

Sociolinguistic predictors of language deficits in pre-school children with and without immigrant background

Eugen Zaretsky^{1,*}, Harald A. Euler³, Katrin Neumann³, Benjamin P. Lange^{1,2}

¹Department of Phoniatics and Pediatric Audiology, University of Frankfurt/Main, Germany

²Institute of Medical Psychology and Medical Sociology, Center of Psychosocial Medicine, Faculty of Medicine, University of Göttingen, Germany

³Department of Phoniatics and Pediatric Audiology, Ruhr-University Bochum, Germany

*Corresponding author.

Department of Phoniatics and Pediatric Audiology

University of Frankfurt/Main

Theodor-Stern-Kai 7, house 7a

60590 Frankfurt/Main, Germany

Telephone: +49 (0)69 - 6301 7272

Fax: +49 (0)69 - 6301 5002

E-mail: yevgen.zaretsky@kgu.de

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Abstract

Several potential predictors of language deficits caused by sociolinguistic factors were examined on the basis of a sample of German pre-school children with and without immigration background ($N = 741$, age range 60-99 months, median 70). A classification tree was calculated in SPSS 20 with a division of children in those needing or not needing special educational support in learning German. The model predicted correctly 71% of this dependent variable. Highest priority for the classification was attributed to the fathers' educational level, followed by the immigrant background and illnesses or impairments which influence negatively the language acquisition. Some other factors were not significant: age, sex, mothers' education, parents' language disorders etc. It is probable that the fathers' education is an indirect link to his IQ and/or the family's income which pre-determine other factors influencing language acquisition.

Topic: Sociolinguistics

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¹Department of Phoniatics and Pediatric Audiology, University of Frankfurt/Main, Germany

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³Department of Phoniatics and Pediatric Audiology, Ruhr-University Bochum, Germany

In the recent decades, Germany has been facing the challenge of integrating immigrants from many different countries, especially, from Turkey and Eastern Europe. In this short article, some sociolinguistic factors are discussed which might influence the language acquisition/learning progress in German and immigrant preschool children. The variable of interest was a classification of all children as those needing (EH) or not needing (NEH) additional educational help in learning/acquiring German. EH-children were defined as those whose language skills were below the 17th percentile of the reference group (1 standard deviation below the mean), with separate test norms for Germans and immigrants. For instance, if the child's grammar skills correspond to the 4th percentile in the reference population, it means that only 4% of tested children had the same or worse grammar skills. The classification as EH usually presupposes that the child might profit not from language therapy, but rather from educational help, that is, language courses or special language training. However, it does not preclude that the child might also have some medical issues.

As has already been shown for one of the databases used here, extralinguistic factors do influence the language acquisition progress in some immigrant groups (Zaretsky, Neumann, Euler, & Lange, 2013). For instance, Turks acquire German under very unfavorable conditions, which means that they have very little contact to German and Germans in the first years of life. Consequently, their progress in the acquisition of the German language is minimal in comparison with other immigrants. Russian speaking children, on the contrary, acquire German under better conditions and show significantly better language progress. In the present study, the language status of all immigrant children as one group is examined.

In order to assess the language status of the test subjects, at least two effective methods are available: a general language test and a plural test. Indeed, results of the plural tasks are so

closely associated with the performance in other language domains that one can draw reliable conclusions on the language development of the child on the basis of the plural error patterns alone (Zaretsky et al., in press; Zaretsky, Lange, Euler, & Neumann, 2013). Unfortunately, the research on the German plural patterns often resulted in confusing and contradicting findings, probably due to limited sample sizes and inconsistent study designs. For instance, according to Schaner-Wolles (1989), only 20% of the four-year-old Germans were able to produce the correct plural form of the noun *Apfel* ‘apple’. However, these 20% referred to only two children out of ten. In one of our databases (4,280 four-year-old monolingual Germans tested with a modified version of the speech and language screening Marburger Sprachscreening (Euler et al., 2010; Neumann et al., 2011)), more than two-thirds of the children produced this particular plural form correctly. In her small longitudinal study of German preschool children, Szagun (2001) found a tendency to substitute the plural marker *-s* with *-er* (e.g., *Autos* > *Auter* ‘cars’). In our large-scale data, such overgeneralizations never occurred. Bittner and Köpcke (2001) analyzed only 67 wrong plural forms produced by eight German preschoolers and came to the conclusion that the omission of *-l* after a schwa (*Vöge* instead of *Vögel* ‘birds’) belongs to the most frequent error patterns in plural acquisition (15% of all errors). In our data, among more than 4,000 wrong plural forms, only seven such omissions occurred, all with the nonsense word *Tapsel* (*Tapse*). Obviously, a very rare phenomenon which happened to occur several times in the small sample of Bittner and Köpcke (2001), probably due to idiolectal or dialectal peculiarities, was erroneously described as one of the most widespread pluralization patterns. In spite of these contradicting findings, we demonstrated in Zaretsky et al. (in press) that certain plural error patterns are clearly associated with the advanced or limited command of German and that plural tasks correlate highly with the overall language status. In the present study, we utilized the grammar subtest from the widely used German language test SETK 3-5 (Grimm, 2001) for the assessment of the language status additionally to MSS. This grammar subtests contains only plural items.

Here, the sample is not subdivided into further groups, as such subdivisions are to be analyzed in other publications. Instead, factors predicting the classification as EH or NEH are analyzed for all children acquiring German. Nevertheless, the immigrant background is taken into account as one of the (dichotomous) variables which might influence the classification as EH or NEH.

Methods

Extralinguistic variables were assessed by questionnaires which belong to a new modified, validated version of the speech and language test Marburger Sprachscreening (MSS). The

questionnaires were filled out by parents and daycare center teachers. First, extralinguistic variables from questionnaires were analyzed on the basis of a large sample ($N = 2,857$) of children acquiring German: 1,560 boys (55%) and 1,297 girls (45%), age range between 36 and 92 months, median 51 months. According to questionnaires and information from the daycare centers, 1,698 of these children were monolingual Germans and 1,159 children were either bilingual and/or had another mother tongue than German. Taking into account that the MSS questionnaires had already been validated, we expected that most of the factors would yield significant results.

All children were tested with MSS. A subgroup ($N = 1,521$) was also tested with the grammar subtest (plural tasks) of the language test SETK 3-5. Because the point biserial correlation between the SETK 3-5 plural score and the classification of all children as needing or not needing additional medical or educational support in learning German was almost as high as for the MSS total score ($r_{ps} = -.655, N = 1,298$, vs. $-.704, N = 1,401, ps < .001$), SETK 3-5 result can be considered an additional examination of the language status (and not only of grammar skills) of the test sample. The Spearman correlation coefficient between SETK 3-5 and the total score of correct answers in MSS was even higher: $\rho = .782, p < .001, N = 1,521$. On the basis of the language tests, audio records, and questionnaires for parents and daycare center teachers, all children were classified as EH or NEH by speech and language therapists and researchers with a PhD in linguistics.

Sociolinguistic variables from questionnaires for parents and daycare center teachers were assessed by means of correlations and cross-tables with the variable of interest, namely classification of all children as EH or NEH. For dichotomous data, Pearson's dichotomous correlations were utilized because they specify the direction of the link (positive or negative correlations) and its strength. For the metric variables, point biserial correlations were utilized. For ordinal variables, not Pearson's Chi-Square values, but linear-by-linear associations (L-b-L) were calculated because they deliver more precise results in such cases. For nominal variables with more than two categories, Chi-Square values were calculated.

All sociolinguistic variables which yielded significant or marginally significant ($p \leq .09$) results, entered the second part of the study. This part aimed at the identification of the most important sociolinguistic variables by means of the classification tree (growing method: Exhaustive Chi-square Automatic Interaction Detectors). Classification trees visualize hierarchical relations

between factors, with the most important ones on top. Bonferroni adjustment of the p -value was applied automatically in SPSS. The dependent variable was the classification of children as EH or NEH.

The second sample consisted of 741 children: 393 boys and 348 girls, age range 60-99 months, median 70. Not all of the children could be unanimously classified as Germans or immigrants, but according to the information from questionnaires and testers, 288 children (39%) were Germans and 412 children (56%) were immigrants. Children were tested with several language tests appropriate for their age: ETS 4-8 (Angermeier, 2007), AWST-R (Kiese-Himmel, 2005), Mottier (Mottier, 1951), and S-ENS (Döpfner, Dietmair, Mersmann, Simon, & Trost-Brinkhues, 2005) including some additional validated tasks called S-ENS b below. The same linguistic domains were examined as in the first part of the study: speech comprehension, vocabulary, grammar, articulation, and phonological short-term memory. The tests were provided during the school enrolment examination. On the basis of the test results, the children were again classified as EH or NEH by the language experts.

Both samples of children were tested in daycare centers, but in case of the second one three public health centers were also involved. Parents were asked to sign an informed consent beforehand. All tests were conducted between the years 2008 and 2012, mostly in the German state of Hesse.

Immigrant background was one of the most important variables in the database used in this study. As was shown in Zaretsky et al. (2013) and Zaretsky et al. (in press), where the same database was used, the differences between children with and without immigrant background were highly significant for any language test and subtest. In the present study, we visualize these differences by means of boxplots with total scores of several language tests. The Results section begins with this visualization. After that, the sociolinguistic factors associated with the classification of children as EH and NEH are analyzed separately for the Germans, immigrants, and for both groups together. Finally, the most important factors are identified by means of the classification tree.

Results

The differences between test total scores of Germans and immigrants in both parts of the study are visualized in four boxplots, see Figure 1.

Figure 1. Boxplots with the total scores of the language tests MSS (speech comprehension, grammar, vocabulary, articulation, phonological short-term memory), ETS (grammar, speech comprehension), S-ENS b (speech comprehension, grammar, vocabulary), and AWST-R (vocabulary).

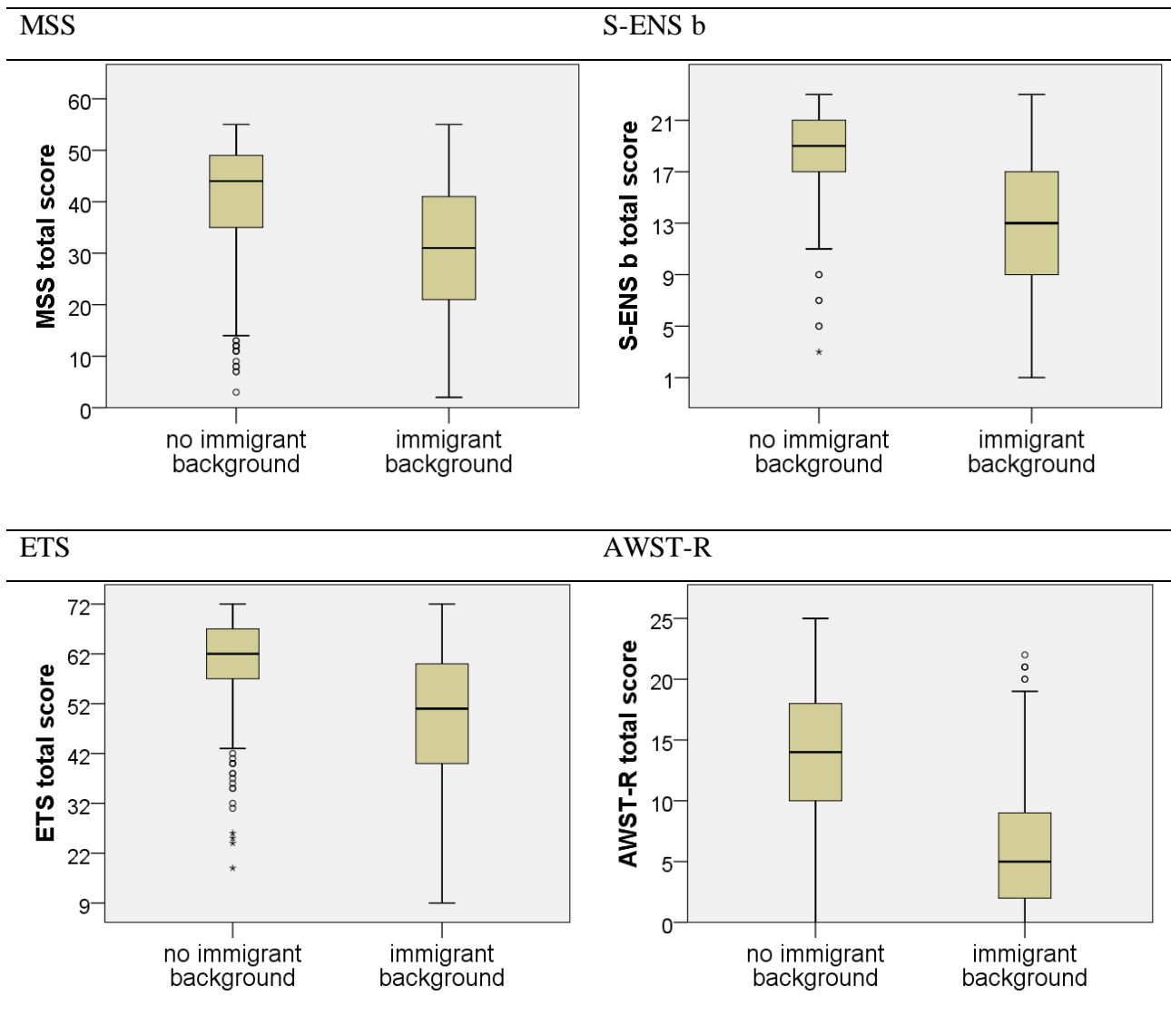


Figure 1 visualizes the necessity of presenting the study results for children with and without immigrant background separately. The boxes show the median, the first and third quartiles. 50% of all cases (here: tested children) are represented within the box. About 95% of all cases are

located within the whiskers. Except for AWST-R where the length of the whiskers for both groups cannot be clearly identified, the results for immigrant children indicate more variance. For all four tests, lower median values for immigrant children are obvious.

Results of the first part of the study – identification of sociolinguistic variables associated with the classification of children as EH/NEH – are given in Table 1. Some questions referred only to immigrant families (e.g., the age when parents began to learn German). Such questions are not mentioned in the columns “Germans” and “Both Germans and immigrants”. Exact significance values are given only for significant or marginally significant results (marked bold in Table 1).

Table 1. Relevance of variables from questionnaires for daycare center teachers and parents for the classification of German preschool children as those needing or not needing additional educational support in learning German.

Sociolinguistic factors from the questionnaires	Germans		Immigrants		Both Germans and immigrants	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Pearson’s dichotomous correlations						
Sex of the child	-.062	.018	-.070	.023	-.064	.001
Attendance of a nursery school in the first two years of life	.118	.006	.167	.002	.189	<.001
The child attends daycare center for half a day or a full day	-0.45	>.05	-.109	.075	-.035	>.05
The child attends daycare center regularly	.012	>.05	.093	>.05	.108	.008
The child has an illness or an impairment which influence negatively the language acquisition	-.265	<.001	.154	.016	-.175	<.001
There is at least one more child in the daycare center group who speaks the same foreign language	-	-	-.170	.011	-	-
The child is a member of some association or study group	.132	<.001	.204	<.001	.236	<.001
The child plays with German	-	-	.187	<.001	-	-

speaking children after the daycare center time

The child speaks his/her mother tongue appropriate for his/her age	-	-	-.038	>.05	-	-
The child has often otitis media	.037	>.05	.270	<.001	.077	.051
Problems with reading and writing in the family	-.110	.003	.017	>.05	-.021	>.05
Language disorders in the family	-.090	.016	-.046	>.05	-.029	>.05
Stuttering in the family	.102	.070	.125	.016	.090	.018
The child has a permanent hearing disorder	.091	>.05	.011	>.05	.025	>.05
The child has a permanent visual disorder	-.072	>.05	-.060	>.05	-0.46	>.05
The child had a preterm or risk birth, or its birth weight was less than 1500 gr	.363	<.001	0.15	>.05	.146	.005

Cross-tables

	χ^2 or L-b-L	<i>p</i>	χ^2 or L-b-L	<i>p</i>	χ^2 or L-b-L	<i>p</i>
The child likes to play with other children	20.71	<.001	6.84	.009	30.93	<.001
The child speaks out when playing with other children	37.60	<.001	29.10	<.001	88.68	<.001
The child plays with German children	-	-	21.66	<.001	-	-
Age when the child had enough language contact to learn German	-	-	105.00	<.001	-	-
How often the child speaks with other immigrants in his/her mother tongue	-	-	.44	>.05	-	-
The child does not hear well	35.80	<.001	17.15	<.001	41.75	<.001
Educational level of the mother	-*	-	12.49	.014	12.22	.016
Educational level of the father	-*	-	7.31	>.05	8.09	.088

Point biserial correlations

Age when the mother began to learn German	-	-	.248	.003	-	-
Age when the father began to learn German	-	-	.135	>.05	-	-
Age of the child in months	-.018	>.05	-.121	<.001	-.055	.007
Length of daycare center attendance in months	-.051	>.05	-.207	<.001	-.143	<.001

*not enough cases

All significant and marginally significant factors were utilized for a classification tree with the second sample, that is, a sample of 741 German and immigrant children tested during the school enrolment examinations, see Table 2.

EH	63.9	483	36.9	24	EH	17.7	25	51.7	93
Total	72.6	756	6.2	65	Total	19.0	141	24.3	180

The child has an illness or impairment which influences negatively the language acquisition. $\chi^2_{(1)} = 9.65, p = .008$

Node 8. No			Node 9. Yes	
Category	%	n	%	n
NEH	93.5	58	73.4	58
EH	6.5	4	26.6	21
Total	8.4	62	10.7	79

Discussion

In this study, some extralinguistic factors which might influence or might be associated with the classification of German and immigrant children as those needing (EH) or not needing (NEH) additional educational support in the language learning were scrutinized. First, questionnaires for parents and daycare center teachers were examined in respect to the correlations or associations with the classification of children as EH or NEH. Because the questionnaires had already been validated as a part of a new version of the speech and language test MSS, most of the factors yielded significant results for our study sample as well. Next, extralinguistic factors which had been shown to be relevant entered a classification tree with the classification of children as EH or NEH as dependent variable in order to identify the most important variables associated with the language development of the German preschool children. Another sample of children was tested linguistically and classified as EH or NEH by the same language experts. Fathers' educational level was shown to be of the utmost value, followed by the immigrant background and impairments or illnesses which influence negatively the language acquisition.

In the first part of the study, namely the validation of the extralinguistic factors, no contra-intuitive results were identified. Children who need additional language training are more often male than female (although the association was very weak), they do not attend the daycare center regularly, have various comorbidities (e.g., hearing disorders), are not members in any associations or study groups, have various language disorders or problems in the family, or had a preterm or risk birth. Also, they do not like to play with other children, do not speak out when playing, and the educational level of their parents is comparatively low. In our sample, such children were also a little younger and attended daycare center for a shorter period of time (in months) than NEH-children. For the linguistic development of immigrant children it is also of importance whether they attend daycare center for a full day or half a day (the longer the better for their language status), whether there are other children in their daycare center group who speak the same foreign language, and whether they play with German children. Very important is the age when immigrant children began to acquire German. Even the age when their mothers began to learn German was of significant importance.

In the second part of the study, relevant factors entered a classification tree with the classification of children as EH or NEH as the dependent variable. The variable with the highest ranking for this classification was the fathers' educational level. The higher the educational level of the fathers, the less likely children were classified as EH. For children whose fathers had an average or high educational level, the immigrant background also played an important role (immigrant children were more often classified as EH) and for children whose fathers had an average educational level, the presence or absence of medical issues was identified as a relevant factor (children with language-related impairments and illnesses were more often classified as EH). For the children whose fathers had a low educational level, no further important factors were found.

The educational level of fathers is probably closely associated with other factors which could not be documented due to ethical or organizational reasons, e.g., IQ of the child or income of the family. Unfortunately, the question on the educational level was also answered very reluctantly by our participants. It is to be assumed that families where fathers have a high educational level and earn comparatively much can afford more expensive and more sophisticated toys (which might result in a better cognitive training), more private tutors, and better educational facilities. For instance, it has been shown that children learn German more quickly in better equipped preschool facilities (that is, facilities with more books, more space, more games, and learning materials) than in less equipped ones (Becker, 2010). Also, such families are probably more liable to be in contact with other individuals or families with a high educational level, which guarantees a qualitatively and quantitatively better language input for children in comparison with the children from less educated and poorer families.

Our results are in accordance with the results of the PISA study that confirmed that in almost no other country social and ethnic background as well as educational background of parents determine student achievement as much as in Germany (Entorf & Minoiu, 2005). For instance, the gap between the most disadvantaged immigrant group (that is, children of foreign parents who speak a foreign language at home) in reading skills and the group of natives (children who were born in Germany and speak

German at home) amounts to 105.7 PISA score points for Germany, cf. 27.5 points for Australia and 25.5 for Canada (Entorf & Minoiu, 2005).

To sum up, according to our findings, advances in the acquisition / learning of the German language depend predominantly on the educational level of the fathers (that is, probably linked to family income and other factors such as IQ) and on the immigrant background. These results are in accordance with the findings of the PISA study that revealed that in Germany the reading scores of school children depend to a very large extent on the income, immigrant background, and educational status of the parents.

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