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Turkish-language ability of children of immigrants in Germany: which contexts of exposure influence preschool children's acquisition of their heritage language?

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A lot of research has been devoted to explaining immigrants' acquisition of the language of the receiving country. However, less attention has been paid to explaining the acquisition of the heritage language among children of immigrants. The most important determinant for young children is exposure to the language. Language exposure can occur in various contexts, such as within the family, during preschool, through peers or via media. Our empirical analysis therefore explores which of these contexts is most statistically significant for the acquisition of the heritage language among children of Turkish immigrants. Using data from the project Preschool Education and Educational Careers among Migrant Children, we show that all contexts are important at different age levels but the acquisition of the heritage language is mainly determined by the exposure to it within the family.

Keywords: heritage language; exposure; children of immigrants; Turkish immigrants; learning context; language retention

1. Introduction

In the 1960s, German industry was in need of low-skilled labour and started to recruit 'guest workers' (Crul and Vermeulen 2003, 970). Many of these labour migrants came from Turkey. In 2011, around 1.6 million individuals of Turkish origin lived in Germany, constituting that country's largest migrant group (Statistisches Bundesamt Deutschland 2011). Several studies report that, on average, the socio-economic status of Turkish immigrants is lower than that of native Germans. Furthermore, they are the least well-integrated migrant group in Germany (e.g. Diehl and Schnell 2006; Nauck 2001; Woellert et al. 2009). This is evidenced by various behavioural aspects, such as marrying mainly within their own ethnic group (Kalter 2010), retaining strong contact with their country of origin (Haug 2000), using a special naming practice for their children (Gerhards and Hans 2009) and having low proficiency in the German language (Clauß and Nauck 2010). The language seems to be the most crucial aspect of all.

The recent international debate on language retention shows that the heritage language is very important for immigrants (Mucherah 2008). Knowledge of the heritage language can help maintain immigrants' ties to the ethnic culture, which in turn can facilitate their psychological adjustment (e.g. Schachter, Kimbro, and Gorman 2012; Oh and Fuligni 2010). Moreover, family cohesion within immigrant families is enhanced through the native language retention of their children (Tseng and Fuligni 2000). Additionally, stronger roots in the ethnic culture may facilitate immigrants' social and cultural adjustment through the ethnic community and may also facilitate their adjustment to the host culture (cf. Park et al. 2012; Portes, Fernandez-Kelly, and Haller 2009). In Germany, about 35% of those with Turkish migration backgrounds speak predominantly Turkish, less than 5% categorize themselves as predominantly German speakers and 60% are bilingual (cf. Haug 2008, 36). However, the level of bilingualism is very mixed and often very limited. The German government encourages immigrants to learn German. There are several German-language support programmes that are expensive for, but highly accepted by the German public (e.g. within preschools).

In contrast, less is known about heritage language proficiency and there is no academic consensus on its importance. Some political actors and researchers believe in the necessity of heritage language retention and think it an important condition for the acquisition of a second language (cf. Cummins 1979). Others think that the focus should be on the German language (e.g. Esser 2006). While the necessity of the heritage language is debated, it is not clear whether immigrants are really able to maintain their heritage language for more than one generation (Mucherah 2008, 7). This paper investigates the question: how are the children of German Turkish immigrants able to learn (language retention/maintenance) their heritage language?

Language development follows the same pattern for bilingual and monolingual children (Clark 2001). The literature on language acquisition is extensive, albeit with differences in details and emphases depending on their academic origin. And all of these models have similarities with respect to their main determinants. In these theories and models, the exposure to/input from language seems to be most important (Chiswick and Miller 1995). In this paper, we investigate the impact of exposure to heritage language in different contexts and the differential importance of these contexts of exposure.

Our paper deals with a central aspect of this question by considering different areas of exposure, an influence

rarely considered because of data restrictions. Since the heritage language of young children of Turkish immigrants is not omnipresent in Germany, it is possible to delineate different areas more clearly. Our results can indicate which parameters in general will have to be changed to improve the heritage-language ability of young children in a country where their heritage language is not spoken by the majority population.

First, the paper will focus on the influence of exposure in different contexts on language-learning processes and give a literature review of different determinants.

After that, the main goals and hypotheses of the paper will be stated, followed by the introduction to the data, the method, the operationalization of the variables, and the results. Using data from the project *Preschool Education and Educational Careers among Migrant Children*, we show that all contexts are statistically significant at different age levels but the acquisition of the heritage language is mainly determined by the exposure to it within the family. Finally, the paper will close with a short summary and discussion.

2. Heritage language acquisition

Language acquisition is a special form of learning, no matter whether one deals with the maintenance/retention of the native language or the learning of a very new one. To explain language acquisition one can consider a wide range of fundamental theories (e.g. Chomsky's innateness theory, Piaget's cognitive theory, Vygotsky's social constructiveness theory). All are fundamental, but hard to test empirically. As a result, most research into language acquisition states that exposure (or input), motivation and some aspects of ability are important factors (see Chiswick and Miller 1995, 13; Klein and Dimroth 2003; Spolsky 1989). As stated by Fishman's (1972) language assimilation theory, the language use (exposure) will be the most prevalent examinational factor (cf. Ducharme, Wesche, and Bourdages 1999; Tran 2010; Thomas 2011).

Exposure to a language can take place in different settings or contexts (cf. Hoff 2006). The most important one, particularly in early childhood, is the family. However, the preschool context might also be important for language development. Nonetheless, for young children of immigrants, the family should provide the most intensive area of input to their heritage language, given the much lower probability of contact to the minority language outside the family. Other potentially influential contexts could be media or friends. We will now review some results of the impact of these contexts of exposure.

2.1. Literature review

Linguistic studies into children's vocabulary acquisition verify that children's vocabulary development strongly depends on parental language input. These studies usually conduct repeated observations at the families' homes and observe parent-child interactions. It has been shown that the quantity of parental language input (Huttenlocher et al. 1991), as well its variety and complexity (Hoff and Naigles 2002; Pan et al. 2005), has positive effects on children's vocabulary acquisition. In addition to these linguistic studies, some sociological and economic studies have shown that specific parent-child activities matter for children's development in various areas (Ermisch 2008; Sylva et al. 2004). Using the data of the British Millennium Cohort Study, Ermisch shows that reading more frequently to children significantly improves their vocabulary development. Results from The Effective Provision of Pre-School Education project also demonstrate the importance of different aspects of parental activities, such as reading to their child, teaching songs and nursery rhymes, playing with letters and numbers, visiting the library, painting and drawing, and so on (Melhuish et al. 2008; Sylva et al. 2004). It can be concluded that activities inside the family are crucial for children's language development and that children's vocabulary growth is strongly related to the amount of parental talk.

Research also finds that social differences in these areas are very pronounced: toddlers in professional families hear, on average, three times as many words as do children in welfare families (Hart and Risley 1995). Moreover, the quality of parents' verbal interactions differs as well, with children in high socio-economic status families getting more encouragement. Including a measurement of parental language input reduces the effect of family's socio-economic background to non-significance (Hoff 2003; Huttenlocher et al. 2002). Class differences in children's language development can be attributed to differences in parental language input (Bodovski and Farkas 2008).

For children who grow up bilingually, the usage of each language in relation to the total language input is crucial. In the study by Marchman, Martinez-Sussmann, and Dale (2004), parents of toddlers simultaneously learning English and Spanish were questioned about all individuals who were in regular contact with their child. In particular, they were asked how much time the child spent with each of these individuals and which language was used at these occasions. From this information, the proportion of exposure to each language was computed. In this sample, the proportion of English-language input was 41.3%. The authors show that a larger proportion of English-language input is positively correlated with the size of the English vocabulary. Pearson et al. (1997) report similar results. Thus, for children of immigrants who grow up bilingually, it is not

only the total quantity of language input that matters, but also the proportion of exposure to each language. In some countries, the loss of the heritage language is discussed because young immigrants have too little exposure to their language of origin (Bylund and Diaz 2012). Research shows that the use of the heritage language is mainly explained by the social background of these parents (Willard et al. 2014). Beyond this evidence of the impact of parental speech on children's language abilities, learning contexts outside the family can have an independent effect on children's vocabulary acquisition as well.

Most children spend some time outside their homes and engage in activities without their parents. For example, they attend preschools, are members of sports or music clubs, or go to playgroups. These contexts outside the family can have an independent effect on children's language abilities. Here, especially, early educational institutions can be important. Such institutions explicitly foster children's education and have trained personnel and stimulating materials for children's development in numerous ways. Various studies have shown that preschool attendance positively affects children's language skills (Currie and Thomas 1995; Sammons et al. 2004; Tietze et al. 1998). The early intervention studies in the USA using an experimental design have demonstrated the positive impact of attending institutions of early education (Schweinhart, Barnes, and Weikart 1993). Other studies find a positive effect of preschool attendance on children's language skills (e.g. Currie and Thomas 1995; Sammons et al. 2004, 30). In the early stage of preschool, Justice et al. (2011) found that, especially for children with low language skills, attendance at preschool classes in which their classmates have strong language skills may be desirable. However, all of these studies are concerned with the development of the majority language. There are only a few studies that analyse possible positive effects of the preschool context on immigrant children's heritage language skills. For example, it may be that in the long run preschool attendance might not affect heritage-language abilities, because the biggest duty of kindergarten is to improve the child's proficiency in the language of the receiving country rather than in the language of origin.

In addition to the family and preschools, other contexts are important for early language acquisition. Peers can also influence language use. This is shown in studies of children at early school ages, where the classroom climate and intellectual conditions are very important for each child (Downer and Pianta 2006). Mashburn et al. (2009) showed that for 1,812 four-year-olds, a positive association exists between peers' expressive language abilities and children's receptive language development. Although the studies focus on diverse competencies, most show that peer achievement has a positive effect and that children benefit from higher-achieving schoolmates (Hanushek et al. 2001). Henry and Rickman (2007, 103) state that 'peer effects may play a significant role in the development of young children, and their omission from estimates of the child development production function leaves a gap in our understanding of how preschool or childcare resources affect children's development'.

Furthermore, media consumption has an influence on the language development of infants from low-income and immigrant families (Mendelsohn et al. 2010). Mendelsohn et al. (2010) suggest that medial verbal interactions may have a direct positive impact on language development, and that media-verbal interactions during the co-viewing of media with educational content (but not other content) were predictive of fourteenth-month-old children's language skills independent of the overall level of cognitive stimulation in the home (also see Tomopoulos et al. 2010). In line with that, Linebarger and Walker (2005) show that the quality of media matters, for example, whether children watch Sesame Street or Teletubbies. In contrast, other studies show that television viewing is not influential (Patterson 2002).

2.2. Present study

The present study will focus on the impact of different contexts of exposure on early language acquisition. By analysing very young children of Turkish immigrants and their competence in their heritage language, we examine first if different contexts of exposure influence their language ability (hypothesis 1). Second, we predict that exposure will be a statistically significant explanatory variable for language development throughout the preschool age (hypothesis 2). In addition, we would like to explore which of the different contexts of exposure (family, preschool, media, peers) are most important. Our final (explorative) hypothesis is that the family influence is the most important aspect (hypothesis 3).

3. Methods

3.1. Data and measures

The empirical analysis uses data collected for the project Preschool Education and Educational Careers among Migrant Children at the University of Mannheim, funded by the German Research Foundation (DFG). This project aims to follow families with preschool children aged three to four years up to the time they start primary school. Data come from 1,281 Turkish-origin and non-migrant participants in thirty cities and

municipalities in the region Rhine-Neckar and are clustered according to postal code. Within each code, the same number of non-migrant and Turkish-origin families was interviewed. Interviews were conducted either in German or Turkish. Bilingual interviewers first interviewed the parents, then administered to their children the German-language version of the psychological developmental test Kaufman Assessment Battery for Children (K-ABC; Kaufman and Kaufman 1994; the German-language version of Melchers and Preuß 2001). K-ABC is an individual test battery measuring child development between the ages of two and twelve years. Within different sub-tests, children have to answer age-fair questions and perform some exercises. The families were surveyed in the first half of 2007; a follow-up interview with the same families took place in 2008 and in 2009. The following analysis is based on data from about 450 Turkish-origin families, after exclusion of cases with missing values.¹ After the parent survey, all the preschools that the children in this study attended were contacted and asked about some structural aspects of their childcare centre (e.g. proportion of Turkish children). The theoretical model we test is:

$$DV = f(\beta_0 + \beta_1 \text{ Family} + \beta_2 \text{ Preschool} + \beta_3 \text{ Media} + \beta_4 \text{ Social contact} + \beta_{5-8} \text{ (Controls)}) + \varepsilon_i$$

Where the dependent variable is a function of some expected variables like family and preschool times an unknown parameter β and also β_0 and an error term ε_i .

3.1.1. Dependent variable (DV)

The sub-test 'expressive vocabulary' from K-ABC is used as a measure of Turkish-language proficiency (time-varying) because the same sub-test was administered to all Turkish-origin children in both languages (German and Turkish). In this sub-test, children were shown pictures of objects and asked to name them. Answers had to be given in Turkish, although the test instructions could be stated in either German or Turkish. The number of correct answers on this sub-test is used as a dependent variable. The number of correct answers ranges between 0 and 24.

3.1.2. Independent variables

3.1.2.1. Exposure to the Turkish language

- Family exposure (time-varying): First, we use one variable measuring the Turkish-language ability of the parents. This is created by the mean of two questions on the self-reported parental proficiency in Turkish: 'How well can you speak Turkish? And how well can you read Turkish?' (1: not at all, 2: a little, 3: moderate, 4: well, 5: very well). The variable is coded such that higher values indicate a higher proficiency in the Turkish language. Second, the frequency of use of the Turkish language is asked: 'How often do you usually talk to [target child's name] in Turkish?' (1: never, 2: rarely, 3: about half of the time, 4: usually, 5: always). Third, we employ a similar question pertaining to communication when friends or relatives visit the family: 'Which language is usually used when relatives or friends visit you? How often is Turkish used then?' (1: never, 2: rarely, 3: about half of the time, 4: usually, 5: always).
- Preschool exposure: First, a variable of duration of preschool attendance in hours since starting to attend kindergarten is created (time-varying).² Second, we use the proportion of Turkish children within each preschool (range from 0 (no Turkish children) to 10 (nearly all children have a Turkish migration background) (time-constant).
- Media exposure (time-varying) : First, we have information about the language of television the child mainly consumes: 'Does [target child's name] watch only German, predominantly German, about half of the time German and Turkish, predominantly Turkish or only Turkish programmes on TV?' (0: no TV, 1: only German, 2: predominantly German, 3: half German, half Turkish, 4: predominantly Turkish, 5: only Turkish). Second, we asked the number of Turkish books within the family (range 0-1,000).³
- Social contact exposure (time-varying): First, we use the proportion of Turkish friends in the social network of the target child: 'Think about the friends of [target child's name], with whom he/she plays together. How many of those children are Turkish?' (1: none; 2: few, 3: about half, 4: most, 5: all). Second, we consider the proportion of Turkish friends of the parents, which is measured using the same answer categories.

3.1.2.2. Controls

Child's cognitive skills (time-varying): As a measure of the child's cognitive skills, different sub-tests of K-ABC measuring different cognitive skills are used:

- Gestalt closure: An inkblot drawing is shown to the child and the child has to identify and name the object that it represents.
- Face recognition: The tester presents a photograph of a face to the child for five seconds, after which the child is shown a group photograph. The child is required to recall the previously presented face and to select the correct face in the group photograph.
- Number recall: The child repeats a series of digits read aloud by the tester.

The test instructions as well as the child's answers could be given in either German or Turkish, so there is no Turkish-language ability necessary to master these exercises. For each sub-test, the proportion of correct answers is calculated. Since all three sub-test scores load only on one factor in a principal component factor analysis (eigenvalue: 1.71 in the first wave, 1.81 in the second wave, 1.77 in the third wave), this factor score is used in each wave.

Education of primary caregiver (time-constant): We use the respondents' educational level as an indicator of family's socio-economic status. The variable measures the years of education ranging from one to thirteen years.

Children (time-varying): Number of children in the family.

Age (time-varying): Age of the child in months.

Girl (time-constant): Sex of the child (1: girl; 0: boy).

3.2. Data analysis

We use ordinary least squares (OLS) regressions for the cross-sectional models. The last set of results attempts to answer how different exposure contexts affect the development of Turkish-language ability over time. The longitudinal nature of the data allows for the studying of children's language development over time from age three to six (hypothesis 2). For these analyses, growth curve models (GCM) are especially useful. We apply linear GCM that simultaneously address changes within persons and between persons using the software Stata 12 (see Singer and Willet 2003). We added a random slope for age so children may differ in their rates of growth.

4. Results

4.1. Descriptive findings

Table 1 gives an overview of the descriptive statistics of the variables in the model. Because of missing data, the number of cases varies slightly between waves. The Turkish-language abilities of the children improve in every wave, although the improvement is not very strong. The development of the exposure variables differs by context across the waves. The Turkish-language ability of the parents remains rather stable, but the frequency of using Turkish diminishes. Unsurprisingly, preschool attendance rises in the longitudinal view and the preschool characteristics remain rather stable, which should be the case because this is only measured once; differences in the mean are caused by the differing number of cases. Also, the amount of Turkish television watched by the children slightly decreases, while the number of Turkish books in the family increases. The number of Turkish friends within the social network decreases slightly. Most of the control variables remain quite stable in the longitudinal view, except for children's cognitive skills, which strongly improve as children get older.

Table 1. Descriptives.

Variable (range)	Wave 1		Wave 2		Wave 3	
	M	SD	M	SD	M	SD
Child's Turkish-language ability (0-24)	6.60	3.67	8.22	4.88	9.32	4.51
Parent's Turkish-language ability (0-4)	3.36	0.62	3.45	0.58	3.38	0.54
Frequency of using Turkish in the family (0-4)	2.93	0.95	2.80	0.89	2.66	0.85
Frequency of using Turkish with relatives (0-4)	3.22	0.95		0.86	3.07	0.96
			3.16			
Duration of preschool (hours/600)	1.13	0.83	3.97	1.42	4.95	3.31
Proportion Turkish children in preschool (0-10) ^a	2.63	2.64	2.64	1.93	2.66	2.01
Turkish television (0-5)	2.15	1.02	1.99	1.00	1.91	0.96
Turkish books/10	3.60	12.09	3.52	9.14	4.46	26.46
Turkish friends of the child (1-5)	3.59	1.23	3.28	1.30	3.07	1.16
Turkish friends of the parents (1-5)	4.02	0.97	3.98	0.94	3.94	0.95
Child's cognitive skills (factor score)	-0.98	0.68	0.18	0.72	0.82	0.64
Education caregiver	8.57	2.39	8.55	2.42	8.47	2.43
Number of children	2.30	1.01	2.35	0.96	2.48	0.94
Age in months	42.88	3.72	54.74	4.00	73.37	4.37
Girl ^a	0.52		0.50		0.50	
Number of cases (N)		405		440		388

Note: Data of the project Preschool Education and Educational Careers among Migrant Children.

^aChanges are due to changes of number of cases; the variable is time-constant.

4.2. Regression models

Table 2 shows the results of OLS regressions to explain the influence of different contexts of exposure. The results of all three waves are given separately. At each wave, the six models are structured similarly, so that model 1 in each wave includes only the control variables, models 2-5 control for each area of exposure separately, and model 6 controls for all contexts of exposure simultaneously. Because of the different age structure of the children, the results change slightly between the waves, but the main results are quite stable. Model 1 shows that the child's cognitive skills are most important to explain their Turkish-language ability. Moreover, parents' education has a negative influence. We speculate that this might be because higher-educated parents with a Turkish migration background might assume that learning Turkish is not as important as learning German.

In model 2, the language exposure within the family is controlled. In all waves, the Turkish-language ability of the parents has a significant positive influence. Within the first wave, this means that if the language ability of the parents increases by one standard deviation, their children answer using 0.88 more words. This accounts for about half of the improvement between waves 1 and 2. Turkish conversation frequency has a significant positive impact on the child's ability to speak Turkish. In wave three, frequency of Turkish communication with relatives and friends is also significant. The power of explanation varies between waves 1 to 3, the growth of additional explanatory power changes each year: at the first wave the family exposure variables add 21% of explained variance to the first model, whereas it just adds 15% of explained variance in the third wave. This suggests that the influence of family exposure on the Turkish-language ability of the child is strong at each wave, but it is strongest at early ages and then weakens slightly.

In model 3, the impact of preschool is added. The influence of this context of exposure differs between the waves. In the first and second wave, the duration of preschool attendance has a negative influence on Turkish-language ability. Within the oldest age group in the third wave, the duration of preschool attendance is not significant to children's Turkish-language ability. The proportion of other Turkish children within the preschool has a positive influence throughout the whole period.

The power of explanation of model 3 is much lower than in model 2 including parental language exposure and the additional explanatory power in comparison with model 1 is also rather small.

Model 4 controls for media exposure. In sum, Turkish television consumption and the availability of Turkish books in the family are positively associated with the Turkish-language ability of children, although the number of books loses its significance in wave 3. The explanatory power is in general slightly higher than in model 1.

Model 5 controls for the influence of exposure via friends and social contacts: Turkish friends of the child, and in part also Turkish friends of the parents, have a statistically significant influence on the child's Turkish-language abilities.

Model 6 controls for all areas of exposure simultaneously.⁴ This model confirms the importance of the family context. As the child grows older, the influence of each

Table 2. Explaining Turkish-language ability (OLS regressions).

	Wave 1						Wave 2						Wave 3					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Child's cognitive skills	0.13* (0.32)	0.19*** (0.28)	0.13* (0.32)	0.13* (0.30)	0.16** (0.30)	0.18*** (0.27)	0.15** (0.36)	0.19*** (0.35)	0.15** (0.36)	0.19*** (0.36)	0.16** (0.36)	0.21*** (0.37)	0.31** (0.38)	0.42*** (0.35)	0.32*** (0.38)	0.36*** (0.37)	0.37*** (0.36)	0.43*** (0.34)
Education caregiver	-0.12* (0.08)	-0.04 (0.07)	-0.08 (0.08)	-0.09+ (0.08)	-0.02 (0.08)	-0.01 (0.07)	-0.16** (0.10)	-0.14** (0.10)	-0.15** (0.10)	-0.15** (0.10)	-0.15** (0.10)	-0.13** (0.09)	-0.14** (0.10)	-0.11* (0.09)	-0.13** (0.10)	-0.13* (0.10)	-0.10* (0.10)	-0.09+ (0.09)
Number of children	0.02 (0.19)	0.00 (0.16)	0.02 (0.19)	0.01 (0.19)	0.01 (0.19)	0.01 (0.16)	-0.04 (0.24)	-0.03 (0.22)	-0.04 (0.24)	-0.06 (0.23)	-0.04 (0.24)	-0.04 (0.22)	-0.01 (0.23)	-0.04 (0.21)	0.01 (0.23)	-0.02 (0.23)	-0.02 (0.22)	-0.04 (0.21)
Age in months	0.02 (0.05)	-0.02 (0.05)	0.09 (0.06)	0.03 (0.05)	0.02 (0.05)	0.05 (0.05)	0.08 (0.06)	0.08 (0.06)	0.11* (0.06)	0.09+ (0.06)	0.09+ (0.06)	0.09+ (0.06)	0.09+ (0.05)	0.08+ (0.05)	0.11 (0.06)	0.10+ (0.05)	0.08+ (0.05)	0.11+ (0.06)
Girl	0.00 (0.36)	-0.03 (0.32)	-0.01 (0.36)	-0.01 (0.36)	-0.01 (0.34)	-0.04 (0.32)	0.07 (0.46)	0.06 (0.44)	0.06 (0.46)	0.04 (0.45)	0.07 (0.46)	0.03 (0.43)	-0.00 (0.43)	0.02 (0.40)	0.00 (0.43)	-0.03 (0.43)	0.01 (0.42)	0.01 (0.41)
Parent's Turkish-language ability		0.24*** (0.27)				0.23*** (0.27)		0.23*** (0.37)				0.24*** (0.36)		0.13** (0.34)				0.12** (0.34)
Frequency of Turkish in family		0.23*** (0.24)				0.16** (0.24)		0.13** (0.29)				0.10+ (0.28)		0.20*** (0.27)				0.14* (0.29)
Frequency of Turkish with relatives		0.12+ (0.25)				0.06 (0.26)		0.00 (0.28)				0.02 (0.27)		0.22*** (0.25)				0.18** (0.26)
Duration of preschool			-0.14* (0.27)			-0.10+ (0.24)			-0.10* (0.17)			-0.10* (0.16)			0.04 (0.08)			0.04 (0.07)
Proportion of Turkish children			0.14** (0.08)			0.08+ (0.08)			0.07 (0.10)			0.05 (0.10)			0.11* (0.09)			0.03 (0.10)
Turkish television				0.23*** (0.16)		0.14** (0.15)				0.22*** (0.20)		0.24*** (0.20)			0.22*** (0.22)			0.11* (0.22)

Table 2 (Continued)

	Wave 1						Wave 2						Wave 3						
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	
Turkish books				0.13** (0.01)		0.08* (0.01)					0.17*** (0.02)	0.13*** (0.02)				0.03 (0.01)		0.04 (0.01)	
Turkish friends of the child					0.22*** (0.19)	0.08 (0.15)						0.01 (0.28)	-0.02 (0.18)					0.23*** (0.26)	0.06 (0.20)
Turkish friends of the parents					0.20*** (0.15)	0.04 (0.22)						0.07 (0.18)	-0.11* (0.28)					0.10* (0.20)	0.07 (0.27)
Number of cases				405							440							388	
(N)																			
R ²	0.03	0.24	0.06	0.10	0.15	0.29	0.06	0.15	0.08	0.14	0.07	0.23	0.13	0.28	0.15	0.18	0.21	0.31	

Note: Data of the project Preschool Education and Educational Careers among Migrant Children, waves1-3. At the first wave children are aged 3-4, second wave 4½-5½, third wave 5½-6½ years.

Standardized coefficients with standard errors in parentheses, +p < .10; *p < .05; **p < .01; ***p < .001.

context of exposure changes. In the first wave, the parents and the media are most important for the Turkish-language abilities of the child. In the second wave, preschool also becomes more important. In the third wave, again family and media explain most variation in the dependent variable. In sum, parental exposure, media and in some aspects also preschool contexts are important for the Turkish-language ability of preschool children. All exposure variables add additional explanatory power to model 1.

We investigated how the changes in contexts of exposure influence the development of Turkish-language ability over the years. Therefore, linear GCM were estimated. The results of these models are given in Table 3. The models are organized as before: first the controls, then the analysis of each context of exposure, followed by a complete model of all contexts of exposure.

All results in Table 3 are similar to the results of our OLS regressions. Here we are mainly interested in statistical significance because the methods and their estimated

Table 3. Explaining the development of Turkish-language ability (growth curve models).

	1	2	3	4	5	6
Age in months	0.01 (0.04)	0.02 (0.03)	0.03 (0.04)	0.01 (0.04)	0.01 (0.04)	0.06 (0.04)
Child's cognitive skills	0.33*** (0.04)	0.35*** (0.04)	0.34*** (0.04)	0.34*** (0.04)	0.34*** (0.04)	0.37*** (0.04)
Education caregiver	-0.16*** (0.04)	-0.12*** (0.03)	-0.15*** (0.04)	0.14*** (0.07)	-0.13*** (0.04)	-0.11*** (0.03)
Number of children	-0.01 (0.03)	-0.02 (0.03)	-0.02 (0.03)	0.02 (0.03)	-0.02 (0.03)	-0.02 (0.03)
Girl	0.03 (0.03)	0.02 (0.03)	0.02 (0.03)	0.02 (0.03)	0.03 (0.03)	0.00 (0.03)
Parent's Turkish-language ability		0.19*** (0.03)				0.19*** (0.03)
Frequency of Turkish in family		0.14*** (0.03)				0.11*** (0.03)
Frequency of Turkish with relatives		0.06* (0.03)				0.06 (0.03)
Duration of preschool			-0.06* (0.03)			-0.09** (0.03)
Proportion of Turkish children in preschool			0.07* (0.03)			0.04 (0.03)
Turkish television				0.13*** (0.03)		0.12*** (0.03)
Turkish books				0.05* (0.03)		0.05* (0.03)
Turkish friends of the child					0.06* (0.03)	0.02 (0.03)
Turkish friends of the parents					0.09** (0.03)	-0.00 (0.03)
Number of observations			1,233			
Number of children			515			
Random slope (var(age))	0.00	0.00	0.00	0.00	0.00	0.00
Random intercept (var(_cons))	0.13	0.03	0.13	0.09	0.10	0.01

Note: Data of the project Preschool Education and Educational Careers among Migrant Children. Standardized coefficients from linear growth curve models (random coefficient models), *p < .05; **p < .01; ***p < .001.

coefficients are not easily compared. In models 1-5, all areas of exposure have a significant influence on Turkish-language ability. The composite model shows again, that the family is the biggest, but also media and preschool are important variables of exposure that explain the dependent variable. In comparison to the single models 1-5 only the influence of friends (and also the sex of the child) is reduced strongly in model 6.

4.3. Summary

We have shown that various contexts of language exposure are important for the Turkish-language ability of immigrant children. Invariably, all linear models show that greater exposure is associated with greater Turkish-language ability of the child, and thus leads us to accept our first hypothesis. This is new a new result in German research, because data with objective information on the heritage language were not available before.

Second, all of these findings can in some aspects be confirmed longitudinally by the growth curve models (hypothesis 2).

Our third hypothesis was rather explorative. We can confirm that family exposure is really important, as are media and preschool (negative). The influence of peers was not expected to be large for children aged three to four because at this age they spend most of their time in the familial environment.

5. Conclusion and discussion

In Germany, 35% of preschool children have a migration background (Bundesministerium für Migration 2012) and the largest group has a Turkish background. These children face the challenge of living in a country where the official language is different from the language of their relatives. Although these children, and sometimes even their parents, were born in Germany, in many cases both are far from being perfectly bilingual and often use Turkish as their language of communication at home (cf. influence of ethnic residential concentration by Vervoort, Dagevos, and Flap 2012). This is one reason why immigrants – especially the biggest immigrant group: Turkish people – often suffer from disadvantages at school, in the labour market and even in everyday life. Most of the previous research conducted was interested in the German-language ability of those immigrants; however, maintenance of the heritage language and ethnic culture can facilitate immigrants' psychological adjustment (Oh and Fuligni 2010), as well as family cohesion or even adjustments in the ethnic community (Tseng and Fuligni 2000). For this reason, this paper explores how children of immigrants, who are being raised in Germany and are attending German (pre)schools, are able to learn their heritage language. Therefore the paper has tried to answer the question of which determinants are most important in order for such preschool children in Germany to learn Turkish. Based on different theoretical models, language exposure seems to be most important. Exposure can occur in very different settings, such as within the family, during preschool, via media or through peers. These settings also differ in their necessity of active exposure (e.g. communication within the family) or passive exposure (watching television). In sum, our findings confirm our hypotheses. Exposure in general has a very important influence on the language ability of young immigrant children. The main influence is of course through the parents and their own Turkish-language ability. However, other contexts are also important.

We find that the duration of preschool attendance is negatively associated with the Turkish language in the GCM models and in the first waves in the OLS regression, which shows that preschools in Germany mainly support the German language. However, in wave 3 of the OLS regressions there is no significant influence on Turkish-language ability. This might be because in later ages the maintenance of the mother tongue is not determined by preschool attendance but rather by other factors.

In addition, media also seems to be influential, whereas the influence of peers is rather small. This leads to the implication that promotional efforts should not be limited to just one area. For example, programmes to help young children improve their language ability should begin not only at preschool, but also within the family. Considering the German debate, which mainly focuses on the acquisition of German-language competence, our results show that children face different contexts of exposure in which Turkish-language ability is also promoted. Our results show that even though parental influence is the most important, it is not the only influence. If there is a strong political intention to promote just the German language, then those non-parental contexts of exposure should be manipulated. However, we think that it is possible to foster German-language and Turkish-language abilities by stimulating programmes; perfect bilingualism is possible and maintenance of the heritage language does not necessarily mean to weaken the German language.

There are some aspects that have to be considered when interpreting our results. First, the group of Turkish immigrants is rather special because it is the largest immigrant group in Germany and has the biggest disadvantages. Unfortunately, the data include no information about other ethnic groups. Our results thus should be replicated with other, and also with smaller immigrant groups. Second, all variables of exposure are measured in a quantitative way, so that we have no information about the quality of the exposure (e.g. we do

not know what kinds of television programmes children watch; we just know in which language). Especially in view of the debate between Linebarger and Walker (2005), it would have been desirable to know more about the quality of language exposure. Third, some influences on language might be important at later age levels (e.g. media and books are perhaps not that important for three-year-olds. However, looking at Table 1, variance in these aspects seems sufficient to analyse them and they therefore should be considered in the analyses. Lastly, although our data are one of the very few projects in that they measure the heritage-language ability of immigrant preschool children in Germany; a multidimensional language assessment (e.g. including a measurement of grammar and other language dimensions) would be very useful.

Nevertheless, our results confirm the importance of exposure and different contexts of exposure on language abilities. This was only possible because we used data on the ability of immigrants to use their heritage language. Such data are very rare. Future research should focus on different ethnic groups and measure the areas of exposure considering quantitative and qualitative aspects.

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Notes

1. The numbers of cases differ between the models because the OLS models just include those cases without missing information for all variables in one wave. In contrast, the GCM also includes cases with missing information in one (N = 162) or two (N = 75) panel waves. The average number of observations per family is 2.4 in the GCM.
2. We divided these hours by 600, a figure that represents 25 hours/week for half a year (which is used quite regularly).
3. We divided the number of books by 10 to allow easier interpretation of coefficients.
4. In all models we checked for multicollinearity, but the variance inflation factor (VIF) was always below 2, indicating no problem of multicollinearity in any reported model.

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