SOCIOLINGUISTIC FACTORS INFLUENCING LANGUAGE DEVELOPMENT IN GERMAN PRESCHOOLERS WITH MEDICAL ISSUES IN THREE FOLLOW-UP STUDIES

Eugen Zaretsky[1*] and Benjamin P. Lange[2]

[1]Dr. phil., Department of Phoniatrics and Pediatric Audiology, University Hospital of Frankfurt/Main, GERMANY, yevgen.zaretsky@kgu.de

[2]Dr. phil., Department of Media Psychology, Institute for Human-Computer-Media, Faculty of Human Sciences, Julius Maximilian University of Wuerzburg, GERMANY, benjamin.lange@uni-wuerzburg.de

*Corresponding author

Abstract

The study aimed at the identification of sociolinguistic factors associated with changes in the classification of German preschool children as those needing or not needing medical assistance in acquiring/learning German. In three studies, 508 German and immigrant children were tested twice with validated, age appropriate language tests with a time span of several months in between. After each test session, a group of language experts classified all test participants as needing or not needing medical help in acquiring German. Differences between these two classifications of the participants were categorized as “worse – the same – better”. Afterwards, these differences were cross-tabled and correlated with the sociolinguistic variables from questionnaires for parents and daycare center teachers. The significant factors entered regressions and classification trees as independent variables for the prediction of the changes (“worse – the same – better”) in the classifications of children. The most relevant factors were immigration background, language disorders in the family, and language therapy. Most children whose classification changed to “better” were immigrants who just began to acquire German. Children whose classification changed to “worse” had family members suffering from language disorders. Other factors associated with changes in the classification of children were, among other things, whether the child attended a nursery school in the first two years of life, the participation in language courses, time span between two test sessions, whether the child played with German-speaking children after the daycare center time, and age when the child had enough language contact to learn German.

Keywords: language acquisition, language disorder, German language, language assessment, language impairment

1. INTRODUCTION

The acquisition of the first (L1) and second (L2) language can be linked to a number of extralinguistic and intralinguistic factors such as morphosyntactic complexity of the language, quantity and quality of the language contact, and various psychological and physiological characteristics of the language learner. The latter are associated with a genetic predisposition for language disorders, acquired or prenatal illnesses and impairments, but also with the access to modern and effective medical therapies, because simple language courses do not eradicate the underlying cause of the language problems and cannot accelerate the language acquisition process considerably.

Whether the child can overcome his or her medical issues, also depends on a number of factors, including sociolinguistic/demographic ones. This study aimed at an examination of such factors in three samples of German preschoolers with and without immigration background. All children were tested twice with different time spans in between depending on the study designs of the three different studies presented below. Test participants were recruited without any special pre-selection, which means that most of them had no medical issues. After both test sessions, all children were classified as needing or not needing medical help, that is, medical examinations and therapies, because of diagnosed or assumed language-related illnesses or

ISBN: 978-605-64453-2-3

impairments. Factors associated with changes between two test sessions in the classification of children as needing or not needing medical help were the subject of this study.

It was hypothesized that normally developed children, especially those without immigration background, had already acquired German to a considerable extent before the first test session. Their classification between two test sessions as “worse – the same – better” could not change much because they had already been good before the first test session (ceiling effect). Children with medical issues and with a limited contact to the German language, that is, those who acquire it as L2, were hypothesized to be in a process of active language acquisition. For this group, one could predict changes from a bad to a better language competence in case of adequate therapies and intensive language contacts. Both monolingual German and immigrant children with a known genetic predisposition for language disorders were expected either to get worse or to stay on the same (low) level of the language acquisition between two test sessions.

It is self-evident that other analyses of comparable variables are possible on the basis of the same data. One of such analyses by the same authors is published in these Conference Proceedings.

2. METHODS

2.1. Test subjects and tests

In all three studies, preschool children acquiring German were tested twice with validated speech and language tests within a time span of several months in between. For an overview of the sample sizes, time spans, tests used, time, and location of all three studies, see Table 1.

All children were classified by language experts (speech and language pathologists and researchers in clinical linguistics) as needing (CLIN) or not needing (ND) additional medical help in acquiring German. Children classified as CLIN scored very low in the language tests (usually below the 6th percentile of the reference population) and had or might have had comorbidities like hearing disorders, Down syndrome or specific language impairment according to the available sociolinguistic information. The classification as CLIN or ND was carried out on the basis of audio recordings of the tests, test batteries, and questionnaires both after the first and after the second test sessions.

Table 1. Sample sizes, tests used, time spans, and location of all three studies

	Study 1	Study 2	Study 3
N	209	134	165
N boys	115 (55%)	82 (61%)	99 (60%)
N girls	94 (45%)	52 (39%)	66 (40%)
N MO	142 (68%)	3 (2%)	60 (36%)
N BM	67 (32%)	131 (98%)	105 (64%)
Age range, 1st session	48-55 months	48-53	37-68
Age median, 1st session	51 months	50	50
Age range, 2nd session	60-78 months	54-60	60-81
Age median, 2nd session	65 months	56	66
ND (1st session)	160 (77%)	109 (81%)	147 (89%)
CLIN (1st session)	49 (23%)	25 (19%)	18 (11%)
ND (2nd session)	171 (82%)	117 (87%)	141 (86%)
CLIN (2nd session)	38 (18%)	17 (13%)	24 (14%)
Result ND→CLIN	30 (14%)	7 (5%)	8 (5%)
Result ND→ND or CLIN→CLIN	138 (66%)	112 (84%)	144 (87%)
Result CLIN→ND	41 (20%)	15 (11%)	13 (8%)
Tests	MSS b → MSS b	MSS b → MSS b	MSS b → S-ENS
Time span in months between test and retest (range)	11-16	4-7	9-33
Time span in months between test and retest (median)	13	6	15
Questionnaires: 1st session	for parents and daycare center teachers	for parents and daycare center teachers	for parents and daycare center teachers
Questionnaires: 2nd session	for daycare center	for daycare center	for parents

ISBN: 978-605-64453-2-3

	teachers	teachers, short version	
Time of test conduction	2007-2008	2010	2008-2011
Test location	daycare centers	daycare centers	public health departments and daycare centers
Region	state of Hesse	state of Hesse	state of Hesse

ND = normally developed, CLIN = needing clinical assistance in acquiring German, MO = monolingual Germans, BM = bi-/multilingual children

Only monolingual German children were classified as MO. Children who spoke not only German but also (an)other language(s) at home were classified as BM (see Table 1). Some data on BM children were collected, although the samples varied depending on which questionnaire items were used in which study and how many parents and daycare center teachers were willing to answer them. For all three studies taken together, the following descriptive statistics were obtained:

1. The age when BM children began to learn German (*N*s): from the birth on – 38 (34%); in the first year of life – 4 (4%); in the second year of life – 9 (8%), in the third year of life – 15 (14%), in the fourth year of life – 45 (41%), *N* = 111.
2. The length of daycare center attendance varied between 0 and 48 months (values above two years are, however, not realistic and might be traced back to the attendance of nursery schools located in the same daycare centers), median = 14, *N* = 182;
3. Mother tongue: 46 children spoke Turkish (18%), 21 Russian (8%), 25 Italian (10%), 25 Arabic (10%), other languages were spoken by groups smaller than 5%, *N* = 260.
4. German skills at the beginning of daycare center attendance were estimated with school marks by daycare center teachers (German school marks range from 6 “very bad” to 1 “excellent”): 6 – 35 (30%), 5 – 27 (23%), 4 – 17 (14%), 3 – 13 (11%), 2 – 14 (12%), 1 – 12 (10%), *N* = 118.
5. German skills of BM children at the time point of the first test session were also estimated with school marks by the same daycare center teachers: 6 – 0 (0%), 5 – 15 (12%), 4 – 19 (16%), 3 – 35 (29%), 2 – 30 (25%), 1 – 22 (18%), *N* = 141.
6. According to the parents, 44 (23%) children who spoke predominantly (an)other language(s) than German at home, spoke it not appropriately for their age, and 151 children (77%) appropriately for their age, *N* = 195.
7. The age range when mothers of BM children began to learn German was 0-36 years (median = 20; *N* = 155), the age range of fathers was 0-50 years (median = 20, *N* = 164).

Some medical aspects were documented in the questionnaires for parents and daycare center teachers. The following results are valid for BM and MO children from all three studies taken together:

1. According to the parents, 7 children (5%) had some impairment or illness which influenced the language acquisition negatively; 147 (95%) had none, *N* = 154.
2. According to the parents, in the families of 17 children there were relatives with language disorders (8%), 197 had none (92%), *N* = 214. Also, in the families of 26 children (13%) some relatives had “problems with reading and writing”, whereas 177 (87%) had none, *N* = 203.
3. According to the parents, 36 children (9%) underwent a language therapy, 376 did not (91%), *N* = 412.
4. According to the daycare center teachers, 14 children (4%) did not hear well often or always, and further 389 children (96%) heard well always, often or sometimes, *N* = 403.

All parents had signed informed consent before the first test session and received information on the test results after both sessions. Consequently, parents were informed about the need of medical help or of medical examination of their children.

Language tests used were modified, validated versions of the Marburger Sprachscreening (MSS b; Euler et al., 2010, Neumann et al., 2011a) and the validated test S-ENS (Döpfner et al., 2005) with some additional validated tasks (S-ENS b; Neumann et al., 2011b). Both include subtests on grammar, vocabulary, articulation, speech comprehension, and phonological short-term memory.

The analysis was carried out retrospectively on the basis of the data gathered for the studies on the validation of two language tests. In Study 1, which is chronologically the oldest one, no tasks on phonological short-term memory were presented in the first test session because these did not yet exist. In Study 2, test versions compared in the first and second sessions were identical. In Study 3, children were first tested with MSS b and then retested with S-ENS b because they were too old for MSS b.

ISBN: 978-605-64453-2-3

No exclusion criteria except inappropriate age were applied in the original studies. In Study 2, however, the original study design aimed at the validation of MSS b for BM children only. This explains why only three MO children were tested. Also, no special criteria were utilized for the choice of children to be retested, that is, all children recruited for the first test session were invited to participate in the second one.

Because the classification of children as CLIN and ND was carried out to a certain extent subjectively, that is, without a medical examination and on the basis of audio files, questionnaires, and test batteries only, the quality of the classification was controlled for 105 children who were classified as CLIN due to a high probability of central or peripheral hearing disorders (Neumann et al., 2011b). These children were invited to the Department of the Phoniatrics and Pediatric Audiology of the Frankfurt University Hospital and examined audiologically with the Göttinger Kindersprachverständlichkeitstest (Chilla et al., 1976, Gabriel et al., 1976), the Oldenburger Kindersatztest (OlKiSa; Wagener and Kollmeier, 2005), the Uttenweiler dichotic test (Uttenweiler, 1980; auditive separation), the Mottier test (Mottier, 1951), Transiently Evoked Otoacoustic Emissions (TEOAE), Distortion Product Otoacoustic Emission (DPOAE), tympanometry, and ENT mirror examination including ear microscopy. The need for the medical intervention was identified in 96% of children who were classified as CLIN. Out of 105 medically examined children, 101 had either central or peripheral hearing disorders.

2.2 Statistical analyses

Non-parametric tests were used because the metric data were not normally distributed according to the Kolmogorov-Smirnov test (ps < .05). Differences in language scores between CLIN and ND children are demonstrated by means of Mann-Whitney *U*-Tests for the total number of correct answers in the MSS b subtests. The non-parametric effect size $\hat{p}$ is provided for this test (Grissom and Kim, 2012). Also, the differences are visualized in a boxplot and in a diagram representing the language development between the first and second test sessions for ND and CLIN children, also under consideration of possible differences between MO and BM children.

Sociolinguistic variables from questionnaires for parents and daycare center teachers (categorical and nominal data) were cross-tabbed with the changes in the CLIN/ND classification “worse – the same – better”: (1) “worse”: ND → CLIN (children who were classified as normally developed after the first test session and as needing medical help after the second one); (2) “the same”: ND → ND or CLIN → CLIN (children whose classification did not change between two sessions); (3) “better”: CLIN → ND (children whose classification improved and who did not need medical help anymore according to the second classification). Spearman-correlations were calculated for the metric data from questionnaires and changes in the classification. Sociolinguistic variables of interest were immigration background (BM vs. MO), gender, age in months in the first and second test sessions, the time span between test sessions in months, language(s) spoken at home, length of daycare center attendance in months, whether the child attended a nursery school in the first two years of life, whether the child attended the daycare center regularly, for half a day or a whole day, languages spoken by parents, length of contact of the child and parents to the German language, language disorders in the family, whether the child played with German speaking children during and after the daycare center time and spoke out when playing, whether he or she (had) underwent a language therapy, whether the child was a member of some study group or association, and educational level of the parents.

For all three studies, regressions were calculated in order to predict the language development of the children classified as “worse – the same – better”, which was the dependent variable in all regressions. The independent variables were sociolinguistic factors identified as relevant in the cross-tables and in the correlations with the classification “worse – the same – better”.

Additionally, a classification tree (growing method “Exhaustive CHAID”) was utilized for the examination of all three studies taken together. The dependent variable was in this case not the classification “worse – the same – better”, but *z*-transformed changes in rankings of children between the first and second sessions. The higher the rank, the better the result (number of correct answers) in the language test. For instance, if the child had a rank 6 in the first test session and a rank 10 in the second one, then it means that his/her value in the dependent variable was -4. Because of the different sample sizes in three study arms, the rankings were *z*-transformed. The dependent variable contained 190 test results of Study 1, 122 results of Study 2, and 132 results of Study 3. Independent variables in the classification tree were items from questionnaires for parents and daycare center teachers, without any pre-selection. The classification tree aimed at an identification of sociolinguistic variables associated with the language development, but, because of its metric nature, it was supposed to be more sensitive and precise than the analysis of the variable “worse – the same – better”.

ISBN: 978-605-64453-2-3

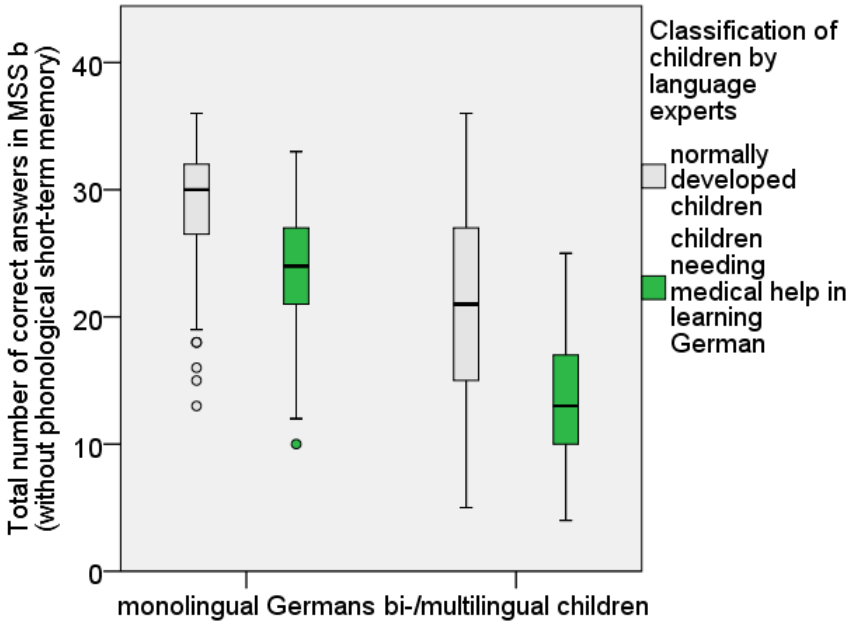
All data were processed using SPSS 20 (International Business Machines Corp., New York, USA). $P < .05$ was considered to indicate a statistically significant difference. All results are reported as two-tailed if not stated otherwise.

3. RESULTS

3.1 General comparison of CLIN and ND children for all three studies

Both BM and MO children classified as CLIN scored lower than those classified as ND. This is exemplified here for the total number of correct answers in MSS b for all three studies taken together (see Figure 1).

Figure 1. Total number of correct answers in MSS b in the answers of children classified as needing or not needing additional medical help in learning/acquiring German; *N* = 467



In the boxplot, boxes show the median (line in the middle of the box), the first and third quartiles. Fifty percent of all cases (here: tested children) are represented within the box. About 95% of all cases are located within the error bars (whiskers). Phonological short-term memory was excluded because too many children failed to accomplish these tasks.

Also, in all three samples taken together, CLIN children scored significantly lower in all MSS b subtests than ND children according to the Mann-Whitney *U*-test, see Table 2.

Table 2. Means (*M*) and results of the Mann-Whitney *U*-test for the differences between children needing (CLIN) and not needing (ND) medical help in learning/acquiring German

	Speech comprehension	Vocabulary	Articulation	Grammar	Repetition of nonce words	Repetition of sentences
M (*SD*) ND	2.15 (0.94)	5.85 (2.57)	8.62 (1.70)	6.98 (3.93)	2.23 (1.26)	8.30 (4.90)
M (*SD*) CLIN	1.64 (1.02)	4.31 (2.85)	6.21 (2.33)	4.19 (3.67)	1.14 (1.03)	5.03 (3.64)
U	11,210	10,485	6,147	9,203	1,880	1,940
Z	-4.32	-4.43	-8.69	-5.47	-4.66	-3.52
$\hat{p}$	0.36	0.34	0.20	0.31	0.26	0.31
p	< .001	< .001	< .001	< .001	< .001	< .001
N ND	378	376	376	376	207	198
N CLIN	83	81	81	80	35	32

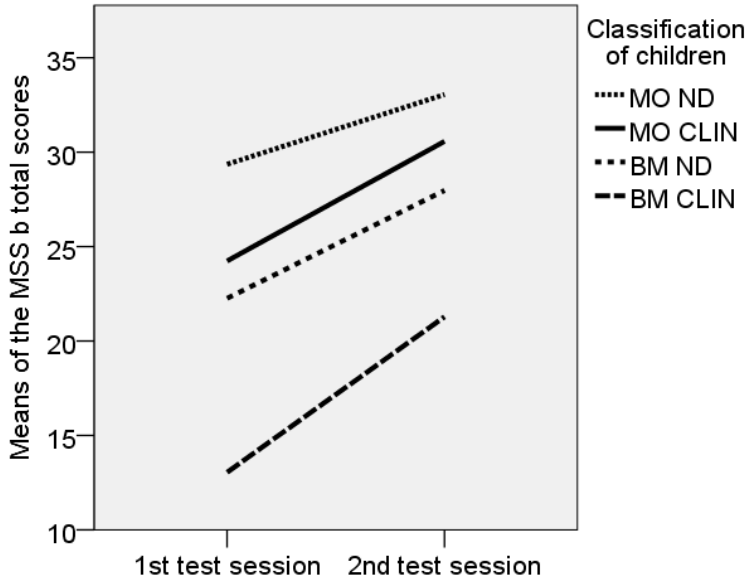
ISBN: 978-605-64453-2-3

Of importance for the interpretation of the results below are also the average MSS b values of BM and MO children from the first and third studies (see Figure 2). The results of the second study could not be visualized because only three MO children were tested. Because in the third study different tests were used for the first and second test sessions, the total scores were *z*-transformed.

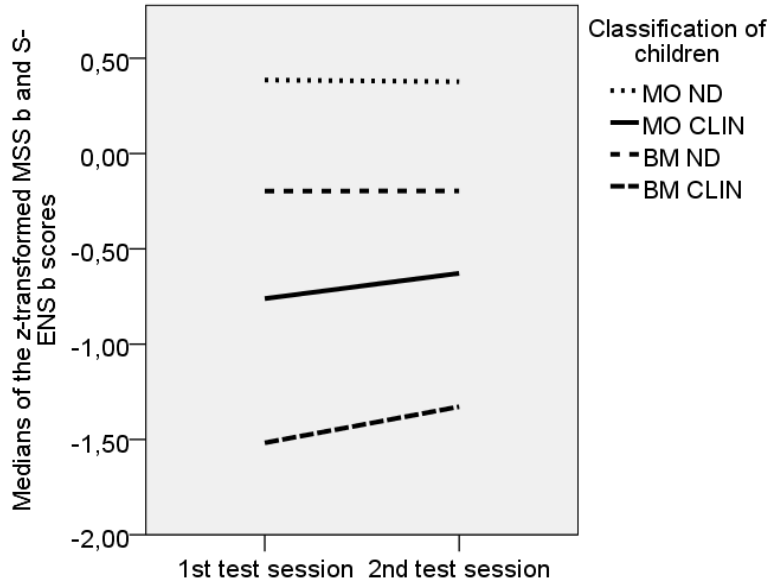
ISBN: 978-605-64453-2-3

Figure 2. Development of the total scores in the language tests between the first and second test sessions

a) Study 1: MSS b → MSS b



b) Study 3: MSS b → S-ENS b



MO = monolingual Germans, BM = bi-/multilingual children, ND = normally developed children, CLIN = children needing medical help in learning/acquiring German

ISBN: 978-605-64453-2-3

All in all, in three studies taken together, more MO children than BM children underwent a language therapy according to the questionnaires for parents: 24 (13%) out of 190 vs. 12 (5%) out of 222. This difference was statistically significant: $\chi^2_{(1)} = 6.70$, $p = .010$, $N = 412$.

3.2 Study 1

In the first study, BM and MO children tested at the age of four with MSS b were retested a year later with the same speech and language test.

In the cross-tables, the following variables from the questionnaires for parents and daycare center teachers yielded significant associations with the classification of results "worse – the same – better" for ND and CLIN children:

1. Parents or teachers: immigration background (BM/MO): $\chi^2_{(2)} = 10.56$, $p = .005$, $N = 209$;
2. Teachers: Language spoken at home (German, German and (an)other language(s), only (an)other language(s)): $\chi^2_{(4)} = 20.76$, $p < .001$, $N = 196$;
3. Teachers: The child attended a nursery school in the first two years of life (yes/no): $\chi^2_{(2)} = 7.52$, $p = .023$, $N = 180$;
4. Parents: The child plays with German-speaking children after the daycare center time (yes/no): $\chi^2_{(2)} = 7.02$, $p = .030$, $N = 54$;
5. Teachers: The child undergoes/underwent a therapy/-ies (yes/no): $\chi^2_{(2)} = 12.01$, $p = .002$, $N = 155$;
6. Teachers: The age when the child had enough language contact to learn German (in years, from zero to four): $\chi^2_{(6)} = 16.62$, $p = .011$, $N = 80$;
7. Teachers: A school mark (1 to 6) for the language competence of the child when he/she began to attend the daycare center: $\chi^2_{(10)} = 22.40$, $p = .013$, $N = 91$;
8. Teachers: A school mark (1 to 6) for the language competence of the child given in the first test session: $\chi^2_{(8)} = 13.97$, $p = .082$ (marginal significance), $N = 74$.

For metric data, only the time span between the first and second test sessions in months yielded a significant correlation with the ordinal classification "worse – the same – better": $r_s = .166$, $p = .030$, $N = 173$. Neither age in months for both test sessions nor length of daycare center attendance in months were significant.

For the categorical regression, all significant variables related to BM children only had to be excluded because they reduced the test sample to $N \leqslant 25$. The remaining variables delivered a highly significant model ($F_{(9, 52)} = 4.26$, $p < .001$) which explained 33% of the variance (adjusted $R^2 = .33$). Only one factor yielded a significant value: school mark for the language competence of the child when he/she began to attend the daycare center (Beta = .649, $p = .029$, importance .907). All other variables were neither significant (ps > .05) nor did they have considerable importance values: immigration background, attendance of the nursery school, school mark for the language competence in the first test session, therapies, time span between test sessions.

It should be noted that the only significant factor, the school mark for the language competence of the child when he/she began to attend the daycare center, correlated significantly with the total number of correct MSS b answers in the first test session: $r_s = -.560$, $p < .001$, $N = 107$.

3.3 Study 2

In the second study, preschool children were tested twice with a comparatively short average time span of six months in between. Because only 2% of the sample were MO children, the variable "immigration background" (BM vs. MO) was excluded from the calculations. All questionnaire items which referred to the BM children only were included.

Only two variables yielded significant χ^2 values when cross-tabled with the classification "worse – the same – better": whether the child undergoes or underwent a language therapy ($\chi^2_{(2)} = 24.38$, $p < .001$, $N = 106$) and whether there is a language disorder in the family ($\chi^2_{(2)} = 9.33$, $p = .009$, $N = 102$). No significant Spearman-correlations were identified.

In the categorical regression ($F_{(2, 99)} = 18.03$, $p < .001$, adjusted $R^2 = .25$), only the factor "language therapy" was significant (Beta = .432, $p = .021$, importance .733), but "language disorders in the family" yielded a considerable importance value (.227) in spite of a not significant result ($p > .05$).

3.4 Study 3

In this study, BM and MO children were tested with MSS b and then re-tested a year or two later during the

ISBN: 978-605-64453-2-3

school enrolment examination with S-ENS including some additional items.

Chi-square values yielded significant or marginally significant results for the following variables from the questionnaires when cross-tabled with the classification “worse – the same – better”:

1. Parents or teachers: immigration background (BM/MO): $\chi^2_{(2)} = 5.50$, $p = .064$ (marginal significance), $N = 165$;
2. Parents: Language disorders in the family (yes/no): $\chi^2_{(2)} = 7.18$, $p = .028$, $N = 150$;
3. Parents: The child undergoes a language therapy (yes/no): $\chi^2_{(2)} = 6.69$, $p = .035$, $N = 156$;
4. Parents: Whether the father can read and write German well (not so well – well – very well): $\chi^2_{(4)} = 10.44$, $p = .034$, $N = 82$;
5. Parents: Language spoken at home (German, German and (an)other language(s), only (an)other language(s)): $\chi^2_{(4)} = 5.52$, $p = .019$, $N = 145$.

No significant correlations were identified.

The categorical regression with five independent variables identified in the cross tables ($F_{(6, 58)} = 2.23$, $p = .032$, adjusted $R^2 = .12$) yielded two significant results: immigration background (Beta = .333, $p = .012$, importance .489) and languages spoken at home (Beta = .225, $p = .049$, importance .116). Noteworthy is a high importance value of the reading and writing skills of fathers (.395) in spite of a not significant p-value.

Finally, a classification tree was calculated with all changes in the rankings of all test subjects as dependent variable and variables from questionnaires as independent variables ($N = 404$). The node 0 ($M = -0.006$, $SD = 1.017$) was subdivided into following groups ($p < .001$, $F_{(2, 401)} = 13.26$):

1. Node 1. Study 3: Time span between test sessions $\leqslant$ 14 months ($M = -0.449$, $SD = 0.787$, $N = 65$ (16.1%)) vs. Node 2: time span > 14 months ($M = 0.436$, $SD = 0.996$, $N = 67$ (16.6%));
2. Node 3 ($N = 272$ (67.3%) referred to the Studies 1 and 2 and was subdivided into further two nodes ($p = .04$, $F_{(1, 270)} = 6.73$): No additional language courses ($M = -0.106$, $SD = 1.011$, $N = 199$ (49.3%)) vs. additional language courses ($M = 0.255$, $SD = 1.032$, $N = 73$ (18.1%)).

4. DISCUSSION

Three retrospective follow-up studies with preschool MO and BM were presented. In Study 1, four-year-old BM and MO children were tested twice with the speech and language test MSS b within a year and a half. In Study 2, four-year-old BM children were tested twice within six months with the same language test. In Study 3, four-year-old BM and MO preschoolers were tested first with MSS b and then, when they had to undergo school enrolment tests in the public health departments about a year or two later, retested with the test S-ENS (official school enrolment test in the state of Hesse) including some additional validated items on grammar, vocabulary, and speech comprehension.

In all three studies, sociolinguistic information was gathered by questionnaires for parents and/or daycare center teachers. This information was utilized for the analysis which factors influenced changes in the classification of children as needing (CLIN) or not needing (ND) medical help in learning/acquiring German. Although the classification of children as ND and CLIN was to a certain extent subjective, medical examinations of 105 children classified as CLIN in a department for phoniatrics and pediatric audiology revealed that 96% of them indeed needed a medical intervention related to their language development.

Three questionnaire items were associated with the classification “worse – the same – better” more than once: language(s) spoken at home (only German, German and (an)other language(s), only (an)other language(s)), language therapy, and language disorders in the family. Further, the following variables were associated with the same classification in one of the studies: immigration background (BM/MO), attendance of the nursery school, age when the child began to learn/acquire German, school mark (that is, language competence) of the child when he/she began to attend the daycare center, whether the child plays with German speaking children after the daycare center time, and whether the father can read and write German well. The latter (reading and writing skills of the father) might be indicative of other not documented variables like income of the family and, hence, quality of medical therapy. A high importance value of this variable in the regression in the Study 3 indicates that its significance was not a matter of chance.

In the first categorical regression (Study 1), the school mark for the language competence of children at the beginning of daycare attendance was the only factor with a significant influence on the classification “worse – the same – better”. Interestingly, the positive beta value reveals that not children with good marks, but children with bad marks were more often classified as “better” after the second test session. However, this corresponds

ISBN: 978-605-64453-2-3

perfectly to other findings which demonstrate that children with the worst German language skills tended to be classified as "better" both in regressions and in cross-tabs (floor effect):

- Studies 1 and 3, cross-tabs: MO children were classified as "better" not as often as BM children. The positive beta-value of the regression in the Study 3 indicates the same finding.
- Studies 1 and 3, cross-tabs: Children speaking only (an)other language(s) than German at home were classified more often as "better" than children speaking only German or German and (an)other language(s). Again, the positive beta-value of the regression in Study 3 indicates the same finding.
- Study 1, cross-tabs: Children who did not attend a nursery school in the first two years of life were classified as "better" more often than other children.
- Study 1, cross-tabs: Children who did not play with German-speaking children after the daycare center time were classified as "better" more often.
- Study 1, cross-tabs: Children who began to learn/acquire German in the fourth year of life were more often classified as "better" than children who acquired German since their birth.
- Study 1, cross-tabs: Children with bad school marks for their language competence at the beginning of daycare center attendance were more often classified as "better" than children with good marks.
- Study 1, cross-tabs: A school mark for the language competence of the child given in the first test session demonstrated the same tendency.
- Study 3, cross-tabs: Children whose fathers could read and write German "well" were more often classified as "better" in comparison with "very well".
- Figure 2: In Study 1 one can recognize a rapid language development of four-year-old children, more so for BM than MO children and more so for CLIN than ND children. In Study 3, the language development of the older children stopped for MO and BM ND children, but still went on for CLIN children.
- For three studies taken together, significantly more MO children than BM children underwent a language therapy before the first test session according to a cross-table. This might be the reason why 20% of BM children and only 17% of MO children were classified as needing medical assistance in acquiring/learning German after the first test session.

For the explanation of this tendency it should be taken into account that, as was shown in the Methods section, the largest group of BM children began to learn German only in their fourth year of life, probably when they entered the daycare centers. These children had to catch up to the German skills of their peers who had already acquired German to a considerable extent. Also, many BM children got in contact with the educational and medical personnel of the daycare centers short before the first test session. The personnel might have given the parents indications on possible medical issues and thus contributed to the medical interventions. It cannot be excluded that our letters with test results and recommendations given to the respective parents also prompted some of them to address medical facilities. Advances in the language acquisition of such BM children were rapid in comparison with children who had enough opportunities in their first three years of life to access the German language input and who had already been medically treated, if necessary, before the first test session.

In two out of three studies, therapies resulted in a higher number of "better"-results according to cross-tables: (1) Study 1: 12% of children who did not undergo a therapy and 37% of children who underwent a therapy; (2) Study 3: 6% vs. 18%. In Study 2, it was not the case, probably because the time span between the first and second test sessions was too short.

The fact that in Study 2 only two sociolinguistic variables yielded significant results in the cross-tables and only one in the regression is not surprising because the time span between the first and second test sessions was only six months (cf. 13 in Study 1 and 15 in Study 3). Obviously, the period was too short for the sociolinguistic variables to influence the language competence considerably.

The reason for a comparatively high percentage of CLIN children in our sample (20% of BM children and 17% of MO children) might be due to the "natural" selection of test subjects: Parents of ND children were probably less inclined to sign the informed consent of the studies presented here than parents of children with some abnormalities in the language development.

Only one sociolinguistic factor was associated with the deterioration of the classification between two test sessions (ND → CLIN), namely language disorders in the family of the child, which might be interpreted as a genetic predisposition of these children for language disorders.

The last calculation in the Results section, a classification tree with all three studies taken together, aimed at the identification of sociolinguistic factors associated not with the classification "worse – the same – better", but with the changes in the rankings of the test subjects within their study samples. In this case, the dependent

ISBN: 978-605-64453-2-3

variable (*z*-transformed changes in the rankings) was metric and, hence, more sensitive to associations with other variables than a simple threefold classification "worse – the same – better". The classification tree identified two relevant factors: time span between two test sessions (the longer, the better the ranking) and whether the child participated in language courses (participants of such courses scored higher in the language tests and received higher rankings).

Therapies and immigration background were two most important sociolinguistic factors which were associated with changes in the classification of German preschool children as needing or not needing medical assistance in the language learning/acquisition. Children who had acquired German from the earliest childhood on underwent therapies in the first years of life, if necessary. Their classification did not change much between two test sessions in all three studies presented in this article. Also, their language scores did not grow considerably because they had already been good before the first test session. Only for children whose contacts to the German language and probably also to the German educational and medical facilities had been limited until their third or fourth year of life, that is, mostly for immigrant children, the language acquisition process was shown to proceed rapidly. These were also the children whose classification often changed between two test sessions from needing to not needing medical help. The only factor closely associated with the result "worse" (ND → CLIN) was language disorders among family members of the child. The factors associated positively with the language development were therapies and the attendance of the daycare center, the latter being obviously the only reason why children with minimal German skills began to develop rapidly in spite of the most unfavorable language acquisition conditions. The factors associated with higher rankings in the second test session in comparison with the first one were longer time span between test sessions and participation in language courses.

REFERENCE LIST

Chilla, R., Gabriel, P., Kozielski, P., Bänsch, D., & Kabas, M. (1976). Der Göttinger Kindersprachverständnistest: I. Sprachaudiometrie des Kindergarten- und retardierten Kindes mit einem Einsilber-Bildtest. *HNO*, vol. 24.

Döpfner, M., Dietmar, I., Mersmann, H., Simon, K., & Trost-Brinkhues, G. (2005). S-ENS. Screening des Entwicklungsstandes bei Einschulungsuntersuchungen. Göttingen: Hogrefe.

Euler, H. A., Holler-Zittlau, I., Van Minnen, S., Sick, U., Dux, W., Zaretsky, Y., & Neumann, K. (2010). Psychometrische Gütekriterien eines Kurztests zur Erfassung des Sprachstandes vierjähriger Kinder. *HNO*, vol. 58.

Gabriel, P., Chilla, C., Kiese, C., Kabas, M., & Bänsch, D. (1976). Der Göttinger Kindersprachverständnistest: II. Sprachaudiometrie des Vorschulkindes mit einem Einsilber-Bildtest. *HNO*, vol. 24.

Grissom, R. J. & Kim, J. J. (2012). Effect sizes for research: Univariate and Multivariate Applications, 2nd ed. New York: Taylor & Francis.

Mottier, G. (1951). Mottier-Test. Über Untersuchungen zur Sprache lesegestörter Kinder. *Folia Phoniatrica*, vol. 3.

Neumann, K., Holler-Zittlau, I., Van Minnen, S., Sick, U., Zaretsky, Y., & Euler, H. A. (2011a). Katzengoldstandards in der Sprachstandserfassung. Sensitivität und Spezifität des Kindersprachscreenings (KiSS). *HNO*, vol. 59.

Neumann, K., Zaretsky, Y., & Euler, H. A. (2011b). Einführung einer flächendeckenden Sprachstandserfassung in Hessen. Forschungsbericht 2011. Frankfurt/Main: Universität Frankfurt/Main.

Uttenweiler, V. (1980). Dichotischer Diskriminationstest für Kinder. *Sprache – Stimme – Gehör*, vol. 4.

Wagener, K. & Kollmeier, B. (2005). Evaluation des Oldenburger Satztests mit Kindern und Oldenburger Kinder-Satztest. *Zeitschrift für Audiologie*, vol. 44.

ISBN: 978-605-64453-2-3