (a) Children's development is affected by the familial environment. However, this influence depends on the *content* of the familial learning environment. (b) In addition, this influence may also vary by *type of developmental outcome* under consideration.

Next, we will apply this basic model of the familial influence on children's academic skills development to the specific situation of immigrant families. For this endeavour, we amplify the model with two additional concepts: the *acculturation strategies of immigrants* and the *society-specificity of skills*.

Immigrant Parents' Acculturation Strategies and Their Influences on Children's Academic Skill Development

Berry (1997) has introduced a schema of acculturation strategies that is widely used in the description of immigrants' inclusion into the receiving society: Immigrants may or may not engage in activities that are directed toward the inclusion into the receiving society (e.g., make friends with individuals of the receiving country, speak the language of the receiving country) and/or in ones that are directed toward the inclusion into their own ethnic group (e.g., make friends with co-ethnics, speak the language of the country of origin).

We want to argue that these acculturation strategies of immigrants also affect their children's academic skills development. Various studies already show that students' acculturation can influence educationally relevant outcomes (Coatsworth, Maldonado-Molina, Pantin, & Szapocznik, 2005; Colón & Sánchez, 2010). Regarding the influence of parents' acculturation, there is especially evidence for the link between parents' language use and children's language proficiency (Gathercole & Thomas, 2009; Marchman, Martínez-Sussmann, & Dale, 2004; Suarez-Orozco, Suarez-Orozco, & Todorova, 2008).

We follow Bronfenbrenner's argument that the content of the microsystem influences how familial processes affect children's development of academic skills. Immigrant parents' major acculturation strategy probably shapes the "cultural content" of the learning environment at home. This in turn will have an influence on the academic skill development of their children as such academic skills are situated in the cultural norms and expectations of the receiving country.

At this point it has to be noted that acculturation is a multidimensional concept. Schwartz, Unger, Zamboanga, and Szapocznik (2010) differentiate between three dimensions of acculturation: practices (e.g., language use), values (e.g., individualism-collectivism), and identifications (e.g., ethnic identity). We assume that especially parents' acculturation practices are relevant with respect to children's development of academic skills in early childhood that Schwartz et al. also term *behavioral acculturation*. For example, if a family has only little contact to individuals from the receiving society and if the parents only speak the language of their country of origin at home, then their child will probably be more competent in the language of the country of origin but learn the language of the receiving country later than a child whose parents have a higher extent of behavioral acculturation to the receiving country. This sort of behavioral acculturation may be strongly structured by the opportunities that are available to the families (e.g., composition of the neighborhood, social institutions, etc.).

Lastly, the influence of immigrant parents' behavioral acculturation on their children's academic skill development may also depend on the type

of skill under consideration. To come back to the previous example, the development of language skills is surely affected by the parental language use while the development of nonverbal cognitive skills may be not. More general, the society-specificity of children's academic skills may influence how much their parents' acculturation strategy affects them (see B. Becker, 2011).

The Society-Specificity of Skills

The concept of the society-specificity of skills goes back to a differentiation by Gary Becker (1975), who distinguished two sorts of human capital: *Specific human capital* means skills or competencies that are useful only in the context of a single employer (e.g., within a certain firm), whereas *general human capital* is useful in all contexts (in all firms). This differentiation can also be applied to other sorts of skills and other than work-related contexts. For our research question, we distinguish between general and society-specific skills. The concept of the society-specificity of skills has already been widely used for research questions on immigrants' situation (e.g., Chiswick, 2009; Friedberg, 2000; Kalter, 2003). General skills are useful in various types of contexts and can be easily transferred between societies without losing their value. In contrast, society-specific skills have different values in different societies and cannot easily and completely be transferred to other societal contexts. Here, we further distinguish between skills that are specific for the receiving country (RC-specific skills) and skills that are specific for the country of origin or for the ethnic community, respectively (CO-specific skills).

The concept of the society-specificity of skills has already been applied to the topic of the educational attainment of children of immigrants (Dollmann, 2010; Kristen et al., 2011). Following Bronfenbrenner's argument that the influence of the familial learning environment on children's development may vary by type of developmental outcome, we assume that the impact of immigrant parents' acculturation also depends on the society-specificity of the skill under consideration. We expect that parents' RC-specific acculturation practices (e.g., use of the RC-language, friends from the RC) positively affect their children's development of RC-specific skills (e.g., proficiency in RC-language, knowledge about customs and traditions of the RC) while CO-specific acculturation practices positively affect children's CO-specific skills (e.g., proficiency in the CO-language, knowledge about customs and traditions of the CO). In contrast, we do not expect that parents' acculturation practices play a role for the development of general skills. The rationale behind this expectation is that these skills are, by definition, not specific to a certain culture and should therefore not be affected by the cultural content of a learning environment. For example, reading aloud to children has positive effects on children's development

regarding their cognitive skills and language skills. However, for the development of nonverbal cognitive skills (a general skill), only the frequency of parental reading to the child should have an impact, but not the language of the book. In contrast, for the development of language skills (a society-specific skill), the language in which the parents read to their child should, of course, matter a lot. To sum up, we hypothesize that immigrant parents' acculturation practices influence their children's academic skill development—but only in the case of society-specific skills.

Focus of the Present Work

In this article, we analyze the development of academic skills in different domains from age 3 to 6 by children of Turkish origin and children of native-born German parents in Germany with a special focus on the role of immigrant parents' acculturation practices. We do not intend to test the whole theoretical model that we described in the previous sections but rather focus on specific aspects. We concentrate on the development of "academic skills" in early childhood that are most likely linked to later academic achievement in the educational system (Duncan et al., 2007; Feinstein, 2003). Concretely, we analyze the development of one general skill (cognitive competency) and two RC-specific skills (active vocabulary and cultural knowledge). CO-specific skills are not addressed in this article. Regarding immigrant parents' acculturation, we concentrate on the behavioral acculturation to the receiving society. Thus, the acculturation to the country of origin and other dimensions of acculturation (values, identification) are not addressed. This does *not* mean that we think these other dimensions of acculturation or children's CO-specific skills are not important. We rather opted for this narrow focus because we expect that parental RC-specific practices are most directly linked to children's RC-specific skills, which in turn are especially relevant for later school success in the receiving country (see Kristen et al., 2011). However, we will discuss limitations of this focus later.

Data and Method

Data and Sample

We use the data of the project *Preschool Education and Educational Careers Among Migrant Children*, which is carried out at the University of Mannheim (Germany). This is a longitudinal study that follows 3-year-old children until the beginning of elementary school with an oversampling of families with a Turkish migration background.

In this study, we randomly selected Turkish-origin and nonimmigrant families with a 3- to 4-year-old child from the data of resident-registration offices in 30 cities and communities of a local region in southwest Germany.¹ A letter describing the study was sent to the families (Turkish-origin families

received this letter in both German and Turkish). Thereafter, interviewers contacted the families to arrange a date for the interview at their homes. A computer-assisted personal interview was conducted with the parent who spends the most time with the child (this was the mother in about 95% of the cases). Turkish-origin families were contacted by bilingual interviewers, and the parents could choose their preferred language for the interview. After the parent interview, the standardized developmental test Kaufman Assessment Battery for Children (K-ABC) was conducted with the child (German version, see Melchers & Preuß, 2003).

Altogether, we surveyed 627 families with a Turkish migration background and 610 German families without migration background in the first half of the year 2007. The response rates were 69% in Turkish-origin families and 63% in nonimmigrant families. The sample is not representative for Turkish-origin or nonimmigrant families with a 3-year-old child in Germany because of the local limitation of the study. But this does not pose a problem since the study was not intended to exactly describe the skill level of children in Germany but to test general association hypotheses. One year later, the same families were contacted once more for a follow-up and in autumn/winter 2009 for a third panel wave. In all, 548 German and 500 Turkish-origin families from the original sample took part in Wave 3. Considering all families with nonmissing data in at least one of the three panel waves leaves an analysis sample of 1,211 families with an average of 2.7 observations per family (the number of cases by migration background and panel wave is shown in Table 1).

A nonresponse analysis reveals that the proportion of children of Turkish origin, children with lower educated parents, and children with lower initial test scores is higher among the cases with missing observations compared to those with complete observations. This selective attrition may lead to an overestimation of a “catch-up process” because especially those children who are at risk of “underperforming” drop out more often. However, since we formulate the research question the other way around and analyze whether differences by migration status still exist at age 6, these estimates are probably rather conservative in this sense and tend to underestimate these differences.

Measures

For our analysis of children’s academic skill development in different domains, we use the results of different subtests of the developmental test Kaufman Assessment Battery for Children. Of course, a major challenge of our study is the topic of test fairness. All studies that aim at measuring any sort of “skills” in mixed samples of children of native-born and immigrant parents have to deal with the problem of a possible cultural bias (Cole, n.d.; Rogoff, 2003; Rossellia & Ardila, 2003). A very evident problem for testing children of immigrants may be language difficulties if the test language is

Table 1
Descriptive Statistics (Means or Proportions) by Panel Wave and Migration Background

	Wave 1		Wave 2		Wave 3	
	Children of Native-Born German Parents	Children of Turkish Origin	Children of Native-Born German Parents	Children of Turkish Origin	Children of Native-Born German Parents	Children of Turkish Origin
<i>Children's test scores:</i>						
Cognitive skills	37.28	34.44*	54.67	57.30*	67.96	69.67*
Language skills	58.11	16.73*	75.71	43.33*	85.76	64.63*
Cultural knowledge	22.23	10.48*	37.78	19.49*	53.05	27.37*
<i>Family and child characteristics:</i>						
Child's age in months	42.00	42.03	54.59	54.72	72.28	73.51*
Third generation	—	0.09	—	0.10	—	0.10
Mother's education		*		*		*
Low	0.14	0.58	0.13	0.57	0.13	0.57
Intermediate	0.53	0.39	0.52	0.39	0.52	0.39
High	0.34	0.03	0.35	0.04	0.35	0.04
Father's education		*		*		*
Low	0.21	0.50	0.21	0.51	0.21	0.51
Intermediate	0.35	0.41	0.34	0.41	0.33	0.40
High	0.45	0.09	0.45	0.09	0.46	0.09
Parents' class position	0.76	0.17*	0.76	0.18*	0.77	0.19*
Mother employed	0.43	0.20*	0.48	0.25*	0.55	0.29*
Two-parent family	0.95	0.98*	0.93	0.97*	0.92	0.95*
Number of children	1.99	2.34*	2.09	2.41*	2.17	2.50*
Familial activities	5.82	4.84*	5.77	5.31*	5.39	4.95*
Club membership	0.63	0.09*	0.75	0.19*	0.83	0.38*
Preschool > 5 hours daily	0.31	0.43*	0.50	0.64*	0.53	0.73*
Receiving county (RC) acculturation	—	-0.15	—	0.05	—	0.11
Number of cases	585	575	569	548	541	491

Source. Project Preschool Education and Educational Careers Among Migrant Children, authors' calculations.

*The difference between children of Turkish origin and children of native-born German parents is significant with $p \leq .05$.

not the native language of the child (see Nell, 2004). However, also nonverbal tests may be culturally biased: They often require specific strategies or cognitive styles that are characteristic of middle-class Western cultures (Rogoff, 2003; Rossellia & Ardila, 2003). In addition, test scores of some cultural groups may be depressed because of negative attitudes to the test situation, the tester, or culturally unfamiliar demands such as working quickly (see Nell, 2004). A large literature exists on the topic of stereotype threat that shows that the test performance of ethnic minority groups can be reduced in test situations where these individuals are concerned to confirm a negative stereotype about their group (Steele & Aronson, 1995; for an overview, see Walton & Spencer, 2009).

We tried to reduce these sources of cultural bias in our study as far as possible by adopting the following measures: All test instructions were available in German and Turkish and the children could choose their preferred language and also respond in either language including switching between languages (the only exception being the subtest on German vocabulary where the answers had to be given in German, see the following). Thus, no language difficulties should impair the understanding of test instructions. This required that only bilingual testers were sent to Turkish-origin families. All of our bilingual test administrators were themselves Turkish immigrants or descendants of Turkish immigrants, which should reduce a possible stereotype threat in the test situation. We further tried to reduce anxiety in the children by completely avoiding the term *test*; the interviewers were instructed to use the term *educational game* instead. This “game-like” character of the test situation was further enhanced by the colorful test materials, which are usually interesting for children. Finally, there was no time pressure for the children, and the interviewers were instructed to have a break at any time during the test if necessary, which should further prevent any stress. The following describes the concrete subtests and other measures in more detail.

Cognitive Skills (Dependent Variable 1)

The results of the following subtests from the K-ABC are used as indicators of children's general cognitive competency:

- Face recognition: The tester presents a face in a photograph to the child for 5 seconds, after which the child is then shown a group photograph. The child is required to recall the previously presented face and to select the correct face in the group photograph. The faces in this subtest are from people of different ethnic origins, which should minimize an in-group bias in recognition performance.
- Gestalt closure: An inkblot drawing is shown to the child and the child has to identify and name the object.
- Number recall: The child repeats a series of digits read aloud by the tester. Only such digits were used that are monosyllabic in the German language and in the Turkish language.

These subtests measure the children's sequential processing and their simultaneous processing skills (for more details about these subtests, see Melchers & Preuß, 2003). Instead of the age-standardized test scores, which use only 3-month-intervals for the age adjustment, we utilize the raw test scores and control for age in months in the later multivariate analyses. All three subtests load on only one factor in a principal component factor analysis. Thus, the arithmetic mean of the three subtest scores (standardized for different ranges of values) is used as an overall measure of children's cognitive skills. For a better interpretation and comparability with the other skill domains, this test score is then transformed to represent the proportion of correct answers in percent.

German-Language Skills (Dependent Variable 2)

Children's German-language proficiency is measured by the subtest "expressive vocabulary" from the K-ABC. In this subtest, the children were shown pictures of objects and were asked to name them. The names of the objects had to be given in German, although the test instructions could be stated in either German or Turkish. Here again, the proportion of correct answers is calculated.

Cultural Knowledge (Dependent Variable 3)

We use the subtest "faces & places" from the K-ABC as a measure of children's knowledge about the dominant culture. In this test, the children are shown pictures of famous people (including fictitious characters) and places and are asked to name them (e.g., Donald Duck, the Leaning Tower of Pisa). This test is supposed to measure "general knowledge" and is explicitly described as being "heavily culturally dependent" by the authors (Melchers & Preuß, 2003, pp. 70–72). But this "cultural bias" is intended since this test should measure the degree to which a child could participate in and learn the culture of a country (Melchers & Preuß, 2003, p. 71). However, this test is not specific for Germany but measures the knowledge about the "Western culture" in a broader sense, which is also dominant in Germany. As in the previous tests, the proportion of correct answers is calculated.

The correlation of the dependent variables with each other is highest between children's language skills and their cultural knowledge ($r = .62$). These two RC-specific skills are moderately correlated with children's cognitive skills ($r = .34$ in both cases).

Turkish Origin and Generational Status

Children were defined as having a "Turkish migration background" if at least one parent or grandparent was born in Turkey.² This definition

includes second- as well as third-generation immigrant children (only four children in this sample were born in Turkey but migrated to Germany within the first 2 years of age and are included in the second-generation group). Within the group of Turkish-origin children, those with two parents born in Germany are regarded as third generation.

Behavioral Acculturation to the Receiving Country

We measure how strongly the Turkish-origin parents in our study are acculturated into the German society on the behavioral dimension by the following items from the parent interview: parent's German proficiency (interviewer rating), frequency of using German as communication language with the child, frequency of using German as communication language with friends, proportion of Germans in the social network, and contact to German neighbors. The Cronbach's alpha of this behavioral acculturation scale is .80. All items load on one factor in a principal component factor analysis; the resulting factor score is used in the later analyses. We term this factor RC-Acculturation Practices. Since this indicator of RC-acculturation practices is only available for Turkish-origin families, the mean value of zero is assigned to all German families in order to keep them in the analysis without altering the results. This means that this acculturation variable represents—technically speaking—an interaction between Turkish origin and parents' RC-acculturation.

The later multivariate analyses also include a number of other family and child characteristics as control variables that can be expected to affect children's skill development: child's age in months, mother's and father's education (low: minimum compulsory schooling or earlier dropout; intermediate: intermediate or upper secondary education; high: tertiary education), highest class position of both parents (low: manual workers or routine nonmanuals; intermediate/high: professionals, administrative and managerial occupations, self-employed); mother's employment status (employed at the time of the interview: yes/no), number of children in the family, two-parent family (yes/no), frequency of familial activities (index of the following items: frequency of telling stories to the child, reading to the child, singing together with the child, playing cards or board games, doing a jigsaw puzzle), club membership (the child is a member of a club or attends a playgroup regularly: yes/no), preschool attendance (more than 5 hours per day vs. less). Descriptive statistics of all variables are presented in Table 1.

Method and Data Analysis Plan

The longitudinal nature of the data allows studying children's academic skill development over time from age 3 to 6. Growth trajectories for different groups of children and different types of skills can be analyzed. For these

kinds of analyses, growth curve models are especially useful. We apply linear growth curve models that simultaneously address changes within persons and between persons using the software Stata 12.³

For each of the three dependent variables (cognitive skills, language skills, and cultural knowledge), we implement a stepwise approach in our data analysis following the notation of Singer and Willet (2003) to describe the skill level of child i at time t :

Model 1: Turkish origin + controls (age centered at 36 months)

$$\begin{aligned} \text{Skill}_{it} = & \gamma_{00} + \gamma_{01}\text{Turkish_origin}_i + \gamma_{02}\text{third_generation}_i + \gamma_{10}\text{age-36}_{it} \\ & + \gamma_{11}\text{Turkish_origin}_i \times \text{age-36}_{it} + \gamma_{12}\text{third_generation}_i \times \text{age-36}_{it} \\ & + \gamma_{0k}\text{time-constant_controls}_i + \gamma_{10}\text{time-varying_controls}_{it} \\ & + \zeta_{0i} + \zeta_{1i}\text{age-36}_{it} + \varepsilon_{it}. \end{aligned}$$

In a first step, we center child's age on 36 months and include only the control variables. The main effect of the Turkish origin therefore represents the difference in test scores between children of Turkish origin and children without migration background at age 36 months controlling for various other child and family characteristics (see Research Question 1). Since we also include a dummy for third-generation status, the effect of the Turkish origin refers to second-generation children while the effect of the third-generation status indicates the difference between second and third generation. The interaction effect between the Turkish origin and child's age shows how much the growth rate of the Turkish-origin children differs from that of the children of native-born German parents (which is represented by the main effect of child's age). Similarly, the interaction effect between third-generation status and child's age indicates how much the growth rates of second- and third-generation children differ from each other.

Model 2: Turkish origin, controls + RC-acculturation (age centered at 36 months)

$$\begin{aligned} \text{Skill}_{it} = & \gamma_{00} + \gamma_{01}\text{Turkish_origin}_i + \gamma_{02}\text{third_generation}_i + \gamma_{10}\text{age-36}_{it} \\ & + \gamma_{11}\text{Turkish_origin}_i \times \text{age-36}_{it} + \gamma_{12}\text{third_generation}_i \times \text{age-36}_{it} \\ & + \gamma_{20}\text{acculturation}_{it} + \gamma_{0k}\text{time-constant_controls}_i \\ & + \gamma_{10}\text{time-varying_controls}_{it} + \zeta_{0i} + \zeta_{1i}\text{age-36}_{it} + \varepsilon_{it}. \end{aligned}$$

Model 2 adds parents' RC-acculturation practices to test whether this index is associated with children's academic skills (Research Question 2).

Development of Cognitive, Language, and Cultural Skills

Model 3: Turkish origin, controls + RC-acculturation (age centered at 78 months)

We center child's age at 78 months and otherwise replicate Model 2 (identical formula except that we now use age - 78 months). The main effect of the Turkish origin now represents the test score difference between children of Turkish origin and native-borns at age 78 months. This allows answering the question whether children of Turkish origin are able to catch up their initial disadvantages or whether differences still persist at the beginning of elementary school (Research Question 3).

Model 4: Turkish origin, controls, RC-acculturation + RC-acculturation × age (age centered at 78 months)

$$\begin{aligned} \text{Skill}_{it} = & \gamma_{00} + \gamma_{01}\text{Turkish_origin}_i + \gamma_{02}\text{third_generation}_i \\ & + \gamma_{10}\text{age-78}_{it} + \gamma_{11}\text{Turkish_origin}_i \times \text{age-78}_{it} \\ & + \gamma_{12}\text{third_generation}_i \times \text{age-78}_{it} + \gamma_{20}\text{acculturation}_{it} \\ & + \gamma_{30}\text{acculturation}_{it} \times \text{age-78}_{it} + \gamma_{0k}\text{time-constant_controls}_i \\ & + \gamma_{10}\text{time-varying_controls}_{it} + \zeta_{0i} + \zeta_{1i}\text{age-78}_{it} + \varepsilon_{it}. \end{aligned}$$

We additionally include an interaction between parents' RC-acculturation practices and children's age in order to find out whether the effect of RC-acculturation practices changes over time (Research Question 4).

Furthermore, we want to stress that the results of our analyses should not be interpreted as causal relationships but as associations.

Results

Table 1 shows the test results of children of native-born German parents and children of Turkish origin by panel wave. In Wave 1, when the children are, on average, 42 months old, we already observe differences in test scores by migration background: Children of Turkish origin score significantly lower in all three tested domains than children of native-born German parents. These differences are large in the case of the RC-specific skills (German-language skills and cultural knowledge) while the difference with respect to cognitive skills (a general skill) is small. The further development of these differences varies in the three domains. With regard to cognitive skills, children of Turkish origin catch up the little disadvantage and even slightly outperform the children of native-born German parents although the difference in this domain remains small in general. However, large differences at age 6 remain regarding language skills and cultural knowledge. So, children of Turkish origin are at a clear disadvantage with

respect to RC-specific skills at the time they enter elementary school, which is not the case for general cognitive skills.

Table 2 presents the results of linear growth curve models when children's age is centered on 36 months. Models 1a, 1b, and 1c show the initial status in children's academic skills at 36 months and their rate of growth controlling for several child and family characteristics. The constant represents the initial skill level of German children without migration background (when all control variables are zero), and the main effect of age represents their rate of change (skill growth per month). The significant positive main effect of the Turkish origin in the domain of cognitive skills (Model 1a) indicates that children of Turkish origin have a small advantage in this domain at the age of 36 months when all the control variables are considered. In contrast, they have a disadvantage in the domains of language skills (Model 1b) and cultural knowledge (Model 1c). The interaction effect between the Turkish origin and children's age represents the difference in the growth rate between children of native-born and Turkish-origin parents. It is significantly positive in the case of language skills, meaning that Turkish-origin children progress at a faster rate—but here the initial disadvantage has also been especially large. In contrast, this interaction effect is significantly negative in the case of cultural knowledge, which points to increasing differences in this domain.

Models 1a, 1b, and 1c also show that children of the third generation have better test scores compared to second-generation children at age 3 regarding their German-language skills but not in the other domains. However, they make faster progress regarding their cultural knowledge than second-generation children. Furthermore, we find several significant associations of the control variables with children's skills.

The RC-acculturation index is added in Models 2a, 2b, and 2c. As expected, the RC-acculturation practices show a significant positive association with children's German language skills and their knowledge about the Western culture—even if other parental resources (like education and class position) are taken into account. In a model without these other parental resources, the coefficient of the RC-acculturation index is even stronger (results not shown). Contrary to our expectations, the RC-acculturation indicator is also positively associated with children's cognitive skills. A comparison of Models 1b and 2b reveals that the advantage of third-generation children regarding their German-language skills is mainly due to the higher RC-acculturation of their parents—the third-generation effect is strongly reduced in Model 2b.

In the next step, we center children's age on 78 months to see whether differences between children of German native-borns and Turkish origin are still present at the time the children usually start elementary school (see Table 3). Models 3a, 3b, and 3c replicate the previous models with this newly centered age variable. The main effect of the Turkish origin now refers to the

Table 2

Differences in Test Scores Between Children of Turkish Origin and Children of Native-Born German Parents at Age 36 Months and Role of Receiving County (RC) Acculturation Practices

	Cognitive Skills		Language Skills		Cultural Knowledge	
	Model 1a	Model 2a	Model 1b	Model 2b	Model 1c	Model 2c
Age in months - 36	1.01 (0.02)*	1.01 (0.02)*	0.88 (0.02)*	0.88 (0.02)*	1.02 (0.02)*	1.02 (0.02)*
Turkish origin (time-constant)	3.60 (0.94)*	3.49 (0.94)*	-36.08 (1.14)*	-36.28 (1.07)*	-3.31 (0.97)*	-3.38 (0.97)*
Turkish Origin × Age - 36 Months	0.04 (0.03)	0.03 (0.03)	0.53 (0.03)*	0.49 (0.03)*	-0.55 (0.03)*	-0.56 (0.03)*
Third generation (time-constant)	1.14 (1.88)	-0.63 (1.91)	11.34 (2.20)*	4.44 (2.12)*	-0.29 (1.78)	-2.46 (1.82)
Third Generation × Age - 36 Months	0.01 (0.06)	0.00 (0.06)	-0.01 (0.07)	-0.01 (0.07)	0.24 (0.07)*	0.24 (0.07)*
Mother's education (reference, low)						
Intermediate (time-constant)	0.33 (0.67)	0.28 (0.66)	2.23 (0.88)*	1.99 (0.82)*	0.97 (0.83)	0.85 (0.82)
High (time-constant)	1.90 (1.01)	1.90 (1.00)	3.90 (1.34)*	3.82 (1.24)*	3.45 (1.26)*	3.40 (1.24)*
Father's education (reference, low)						
Intermediate (time-constant)	0.89 (0.64)	0.68 (0.64)	1.95 (0.85)*	1.11 (0.79)	-0.26 (0.80)	-0.54 (0.79)
High (time-constant)	0.75 (0.86)	0.45 (0.86)	3.22 (1.14)*	2.04 (1.06)*	-0.43 (1.07)	-0.83 (1.06)
Parents' class (time-constant)	2.64 (0.72)*	2.42 (0.72)*	4.13 (0.96)*	3.32 (0.89)*	2.13 (0.90)*	1.83 (0.90)*
Mother employed	0.86 (0.49)	0.70 (0.49)	1.23 (0.60)*	0.90 (0.58)	0.83 (0.53)	0.74 (0.53)
Two-parent family	-0.59 (1.01)	-0.48 (1.01)	-1.14 (1.28)	-0.81 (1.23)	-2.49 (1.20)*	-2.43 (1.19)*
Number of children	-0.40 (0.27)	-0.30 (0.27)	-0.54 (0.35)	-0.13 (0.33)	-1.25 (0.32)*	-1.15 (0.32)*
Familial activities	2.25 (0.22)*	2.09 (0.22)*	2.54 (0.26)*	1.97 (0.26)*	1.22 (0.23)*	1.05 (0.23)*
Club membership	1.24 (0.50)*	1.12 (0.50)*	2.64 (0.61)*	2.36 (0.59)*	1.91 (0.53)*	1.86 (0.53)*
Preschool > 5 hours daily	1.61 (0.45)*	1.57 (0.44)*	2.64 (0.54)*	2.48 (0.53)*	0.47 (0.49)	0.42 (0.49)
RC-acculturation practices		1.74 (0.37)*		6.52 (0.44)*		2.10 (0.42)*
Constant	26.98 (1.28)*	27.56 (1.28)*	43.88 (1.61)*	45.98 (1.54)*	13.63 (1.48)*	14.38 (1.48)*
<i>Variance components</i>						
Level 1: Within person (σ^2_ϵ)	87.21 (2.72)*	86.75 (2.70)*	114.05 (3.60)*	112.54 (3.55)*	75.53 (3.42)*	75.73 (3.42)*
Level 2: In initial status (σ^2_0)	62.68 (6.48)*	61.57 (6.39)*	87.74 (8.76)*	60.55 (4.66)*	55.45 (7.71)*	53.29 (7.60)*
In rate of change (σ^2_1)	0.00 (0.00)*	0.00 (0.00)*	0.00 (0.00)	0.00 (0.00)*	0.07 (0.01)*	0.07 (0.01)*
Covariance (σ^2_{01})	-0.38 (0.14)*	-0.36 (0.14)*	0.26 (0.16)	0.45 (0.05)*	0.85 (0.24)*	0.84 (0.24)*
Number of observations	3,307	3,307	3,264	3,264	3,259	3,259
Number of children	1,211	1,211	1,210	1,210	1,210	1,210

Source. Project Preschool Education and Educational Careers Among Migrant Children, authors' calculations.

Note. Unstandardized coefficients from linear growth curve models (random coefficient models) with standard errors in parentheses.

* $p \leq .05$.

differences in academic skill levels at age 78 months. It is small but significantly positive in the case of cognitive skills, indicating that children of Turkish immigrants have a little advantage here (Model 3a). With respect to language skills and cultural knowledge, there is a large significant negative main effect of the Turkish origin, demonstrating pronounced disadvantages of the Turkish-origin children in these skill domains at the beginning of their school career. In comparison to age 3, this disadvantage is strongly reduced in the case of the language skills (Model 3b vs. Model 2b). In contrast, it has remarkably increased in the case of the cultural knowledge (Model 3c vs. Model 2c).

Finally, we examine whether the effect of immigrant parents' RC-acculturation practices changes over time. Models 4a, 4b, and 4c therefore include an interaction between parents' RC-acculturation practices and children's age. This interaction effect is not significant regarding children's cognitive skills (Model 4a). For children's German-language skills and cultural knowledge, we see different algebraic signs: In the case of language skills, the effect of parents' RC-acculturation practices decreases over time while the opposite is true in the case of cultural knowledge. These different trends are also depicted in Figure 1.

Figure 1 presents the predicted development of children's academic skills from age 36 months to age 78 months by migration background and RC-acculturation practices controlling for various family and child characteristics. With respect to children's cognitive skills, there are only minor differences between the groups: Turkish-origin children whose parents have a high level of behavioral acculturation to the receiving country have a little advantage over the other groups. Regarding the German-language skills, the group differences are much more pronounced, especially at a very early age: Children of native-born German parents score better than children of Turkish origin. Within the group of Turkish-origin children, those children whose parents have a higher level of RC-acculturation reach better vocabulary test scores. These group differences are very large at the age of 36 months and then decline over time. However, even at the age of 78 months, considerable group differences remain. The development is quite different in the case of children's cultural knowledge. Here, all children start at a low level at the age of 36 months though the children of native-born Germans already have a slight advantage. The children of German native-borns show a clear progress over the next few years whereas the children of Turkish origin only progress at a slow rate. This is especially true for Turkish-origin children whose parents have a low level of RC-acculturation practices.

Discussion

The present study on the academic skill development of children of Turkish origin and children of native-born German parents in Germany

Table 3

Differences in Test Scores Between Children of Turkish Origin and Children of Native-Born German Parents at Age 78 Months and Growth Trajectories by Acculturation Level

	Cognitive Skills		Language Skills		Cultural Knowledge	
	Model 3a	Model 4a	Model 3b	Model 4b	Model 3c	Model 4c
Age in months - 78	1.01 (0.02)*	1.01 (0.02)*	0.88 (0.02)*	0.87 (0.02)*	1.02 (0.02)*	1.02 (0.02)*
Turkish origin (time-constant)	4.76 (0.92)*	4.75 (0.92)*	-15.78 (1.17)*	-15.80 (1.17)*	-27.06 (1.30)*	-27.02 (1.30)*
Turkish Origin × Age - 78 Months	0.03 (0.03)	0.03 (0.03)	0.49 (0.03)*	0.48 (0.03)*	-0.56 (0.03)*	-0.56 (0.03)*
Third generation (time-constant)	-0.45 (1.83)	0.41 (1.89)	4.23 (2.39)	7.00 (2.46)*	7.60 (2.74)*	5.30 (2.82)
Third Generation × Age - 78 Months	0.00 (0.06)	0.04 (0.07)	-0.01 (0.07)	0.11 (0.08)	0.24 (0.07)*	0.16 (0.08)*
Mother's education (reference, low)						
Intermediate (time-constant)	0.28 (0.66)	0.28 (0.66)	1.99 (0.82)*	2.00 (0.82)*	0.85 (0.82)	0.87 (0.82)
High (time-constant)	1.90 (1.00)	1.91 (1.00)	3.82 (1.24)*	3.85 (1.24)*	3.40 (1.24)*	3.41 (1.24)*
Father's education (reference, low)						
Intermediate (time-constant)	0.68 (0.64)	0.67 (0.64)	1.11 (0.79)	1.07 (0.79)	-0.54 (0.79)	-0.50 (0.79)
High (time-constant)	0.45 (0.86)	0.44 (0.86)	2.04 (1.06)*	1.98 (1.06)	-0.83 (1.06)	-0.77 (1.06)
Parents' class position (time-constant)	2.42 (0.72)*	2.40 (0.72)*	3.32 (0.89)*	3.32 (0.89)*	1.83 (0.90)*	1.87 (0.89)*
Mother employed	0.70 (0.49)	0.75 (0.49)	0.90 (0.58)	1.01 (0.58)	0.74 (0.53)	0.67 (0.53)
Two-parent family	-0.48 (1.01)	-0.52 (1.01)	-0.81 (1.23)	-0.94 (1.23)	-2.43 (1.19)*	-2.35 (1.19)*
Number of children	-0.30 (0.27)	-0.29 (0.27)	-0.13 (0.33)	-0.10 (0.33)	-1.15 (0.32)*	-1.18 (0.32)*
Familial activities	2.09 (0.22)*	2.06 (0.22)*	1.97 (0.26)*	1.88 (0.26)*	1.05 (0.23)*	1.10 (0.23)*
Club membership	1.12 (0.50)*	1.16 (0.50)*	2.36 (0.59)*	2.46 (0.59)*	1.86 (0.53)*	1.79 (0.53)*
Preschool > 5 hours daily	1.57 (0.44)*	1.55 (0.44)*	2.48 (0.53)*	2.40 (0.53)*	0.42 (0.49)	0.47 (0.49)
Receiving county (RC) acculturation practices	1.74 (0.37)*	0.99 (0.55)	6.52 (0.44)*	4.10 (0.70)*	2.10 (0.42)*	4.12 (0.75)*
RC Acculturation × Age - 78 Months		-0.04 (0.02)		-0.10 (0.02)*		0.07 (0.02)*
Constant	70.01 (1.30)*	70.02 (1.30)*	82.79 (1.61)*	82.85 (1.60)*	57.04 (1.61)*	56.95 (1.61)*
<i>Variance components</i>						
Level 1: Within person (σ_{ϵ}^2)	86.75 (2.70)*	86.63 (2.70)*	112.54 (3.55)*	111.52 (3.52)*	75.73 (3.42)*	75.96 (3.43)*
Level 2: In initial status (σ_0^2)	34.78 (4.96)*	34.50 (4.94)*	103.85 (10.20)*	103.33 (6.07)*	240.12 (15.96)*	236.70 (15.79)*
In rate of change (σ_1^2)	0.00 (0.00)*	0.00 (0.00)*	0.00 (0.00)*	0.00 (0.00)*	0.07 (0.01)*	0.07 (0.01)*
Covariance (σ_{01}^2)	-0.27 (0.08)*	-0.28 (0.08)*	0.58 (0.21)*	0.56 (0.06)*	3.61 (0.39)*	3.51 (0.39)*
Number of observations	3,307	3,307	3,264	3,264	3,259	3,259
Number of children	1,211	1,211	1,210	1,210	1,210	1,210

Source. Project Preschool Education and Educational Careers Among Migrant Children, authors' calculations.

Note. Unstandardized coefficients from linear growth curve models (random coefficient models) with standard errors in parentheses.

* $p \leq .05$.

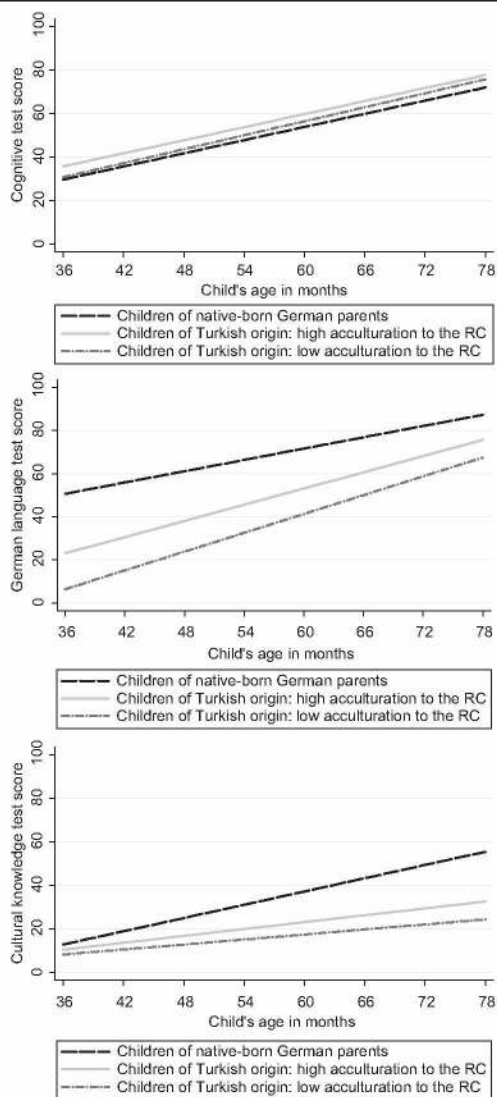


Figure 1. The development of cognitive, language, and cultural skills by migration background and receiving country (RC) acculturation practices.

Source. Project Preschool Education and Educational Careers Among Migrant Children, authors' calculations.

Note. Predicted values from Models 4a, 4b, and 4c. The other variables are set on mean or modal value. "High" and "low" RC-acculturation refers to values of 1 standard deviation above/below the mean.

from age 3 to 6 shows that children of Turkish origin are disadvantaged with respect to academic skills that are specific for the German society (language skills, cultural knowledge). In contrast, we find a slight advantage for Turkish-origin children in the domain of cognitive skills when the social background of the family is taken into account. However, this advantage of the Turkish-origin children with respect to cognitive skills should not be overinterpreted since the differences in this domain are rather small in general and the nonrandom sample attrition might lead to an overestimation of the Turkish-origin children's test scores in the later panel waves. Thus, we only conclude that there is at least no disadvantage for children of Turkish origin regarding cognitive skills in early childhood while there are pronounced differences with respect to RC-specific skills. These results are in line with other studies on immigrant children's academic skills that find the largest differences in the domain of RC-language skills (Dubowy et al., 2008; Magnuson et al., 2006; Niklas, Segerer, Schmiedeler, & Schneider, 2012). This should be alarming for policymakers since especially immigrant children's RC-language skills are related to their later educational success (Demie & Strand, 2006; Esser, 2006; von Below, 2007).

The finding that the differences between children of Turkish origin and children of native-born parents are strongest in the domain of RC-specific skills is supportive of our theoretical model. Taking Bronfenbrenner's notion that the influence of familial processes (e.g., parent-child interactions) also depend on the content of this microsystem and the concrete type of developmental outcome, we have argued that children's development also depends on the "cultural content" of the familial environment. To arrive at concrete hypotheses, we have combined Bronfenbrenner's theoretical framework with the concept of the society-specificity of skills. Our theoretical model assumes that the cultural content of the familial environment affects children's skill development in the case that it matches the concrete type of skill regarding its society-specificity. In a first step, we only regard the families' migration background as a proxy for the cultural content of the familial environment (later we specify this in more detail by including the concept of immigrant parents' acculturation). The empirical results of our study confirm a differential effect of the migration background depending on the type of skill under consideration: We only find a small association between children's migration background and their cognitive skills (a general skill) while this association is large in the case of language skills and cultural knowledge (RC-specific skills). This shows that Bronfenbrenner's general idea that the content of the familial microsystem affects children's development can be applied to different cultural contexts in immigrant families and families without migration background. His idea of differential influences depending on the type of developmental outcome can be applied to the differentiation between general and society-specific skills.

In our study, we not only find that the differences between children of immigrants and native-born parents vary by skill domain but also the longitudinal development of these differences varies by type of skill: With respect to language skills, the difference in the test scores between the children of native-born German parents and the children of Turkish origin is most pronounced at the earliest measurement in our study and then declines over time. Thus, children of Turkish origin rapidly catch up in this domain. However, the difference is still large at the age of 78 months—it nearly equals 1 year of learning for the Turkish-origin children. This finding is similar to the results of Leseman, Scheel, Mayo, and Messer (2009), who found large differences between Moroccan-Dutch children and Turkish-Dutch children compared to monolingual Dutch children regarding their Dutch-language skills at age 3. These differences decline until the age of 6 but are still large at that point in time (Leseman et al., 2009, p. 299). Niklas et al. (2012) describe a similar catching-up effect of children of immigrants regarding their early literacy competencies from age 5 until the time of school entry. However, we find the opposite pattern regarding children's cultural knowledge: The difference between children with and without migration background is not very large at age 3 but then steadily increases. Here, we know of no other study that has analyzed the longitudinal development of children's cultural knowledge in early childhood.

These different longitudinal trajectories in the domain of language skills and cultural knowledge (both RC-specific skills), of course, lead to the question about possible reasons for these patterns. One interpretation could be that extra-familial learning contexts like preschools are of different importance in the acquisition of these skills. In Germany, most children start preschool at the age of 3. Thus, differences in the cultural content of the home are of major importance for the development of society-specific skills up to that age. We find a large difference between children of Turkish origin and children without migration background with regard to their German vocabulary at age 3, which is in line with this reasoning. The difference with regard to children's cultural knowledge at that age is not so large, which may be due to the greater difficulty of this subtest in general. Some of the test items in the cultural knowledge test are a bit outdated (e.g., knowing Charlie Chaplin) and very difficult even for children of native-born Germans. Thus, all children start at a rather low level in this test at age 3. In the following years, the Turkish-origin children start catching up with respect to German-language skills. Preschool attendance may be an important factor for their language acquisition because they can get in much contact with the German language in this context. Various studies have demonstrated that preschool attendance positively affects children's skill development (e.g., Gormley, Phillips, & Gayer, 2008; NICHD Early Child Care Research Network, 2002). This is especially true for children whose parents do not speak the language of the receiving country at home (Gormley, 2008;

Magnuson, Meyers, Ruhm, & Waldfogel, 2004). Also in the present study, a longer preschool attendance is positively associated with children's language skills. Separate models by migration status reveal that this positive preschool effect is much stronger for the Turkish-origin children than for the children of German native-born parents (results not presented). In contrast, preschool attendance does not have any significant influence on children's cultural knowledge in either group. Thus, children without migration background who probably get more exposure to the dominant culture at home as they get older can improve their knowledge about the Western culture much more than children of Turkish origin. We therefore see an increasing difference in this domain.

An alternative explanation for the different trajectories could be that the children are in different phases on the same learning curve. Regarding children's cultural knowledge, we have observed the *beginning* of the acquisition process with all children starting at a low initial level at age 3. Children of native-born German parents could then make larger progress until the age of 6 than children of immigrants because of the "match" between the cultural content of their familial environment with this type of skill. However, it is possible that a catching-up process has taken place *after* our observation period if the children of immigrants are more and more exposed to the dominant culture. The situation regarding children's German vocabulary is different: We have observed a large difference at the age of 3 but not the *emergence* of this difference *before* that age. Since children start to build a vocabulary very early in life around the age of 1 (see Berk, 2009; Hart & Risley, 1995), we have missed the period of increasing differences in our data. It is therefore possible that the two longitudinal trajectories are not in principal different from each other but only shifted in time. Unfortunately, we cannot test this idea with our current data since a longer time horizon would be necessary.

The second main topic of this article is the role of immigrant parents' behavioral acculturation to the receiving country for their children's academic skill development in early childhood. Using Berry's concept of acculturation strategies, we have argued that parents' acculturation strategy shapes the cultural content of the familial microsystem. We again refer to Bronfenbrenner's notion that the influence of familial processes on children's development also depends on the content of the familial microsystem. It is well known that parents' socioeconomic status is related to various familial processes like parent-child interactions, which in turn affect children's development (for an overview, see Bradley & Corwyn, 2002; Feinstein, Duckworth, & Sabates, 2004). However, such studies usually do not consider the cultural content of these familial processes. This may not pose a problem in samples of families without migration background. In contrast, the cultural content of the familial environment is definitely of major importance in immigrant families since it probably often differs from

the dominant culture of the receiving society (see Diehl & Schnell, 2006), which may also have consequences for children's development of society-specific skills. For example, it does not only matter how often parents tell stories to their children but also which stories in which language. We have argued that this cultural content of the familial microsystem has to be taken into account in an analysis of immigrant children's society-specific skills. In our present study, we did this by explicitly focusing on immigrant parents' acculturation practices.

We have found that children of Turkish origin whose parents show stronger signs of acculturation to the receiving country score better in all three test domains. The association is largest with respect to German-language skills. This is hardly surprising since most of the items that we used as indicators of parents' RC-acculturation practices are related to their German-language use or proficiency. However, we did not expect an association between parents' RC-acculturation and children's cognitive skills since cognitive skills are general and not society-specific skills. Of course, unobserved heterogeneity might be a reason for this association. For example, immigrant parents who have better opportunities to learn a new language may also have better opportunities regarding their involvement in the early education of their child. More research on these possible associations is needed in the future. Finally, it should be noted that the influence of parents' acculturation may be especially large in early childhood and may decline among older children when they spend more time in school and with friends.

The discussion on the impact of immigrant parents' RC-acculturation practices on their children's RC-specific skills already points to the most serious limitations of the present study: We only regarded one dimension of acculturation (behavioral acculturation) and only the acculturation to the receiving country and not the acculturation to the country of origin. Similarly, we only addressed children's RC-specific skills and not their CO-specific skills. We chose this narrow focus because we wanted to concentrate on academic skills that are most closely related to later school success (Duncan et al., 2007). This does not mean that CO-specific skills are unimportant. For example, it has been shown that fluent bilingual children have more self-esteem and higher educational aspirations than children of immigrants who are only proficient in the RC-language but not in the CO-language (Portes & Hao, 2002). Our focus on immigrant parents' acculturation to the receiving country follows from our concentration on children's RC-specific skills. Here again, we do not want to indicate that parents' acculturation to their country of origin is unimportant. Several authors have argued that "ethnic resources" can be very valuable for immigrants and their families (Portes & Zhou, 1993; Zhou, 1997). Finally, we want to acknowledge that also other dimensions of immigrant parents' acculturation (values, beliefs, identifications) shape the home learning environment (Keels, 2009;

Louie, 2006). We concentrated on the behavioral dimension because its link to children's skill development is most straightforward and our data set is also restricted with regard to other dimensions. However, considering different dimensions of acculturation would also be a very interesting topic for future research.

Some further limitations of the present study should also be noted. Since we use a local sample we cannot make any statements about the "absolute skill levels" of children in Germany. Thus, we are not interested in exact skill levels but only in general associations (e.g., whether there is a positive association between parents' RC-acculturation practices and children's language skills), which we probably would also find similarly in other regions of Germany. The problem of nonrandom sample attrition has already been mentioned in the methods section. This is a main problem of all longitudinal studies. In our case, especially Turkish-origin children with low initial test scores are more likely to drop out of the study. Thus, our results are rather conservative regarding the size of the differences between children of native-born and Turkish-origin parents in the later panel waves. This is especially true with respect to the German-language skills: The vocabulary test was probably quite easy for the German children without migration background in the third panel wave, which might have resulted in a ceiling effect for this subpopulation. Thus, the catching up of the Turkish-origin children in this domain might be overestimated. A further clear limitation of our study is that it includes only one immigrant group. Although Turkish immigrants in Germany are an especially interesting group because it is the largest immigrant group in Germany and also the most disadvantaged group in the German educational system, a comparison to other immigrant groups could have given additional insights.

The results of our study have some implications for the research on the academic skills of children of immigrants. It is important to clearly distinguish between general and society-specific skills since different results can be expected depending on the type of skill. This means that tests that mix up verbal with nonverbal elements are problematic in this sense. Special attention and effort is necessary if the children have a different native language than the test language—we consider the translation of test instructions and the use of bilingual testers essential to avoid lower test results because of language barriers (also tests on "general skills" usually require at least some minimal verbal instructions).

In addition, some socio-political implications may be derived from the results of this study. First, we replicated the finding from other studies that differences in academic skills between children of native-born and immigrant parents can be found early in life. Thus, interventions aiming for more equality in educational opportunity should especially target this early age period (see Heckman, 2006). Although we cannot generalize our results to other immigrant groups and other countries, it is not unlikely that some of

our findings would also be found in other contexts: The greatest differences between children of immigrants and children without migration background are found in domains that are specific for the receiving society like language skills. Since RC-language skills are also highly important for children's later educational success, a clear implication would be to put a strong emphasis on language in early intervention programs. However, a strong emphasis on early RC-language learning does not imply that CO-language skills should not be maintained. It has been shown that children of immigrants who are proficient in the RC-language *and* in the CO-language (fluent bilingualism) have some advantages in comparison to monolingual children (Portes & Hao, 2002; St-Hilaire, 2002). Also, bilingual education programs usually show advantages compared to monolingual programs (Goldenberg, 2008). Bradley and McKelvey (2007) argue that the most important factor for successful early intervention programs for children of immigrants is bridging the language and ways of understanding of the children's home and the language and ways of understanding that are characteristic of schools (for a description of differences in practitioners' and immigrant parents' beliefs about early education, see Tobin & Kurban, 2010; for a discussion on culturally responsive educational settings, see Souto-Manning & Mitchell, 2010). With the results of our study in mind, we would like to add that such programs should start as early as possible in order to give the children more time for adaptation to the different cultural environments.

Notes

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¹An initial differentiation between Turkish-origin and nonimmigrant families was done on the basis of children's citizenship and the screening of the children's and their parents' full names by Turkish native speakers in order to detect naturalized Turkish-origin families. Additionally, a screening question about both parents' country of birth was implemented before the interviews in "German" families (for more details, see B. Becker, 2012).

²We do not have information about the children's great-grandparents. Thus, fourth-generation children of Turkish origin would be included in the "no migration background" group.

³We also considered nonlinear growth curve models. However, with only three measurements per child it is not so straightforward to decide about the functional form. In this situation, we decided to use a linear model because of its easiest interpretability. Graphical inspection with LOWESS (locally weighted scatterplot smoothing) curves confirms that the growth of children's academic skills is quite linear between the age of 36 and 78 months. However, we also tested alternative models including quadratic age terms. All of our research questions would be answered the same way with these alternative models.

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