BILINGUAL CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT: ADDITIONALLY DISADVANTAGED?

JUDIT STEENGE

General acknowledgements

This research is partly financed by the ministry of Education, Culture and Science in the Netherlands, Den Haag, the Mgr. J. C. van Overbeek Foundation, Den Bosch, and *Viataal*, Sint-Michielsgestel. Special appreciation is expressed to the children who participated, their parents, teachers, and clinical experts of the participating schools of *Siméa*.

Cover design: NIKA grafische vormgeving, Vught
Cover illustration: www.versch.nl (671kb)
Print: PrintPartners Ipskamp, Enschede
ISBN-10: 90-9020920-4
ISBN-13: 978-90-9020920-3

Published by: EAC, Research Centre on Atypical Communication, Radboud University Nijmegen

Bilingual children with Specific Language Impairment: Additionally disadvantaged?

Een wetenschappelijke proeve op het gebied van de Sociale Wetenschappen

Proefschrift

Ter verkrijging van de graad van doctor
aan de Radboud Universiteit Nijmegen
op gezag van de Rector Magnificus prof. dr. C. W. P. M. Blom,
volgens besluit van het College van Decanen
in het openbaar te verdedigen op woensdag 4 oktober 2006
des namiddags om 1.30 uur precies door

Judit Steenge
geboren op 18 mei 1976
te Westerbork

Nijmegen 2006

Promotor:	Prof. dr. Ludo Verhoeven
Copromotor:	Dr. Hans van Balkom
Manuscriptcommissie:	Prof. dr. Harry Knoors (voorzitter)
	Prof. dr. Sieneke Goorhuis-Brouwer – UMC Groningen
	Dr. Anne Vermeer – Universiteit van Tilburg

Voor Johan

CONTENTS

VOORWOORD

De Nijmeegse 4-daagse wandelen, een Kennedymars van 80 km. lopen, een halve marathon rennen, de top van de Kilimanjaro beklimmen: stuk voor stuk activiteiten waarin ik heb afgezien en mijn grenzen heb opgezocht. Maar al deze activiteiten tezamen is niets vergeleken bij het schrijven van een proefschrift! Het is dan ook niet de verdienste van mij alleen dat dit boek nu voor u ligt. Daarom heb ik de komende pagina's gereserveerd voor de mensen aan wie ik dank verschuldigd ben, omdat ze er jarenlang voor me waren. Maar voordat u verder leest met het idee dat het schrijven van dit proefschrift kommer en kwel is geweest, wil u zeggen dat de Nijmeegse 4-daagse, de Kennedymars, de halve marathon, de Kilimanjaro én dit proefschrift geweldige, uitdagende ervaringen waren waarvan ik met volle teugen heb genoten en waarin ik veel (over mezelf) heb geleerd. De beproeving is soms zwaar, maar het gevoel van triomf is altijd groter.

Allereerst wil ik mijn promotor en dagelijks begeleider bedanken: Ludo Verhoeven. Ludo, jij was degene die mij in mei 2000 verraste met het telefoontje dat ik mocht beginnen aan het onderzoeksproject waarop ik een paar weken eerder had gesolliciteerd. Hiermee gaf je mij de kans die ik met beide handen aan greep. Vanaf het begin hebben de afspraken met jou mij inspiratie gegeven voor mijn onderzoek. Uit jouw vele ideeën en voorstellen spreekt je enthousiasme en deskundigheid: twee dingen waardoor ik altijd vol energie verder ging met mijn onderzoek.

Natuurlijk wil ik naast mijn promotor ook mijn copromotor bedanken: Hans van Balkom. Hans, de wetenschap jou te kunnen raadplegen met grote, maar ook kleine dingen, al dan niet met betrekking tot het onderzoek, heeft mij altijd een goed gevoel gegeven. Naast jouw vertrouwen in mij als onderzoeker en je frisse kijk op het onderzoek zal ook de gezelligheid van de samenwerking met jou mij bijblijven.

Verder wil ik alle kinderen bedanken die ervoor gezorgd hebben dat er überhaubt iets te onderzoeken viel. Ook hun ouders, die toestemming gaven en hun leerkrachten, die zorgden dat er tijd werd vrijgemaakt bedank ik bij deze. Verder wil ik graag de contactpersonen, directeuren en alle medewerkers van de volgende scholen bedanken voor de ondersteuning van het onderzoek: de Prof. Groenschool te Amersfoort, de Taalkring te Utrecht, de Martinus van Beekschool te Nijmegen, de dr. P.C.M. Bosschool te Arnhem, de Cor Emousschool te Den Haag, de Mgr. Hermusschool (nu: Signis) te Amsterdam, de L.W. Hildernisseschool te Rotterdam, de dr. F. Hogewindschool te Rotterdam, de Tine

Marcusschool te Groningen, de Alexander Roozendaalschool te Amsterdam, de Spreekhoorn te Breda.

Ook dank ik alle onderzoeksassistenten die data hebben verzameld. Drie onderzoeksassistenten hebben naast data verzamelen ook data ingevoerd: Eva Heijltjes, Marian Leenaerts en Erdem Yaktemur. Dit proefschrift is in het Engels geschreven, mijn 'L2', daarom: Kathleen, bedankt voor het nalezen en corrigeren van mijn proefschrift. Jan van Leeuwe, dank voor je advies, uitleg en antwoorden op mijn statistische vragen.

Heel belangrijk waren mijn collega's, met name de AiO's (nu: junioronderzoekers). Mensen bij wie je terecht kunt als je het even niet of juist weer helemaal ziet zitten. Mensen die zorgen voor de nodige en welkome afleiding en gezelligheid. Ik dank al mijn collega's, maar een aantal in het bijzonder: Loes, met jou begon ik altijd de werkdag. Een e-mail met als onderwerp "k&k?" stond garant voor het eerste halfuur (of langer) nog niet aan de slag: gelukkig ben ik een avondmens. Martine, jouw opgewektheid deed mij altijd goed. Van jouw vermogen om te relativeren en mee te denken heb ik dankbaar gebruik gemaakt. Natuurlijk ook erg bedankt voor je rol als paranimf. Mieke (van Diepen), hoewel je niet 'bij ons op de vijfde' zat, heb ik je altijd beschouwd als collega AiO. Wat begrepen wij elkaar altijd goed! Martijn en Liesbeth, prettiger gezelschap op kamer A05.35 had ik me niet kunnen wensen.

Als AiO bracht ik mijn tijd niet alleen op de universiteit met mijn collega's door: ik bracht ook wel eens tijd door met vrienden en familie, daarom hier ook een woord van dank aan hen: Bedankt voor de interesse die jullie hebben getoond in mijn onderzoek, maar zeker ook voor de momenten van ontspanning die ik met jullie heb mogen doorbrengen en waarin ik mijn onderzoek even van me af kon zetten.

Vaak worden de belangrijkste mensen als laatste genoemd, zo ook hier. Papa en mama, ik ben zo blij met jullie. Jullie respecteerden en steunden mijn keuzes voor studie en werk, daarmee lieten jullie je vertrouwen in mij blijken. Dat vertrouwen deed mij goed: dank jullie wel! Moniek en Ine, ik kan alleen maar zeggen dat ik geluk heb met zussen zoals jullie. En Moniek, echt leuk dat je als paranimf op mijn promotie naast me staat! Jan, Harma en Erwin, ook bedankt voor jullie interesse en steun.

Tot slot Johan, mijn man, hoewel ik jou hier als laatste noem, ben jij mijn nummer één. Mijn dank aan jou is groot. Ik dank je voor het delen van de voor- en tegenspoed tijdens mijn project. Ik weet dat ik het je vaak niet makkelijk heb gemaakt met mijn gemopper, gezeur en geklaag. Ik bewonder het dat je mij hierin vaak mijn gang liet gaan, maar ook dat je mij van tijd tot tijd weer tot de orde riep: dit had ik wel eens nodig! Gelukkig kon ik ook de goede dingen met jou delen. Bovendien zorgde jij voor welkome afleiding, bijvoorbeeld in de vorm van het samen ondernemen van uitdagende en grensverleggende activiteiten. En het is echt waar: dit project volbrengen en vooral de bekende laatste loodjes dragen had ik niet gekund zonder jouw vertrouwen, aanmoediging en steun: dankjewel liefste! En nu ben ik klaar om de volgende uitdagende en grensverleggende activiteit met jou te ondernemen![1]

[1] Bij deze mijn excuses aan degenen die ik vergeten heb te noemen in dit voorwoord. Mijn dank aan jullie is niet minder groot.

CHAPTER 1

INTRODUCTION

Estimates are that the majority of the world's population is learning more than one language (Klein, 1986; Romaine, 1995) and is, therefore, in one way or another, bilingual or multilingual. Romaine (1995) described different types of bilingual language development in children. One of those types is the 'non-dominant home language without community support' (p. 184) in which both parents have the same mother tongue which is different from the dominant language in the community. This situation is experienced by minority groups in a number of countries (e.g., Sweden, Germany, and the Netherlands). The community language is not successfully learned as second language (L2) by everyone. Limited language input and little communication opportunities tend to slow the rate of L2 acquisition (Genesee, Paradis, & Crago, 2004). The fact that developing more than one language is not a matter of course for everyone is exemplified in people suffering from language impairments. Children with specific language impairment (SLI) whose home-language is not the community language, for instance, are already suffering from atypical language development in addition to limited contact to their L2. The course of first and second language development may well be more delayed than, or even different from the course of language development of bilingual children without SLI. The focus of this thesis is on the development of L2 ability in bilingual children with SLI in the Netherlands.

1.1 Specific Language Impairment

The prevalence of SLI in children is about 6% in the general population (Law, Boyle, Harris, Harkness, & Nye, 1998). Some characteristics of language development of children with SLI are late appearance of the first words and word combinations (Leonard, 2000), acquiring grammatical morphemes rather late (Rice, 2000), and using immature grammar longer than typically developing children (Leonard, 1998). A definition of children with SLI is given by Leonard who described them as "children who show a significant limitation in language ability, yet the factors usually accompanying language learning problems such as hearing impairment, low non-verbal intelligence test scores, and neurological damage are not evident" (Leonard, 1998, p. 3). As a result of this definition, diagnosis of SLI is commonly based on exclusion criteria. Therefore, the group of children with SLI is a very heterogeneous group. To bring more homogeneity into this group, attempts have been made to classify the

language problems of children with SLI into subtypes of language impairment. Especially the more recent studies concerning classifications of SLI seem to be valid. Accordance concerning the language problems found in children with SLI seems to have been reached. Bishop (2004) has described four subtypes of SLI about which there is substantial agreement from both research perspectives and clinical perspectives. The first subtype manifests itself as (severe) problems with grammatical development. The underlying nature of these problems, however, can be of various kinds, such as auditory perception problems or a working memory disorder. The second subtype of language problems is characterized by speech output difficulties. It is often referred to as verbal dyspraxia. The third subtype involves severe receptive language disorders. This subtype can in some cases be interpreted as childhood verbal auditory agnosia. The last subtype refers to pragmatic difficulties. Children with this kind of problem speak in normal sentences, but use language inappropriately.

A large body of research exists on the first type of SLI that Bishop mentioned (grammatical problems).This subtype is also called typical SLI, because many children with SLI do have grammatical difficulties. In comparison with their typically developing peers, children with SLI have a weak development of grammatical morphemes (cf. Leonard, 1998; Rice, 2000). Some investigators even see deficits in grammatical development as a clinical marker of SLI (cf. Leonard, 2000; Rice, 2000). Theories of SLI to explain grammatical problems (and other language disabilities) can be divided into two groups. One group proposes that an underlying grammatical deficit causes the problems in development of grammar. Another group of theories proposes that limitations in language processing are the basis for the difficulties. The development and proficiency of verb morphology has been widely investigated and is the basis of many theories of SLI. Evidence of problems with verb morphology comes from research on a number of languages, such as English (e.g., Fletcher & Ingham, 1995), German (Clahsen, 1989), Italian (e.g., Bortolini, Caselli, & Leonard, 1997), French (e.g., Paradis & Crago, 2000), Swedish (e.g., Hansson, Nettelbladt, & Leonard, 2000), and Hebrew (e.g., Dromi, Leonard, Adam, & Zadunaisky-Ehrlich, 1999). Children with SLI not only perform worse than age-matched children with typical language development, but sometimes also worse than younger typically developing children with the same level of language development level as measured by their mean length of utterance (MLU). Examples of difficulties are marking verbs for third person singular, marking verbs for past tense, and agreement between subject and verb.

1.2 Bilingualism and Specific Language Impairment

Research on SLI conducted so far has mostly concentrated on monolingual children with SLI. Recently, however, research on SLI in bilingual children has received growing interest. Outcomes of studies in this line of research show that the language performance in the second language (L2) of bilingual children with SLI (Bili-SLI) is worse than the language performance in that same language of monolingual children with SLI (Mono-SLI). Moreover, the language problems of Bili-SLI children turned out to be more complex and more persistent than the language problems of Mono-SLI children (Crutchley, 1999; Crutchley, Botting, & Conti-Ramsden, 1997; Restrepo, 1998).

Studies in which Bili-SLI children are compared to typically developing bilingual children (Bili-TD) showed that acquiring two languages is possible for Bili-SLI children, but both their level of grammatical development and their pace of development were lower than the level and pace of development of Bili-TD children (Håkansson, Salameh, & Nettelbladt, 2003; Salameh, Håkansson, & Nettelbladt, 2004).

Although an important step has been taken with earlier studies on SLI in bilingual children some important questions still remain unanswered. One such question is whether the position of Bili-SLI children can be seen as additionally disadvantaged. After all, these children are suffering from delayed language acquisition due to the language disorder on the one hand and to limited contact with the L2 on the other. In order to be able to answer the question of an additional disadvantage (as far as the L2 is concerned), a research design is needed in which Bili-SLI children are compared to three other groups of children: Mono-SLI, Bili-TD, and Mono-TD (monolingual children without SLI). Only with such a design can it be said whether the language development of Bili-SLI children is comparable to any of the other groups. The question of an additional disadvantage refers not only to language development in general, but also to grammatical development and problems in morpho-syntax which have already been found by Mono-SLI children. Paradis, Crago, Genesee, and Rice (2003) have studied grammatical difficulties of French-English bilingual children with SLI in comparison to French-speaking children with SLI and English-speaking children with SLI. Their results showed that the grammatical problems of the Bili-SLI children in English and in French resemble the grammatical problems of the Mono-SLI children. However, for drawing conclusions about the additionally disadvantaged position in grammatical proficiency, typically developing children (monolingual and bilingual) must be taken into account, as well.

Another interesting but still unanswered question is whether the language problems of Bili-SLI children in their L2 can be classified, in other words, can subtypes of SLI be distinguished in Bili-SLI children? Research on the classification of language impairments has shown some agreement on subtypes of language impairments (see Bishop, 2004). Even across languages, the same subtypes have been found. Two studies on subtypes of SLI in the Netherlands showed that the subtypes found for English-speaking children (mentioned before in 1.1) also account for younger and older Dutch-speaking children with SLI (see Van Daal, Verhoeven, & van Balkom, 2004; Van Weerdenbrug, Verhoeven, & van Balkom, 2006). If the language problems of Bili-SLI children resemble language problems of Mono-SLI children, it could well be possible that the subtypes of SLI in Bili-SLI children resemble those of Mono-SLI children, as well. However, it has been shown that the language problems of Bili-SLI children are slightly different, namely more complex and more persistent (Crutchley, 1999; Crutchley, Botting, & Conti-Ramsden, 1997), so the subtypes of SLI may also be different. To investigate this, L2 performance of bilingual children should be measured and put into a factor-analysis to find out what latent factors can be found to explain the variance in L2 performance. The resulting factor model should then be compared to documented subtypes of SLI.

In addition to L2 proficiency, the L1 development and performance of Bili-SLI children also deserves attention. So far, only few studies have paid attention to both languages of Bili-SLI children. However, these studies have focused on the acquisition of two languages in Bili-SLI children (Håkansson, Salameh, & Nettelbladt, 2003; Salameh, Håkansson, & Nettelbladt, 2004) and on the morpho-syntactic problems in two languages (Paradis, Crago, Genesee, & Rice, 2003). No research has yet been conducted on the influence of one language on the other in Bili-SLI children. This topic has received much attention in Bili-TD children. One theory about language influence in bilingualism comes from Cummins (1979, 1981, 1991). This interdependence hypothesis states that the dominant language of bilinguals may influence the development of the non-dominant language on the conditions that there is adequate exposure to the non-dominant language and that there is a motivation to learn that non-dominant language. Much evidence in favor of this hypothesis has been reported (for an overview see Verhoeven, 1994). Transfer between languages can take place at different linguistic levels: language skills as well as literacy skills may transfer. In this light, it is very important to know to what extent transfer between languages occurs in Bili-SLI children. Outcomes of such investigations may have influence on education and instruction of Bili-SLI children. In such studies, it must be determined which language is the

dominant language. Furthermore, the relationship between the dominant language and the non-dominant language has to be examined, preferably at different linguistic levels.

1.3 The Dutch context

In the Netherlands, almost all bilingual people are members of minority groups. This means that they have a mother tongue which is not the dominant language in the community. The community language (Dutch) is their second language. The largest minority groups of in the Netherlands are of Turkish, Moroccan, and Surinamese origin (in total, 32% of all immigrants: CBS[2] (a)). The children from these families are second generation children and born in the Netherlands. Minority children now comprise a stable 15% of the population in the Dutch schools (CBS(b)). Their language environment can best be defined as an L2 submersion context. Children enter primary education at the age of four. After two years of kindergarten, formal language and literacy education starts in Grade 1. The instruction for minority children is L2 based from the beginning. Minority children learn Dutch as L2 in school and with peer contacts. When entering primary education (at the age of four) many minority children have limited knowledge of Dutch, but are proficient in their home language (cf. Extra & Verhoeven, 1993). The problems these bilingual children experience in the acquisition of L2 have been demonstrated in several linguistic domains. Bilingual children lag behind in Dutch, in comparison to their monolingual peers, on skills like vocabulary, sentence comprehension and production, and text comprehension and production (e.g., Driessen, van der Slik, & de Bot, 2002; Verhoeven & Vermeer, 1996, 1999).

Children with special educational needs in the Netherlands often attend schools for special education. Special schools exist for children with severe speech and language problems. In the '94 – '95 school-year 0.2 % of the Dutch children attended these schools, which has increased to 0.3% of the Dutch children in the '04 – '05 school-year (CBS(c)). Children are diagnosed as having SLI by a multidisciplinary team of school psychologists, speech therapists, and clinical linguists in the event that they fail to develop language typically for no apparent reason. They do not have hearing disorders, they have no neurological damage, and do have adequate non-verbal intelligence scores (cf. Leonard, 1998). The number of bilingual children attending schools for severe speech and language disorders ran up to over 50% in large cities (Amsterdam, Rotterdam, The Hague, Utrecht) in the '00 – '01 school-year. In these schools, the majority of the bilingual children were also of

[2] CBS: Centraal Bureau voor de Statistiek [Central Statistical Office]

Turkish, Moroccan, and Surinamese origin. Dealing with these children is becoming a large problem for the schools with a high percentage of bilingual SLI children, because little is known about bilingual children with SLI in the Netherlands. The schools have to deal with questions about assessment and intervention specifically for bilingual children with SLI which can not yet be answered.

1.4 The present study

Research on language ability of Bili-SLI children is under development. A good start has been made by investigating how the language performance of Bili-SLI children compares to Mono-SLI children (Crutchley, 1999; Crutchley, Botting, & Conti-Ramsden, 1997; Restrepo, 1998). Furthermore, research has been conducted on the development of more than one language in Bili-SLI children (Håkansson, Salameh, & Nettelbladt, 2003; Salameh, Håkansson, & Nettelbladt, 2004). Attention has also been paid to morpho-syntactic difficulties of Bilil-SLI children (Paradis, Crago, Genesee, & Rice, 2003). We have already seen that there are still some gaps in research on Bili-SLI children (see 1.2). To summarize, as far as L2 proficiency and development is concerned, there is a need to investigate the position of Bili-SLI children in relationship to Bili-TD children, Mono-SLI children and Mono-TD children in one design, in order to determine whether Bili-SLI children suffer from an additionally disadvantaged position (in L2 proficiency in general as well as L2 morpho-syntactic proficiency). A second topic of interest in this line of research is the search for subtypes of language impairment in the L2 of Bili-SLI children. Besides examining the L2, it is also important to examine the L1 of Bili-SLI children in relation to the L2. Research in this is also still lacking.

The present study deals with some gaps in Bili-SLI research. Four studies are described in which earlier mentioned topics are examined. The first study (Chapter 2) deals with L2 performance at different linguistic levels of Bili-SLI children learning Dutch as L2 (aged 6 to 8 years) in comparison with three groups of age-matched control children: Mono-TD children, Mono-SLI children, and Bili-TD children. The central question in this study is at which linguistic L2 levels Bili-TD and Mono-SLI children show a disadvantage in comparison to native typically developing Dutch children and, more importantly, at which linguistic L2 levels Bili-SLI children show an additional disadvantage in comparison to Bili-TD and Mono-SLI children? The second study in this thesis (Chapter 3) is an in-depth study on the possible additional disadvantage of Bili-SLI children. Morpho-syntactic difficulties are examined for the same four groups of children as in the first study in children of seven and

nine years of age. The focus is on errors in Dutch verb morphology. Questions are whether SLI specific errors can be found in the native and bilingual children with SLI or whether the errors of Bili-SLI children resemble the errors of Bili-TD more. Chapter 4 is a report of a study on subtypes of SLI in the L2 of Bili-SLI children aged 6 to 11 years. The first question in this study is: Can different subtypes of SLI be distinguished in the L2 of Bili-SLI children? The second question is: Do these subtypes correspond to subtypes found in earlier studies? In the last study (Chapter 5), the topic of investigation is the development of L2 in relation to the performance in L1 of Turkish-Dutch children with SLI. Linguistic and meta-linguistic skills in both languages are studied and the question is what levels of (meta)linguistic skills Turkish-Dutch children with SLI show in the course of primary school. The second question is to what extent evidence can be found for transfer from the dominant to the non-dominant language at the level of linguistic and meta-linguistic skills. In the final chapter (Chapter 6), some general conclusions and a discussion of the results of this thesis are presented. In addition, some limitations of the present study, implications for further research, and implications for theory and practice are mentioned.

References

Bishop, D. V. M. (2004). Specific language impairment: Diagnostic dilemma's. In L. Verhoeven & H. van Balkom (Eds.), *Classification of developmental language disorders* (pp 309 - 326). Mahwah, NJ: Lawrence Erlbaum.

Bortolini, U., Caselli, M. C., & Leonard, L. (1997). Grammatical deficits in Italian-speaking children with specific language impairment. *Journal of Speech and Hearing Research, 40*, 809 - 820.

CBS(a): Centraal Bureau voor de Statistiek [Central Statistical Office]: http://statline.cbs.nl/StatWeb/table.asp?STB=G1&LA=nl&DM=SLNL&PA=37325&D1=0-2&D2=2,126,141,204,220,240-241&D3=0&D6=l&LYR=G5:0&HDR=T,G4,G3,G2

CBS(b): Centraal Bureau voor de Statistiek [Central Statistical Office]: http://statline.cbs.nl/StatWeb/Table.asp?LYR=G2:0&LA=nl&DM=SLNL&PA=37846sol&D1=1-2&D2=a&D3=0&STB=G3&HDR=T,G1

CBS(c): Centraal Bureau voor de Statistiek [Central Statistical Office]: http://statline.cbs.nl/StatWeb/Table.asp?HDR=G3,G2&LA=nl&DM=SLNL&PA=37746sol&D1=0&D2=a&D3=a,!0&D4=(l-10),l&STB=G1&LYR=T:0

Clahsen, H. (1989). The grammatical characterization of developmental dysphasia. *Linguistics, 27*(897 - 920).

Crutchley, A. (1999). Bilingual children with SLI attending language units: getting the bigger picture. *Child Language Teaching and Therapy, 15*(3), 201-217.

Crutchley, A., Botting, N., & Conti-Ramsden, G. (1997). Bilingualism and specific language impairment in children attending language units. *European Journal of Disorders of Communication, 32*(2), 267-276.

Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research, 49*, 221 - 251.

Cummins, J. (1981). The role of primary language development in promoting educational success for language minority students. In *Schooling and language minority students: A theoretical framework* (pp. 3 – 49). Los Angeles, California State University: Department of Education, Evaluation, Dissemination and Assessment Center.

Cummins, J. (1991). Conversational and academic language proficiency in bilingual contexts. *AILA Review, 8*, 75-89.

Driessen, G., van der Slik, F., & de Bot, K. (2002). Home language and language proficiency: A large-scale longitudinal study in dutch primary schools. *Journal of Multilingual and Multicultural Development, 23*(3), 175-194.

Dromi, E., Leonard, L., Adam, G., & Zadunaisky-Ehrlich, S. (1999). Verb agreement morphology in Hebrew-speaking children with specific language impairment. *Journal of Speech, Language, and Hearing Research, 42*, 1414 - 1431.

Extra, G. & Verhoeven, L. (1993). Community languages in cross-cultural perspective. In G. Extra & L. Verhoeven (Eds.), *Community languages in the Netherlands* (Vol. 3, pp. 1-28). Amsterdam, Lisse, Berwyn, PA: Swets & Zeitlinger.

Fletcher, P. & Ingham, R. (1995). Grammatical impairment. In P. Fletcher & B. MacWhinney (Eds.), *The handbook of child language* (pp. 603 - 622). Oxford: Blackwell.

Genesee, F., Paradis, J., & Crago, M. (2004). *Dual Language Development and Disorders. A Handbook on Bilingualism and Second Language Learning*. Baltimore: Paul Brooks Publishing Co.

Håkansson, G., Salameh, E.-K., & Nettelbladt, U. (2003). Measuring language development in bilingual children: Swedish-Arabic children with and without language impairment. *Linguistics, 41*(2), 255 - 288.

Hansson, K., Nettelbladt, U., & Leonard, L. (2000). Specific language impairment in Swedish: The status of verb morphology and word order. *Journal of Speech, Language, and Hearing Research, 43*, 848 - 864.

Klein, W. (1986). *Second Language Acquisition*. Cambridge: Cambridge University Press.

Law, J., Boyle, J., Harris, F., Harkness, A., & Nye, C. (1998). *Screening for speech and language delay: A systematic review of the literature.* Southampton: NCCHTA.

Leonard, L. (1998). *Children with specific language impairment*. Cambridge, MA: The MIT Press.

Leonard, L. (2000). Specific language impairment across languages. In D. V. M. Bishop & L. B. Leonard (Eds.), *Specific language impairment in children: Causes, characteristics, intervention, and outcome* (pp. 115 - 129). Hove, UK: Psychology Press Ltd.

Paradis, J. & Crago, M. (2000). Tense and temporality: a comparison between children learning as a second language and children with SLI. *Journal of Speech, Language, and Hearing Research, 43*, 834-847.

Paradis, J., Crago, M., Genesee, F., & Rice, M. (2003). French-English bilingual children with SLI: How do they compare with their monolingual peers? *Journal of Speech, Language, and Hearing Research, 46*(1), 113-127.

Restrepo, M. A. (1998). Indentifiers of predominantly Spanish-speaking children with language impairment. *Journal of Speech, Language, and Hearing Research, 41*, 1398-1411.

Rice, M. (2000). Grammatical symptoms of specific language impairment. In D. V. M. Bishop & L. B. Leonard (Eds.), *Speech and language impairments in children: Causes, characteristics, and outcome* (pp 17 - 34). Hove, UK: Psychology Press Ltd.

Romaine, S. (1995). *Bilingualism*. Oxford: Basil Blackwell.

Salameh, E.-K., Håkansson, G., & Nettelbladt, U. (2004). Developmental perspectives on bilingual Swedish-Arabic children with and without language impairment: a longitudinal study. *International Journal of Language and Communication Disorders, 39*(1), 65 - 91.

Van Daal, J., Verhoeven, L., & van Balkom, H. (2004). Subtypes of severe speech and language impairments: Psychometric evidence from 4-year-old children in the

Netherlands. *Journal of Speech, Language, and Hearing Research, 47*(6), 1411 - 1423.

Van Weerdenburg, M., Verhoeven, L., & van Balkom, H. (2006). Towards a typology of specific language impairment. *Journal of Child Psychology and Psychiatry, 47*(2), 176 - 189.

Verhoeven, L. (1994). Transfer in bilingual development: The linguistic interdependence hypothesis revisited. *Language Learning, 44*(3), 381 - 415.

Verhoeven, L. & Vermeer, A. (1996). *Taalvaardigheid in de bovenbouw: Nederlands van autochtone en allochtone leerlingen in het basis- en mlk-onderwijs*.[Language proficiency in higher grades of primary education: Dutch proficiency of native and minority children in primary and special education]. Tilburg, The Netherlands: Tilburg University Press.

Verhoeven, L. & Vermeer, A. (1999). Taalvaardigheid van moeilijk lerende autochtone en allochtone kinderen.[Language proficiency of native and minority children in special education]. *Tijdschrift voor Orthopedagogiek, 38*, 217 - 233.

CHAPTER 2

BILINGUAL CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT: ADDITIONALLY DISADVANTAGED?

Abstract

In the present study we examined the second language achievement level of bilingual children with Specific Language Impairment (SLI) in a Dutch submersion environment in the Netherlands. The oral proficiency level in Dutch as a second language of 74 bilingual children with SLI in the age range of 6-8 years was compared with three control groups of children: (1) typically developing monolingual Dutch children, (2) typically developing bilingual children with Dutch as second language and (3) monolingual Dutch children with SLI. The results show that bilingual children with SLI perform at a lower level than the other groups in almost all aspects of achievement in Dutch. For language tasks related to the mental lexicon and grammar, an additional disadvantage was evidenced as a result of the combination of learning Dutch as second language and having SLI.

Introduction

Children with Specific Language Impairment (SLI) are diagnosed as exhibiting a significant deficit in the production and/or comprehension of language that cannot be explained by general cognitive impairment, sensory-motor deficits, neurological disorder, psychiatric diagnosis or a general lack of exposure to language (Leonard, 1998). Children with SLI have limited linguistic ability, their language development is delayed. Exclusion criteria are often used to identify this population. It is estimated that 6% of children in the general population have SLI, although there is considerable heterogeneity among the language profiles of these children (Law, Boyle, Harris, Harkness & Nye, 1998; Van Weerdenburg, Verhoeven, & van Balkom, 2006). Prominent problems among children with SLI are in the areas of morpho-syntax, phonology, and lexicon (Bishop, 1997). Firstly, morpho-syntactic difficulties have most extensively been investigated in different languages (see Leonard, 2000). A common problem of children with SLI that is seen in different languages concerns verb morphology (see Chapter 3 in this thesis). Because many children with SLI have morpho-syntactic problems, it is sometimes referred to as typical SLI (e.g.,

Bishop, 2004). Secondly, many studies have focused on phonological abilities of children with SLI. Such research showed for example that children with SLI can not discriminate and process sounds adequately (Bishop, 1997). In addition, children with SLI have been shown to have expressive phonological problems, often referred to as verbal dyspraxia (Bishop, 2004; Rapin, 1996). Finally, children with SLI have been shown to exhibit lexical problems, such as difficulties in acquiring new words and in word finding. Most lexical problems, however, co-occur with syntactical difficulties (see Leonard & Deevy, 2004).

The language acquisition of children with SLI is especially at risk for those who are bilingual. Most bilingual children in the Netherlands are members of minority groups. As such, they are confronted with the task of communicating in the dominant language of a majority environment in order to cope with daily life. Usually, this language is learned as a second language (L2). Such a context is called a submersion context. Not all members of minority groups acquire the dominant language of the majority environment successfully. The success of acquiring a second language is influenced by factors like language attitude and motivation to learn the L2. Therefore, much individual variation exists in speed of L2 acquisition.

Research on English as a second language demonstrated that L2 learners make developmental errors which can not be attributed to the first language (L1). These errors have been observed in the domains of phonology, grammar, grammatical morphology, and pragmatics. As far as grammatical morphology is concerned, these errors have also been observed in typically developing English L1 children and English L1 children with SLI (Genesee, Paradis, & Crago, 2004). Empirical studies on young L2 learners in the Netherlands have focused on children of Turkish, Moroccan, Surinamese, and Antillean origin who attend mainstream primary education and live in a submersion context. These studies have demonstrated that in the vast majority of cases, bilingual children have no serious problems in acquiring phonological skills, such as articulation. However, in the linguistic domains of lexicon, morphology, and syntax, bilingual children often appear to fall behind their native peers (Driessen, van der Slik, & de Bot, 2001; Lalleman, 1986; Verhoeven & Narain, 1996; Verhoeven & Vermeer, 1996).

The problem of L2 acquisition in bilingual children with SLI has been addressed in only a few studies (Schiff-Myers, 1992). Bruck (1982) explored the cognitive and linguistic abilities of children with language impairment attending French immersion programs, in which English speaking children followed education in French as their second language. After two years of instruction in a second language, she found their L1 cognitive and

linguistic skills to be at a similar level to those of a comparable group of children with SLI who were educated in their first language. The second language proficiency levels, however, were below those of children without SLI in French immersion programs. Restrepo (1998) made an attempt to identify a set of measures discriminating predominantly Spanish-speaking children (learning English as a second language) with typical language development and with SLI. Measures of vocabulary, bound-morpheme learning skills and language form were administered, along with parent questionnaires on the child's language achievement and family history of speech and language problems. The following measures turned out to discriminate between bilingual children with and without SLI: parental report of the child's speech and language skills, family history of speech and language problems, mean length per T-unit[3], and the number of errors per T-unit. In studies by Crutchley, Botting, and Conti-Ramsden (1997) and Crutchley (1999), the language achievement of bilingual children with SLI and monolingual children with SLI in English as a first and second language was compared. Overall, the bilingual children had lower scores than their monolingual peers on standardized language assessment measures in the domains of vocabulary and grammar. The researchers found that the bilingual children were more likely to have language difficulties in complex language skills like morphology and grammar than in phonological skills.

However, from research on SLI and bilingualism conducted so far, we must conclude that a coherent picture of the acquisition of L2 in bilingual children with SLI is generally lacking. In most studies, the L1 achievement level of monolingual children was compared with the L2 achievement level of bilingual children. No attempt has been made to take into account the achievement levels of monolingual and bilingual children with and without language impairment in the same design. Moreover, insofar as language data have been compared, only a few linguistic domains were taken into account. Studies providing a full account of the speech and language achievement of monolingual and bilingual children with and without SLI still are extremely scarce.

The present study can be seen as a first attempt to shed light on the language difficulties of bilingual children with SLI in the Netherlands. The aim of this study is to explore the L2 achievement of bilingual children with SLI from Turkish, Moroccan, and Surinamese origin in the age range of 6 – 8 years. The bilingual children with SLI (Bili-SLI) will be compared with three control groups of children in the same age-range: (1) typically developing monolingual Dutch children (Mono-TD), (2) typically developing bilingual

[3] T-unit defined as "any clause and its subordinate clauses (Hunt, 1965)" (Restrepo, 1998, p. 1402)

children from Turkish, Moroccan, and Surinamese origin with Dutch as L2 (Bili-TD), and (3) monolingual Dutch children with SLI (Mono-SLI). We do not conceive of language proficiency as a monolithic ability, but assume that speaking a language in varying environments involves distinct sub-skills that can be acquired in differential patterns (MacWhinney, 1992). For this reason, achievement scores have been assessed in the linguistic domains of phonology, lexicon, morpho-syntax, and stories. One could imagine that bilingual children with SLI may be in an additionally disadvantaged position because: they have to acquire Dutch as a second language while experiencing language impairment. The central question in this study, therefore, is at which linguistic L2 levels typically developing bilingual children and monolingual children with SLI show a disadvantage in comparison to native typically developing Dutch children and, more to the point, at which linguistic L2 levels Bili-SLI children show an additional disadvantage in comparison to Bili-TD and Mono-SLI children? Our expectation is that Bili-SLI children will show an additional disadvantage at least in the domains of lexical and grammatical skills, since these domains have proven to be problematic for both Mono-SLI children and bilingual children.

Method

Participants

A total of 1108 children, divided over the Bili-SLI group and three control groups, participated in this study. The Bili-SLI group consisted of 74 bilingual children (54 boys, 20 girls), learning Dutch as a second language, with SLI. The children originated from three minority groups: Turkish (n = 34), Moroccan (n = 27), and Surinamese (n = 13). The children's ages varied from 67 to 103 months (M = 85 months).

Three groups of children served as control groups. The first control group consisted of 137 (93 boys, 44 girls) native Dutch children with SLI (Mono-SLI). The children's ages varied from 73 to 102 months (M = 86 months). All children with SLI (both in the Bili-SLI group and in the control Mono-SLI group) were diagnosed with SLI by a multidisciplinary team of clinical linguists, psychologists, and speech therapists. The children had normal hearing and adequate intelligence, and attended special elementary schools for children with SLI in various regions of the Netherlands.

The second control group consisted of 321 bilingual children, learning Dutch as a second language, with typical language development (Bili-TD) who had served as a portion

of the norm-group for the Dutch language test used. This group consisted of 169 boys and 152 girls originating from three minority groups: Turkish (n = 146), Moroccan (n = 114), and Surinamese (n = 61). The children's ages varied from 67 to 102 months (M = 84 months). These children attended mainstream elementary schools in various regions of the Netherlands.

The third control group was a group of 576 native Dutch children with typical language development (Mono-TD). This group also had served as a portion of the norm-group for the Dutch language test used and consisted of 273 boys and 303 girls with ages varying from 67 to 102 months (M = 84 months).

Materials

The Dutch standardized language test "Taaltoets Alle Kinderen" [Language Proficiency Test for All Children] (Verhoeven & Vermeer, 2001) was used to assess the children's Dutch language skills. This test consists of 11 different language-skill tasks. All tasks yield sufficient reliability indices; Cronbach's alpha was greater than .84 in all cases. In this study, we selected nine of the tasks, concerning phonology, lexicon, morpho-syntax, and story-comprehension. These nine tasks will be described in the following.

Phonology

Auditory discrimination. The auditory discrimination task was used to assess whether a child could process auditory information. The investigator orally presented pairs of words to the child using a piece of paper as coverage for her mouth, so that the child had no visual feedback. After each pair, the child had to indicate whether the words were the same by saying 'the same' or 'not the same'. The task consisted of 50 pairs of words, 13 of these pairs consisted of two identical words (correct response: 'the same'), the remaining 37 pairs consisted of two words that differed in only one sound (correct response: 'not the same'). The child's score was the total number of correct answers. The maximum score was 50. There was no termination-rule; all children were required to answer all items. An example of a word-pair with two identical words was 'kat – kat' [cat - cat]. An example of a word-pair with two different words differing in only one sound was 'bel – bal' [bell – ball].

Articulation. The articulation task was used to assess whether a child could articulate all sounds in words with and without clusters of consonants. The investigator orally presented a word to the child which the child had to re-articulate. The task consisted of 45 words of different levels of articulation-difficulty, depending on the absence (less difficult) or presence

(difficult) of consonant-clusters in the words. The child's score was the total number of correctly pronounced words. A difference in pronunciation of the child from the pronunciation of the investigator resulted in an incorrect answer, even pronunciation-differences due to a child's dialect. The maximum score was 45. There was no termination-rule; all children were required to answer all items. An example of a word without any consonant-clusters was 'muur' [wall]. An example of a word with a consonant-cluster was 'herfst' [fall].

Lexicon

Receptive vocabulary. The receptive vocabulary task was used to assess a child's receptive lexicon. The investigator orally presented a word which was depicted in one of four line-drawings and the child had to respond by choosing the correct line-drawing. The task consisted of 96 picture-pointing items presented in order of increasing difficulty. An item contained a picture of the item of the word and three distracting pictures. The child's score was the total number of correct answers. The maximum score was 96. The task was terminated after five consecutive incorrect answers. An example of a picture-pointing item was the word 'neus' [nose] with a line-drawing of a nose and three distracting drawings of an eye, a mouth, and a knee.

Word definition. The word definition task assessed a child's lexicon and his or her ability to describe words. The investigator orally presented words and asked the child to describe, to point to, or to demonstrate these words. When the child's description was not specific enough, the investigator asked the child to say some more about the word. The task consisted of 45 items in order of increasing difficulty. The child's score was the total number of correct answers. The maximum score was 45. The task was terminated after five consecutive incorrect answers. An example of a question presented by the investigator was 'can you tell me what a bed is?' An example of a correct answer for this item was 'you can sleep in it'. An example of an insufficiently specific answer was 'it is in my room'. Given such a response the investigator would ask the child to say more about it and if the child's subsequent answer was sufficiently specific, the answer was judged to be correct. An example of an incorrect answer to the item 'can you tell me what a bed is?' was 'you can eat it'.

Morpho-syntax

Morphology. The morphology task was used to assess whether a child could derive plural nouns from single nouns and past participles from single present tenses. The investigator showed pictures of objects and elicited the plural nouns and past participles with fixed sentences. The task consisted of 24 items, 12 plural nouns and 12 past participles. The child's score was the total number of correct derivations. The maximum score was 24. There was no termination-rule; all children were required to answer all items. An example of a fixed sentence used to elicit a plural noun was 'this is one ship, these are two ...' (ships). An example of a fixed sentence to elicit a past participle was 'Rosita is throwing a ball. Yesterday, she has also.... a ball' (thrown).

Comprehension of function words. This task was used to assess the child's perception of grammar. The investigator orally presented a sentence and the child had to choose the correct one of three line-drawings. The task consisted of 42 items. The child's score was the total number of correct answers. The maximum score for this task was 42. There was no termination-rule; all children were required to answer all items. An example of an item from the function word comprehension task was the question 'which mouse is sitting on the cheese' with three pictures, one of a mouse sitting in front of the cheese, one of a mouse sitting on the cheese and one with a mouse sitting next to the cheese.

Sentence comprehension. The sentence comprehension task was used to assess the child's perception of grammar. This task consisted of sentence comprehension and concerns comprehension of word order and implicit meanings. The investigator orally presented a sentence and the child had to choose the correct one of three line-drawings. The task consisted of 42 items. The child's score was the total number of correct answers to the questions. The maximum score for this task was 42. There was no termination-rule; all children were required to answer all items. An example of an item from the sentence comprehension task was the sentence 'the tree is taller than the house' with three pictures of a tree and a house, one in which the tree is taller, one in which the house is taller, and one in which the tree was as tall as the house.

Sentence imitation. The sentence imitation task was used to assess a child's grammatical performance. This task focused on function words and sentence patterns. The investigator pronounced a complex sentence and the child had to repeat the sentence as accurately as possible. The task consisted of 20 sentences. The child's score was the total number of correctly repeated function words plus the total number of correctly repeated sentence patterns. For each sentence the child earned zero points if both the function word

and the sentence pattern were repeated incorrectly, one point if either the function word or the sentence pattern was repeated correctly, or two points if both the function word and the sentence pattern were repeated correctly. The maximum score was 40. There was no cut-off rule; all children were required to answer all items. An example of a sentence from the sentence-imitation task was 'Gisteren is mijn moeder met de fiets naar de stad gegaan' [Yesterday, my mother went to town by bike], 'is' [went] was the function word, 'met de fiets' [by bike] was the sentence pattern.

Story comprehension

Story comprehension. The story comprehension task was used to assess a child's ability to understand a spoken story. The investigator told the child that she was going to tell a story and that he or she had to listen carefully, because after the story the investigator would ask some questions about it. The questions were asked immediately after the story was told. The task consists of six short stories with four questions about each story. Every story had at least one yes-or-no-question. The total number of items was 24. The child's score was the total number of correct answers to the questions. The maximum score was 24. There was no cut-off rule; all children were required to answer all items. An example of a story and the accompanying questions was 'It is very quiet in the house. The cat is sleeping on the couch. Then, a mouse comes out of his little hole into the room. He is looking for bread and cheese. The cat hears the mouse and jumps off the couch. He runs quickly after the mouse. The mouse is startled but suddenly has an idea. He runs to the cupboard. He knows the cat cannot get under there. He makes sure that he is under there just in time.' The four questions and answers (between brackets) were 'where did the cat sleep?' (on the couch), 'what is the mouse looking for?' (bread and cheese or food), 'why does the mouse run under the cupboard?' (because the cat cannot get under there or because he is safe there), 'does the cat get the mouse?' (no).

Procedure

All children were tested in six to eight sessions of 20 to 40 minutes each. Each task was explained following a protocol of verbal explanation and two example items with positive or negative feedback. When a child did not understand the task, a second explanation was given and the example items were repeated and further explained or other examples were given and explained. During the effective tasks the child was given encouragement, but no feedback on his or her answers. The investigator wrote down all answers and computed the

number of correct answers per child. The tasks *articulation*, *word definition*, and *sentence imitation*, were audio-taped in order to verify the scores.

The data were subjected to a 3 (Age: 6, 7, 8) x 4 (Group: Mono-TD, Bili-TD, Mono-SLI, Bili-SLI) MANOVA (GLM). Because the interaction between Age and Group was significant ($F(54,5185) = 2.725$, $p < .001$) further analyses were conducted per age-group. For each age-group and for each language-test task a one-way ANOVA was performed with language task as dependent variable and group (Mono-TD, Bili-TD, Mono-SLI, Bili-SLI) as between subject factor. To answer the question of an additional disadvantage for Bili-SLI children, four planned contrasts were necessary in each age-group (6, 7, and 8): 1) Mono-TD versus Mono-SLI, 2) Mono-TD versus Bili-TD, 3) Mono-SLI versus Bili-SLI, and 4) Bili-TD versus Bili-SLI. We speak of a disadvantage for SLI when the Mono-TD group scores significantly higher than the Mono-SLI group. We consider there to be a disadvantage for bilingualism if the Mono-TD group scores significantly higher than the Bili-TD group. We define an additional disadvantage for Bili-SLI children only when a disadvantage is found for both SLI and bilingualism separately and the Bili-SLI group scores significantly lower than both the Bili-TD group and the Mono-SLI group. In other words, we speak of an additional disadvantage only when all four contrasts show significant differences in the expected direction. We consider a difference to be significant when $p < .0125$ (a Bonferroni correction of .05 divided by four was used).

Results

Descriptive statistics were computed and are presented in the Appendix. In each age-group, the Bili-SLI children have the lowest scores on almost all language tasks. Whether these scores differ significantly from the other scores, was investigated by means of planned contrasts. The results of the planned contrasts for each language task are described below. In all cases when significant differences existed between two groups, the differences were in the expected direction. Specifically, when contrasts were significant, children in the Mono-TD group had higher scores than their peers in both the Mono-SLI and Bili-TD groups, and Bili-SLI children had lower scores than children in both the Mono-SLI and Bili-TD groups. The test-values of the contrasts are presented in Tables 1 to 4.

Phonology (see Table1)

Auditory discrimination. Each of the three ANOVAs with Auditory discrimination as dependent variable, showed a significant effect of Group (6-year-olds: $F(4, 375) = 3701.67$, $p < .01$, $\eta^2 = .98$; 7-year-olds: $F(4, 369) = 7051.06$, $p < .01$, $\eta^2 = .99$; 8-year-olds: $F(4, 332) = 12491.88$, $p < .01$, $\eta^2 = .99$). Planned contrasts for the 6-year-olds revealed a significant disadvantage in auditory articulation due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was, however, no significant disadvantage due to bilingualism: (Mono-TD vs. Bili-TD: $p = .02$; critical $\alpha = .0125$). On average, children in the Bili-SLI group did score significantly lower than children in the Bili-TD group. However, no significant difference was found between the means of children in the Mono-SLI and Bili-SLI groups According to our criteria, therefore, there was no significant additional disadvantage for 6-year-old children in the Bili-SLI group in the area of auditory discrimination.

Planned contrasts for the 7-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD; $p < .001$). Also, children in the Bili-SLI group scored significantly lower than children in the Bili-TD group. However, no significant difference was found between children in the Mono-SLI and Bili-SLI groups. Taken together, these results reveal no significant additional disadvantage for 7-year-old children in the Bili-SLI group in the area of auditory discrimination.

Planned contrasts for the 8-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was no significant disadvantage due to bilingualism: (Bili-TD vs. Mono-TD: $p = .11$). There were no significant differences between the means of children in the Mono-SLI and Bili-SLI groups, or the Bili-TD and Bili-SLI groups. Again, no additional disadvantage was found for 8-year-old children in the Bili-SLI group on the auditory discrimination task.

In sum, although there was a significant disadvantage due to SLI in each of the age-groups, children in the Bili-SLI group do not suffer from a significant additional disadvantage in the area of auditory discrimination in any of the age-groups (see Figure 1a).

Articulation. Each of the three ANOVAs with Articulation as dependent variable, showed a significant effect of Group (6-year-olds: $F(4, 378) = 6769.74$, $p < .01$, $\eta^2 = .99$; 7-year-olds: $F(4, 376) = 10099.01$, $p < .01$, $\eta^2 = .99$; 8-year-olds: $F(4, 332) = 10385.90$, $p < .01$, $\eta^2 = .99$). Planned contrasts for the 6-year-olds revealed a significant disadvantage due to SLI on articulation: (Mono-SLI < Mono-TD; $p < .001$). No significant disadvantage was

found for bilingualism (Bili-TD vs. Mono-TD: $p = .06$). A significant difference was found in the expected direction between the means of children in the Bili-TD and Bili-SLI groups, but no difference was found between the Mono-SLI and Bili-SLI groups. Therefore, no significant additional disadvantage was found for 6-year-old children in the Bili-SLI group on articulation.

Planned contrasts for the 7-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). No significant disadvantage was found due to bilingualism (Bili-TD vs. Mono-TD: $p = .08$). Children in the Bili-SLI group did score, on average, significantly lower than their peers in the Bili-TD group. However, no significant difference was found between the means of children in the Mono-SLI and Bili-SLI groups. Therefore, no significant additional disadvantage was found for 7-year-old children in the Bili-SLI group on articulation.

Planned contrasts for the 8-year-olds also revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). No significant disadvantage was found due to bilingualism (Bili-TD vs. Mono-TD: $p = .81$). Children in the Bili-SLI group scored, on average, significantly lower than those in the Bili-TD group. There was no significant difference between the means of the children in the Mono-SLI and Bili-SLI groups. Therefore, no significant additional disadvantage was found for 8-year-old children in the Bili-SLI group on articulation.

In sum, although there was a significant disadvantage due to SLI in all age-groups, there was no significant additional disadvantage in the area of articulation for children in the Bili-SLI group in any age-group (see Figure 1b).

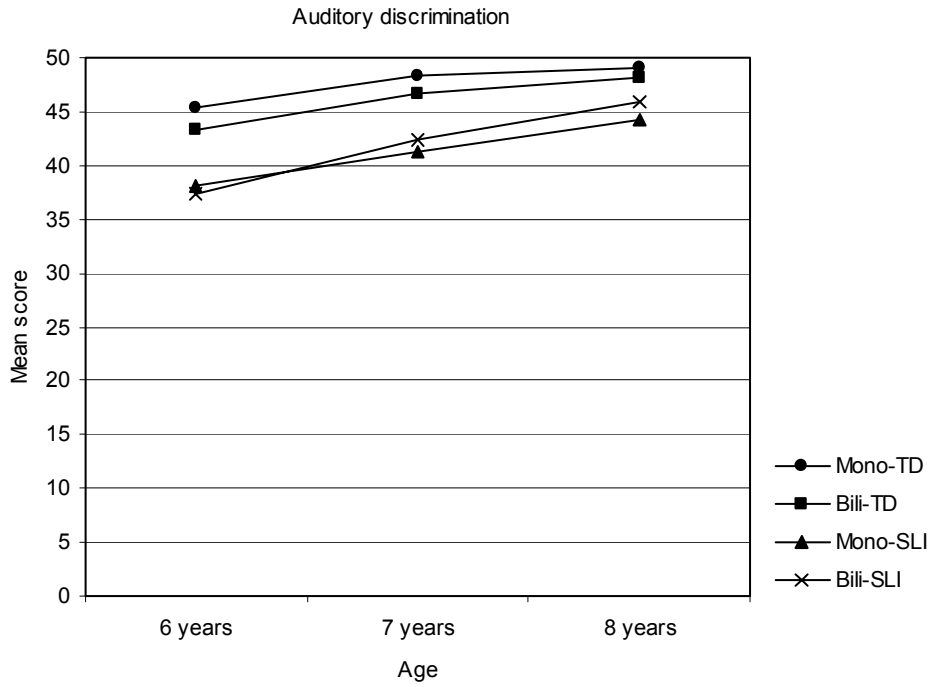


Figure 1a. *Mean scores per group and per age for Auditory discrimination*

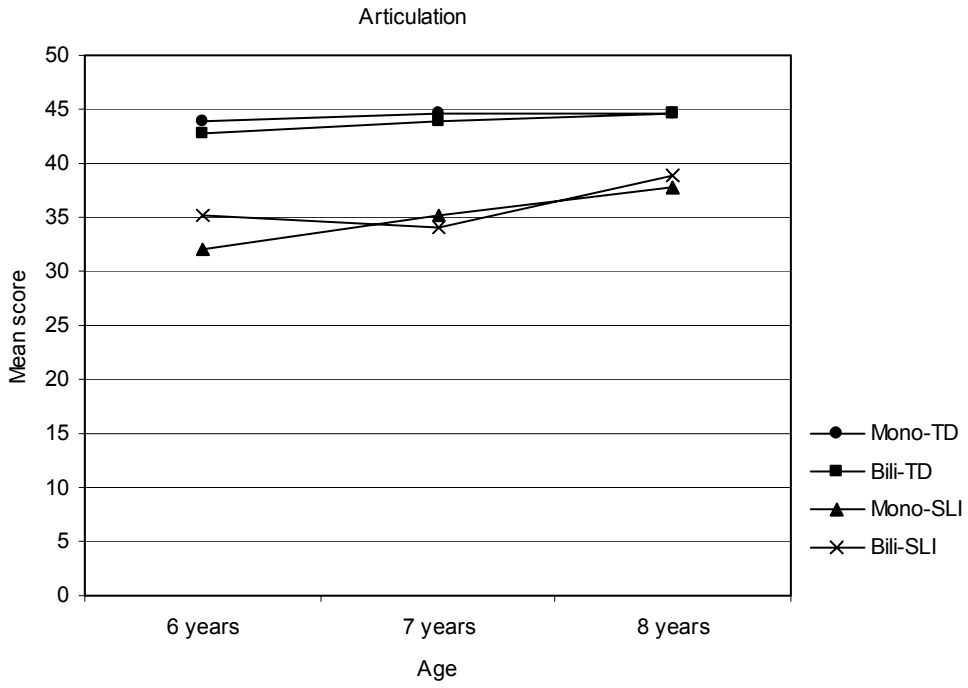


Figure 1b. *Mean scores per group and per age for Articulation*

Table 1. Planned contrasts for Phonology

		Auditory discrimination				Articulation			
Age	Contrast	*df*	*F*	*p*	eta^2	*df*	*F*	*p*	eta^2
6	Mono-TD vs. Mono-SLI	1	39.60	.00*	.10	1	202.58	.00*	.35
	Mono-TD vs. Bili-TD	1	5.26	.02	.01	1	3.60	.06	.01
	Mono-SLI vs. Bili-SLI	1	0.73	.40	.00	1	1.81	.18	.01
	Bili-TD vs. Bili-SLI	1	19.36	.00*	.05	1	64.44	.00*	.15
	Error	375	(18024.56)			378	(24.48)		
7	Mono-TD vs. Mono-SLI	1	63.05	.00*	.15	1	189.98	.00*	.34
	Mono-TD vs. Bili-TD	1	10.19	.00*	.03	1	3.06	.08	.01
	Mono-SLI vs. Bili-SLI	1	.00	1.00	.00	1	0.44	.51	.00
	Bili-TD vs. Bili-SLI	1	17.65	.00*	.05	1	104.28	.00*	.22
	Error	369	(28.49)			376	(17.11)		
8	Mono-TD vs. Mono-SLI	1	51.60	.00*	.14	1	116.75	.00*	.26
	Mono-TD vs. Bili-TD	1	2.51	.11	.01	1	0.06	.81	.00
	Mono-SLI vs. Bili-SLI	1	3.21	.07	.01	1	1.95	.16	.01
	Bili-TD vs. Bili-SLI	1	5.40	.02	.02	1	37.17	.00*	.10
	Error	332	(15.40)			332	(15.25)		

Note. Values enclosed in parentheses represent mean square errors.
* $p < .0125$

Lexicon (see Table 2)

Receptive vocabulary. Each of the three ANOVAs with Receptive vocabulary as dependent variable, showed a significant effect of Group (6-year-olds: $F(4, 378) = 1581.26$, $p < .01$, $\eta^2 = .94$; 7-year-olds: $F(4, 378) = 2397.60$, $p < .01$, $\eta^2 = .96$; 8-year-olds: $F(4, 327) = 3273.82$, $p < .01$, $\eta^2 = .98$). Planned contrasts for the 6-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). Children in the Bili-SLI group scored, on average, significantly lower than those in the Mono-SLI group, but no significant difference was found between the means of children in the Bili-TD and Bili-SLI groups. Taken together, these results reveal no significant additional disadvantage for 6-year-old children in the Bili-SLI group in the area of receptive vocabulary.

Planned contrasts for the 7-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). The mean score of the Bili-SLI group was significantly lower than the Mono-SLI group but no significant difference was found between the means of the Bili-TD and Bili-SLI groups. According to our criteria, therefore, there was no significant additional disadvantage for 7-year-old children in the Bili-SLI group in the area of receptive vocabulary.

Planned contrasts for the 8-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). Also as expected, children in the Bili-SLI scored, on average, significantly lower than children in the Mono-SLI group, and the mean of the Bili-SLI group was significantly lower than that Bili-TD group (see Figure 2a). Therefore, there was a significant additional disadvantage for 8-year-old children in the Bili-SLI group in the area of receptive vocabulary.

In sum, for the task Receptive vocabulary, a significant disadvantage due to both SLI and bilingualism was found in each age-group and a significant additional disadvantage was found for the 8-year-old children in the Bili-SLI group (see Figure 2a).

Word definition. Each of the three ANOVAs with Word definition as dependent variable, showed a significant effect of Group (6-year-olds: $F(4, 377) = 583.05$, $p < .01$, $\eta^2 = .86$; 7-year-olds: $F(4, 364) = 854.36$, $p < .01$, $\eta^2 = .90$; 8-year-olds: $F(4, 324) = 1059.21$, $p < .01$, $\eta^2 = .93$). Planned contrasts for the 6-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). However, no significant difference was found between the Mono-SLI and Bili-SLI groups or between the Bili-TD and Bili-SLI groups. Therefore, no significant additional disadvantage was found for 6-year-old children in the Bili-SLI group on word definition.

Planned contrasts for the 7-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). Also as expected, children in the Bili-SLI scored, on average, significantly lower than children in the Mono-SLI group, and the mean of the Bili-SLI group was significantly lower than that Bili-TD group. Taken together, there was a significant additional disadvantage for 7-year-old children in the Bili-SLI group on word definition.

Planned contrasts for the 8-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). Also as expected, children in the Bili-SLI scored, on average, significantly lower than children in the Mono-SLI group, and the mean of the Bili-SLI group was significantly lower than that Bili-TD group. Again, a significant additional disadvantage was found for 8-year-old children in the Bili-SLI group on word definition.

In sum, for the task Word definition, a significant disadvantage was found for both SLI and bilingualism in every age-group and a significant additional disadvantage was found for the 7- and 8-year-old Bili-SLI children (see Figure 2b).

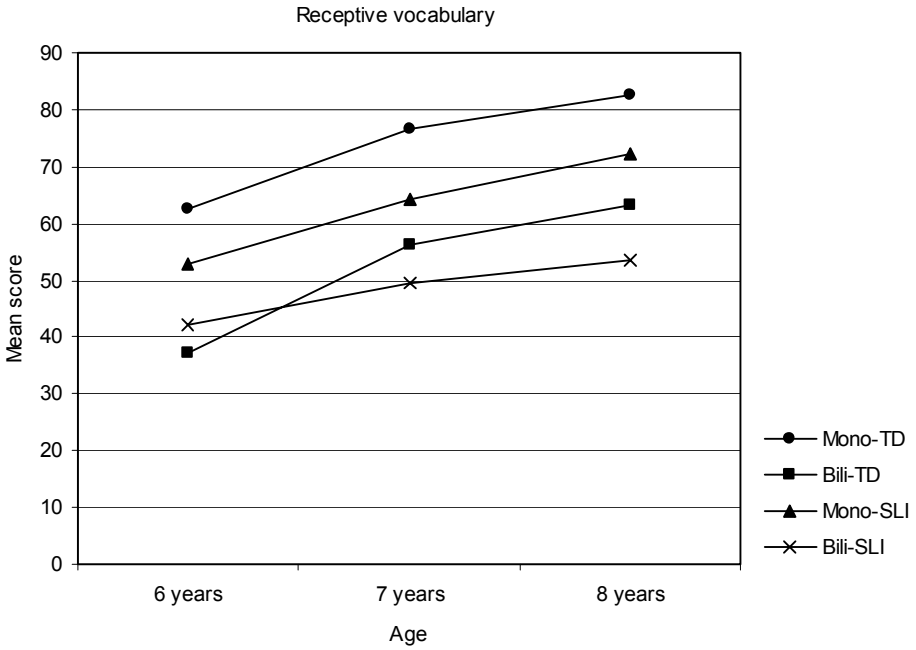


Figure 2a. *Mean scores per group and per age for Receptive vocabulary*

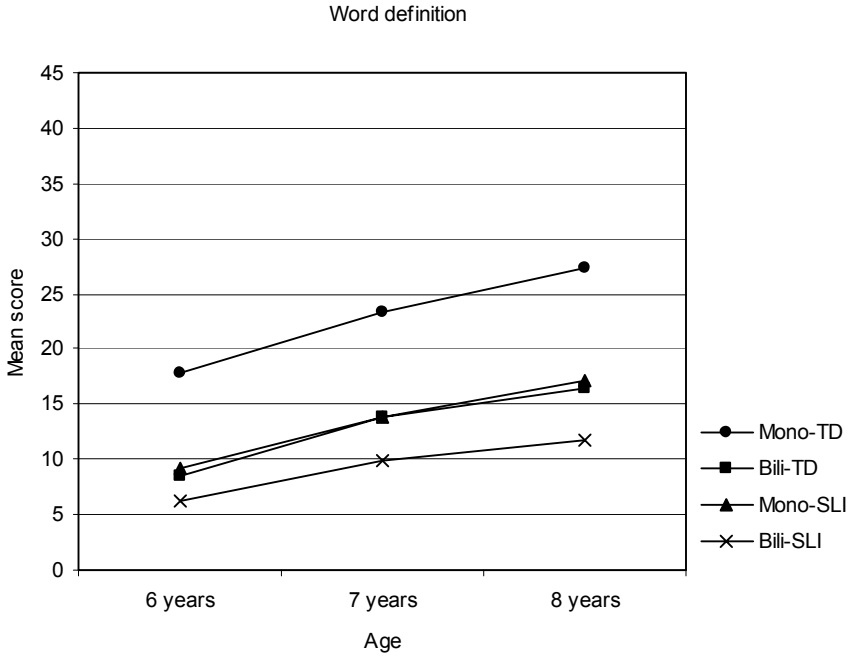


Figure 2b. *Mean scores per group and per age for Word definition*

Table 2. *Planned contrasts for Lexicon*

		Receptive vocabulary				Word definition			
Age	Contrast	*df*	*F*	*p*	eta^2	*df*	*F*	*p*	eta^2
6	Mono-TD vs. Mono-SLI	1	20.70	.00*	.05	1	79.21	.00*	.17
	Mono-TD vs. Bili-TD	1	265.10	.00*	.41	1	193.80	.00*	.34
	Mono-SLI vs. Bili-SLI	1	11.79	.00*	.03	1	4.23	.04	.01
	Bili-TD vs. Bili-SLI	1	1.77	.19	.01	1	2.62	.11	.01
	Error	378	(174.38)			377	(32.45)		
7	Mono-TD vs. Mono-SLI	1	29.14	.00*	.07	1	86.96	.00*	.19
	Mono-TD vs. Bili-TD	1	164.61	.00*	.30	1	162.90	.00*	.31
	Mono-SLI vs. Bili-SLI	1	23.07	.00*	.06	1	6.73	.01*	.02
	Bili-TD vs. Bili-SLI	1	5.19	.02	.01	1	7.77	.01*	.02
	Error	378	(182.86)			364	(39.65)		
8	Mono-TD vs. Mono-SLI	1	28.67	.00*	.08	1	99.70	.00*	.24
	Mono-TD vs. Bili-TD	1	170.60	.00*	.34	1	194.79	.00*	.38
	Mono-SLI vs. Bili-SLI	1	33.51	.00*	.09	1	11.29	.00*	.03
	Bili-TD vs. Bili-SLI	1	9.72	.00*	.03	1	10.53	.00*	.03
	Error	327	(138.15)			324	(38.07)		

Note. Values enclosed in parentheses represent mean square errors.
* $p < .0125$

Morpho-syntax (see Table 3)

Morphology. Each of the three ANOVA's with Morphology as dependent variable, showed a significant effect of Group (6-year-olds: $F(4, 372) = 739.47$, $p < .01$, $\eta^2 = .89$; 7-year-olds: $F(4, 377) = 1118.38$, $p < .01$, $\eta^2 = .92$; 8-year-olds: $F(4, 332) = 1444.86$, $p < .01$, $\eta^2 = .95$). Planned contrasts for the 6-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p = .01$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). However, no significant differences were found between the Mono-SLI and Bili-SLI groups or between the Bili-TD and Bili-SLI groups. To our criteria, there was no significant additional disadvantage for 6-year-old children in the Bili-SLI group in the area of morphology.

Planned contrasts for the 7-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). Also as expected, children in the Bili-SLI scored, on average, significantly lower than children in the Mono-SLI group, and the mean of the Bili-SLI group was significantly lower than that of the Bili-TD group. Therefore, a significant additional disadvantage found for 7-year-old children in the Bili-SLI group on morphology.

Planned contrasts for the 8-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to

bilingualism (Bili-TD < Mono-TD: $p < .001$). Also as expected, children in the Bili-SLI scored, on average, significantly lower than children in the Mono-SLI group, and the mean of the Bili-SLI group was significantly lower than that of the Bili-TD group. Taken together, there was a significant additional disadvantage for 8-year-old children in the Bili-SLI group in the area of morphology.

In sum, for the task Morphology, significant disadvantages due to SLI and bilingualism were found in each age-group and a significant additional disadvantage was found for 7- and 8-year-old Bili-SLI children (see Figure 3a).

Comprehension of function words. Each of the three ANOVAs with comprehension of function words as dependent variable, showed a significant effect of Group (6-year-olds: $F(4, 380) = 3862.17$, $p < .01$, $\eta^2 = .98$; 7-year-olds: $F(4, 381) = 9476.57$, $p < .01$, $\eta^2 = .99$; 8-year-olds: $F(4, 331) = 12236.38$, $p < .01$, $\eta^2 = .99$). Planned contrasts for the 6-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p = .01$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). Also, a significant difference was found, in the expected direction, between the Mono-SLI and Bili-SLI groups. However, no significant difference was found between the means of the Bili-TD and Bili-SLI groups. Taken together, there was no additional disadvantage for 6-year-old children in the Bili-SLI group on comprehension of function words.

Planned contrasts for the 7-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). Also as expected, children in the Bili-SLI scored, on average, significantly lower than children in the Mono-SLI group, and the mean of the Bili-SLI group was significantly lower than that Bili-TD group. Therefore, there was a significant additional disadvantage for 7-year-old children in the Bili-SLI group on comprehension of function words.

Planned contrasts for the 8-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). However, although there was a significant difference between the means of the Bili-SLI and Bili-TD groups, there was no significant difference between the Bili-SLI and Mono-SLI groups. Therefore, no significant additional disadvantage was found for 8-year-old children in the Bili-SLI group on comprehension of function words.

In sum, for the task Comprehension of function words, there was a significant disadvantage due to both SLI and bilingualism and there was also a significant additional disadvantage found for 7-year-old children in the Bili-SLI group (see Figure 3b).

Sentence comprehension. Each of the three ANOVAs with Sentence comprehension as dependent variable, showed a significant effect of Group (6-year-olds: $F(4, 371) = 3134.69$, $p < .01$, $\eta^2 = .97$; 7-year-olds: $F(4, 378) = 5371.80$, $p < .01$, $\eta^2 = .98$; 8-year-olds: $F(4, 331) = 6957.41$, $p < .01$, $\eta^2 = .99$). Planned contrasts for the 6-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). However, no significant differences were found between the means of the Mono-SLI and Bili-SLI groups or between the Bili-TD and Bili-SLI groups. According to our criteria, there was no significant additional disadvantage for 6-year-old children in the Bili-SLI group on sentence comprehension.

Planned contrasts for the 7-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). There was a significant difference between the Bili-TD and Bili-SLI groups. However, no significant difference was found between the Mono-SLI and Bili-SLI groups. No significant additional disadvantage was found for 7-year-old children in the Bili-SLI group on sentence comprehension.

Planned contrasts for the 8-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). There was also a significant difference between the means of the Bili-SLI and Bili-TD groups, and between the Bili-SLI and Mono-SLI groups. Therefore, there was a significant additional disadvantage for 8-year-old children in the Bili-SLI group on sentence comprehension.

In sum, for the task Sentence comprehension, there were significant disadvantages for both SLI and bilingualism and there was also a significant additional disadvantage found for 8-year-old children in the Bili-SLI group (see Figure 3c).

Sentence imitation. Each of the three ANOVAs with Sentence imitation as dependent variable, showed a significant effect of Group (6-year-olds: $F(4, 371) = 603.51$, $p < .01$, $\eta^2 = .87$; 7-year-olds: $F(4, 366) = 998.30$, $p < .01$, $\eta^2 = .92$; 8-year-olds: $F(4, 331) = 1494.52$, $p < .01$, $\eta^2 = .95$). Planned contrasts for the 6-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to

bilingualism (Bili-TD < Mono-TD: $p < .001$). Also, children in the Bili-SLI group scored, on average, significantly lower than their peers in the Bili-TD group. However, no significant difference was found between the Mono-SLI and Bili-SLI groups. Therefore, there was no additional disadvantage for 6-year-old children in the Bili-SLI group in the area of sentence imitation.

Planned contrasts for the 7-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). In addition, although children in the Bili-SLI group scored, on average, significantly lower than their peers in the Bili-TD group, no significant difference was found between the Mono-SLI and Bili-SLI groups. Therefore, there was no additional disadvantage for 7-year-old children in the Bili-SLI group on sentence imitation.

Planned contrasts for the 8-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). Also, children in the Bili-SLI group scored significantly lower than their peers in the Bili-TD group. However, no significant difference was found between the Mono-SLI and Bili-SLI groups. Taken together, no additional disadvantage was found for 8-year-old children in the Bili-SLI group on sentence imitation.

In sum, for the Sentence imitation task, although there were disadvantages due to both SLI and bilingualism, no additional disadvantage was found for Bili-SLI children in any of the age-groups (see Figure 3d).

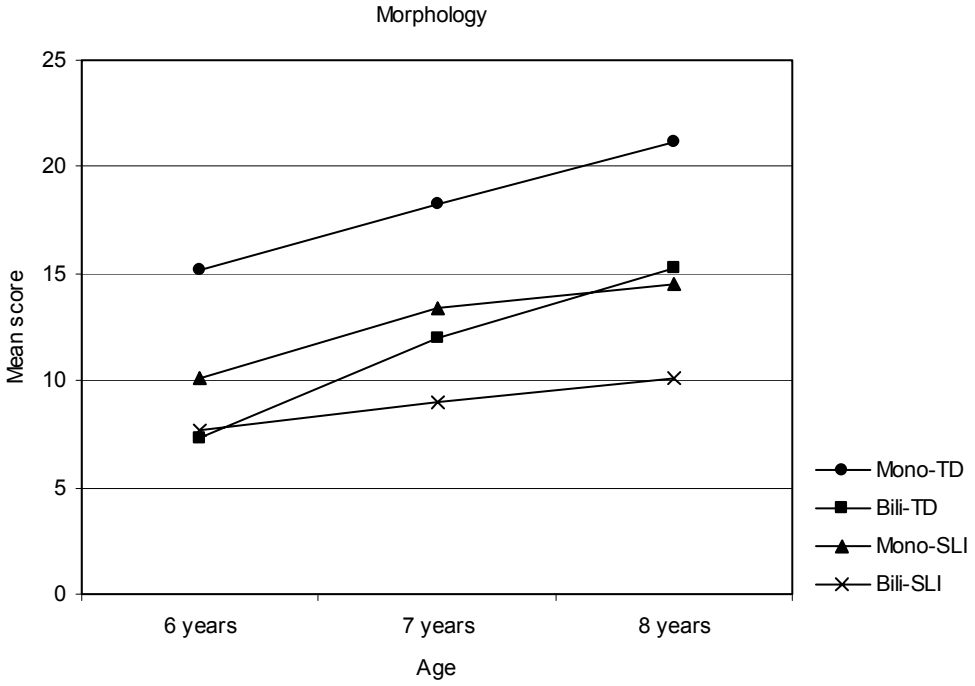


Figure 3a. *Mean scores per group and per age for Morphology*

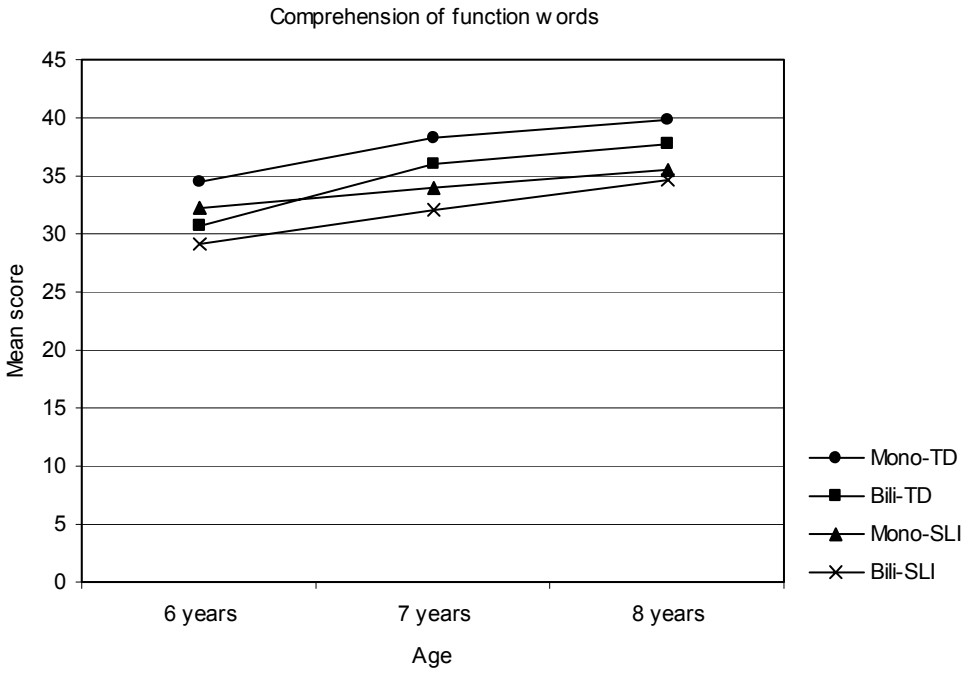


Figure 3b. *Mean scores per group and per age for Comprehension of function words*

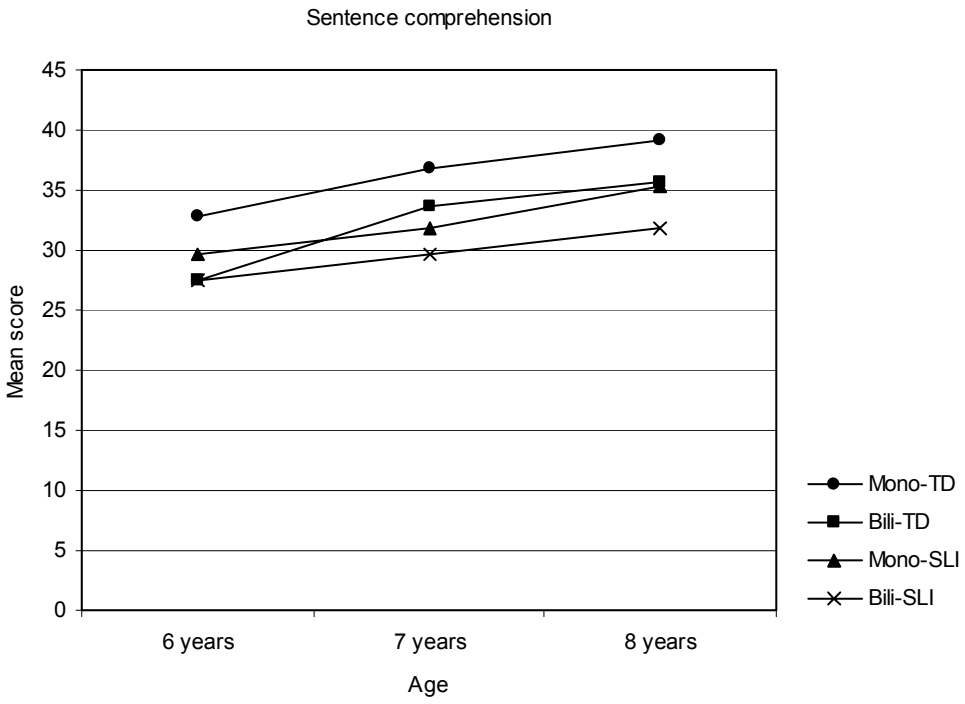


Figure 3c. *Mean scores per group and per age for Sentence comprehension*

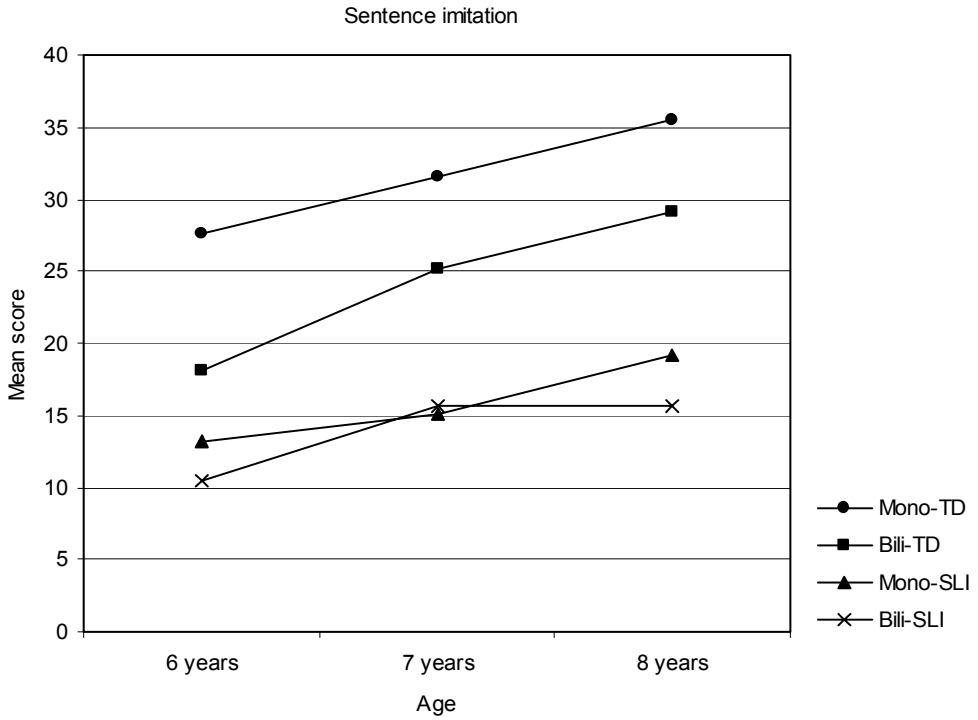


Figure 3d. *Mean scores per group and per age for Sentence imitation*

Table 3. *Planned contrasts for Morpho-syntax*

		Morphology				Comprehension of function words			
Age	Contrast	*df*	*F*	*p*	*eta*^{2}	*df*	*F*	*p*	*eta*^{2}
6	Mono-TD vs. Mono-SLI	1	49.93	.00*	.12	1	6.63	.01*	.02
	Mono-TD vs. Bili-TD	1	234.45	.00*	.34	1	48.95	.00*	.11
	Mono-SLI vs. Bili-SLI	1	3.33	.07	.01	1	7.28	.01*	.02
	Bili-TD vs. Bili-SLI	1	0.59	.44	.00	1	1.65	.20	.00
	Error	372	(19.50)			380	(26.33)		
7	Mono-TD vs. Mono-SLI	1	43.15	.00*	.10	1	44.65	.00*	.11
	Mono-TD vs. Bili-TD	1	135.94	.00*	.27	1	29.63	.00*	.07
	Mono-SLI vs. Bili-SLI	1	21.57	.00*	.05	1	7.64	.01*	.02
	Bili-TD vs. Bili-SLI	1	13.00	.00*	.03	1	26.03	.00*	.06
	Error	377	(20.79)			381	(13.54)		
8	Mono-TD vs. Mono-SLI	1	86.85	.00*	.21	1	64.03	.00*	.16
	Mono-TD vs. Bili-TD	1	112.75	.00*	.25	1	27.76	.00*	.08
	Mono-SLI vs. Bili-SLI	1	11.27	.00*	.03	1	1.37	.24	.00
	Bili-TD vs. Bili-SLI	1	21.16	.00*	.06	1	17.33	.00*	.05
	Error	332	(19.05)			331	(10.01)		
		Sentence comprehension				Sentence imitation			
Age	Contrast	*df*	*F*	*p*	*eta*^{2}	*df*	*F*	*p*	*eta*^{2}
6	Mono-TD vs. Mono-SLI	1	15.28	.00*	.04	1	91.04	.00*	.20
	Mono-TD vs. Bili-TD	1	78.44	.00*	.18	1	78.56	.00*	.18
	Mono-SLI vs. Bili-SLI	1	4.81	.03	.01	1	1.30	.26	.00
	Bili-TD vs. Bili-SLI	1	0.42	.52	.00	1	12.34	.00*	.03
	Error	371	(27.89)			371	(81.78)		
7	Mono-TD vs. Mono-SLI	1	43.05	.00*	.10	1	148.37	.00*	.29
	Mono-TD vs. Bili-TD	1	38.84	.00*	.09	1	43.94	.00*	.11
	Mono-SLI vs. Bili-SLI	1	5.92	.02	.02	1	0.02	.89	.00
	Bili-TD vs. Bili-SLI	1	17.41	.00*	.04	1	31.35	.00*	.08
	Error	378	(21.51)			366	(68.93)		
8	Mono-TD vs. Mono-SLI	1	31.53	.00*	.09	1	182.06	.00*	.36
	Mono-TD vs. Bili-TD	1	46.92	.00*	.12	1	49.77	.00*	.13
	Mono-SLI vs. Bili-SLI	1	8.48	.00*	.03	1	2.97	.09	.01
	Bili-TD vs. Bili-SLI	1	12.27	.00*	.04	1	60.23	.00*	.15
	Error	331	(16.56)			331	(52.18)		

Note. Values enclosed in parentheses represent mean square errors.
* $p < .0125$

Spoken story comprehension (see Table 4)

Spoken story comprehension. Each of the three ANOVAs with Spoken story comprehension as dependent variable, showed a significant effect of Group (6-year-olds: $F(4, 368) = 1020.94$, $p < .01$, $\eta^2 = .92$; 7-year-olds: $F(4, 366) = 1469.49$, $p < .01$, $\eta^2 = .94$; 8-year-olds: $F(4, 332) = 2031.77$, $p < .01$, $\eta^2 = .96$). Planned contrasts for the 6-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$). There was also a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). Also, children

in the Bili-SLI group scored, on average, significantly lower than children in the Mono-SLI group. However, no significant difference was found between the Bili-TD and Bili-SLI groups. Therefore, there was no significant additional disadvantage for 6-year-old children in the Bili-SLI group.

Planned contrasts for the 7-year-olds revealed a significant disadvantage due to SLI (Mono-SLI < Mono-TD; $p < .001$) and a significant disadvantage due to bilingualism (Bili-TD < Mono-TD: $p < .001$). Although the means of the Bili-SLI and Mono-SLI groups were found to differ in the expected direction, no significant difference was found between the Bili-TD and Bili-SLI groups. Taken together, there was no additional disadvantage for 7-year-old children in the Bili-SLI group on spoken story comprehension.

Planned contrasts for the 8-year-olds revealed a significant disadvantages due to both SLI (Mono-SLI < Mono-TD; $p < .001$) and bilingualism (Bili-TD < Mono-TD: $p < .001$). In addition, significant differences were found in the expected direction both between the Mono-SLI and Bili-SLI groups, and between the Bili-TD and Bili-SLI groups. Therefore, a significant additional disadvantage was found for 8-year-old children in the Bili-SLI group on spoken story comprehension.

In sum, for the Story comprehension task, significant disadvantages were found due to both SLI and bilingualism in all age-groups and a significant additional disadvantage was found for 8-year-old Bili-SLI children (see Figure 4).

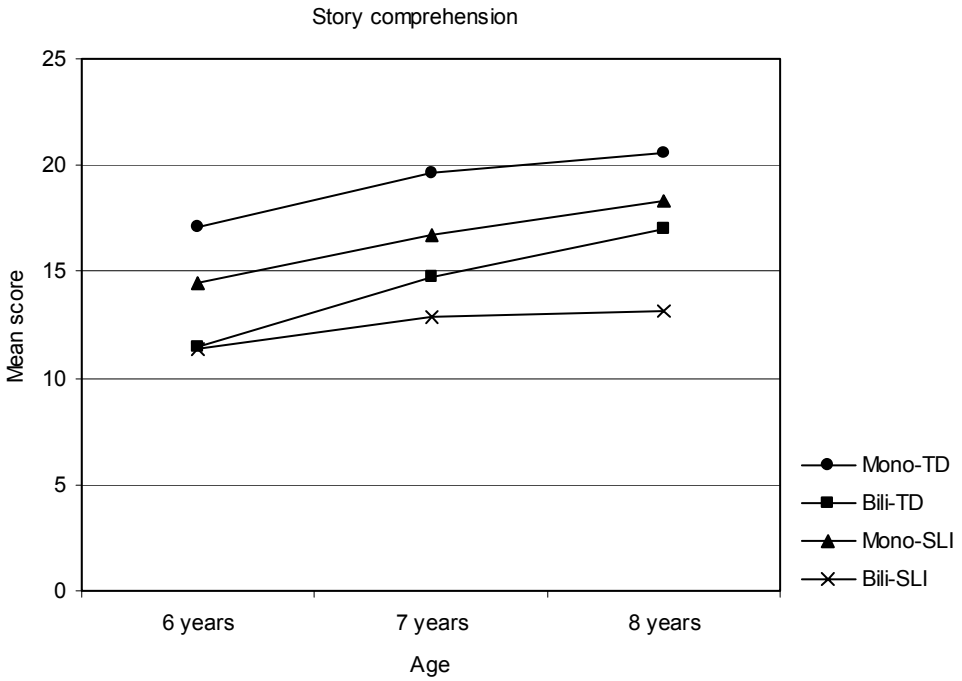


Figure 4. *Mean scores per group and per age for Story comprehension*

Table 4. *Planned contrasts for Spoken story comprehension*

		Spoken story comprehension			
Age	Contrast	*df*	*F*	*p*	eta^2
6	Mono-TD vs. Mono-SLI	1	11.07	.00*	.03
	Mono-TD vs. Bili-TD	1	104.86	.00*	.22
	Mono-SLI vs. Bili-SLI	1	9.85	.00*	.03
	Bili-TD vs. Bili-SLI	1	0.37	.54	.00
	Error	368	(20.59)		
7	Mono-TD vs. Mono-SLI	1	18.61	.00*	.05
	Mono-TD vs. Bili-TD	1	87.07	.00*	.19
	Mono-SLI vs. Bili-SLI	1	12.02	.00*	.03
	Bili-TD vs. Bili-SLI	1	3.43	.07	.01
	Error	366	(19.32)		
8	Mono-TD vs. Mono-SLI	1	12.91	.00*	.04
	Mono-TD vs. Bili-TD	1	53.54	.00*	.14
	Mono-SLI vs. Bili-SLI	1	23.94	.00*	.07
	Bili-TD vs. Bili-SLI	1	15.98	.00*	.05
	Error	332	(14.58)		

Note. Values enclosed in parentheses represent mean square errors.
* $p < .0125$

Conclusion and discussion

This study was conducted to investigate whether bilingual children with SLI (Bili-SLI) have an additional disadvantage for language learning. We considered there to be an additional disadvantage for bilingual children with SLI on a given language task if there was a disadvantage for both SLI and bilingualism in comparison to typically developing native speakers and, in addition, if bilingual children with SLI scored significantly below both native speakers with SLI and typically developing bilingual children. Our conclusion is that for most second language skills, children in the Bili-SLI group have an additional disadvantage, at least at the age of eight. At the age of six, children in the Bili-SLI group do not show signs of an additional disadvantage. All tasks showing an additional disadvantage for children in the Bili-SLI group are part of the lexicon module or the morpho-syntax module. The tasks that showed no additional disadvantage were two phonological tasks (*Articulation* and *Auditory discrimination*) and the *Sentence imitation* task.

Our results correspond to outcomes of earlier studies which demonstrated that bilingual children with SLI have lower scores on language tests than native speakers with SLI. This was especially true for vocabulary and grammar skills (Crutchley, Botting, & Conti-Ramsden, 1997; Crutchley, 1999). The same pattern was found in our data: especially lexicon and grammar are particularly vulnerable areas in language development. In fact, these are the areas in which bilingual children with SLI fall behind most in comparison to typically developing bilingual children and native speakers with SLI. This can be explained by the fact that these language areas are very vulnerable both for children with SLI (Bishop, 1997; Leonard & Deevy, 2004), and for children learning a L2, particularly bilingual children learning Dutch as L2 (Driessen, van der Slik, & Bot, 2001; Verhoeven & Vermeer, 1996). From our data, it seems that bilingualism had more influence than SLI on the scores on the lexicon tasks. Especially the Receptive vocabulary task at the ages 6 and 7. This can be demonstrated by the fact that children in the Bili-SLI group did differ significantly from children in the Mono-SLI group on this task, but did not differ significantly from their peers in the Bili-TD group while children in the Bili-TD group did differ significantly from those in the Mono-TD group. Other studies on bilingual children in the Netherlands have already shown that the vocabulary of bilingual children lags behind the vocabulary of monolingual children (Verhoeven & Narain, 1996; Verhoeven & Vermeer, 1999).

The results for the phonological skills showed no additional disadvantage for children in the Bili-SLI group, but a determinative disadvantage due to SLI. This can be concluded

based on the fact that native speakers with SLI did not differ from bilingual children with SLI on the phonological tasks, but native speakers with SLI did differ significantly from typically developing native speakers and bilingual children with SLI did differ significantly from typically developing native speakers. This finding is in accordance with the idea that children with SLI have difficulties with auditory processing of verbal information (e.g., Bishop, 1992). These difficulties result in lower language proficiency on skills like morphology and grammar. Problems in vocabulary and grammar of L2 learners have not been documented as the result of difficulties in auditory processing. The explanation for the position of bilingual children with SLI is as follows: because of their language impairment, bilingual children with SLI exhibit language processing difficulties, resulting in language proficiency problems added to the language learning problems they already experience because they are L2 learners.

The present study can only be seen as a first step toward an understanding of the variation in language acquisition of bilingual children with SLI, further research is needed. First of all, the results of our study can not be generalized to a developmental perspective, because our data were cross-sectional as opposed to longitudinal. Therefore, a longitudinal study on L2 language development is needed. Generalization of the findings is also limited because the group of bilingual children with SLI was relatively small in our study. Furthermore, future research should take home-language skill into account. Also, the bilingual children with SLI in this study originated from different language backgrounds.

For clinical practice it is important to realize that bilingual children with SLI need special care. As was shown, language impairment plays an important role in the proficiency of L2, but it is evident that bilingual children with SLI first are bilingual language users, a fact that should not be overlooked. Vocabulary is influenced by the factor bilingualism in particular. No specific advice or intervention can be given as a result of this study. For some domains, like phonology, it may be best to deal with the language impairment first, because this factor has the most impact on these language skills. As a result, the L2 skills may improve. However, in other domains, like morpho-syntax, it seems advisable to address both problems due to language impairment and bilingualism because, not only was there a disadvantage for each of these factors, but also an additional disadvantage for bilingual children with SLI was found. It may be particularly important to begin intervention for these children at an early age because the observed differences appear to increase with age.

In the Netherlands, language intervention always takes place on the basis of the L2 (Dutch) only. Clearly, further investigation is needed to find out how intervention for

bilingual children with SLI may best be handled and whether different language skills should be handled differently. Again, the role of the mother tongue can be taken into account in such investigations. Further research, taking the mother tongue and the role of language transfer into account, could also obtain a fuller scope of the exact linguistic parameters of the organization of the language system in monolingual and bilingual children with SLI.

References

Bishop, D. V. M. (1992). The underlying structure of specific language impairment. *Journal of Child Psychology and Psychiatry, 33*(1), 3-66.

Bishop, D. V. (1997). *Uncommon understanding: development and disorders of language comprehension in children*. Cambridge, UK: Psychology Press.

Bishop, D. V. M. (2004). Specific language impairment: Diagnostic dilemma's. In L. Verhoeven & H. van Balkom (Eds.), *Classification of developmental language disorders* (pp 309 – 326). Mahwah, NJ: Lawrence Erlbaum.

Bruck, M. (1982). Language impaired children's performance in an additive bilingual education program. *Applied Psycholinguistics 3*(1), 45 – 60.

Crutchley, A. (1999). Bilingual children with SLI attending language units: getting the bigger *picture*. *Child Language Teaching and Therapy, 15*(3), 201 – 217.

Crutchley, A., Botting, N., & Conti-Ramsden, G. (1997). Bilingualism and specific language impairment in children attending language units. *European Journal of Disorders of Communication, 32*(2), 267 – 276.

Driessen, G., van der Slik, F., & de Bot, K. (2002). Home language and language proficiency: A large-scale longitudinal study in Dutch primary schools. *Journal of Multilingual and Multicultural Development*, *23*, 175 – 194.

Genesee, F., Paradis, J., & Crago, M. (2004). *Dual language development and disorders. A handbook on bilingualism and second language learning*. Baltimore: Paul Brooks Publishing Co.

Lalleman, J. (1986). *Dutch language proficiency of Turkish children born in the Netherlands*. Dordrecht: Foris Publications.

Law, J., Boyle, J., Harris, F., Harkness, A., & Nye, C. (1998). *Screening for speech and language* delay*: A systematic review of the literature.* Southampton: NCCHTA.

Leonard, L.B. (1998). *Children with specific language impairment*. Cambridge, MA: MIT

Leonard, L. B. (2000). Specific language impairment across languages. In D. V. M. Bishop & L. B. Leonard (Eds.), *Specific language impairment in children: Causes, characteristics, intervention, and outcome* (pp. 115 – 129). Hove, UK: Psychology Press Ltd.

Leonard, L. & Deevy, P. (2004). Lexical deficits in specific language impairment. In L. Verhoeven & H. van Balkom (Eds.), *Classification of developmental language disorders* (pp 209-233). Mahwah, NJ: Lawrence Erlbaum.

MacWhinney, B. (1992). Transfer and competition in second language learning. In R.J. Harris (Ed.), *Cognitive processes in bilinguals* (pp. 371 – 390). Amsterdam: Elsevier.

Rapin, I. (1996). Practitioner review: Developmental language disorders: A clinical update. *Journal of Child Psychology and Psychiatry, 37*, 643 – 655.

Restrepo, M. A. (1998). Identifiers of predominantly Spanish-speaking children with language impairment. *Journal of Speech, Language, and Hearing Research,* 41 1398 –1411.

Schiff-Myers, N. B. (1992). Considering arrested language development and language loss in the assessment of second language learners. *Language, Speech and Hearing Services in Schools* 23(1), 28 – 33.

Van Weerdenburg, M. Verhoeven, L., & van Balkom, H. (2006). Towards a typology of specific language impairment. *Journal of Child Psychology and Psychiatry, 47*(2), 176 – 189.

Verhoeven, L. & Narain, G. (1996) Ontwikkeling van tweetaligheid bij allochtone kleuters. [Bilingual development of immigrant kindergartners]. *Tijdschrift voor Onderwijsresearch, 21*(1), 54 – 80.

Verhoeven, L. & Vermeer, A. (1996). *Taalvaardigheid in de bovenbouw: Nederlands van autochtone en allochtone leerlingen in het basis- en mlk-onderwijs* [Linguistic competence in higher classes of primary education: Performance of Dutch of native and minority pupils in general primary schools and primary schools for mildly mentally retarded children] Tilburg, The Netherlands: Tilburg University Press.

Verhoeven, L. & Vermeer, A. (1999). Taalvaardigheid van moeilijk lerende autochtone en allochtone kinderen. [Linguistic competence of native and minority children with learning difficulties]. *Tijdschrift voor Orthopedagogiek*, 38, 217 – 233.

Verhoeven, L. & Vermeer, A. (2001). *Taaltoets Alle Kinderen* [Language Proficiency Test for all Children]. Arnhem: CITO.

APPENDIX

Descriptive statistics (absolute numbers) of the language tasks by age and by group

		Monolingual						Bilingual					
Age	Task (maximum score)	TD			SLI			TD			*SLI*		
		M	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*	*M*	*SD*	*n*
6	Auditory Discrimination (50)	45.4	5.8	200	38.1	8.8	42	43.4	6.9	96	37.4	10.0	21
	Articulation (45)	43.8	2.0	200	32.1	10.3	42	42.8	3.8	96	35.1	8.6	21
	Receptive Vocabulary (96)	62.6	13.1	200	52.8	15.0	42	37.1	12.6	96	42.1	12.8	21
	Word Definition (45)	17.8	6.2	200	9.1	5.1	42	8.5	5.0	96	6.3	3.8	21
	Morphology (24)	15.2	4.2	200	10.1	4.5	42	7.3	4.9	96	7.7	3.5	21
	Comprehension of Function Words (42)	34.5	4.5	200	32.3	4.9	42	30.7	5.4	96	29.2	4.6	21
	Sentence Comprehension (42)	32.9	4.7	200	29.6	6.1	42	27.5	5.4	96	27.5	5.4	21
	Sentence Imitation (40)	27.6	8.9	200	13.2	8.5	42	18.1	9.7	96	10.5	7.6	21
	Story Comprehension (24)	17.1	4.3	200	14.5	4.9	42	11.5	4.7	96	11.4	5.1	21
7	Auditory Discrimination (50)	48.3	2.5	193	41.2	11.3	45	46.6	4.3	99	42.3	6.0	23
	Articulation (45)	44.6	1.0	193	35.1	8.9	45	43.8	2.2	99	34.0	9.6	23
	Receptive Vocabulary (96)	76.6	10.9	193	64.1	14.4	45	56.2	16.1	99	49.6	15.3	23
	Word Definition (45)	23.3	6.2	193	13.8	6.8	45	13.9	6.5	99	9.9	4.7	23
	Morphology (24)	18.3	4.2	193	13.4	4.5	45	12.0	5.1	99	9.0	4.5	23
	Comprehension of Function Words (42)	38.2	2.9	193	34.0	5.3	45	36.1	3.3	99	32.0	5.0	23
	Sentence Comprehension (42)	36.9	4.0	193	31.8	7.2	45	33.7	4.2	99	29.6	4.9	23
	Sentence Imitation (40)	31.6	7.8	193	15.1	8.6	45	25.2	9.1	99	15.7	7.3	23
	Story Comprehension (24)	19.6	3.7	193	16.7	5.2	45	14.8	5.1	99	12.9	4.9	23
8	Auditory Discrimination (50)	49.0	2.0	148	44.3	8.2	47	48.2	2.9	101	46.0	2.3	21
	Articulation (45)	44.7	1.0	148	37.7	9.7	47	44.6	0.8	101	38.9	5.1	21
	Receptive Vocabulary (96)	82.8	9.3	148	72.2	11.3	47	63.1	14.4	101	53.5	12.3	21
	Word Definition (45)	27.4	6.0	148	17.1	6.5	47	16.4	6.3	101	11.8	3.9	21
	Morphology (24)	21.2	3.3	148	14.5	5.9	47	15.3	5.2	101	10.1	3.3	21
	Comprehension of Function Words (42)	39.9	2.0	148	35.6	6.3	47	37.7	2.5	101	34.7	2.5	21
	Sentence Comprehension (42)	39.2	2.9	148	35.3	6.8	47	35.7	4.0	101	31.9	4.2	21
	Sentence Imitation (40)	35.5	5.1	148	19.2	9.7	47	29.1	8.8	101	15.6	6.6	21
	Story Comprehension (24)	20.6	3.2	148	18.3	4.1	47	17.0	4.5	101	13.2	4.3	21

CHAPTER 3

VERB MORPHOLOGY IN BILINGUAL CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT: THE CASE OF DUTCH

Abstract

The goal of this study was to determine whether bilingual children with Specific Language Impairment are in an additionally disadvantaged position as far as verb morphology in their second language (L2) is concerned. We also searched for possible clinical markers of SLI in Dutch as first and second language. The use of verbs in Dutch narratives was analyzed in four groups of children: native Dutch (monolingual) children without SLI, bilingual children without SLI, native Dutch (monolingual) children with SLI, and bilingual children with SLI. The results showed that bilingual children with SLI are in an additionally disadvantaged position as far as L2 proficiency is concerned, but not specifically in the area of verb morphology. It was also found that omission of an agreement marker in the third person singular verb form can be seen as a clinical marker of SLI. No other SLI specific errors were found.

Introduction

This study considers the development of verb morphology in children with Specific Language Impairment (SLI) learning Dutch as a second language. Children with SLI learning more than one language have been an under-investigated group. Recently, however, investigators from a number of different countries have begun to give this group of children the attention they deserve (Canada: (Paradis, Crago, Genesee, & Rice, 2003), Sweden: (Salameh, Håkansson, & Nettelbladt, 2004), United Kingdom: (Crutchley, 2000)). The group of bilingual children with SLI (Bili-SLI) is an important group to investigate, because insight in the linguistic performance of these children could provide improved insight on the application and relevance of linguistic theories dealing with SLI, but also on linguistic theories dealing with bilingualism. In addition, reliable investigations on identifying language development disorders in Bili-SLI children are crucial for differentiating difficulties in second language learning from language development disorders.

Reviews of studies on the language development of bilingual children compared to monolingual children report no specific problems with grammar or morphology in bilingual

children. With respect to second language acquisition, it is generally found that children go through the same stages of morphological and syntactic development (Lalleman, 1986; Klein & Perdue, 1992). However, limited linguistic input and less communication opportunities in L2 tend to slow down the rate of second language acquisition (cf. Genesee, Paradis, & Crago, 2004).

With respect to the development of morpho-syntactic abilities in children with SLI, it is the language learning capacity that makes a difference. In comparison to children with typical language development (TD), the development of grammatical morphology in children with SLI turns out to be very weak. This vulnerability is evidenced by late acquisition of grammatical morphemes (Rice, 2000), continuing to use immature grammar longer than TD children (Leonard, 1998), and displaying morpho-syntactic difficulties that can be seen as clinical markers of SLI. Evidence comes from a broad range of studies covering different aspects of verb morphology in a variety of languages. The most investigated language in children with SLI is English. For English, it was found that compared to mean length of utterance (MLU) matched peers, children with SLI showed many more problems with third person singular '–s', past tense '–ed', the auxiliary 'be', and the infinitive particle 'to' (Fletcher & Ingham, 1995). The search for clinical markers of SLI has also been studied in other languages, mainly focusing on difficulties in the acquisition of verb morphology. In almost all studies children with SLI lagged behind TD control children (age and language matched). As far as Romance languages are concerned, Italian speaking children with SLI were found to have significantly more problems on third person plural verb inflection than MLU matched control children. Compared to age matched controls, Italian speaking children with SLI had also significantly more problems with singular verb inflections (Bortolini, Caselli, & Leonard, 1997; Leonard et al., 1992). Problems with tense marking were also found in French speaking children with SLI (Jakubowicz, Nash, & van der Velde, 1999; Paradis & Crago, 2000) and Spanish speaking children with SLI showed more problems with past tense inflections than age matched controls (Bedore & Leonard, 2001). Problems with past tense marking were also reported with Hebrew speaking children with SLI (Dromi, Leonard, Adam, & Zadunaisky-Ehrlich, 1999; Dromi, Leonard, & Shteiman, 1993). A number of studies have looked at children with SLI speaking Germanic languages. Swedish speaking children with SLI more frequently omitted regular past tense forms in obligatory contexts and copula forms than age matched control children and than language matched control children (Hansson, Nettelbladt, & Leonard, 2000). Clahsen (1989) investigated verb morphology in German speaking children with SLI and reported difficulties in the area of

subject-verb agreement. De Jong (1999) investigated Dutch speaking children with SLI and also found agreement errors as grammatical symptoms of SLI. He found significant differences between children with SLI and their younger peers on omission past tense markers in an obligatory context, omission of the agreement marker, substitution of a plural marker by a singular marker, and production of utterance-final infinitives.

The performance in verb morphology of children with SLI has not only been compared to age matched peers and language matched peers, but also to bilingual children. By means of such a comparison, one could find out whether problems (e.g., in verb tense) reported for children with SLI can be seen as SLI specific or not. Paradis and Crago (2000) investigated the verb tense patterns of bilingual children learning French as a second language and monolingual French speaking children with SLI. Given the fact that they found a great deal of overlap in error patterns in the two groups of children, they concluded that difficulties with tense can not be seen as a clinical marker for SLI.

Another investigation in which children with SLI were compared to bilingual children is the study of Håkansson (2001). She conducted research on verb second and tense marking in L1 learners of Swedish, L2 learners of Swedish, and Swedish speaking children with SLI. She found differences in error scores between the L1 learners and the L2 learners, and between the L1 learners and the children with SLI. No differences were found between the L2 learners and the children with SLI. Håkansson concludes that the idea of a deficit in linguistic representation in language development by children with SLI could be questioned, because in bilingual children and in children with SLI the same types of errors were found.

The position of Bili-SLI children is in question. Should this group be seen as a special group? Is the language development of these children different from that of Mono-SLI children or Bili-TD children? Since recently, there is growing interest in the study of SLI in bilingual children. Paradis, Crago, Genesee, and Rice (2003) compared monolingual French and monolingual English children with SLI to bilingual French-English children with SLI. They examined the use of obligatory morphemes in French as well as in English in spontaneous speech. There were no significant differences between the group of Bili-SLI children and both groups of Mono-SLI children. It was concluded that the morpho-syntactic problems of the bilingual children in both languages resemble the problems of the monolingual children. In contrast, Crutchley (1999) and Crutchley, Botting, and Conti-Ramsden (1997) studied Bili-SLI children in England and compared them with Mono-SLI children. In these studies, it was found that the Bili-SLI children suffered from more complex language impairments. They showed more problems with the more complex language skills,

like morphology and syntax, than the Mono-SLI children. Salameh, Håkansson, and Norlin (2004) and Håkansson, Salameh, and Nettelbladt (2003) investigated the development of grammar in Swedish-Arabic bilingual children with and without SLI. They found that the Bili-SLI children were able to develop two languages, but the level of grammatical development and the speed of grammatical development were both below the level of bilingual peers without SLI.

In order to get a clear picture of the performance of Bili-SLI children it is necessary to compare them with different groups of children. This is a complex matter. Firstly, in order to find out to what degree Bili-SLI children suffer from SLI, a comparison with Bili-TD children is necessary. Secondly, for more knowledge about SLI and the (language) specific features of the impairment, Bili-SLI children have to be compared to Mono-SLI children learning the same language (at least one common language). Finally, to complete the picture of the situation of Bili-SLI children, a comparison with Mono-TD children should be added.

The present study focuses on the verb morphology performance in Dutch of 7- and 9-year old Bili-SLI children in the Netherlands, learning Dutch as a second language (L2). The Bili-SLI children are compared to Bili-TD children, Mono-SLI Dutch children, and Mono-TD Dutch children at the same age levels. Based on previous studies, our expectations are that the bilingual children will lag behind their monolingual peers and that children with SLI will do worse than TD children with respect to verb morphology. In fact, we think that Bili-SLI children have an additional disadvantage in relation to Mono-TD because of their language impairment combined with the fact that they are also L2 learners. We will also search for possible clinical markers of SLI in Dutch that do not distinguish between Dutch as L1 or L2.

Method

Participants

The participants of this study were recruited out of four groups of children: one group of native Dutch children without SLI (Mono-TD); one group of bilingual children without SLI, learning Dutch as a second language (Bili-TD); a third group consisted of native Dutch children with SLI (Mono-SLI); and the fourth group consisted of bilingual children with SLI, learning Dutch as a second language (Bili-SLI). All children with SLI were diagnosed as

having SLI by a multidisciplinary team of school psychologists, speech therapists and clinical linguists after the development of Dutch stagnated for no apparent reason. The participants were from two age-groups: 7- and 9-year old. There were twelve children per group, per age. The mean ages in months for each group are shown in Table 1.

Table 1. *Mean ages in months for the monolingual and the bilingual children with typical language development (TD) and with SLI, per age-group*

	Monolingual		Bilingual	
	TD	SLI	TD	SLI
7-year-olds	87 (10:2)[1]	91(8:4)[1]	88 (10:2)[1]	88 (10:2)[1]
9-year-olds	112 (8:4)[1]	114 (6:6)[1]	111 (9:3)[1]	110 (9:3)[1]

[1] (boys:girls)

The bilingual children in this study (Bili-TD, Bili-SLI) could also be considered 'minority' children from Turkish or Moroccan backgrounds, but born in the Netherlands. Their situation is as follows: their first language (Turkish or Moroccan-Arabic/ Berber) is not the community language and is only spoken at home. Most minority children start learning their L2 (Dutch) when entering primary school at age four. This language is the community language and thus the only language spoken at school. Most minority children already lag behind in their acquisition of Dutch in comparison to their monolingual peers when they enter school. SLI was determined in the bilingual children by using a language test to measure the second language performance of bilingual children. The results on this test were compared to the results of a norm group of bilingual children. If a child scored below age level, further testing was conducted to determine whether that child could be diagnosed with SLI. SLI was diagnosed by a multidisciplinary team of clinical linguists, psychologists, and speech therapists. The children had normal hearing and adequate intelligence.

Materials and analyses

The data used in this study consisted of 96 Dutch spoken narratives produced by the 96 participants. The narratives were elicited by using the picture-book "Frog, where are you" (Mayer, 1969). The procedure was as follows: First, the child looked through the book. After that, the child was instructed to tell the story based on the pictures in the book to the experimenter who could not see these pictures. The child went through the book picture-by-picture. All narratives were recorded on audio-tape. The recorded narratives were transcribed in CLAN following the formats of CHILDES (MacWhinney, 2000).

Text length. The texts were divided into utterances defined as: "a singular main clause with all associated subordinate clauses. Coordinated clauses are split up into separate main clauses unless contraction has taken place"[4] (Van den Dungen & Verbeek, 1994, p. 13). Utterances and parts of utterances in direct speech were excluded from analysis, as were utterances that did not refer to the story. Unintelligible utterances and utterances with unintelligible parts were also excluded.

Utterance length. For each transcript the mean length of utterance (MLU) in words was calculated. Repetitions and hesitations were excluded from this count.

Grammaticality. The grammaticality of the utterances was determined on the basis of the types of grammatical errors, as described by Van den Dungen and Verbeek (1994). An overview of the types of errors can be found in the Appendix.

Analyses of the narratives consisted of error-analyses on two different aspects of the verb phrase. The first type of error consisted of errors concentrated on the agreement marking in the verb phrase and the second type of error was on past tense marking. The numbers as well as the types of errors were determined.

Agreement marking. Four types of errors concerning agreement between subject and verb were counted. These errors were only counted in utterances that contained both a subject and a verb. The first type of error was omission of the agreement marker (OAM), so nothing but the bare stem was used. In Dutch, this error can be found in second and third person singular (example 1a), and in all plural verb forms (example 1b). The first person singular verb form consists of the bare verb stem. The second type of agreement error was the substitution of a plural marker by a singular marker (Subst). This error was determined when a plural subject was accompanied by a singular verb. Both present tense and past tense forms were included. Examples of these errors are affixation of third person singular marker *–t* to the stem (example 2a) and a singular past tense verb instead of a plural past tense verb (example 2b). The third type of error was the final infinitive (FI). This error consisted of infinitival verbs which have not been moved to the correct position in the sentence; they are still at utterance final position (example 3). These verbs are thus not marked for person, number, or tense. All other subject verb agreement errors that occurred in the data were counted as miscellaneous errors (Misc.). Examples of errors in this Misc. category are: affixing third person singular marker *–t* to past tense forms (example 4) and a singular subject accompanied by a plural verb in the past tense (example 5).

[4] This definition is derived from Hunt (1970)

Examples of omission of the agreement marker (OAM).

(1a) *En de jongen *zoek* overal. (*zoek* bare stem instead of *zoekt* 3rd person singular)
and the boy search bare stem everywhere
"And the boy is searching everywhere"

(1b) *Jongen en hond *zoek* naar het kikker. (*zoek* bare stem instead of *zoeken* 3rd person plural)
boy and dog look bare stem for the frog
"The boy and the dog are looking for the frog"

Examples of substitution of a plural marker by a singular marker (Subst).

(2a) *Het hondje en het kindje *valt* in de sloot. (*valt* 3rd person singular inflection *–t* instead of *vallen* 3rd person plural inflection)
the dog and the boy falls 3rd person singular inflection into the ditch
"The dog and the boy fall into the ditch"

(2b) *De jongen en de hond *viel*. (*viel* singular past tense instead of *vielen* plural past tense)
the boy and the dog fell singular past tense
"The boy and the dog fell"

Example of final infinitives (FI).

(3) *De hond in de pot *kijken*. (*kijken* infinitive instead of *kijkt* 3rd person singular)
the dog into the jar to look
"The dog looks into the jar"

Examples of Misc. errors (Misc.): Affixing third person singular –t to past tense forms (4) and a singular subject accompanied by a plural verb in the past tense (5).

(4) *En toen *schrokt* hij. (*schrokt* 3rd person present singular inflection *–t* instead of *schrok* singular past tense)
and then he scareds 3rd person present singular inflection
"And then he scared"

(5) *De hond *vielen* uit het raam. (*vielen* plural past tense instead of *viel* singular past tense)
the dog fell plural past tense out of the window
"The dog fell out of the window"

Past tense marking. Number and types of past tense errors were only counted in utterances that contained both a subject and a verb. A past tense form could be correct or incorrect and two types of past tense errors were distinguished. The first type of error was omission of a past tense marker (OPTM). This error could only be counted in obligatory contexts for past tense. In this study two types of obligatory contexts for past tense occurred. The first type consisted of sentences with the adverb 'toen' [then] which indicates past tense. The second type of obligatory contexts consisted of sentences with a main clause in the past

tense and a dependent clause which should also be in the past tense. In the two contexts mentioned, omission of past tense marker was counted if the past tense marker was omitted or if present tense was formulated instead (example 6). The second past tense error type was overgeneralization of the past tense form (OverGen). Included in this category, for example, were verbs with an irregular past tense that were formed with a past tense marker for regular past tense (example 7).

Example of omission of the past tense marker (OPTM).

(6) *En toen *kijken* de jongen en de hond in het hol. (*kijken* plural present tense instead of *keken* plural past tense)
and then look the boy and the dog in the hole
"And then, the boy and the dog looked into the hole"

Example of overgeneralization of the past tense (OverGen).

(7) *De jongen *keekte* naar de vogels. (*keekte* irregular past tense with regular past tense inflection *-te* instead of *keek* irregular past tense)
the boy looked irregular past tense with regular past tense inflection at the birds
"The boy looked at the birds"

Since the narratives differed considerably in length (varying from 14 utterances to 86 utterances) percentages of the error types were computed. The number of each type of error was divided by the total number of utterances that contained a subject as well as a verb, since those utterances were the ones that were taken into account by the error counts.

For each dependent variable, a univariate ANOVA was conducted with Age-group, Bilingualism, and SLI as between subject factors. This resulted in ANOVA's with a 2 x 2 x 2 design. Results with $p < 0.05$ indicated significant differences between groups, results with $0.05 \leq p < 0.10$ indicated tendencies. The results of the analyses are reported below.

Results

Descriptive statistics

The descriptive statistics show that the percentage of ungrammatical utterances is, in both age-groups, highest for the Bili-SLI children (see Tables 2 and 3). The percentages of

OAM and Subst are also highest for the Bili-SLI children. The data were further analyzed to determine whether the differences between groups were significant.

Table 2. *Descriptive statistics of analytic categories, 7-year-olds*

7-year-olds	Monolingual				Bilingual			
	TD		SLI		TD		SLI	
	n	*Mean (sd)*	*n*	*Mean (sd)*	*n*	*Mean (sd)*	*n*	*Mean (sd)*
Narrative length [a]	12	45.8 (12.5)	12	45.3 (11.9)	12	39.8 (8.5)	12	35.7 (8.5)
MLU in words	12	6.2 (0.80)	12	5.5 (0.9)	12	5.5 (0.9)	12	5.0 (1.0)
% Ungramm. utterances	12	23.4 (16.9)	12	56.6 (17.8)	12	50.4 (26.9)	12	66.8 (16.5)
% OAM	12	1.7 (2.7)	12	8.6 (8.3)	12	6.4 (14.1)	12	12.8 (9.7)
% Subst	12	1.6 (2.2)	12	3.6 (2.5)	12	6.7 (10.6)	12	6.7 (6.2)
% FI	12	0.0 (0.0)	12	0.8 (2.7)	12	0.0 (0.0)	12	1.0 (1.80
% Misc. agreement err's	12	0.3 (0.8)	12	1.8 (2.6)	12	0.3 (0.9)	12	1.4 (2.2)
% OPTM	9	0.7 (2.1)	11	12.2 (13.6)	10	6.9 (10.0)	9	3.0 (9.0)
% OverGen	9	0.7 (2.1)	11	1.4 (3.5)	10	11.3 (31.4)	9	11.5 (33.2)

[a] in number of utterances

Table 3. Descriptive statistics of analytic categories, 9-year-olds

9-year-olds	Monolingual				Bilingual			
	TD		SLI		TD		SLI	
	n	*Mean (sd)*	*n*	*Mean (sd)*	*n*	*Mean (sd)*	*n*	*Mean (sd)*
Narrative length [a]	12	40.8 (6.7)	12	49.0 (13.6)	12	38.3 (7.3)	12	41.8 (7.5)
MLU in words	12	6.5 (0.7)	12	6.4 (0.9)	12	6.4 (0.9)	12	6.0 (1.0)
% Ungramm. utterances	12	17.6 (7.7)	12	50.8 (17.1)	12	35.8 (13.2)	12	58.0 (19.3)
% OAM	12	0.4 (1.0)	12	4.0 (5.7)	12	0.6 (1.2)	12	6.5 (8.6)
% Subst	12	0.4 (1.0)	12	3.4 (3.4)	12	1.9 (2.9)	12	4.9 (2.9)
% FI	12	0.0 (0.0)	12	2.5 (8.8)	12	0.0 (0.0)	12	4.6 (15.8)
% Misc. agreement err's	12	0.2 (0.6)	12	2.1 (3.8)	12	1.3 (4.5)	12	2.0 (3.2)
% OPTM	10	0.3 (1.0)	12	9.5 (26.0)	10	0.6 (1.3)	11	2.3 (3.6)
% OverGen	10	3.4 (4.1)	12	3.6 (4.0)	10	6.8 (9.4)	11	5.5 (7.7)

[a] in number of utterances

Narrative length, utterance length and grammaticality

Three univariate ANOVA's were conducted to investigate the roles of the factors Age-group, Bilingualism, and Specific Language Impairment (SLI) in length of the narratives, utterance length, and grammaticality of the narratives.

Narrative length. The univariate ANOVA with narrative length as dependent variable showed a significant interaction effect between Age and SLI ($F(1, 88) = 1.05$, $p < .05$). To investigate this interaction effect, two independent samples *t*-tests were conducted. These *t*-tests showed a significant difference between children with and without SLI in the 9-year-olds ($t(46) = -2.18$, $p < .05$). Children with SLI produced more utterances per narrative than TD children. No significant difference between children with and without SLI was found in

the 7-year-olds. Furthermore, a main effect of Bilingualism ($F(1, 88) = 9.80$, $p < .01$) was found. Bilingual children told longer stories than monolingual children. Other interaction effects and main effects were not significant.

Utterance length. The univariate ANOVA with mean length of utterance (MLU) as dependent variable showed a main effect of Age ($F(1, 88) = 19.92$, $p < .01$). The 9-year-old children had higher MLU's than the 7-year-old children. A main effect of Bilingualism ($F(1, 88) = 5.64$, $p < .05$) was found. Monolingual children had longer utterances than bilingual children. And a main effect of SLI ($F(1, 88) = 5.31$, $p < .05$) was found. TD children had higher MLU's than children with SLI. No interaction effects were found to be significant.

Grammaticality. The univariate ANOVA with percentage of ungrammatical utterances in the narratives as dependent variable did show main effects of Age ($F(1, 88) = 5.92$, $p < .05$), Bilingualism ($F(1, 88) = 18.80$, $p < .01$), and SLI ($F(1, 88) = 52.97$, $p < .01$). Younger children made more ungrammatical utterances in their stories than older children, bilingual children had more ungrammatical utterances than monolingual children, and children with SLI had more ungrammatical utterances than TD children. There was a tendency on the interaction effect between Age and SLI ($F(1, 88) = 3.69$, $p = .06$), but because this effect was not strictly significant, it was not further investigated. Other interaction effects were not found to be significant.

In short, these general language performance measures did show differences in the directions that could be expected. The performance in Dutch (as measured by mean length of utterance and number of ungrammatical sentences) was worse for children learning Dutch as a second language, for children suffering from SLI, and for younger children.

Agreement marking

Four univariate ANOVA's were executed to investigate whether Age, Bilingualism, and SLI had influence on the number and the types of agreement errors. Dependent variables, therefore, were the types of agreement errors: omission agreement marker (OAM), substitution of a plural verb by a singular verb (Subst), final infinitives (FI), and all other error types (Misc.).

Omission agreement marker. The analysis with OAM as dependent variable resulted in a significant main effect of Age ($F(1, 88) = 8.13$, $p < .01$), 7-year-old children had more errors of this type than 9-year-old children. A main effect of SLI was found ($F(1, 88) = 12.95$, $p < .01$). Children with SLI had more OAM errors than TD children. A tendency was

found for an effect of Bilingualism ($F(1, 88) = 3.40$, $p = .07$). The other effects were not found to be significant.

Substitution of a plural verb. The ANOVA for Subst. showed a main effect of Age ($F(1, 88) = 4.03$, $p < .05$), younger children substituted the plural verb more often by a singular verb than older children. A main effect of Bilingualism was found ($F(1, 88) = 7.95$, $p < .01$). Bilingual children had a higher mean percentage of this type of error than monolingual children. A tendency was found for an effect of SLI ($F(1, 88) = 3.94$, $p = .05$). The interaction effects were not significant.

Final infinitives and Misc.. The analysis with FI as dependent variable did not show any significant effects. The analysis with Misc. as dependent variable did show one main effect: an effect of SLI ($F(1, 88) = 5.43$, $p < .05$). Children with SLI made more errors in the category Misc. than TD children.

To summarize, younger children made more agreement errors than older children. OAM seems a problems for children with SLI, whereas Subst. seems to cause more problems for children learning Dutch as L2. Furthermore, children with SLI also made more Misc. agreement errors.

Past tense marking

Two analyses were undertaken to find out the effect of Age, Bilingualism, and SLI on errors in past tense marking. Omission past tense marker OPTM) and Overgeneralization of the past tense (OverGen) were the dependent variables in the two univariate ANOVA's. The number of children was not per se 12 per group, because not all children had used past tense verb forms (and were therefore excluded in these analyses, see Table 2).

Omission past tense marker. For OPTM one interaction effect was found to be significant, the interaction between Bilingualism and SLI ($F(1, 74) = 4.48$, $p < .05$). To further investigate this interaction effect, two independent samples *t*-tests were performed. These *t*-tests showed a significant difference between children with and without SLI in the group monolingual children ($t(22.3) = -2.39$, $p < .05$) in the direction that children with SLI had a higher percentage of OPTM errors than TD children. No significant difference was found between children with and without SLI in the group of bilingual children. The difference between children with and without SLI in the group of monolingual children indeed exceeded the difference in the group of bilingual children.

Overgeneralization. The ANOVA for OverGen did not result in any significant interaction effects or significant main effects. There was only a tendency for an effect of Bilingualism ($F(1, 74) = 3.24$, $p = .08$).

In short, marking past tense in obligatory contexts seems to be a problem for children with SLI as well as for children with Dutch as L2, however, the difference in the group of monolingual children is larger than in the group of bilingual children. As far as Overgeneralization is concerned, there are no differences between the groups.

Conclusions and discussion

The aim of the present study was to find out to what extent Bili-SLI children are additionally disadvantaged in comparison to Mono-SLI children and to Bili-TD children. We analyzed the use of verbs in Dutch spoken narratives and came to the conclusion that there is some evidence of an additional disadvantaged position for Bili-SLI children, but we question whether problems with verb morphology are characteristic for children with SLI. We speak of an additional disadvantage when two main effects are present, the main effect of Bilingualism and the main effect of SLI, in the expected direction. We found this combination of main effects for the variables *utterance length* (MLU) and *grammaticality*. This means that the proficiency level of Dutch is lower for the Bili-SLI children than both the Mono-SLI children and Bili-TD children and also that both factors, Bilingualism and SLI, have an effect on the language performance. The finding that Bili-SLI children are in an additionally disadvantaged position as far as MLU is concerned is in correspondence with the finding of Restrepo (1998) that mean length of T-unit discriminated between Spanish-English children with and without SLI.

In search of clinical markers of SLI, several studies have found evidence for verb morphology as a vulnerable area for children with SLI. Agreement marking, for example, has been found to be problematic for German speaking children with SLI (Clahsen, 1989) and for Dutch speaking children with SLI (De Jong, 1999). The idea of agreement as clinical marker of SLI is partly supported by our data. In our view, an error-type is a clinical marker of SLI when a main effect of SLI is present. We found this main effect for *omission agreement marker* (OAM), but not for *substitution* (Subst) and *final infinitives* (FI). OAM can therefore be seen as a clinical marker for children with SLI learning Dutch, irrespective of whether Dutch is their first or second language. For Subst. we found a main effect of Bilingualism.

Our conclusion, therefore, is that Subst. can not be seen as a clinical marker of SLI in Dutch, because it is (also) a problem for bilingual children. An explanation for this finding is that bilingual children in the Netherlands (Turkish-Dutch and Moroccan-Dutch children) have problems with Dutch morphology. Lalleman (1986) reported problems concerning noun morphology for 6-year old Turkish-Dutch children, for example with plural forming of nouns. Lack of knowledge concerning the number of a noun makes it problematic to agree the verb with the noun. The substitution error (where a plural subject is accompanied by a singular verb) can therefore be very frequent by Turkish-Dutch children. In another study, agreement errors were also found by atypical developing Dutch children, children with psychiatric impairment (Blankenstijn & Scheper, 2003). It could therefore be questioned whether this type of error should be considered a clinical marker of SLI at all.

Past tense marking has been described as clinical marker of SLI, as well (Bedore & Leonard, 2001; Fletcher & Ingham, 1995; Hansson, Nettelbladt, & Leonard, 2000). In our study, we counted the number of omissions of past tense markers (OPTM) and found no evidence for this type of error as clinical marker of SLI. There was an interaction effect between SLI and Bilingualism in which the difference between children with and without SLI was only found in the monolingual group. The conclusion here is that this type of error is also present in bilingual children and thus can not be considered to be a clinical marker of SLI. This finding is in contrast to De Jong (1999), who reported OPTM as specific error for Dutch children with SLI. Other studies have also found evidence against tense marking as a clinical marker of SLI, for example Håkansson (2001). She found no differences on tense marking between L1, L2, and SLI children.

In future research, a task should be used to elicit past tense forms in order to analyze the use of past tenses and to investigate past tense as a clinical marker of SLI in Dutch as L1 and L2. A narrative task like the one used in our study can be questioned because the level of language performance is an 'at least' level of performance. In other words, the children may or may not perform at their actual level of language development. In our study, the number of children per group (n = 12) was quite small. Also, the bilingual children originated from two different cultural backgrounds, Turkish and Moroccan. It would be interesting to know whether differences exist between Bili-SLI children, learning the same L2, but with different mother tongues. Especially in the light of cross-linguistic research on clinical markers of SLI that showed that clinical markers can be different for different languages (see Leonard, 2000).

Considering potential implications for clinical practice, it must be concluded that clinical markers of SLI in L2 to determine SLI in bilingual children have not yet been determined. Looking at the utterance length and the number of ungrammatical utterances compared to typically developing bilingual children seems a possibility to determine SLI in bilingual children. Even compared to monolingual children with SLI, bilingual children with SLI perform worse on these general language proficiency levels. However, this may help to diagnose bilingual children with SLI, but may not be the key factor. On the other hand, MLU may be a starting point for finding a way to diagnose bilingual children based on their L2 performance, because this factor was found to distinguish between Bili-SLI children and Bili-TD children in both this study and in an earlier study (Restrepo, 1998).

References

Bedore, L. & Leonard, L. (2001). Grammatical morphology deficits in Spanish-speaking children with specific language impairment. *Journal of Speech, Language, and Hearing Research, 44,* 905 – 924.

Blankenstijn, C. J. K. & Scheper, A. R. (2003). *Language Development in Children with Psychiatric Impairment*. Unpublished doctoral dissertation. Universiteit van Amsterdam, Amsterdam.

Bortolini, U., Caselli, M. C., & Leonard, L. (1997). Grammatical deficits in Italian-speaking children with specific language impairment. *Journal of Speech and Hearing Research, 40*, 809 - 820.

Clahsen, H. (1989). The grammatical characterization of developmental dysphasia. *Linguistics, 27*(897 - 920).

Crutchley, A. (1999). Bilingual children with SLI attending language units: getting the bigger picture. *Child Language Teaching and Therapy, 15*(3), 201-217.

Crutchley, A. (2000). Bilingual children in language units: does having 'well-informed' parents make a difference? *International Journal of Language and Communication Disorders, 35*(1), 65 - 81.

Crutchley, A., Botting, N., & Conti-Ramsden, G. (1997). Bilingualism and specific language impairment in children attending language units. *European Journal of Disorders of Communication, 32*(2), 267-276.

De Jong, J. (1999). Specific language impairment in Dutch: Inflectional morphology and argument structure. Unpublished doctoral dissertation, Univeristy of Groningen.

Dromi, E., Leonard, L., Adam, G., & Zadunaisky-Ehrlich, S. (1999). Verb agreement morphology in Hebrew-speaking children with specific language impairment. *Journal of Speech, Language and Hearing Research, 42*, 1414 - 1431.

Dromi, E., Leonard, L., & Shteiman, M. (1993). The grammatical morphology of Hebrew-speaking children with specific language impairment: Some competing hypotheses. *Journal of Speech and Hearing Research, 36*, 760 - 771.

Hunt, K. W. (1970). Syntactic maturity in schoolchildren and adults. *Monographs of the Society for Research in Child Development, serial 134, vol. 35*(1).

Fletcher, P. & Ingham, R. (1995). Grammatical impairment. In P. Fletcher & B. MacWhinney (Eds.), *The Handbook of Child Language* (pp. 603 - 622). Oxford: Blackwell.

Genesee, F., Paradis, J., & Crago, M. (2004). *Dual Language Development and Disorders: A handbook on bilingualism and second language learning*. Baltimore: Paul Brooks Publishing Co.

Håkansson, G. (2001). Tense Morphology and Verb Second in Swedish L1 children, L2 children and children with SLI. *Bilingualism: Language and Cognition, 4*(1), 85 - 99.

Håkansson, G., Salameh, E.-K., & Nettelbladt, U. (2003). Measuring language development in bilingual children: Swedish-Arabic children with and without language impairment. *Linguistics, 41*(2), 255 - 288.

Hansson, K., Nettelbladt, U., & Leonard, L. (2000). Specific Language Impairment in Swedish: The Status of Verb Morphology and Word Order. *Journal of Speech, Language and Hearing Research, 43*, 848 - 864.

Jakubowicz, C., Nash, L., & van der Velde, M. 1999. Inflection and past tense morphology in French SLI. In A. Greenhill, H. Littlefield & C. Tano (Eds.), *Proceedings of the 23rd annual Boston University conference on language development* (pp. 289-300). Somerville, MA: Cascadilla Press.

Klein, W., & Perdue, C. (1992). *Utterance structure, developing grammars again* (Vol. 5). Amsterdam, Philadelphia: John Benjamins Publishing Company.

Lalleman, J. (1986). *Dutch language proficiency of Turkish children born in the Netherlands*. Dordrecht: Foris Publications.

Leonard, L. (1998). *Children with specific language impairment*. Cambridge, MA: The MIT Press.

Leonard, L. (2000). Specific language impairment across languages. In D. V. M. Bishop & L. B. Leonard (Eds.), *Specific language impairment in children: Causes, characteristics, intervention, and outcome* (pp. 115 - 129). Hove, UK: Psychology Press Ltd.

Leonard, L., Bortolini, U., Caselli, M. C., McGregor, K., & Sabbadini, L. (1992). Morphological deficits in children with specific language impairment: the status of features in the underlying grammar. *Language Acquisition, 2*(2), 152 - 179.

MacWhinney, B. (2000). *The CHILDES project: Tools for analyzing talk* (Third ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Mayer, M. (1969). *Frog, where are you?* New York: The Dial Press.

Paradis, J. & Crago, M. (2000). Tense and temporality: a comparison between children learning as a second language and children with SLI. *Journal of Speech, Language and Hearing Research, 43*, 834-847.

Paradis, J., Crago, M., Genesee, F., & Rice, M. (2003). French-English bilingual children with SLI: How do they compare with their monolingual peers? *Journal of Speech, Language and Hearing Research, 46*(1), 113-127.

Restrepo, M. A. (1998). Indentifiers of predominantly Spanish-speaking children with language impairment. *Journal of Speech, Language, and Hearing Research, 41*, 1398-1411.

Rice, M. (2000). Grammatical symptoms of specific language impairment. In D. V. M. Bishop & L. Leonard (Eds.), *Specific Language Impairment in children: Causes, characteristics, and outcome*. Hove, UK: Psychology Press Ltd.

Salameh, E.-K., Håkansson, G., & Nettelbladt, U. (2004). Developmental perspectives on bilingual Swedish-Arabic children with and without language impairment: a longitudinal study. *International Journal of Language and Communication Disorders, 39*(1), 65 - 91.

Salameh, E.-K., Nettelbladt, U., & Norlin, K. (2003). Assessing phonologies in bilingual Swedish-Arabic children with and without language impairment. *Child Language Teaching and Therapy, 19*(3), 338 - 364.

Van den Dungen, L. & Verbeek, J. (1994). *STAP- Handleiding* (Vol. 63). Amsterdam: Publikaties voor het Instituut van Algemene Taalwetenschap.

APPENDIX

Overview of the types of grammatical errors derived from Van den Dungen and Verbeek, 1994.

Morphological errors:

- inflection (verb) strict past tense
- inflection (verb) strict participle
- inflection (verb) strict congruence error
- inflection (verb) context
- inflection strict noun
- inflection strict adjective
- inflection strict possessive pronoun
- inflection context noun
- inflection context adjective
- inflection context possessive pronoun

Syntactic errors

- deletion subject
- deletion direct object
- deletion indirect object
- deletion prepositional object
- deletion main verb
- deletion auxiliary
- deletion copula
- deletion article
- deletion adjectival demonstrative pronoun
- deletion possessive pronoun
- deletion adverb (toen [when] – dan [then])
- deletion part of adverbial phrase
- deletion "er" [there]
- insertion function word
- insertion adverb (toen [when] – dan [then])
- insertion "er" [there]
- substitution article
- substitution demonstrative pronoun (dit [this] – deze [these]/ dat [that] – die [those])
- substitution conjunction
- substitution preposition
- substitution auxiliary of time (hebben [to have]/ zijn [to be])
- substitution adverb (toen [when] – dan [then])
- inversion (except for inversion of "er" [there])
- transformation determiner
- problems with "er" [there] (NOT: deletion or insertion)

CHAPTER 4

UNDERLYING FACTORS IN SECOND LANGUAGE PERFORMANCE OF BILINGUAL CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT

Abstract

In this study we investigated whether subtypes of Specific Language Impairment (SLI) could be distinguished in the second language (L2) of a group of 140 bilingual children with SLI in the Netherlands, aged 6 to 11 years, divided into three age-groups. L2 skill was measured by means of speech and language tasks representing different language skills. Factor analyses revealed four factors which could be interpreted as indicating the following linguistic domains: 1) auditory conceptualization, 2) speech production, 3) lexical-semantic skills, and 4) syntactic-sequential skills. The factors being evidenced imply types of language problems which resemble subtypes of SLI earlier found both in monolingual Dutch speaking as well as in monolingual English speaking children. With a quasi-LISREL approach, the factors were found to be stable over time. Moreover, empirical evidence for a semantic bootstrapping effect was found.

Introduction

During the past decades, the classification of children with Specific Language Impairment (SLI) has received much attention. SLI is defined as a delay in language development without known cause. Leonard (1998) has described children with SLI as "children who show a significant limitation in language ability, yet the factors usually accompanying language learning problems such as hearing impairment, low non-verbal intelligence test scores, and neurological damage are not evident" (Leonard, 1998, p. 3). Given the fact that the diagnosis of SLI is commonly based on exclusion of the above mentioned criteria, the group of children diagnosed as SLI is a very heterogeneous group. Early attempts to classify the language problems of children with SLI into subtypes of language impairment can at best be called inconclusive. The number of subtypes found in different studies varied from two (Wolfus, Moscovitch, & Kinsbourn, 1980) to six (Aram & Nation, 1975; Aram, Ekelman, & Nation, 1984; Rapin & Allen, 1983) or even eleven (Wilson & Risucci, 1986).

More recently, an attempt has been made to validate classifications of language impairment with clinical data. This resulted in subtypes about which there is more agreement. Conti-Ramsden, Crutchley, and Botting (1997) tested a large group of children with SLI. These authors identified six subgroups of SLI based on children's test performance and teacher interviews, five of which highly resembled the clinical subtypes distinguished by Rapin and Allen (1983): the expressive disorders verbal dyspraxia and speech programming disorder, the mixed expressive/ receptive disorder phonologic-syntactic deficit, and the higher order processing disorders lexical-syntactic deficit and semantic-pragmatic deficit. In a follow-up study by Conti-Ramsden and Botting (1999) these types of language impairments were found to be stable over time. In a recent overview, Bishop (2004) described a classification of four subtypes of SLI about which there is substantial agreement from the perspectives of both research and clinical practice. The first subtype is called *typical SLI*. This subtype is manifested by (severe) problems with grammatical development. The underlying nature of this impairment can be of various kinds, such as an impairment in auditory perception or working memory. The problems in grammar co-occur with problems in semantics but also with problems in comprehension, although severe comprehension difficulties do not often appear. The second subtype is characterized by speech output problems and often referred to as *verbal dyspraxia*. The third subtype involves severe receptive language disorders and can in some cases be interpreted as a childhood manifestation of *verbal auditory agnosia*. The fourth subtype refers to children with *pragmatic* language impairment. These children speak in normal sentences, but they use language inappropriately. Empirical evidence for the existence of these four subtypes also comes from recent studies that have been performed on Dutch speaking children with severe speech and language impairments (Van Daal, Verhoeven, & van Balkom, 2004; Van Weerdenburg, Verhoeven, & van Balkom, 2006).

Almost exclusively monolingual children with SLI have been involved in the classification studies conducted thus far. Only recently has the study of language problems in bilingual children with SLI received attention. An important question is to what extent the (second) language achievement of bilingual children with SLI (Bili-SLI) lags behind that of typically developing bilingual peers (Bili-TD) on the one hand, and monolingual peers with SLI (Mono-SLI) on the other hand. Bili-SLI children may be in an additionally disadvantaged position as far as their second language (L2) development is concerned, especially Bili-SLI children in a community in which their home-language is different from the dominant community language. Many bilingual children in such a context suffer from restricted input

of the L2 (i.e. the community language) in the early years of life, because early L2 language input usually only comes from television and contact with peers. Besides this disadvantaged position for learning L2, Bili-SLI children have an additional problem: they do not develop language typically because of their language impairment. In order to reveal language problems of Bili-SLI children that can be attributed to the language disorder, comparisons should be made between Bili-SLI children and Bili-TD children. Outcomes of studies in this line of research show that acquiring a L2 is possible for Bili-SLI children. Håkansson, Salameh, and Nettelbladt (2003) and Salameh, Håkansson, and Nettelbladt (2004) found evidence for this by Arabic-Swedish children with SLI. The process of L2 acquisition by the Arabic-Swedish Bili-SLI children was generally slower than by Arabic-Swedish Bili-TD children, so the level of language acquisition was lower in the Bili-SLI children than the Bili-TD children for both languages. Comparing Bili-SLI children with Mono-SLI children on their common language was conducted in studies by Crutchley (1999) and Crutchley, Botting, and Conti-Ramsden (1997). English language skills of Bili-SLI children were compared to English language skills of Mono-SLI children (where English was the L2 for the Bili-SLI children and the L1 for the Mono-SLI children). The performance on language tests was found to be lower for the Bili-SLI children. Moreover, the types of language problems in English of the Bili-SLI children were found to be more complex in comparison to the types of the Mono-SLI children.

So far, no attempt has been made to examine underlying factors in the L2 achievement of Bili-SLI children. It is still unclear whether the classification of SLI as evidenced in monolingual children also holds for children learning a L2. In the present study, an attempt will be made to uncover the underlying factors in L2 performance of 6- to 11-year-old Bili-SLI children in the Netherlands. The following research-questions will be addressed: 1) To what extent do Bili-SLI children lag behind in learning their L2 as compared to Bili-TD children? 2) Can different subtypes of SLI be distinguished in the L2 of our group of Bili-SLI children and do these subtypes resemble the SLI subtypes previously identified in Mono-SLI children? 3) How stable are the factors over time and what relationships exist between the various factors over time?

We conceive of language as being a hierarchical structure, which implies that levels that are lower in the hierarchy may be conditional for levels higher in the hierarchy.

Method

Participants

The group of participants consisted of 140 immigrant children, aged 66 to 138 months (mean age 106.6), divided into three age-groups (6/ 7-year, 8/ 9-year, and 10/ 11-year) of children learning Dutch as L2 and originating from Turkish, Moroccan, and Surinamese backgrounds. The children's mean ages and numbers of children per age-group are shown in Table 1. All children attended special education primary schools for children with severe speech or language difficulties in various regions of the Netherlands. In the Netherlands, if a child fails to develop language typically for no apparent reason, she/he is screened for SLI. The diagnosis of SLI is determined by a multidisciplinary team consisting of speech therapists, clinical linguists, and school psychologists, based on Dutch language test scores. Bilingual children who are screened for SLI are compared to norm-scores on Dutch language tests of typically developing bilingual children.

The non-verbal intelligence of the Bili-SLI children was tested in this study by means of the Raven's Coloured Progressive Matrices (RCPM) (Raven, 1971). The mean non-verbal intelligence per age-group did not differ significantly from each other (F (2, 260) = 1.272, p = 0.28) and, as can be seen in Table 1, the means and standard deviations are almost the same as the mean (5.0) and standard deviation (2.0) of the Dutch norm group (Van Bon, 1986).

A group of children from Turkish, Moroccan, and Surinamese backgrounds with typical language development was used as a control group. This group also served as the norm group for the standardized language test *Taaltoets Alle Kinderen* (TAK) [Language Proficiency Test for All Children] (testing Dutch) of Verhoeven and Vermeer (2001). The control group consisted of 1164 children, aged 6 to 9 years. The proportions of Turkish, Moroccan, and Surinamese children in the control group were comparable to the proportions in the Bili-SLI group.

Table 1. *Means and standard deviations of ages in months, number of participants (Bili-SLI children), and means and standard deviations on RCPM for each age-group*

	6/ 7-year-olds	8/ 9-year-olds	10/ 11-year-olds
Mean age (sd)	79 (7)	104 (7)	127 (6)
n	67	109	105
RCPM Mean (sd)	4.7 (2.2)	4.9 (1.8)	5.2 (1.8)

Materials

Based on recent studies on subtypes of SLI, language tasks were selected to measure four types of linguistic skills: Auditory conceptualization (AC), Speech production (SP), Lexical-semantics (LS), and Morpho-syntax (SYN). In the Appendix, the tasks of the test battery are summarized and ordered by what they measure, based on Bishop's (2004) aforementioned four different subtypes of SLI. The language-tasks came from different testing instruments. The Dutch standardized language test: *Taaltoets Alle kinderen*, TAK [Language Proficiency Test for All Children] (Verhoeven & Vermeer, 2001) provided tasks from all different linguistic levels (phonology, lexicon, semantics, morphology, and syntax). This is a standardized test for the assessment of 4 to 10-year-old children and consists of nine sub-tests (all with Cronbach's alphas between .90 and .97). An earlier version of the test provided the sub-test *Productive Vocabulary* (Verhoeven & Vermeer, 1986). The Dutch version of the revised Lindamood Auditory Conceptualization Test (LAC-r) (Lindamood & Lindamood, 1979) was also used. This is a test for phonemic awareness and provided tasks for auditory processing. Finally, a Dutch articulation test was used, which provided two non-word repetition tasks (Maassen & van der Meulen, 2000). This test is designed to test planning of articulation.

Procedure

The second language skills of the group of Bili-SLI children were tested in three successive years. The participants were tested by specially trained test-assistants over a period of three months. The complete test-battery took about three hours per child and was therefore divided into a number of separate test sessions of 20 to 45 minutes. All test sessions took place in the school environment of the children.

Not all children participated in all three measurements. The final database consisted of language test scores of 281 cases for 140 different children. Each case in the final database was then assigned to one of the three combined age-groups: 6/ 7-year-olds, 8/ 9-year-olds, or 10/ 11-year-olds. Children who participated more than once, therefore, could participate in one age-group twice. In other words, there is some overlap both between and within the age-groups as far as the children are concerned.

In order to find out to what extent Bili-SLI children lag behind in L2 development as compared to their TD peers, independent-samples *t*-tests were performed for each combined age-group. Furthermore, in order to uncover subtypes of language impairment in the Bili-SLI group, we computed bivariate mutual correlations between all scores on the speech and

language tasks with age partialled out. Missings were deleted pairwise. Subsequently, for each age-group, a Principal Factor Analysis with Varimax rotation was done. Only factors with Eigenvalue ≥ 1.0 were extracted. Variables with low levels of difficulty (expressed by p-value) were excluded from the factor analysis. This resulted in exclusion of LAC1a (p = .98) for the 10/ 11 year-olds. Finally, in order to examine the relationship between factor scores over time, each case was assigned to a single-year age-group (6, 7, 8, 9, 10 or 11) rather than the combined age-groups.

Next, factor-scores were computed for each case in each age-group in the following way: Z-scores were computed for each case on each speech or language task and the mean z-score for each factor was computed. We used the classification of the tasks as presented in the Appendix. For example, the factor-score on the factor Speech production consisted of the mean z-score of the tasks *articulation*, *non-word repetition a*, and *non-word repetition b* (see Appendix). This resulted in 24 variables each representing a factor-score (factor 1, 2, 3 or 4 at age 6, 7, 8, 9, 10, or 11). With these variables we carried out one analysis: bivariate correlations between the factor-scores. Subsequently, we adjusted the data set again. For each child who participated more than once, the scores obtained from only one randomly selected testing session of that child were kept in the data set, keeping into consideration the size of each age-group. The data set then consisted of different children, no overlap between ages existed. With this data set a multiple cohort model of structural equations was conducted to investigate the relations within factors over time and the relation between factors over time.

Results

Descriptive statistics

The performance of Bili-SLI children was compared to that of Bili-TD on each of the speech and language tasks, per combined age group, by means of independent-samples *t*-tests. The descriptive and test statistics are presented in Table 2. After a Bonferroni correction (*p*-value times ten, because ten comparisons were made in each age-group) significant differences were found in the 6/ 7-year-olds on the tasks *Auditory discrimination* (AD), *Articulation* (ART), and *Sentence reproduction* (SR). On these tasks, the Bili-SLI children had significantly lower scores than the Bili-TD children. No other significant differences were found on the remaining tasks in the 6/ 7-year-old age group. For the 8/ 9-year-olds, significant differences were found between the two groups (after a Bonferroni correction of

p-value times ten) on all tasks except for *Receptive vocabulary* (RV). Again, the children with SLI had lower scores than the children without SLI. It was not possible to compare the 10/ 11-year-old Bili-SLI children with age-matched controls, because no standardized data of 10/ 11-year-old Bili-TD children were available.

Table 2. *Descriptive statistics of each language task, per age-group*

6/ 7 years		Bili-SLI		Bili-TD			
Task	*N*	*Mean (sd)*	*N*	*Mean (sd)*	*dF*	*t*	p^a
Art.	67	34.8 (8.8)	795	43.0 (3.4)	67.6	-7.6	< .05
NW a	66	5.9 (2.8)		-			
NW b	66	8.0 (2.1)		-			
AD	67	38.6 (10.0)	765	43.8 (7.2)	72.1	-4.2	< .05
LAC 1a	66	8.2 (2.3)		-			
LAC 1b	65	3.5 (1.9)		-			
LAC 2	58	3.5 (2.7)		-			
RV	67	43.3 (15.0)	796	43.5 (17.1)	861	-0.1	ns
PV	66	19.1 (8.9)		-			
WD	61	7.8 (5.1)	790	9.9 (6.2)	849	-2.7	ns
SC	66	11.2 (5.0)	761	12.6 (5.6)	825	-1.9	ns
ST	66	15.6 (6.4)	772	15.9 (7.8)	82.8	-0.4	ns
Mor	66	8.0 (4.6)	792	9.4 (5.7)	82.7	-2.3	ns
FW	67	29.9 (5.5)	807	31.8 (5.8)	872	-2.7	ns
SP	67	27.6 (6.1)	783	29.4 (6.2)	848	-2.2	ns
SR	63	12.8 (7.8)	767	20.2 (10.6)	82.4	-7.0	< .05

8/ 9 years		Bili-SLI		Bili-TD			
Task	*N*	*Mean (sd)*	*N*	*Mean (sd)*	*dF*	*t*	p^a
Art.	109	40.4 (3.7)	353	44.6 (1.0)	112.9	-11.8	< .05
NW a	109	7.3 (2.5)		-			
NW b	109	9.3 (1.9)		-			
AD	109	46.3 (4.2)	351	48.3 (3.1)	458	-5.4	< .05
LAC 1a	109	9.5 (1.2)		-			
LAC 1b	109	4.8 (1.5)		-			
LAC 2	102	8.0 (2.8)		-			
RV	108	62.9 (13.2)	342	64.9 (14.1)	448	-1.3	ns
PV	109	29.4 (7.7)		-			
WD	108	14.5 (4.7)	351	17.3 (5.8)	216.5	-5.1	< .05
SC	109	15.4 (3.9)	351	17.4 (4.2)	458	-4.4	< .05
ST	109	20.6 (5.7)	326	23.0 (6.5)	208.5	-3.7	< .05
Mor	109	13.6 (4.7)	341	15.7 (4.8)	448	-4.0	< .05
FW	109	36.2 (3.0)	342	37.8 (2.5)	158.7	-5.2	< .05
SP	109	34.7 (4.5)	342	36.2 (3.9)	449	-3.5	< .05
SR	109	19.9 (7.3)	351	29.7 (7.9)	458	11.5	< .05

Table continues

10/ 11 years		Bili-SLI
Task	*N*	*Mean (sd)*
Art.	105	42.2 (3.8)
NW a	105	9.0 (1.9)
NW b	105	9.9 (1.3)
AD	105	47.3 (4.5)
LAC 1a	105	9.8 (0.6)
LAC 1b	105	5.3 (0.9)
LAC 2	99	10.1 (1.8)
RV	104	74.2 (9.4)
PV	105	37.6 (7.6)
WD	97	18.5 (4.3)
SC	105	17.9 (3.7)
ST	105	23.4 (4.4)
Mor	104	18.6 (3.2)
FW	104	38.1 (1.9)
SP	104	38.0 (3.1)
SR	105	26.5 (5.9)

[a] after Bonferroni correction of *p*-value times ten

Correlations between language tasks

The variables in the correlation analysis were the aforementioned speech and language tasks (see Appendix). The intercorrelations between the children's scores on the different language tasks are shown in Tables 3a, 3b, and 3c. The intercorrelations for the speech production measures (SP) and the auditory conceptualization measures (AC) are intermediate for the two youngest age-groups and low for the highest age-group. The latter may be due to ceiling effects on the tasks. For lexical-semantic measures (LS) and syntactic measures (SYN) we see much higher intercorrelations in each of the age-groups. The correlations between the lexical-semantic measures, on the one hand, and the syntactic measures, on the other hand, are substantial (see Tables 3a, 3b, and 3c).

Table 3a. *Correlations between the different language tasks for the 6/ 7-years-olds*

		SP			AC				LS					SYN			
		Art	NW a	NW b	AD	LAC 1a	LAC 1b	LAC 2	RV	PV	WD	SC	ST	Mor	FW	SP	SR
SP	Art	1	.44*	.20	.29*	.02	.27*	.14	.14	.27*	.27*	.27*	.14	.23	.29*	.26*	.22
	NW a		1	.58*	.34*	.17	.27*	.41*	.35*	.35*	.44*	.24	.18	.37*	.30*	.14	.54*
	NW b			1	.18	.05	.30*	.44*	.24	.18	.28*	.09	.21	.29*	.26*	.15	.34*
AC	AD				1	.27*	.31*	.26*	.51*	.39*	.47*	.43*	.46*	.29*	.43*	.41*	.49*
	LAC 1a					1	.56*	.49*	.43*	.40*	.46*	.28*	.37*	.17	.44*	.44*	.16
	LAC 1b						1	.56*	.32*	.43*	.38*	.32*	.34*	.27*	.42*	.43*	.16
	LAC 2							1	.30*	.31*	.45*	.18	.20	.10	.45*	.30*	.24
LS	RV								1	.73*	.72*	.65*	.49*	.40*	.74*	.65*	.60*
	PV									1	.66*	.70*	.52*	.63*	.74*	.62*	.56*
	WD										1	.61*	.49*	.46*	.72*	.67*	.61*
	SC											1	.50*	.40*	.66*	.61*	.45*
	ST												1	.35*	.50*	.41*	.33*
SYN	Mor													1	.40*	.40*	.50*
	FW														1	.74*	.59*
	SP															1	.46*
	SR																1

Pearson Correlation coefficients, two-tailed
* Correlation is significant at the 0.05 level

Table 3b. *Correlations between the different language tasks for the 8/ 9-years-olds*

		SP			AC				LS					SYN			
		Art	NW a	NW b	AD	LAC 1a	LAC 1b	LAC 2	RV	PV	WD	SC	ST	Mor	FW	SP	SR
SP	Art	1	.40*	.36*	.05	.09	.33*	.34*	.17	.10	.11	.18	.07	.29*	.30*	.21*	.28*
	NW a		1	.48*	.04	.03	.16	.21*	.32*	.18	.18	.23*	.17	.37*	.26*	.17	.54*
	NW b			1	.18	.05	.22*	.15	.25*	.20*	.18	.31*	.07	.38*	.27*	.26*	.41*
AC	AD				1	.09	.18	.27*	.18	.26*	.23*	.30*	-.02	.28*	.37*	.45*	.18
	LAC 1a					1	.41*	.27*	.03	.12	.12	-.01	.06	.21*	.23*	.32*	.04
	LAC 1b						1	.40*	.02	-.03	.07	-.12	-.04	.11	.23*	.23*	.22*
	LAC 2							1	.29*	.26*	.29*	.16	.09	.43*	.50*	.42*	.33*
LS	RV								1	.62*	.66*	.49*	.16	.67*	.47*	.64*	.57*
	PV									1	.74*	.49*	.26*	.70*	.49*	.58*	.44*
	WD										1	.48*	.19	.68*	.49*	.59*	.46*
	SC											1	.23*	.45*	.47*	.60*	.26*
	ST												1	.16	.05	.13	.10
SYN	Mor													1	.55*	.57*	.61*
	FW														1	.64*	.47*
	SP															1	.49*
	SR																1

Pearson Correlation coefficients, two-tailed
*Correlation is significant at the 0.05 level

Table 3c. *Correlations between the different language tasks for the 10/ 11-years-olds*

		SP			AC				LS					SYN			
		Art	NW a	NW b	AD	LAC 1a	LAC 1b	LAC 2	RV	PV	WD	SC	ST	Mor	FW	SP	SR
SP	Art	1	.06	.06	.08	-.04	.01	.19	.14	.08	.06	-.05	-.04	.21*	.02	-.07	-.07
	NW a		1	.26*	.09	.11	.22*	.28*	.21*	.17	.09	.12	.20*	.18	.15	.19	.31*
	NW b			1	.11	.14	-.01	.18	-.01	-.02	-.11	.16	.10	.14	.34*	.04	.04
AC	AD				1	-.02	.14	.14	.13	.10	.13	.12	.03	.10	.05	.22*	.15
	LAC 1a					1	.20*	.27*	-.10	-.15	-.13	.17	-.12	-.03	.12	.02	.03
	LAC 1b						1	.36*	-.10	-.19	-.06	-.02	.29*	-.15	.11	-.01	.02
	LAC 2							1	.01	.14	.19	.12	.22*	.26*	.16	.18	.24*
LS	RV								1	.65*	.55*	.18	.15	.45*	.27*	.37*	.37*
	PV									1	.73*	.22*	.20*	.54*	.20*	.30*	.39*
	WD										1	.29*	.21*	.55*	.25*	.36*	.50*
	SC											1	.09	.14	.23*	.44*	.24*
	ST												1	.24*	.17	.18	.30*
SYN	Mor													1	.32*	.29*	.50*
	FW														1	.39*	.23*
	SP															1	.46*
	SR																1

Pearson Correlation coefficients, two-tailed
* Correlation is significant at the 0.05 level

Principal Axis Factor analyses

For each of the three age-groups a Principal Axis Factor analysis (PAF) with Eigenvalues > 1.0 was performed (see Tables 4a, 4b, and 4c). The variables in the analyses were all tasks mentioned in the Appendix.

The analysis for the 6/ 7-year-olds resulted in a model with three factors (see Table 4a) that explain over 65% of the total amount of variance. The first factor shows high loadings of the lexical-semantic and syntactic tasks. Apparently, these language skills are not distinguished in the younger bilingual children with SLI in this study. Some of the tasks that load on this factor also load on one of the two other factors. The second factor shows high loadings of the three LAC-tasks and can thus be interpreted as *auditory conceptualization*. The third factor is dominated by the measure of non-word repetition and to a lesser degree by articulation and can therefore be called the *speech production* factor.

Table 4a. *Principal Axis Factoring analysis for the 6/ 7-years-olds*

Task	Factor 1	Factor 2	Factor 3
Productive vocabulary	.81		
Receptive vocabulary	.79		
Story comprehension	.77		
Function words	.77	.35	
Syntactic patterns	.72	.33	
Word definition	.71	.34	
Sentence reproduction	.61		.49
Story telling	.55		
Morphology	.52		.33
Auditory discrimination	.48		
LAC 2		.71	.33
LAC 1a		.70	
LAC 1b		.68	
Non-word repetition a + b			.93
Articulation			.34

Note. Cases containing missing values deleted pair-wise

Varimax rotation solution. Values > .30 reported

The analysis for the 8/ 9-year-olds resulted in a four-factor model (see Table 4b). More than 65% of the total variance is explained by the four extracted factors. The key-skills that load on the first factor are the lexical-semantic tasks. Some syntactic tasks also load on this factor, but to a lesser extent. This first factor can be interpreted as *lexical-semantic* factor. The second factor shows high loadings for the LAC-tasks and can therefore be seen as *auditory conceptualization*. The third factor, with high loadings for the measures of non-word repetition and articulation, can be interpreted as *speech production*. The fourth factor can be seen as *syntactic-sequential* since it shows high loadings for story comprehension and syntactic patterns, which are both tasks in which syntax and order play an important role.

Table 4b. *Principal Axis Factoring analysis for the 8/ 9-years-olds*

Task	Factor 1	Factor 2	Factor 3	Factor 4
Productive vocabulary	.81			
Word definition	.80			
Morphology	.76		.30	
Receptive vocabulary	.74			
Sentence reproduction	.55		.51	
Function words	.43	.40		.43
LAC 1b		.72		
LAC 2		.54		
LAC 1a		.52		
Non-word repetition a + b			.80	
Articulation			.53	
Story comprehension	.38			.77
Syntactic patterns	.54	.41		.56
Auditory discrimination				.36

Note. Cases containing missing values deleted pair-wise

Varimax rotation solution. Values > .30 reported

The analysis for the 10/ 11-year-olds shows a similar pattern (see Table 4c). About 60% of the total variance is explained by four factors. The first factor can be seen as *lexical-semantic* with high loadings for productive vocabulary and word definition. The second factor seems to be a syntactic factor because it is clearly dominated by the task that measures syntactic patterns. The third factor can be seen as *auditory conceptualization* since it shows high loadings for the LAC-tasks. The final factor can interpreted as *speech production* since it is dominated by the articulation task.

Table 4c. *Principal Axis Factoring analysis for the 10/ 11-year-olds*

Task	Factor 1	Factor 2	Factor 3	Factor 4
Productive vocabulary	.85			
Word definition	.82			
Receptive vocabulary	.64			
Morphology	.62			.33
Sentence reproduction	.48	.40		
Syntactic patterns		.80		
Story comprehension		.48		
Function words		.44		
Non-word repetition a + b		.32		
LAC 1b			.70	
LAC 2			.52	.31
Story telling			.46	
Articulation				.53

Note. Cases containing missing values deleted pair-wise

Varimax rotation solution. Values > .30 reported.

In short, the PAF analyses showed one three-factor model and two four-factor models that can be easily interpreted. The four-factor models consisted of *speech production*, *auditory conceptualization*, *lexical-semantic*, and *syntactic-sequential* factors. For the youngest age-group, the two final factors turned out to be combined. Taken together, one can conclude that the subtypes of language difficulties that have been found in monolingual children with SLI in previous studies also seem to apply for the L2 learning process of bilingual children with SLI. Having identified these factors, we are interested in the stability of the factors over time and the relations between these factors over time.

Relationships between factors over time

In Table 5 the correlations of factor-scores of the previously determined factors (i.e. the four factors based on earlier studies on subtypes of SLI) between six different age-groups are presented. It can be seen that the correlations between the factors over time are quite high, especially for the Lexical-semantic factor (LS) and for the Morpho-syntactic factor (SYN).

Table 5. *Correlations between factors over time*

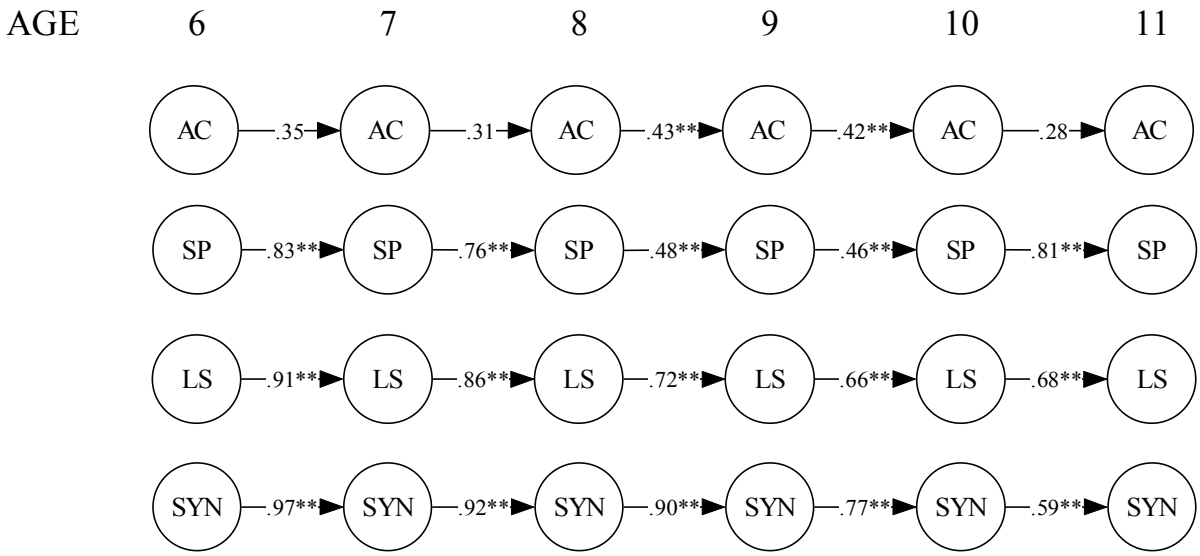
		6				7				8				9				10				11			
		SP	AC	LS	SYN	SP	AC	LS	SYN	SP	AC	LS	SYN	SP	AC	LS	SYN	SP	AC	LS	SYN	SP	AC	LS	SYN
6	SP	1	.17	.27	.34	.66*	-.25	-.40	.02	.49	-.84*	-.38	-.28												
	AC		1	.63*	.53*	-.23	.38	.23	.00	-.17	.84*	.20	.14												
	LS			1	.87*	.16	.34	.88*	.58*	.53	.46	.93*	.94*												
	SYN				1	.34	.42	.85*	.83*	.61	.38	.88*	.94*												
7	SP					1	.49*	.36*	.53*	.56*	.21	.26	.44*	.08	.38	.23	.64*								
	AC						1	.46	.51*	.12	.27	.55*	.46*	.09	.47	.43	.57*								
	LS							1	.77*	.33	.06	.85*	.82*	-.09	.11	.81*	.76*								
	SYN								1	.50*	.22	.72*	.88*	-.04	.22	.77*	.85*								
8	SP									1	.26	.23	.49*	.61*	.53*	.22	.50*	.55*	-.14	.56*	.35				
	AC										1	.06	.37*	.14	.43*	-.00	.18	-.13	.58*	-.09	-.02				
	LS											1	.75*	.26	.22	.71*	.61*	-.04	.01	.36	.39				
	SYN												1	.26	.53*	.65*	.86*	-.13	.07	.16	.72*				
9	SP													1	.16	.18	.34*	.44*	.33	.24	.29	.47*	.36	-.06	.14
	AC														1	.19	.54*	.23	.46*	.08	.45*	-.03	.56*	.51*	.52*
	LS															1	.67*	-.09	-.13	.70*	.33	-.12	.05	.78*	.34
	SYN																1	.01	.21	.53*	.77*	-.10	.12	.71*	.85*
10	SP																	1	.26	.25	.30*	.69*	.41*	.19	.08
	AC																		1	.05	.27*	.20	.14	-.15	.13
	LS																			1	.63*	.08	.15	.76*	.48*
	SYN																				1	.09	.18	.51*	.69*
11	SP																					1	.26	.05	.13
	AC																						1	.12	.15
	LS																							1	.65*
	SYN																								1

Pearson Correlation coefficients, two-tailed

* Correlation is significant at the 0.05 level

To get an impression of the stability of the four factors over time and their mutual correlations, we used a multiple cohort model of structural equations. It should be noted immediately that our data are too limited to perform hypothesis testing in the usual way of structural equation modeling because our group sizes are too small to fulfill the requirements of the LISREL approach. Hence, the emphasis is on parameter estimation, concentrating on regressions of lagged variables. But again, we have to consider the variability of the estimates. First, we estimated the longitudinal development of each factor separately by means of a multiple cohort model. The idea behind this multiple cohort model is that we take only those children into account that produced scores at three subsequent ages, either at ages 6,7,8 (Cohort 1 (C1)) or at 7,8,9 (Cohort 2 (C2)) or at 8,9,10 (Cohort 3 (C3)) or at 9,10,11 (Cohort 4 (C4)). Moreover, common regressions in subsequent cohorts are assumed to be equal. For example, the standardized regressions from age 7 to age 8 are constrained to be equal for Cohorts 1 and 2, their value is estimated at .75. The same is done for common regressions in subsequent pairs of cohorts. This way, the regressions are estimated based on the data of two cohorts, except for the first and the last regressions. The development over the total range of age 6 to age 11 may then be summarized in a model by connecting the regressions of the separate cohorts. Such a model was applied to the four factors: Auditory conceptualization (AC), Speech production (SP), Lexical-semantic ability (LS), and Morpho-syntactic ability (SYN). Again, it is noted that the number of children involved is far too small for model testing. For Cohorts 1 to 4, the number of children was 7, 14, 14 and 18, respectively. Estimates of the regressions (common metric standardized solution) are presented in Figure 1.

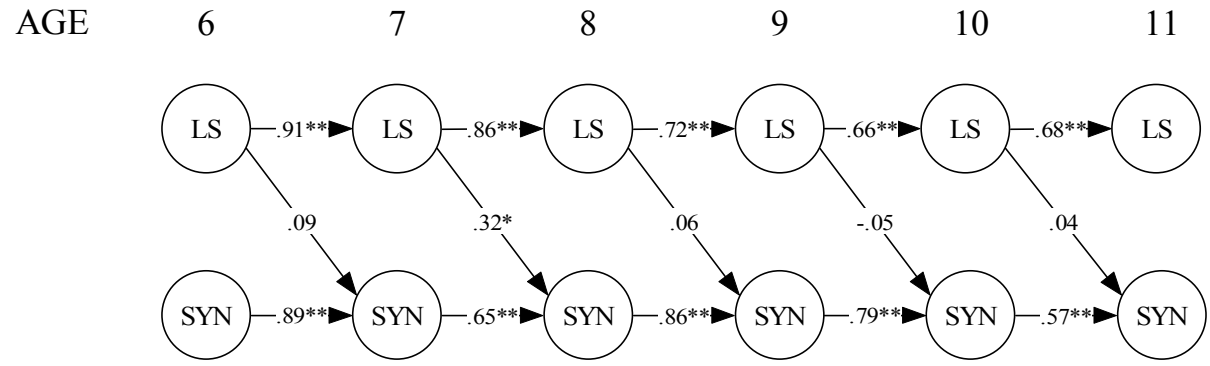
From Figure 1 it is clear that AC is far less stable over time than the other three factors. This does not follow from the values of the estimates only, but also from the standard errors which imply that the value zero (no influence at all) is within the 95 % confidence interval in three out of five cases for AC. For the three remaining factors the value zero is far from the 95% confidence interval for all cases, indicating substantial regressions.



** $p < .01$

Figure 1. *Longitudinal development of factors, separately. Estimated by multiple cohort model*

Finally, relations between SP and LS, between LS and SYN, and between AC and each of the three other factors (SP, LS, SYN) were determined. In the same way as before, models were defined for all four cohorts and common effects. Regression of each factor on itself and between two factors are assumed equal over cohorts. By taking these common effects together, we only found a significant relationship between LS at age 7 and SYN at age 8 (see Figure 2).



* $p < .05$, ** $p < .01$

Figure 2. *Regression model of SYN influenced by LS*

Conclusion and discussion

In the present study we investigated three research questions concerning L2 performance and types of L2 difficulties of Bili-SLI children. The first question was to what extent differences existed between Bili-SLI children and Bili-TD children as far as L2 performance is concerned. It was found that the performance on different L2 skills of the Bili-SLI children lagged behind the performance of Bili-TD children. In the youngest children, differences were found especially at the phonological level, while the differences in the older children covered all measured language skills (phonological, lexical, syntactic, and textual). The results from the comparison of the Bili-SLI children with the Bili-TD children on L2 skills are in agreement with the results of earlier studies in which bilingual children with and without SLI are compared (Håkansson, Salameh, & Nettelbladt, 2003; Salameh, Håkansson, & Nettelbladt, 2004; Salameh, Nettelbladt, & Norlin, 2003). The present data show that Bili-SLI children lag behind their Bili-TD peers and the differences in language skills over the course of time tend to increase. Our results, therefore, indicate an additional disadvantage for Bili-SLI children compared to Mono-TD children.

The second research question concerned the relations between language skills and possible subgroups of SLI in Bili-SLI children. In our data, we found evidence for the existence of four underlying factors of language abilities in the L2 which can be labeled as *auditory conceptualization*, *speech production*, *syntax* and *lexical-semantics*. In the youngest age-group, the two latter factors turned out to collapse into one more general language factor whereas, starting from age 8, each of the four factors could be evidenced separately. Thus, it can be concluded that the same factors (or subtypes of SLI) that have been found in earlier studies on monolingual children with SLI (cf. Bishop, 2004; Van Daal, Verhoeven, & van Balkom, 2004; Van Weerdenburg, Verhoeven, & van Balkom, 2006) also apply for bilingual children with SLI (as far as their L2 is concerned). The *speech production* factor is similar to the type of SLI that Bishop (2004) called verbal dyspraxia. Our *syntactic-sequential* factor overlaps with Bishop's *typical SLI* type which consists of problems in grammar that in our case influences the comprehension of texts. Bishop's type of pragmatic language impairment has some overlap with our *lexical-semantic* factor. However, lexical abilities form a substantial part of our factor. Our *auditory conceptualization* factor comes close to Bishop's verbal agnosia factor, although in our case this factor is highly determined by auditory conceptualization tasks and was therefore labeled as such. The fact that we found a three factor model for the 6/ 7-year-olds can be tentatively explained by the fact that syntax and

lexical-semantics are highly related in an early stage of language acquisition. Apparently, more general language skills were not yet differentiated in the 6/ 7-year-old Bili-SLI children in our study. In our sample of the 10/ 11-year-old children the same four factors were found as in the sample of the 8/ 9-year-olds, although, the factor *speech production* was less clear here than it was in the two other age-samples. This can be explained by the idea that there is a switch from speech to language as children get older. Child language development starts out with phonetic and phonological skills (speech) which will have developmental emphasis during the first period of language acquisition. Phonological skills will develop far before other language skills (like morphology and syntax). By then, the emphasis will be on the other language skills.

The final research question concerned the stability of factor scores and relations between factor scores over time. We found that the factors of *speech production*, *syntax* and *lexical-semantics* turned out to be highly stable over time whereas the factor of *auditory conceptualization* was found to be less stable. The results of our analyses concerning the stability of the factors over time did support the idea that the factors are robust components. Other studies have also found that subtypes of SLI are stable for children across ages (Conti-Ramsden & Botting, 1999; Van Weerdenburg et al., 2006). The finding that the factor *auditory conceptualization* was less stable over time can be explained from the fact that the development of such a factor is highly related to literacy development. There is evidence that phonological skills have bi-directional relations with early reading (Perfetti, Beck, Bell, & Huhges, 1987; Wagner, Torgesen, & Rashotte, 1994). It can be expected that the pattern of auditory conceptualization of the children in our study is at least partly influenced by learning to read, which is probably impaired because of their SLI.

Finally, the significant relation between LS at age 7 and SYN at age 8 can be interpreted as an incidence of semantic bootstrapping. The semantic bootstrapping hypothesis states that children use semantic information to come to the innate syntactic knowledge, based on universal syntactic-semantic correspondences. This hypothesis has been described by Pinker (1984). It can be tentatively concluded that children's level of lexical-semantic abilities has a substantial impact on their syntactic development.

To summarize, the results of the present study show that Bili-SLI children have very low levels of L2 proficiency compared to Bili-TD children. Bili-SLI children seem to suffer from an additional disadvantage in learning their L2. As far as the types of language problems of our Bili-SLI children are concerned, there is no reason to assume that the types of SLI in Bili-SLI children differ from the types of SLI in Mono-SLI children. In addition,

the underlying language factors turned out to be very stable over time with a small semantic bootstrapping effect found at an early age.

As we have already mentioned before, the numbers of participants in this study are relatively small. Therefore, the present research can only be seen as a preliminary look at the questions of interest. A word of caution should be mentioned with respect to the design of the present study which can be called pseudo-longitudinal at best, since cross-sectional and longitudinal data were combined. In order to arrive at a fuller account of the L2 development of Bili-SLI children, we are in need of follow-up studies in which larger numbers of participants are investigated longitudinally. Furthermore, we should keep in mind that the focus of the present study is on the L2 of Bili-SLI children. There is an urgent need for studies in which not only the L2 but also the native language of these children is investigated. Only by taking into account the L1 and L2 proficiency levels of children can the role of meta-linguistic awareness in language acquisition and language transfer be uncovered. In future studies, children's literacy development should also be measured in order to be able to understand the impact of literacy on language, and vice versa.

Finally, the present study has important implications for clinical practice. This study shows that Bili-SLI children are at a very disadvantaged position with regard to the acquisition of L2. An important implication of the present study is that Bili-SLI children need more and longer exposure to their L2 in order to acquire a higher level of L2 development. Therefore, it is mandatory to give their L2 acquisition a boost starting at an early age. Given the fact that different factors appear to underlie L2 development, clinicians should be urged to dynamically assess children's linguistic abilities so that the remediation of language skills can continuously be attuned to the needs of the individual learner.

References

Aram, D. M., Ekelman, B. L., & Nation, J. E. (1984). Preschoolers with language disorders: 10 years later. *Journal of Speech and Hearing Research, 27*, 232 - 244.

Aram, D. M. & Nation, J. E. (1975). Patterns of language behavior in children with developmental language disorders. *Journal of Speech and Hearing Research, 18*, 229 - 241.

Bishop, D. V. M. (2004). Specific language impairment: Diagnostic dilemma's. In L. Verhoeven & H. van Balkom (Eds.), *Classification of developmental language disorders* (pp 309 - 326). Mahwah, NJ: Lawrence Erlbaum.

Conti-Ramsden, G. & Botting, N. (1999). Classification of children with specific language impairment: Longitudinal considerations. *Journal of Speech, Language, and Hearing Research, 42*, 1195 - 1204.

Conti-Ramsden, G., Crutchley, A., & Botting, N. (1997). The extend to which psychometric tests differentiate subgroups of children with SLI. *Journal of Speech, Language, and Hearing Research, 40*, 765 - 777.

Crutchley, A. (1999). Bilingual children with SLI attending language units: getting the bigger picture. *Child Language Teaching and Therapy, 15*(3), 201-217.

Crutchley, A., Botting, N., & Conti-Ramsden, G. (1997). Bilingualism and specific language impairment in children attending language units. *European Journal of Disorders of Communication, 32*(2), 267-276.

Håkansson, G., Salameh, E.-K., & Nettelbladt, U. (2003). Measuring language development in bilingual children: Swedish-Arabic children with and without language impairment. *Linguistics, 41*(2), 255 - 288.

Leonard, L. (1998). *Children with specific language impairment*. Cambridge, MA: The MIT Press.

Lindamood, C. H. & Lindamood, P. C. (1979). *Lindamood Auditory Conceptualization (LAC) Test - revised.* Austin, TX: Pro-Ed.

Maassen, B. & van der Meulen, S. (2000). Differentiaal Diagnostisch Articulatie Onderzoek (DDAO) [Differential diagnostic articulation test] *Logopedie en Foniatrie, 72*(7/8), 159 - 161.

Perfetti, C. A., Beck, I., Bell, L., & Hughes, C. (1987). Phonemic knowledge and learning to read are reciprocal: A longitudinal study of first grade children. *Merill-Palmer Quarterly, 33*(3), 283 - 319.

Pinker, S. (1984). *Language learnability and language development.* Cambridge, Mass.: Harvard University Press.

Rapin, I. & Allen, D. A. (1983). Developmental language disorders: Nosologic considerations. In U. Kirk (Ed.), *Neuropsychology of Language, Reading, & Spelling* (pp. 155 - 184). New York: Academic Press.

Raven, J. C. (1971). *Coloured Progressive Matrices sets A, Ab, B*. London: Lewis.

Salameh, E.-K., Håkansson, G., & Nettelbladt, U. (2004). Developmental perspectives on bilingual Swedish-Arabic children with and without language impairment: a longitudinal study. *International Journal of Language and Communication Disorders, 39*(1), 65 - 91.

Salameh, E.-K., Nettelbladt, U., & Norlin, K. (2003). Assessing phonologies in bilingual Swedish-Arabic children with and without language impairment. *Child Language Teaching and Therapy, 19*(3), 338 - 364.

Van Bon, W. H. J. (1986). *Raven's Coloured Progressive Matrices, Nederlandse normen en enige andere uitkomsten van onderzoek*. [Raven's Coloured Progressive Matrices, Dutch norm-scores and other research outcomes] Lisse: Swets & Zeitlinger B.V.

Van Daal, J., Verhoeven, L., & van Balkom, H. (2004). Subtypes of severe speech and language impairments: Psychometric evidence from 4-year-old children in the Netherlands. *Journal of Speech, Language, and Hearing Research, 47*(6), 1411 - 1423.

Van Weerdenburg, M., Verhoeven, L., & van Balkom, H. (2006). Towards a typology of specific language impairment. *Journal of Child Psychology and Psychiatry 47*(2), 176 - 189.

Verhoeven, L. & Vermeer, A. (1986). *Taaltoets Allochtone Kinderen* [Language Proficiency Test for Minority Children] Tilburg, The Netherlands: Zwijsen.

Verhoeven, L. & Vermeer, A. (2001). *Taaltoets Alle Kinderen* [Language Proficiency Test for All Children] Arnhem: the Netherlands: Cito.

Wagner, R. K., Torgesen, J. K., & Rashotte, C. A. (1994). Development of reading-related phonological processing abilities: New evidence of bidirectional causality from a latent variable longitudinal study. *Developmental Psychology, 30*(1), 73 - 87.

Wilson, B. C. & Risucci, D. A. (1986). A model for clinical-quantitative classification. Generation 1: Application to language-disordered preschool children. *Brain and Language, 27*, 281 - 309.

Wolfus, B., Moscovitch, M., & Kinsbourne, M. (1980). Subgroups of developmental language impairment. *Brain and Language, 10*, 152 - 171.

APPENDIX

Tasks used for data-collection, based on four types of language impairment (LI)

Type LI and Task (Reference; number of items)	Task description (Productive/ Receptive)
Speech production (SP)	
Articulation (Art) (Verhoeven & Vermeer, 2001; 45)	Repetition of monosyllabic words with and without consonant-clusters (e.g. *lief* [sweet], *herfst* [autumn]. The answer is correct if the word is repeated correctly. (Productive)
Non-word repetition a (NW a) (Maassen & van der Meulen, 2000; 12)	Repetition of non-words consisting of ≥ three syllables (e.g. *maa-nie-loo-de*). The answer is correct if the non-word is repeated correctly. (Productive)
Non-word repetition b (NW b) (Maassen & van der Meulen, 2000; 11)	Repetition of non-words consisting of three syllables with different consonants and only the vowel /a/ (e.g. *la-ga-fa*). The answer is correct if the non-word is repeated correctly. (Productive)
Auditory Conceptualization (AC)	
Auditory discrimination (AD) (Verhoeven & Vermeer, 2001; 50)	Deciding whether pairs of monosyllabic words with minimal difference are identical or not. (Receptive)
LAC-r 1a (Lindamood & Lindamood, 1979; 10)	Displaying two or three orally presented isolated sounds by placing colored blocks. Order, differences and number have to be represented by the blocks. (Receptive)
LAC-r 1b (Lindamood & Lindamood, 1979; 6)	Displaying three orally presented isolated sounds by placing colored blocks. Order, differences and number have to be represented by the blocks. (Receptive)
LAC-r 2 (Lindamood & Lindamood, 1979; 12)	Displaying orally presented sounds as a non-word by placing colored blocks. Order, differences and number have to be represented by the blocks. The task has to be terminated after five errors. (Receptive)
Lexical-semantic (LS)	
Receptive vocabulary (RV) (Verhoeven, & Vermeer, 2001; 96)	Picture pointing (one out of four pictures) of orally presented words in increasing difficulty. The task has to be terminated after five consecutive errors. (Receptive)
Productive vocabulary (PV) (Verhoeven, & Vermeer, 1986; 60)	Picture naming in increasing difficulty. The task has to be terminated after five consecutive errors. (Productive)
Word definition (WD) (Verhoeven & Vermeer, 2001; 45)	Describing or demonstrating the meaning of orally presented words in increasing difficulty. The task has to be terminated after five consecutive errors. (Productive)
Story comprehension (SC) (Verhoeven, & Vermeer, 2001; 24)	Answering open and yes/ no-questions about orally presented short stories (about ten sentences). (Receptive)
Story telling (ST) (Verhoeven, & Vermeer, 2001; 32)	Telling two stories based on two comic strips of eight pictures. Events on the pictures and relations between pictures have to be put into words. (Productive)
Morpho-syntactic (SYN)	
Morphology (Mor) (Verhoeven, & Vermeer, 2001; 24)	Forming plural nouns and perfect forms of verbs by completing orally presented incomplete sentences by a picture. (e.g. *This is one ear, these two ... .; Here you see Paul sitting on a bench. Yesterday he also ... .*) (Productive)
Comprehension of function words (FW) (Verhoeven, & Vermeer, 2001; 42)	Picture pointing task with complex sentences as input. The key to the right picture is a function word. (Receptive)
Comprehension of syntactic patterns (SP) (Verhoeven & Vermeer, 2001; 42)	Picture pointing task with complex sentences as input. The key to the right picture is a syntactic pattern. (Receptive)
Sentence reproduction (SR) (Verhoeven, & Vermeer, 2001; 20)	Reproducing orally presented complex sentences. Reproducing specific function words and specific syntactic patterns provide points for the total score. (Productive)

CHAPTER 5

LINGUISTIC TRANSFER IN TURKISH-DUTCH CHILDREN WITH SPECIFIC LANGUAGE IMPAIRMENT

Abstract

This study examined the level of (meta)linguistic abilities in the two languages of Turkish-Dutch children with Specific Language Impairment (SLI). Furthermore, it was investigated whether transfer between first and second language existed. Therefore, a group of 54 Turkish-Dutch children aged 6 to 11 was tested on their Turkish (L1) and Dutch (L2) linguistic and meta-linguistic skills, using different tasks from standardized language proficiency tests. Repeated Measures analyses showed that the children had significant higher scores in L1 than in L2. Structural equation modeling revealed significant influence of meta-linguistic skills in L1, short term memory, and non-verbal intelligence scores on both linguistic and meta-linguistic skills in L2. Our conclusion is that meta-linguistic skills in L1 help to develop (meta)linguistic skills in L2, thus bilingual children with SLI could best be addressed in their mother tongue.

Introduction

The structure and rate of language development of children with Specific Language Impairment (SLI) has been a lively topic of investigation over the past decades. Children with SLI are defined by Leonard as follows "children who show a significant limitation in language ability, yet the factors usually accompanying language learning problems such as hearing impairment, low non-verbal intelligence test scores, and neurological damage are not evident" (Leonard, 1998, p. 3). Investigations have shown that severe developmental language disorders can be either monofactorial or multifactorial. A distinction can be made between more central impairments, characterized by a loss on several components, and peripheral impairments such as defective articulation. For a discussion on this topic, see Bishop (1992), Rapin (1996), Bishop and Leonard (2000) and Verhoeven and van Balkom (2004). There is also abundant empirical evidence on the teachability of language-impaired children. In a meta-analysis of intervention studies carried out over the past two decades, Law, Boyle, Harris, Harkness, and Nye (1998) showed the mean effect sizes for the treatment

of both expressive and receptive language disorders to be relatively high. Although a substantial body of research on the classification of children with SLI and their possibilities for intervention is now available on children, there is at least one subgroup of children with SLI that has been under-investigated: bilingual children with SLI.

Bilingual children suffering from SLI (Bili-SLI) form a special group in that they do not develop language typically because of their language impairment, while they also suffer from restricted language input. Children's first language development often benefits from rich input from the family and the neighborhood, but later the conditions of exposure to L1 may become very poor. Their second language (L2) input in the early years is usually limited and comes from television and contact with peers, while at school children are abruptly immersed into a second language curriculum. It can be hypothesized that limited language exposure and abrupt transition from L1 to L2 in school may be responsible for weakening both L1 and L2 development. Crutchley, Botting, and Conti-Ramsden (1997) and Crutchley (1999) found that Bili-SLI children in England have more complex and more persistent problems in English, as their L2, than monolingual children with SLI (Mono-SLI) in English as their L1. Very few studies have examined the proficiency of Bili-SLI children in both languages. Håkansson, Salameh, and Nettelbladt (2003) and Salameh, Håkansson, and Nettelbladt (2004) found the proficiency of native Arabic-speaking children with SLI in Sweden in both L1 and L2 to be low in comparison to the language development level of their peers without SLI. However, in a study on the acquisition of grammatical morphemes in French-English Bili-SLI children in Canada Paradis, Crago, Genesee, and Rice (2003) found bilinguals with SLI to show comparable results as monolinguals with SLI. But the bilingual children in the latter study were simultaneous bilingual, while the children from the earlier mentioned studies can best be seen as sequential bilingual.

Up to now, research on SLI in bilingual children has concentrated on linguistic skills (in L1 and L2). However, the relationship between the two languages in Bili-SLI children has not yet been a topic of investigation. In the light of second language learning theories, an interesting question is to what extent language transfer at the level of linguistic and/or meta-linguistic abilities in L1 and L2 occurs in Bili-SLI children. A theory of second language and instruction for this group of children must explain the influence of L1 knowledge, strategies and processes on L2 learning. Understanding the nature of cross-language transfer is of great importance for the education of Bili-SLI children since it shows under what conditions language learning may be facilitated under impoverished conditions. Cummins (1979, 1981, 1991) has proposed the interdependency hypothesis, claiming that the dominant language of

bilingual children may positively influence the non-dominant language under the conditions that exposure to that non-dominant language is adequate and that there is a motivation to learn that non-dominant language. From previous research, we know that L2 learners do not need to relearn the basic categories of language. Taking the analyzed system of the L1 as a starting point, they only have to learn the language-specific devices of the new language. Empirical research has shown that L2 learners adopt a variety of strategies from mother tongue acquisition that can easily be transferred to the L2 learning process (MacWhinney, 1992). An effective use of such strategies will improve the analysis of knowledge and the control of processing in L2 learning. According to Bialystok (2001), effortful control plays a crucial role in L2 learning. She claims two self-regulatory processes to be fundamental to the development of language: analysis and control. Analysis is the process by which linguistic and conceptual representations become more explicit, more structured and more accessible to inspection. Control fulfils the monitoring role in oral and written language use. Analysis and control proceed on implicit unstructured representations and convert them to an increasingly explicit form. Bialystok (2001) also claims that the cognitively confusing effects of L2 learning will primarily concern children's awareness of language, or meta-linguistic awareness. This awareness implies the ability to focus attention on language, and reflect upon its nature, structure and functions. Thus, it can be hypothesized that the more linguistic or conceptual representations are analyzed, and explicit structures are represented, the more language learning will become facilitated. Empirical evidence for this hypothesis mainly comes from studies on phonological development (Paradis, 2001; Verhoeven, 1994), or phonological awareness (Durgunoglu, Nagy, & Hanci-Bhatt, 1993). Thus it can be argued that language transfer is mainly evident at the level of meta-linguistic abilities. As a case in point, Carlisle, Beeman, Davis, and Spharim (1999) found L2 vocabulary development in Spanish-English children to be associated with meta-linguistic abilities in either language. In a similar vein, López and Greenfield (2004) found the general language proficiency of Spanish-English bilingual children to be related to their level of phonological awareness in the two languages

In the present study, the subject of investigation is a group of bilingual children in the Netherlands, suffering from SLI. In the Netherlands, bilingual children make up about 15% of all students in primary education. They form part of the second generation of immigrants who came to the Netherlands during the past decades. Most of the first generation immigrants were contract workers who expected – or were expected – to stay for a limited period of time. As the period of their stay gradually became longer, the pattern of economic migration was

followed by a pattern of social migration of families. Subsequently, a second generation was born in the immigrant countries and grew up with parental uncertainty and ambivalence about whether to stay or return. The biggest group of immigrants in the Netherlands is of Turkish origin. Almost all of the children of the latest generation of Turkish immigrants were born in the Netherlands. They speak Turkish at home and start learning the community language (Dutch) when entering primary school at the age of four. Previous research has shown that the L2 achievement of these bilingual children lags behind their Dutch monolingual peers, at least as far as lexicon and grammar are concerned (Driessen, 1996, Verhoeven & Vermeer, 1999). Over time, bilingual children tend to catch up with Dutch children on some language and literacy skills (e.g., decoding and spelling), but vocabulary remains a weakness in L2 development (Verhoeven & Vermeer, 1999). In the present study, the language achievement of bilingual school children with SLI in the Netherlands will be examined. An attempt will be made to find an answer to the following questions: What levels of linguistic and meta-linguistic abilities do Turkish-Dutch Bili-SLI children show in the course of primary school? And to what extent is there evidence of transfer at the level of linguistic and meta-linguistic abilities? With respect to the first question, our prediction is that Turkish is the dominant language in the early years of primary school, but that as a consequence of schooling, Dutch becomes the dominant language in the course of schooling. With respect to the second question, we expect to find evidence for language transfer from the dominant to the non-dominant language. Moreover, we assume meta-linguistic and linguistic abilities in both languages to be related.

Method and procedure

Participants

A group of Bili-SLI children participated in this study. The children were of Turkish origin, born in the Netherlands. The home language of the children was Turkish and they learned Dutch as L2. The children were diagnosed as SLI by school-teams of speech therapists, clinical linguists, and psychologists and they therefore attended special education for children with speech and language impairments. Diagnoses were based on exclusion criteria like hearing impairment, intellectual disabilities, and psychiatric disorders.

Over a period of three years, 54 different children were tested once, twice or three times on their first and second (meta)linguistic skills (Turkish and Dutch). We divided the

children into three age groups: the 6/ 7-year-olds, the 8/ 9-year-olds, and the 10/ 11-year-olds. In the event that a given child was tested more than once within the span of a single age-group, overlap within age-groups was avoided by randomly selecting only one of the measurements for that child in that age-group. However, overlap between age-groups was allowed in this study. In other words, data from some, but not all children were included in more than one age-group. The final data-set consisted of 75 cases of 54 different children who were tested once or twice on two languages: (Turkish (L1) and Dutch (L2)). For each age-group the number of participants, mean ages, and age ranges are presented in Table 1.

The language performance in both languages was (where possible) compared to the norm scores of the language tests that were used (see *Materials*). These norm scores were provided by nationwide samples of Turkish-Dutch bilingual children without SLI (Bili-TD) in primary education. The sample of children used for the norm scores of the Turkish language test consisted of 24 children of 6/ 7-year-old and is further described in Narain and Verhoeven (1994). The sample of children used for the norm scores of the Dutch language test consisted of 99 6/ 7-year-olds and 47 8-year-old.

Table 1. *Number of boys and girls and mean ages in months per age group*

	6/ 7 year-olds	8/ 9 year-olds	10/ 11 year-olds
n (boys; girls)	19 (12; 7)	29 (20; 9)	27 (19; 8)
Mean age (range)	80 (68 – 90)	104 (89 – 115)	130 (120 – 138)

Materials

(Meta)linguistic performances in L1 (Turkish) and L2 (Dutch) were tested. Therefore, two language proficiency tests were used, and in addition, a non-word repetition task for each language and an auditory conceptualization task for each language. Dutch data were collected with the standardized language test *Taaltoets Alle Kinderen* (TAK-r) [Language Proficiency Test for all Children] of Verhoeven and Vermeer (2001) completed with the productive vocabulary task of the standardized language test *Taaltoets Allochtone Kinderen* (TAK) [Language Proficiency Test for Minority Children] of Verhoeven and Vermeer (1986). Turkish data were collected with the standardized language test *Toets Tweetaligheid* (TT) [Test for Bilingualism] of Verhoeven, Narain, Extra, Konak, and Zerrouk (1995). Both the TAK-r and the TT consist of different receptive and productive (meta)linguistic tasks measuring several (meta)linguistic skills, like phonology, vocabulary, and syntax. The Turkish TT consisted of a few less tasks than the Dutch test and was therefore complemented

with some translated tasks from the Dutch TAK. In Table 2, information is given about the (meta)linguistic tasks for each language.

In addition to (meta)linguistic performances, non-verbal intelligence and short term memory (STM) were tested. *Raven's Coloured Progressive Matrices* (CPM) (Raven, 1971) was used to test non-verbal intelligence. *Repeating numbers* of Kaufman and Kaufman (1983) was used to test short term memory.

Table 2. *Information about the (meta)linguistic tasks*

Dutch task (max. score)	Turkish task (max. score)	Description
Auditory discrimination (50)	Auditory discrimination (50)	The child has to determine whether orally presented word-pairs are identical or not. Different pairs differ with respect to one phoneme from each other. The score is based on the number of correct answers.
Articulation (45)	Articulation (40)	The child has to reproduce orally presented words. The score is based on the number of correct answers.
Receptive vocabulary (96)	Receptive vocabulary (60)	The child has to point to one out of four pictures after hearing a word. The score is based on the number of correct answers. After five consecutive errors these tasks and the administration was stopped.
Productive vocabulary (60)	Productive vocabulary (40)	The child has to name pictures. The score is based on the number of correct answers. After five consecutive errors these tasks and the administration was stopped.
Word definition (45)	Word definition (45)	The child has to define orally presented words. The score is based on the number of correct answers. After five consecutive errors these tasks and the administration was stopped.
Comprehension of function words (42)	Comprehension of function words (45)	The child has to point to one out of three pictures after hearing a sentence of which the meaning depends on key words in that sentence. The score is based on the number of correct answers.
Sentence reproduction (40)	Sentence reproduction (40)	The child has to reproduce orally presented complex sentences. The score is based on correct repetition of function words and core syntactic patterns.
Lindamood auditory conceptualisation task, category 1 (16)	Lindamood auditory conceptualisation task, category 1 (16)	The child has to reproduce sequences of orally presented isolated phonemes by means of coloured blocks. A specific colour must be matched with a phoneme and the blocks have to be put in the right order. Each item consists of a new sequence. The score is based on the number of correct answers.
Lindamood auditory conceptualisation task, category 2 (12)	Lindamood auditory conceptualisation task, category 2 (12)	The child has to reproduce orally presented series of phonemes by means of coloured blocks. A specific colour must be matched with a phoneme and the blocks have to be put in the right order. Each item follows on the preceding item in the way that one phoneme is changing by a next item. The score is based on the number of correct answers.
Nonword repetition (23)	Nonword repetition (23)	The child has to reproduce orally presented nonsense words each consisting of two, three or four syllables. The score is based on the number of correct answers.
Story comprehension (24)	Story comprehension (20)	The child has to answer questions about orally presented short stories (4 or 5 questions per story). The score is based on the number of correct answers.

Statistical methods

In order to find the answers to our research questions, several statistical analyses were executed. Descriptive statistics were computed for Raven's CPM, Repeating numbers and for each (meta)linguistic task of both language-tests. Where possible, comparisons were made between bilingual children with and without SLI. Independent samples *t*-tests were conducted for the Turkish tasks Receptive vocabulary, Productive vocabulary, Sentence imitation, and Story comprehension and for the Dutch tasks Auditory discrimination, Articulation, Receptive vocabulary, Word definition, Function word comprehension, Sentence imitation, and Story comprehension. Furthermore, General Linear Model (GLM) Repeated Measures analyses were conducted in order to compare the performance in Turkish with the performance in Dutch. The third type of analyses were correlations: bivariate as well as partial correlations between the Turkish and the Dutch tasks were computed. Finally, regressions between Turkish and Dutch were computed by using a path analysis. In order to be able to compare the Dutch and the Turkish (meta)linguistic tasks, all analyses with the (meta)linguistic tasks were undertaken with percentages of correct answers.

However, before the statistical analyses were undertaken, three Missing Value Analyses (MVA) with the Estimated Means method were executed. The first analysis computed the missing values of the variables *Raven's CPM* and *Repeating numbers*. Predicted variables were the standard score on *Raven's CPM* and the standard score on *Repeating numbers*. These two variables were also the predictor variables in addition to age in months. The second MVA was conducted to calculate the missing values of the Turkish (meta)linguistic tasks. Predicted and predictor variables were mean percentages of right answers of all eleven Turkish tasks. The last MVA computed the missing values of the Dutch (meta)linguistic tasks. Predicted and predictor variables were mean percentages of right answers of all eleven Dutch tasks. In the new database all 75 cases had a score on all testing variables.

Results

Descriptive statistics

Mean standard-scores on *Raven's CPM* are given in Table 3. The mean standard-scores of each of the three age groups on *Raven's CPM* did not differ significantly from each other, which was tested with an one-way ANOVA ($F(2, 72) = .22$, $p = .80$) nor from the

mean standard-score of the Dutch norm group (i.e. 5.0, reported by van Bon, 1986), which was tested with three one-sample *t*-tests (6/ 7-year-olds: $t(18) = -.79$, $p = .44$; 8/ 9-year-olds: $t(28) = -.73$, $p = .47$; 10/ 11-year-olds: $t(26) = -.07$, $p = .95$). Mean standard-scores on *Repeating numbers* are given in Table 3. The mean standard-scores of each of the three age groups on *Repeating numbers* did not differ significantly from each other, which was tested with an one-way ANOVA ($F(2, 72) = .68$, $p = .51$).

Table 3. *Mean standard-score and standard-deviations between ( ) on Raven's Coloured Progressive Matrices and Repeating numbers of Kaufman-ABC*

	6 / 7-year-olds	8 / 9-year-olds	10 / 11-year-olds
Raven's CPM	4.6[a] (2.1)	4.8[a] (1.5)	5.0[a] (1.9)
Repeating numbers	6.1 (2.2)	6.8 (2.1)	6.7 (1.9)

[a] Not significantly different from the Dutch norm group.

Mean percentages of correct answers on the (meta)linguistic tasks are measured and can be seen in Tables 4 and 5. Generally, the children performed better in Turkish than on Dutch. The performance on four Turkish linguistic tasks of the 6/ 7-year-old Bili-SLI children was compared to the performance on the same tasks of the control group of age-matched Turkish-Dutch children without SLI (scores that were used can be found in Table 4.4. in Narain & Verhoeven, 1994). These tasks were Receptive vocabulary, Productive vocabulary, Sentence imitation, and Story comprehension. For the other age groups (8/ 9-year-olds and 10/ 11-year-olds) and the other Turkish (meta)linguistic tasks, no data were available to compare with. Four independent samples *t*-tests were performed and all tests showed a significant difference between the Bili-SLI children and the Bili-TD children after Bonferroni correction of *p*-value times four. The Bili-SLI children had significantly lower scores than the Bili-TD children (see Table 4).

The performance in Dutch of the Bili-SLI children was compared to the performance in Dutch of Bili-TD children of the same age, where possible. For some Dutch (meta)linguistic tasks and the oldest age-group (10/ 11-year-olds), no data were available of Bili-TD children. For the age groups 6/ 7-year-old and 8/ 9-year-olds, independent samples *t*-tests were executed. After Bonferroni correction of *p*-value times seven, the Bili-SLI children of 6/ 7-year scored significantly lower than Bili-TD children on Auditory discrimination, Articulation, Function word comprehension, and Sentence imitation. The 8/ 9-year-old Bili-SLI children scored significantly lower than Bili-TD children on the tasks Articulation, Function word comprehension, and Sentence imitation (see Table 5).

Table 4. *Means, standard deviations and test statistics of independent samples t-tests for the Turkish (meta)linguistic tasks*

		Bili-SLI		Bili-TD				
Age-group	Task	*N*	*M (sd)*	*N*	*M (sd)*	dF	*t*	*p*[a]
6/ 7	Auditory Discrimination	22	90.8 (13.2)	-	-	-	-	-
	LAC 1	22	79.9 (21.3)	-	-	-	-	-
	LAC 2	22	32.3 (19.0)	-	-	-	-	-
	Articulation	22	76.5 (15.9)	-	-	-	-	-
	Non-word Repetition	22	62.2 (17.6)	-	-	-	-	-
	Receptive Vocabulary	22	59.6 (14.2)	24	82.4 (9.1)[b]	44	6.55	< .01
	Productive Vocabulary	22	31.3 (13.9)	24	58.5 (13.9)[b]	44	6.61	< .01
	Word Definition	22	18.6 (15.3)	-	-	-	-	-
	Function Word Comprehension	22	66.4 (10.1)	-	-	-	-	-
	Sentence Imitation	22	34.1 (21.2)	24	79.3 (15.5)[b]	44	8.32	< .01
	Story Comprehension	22	66.6 (21.8)	24	88.7 (12.3)[b]	44	4.30	< .01
8/ 9	Auditory Discrimination	38	94.7 (5.6)	-	-	-	-	-
	LAC 1	38	92.5 (9.5)	-	-	-	-	-
	LAC 2	38	64.5 (23.2)	-	-	-	-	-
	Articulation	38	82.8 (16.8)	-	-	-	-	-
	Non-word Repetition	38	77.1 (17.9)	-	-	-	-	-
	Receptive Vocabulary	38	73.7 (13.4)	-	-	-	-	-
	Productive Vocabulary	38	46.4 (15.9)	-	-	-	-	-
	Word Definition	38	29.5 (14.0)	-	-	-	-	-
	Function Word Comprehension	38	80.1 (11.8)	-	-	-	-	-
	Sentence Imitation	38	51.6 (18.5)	-	-	-	-	-
	Story Comprehension	38	82.5 (11.9)	-	-	-	-	-
10/ 11	Auditory Discrimination	35	97.2 (4.8)	-	-	-	-	-
	LAC 1	35	96.5 (4.4)	-	-	-	-	-
	LAC 2	35	83.3 (21.6)	-	-	-	-	-
	Articulation	35	87.1 (15.3)	-	-	-	-	-
	Non-word Repetition	35	82.0 (16.9)	-	-	-	-	-
	Receptive Vocabulary	35	83.9 (8.2)	-	-	-	-	-
	Productive Vocabulary	35	60.8 (18.8)	-	-	-	-	-
	Word Definition	35	44.8 (18.6)	-	-	-	-	-
	Function Word Comprehension	35	91.8 (6.4)	-	-	-	-	-
	Sentence Imitation	35	63.9 (18.4)	-	-	-	-	-
	Story Comprehension	35	87.6 (13.3)	-	-	-	-	-

[a] after Bonferroni correction of *p*-value times four
[b] derived from Narain and Verhoeven, 1994

Table 5. *Means, standard deviations and test statistics of independent samples t-tests for the Dutch (meta)linguistic tasks*

		Bili-SLI		Bili-TD				
Age-group	Task	*N*	*M (sd)*	*N*	*M (sd)*	dF	*t*	*p*[a]
6/ 7	Auditory Discrimination	19	78.8 (14.9)	96	90.4 (12.4)	114	3.59	< .01
	LAC 1	19	70.1 (28.8)	-	-	-	-	-
	LAC 2	19	31.6 (24.3)	-	-	-	-	-
	Articulation	19	76.0 (23.6)	96	96.5 (6.5)	114	7.34	< .01
	Non-word Repetition	19	56.5 (21.8)	-	-	-	-	-
	Receptive Vocabulary	19	40.5 (14.4)	96	46.5 (19.7)	114	1.26	ns
	Productive Vocabulary	19	28.4 (14.2)	-	-	-	-	-
	Word Definition	19	13.9 (9.5)	96	21.1 (15.0)	116	2.00	ns
	Function Word Comprehension	19	67.7 (10.1)	96	80.0 (13.2)	116	3.84	< .01
	Sentence Imitation	19	24.6 (17.2)	96	53.1 (23.4)	113	5.03	< .01
	Story Comprehension	19	43.4 (19.2)	96	54.3 (21.5)	113	2.05	ns
8/ 9	Auditory Discrimination	14	93.3 (4.9)	47	96.2 (5.4)	59	2.66	ns
	LAC 1	14	90.3 (12.0)	-	-	-	-	-
	LAC 2	14	59.9 (25.0)	-	-	-	-	-
	Articulation	14	89.6 (7.7)	47	99.0 (2.1)	59	8.17	< .01
	Non-word Repetition	14	69.3 (18.0)	-	-	-	-	-
	Receptive Vocabulary	14	57.3 (13.0)	47	62.5 (15.9)	59	1.83	ns
	Productive Vocabulary	14	41.6 (11.2)	-	-	-	-	-
	Word Definition	14	27.8 (9.1)	47	33.0 (13.7)	59	1.87	ns
	Function Word Comprehension	14	83.6 (9.3)	47	88.4 (5.9)	59	3.44	< .01
	Sentence Imitation	14	45.0 (17.6)	47	69.2 (22.9)	59	4.29	< .01
	Story Comprehension	14	61.3 (14.2)	47	65.6 (19.8)	59	0.59	ns
10/ 11	Auditory Discrimination	42	95.7 (4.5)	-	-	-	-	-
	LAC 1	42	97.0 (4.4)	-	-	-	-	-
	LAC 2	42	83.6 (17.8)	-	-	-	-	-
	Articulation	42	95.3 (4.7)	-	-	-	-	-
	Non-word Repetition	42	81.6 (12.8)	-	-	-	-	-
	Receptive Vocabulary	42	73.3 (10.5)	-	-	-	-	-
	Productive Vocabulary	42	56.7 (12.0)	-	-	-	-	-
	Word Definition	42	35.9 (9.5)	-	-	-	-	-
	Function Word Comprehension	42	90.1 (5.0)	-	-	-	-	-
	Sentence Imitation	42	64.4 (16.1)	-	-	-	-	-
	Story Comprehension	42	75.5 (13.6)	-	-	-	-	-

[a] after Bonferroni correction of *p*-value times seven

General Linear Model Repeated Measures

To further investigate the differences between the (meta)linguistic performance on Turkish and on Dutch several GLM Repeated Measures analyses were conducted. Each GLM Repeated Measures analysis was conducted with a (meta)linguistic task as dependent variable, Language (Turkish, Dutch) as a within subject variables and age-group as a between subjects variable. The test-statistics are presented in Table 6. Every (meta)linguistic task showed a main effect of Age-group: older children had more correct answers than younger children. In addition to these main effects, there were also main effects of Language, meaning that there existed a significant difference between the performance on the Turkish task as compared to the performance on the Dutch task. The tasks Auditory discrimination, LAC1, Articulation, Non-word repetition, Receptive vocabulary, Word definition, Sentence imitation, and Story comprehension showed main effects of Language. Except for the task Articulation, where the performance in Dutch was better than the performance in Turkish, the performances on the Turkish (meta)linguistic tasks were better than the performances on the Dutch tasks. There were three tasks that showed an interaction effect between Task and Age-group: Auditory Discrimination, LAC 1, and Story comprehension. These effects are visualized in Figures 1, 2, and 3. In all three cases the differences between Turkish and Dutch decrease with age.

Table 6. *Statistics of the General Linear Model (GLM) Repeated Measures analyses*

Dependent variable	Source	*df*	*F*	η^2	*p*
Auditory Discrimination			Between subjects		
	Age	2	20.80**	.37	.000
	error	72	(76.94)		
			Within subjects		
	Task	1	14.94**	.17	.000
	Task x Age	2	6.69**	.16	.002
	error	72	(59.37)		
LAC 1			Between subjects		
	Age	2	16.40**	.31	.000
	error	72	(335.94)		
			Within subjects		
	Task	1	6.02*	.08	.017
	Task x Age	2	3.48*	.09	.036
	error	72	(89.18)		
LAC 2			Between subjects		
	Age	2	38.07**	.51	.000
	error	72	(779.04)		

Table continues

			Within subjects		
	Task	1	.51	.01	.478
	Task x Age	2	.48	.01	.621
	error	72	(192.62)		
Articulation			Between subjects		
	Age	2	9.64**	.21	.000
	error	72	(262.36)		
			Within subjects		
	Task	1	5.19*	.07	.026
	Task x Age	2	1.38	.04	.259
	error	72	(166.17)		
Non-word repetition			Between subjects		
	Age	2	13.02**	.27	.000
	error	72	(433.69)		
			Within subjects		
	Task	1	4.38*	.06	.040
	Task x Age	2	1.12	.03	.331
	error	72	(175.71)		
Receptive Vocabulary			Between subjects		
	Age	2	50.4**	.58	.000
	error	72	(180.66)		
			Within subjects		
	Task	1	70.66**	.50	.000
	Task x Age	2	1.84	.05	.166
	error	72	(120.67)		
Productive Vocabulary			Between subjects		
	Age	2	42.12**	.54	.000
	error	72	(224.20)		
			Within subjects		
	Task	1	2.76	.04	.101
	Task x Age	2	.05	.00	.949
	error	72	(201.49)		
Word Definition			Between subjects		
	Age	2	31.35**	.47	.000
	error	72	(208.32)		
			Within subjects		
	Task	1	6.87*	.09	.011
	Task x Age	2	1.33	.04	.270
	error	72	(137.82)		
Function Word Comprehension			Between subjects		
	Age	2	56.98**	.61	.000
	error	72	(111.94)		
			Within subjects		
	Task	1	.78	.01	.379
	Task x Age	2	1.87	.05	.162
	error	72	(50.28)		

Table continues

Sentence Imitation			Between subjects		
	Age	2	31.08**	.46	.000
	error	72	(436.02)		
			Within subjects		
	Task	1	4.43*	.06	.039
	Task x Age	2	1.46	.04	.238
	error	72	(218.78)		
Story Comprehension			Between subjects		
	Age	2	23.24**	.39	.000
	error	72	(339.26)		
			Within subjects		
	Task	1	94.82**	.57	.000
	Task x Age	2	3.16*	.08	.048
	error	72	(135.24)		

Note. Values enclosed in parentheses represent mean square errors.
* $p < .05$, ** $p < .01$

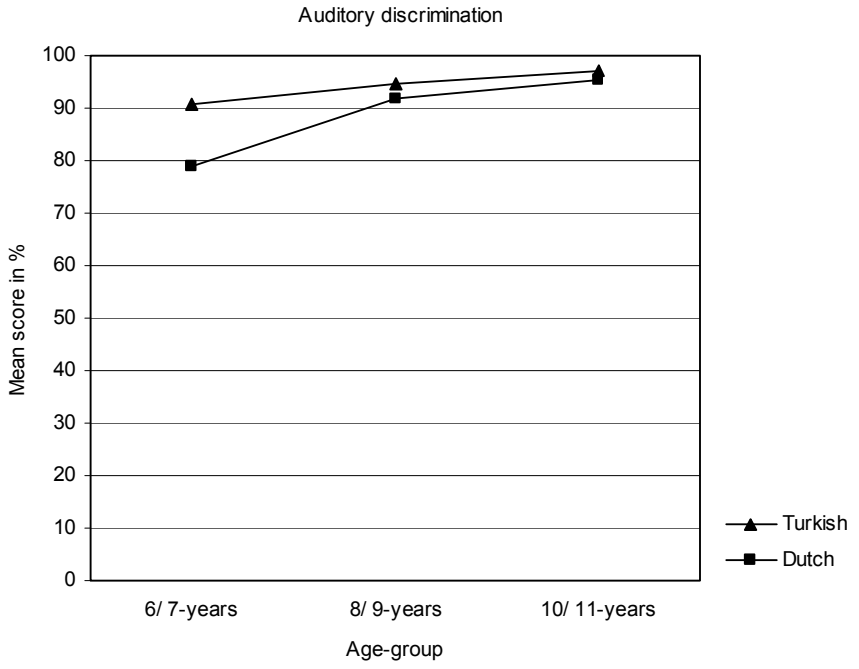


Figure 1. *Interaction effect between Task and Age-group for Auditory Discrimination*

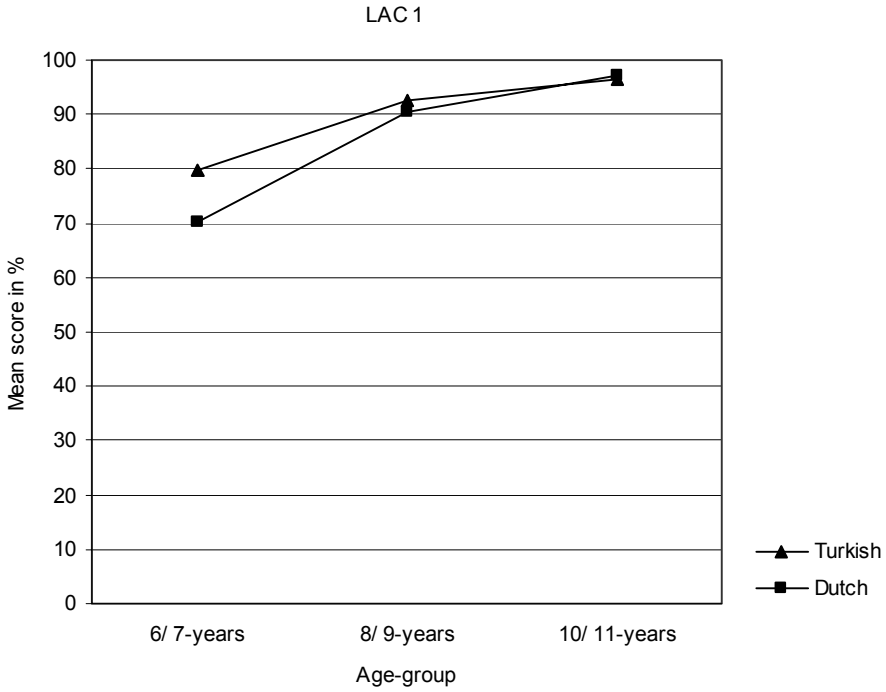


Figure 2. *Interaction effect between Task and Age-group for LAC 1*

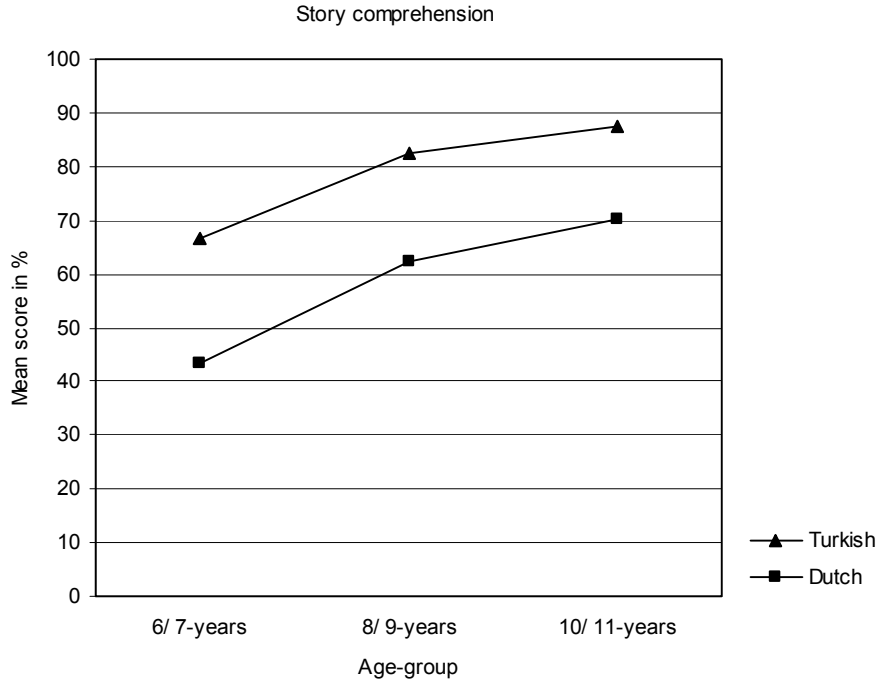


Figure 3. *Interaction effect between Task and Age-group for Story comprehension*

Bivariate and partial correlations.

In order to find out if there existed any relationship between the Turkish and the Dutch (meta)linguistic tasks correlation analyses were executed. First, bivariate correlations across ages were computed. High correlations were found between the Turkish and the Dutch versions of LAC 1, LAC 2, and Function word comprehension. Medium high correlations were found between the Turkish and the Dutch Articulation, Non-word repetition, Receptive and Productive vocabulary, Word definition, Sentence imitation, and Story comprehension. Low correlation was found between Auditory discrimination in Turkish versus Dutch. All correlations were significant. Test statistics are presented in Table 7.

However, the factor Age was not taken into account in the bivariate correlations between Turkish and Dutch versions of the tasks. A main effect of Age-group was found in the repeated measures analyses, therefore, partial correlations were calculated, controlling for age in months. Again, the variables taken into account were all Turkish and Dutch (meta)linguistic tasks. The results again showed a high correlation between the Turkish and the Dutch LAC 1. There were medium high correlations between the Turkish and the Dutch LAC 2, Non-word repetition, Function word comprehension, Sentence imitation, and Story comprehension. Low correlations existed between Auditory discrimination, Articulation, Receptive and Productive vocabulary, and Word definition in Turkish versus Dutch (see Table 8).

Table 7. *Bivariate correlations between the Turkish and the Dutch (meta)linguistic tasks*

	Dutch										
Turkish	AD	LAC1	LAC2	Art	NR	RV	PV	WD	CFW	SI	SC
Aud. Discr.	.28*	.33**	.43**	.41**	.54**	.26*	.33**	.37**	.43**	.43**	.30**
LAC 1	.41**	.70**	.54**	.24*	.35**	.48**	.53**	.45**	.56**	.38**	.46**
LAC 2	.50**	.67**	.78**	.44**	.52**	.66**	.66**	.70**	.75**	.61**	.55**
Articulation	.16	.26*	.45**	.32**	.33**	.21	.20	.20	.30*	.25*	.14
Non-word rep.	.33**	.37**	.49**	.41**	.53**	.35**	.39**	.35**	.50**	.43**	.33**
Recept. Voc.	.38**	.45**	.53**	.40**	.50**	.55**	.53**	.56**	.65**	.48**	.52**
Product. Voc.	.35**	.34**	.46**	.34**	.37**	.50**	.42**	.46**	.59**	.39**	.58**
Word Def.	.31**	.35**	.51**	.38**	.48**	.50**	.44**	.50**	.56**	.49**	.48**
Compr. Funct. W.	.49**	.57**	.64**	.50**	.53**	.64**	.65**	.62**	.70**	.63**	.56**
Sentence Imi.	.41**	.27*	.46**	.44**	.53**	.43**	.40**	.50**	.52**	.56**	.42**
Story Compr.	.36**	.29*	.39**	.41**	.37**	.45**	.42**	.46**	.55**	.39**	.59**

*$p < .05$, **$p < .01$

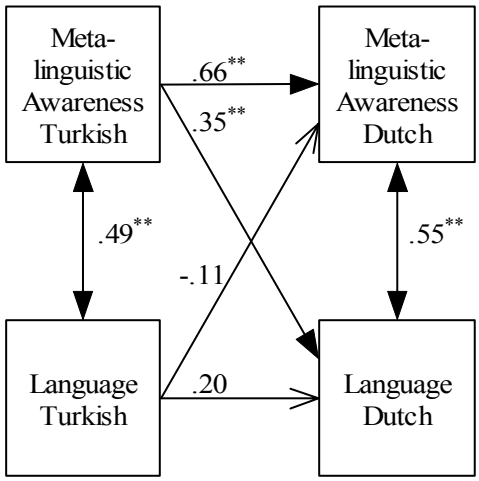
Table 8. *Partial correlations between the Turkish and the Dutch (meta)linguistic tasks controlled for age in months*

	Dutch										
Turkish	AD	LAC1	LAC2	Art	NR	RV	PV	WD	CFW	SI	SC
Aud. Discr.	.08	.16	.25*	.26*	.43**	-.01	.10	.16	.25*	.26*	.10
LAC 1	.20	.61**	.34**	-.02	.14	.24*	.33**	.21	.37**	.11	.26*
LAC 2	.14	.48**	.54**	.07	.24*	.30*	.32**	.40**	.47**	.22	.19
Articulation	-.06	.08	.28*	.15	.17	-.07	-.08	-.07	.05	-.00	-.12
Non-word Rep.	.10	.17	.27*	.22	.39**	.07	.13	.06	.28*	.19	.08
Recept. Voc.	.03	.16	.15	.09	.26*	.21	.18	.23*	.36**	.09	.23
Product. Voc.	.04	.05	.10	.05	.11	.19	.07	.13	.33**	.01	.36**
Word Def.	-.03	.06	.17	.11	.26*	.17	.08	.18	.25*	.16	.19
Compr. Funct. W.	.16	.32**	.28*	.20	.27*	.29*	.32**	.27*	.38**	.28*	.24*
Sentence Imi.	.15	-.02	.14	.21	.35**	.10	.07	.22	.23	.32**	.15
Story Compr.	.35**	.07	.11	.22	.18	.23	.18	.25*	.38**	.13	.45**

* $p < .05$, ** $p < .01$

Regression analyses

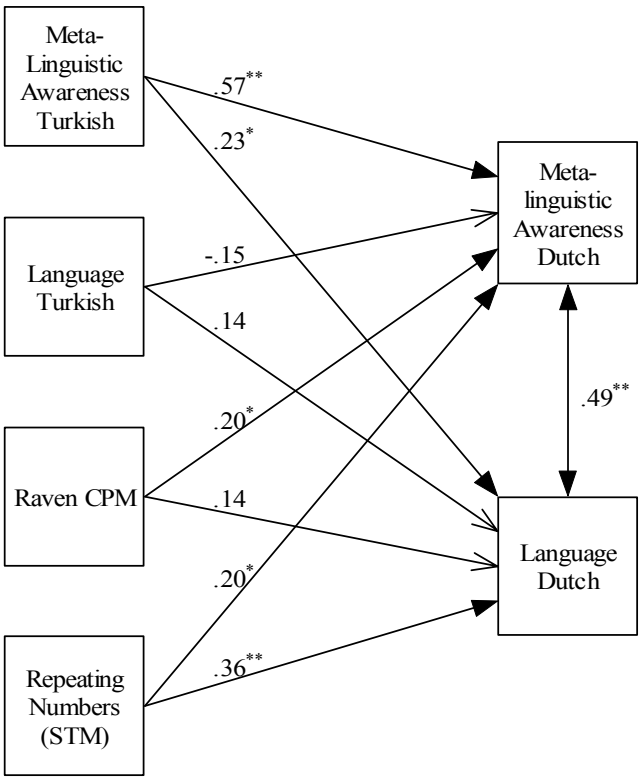
We computed two factors: a Meta-linguistic awareness factor (MA), by calculating the mean of the variables Auditory discrimination, LAC 1, and LAC 2; and a Language factor (LG) by calculating the mean of the other eight variables. In order to answer the second research question a path analysis was performed to investigate the influence of MA and LG for Turkish on the same factors for Dutch language proficiency. All regressions of MA and LG for Turkish on MA and LG for Dutch were included. Correlations between MA and LG, both with respect to Turkish and Dutch were allowed. Estimation was performed by the Amos software for structural equation modeling (Arbuckle & Wothke, 1999). The result is presented in Figure 4. Since the model has zero degrees of freedom, no goodness of fit test is available. From Figure 4 it is clear that MA for Turkish does influence both MA and LG for Dutch, although there is no significant influence of LG for Turkish on MA or LG for Dutch.



** $p < .01$

Figure 4. *Regressions between MA Turkish and LG Turkish and MA Dutch and LG Dutch*

It could be that short term memory (see Brown & Hulme, 1992) and non-verbal intelligence (see Genesee, Paradis, & Crago, 2004) are important factors in explaining second language proficiency in addition to first language proficiency. To investigate this possibility, short term memory and non-verbal intelligence were added to model. The result is presented in Figure 5. Again, no overall goodness of fit test is possible since all relations are specified (for all pairs of variables a relation is specified, either by a regression or a correlation). It is clear from Figure 5 that short term memory influences MA (.20) and LG (.36) for Dutch and is correlated with MA (.30) and LG (.22) for Turkish. It is remarkable that Raven's CPM influences MA for Turkish in a significant way (.20).



* $p < .05$, ** $p < .01$

Figure 5. *Regressions between MA Turkish, LG Turkish, Raven CPM, and Repeating numbers and MA Dutch and LG Dutch*

Conclusion and discussion

In the present study we examined what levels of linguistic and meta-linguistic abilities Turkish-Dutch Bili-SLI children show, in both their languages, compared to age-matched Turkish-Dutch Bili-TD children. Furthermore, the role of the first language Turkish (L1) on the (meta)linguistic abilities in the second language Dutch (L2) was investigated in the children with SLI. Our results showed that the children with SLI had lower scores on all Turkish measures and most of the Dutch measures compared to the typically developing bilingual children. For Dutch, the Bili-SLI children lagged behind on speech and syntax-related tasks. The 6/ 7-year-olds and the 8/ 9-year-olds scored significantly lower than the control children on the following tasks: Articulation, Function word comprehension, and

Sentence imitation. The 6/ 7-year-olds also lagged significantly behind the control children on the meta-linguistic task Auditory discrimination.

In addition, we found that, except for Articulation, the children with SLI obtained higher scores in Turkish as compared to Dutch. Therefore, Turkish can be seen as their dominant language throughout primary school. The conclusion that we draw from these results is that the Bili-SLI children lag behind in the acquisition of both languages and that there is no language shift from L1 to L2 (which may have been expected due to intensive L2 input and instruction). The latter conclusion corresponds with findings of Narain and Verhoeven (1994) and Verhoeven (1987) who found typically developing Turkish-Dutch children to have L1 (Turkish) dominance. With respect to the notion of linguistic interdependencies, our data showed relatively low correlations between Turkish and Dutch tasks in the linguistic domains as opposed to higher correlations in the meta-linguistic domains. This result corresponds well with the outcomes of earlier studies on typically developing bilingual children (Durgunoglu, Nagy, & Hancin-Bhatt, 1993; Verhoeven, 1994). Within both L1 and L2, we also found substantial correlations between meta-linguistic skills, on the one hand, and linguistic skills, on the other hand, which is in line with López and Greenfield's (2004) findings on children without SLI. It can thus be concluded that relationship between L1 and L2 (meta)linguistic skills of Bili-SLI children does not differ from the relationship observed in Bili-TD children.

Through the use of structural equation modeling, we found that meta-linguistic awareness in Turkish (L1) has great influence on meta-linguistic awareness in Dutch (L2) and moderate influence on linguistic performance in L2. Furthermore, meta-linguistic awareness in L1 and L2 turned out to be highly related with linguistic proficiency in the same language. When other cognitive skills (non-verbal intelligence and short term memory (STM)) are taken into account in looking at the influence on L1 on L2, the same relationships turn out to prevail. Thus, we may conclude that meta-linguistic skills in L1 help the development of both meta-linguistic and linguistic skills in L2. Finally, we also found children's STM to be a significant predictor of children's level of meta-linguistic and linguistic abilities in L2. The importance of STM for the development of language has earlier been highlighted in the case of monolingual children with SLI (Gillam & Hoffman, 2004) and in the case of Bili-TD children (e.g., Brown & Hulme, 1992).

Some limitations of the present study should be mentioned. First of all, it should be noted that the design of the study was cross-sectional rather than longitudinal. In order to be able to investigate language dominance and language shift in Bili-SLI children there is an

urgent need for longitudinal studies in which the development of linguistic and meta-linguistic skills is monitored over the course of time. In such studies, detailed observations concerning the socio-cultural and linguistic background of the children should also be collected. Furthermore, in the present study we restricted ourselves to the study of meta-linguistic and language abilities without taking literacy skills into account. In the literature, it has been well documented that the development of meta-linguistic awareness is crucial for both language and literacy development, also in children's speech and/ or language disorders (Stackhouse, 2000). In order to get a full account of the linguistic development of Bili-SLI children, the extension with literacy-related tasks should therefore be considered

The present study has some implications for clinical practice. This study shows that Bili-SLI children may best be addressed to in their native language. This is the language they understand best. Therefore, it is advisable to give classroom instructions in L1 to insure that they are understood. Teacher - student interaction in L1 proves to be crucial for the development of meta-linguistic and linguistic skills in both L1 and L2. Bilingual programs for Bili-SLI children can thus be recommended. Moreover, children's L1 development can also be supported by implementing parent training programs (see Girolametto, Pearce, & Weitzman, 1996). In addition, in the school context a strong effort should be made to strengthen children's L2 development while taking into account children's limited short-term memory capacity. Suggestions for such programs are given by Gillam and Hoffman (2004).

References

Arbuckle, J. & Wothke, W. (1999). *Amos 4.0 user's guide*. Chicago: SmallWaters.

Bialystok, E. (2001). *Bilingualism in Development. Language, Literacy, and Cognition*. Cambridge: Cambridge University Press.

Bishop, D. V. M. (1992). The underlying structure of specific language impairment. *Journal of Child Psychology and Psychiatry, 33*(1), 3-66.

Bishop, D. V. M., & Leonard, L. B. (2000). *Speech and language impairments in children: Causes, characteristics, intervention, and outcome*. Hove, UK: Psychology Press.

Brown, G. D. A. & Hulme, C. (1992). Cognitive psychology and second-language processing: The role of short term memory. In R. J. Harris (Ed.), *Cognitive Processing in Bilinguals* (pp 105 - 121). Amsterdam: North-Holland.

Carlisle, J. F., Beeman, M., Hull Davis, L., & Spharim, G. (1999). Relationship of metalinguistic capabilities and reading achievement for children who are becoming bilingual. *Applied Psycholinguistics, 20*, 459 - 478.

Crutchley, A. (1999). Bilingual children with SLI attending language units: getting the bigger picture. *Child Language Teaching and Therapy, 15*(3), 201-217.

Crutchley, A., Botting, N., & Conti-Ramsden, G. (1997). Bilingualism and specific language impairment in children attending language units. *European Journal of Disorders of Communication, 32*(2), 267-276.

Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research, 49*, 221 - 251.

Cummins, J. (1981). The role of primary language development in promoting educational success for language minority students. In *Schooling and language minority students: A theoretical framework* (pp 3 – 49). Los Angeles, California State University: Department of Education, Evaluation, Dissemination and Assessment Center.

Cummins, J. (1991). Interdependence of first- and second language proficiency in bilingual children. In E. Bialystok (Ed.), *Language Processing in Bilingual Children* (pp 70 - 89). Cambridge: Cambridge University Press.

Driessen, G. (1996). De taalvaardigheid Nederlands van allochtone en autochtone leerlingen. De ontwikkeling van het basisonderwijs in kaart gebracht.[Dutch language proficiency of minority and native children. The development of primary education mapped] *Gramma/ TTT- tijdschrift voor Taalwetenschap, 5*, 31 - 40.

Durgunoglu, A. Y., Nagy, W. E., & Hancin-Bhatt, B. J. (1993). Cross-language transfer of phonological awareness. *Journal of Educational Psychology, 85*(3), 453 - 465.

Genesee, F., Paradis, J., & Crago, M. (2004). *Dual Language Development and Disorders. A Handbook on Bilingualism and Second Language Learning*. Baltimore: Paul Brooks Publishing Co.

Gillam, R. B. & Hoffman, L. M. (2004). Information processing in children with specific language impairment. In L. Verhoeven & H. van Balkom (Eds.), *Classification of developmental language disorders* (pp 137 - 157). Mahwah NJ: Lawrence Erlbaum.

Girolametto, L., Pearce, P. S., & Weitzman, E. (1996). Interactive focused stimulation for toddlers with expressive vocabulary delays. *Journal of Speech and Hearing Research, 39*(6), 1274 - 1283.

Håkansson, G., Salameh, E.-K., & Nettelbladt, U. (2003). Measuring language development in bilingual children: Swedish-Arabic children with and without language impairment. *Linguistics, 41*(2), 255 - 288.

Kaufman, A. S. & Kaufman, N. L. (1983). *Kaufman assessment battery for children: Interpretative manual.* Circle Pine (MN): American Guidance Service.

Law, J., Boyle, J., Harris, F., Harkness, A., & Nye, C. (1998). *Screening for speech and language delay: A systematic review of the literature.* Southampton: NCCHTA.

Leonard, L. (1998). *Children with specific language impairment*. Cambridge, MA: The MIT Press.

López, L. M. & Greenfield, D. B. (2004). The cross-language transfer of phonological skills of Hispanic head start children. *Bilingual Research Journal, 28*(1), 1 - 18.

MacWhinney, B. (1992). Tranfser and competition in second language learning. In R. J. Harris (Ed.), *Cognitive processes in bilinguals* (pp 371-390). Amsterdam: Elsevier.

Narain, G. & Verhoeven, L. (1994). *Ontwikkeling van tweetaligheid bij allochtone kleuters* [Development of bilingual kindergartners] (Vol. 5). Tilburg, The Netherlands: Tilburg University Press.

Paradis, J. (2001). Do bilingual two-year-olds have separate phonological systems? *The International Journal of Bilingualism, 5*(1), 19 - 38.

Paradis, J., Crago, M., Genesee, F., & Rice, M. (2003). French-English bilingual children with SLI: How do they compare with their monolingual peers? *Journal of Speech, Language, and Hearing Research, 46*(1), 113-127.

Rapin, I. (1996). Practitioner review: Developmental language disorders: A clinical update. *Journal of Child Psychology and Psychiatry, 37*, 643-655.

Raven, J. C. (1971). *Coloured Progressive Matrices sets A, Ab, B*. London: Lewis.

Salameh, E.-K., Håkansson, G., & Nettelbladt, U. (2004). Developmental perspectives on bilingual Swedish-Arabic children with and without language impairment: a longitudinal study. *International Journal of Language and Communication Disorders, 39*(1), 65 - 91.

Stackhouse, J. (2000). Barriers to literacy development in children with speech and language difficulties. In D. V. M. Bishop & L. B. Leonard (Eds.), *Speech Speech and language impairments in children: Causes, characteristics, intervention, and outcome* (pp 73 - 97). Hove, UK: Psychology Press.

Verhoeven, L. (1987). *Ethnic minority children acquiring literacy*. Berlin: Mouton & De Gruyter.

Verhoeven, L. (1994). Transfer in bilingual development: The linguistic interdependence hypothesis revisited. *Language Learning, 44*(3), 381 - 415.

Verhoeven, L., Narain, G., Extra, G., Konak, Ö. A., & Zerrouk, R. (1995). *Toets Tweetaligheid*.[Bilingualism Test]. Arnhem: Cito.

Verhoeven, L. & van Balkom, H. (2004). *Classification of developmental language disorders*. Mahwah NJ: Lawrence Erlbaum.

Verhoeven, L. & Vermeer, A. (1986). *Taaltoets Allochtone Kinderen*.[Language Proficiency Test for Minority Children]. Tilburg, The Netherlands: Zwijsen.

Verhoeven, L. & Vermeer, A. (1996). *Taalvaardigheid in de bovenbouw: Nederlands van autochtone en allochtone leerlingen in het basis- en mlk-onderwijs*.[Language proficiency in higher grades of primary education: Dutch proficiency of native and minority children in primary and special education]. Tilburg, The Netherlands: Tilburg University Press.

Verhoeven, L. & Vermeer, A. (1999). Taalvaardigheid van moeilijk lerende autochtone en allochtone kinderen.[Language proficiency of native and minority children in special education]. *Tijdschrift voor Orthopedagogiek, 38*, 217-233.

Verhoeven, L. & Vermeer, A. (2001). *Taaltoets Alle Kinderen*.[Language Proficiency Test for All Children] Arnhem, The Netherlands: Cito.

CHAPTER 6

CONCLUSIONS AND DISCUSSION

The aim of the present thesis was to gain insight into the language problems of bilingual children with SLI (Bili-SLI). Therefore, language proficiency in the first (L1) and second language (L2) of a group of bilingual children in the Netherlands who were diagnosed as SLI was studied. Research has been performed by using different types of data; language-test data as well as elicited speech samples were collected. In order to study the children's L2 proficiency, the Bili-SLI children were compared to three control groups: native Dutch children with typical language development (Mono-TD), native Dutch children with SLI (Mono-SLI), and bilingual children with typical language development (Bili-TD). Three aspects of L2 development of Bili-SLI children were investigated. First of all, an attempt was made to evaluate the rate of the children's L2 development as compared to the above mentioned control groups. Then, in order to find out to what extent the L2 proficiency of Bili-SLI children also differs from a structural point of view, the focus was on the error patterns as regards verb morphology in a narrative elicitation task. In addition, we were interested in the subtypes of SLI occurring in the L2 data of Bili-SLI children. Finally, we also wanted to find out to what extent the first and second language proficiency of Bili-SLI children is interrelated.

In the next section, the outcomes of the four studies in the present thesis will be reviewed. In the following section (6.2) the status of theory-building on the topic of SLI in bilingual children will be revisited. In the subsequent section (6.3), the limitations of the present study will be examined. In the final section (6.4), the practical implications of the present study will be discussed.

6.1 Conclusions of the four studies

6.1.1 Second language proficiency of bilingual children with SLI

The first study in this thesis on the L2 (i.e., Dutch) proficiency of Bili-SLI children followed a multi-group design in which several linguistic levels of L2 were taken into account. An attempt was made to discover at which linguistic L2 levels Bili-SLI children show an additional disadvantage in comparison to Mono-TD children, beyond the disadvantage of Bili-TD and/ or Mono-SLI children in comparison to Mono-TD children. Dutch language test data were collected from Bili-SLI children aged 6 to 8. Comparisons

were made with the three control groups of children of the same age. It was concluded that an additional disadvantage was shown for Bili-SLI children at the age of 7 on *Word definition* (Lexicon-Semantic skill) and on *Morphology* and *Comprehension of functions words* (Morpho-syntax skills). At the age of 8, Bili-SLI children are additionally disadvantaged on *Receptive vocabulary* and *Word definition* (Lexicon-Semantics skills), on *Morphology* and *Sentence comprehension* (Morpho-Syntax skills), and on *Story comprehension*. Thus, the arrears in L2 proficiency of Bili-SLI children compared to Mono-TD children tended to be larger with progression of age. It can tentatively be concluded that the L2 development of Bili-SLI children progresses more slowly than the language development of Mono-TD children.

As far as the comparison to Mono-SLI children is concerned, the performance of 6-year-old Bili-SLI children was comparable to that of Mono-SLI children on all linguistic levels (Phonology, Lexicon-semantic, Morpho-syntax, and Story comprehension). Older Bili-SLI children differed from Mono-SLI children on almost all linguistic levels, except for Phonology. This finding is in accordance with findings of earlier studies on bilingual children with SLI reporting significant differences between bilingual children with SLI and monolingual children with SLI on vocabulary and grammar skills (Crutchley, Botting, & Conti-Ramsden, 1997; Crutchley, 1999).

Finally, the comparison between Bili-SLI children and Bili-TD children showed that, at the age of six, Bili-SLI children resembled Bili-TD children on all linguistic levels (Phonology, Lexicon-semantic, Morpho-syntax, Story comprehension). At older age levels, however, the L2 level of Bili-SLI children differed from that of Bili-TD children. Differences in L2 levels between Bili-SLI children and Bili-TD children have also been found in previous studies. Håkansson, Salameh, and Nettelbladt (2003) and Salameh, Håkansson, and Nettelbladt (2004) reported lower levels of L2 development in Bili-SLI children as compared to Bili-TD children in Sweden.

6.1.2 Verb morphology in the second language of bilingual children with SLI

To get a more complete picture of L2 proficiency of Bili-SLI children, a qualitative study was performed in which the use of Dutch verb forms was investigated by analyzing elicited speech. Errors in verb morphology were analyzed in an effort to identify clinical markers of SLI. Data consisted of elicited narrative data of 7- and 9-year old Bili-SLI children. These data were compared to similar data of three control groups of children (Mono-TD, Mono-SLI, and Bili-TD) matched on age. Quantitative and qualitative analyses

were undertaken to investigate the role of the factor SLI and the role of the factor Bilingualism. Given the numbers of ungrammatical utterances, the data seem to show that Bili-SLI children are additionally disadvantaged in elicited speech. The number of ungrammatical utterances was highest for the Bili-SLI children and the utterance length was lowest for the Bili-SLI children. The factor SLI as well as the factor Bilingualism had a significant effect on these two variables.

The analysis of errors in verb morphology revealed one type of error that could be a clinical marker: Omission agreement marker (OAM). Other errors in verbs did not distinguish very well between children with SLI and bilingual children. Errors in verb morphology that had previously been identified as being characteristic for Dutch children with SLI (see De Jong, 1999, 2004), did not appear to be clinical markers of SLI in Dutch, since Bili-TD children turned out to make these errors as well. A similar conclusion was arrived at by Håkansson (2001) who reported similarities between bilingual children and children with SLI on subject-verb inversion in Swedish.

6.1.3. Underlying factors in second language performance of bilingual children with SLI

An important question is to what extent the underlying factors in Bili-SLI children's L2 proficiency is similar to the underlying factors in the L1 proficiency of their monolingual peers. In order to investigate the stability of subtypes of SLI over the course of time, the L2 proficiency of Bili-SLI children aged 6 to 11 was tested three years in a row. A comparison was made with data from Bili-TD children of the same ages. The results were in agreement with the first study: Bili-SLI children were shown to lag behind Bili-TD children on L2 development and these differences increase with age. It was also found that four underlying factors could be identified in the L2 of Bili-SLI children. The resulting factor model reflected subtypes which resemble the subtypes found in Mono-SLI children (Bishop, 2004; Van Daal, Verhoeven, & van Balkom, 2004; Van Weerdenburg, Verhoeven, & van Balkom, 2006). The subtypes could be labeled as *auditory conceptualization*, *speech production*, *syntax* and *lexical-semantics*. In the youngest children, the two latter subtypes were collapsed into one more general language subtype, but from the age of 8, the four factors were found to be evidenced separately. The factors speech production, lexical-semantics, and syntax were found to be highly stable over time. This finding supports the idea that the underlying factors can be regarded as robust dimensions of L2 proficiency. This is in accordance with the findings of previous studies in which subtypes of SLI were found to be stable factors across ages (Conti-Ramsden & Botting, 1999; Van Weerdenburg Verhoeven, & van Balkom, 2006).

Finally, there was evidence of a semantic bootstrapping effect in that we found that a significant relationship existed between the factor 'lexical-semantics' at age 7 and the factor 'syntax' at age 8. Such an effect was also evidenced in a study on monolingual SLI children by Van Weerdenburg (2006).

6.1.4 Relations between L1 and L2 proficiency of Turkish-Dutch children with SLI

In the final investigation in this thesis, the first (i.e., Turkish) and second language (i.e., Dutch) of a group of Turkish-Dutch children with SLI were studied. Here, the main interest was to find out what levels of linguistic and meta-linguistic abilities Turkish-Dutch children with SLI show in the course of primary school and to what extent there is evidence of language transfer. Turkish-Dutch children with SLI aged 6 to 11 were followed for three consecutive years. As regards the children's bilingual proficiency, a comparison was also made with Turkish-Dutch children without SLI of the same ages. This study showed that the Bili-SLI children were behind in L1 as well as in L2 as compared to age-matched Bili-TD children. In Turkish (L1), the children with and without SLI differed significantly from each other on lexical and syntactic tasks. There were significant differences between the two groups on speech and syntactical tasks in Dutch (L2). It was also found that the Bili-SLI children had higher scores on tasks in L1 than on tasks in L2, indicating that Turkish (L1) was their dominant language. This turned out to be the case over the years. The conclusion that was drawn from these results was that the Bili-SLI children are behind in the acquisition of both their languages and that there is no language shift from L1 to L2. The latter conclusion corresponds with findings of Narain and Verhoeven (1994) and Verhoeven (1987) who did not find L2 dominance either, in Turkish-Dutch typically developing children. As far as the role of language transfer is concerned, it was found that meta-linguistic awareness in L1 had great influence on meta-linguistic awareness in L2 and a medium influence on linguistic performance in L2. This result was in line with earlier findings as regards the bilingual development of Bili-TD children (Durgunoglu, Nagy, & Hancin-Bhatt, 1993; Verhoeven, 1994). Meta-linguistic awareness in both L1 and L2 also turned out to be highly related to linguistic abilities in the same language, even when the cognitive abilities short term memory and non-verbal IQ were taken into account. It was concluded that the relationship between first and second (meta)linguistic skills of Bili-SLI children do not differ from these relationships in Bili-TD children. And that meta-linguistic skills in L1 may help the development of both meta-linguistic and linguistic skills in L2. These conclusions are

fully commensurate with the outcomes of earlier studies on children without SLI of López and Greenfield (2004).

6.2 Specific Language Impairment in bilingual children revisited

The results of the studies discussed in this thesis show that from a clinical point of view Bili-SLI children can be regarded as a special group. They differ from Mono-SLI children and Bili-TD children in that they suffer from an additional disadvantage as far as their proficiency in Dutch is concerned. However, they also resemble Mono-SLI children and Bili-TD children in some aspects of language proficiency. The additional disadvantage in domains like vocabulary and grammar seems logical in a sense, given the fact that children with SLI as well as bilingual children have been shown to have problems in these linguistic areas. Such findings were reported for children with SLI in studies by Leonard and Deevy (2004) and by Bishop (1997). For bilingual children in the Netherlands, the evidence came from studies by Driessen, van der Slik, and Bot (2001) and by Verhoeven and Vermeer (1996). It is interesting to note that in this study we found more similarities in the language proficiency levels of Bili-SLI children and Mono-SLI children than in those of Bili-SLI children and Bili-TD children. Nevertheless, on some language tasks, i.e., in the phonological domain, Bili-SLI children turned out not to differ from Mono-SLI children nor from Bili-TD children. Similarities between Mono-SLI children and Bili-SLI children were also found by Paradis, Crago, Genesee, and Rice (2003). From a theoretical point of view, it can be questioned whether Bili-SLI children have deviant or delayed language development. The dominant view about deviant versus delayed language development in children with SLI is that children with SLI have delayed language development in some domains (i.e., vocabulary) and deviant language development in other domains (i.e., grammatical tense and agreement) (Rice, Warren, & Betz, 2005). However, so far the research on this topic has been based on language development of monolingual children with SLI. In this thesis, some evidence has been found for deviant language development in bilingual children with SLI. We found the omission of an agreement marker on the verb to be a specific error in Dutch children with SLI (Chapter 3). However, verb agreement errors have been shown to be not as characteristic of children with SLI as they seem. Previous studies on other atypically developing Dutch children have shown that agreement errors were also found by children with psychiatric impairment (Blankenstijn & Scheper, 2003). Another study in which tense marking was found not to be a clinical marker of SLI was the study of Paradis and Crago

(2000) in which monolingual children with SLI were found to be comparable to bilingual children without SLI on this aspect of language development.

As can be concluded from Chapter 2 and 3 in this thesis, Bili-SLI children do not show an overall additional disadvantage. It would be interesting to know whether the additional disadvantage of Bili-SLI children and the similarities and differences with Mono-SLI children and Bili-TD children have influence on the types of the language problems in Dutch of Bili-SLI children. It was shown in Chapter 4 that the additional disadvantage for Bili-SLI children did not have an effect on the subtypes of language problems compared to Mono-SLI children. The subtypes that were found can be seen as highly comparable to the ones evidenced by Dutch Mono-SLI children and English-speaking Mono-SLI children (Bishop, 2004; Van Daal, Verhoeven, & van Balkom, 2004; Van Weerdenburg, Verhoeven, & van Balkom, 2006). However, it can be questioned whether the type of SLI which was labeled *lexical-semantics* is actually a type of SLI or rather a type of language problems in general. In previous studies, it has been shown that bilingual children in the Netherlands have lower vocabulary skills in Dutch than monolingual Dutch children (Driessen, van der Slik, & Bot, 2002; Verhoeven & Vermeer, 1996). Another aspect on which Bili-SLI children showed similarities with Mono-SLI children is the semantic bootstrapping effect (see Chapter 4). Such an effect had already been found by Mono-SLI children in other studies (e.g., Bishop et al, 2000; Van Weerdenburg, 2006).

Finally, the study on the bilingual development of Turkish Bili-SLI children showed L1 to be their dominant language. This result corresponds to earlier findings from Håkansson, Salameh, and Nettelbladt (2003), Paradis Crago, Genese, and Rice (2003), and Salameh, Håkansson, and Nettelbladt (2004). However, the level of development in both languages differs from Bili-TD children (Håkansson, Salameh, & Nettelbladt, 2003; Salameh, Håkansson, & Nettelbladt, 2004). Also, Turkish-Dutch children with SLI were found to have lower levels of language development in both Turkish and Dutch than Turkish-Dutch children without SLI (Chapter 5). With respect to the relationship between L1 and L2 in Bili-SLI children, evidence was found for transfer at the meta-linguistic level, and not so much at the linguistic level. Evidence for meta-linguistic transfer has also been found in earlier studies (Carlisle, Beeman, Davis, & Spharim, 1999; Durgunoglu, Nagy & Hanci-Bhatt, 1993; López & Greenfield, 2004; Paradis, 2001; Verhoeven, 1994). This can be seen as an important finding, given the fact that meta-linguistic skills have great influence on literacy skills (cf. Snow, Burns, & Griffin, 1998).

To conclude, Bili-SLI children form a special group in the sense that they have to learn two languages while having SLI, but they may not be as different from Mono-SLI children and Bili-TD children as may seem. This thesis presented evidence for differences as well as similarities between Bili-SLI children and mono-SLI children and between Bili-SLI children and Bili-TD children.

6.3 Limitations of the present study

With this thesis, an important step has been taken to examine the patterns of language development in Bili-SLI children. An effort was made to overcome some limitations of earlier studies on Bili-SLI children, such as a restriction in comparison groups and a restriction in linguistic data. Therefore, Bili-SLI children were compared to diverse control groups: Mono-TD, Bili-TD, and Mono-SLI children. Moreover, the language data used in this thesis came from language tests as well as from elicited speech. However, the present study can only be seen as a first step toward the goal of unraveling the processes of first and second language development of Bili-SLI children.

The studies in this thesis, for example, were performed with relatively small groups of participants. To be able to generalize the findings, investigations with larger numbers of participants should be undertaken. With respect to data collection, a longitudinal design can be recommended. An example of a longitudinal study is that of Paradis and Crago (2005). They studied grammatical morphology in Bili-SLI children over a period of 20 months. Furthermore, in search of specific characteristics in L2 of Bili-SLI children, analyses of grammatical errors should be undertaken over time. Paradis, Golberg, and Crago (2005) did find that some aspects of tense morphology distinguished L2 learners of English with and without SLI. Their findings were in the area of error types as well as on grammatical judgment scores. The error types found in that study and grammatical judgment tasks may be a starting point for future research on characteristics of children with SLI learning Dutch (as L1 or L2).

Furthermore, it seems important to further explore to what extent Bili-SLI children have specific characteristics in their L1 and L2 (development) as compared to Mono-SLI children, on the one hand, and Bili-TD children, on the other hand. In order to get a more complete account of bilingual development, it must be investigated whether the L1 and L2 proficiency of Bili-SLI children can be divided into subtypes of children (see Conti-Ramsden, Crutchley, & Botting, 1997; Van Weerdenburg, Verhoeven, & van Balkom, 2006).

In future studies, it can also be recommended to take the different language and cultural backgrounds of the participants into account. In the studies described in this thesis, the language achievement of children from Turkish, Moroccan, and Surinamese backgrounds was studied without paying attention to differences in their linguistic and cultural background. It would be interesting to find out whether different mother tongues have different influences on the language performance of Bili-SLI children. In line with this, it would be interesting to examine the role of language input in both L1 and L2. The role of language input was taken into account in the study of Salameh, Håkansson, and Nettelbladt (2004). It was shown that Bili-SLI children were more vulnerable to limited exposure to L1 and L2 than Bili-TD children.

6.4 Practical implications

The studies described in this thesis have some implications for clinical practice. First of all, the study on dimensions in the L2 proficiency of Bili-SLI shows that four subtypes of language problems can be distinguished: *auditory conceptualization, speech production, syntax* and *lexical-semantics*. These subtypes turn out to be highly similar to those evidenced for Mono-SLI children. Furthermore, the study in Chapter 3 did show one type of error in verb tense that may be a clinical marker for SLI, irrespective of being monolingual or bilingual. This may help to diagnose Bili-SLI children, but may be more as a control function than as a key function in the diagnosis. The fact that Bili-SLI children produced more ungrammatical utterances than Bili-TD and than Mono-SLI children is something to consider in diagnosing Bili-SLI children.

The present studies showed that Bili-SLI children resembled Mono-SLI children at several points, implying that language development processes in both groups of children may be the same. However, the findings of the study in Chapter 4 implied that more and longer exposure to L2 has a positive effect on the level of L2 development. Therefore, L2 acquisition should also be given a boost as early as possible. Thus, the difference with intervention of Mono-SLI children lays in the intensity of the therapy. The fact that we found transfer at the level of meta-linguistics from L1 to L2 suggests a bilingual approach in language therapy. It can be recommended to provide bilingual children with complex meta-linguistic instructions in their L1, immediately followed by similar instruction in L2. An optimal transfer from L1 to L2 may thus be attained.

Furthermore, it was found that different types of language impairment may occur and that the types of difficulties tend to be robust over time. This implies a need for a highly

specific type of language therapy. However, our finding of a semantic bootstrapping effect implies that working on lexical domains of language may have a positive effect on syntactic ability at a later age. So, when Bili-SLI children suffer from lexical disorders as well as from syntactic disorders, working on lexicon would be a good first step to improve both lexical and syntactic skills.

Finally, it was found that Bili-SLI children have an additional disadvantage in acquiring L2, especially in certain domains (lexicon, syntax). When helping Bili-SLI children by means of therapy and support, this finding should be taken into account. Special attention should be paid to the vulnerable areas of L2 acquisition, maybe in a more intensive way than in Mono-SLI children. However, the fact that the factor SLI had more influence on L2 proficiency than the factor bilingualism is an indication that the appropriate intervention may be the same as for Mono-SLI children. Although, in the Dutch situation, language intervention always takes place on the basis of L2, the study in Chapter 5 showed that intervention on the meta-linguistic level in L1 (the dominant language) can have a positive effect on acquisition of L2. Concretely, it may help to give instructions and explaining the L2 in the L1, with the help a native speaker of the L1. That way, instructions in the classroom may better be understood. Thus, L1 development should get more attention and must be stimulated. Parental training programs can help L1 development (see Girolametto, Pearce, & Weitzman, 1996).

References

Bishop, D. V. M. (1997). *Uncommon understanding: Development and disorders of language comprehension in children*. Cambridge, UK: Psychology Press.

Bishop, D. V. M. (2004). Specific language impairment: Diagnostic dilemma's. In L. Verhoeven & H. van Balkom (Eds.), *Classification of developmental language disorders* (pp 309 – 326). Mahwah, NJ: Lawrence Erlbaum.

Bishop, D. V. M., Bright, P., James, C., Bishop, S. J., & van der Lely, H. K. J. (2000). Grammatical SLI: A distinct subtype of developmental language impairment? *Applied Psycholinguistics, 21*, 159 - 181.

Blankenstijn, C. J. K. & Scheper, A. R. (2003). *Language Development in Children with Psychiatric Impairment.* Unpublished doctoral dissertation, University of Amsterdam, Amsterdam.

Carlisle, J. F., Beeman, M., Hull Davis, L., & Spharim, G. (1999). Relationship of metalinguistic capabilities and reading achievement for children who are becoming bilingual. *Applied Psycholinguistics, 20*, 459 - 478.

Conti-Ramsden, G. & Botting, N. (1999). Classification of children with specific language impairment: Longitudinal considerations. *Journal of Speech, Language, and Hearing Research, 42*, 1195 - 1204.

Conti-Ramsden, G., Crutchley, A., & Botting, N. (1997). The extend to which psychometric tests differentiate subgroups of children with SLI. *Journal of Speech, Language, and Hearing Research, 40*, 765 - 777.

Crutchley, A. (1999). Bilingual children with SLI attending language units: getting the bigger picture. *Child Language Teaching and Therapy, 15*(3), 201-217.

Crutchley, A., Botting, N., & Conti-Ramsden, G. (1997). Bilingualism and specific language impairment in children attending language units. *European Journal of Disorders of Communication, 32*(2), 267-276.

De Jong, J. (1999). *Specific language impairment in Dutch: Inflectional morphology and argument structure*. Unpublished doctoral dissertation, University of Groningen.

De Jong, J. (2004). Grammatical impairment: an overview and a sketch of Dutch. In: L. Verhoeven & H. van Balkom (Eds.), *Classification of developmental language disorders. Theoretical issues and clinical implications* (pp 261-282). Mahwah, NJ: Erlbaum.

Driessen, G., van der Slik, F., & de Bot, K. (2002). Home language and language proficiency: A large-scale longitudinal study in Dutch primary schools. *Journal of Multilingual and Multicultural Development, 23*(3), 175-194.

Durgunoglu, A. Y., Nagy, W. E., & Hancin-Bhatt, B. J. (1993). Cross-language transfer of phonological awareness. *Journal of Educational Psychology, 85*(3), 453 - 465.

Girolametto, L., Pearce, P. S., & Weitzman, E. (1996). Interactive focused stimulation for toddlers with expressive vocabulary delays. *Journal of Speech and Hearing Research, 39*(6), 1274 - 1283.

Håkansson, G. (2001). Tense morphology and verb second in Swedish L1 children, L2 children and children with SLI. *Bilingualism: Language and Cognition, 4*(1), 85 - 99.

Håkansson, G., Salameh, E.-K., & Nettelbladt, U. (2003). Measuring language development in bilingual children: Swedish-Arabic children with and without language impairment. *Linguistics, 41*(2), 255 - 288.

Leonard, L. & Deevy, P. (2004). Lexical deficits in specific language impairment. In L. Verhoeven & H. van Balkom (Eds.), *Classification of developmental language disorders* (pp 209-233). Mahwah, NJ: Lawrence Erlbaum.

López, L. M. & Greenfield, D. B. (2004). The cross-language transfer of phonological skills of Hispanic head start children. *Bilingual Research Journal, 28*(1), 1 - 18.

Narain, G. & Verhoeven, L. (1994). *Ontwikkeling van tweetaligheid bij allochtone kleuters* [Development of bilingual kindergartners] (Vol. 5). Tilburg, The Netherlands: Tilburg University Press.

Paradis, J. & Crago, M. (July 2005). Grammatical morphology in English second language learners over time. Paper presented as part of symposium on bilingual/second language children and SLI, *IASCLX,* Berlin, Germany.

Paradis, J. (2001). Do bilingual two-year-olds have separate phonological systems? *The International Journal of Bilingualism, 5*(1), 19 - 38.

Paradis, J. & Crago, M. (2000). Tense and temporality: a comparison between children learning as a second language and children with SLI. *Journal of Speech, Language, and Hearing Research, 43*, 834-847.

Paradis, J., Crago, M., Genesee, F., & Rice, M. (2003). French-English bilingual children with SLI: How do they compare with their monolingual peers? *Journal of Speech, Language, and Hearing Research, 46*(1), 113-127.

Paradis, J., Golberg, H., & Crago, M. (March 2005). Distinguishing between typically developing L2 children and L2 children with SLI: Verb diversity and tense morphology over time. Poster presentation at the *International Symposium on Bilingualism*, Barcelona, Spain.

Rice, M. L., Warren, S. F., & Betz, S. K. (2005). Language symptoms of developmental language disorders: An overview of autism, Down syndrome, fragile X, specific language impairment, and Williams syndrome. *Applied Psycholinguistics, 26*, 7 - 27.

Salameh, E.-K., Håkansson, G., & Nettelbladt, U. (2004). Developmental perspectives on bilingual Swedish-Arabic children with and without language impairment: a longitudinal study. *International Journal of Language and Communication Disorders, 39*(1), 65 - 91.

Snow, C.E., Burns, S., & Griffin, P. (Eds). (1998). *Preventing reading difficulties in young children*. National Academy Press: Washington, DC.

Van Daal, J., Verhoeven, L., & van Balkom, H. (2004). Subtypes of severe speech and language impairments: Psychometric evidence from 4-year-old children in the

Netherlands. *Journal of Speech, Language, and Hearing Research, 47*(6), 1411 - 1423.

Van Weerdenburg, M. (2006). *Language and literacy development in children with specific language impairment*. Unpublished doctoral dissertation. Radboud University, Nijmegen.

Van Weerdenburg, M., Verhoeven, L., & van Balkom, H. (2006). Towards a typology of specific language impairment. *Journal of Child Psychology and Psychiatry, 47*(2), 176 - 189.

Verhoeven, L. (1987). *Ethnic minority children acquiring literacy*. Berlin: Mouton & De Gruyter.

Verhoeven, L. (1994). Transfer in bilingual development: The linguistic interdependence hypothesis revisited. *Language Learning, 44*(3), 381 - 415.

Verhoeven, L., & Vermeer, A. (1996). *Taalvaardigheid in de bovenbouw: Nederlands van autochtone en allochtone leerlingen in het basis- en mlk-onderwijs*.[Language proficiency in higher grades of primary education: Dutch proficiency of native and minority children in primary and special education]. Tilburg, The Netherlands: Tilburg University Press.

SUMMARY

The present thesis describes a study on the first (L1) and second (L2) language proficiency of bilingual children (aged 6 to 11 years) with Specific Language Impairment (Bili-SLI) in the Netherlands, speaking Dutch as a second language. The language proficiency of Bili-SLI children has been compared to that of three other groups of children: Monolingual children with typical language development (Mono-TD), monolingual children with SLI (Mono-SLI), and bilingual children with typical language development (Bili-TD). All bilingual children in the studies are from Turkish, Moroccan, and Suriname origin. The children with SLI were diagnosed with SLI by multidisciplinary teams of clinical linguists, psychologists, and speech therapists and they attended special elementary schools for children with SLI. Four studies were conducted to find out what differences and similarities exist between Bili-SLI children and the three other groups in the area of first and second language performance. Several linguistic domains have been examined.

Research on Bili-SLI children in the Netherlands have not been performed earlier. Therefore, the first step was to find out whether Bili-SLI children are in an additionally disadvantaged position as far as performance in Dutch is concerned, because Bili-SLI children have to learn a second language while experiencing language impairment. Chapter 2 describes a study in which this is investigated. It appeared that Bili-SLI children (in the ages 6 to 8 years) have an additional disadvantage, at least at the age of eight, for linguistic skills in the lexicon and morpho-syntax module. Besides an additional disadvantage for especially older Bili-SLI children it was also found that, in case no additional disadvantage was found, the factor SLI had great influence on the performance in phonological skills, like articulation and auditory discrimination, while the factor Bilingualism had more influence on the lexical skills. For clinical practice, these findings suggest that, in intervention, for some domains (like phonology) it may be best to deal with the language impairment first, while for other domains (like morpho-syntax) it seems advisable to address both problems due to language impairment and to bilingualism. It may be important to begin intervention for Bili-SLI children at an early age because observed differences appear to increase with age.

In order to be able to recognise Bili-SLI children at an early age, it is important to find out whether clinical markers of SLI in Dutch that hold for Mono-SLI children also hold for Bili-SLI children. Chapter 3 reports on a research in Dutch morpho-syntax. Bili-SLI children of 7 and 9 years old were compared to Mono-SLI children, Bili-TD children, and Mono-TD children on their performance on Dutch verb morphology, besides some general language

measures (narrative length, mean length of utterance, and number of grammatical utterances). One error in verb morphology may function as a clinical marker, namely: Omission of an agreement marker in the third person singular verb form. No other SLI specific errors were found. However, the additionally disadvantaged position for Bili-SLI children again has been shown by the result of the study in this chapter. The level of proficiency in Dutch in spontaneous speech, expressed by mean length of utterance and number of grammatical utterances, was lowest for Bili-SLI children in comparison with the three other groups. Implications for clinical practice are that utterance length and number of ungrammatical in L2 seem a possibility to determine SLI in bilingual children based on their L2, however, it may not be the key factor.

Subsequent investigation focused on the heterogeneity of SLI. In Chapter 4, research on the existence of subtypes of SLI in the L2 of Bili-SLI children from 6 to 11 years is reported. This research shows that in the data of the Bili-SLI children, evidence is found for the existence of four underlying factors of language ability in the L2.The factors could be labelled as *auditory conceptualization*, *speech production*, *syntax*, and *lexical-semantics*. In the youngest children the two latter factors turned out to collapse into one more general language factor, whereas starting from the age of 8 each of the four factors could be evidenced separately. The stability of the factors over time was examined. The factors *speech production*, *syntax*, and *lexical-semantics* turned out to be highly stable over time, whereas the factor *auditory conceptualization* was found to be less stable. These results support the idea that these factors are robust components. Finally, empirical evidence was found for a lexical bootstrapping effect. This study implicates that clinicians should be urged to dynamically assess children's linguistic abilities so that the remediation of language skills can continuously be attuned to the needs of the individual learner.

Besides investigating the L2, it is also important to investigate the L1 of Bili-SLI children. Chapter 5 focuses on linguistic transfer in Turkish-Dutch children with SLI aged 6 to 11 years. These children were compared with Turkish-Dutch children with typical language development on their first and second language performance. The study shows that children with SLI lagged behind in both their languages compared to TD children. Turkish (L1) appeared to be the dominant language throughout primary school. Investigation of the influence of the dominant language (Turkish) on the non-dominant language (Dutch) in the children with SLI shows that meta-linguistic awareness in Turkish has great influence on meta-linguistic awareness in Dutch and moderate influence on linguistic proficiency in Dutch. Meta-linguistic awareness in L1 and L2 is highly related to linguistic performance in

the same language. Therefore, it is concluded that meta-linguistic skills in L1 help the development of both meta-linguistic and linguistic skills in L2. For clinical practice, this implicates that Bili-SLI children may best be addressed to in their native language, this is the language they understand best. For example, it is advisable to give classroom instructions in L1 to insure that they are understood.

In general, the conclusion of this thesis is that bilingual children with SLI form a special group. They are additionally disadvantaged in the proficiency of their L2. However, Bili-SLI children are similar to Bili-TD children and Mono-SLI children at some points. The results are important for clinical practice as well as for theories in the area of specific language impairment. Further investigation should be conducted to get an even more clear picture of the position of Bili-SLI children.

SAMENVATTING

In deze dissertatie wordt verslag gedaan van een onderzoek naar de taalvaardigheid in de eerste (L1) en de tweede taal (L2) van tweetalige kinderen met ernstige spraak- en/ of taalmoeilijkheden (ESM) (van 6 tot 11 jaar) met Nederlands als tweede taal. De taalvaardigheid van deze kinderen (Bili-SLI kinderen) is vergeleken met die van drie andere groepen kinderen: Eentalige kinderen met normale taalontwikkeling (Mono-TD), eentalige kinderen met ESM (Mono-SLI) en tweetalige kinderen met normale taalontwikkeling (Bili-TD). De tweetalige kinderen die hebben meegedaan aan de studies waren van Turkse, Marokkaanse en Surinaamse afkomst. De kinderen met ESM die hebben meegedaan aan de studies waren allen gediagnosticeerd als ESM door een multidisciplinair team van specialisten. De kinderen met ESM bezochten scholen voor speciaal basisonderwijs voor kinderen met ernstige spraak- en/ of taalmoeilijkheden. Er werden vier onderzoeken uitgevoerd om verschillen en overeenkomsten tussen Bili-SLI kinderen en de andere drie groepen kinderen vast te stellen op het gebied van taalvaardigheid in L1 en in L2. in de studies zijn verschillende taaldomeinen onderzocht.

In Nederland is nog niet eerder onderzoek gedaan naar tweetalige kinderen met ESM. Daarom moest eerst onderzocht worden in welke mate deze kinderen een extra nadeel hebben ten opzichte van eentalige kinderen zonder ESM. Immers, Bili-SLI kinderen leren een tweede taal terwijl ze een taalontwikkelingsstoornis hebben. Het is denkbaar dat de combinatie van deze factoren extra nadelig is voor de taalontwikkeling. In Hoofdstuk 2 wordt een onderzoek beschreven waarin is onderzocht of Bili-SLI kinderen zich in een extra nadelige positie bevinden wat betreft de taalvaardigheid in het Nederlands ten opzichte van Mono-TD kinderen. Bili-SLI kinderen (in de leeftijd van 6 tot 8 jaar) blijken inderdaad een extra nadeel te hebben vooral op het gebied van lexicon en morfo-syntaxis. Deze nadelige positie is vooral het geval bij Bili-SLI kinderen van 8 jaar oud. Verder laten de resultaten van deze studie zien dat, als er geen extra nadelige situatie is voor Bili-SLI kinderen, de factor taalstoornis grote invloed heeft op de fonologische vaardigheden zoals articulatie en auditieve discriminatie, terwijl de factor tweetaligheid vooral invloed heeft op lexicale vaardigheden. Uit de resultaten van dit onderzoek is op te maken dat interventie voor Bili-SLI kinderen zich soms het beste kan richten op de taalstoornis (bijvoorbeeld bij fonologische vaardigheden), maar dat soms beide factoren (taalstoornis en tweetaligheid) aandacht verdienen. Bovendien is het erg belangrijk dat interventie op een zo jong mogelijke leeftijd aanvangt, omdat de problemen die Bili-SLI kinderen ondervinden toenemen naarmate de kinderen ouder zijn.

Vroege onderkenning van ESM is dus belangrijk. Hoe vroeger ESM kan worden vastgesteld, hoe eerder kan worden begonnen met interventie. Om ESM vroeg op te sporen is het belangrijk dat er kenmerken worden gevonden die voor kinderen met ESM gelden, voor eentalige zowel als voor tweetalige kinderen met ESM. In Hoofdstuk 3 wordt een onderzoek gerapporteerd waarin is gezocht naar kenmerken van ESM in het Nederlands. Het onderzoek richtte zich op morfo-syntaxis van het Nederlands, in het bijzonder werkwoordvervoeging. Bili-SLI kinderen van 7 en 9 jaar oud werden vergeleken met Mono-TD kinderen, Mono-SLI kinderen en Bili-TD kinderen van dezelfde leeftijd op het gebied van fouten in werkwoordvervoeging, naast enkele algemene taalmaten (lengte van het gesproken verhaal, uitingslengte en aantal ongrammaticale uitingen). Er werd één fout in werkwoordvervoeging gevonden die een kenmerk van ESM in het Nederlands zou kunnen zijn: Omissie van de uitgang voor de 3^{e} persoon enkelvoud (-t). Andere fouten bleken niet specifiek door kinderen met ESM gemaakt te worden. Echter, de extra nadelige positie voor Bili-SLI kinderen komt in dit onderzoek naar voren op het gebied van spontane taal. De taalvaardigheid, uitgedrukt in gemiddelde uitingslengte en aantal ongrammaticale uitingen, van Bili-SLI kinderen was het kleinst. Genoemde twee factoren zouden een mogelijkheid kunnen bieden tot het vaststellen van ESM, maar het zijn niet de sleutelfactoren.

Het onderzoek dat beschreven is in Hoofdstuk 4 richt zich op de heterogeniteit van ESM. Er is onderzocht of er verschillende subtypen van ESM te vinden zijn bij Bili-ESM kinderen van 6 tot en met 11 jaar oud. Uit de data blijkt dat er vier typen taalproblemen te onderscheiden zijn die gelabeld kunnen worden als: *auditieve conceptualisatie*, *spraakproductie*, *syntaxis* en *lexicaal-semantische vaardigheden*. Bij de jongste kinderen waren de laatste twee typen niet te onderscheiden, in plaats daarvan was er een meer algemeen subtype aanwezig. De subtypen *spraakproductie*, *syntaxis* en *lexicaal-semantische vaardigheden* bleken zeer stabiel te zijn over de tijd heen. Echter, het type *auditieve conceptualisatie* was een minder stabiel subtype. Toch ondersteunen de resultaten de robuustheid van de subtypen. Verder is er empirisch bewijs gevonden voor het lexicale 'bootstrappingeffect'; de lexicaal-semantische vaardigheden op 7-jarige leeftijd hebben een effect op de syntactische vaardigheden op 8-jarige leeftijd. De resultaten van deze studie betekenen voor de praktijk dat de behandeling van taalproblemen bij Bili-SLI kinderen dynamisch van aard zou moeten zijn en zou steeds afgestemd moeten worden op de behoeften van elk individueel kind.

Tot slot is er in deze dissertatie verslag gedaan van een onderzoek naar de eerste (L1: Turks) en de tweede (L2: Nederlands) taal van een groep kinderen met ESM van Turkse

afkomst (Hoofdstuk 5), omdat het erg belangrijk is niet alleen naar de vaardigheden in de tweede taal, maar ook naar die in de eerste taal te kijken, zo kan een completer beeld van de groep Bili-SLI kinderen verkregen worden. De Turks-Nederlandse kinderen met ESM (van 6 tot en met 11 jaar oud) zijn vergeleken met een vergelijkbare groep tweetalige kinderen zonder ESM. Er is onderzocht of er transfer is van de dominante taal naar de niet-dominante taal. Allereerst bleek dat de Turks-Nederlandse kinderen met ESM een lagere taalvaardigheid hebben in zowel L1 als L2, vergeleken met leeftijdgenoten zonder ESM. Bovendien bleek het Turks (L1) de dominante taal te zijn gedurende de basisschoolperiode. Onderzoek naar de invloed van het Turks op de vaardigheid van het Nederlands (bij Bili-SLI kinderen) liet zien dat het metalinguïstisch bewustzijn in het Turks een grote invloed heeft op het metalinguïstisch bewustzijn in het Nederlands. Metalinguïstisch bewustzijn in het Turks had een gemiddelde invloed op de linguïstische vaardigheden in het Nederlands. Daarnaast bleek dat metalinguïstisch bewustzijn in het Turks en het Nederlands grote invloed hadden op de linguïstische vaardigheden in dezelfde taal. Er kan geconcludeerd worden dat metalinguïstisch bewustzijn in het Turks meehelpen in de ontwikkeling van zowel metalinguïstische als linguïstische vaardigheden in het Nederlands. Deze resultaten impliceren dat Bili-SLI kinderen misschien het best benaderd kunnen worden in hun eerste taal, omdat dit de taal is die ze het beste begrijpen. Een voorbeeld is dat instructie in de klas, bijvoorbeeld over L2, gegeven wordt in L1, zodat men zeker is dat deze instructie begrepen wordt.

De algemene conclusie van de studies die in dit boek beschreven zijn is dat tweetalige kinderen met ESM een speciale groep vormen. Ze zijn in een extra nadelige positie voor zover het de vaardigheid in de tweede betreft. Echter, naast verschillen vertonen Bili-SLI kinderen ook overeenkomsten met Bili-TD en Mono-SLI kinderen. De resultaten zijn erg belangrijk voor de praktijk, maar ook voor theorievorming rond ESM. Vervolgonderzoek zal nog meer duidelijk moeten maken over de positie van Bili-SLI kinderen.

CURRICULUM VITAE

Judit Steenge is geboren op 18 mei 1976 te Westerbork. Na het behalen van haar VWO diploma op de *Gemeentelijke Scholengemeenschap* te Emmen in 1994, begon ze de studie Nederlandse Taal- en Letterkunde aan de *Rijksuniversiteit Groningen*. In 1995 haalde ze haar propedeuse en ging ze verder met de bovenbouwstudie Algemene Taalwetenschap. Na het eerste jaar van deze bovenbouwstudie koos ze in haar derde studiejaar binnen Neurolinguïstiek voor de specialisatie Taalontwikkelingsstoornissen. In januari 1999 reisde ze af naar Parijs, om binnen *Le Laboratoire de Neuropsychologie Clinique de l'Enfant* een afstudeeronderzoek uit te voeren naar het gebruik van persoonlijke voornaamwoorden van Franse kinderen met enkelvoudige partiële epilepsie. Van dit onderzoek verscheen een artikel in *Nederlands Tijdschrift voor Epileptologie* (28 (1), 2000). In augustus 1999 behaalde ze haar doctoraaldiploma.

In 2000 verhuisde ze naar Nijmegen om haar promotieonderzoek, dat in dit proefschrift beschreven is, uit te voeren bij de sectie Orthopedagogiek, Leren en Ontwikkeling van de toenmalige *Katholieke Universiteit Nijmegen*. In dit onderzoek richtte ze zich op de taalontwikkeling van tweetalige kinderen met ernstige spraak- en/ of taalmoeilijkheden. Naast haar werkzaamheden als onderzoeker heeft ze studenten begeleid in hun afstudeerscripties en enkele lesgevende taken verricht. In 2006 rondde ze haar onderzoek en haar proefschrift af. Sinds september 2005 is ze werkzaam als docent Nederlands aan de *Hogeschool Edith Stein/ Onderwijscentrum Twente* te Hengelo waar ze naast het verzorgen van modules op het gebied van onderzoek, taal, taaldidactiek en taalbeleid een bijdrage levert aan de nieuwe onderzoeksleerlijn van de opleiding.

STUDIES ON ATYPICAL COMMUNICATION

Ludo Verhoeven & Hans van Balkom (Editors)

The aim of this series is to advance insight into the processes of communication within and across children and adults with special needs, including persons with learning disabilities, cognitive, physical, and sensory impairments, and persons from culturally and linguistically diverse backgrounds. It combines interest in sociolinguistic and psycholinguistic accounts of the acquisition and transmission of language in these populations, and in educational solutions to help individuals overcome or reduce communication disabilities and to support their participation in society.

1. Multimedia Support of Language Learning in Kindergarten
   Eliane Segers
2. Reading Comprehension in Deaf Children: The Impact of the Mode of Acquisition of Word Meanings
   Loes Wauters
3. Language and Literacy Development in Children with Specific Language Impairment
   Marjolijn van Weerdenburg
4. Bilingual Children with Specific Language Impairment: Additionally Disadvantaged?
   Judit Steenge