Narrative abilities in early successive bilingual Slovak–English children: a cross-language comparison

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Narrative abilities in early successive bilingual Slovak-English children:

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Abstract

This study investigates macrostructure skill transfer in successive bilingual children speaking Slovak and English, a new language combination for narrative research. We examined whether narrative performance reflected language dominance and assessed relationships between nonword repetition (NWR) and narrative skills within and across languages. Forty typically developing Slovak-English bilingual children (mean age 5;10) were evaluated for microstructure and macrostructure performance in both languages through story telling and retelling tasks. Additionally, NWR was assessed in Slovak, the children's first language (L1). Macrostructure scores were higher in L1 than L2, but comprehension did not differ across languages. L1 NWR was significantly related to L1 microstructure scores, but not to L1/L2 macrostructure or L2 microstructure. Implications for assessing bilingual children's language are discussed.

Narrative abilities in early successive bilingual Slovak-English children: A cross-language comparison

In a world where bilingualism is increasing, numerous challenges arise for researchers and clinicians in finding ways to effectively test a bilingual child's language in cases where standardized tests do not exist or have only been normed on monolingual speakers (Kohnert, 2010). The development of bilingual and monolingual children's language is broadly similar (e.g. Bialystok & Craik, 2010), but there are two crucial differences that will inevitably influence language progress: (1) the organization of language on multiple linguistic levels is necessarily more complex when additional languages are present and (2) input will vary in its quantity, quality and timing between a bilingual child's first and second languages (Gathercole, 2013). A particular challenge in this context is distinguishing between delayed language due to insufficient input, which is likely to improve over time, and actual language impairment requiring early intervention (Chiat, Armon-Lotem, Marinis, Polišenská, Roy, & Seeff-Gabriel, 2013).

Narrative assessments have shown promise in addressing the challenges involved in assessing bilingual children's language (Squires, Lugo-Neris, Peña, Bedore, Bohman, & Gillam, 2014), but previous results have been inconsistent and focused on production rather than comprehension (Gagarina et al., 2012). Studies in this area have primarily been conducted in the USA (English-Spanish bilinguals) but bilingualism has received little attention of any kind in Eastern Europe. This paper builds on previous studies by testing narrative assessments developed specifically for bilingual children in the context of Eastern Europe with a language combination that has not yet been studied: Slovak-English. The study explores the effect of the children's L1 (Slovak) vs. L2 (English) on

story macrostructure and microstructure in this cultural context, and the possible transfer of these structures between languages of successive bilingual children.

There are additional broader challenges involved in assessing bilingual children that this study aims to explore. Researchers and clinicians such as speech and language therapists (SLTs) often only know one of a bilingual child's languages. This has led to suggestions in the literature that NWR can contribute to the assessment of bilingual children in situations where specific language knowledge is lacking (e.g., Thordardottir & Brandeker, 2013). In this study, we examine NWR and its relationship to narrative performance. Before NWR and narrative tasks are jointly utilized in language assessments for bilingual children, more information is needed to understand how they relate to each other, as addressed in this study.

Narrative Assessment of Bilingual Children's Language Skills

The use of narrative assessment with bilingual children has a number of motivations. Firstly, narrative assessments are informative and ecologically valid in that they reflect the importance of stories in most children's lives (Botting, 2002; Kit-Sum To, Stokes, Cheung, & T'sou, 2010; Skarakis-Doyle & Dempsey, 2008). Secondly, narrative assessments provide researchers with the opportunity to examine multiple linguistic levels in one task: the microstructural level (e.g. morphosyntax, referential devices, and lexicon) as well as the more global macrostructural level (i.e., the organization of the storytelling above the sentence level) (Iluz-Cohen & Walters, 2012; Pearson, 2002). Thirdly, narrative skills have been shown to reflect cognitive development and predict academic success in TD children (Kit-Sum To et al., 2010), while also revealing language impairment (Botting, 2002; Norbury & Bishop, 2003).

There have been a number of studies that have investigated the transfer of narrative ability (or of language ability in a narrative context) between TD bilingual children's L1 and L2. Pearson (2002) found that scores for macrostructure (story elements, sequencing, referencing, internal states and engagement) were similar for both Spanish (L1) and English (L2). Gutiérrez-Clellen (2002) also found that TD bilingual second-graders produced grammatical narratives in both Spanish (L1) and English (L2), but performance on story recall and associated comprehension tasks was actually better in English than Spanish. Squires et al. (2014) claimed that macrostructure ability in Spanish (L1) transferred to English (L2) based on their findings for Spanish-English bilinguals. Iluz-Cohen and Walters (2012) studied sequential English-Hebrew bilingual children. They also reported transfer of story structure (macrostructure) across the languages of a bilingual child, but lexical and morphosyntactic abilities (microstructure) remained more language-specific and did not transfer to the same extent. Overall, these findings point to increasing evidence that narrative macrostructure is less reliant on language ability compared to microstructure.

The use of narrative assessments in distinguishing monolingual children with language impairment from their TD peers (see Boudreau, 2008; Cleave, Girolametto, Chen, & Johnson, 2010) has been extended to bilingual children, with the aim of enabling researchers and clinicians to more effectively differentiate between disordered language and difficulties that may only arise from insufficient input in an L2. TD children are expected to obtain higher scores than children with language impairment regardless of whether they are tested in their L1 or L2 as they will not be compromised by impairment in either language. A notable recent example of assessment aimed at eliciting data from

bilingual children is the *Multilingual Assessment Instrument for Narratives* (MAIN) (Gagarina et al., 2012). Developed to evaluate narrative abilities across 26 European languages and to aid in distinguishing Specific Language Impairment (SLI) from TD in bilingual children, the MAIN includes measures of narrative production and comprehension.

Comprehension Skills in Monolingual and Bilingual Children

It is well established that comprehension (receptive) difficulties in monolingual children highlight a risk of language impairment before verbal expression emerges (Bishop, Holt, Line, McDonald, McDonald, & Watt, 2012; Eadie, Nguyen, Carlin, Bavin, Bretherton, & Reilly, 2014; Polišenská & Kapalková, 2014a). Thal, Tobias and Morrison (1991) suggested that comprehension is an excellent predictor of recovery from expressive language delays and Bates (1993) argued that children with delayed language who can build on their receptive knowledge of language have a much better chance of catching up with their peers. Comprehension difficulties may also directly affect narrative skills. Boudreau (2007 in Boudreau, 2008) compared the narrative performance of a group of children who had receptive and expressive language impairments with a group of children exclusively with expressive impairment. The study found that children who also had receptive language impairments performed more poorly across a range of micro- and macrostructural measures than children who only had expressive difficulties. Narrative comprehension has also been related to later literacy. For example, Paris and Paris (2003) assessed monolingual children of a similar age range (61-98 months) to our participants, and found a link between narrative comprehension and reading skills.

There has been limited research on narrative comprehension in bilingual children.

A notable exception is a study by Gutiérrez-Clellen (2002) in which English-Spanish bilingual children showed significantly better comprehension in English than in Spanish, although with more variable results for Spanish. Importantly, the author pointed out that it is possible that the stories used in the study did not have the same level of difficulty across their two languages. In the present study, parallel stories across our two languages (see Procedure) ensure that any observed differences between languages cannot be attributed to task difficulty.

We also expect to find the same asymmetry between comprehension and production skills in bilingual children as found in monolingual children. We know that assessment of production skills can reveal delay in bilingual children's language relative to monolingual children. As Leonard (2009) notes, expressive language problems are unlikely to occur in isolation. Knowing that a child is scoring within the normal range for comprehension in their L2 could help separate those whose language is developing normally from children with mixed receptive-expressive language impairments. The first step in providing better assessments for bilingual children who may be facing language disorder is understanding variation in TD bilingual populations, as investigated in this study.

NWR in Monolingual and Bilingual Children

Like narrative assessments, NWR tasks have also been proposed to identify language impairment in monolingual children (e.g. Botting, 2002; Conti-Ramsden, Botting & Faragher, 2001). A number of studies in different languages have indeed shown that TD children consistently achieve higher scores on NWR assessments than children with language difficulties (Bortolini, Arfé, Caselli, Degasperi, Deevy &

Leonard, 2006; Coady & Evans, 2008; Girbau & Schwartz, 2007; Kapalková, Polišenská & Vicenová, 2013; Thordardottir, 2008). Calderón (2003) and Girbau and Schwartz (2008) proposed that NWR tasks have the potential to identify language impairment even when only one language of a bilingual child is assessed. Thordardottir and Brandeker (2013) showed that French-English bilingual children did not differ from TD monolingual children on a NWR task but did differ from children with SLI, thus confirming the marker of NWR in bilingual children.

A number of studies have also investigated the relationship between NWR and vocabulary development and links have been shown between the skills underlying NWR and the skills involved in vocabulary acquisition (e.g., Gathercole & Baddeley, 1989); indeed, this link is already present in children under 2 years of age (Hoff et al., 2008; Polišenská & Kapalková, 2014b). In addition, NWR ability has been shown to be significantly related to vocabulary skills in bilingual children (e.g., Messer, Leseman, Boom, & Mayo, 2010; Service, 1992), and Adams and Gathercole (1995) confirmed that the link found between NWR and vocabulary extends to other linguistic domains. Adams and Gathercole's study demonstrated that children who scored better on short-term memory measures including a NWR task were able to produce a wider range of grammatical structures in their spontaneous speech, and the authors proposed that the skills revealed by NWR may be vital for learning new syntactic constructions. Similarly, Montgomery (1995) found a positive correlation between NWR performance and performance on a sentence comprehension task.

Together, these studies provide evidence that connections between NWR performance and language exist beyond the word level, and that phonological short-term

memory (tapped by NWR) can be seen as a prerequisite for learning new syntactic constructions in addition to being a feature of vocabulary acquisition. In sum, NWR provides another method for distinguishing between language difficulties caused by insufficient input vs. actual language impairment.

The Current Study

Using a within-subject design, the current study assessed successive Slovak-English bilingual children on narrative production, narrative comprehension, and NWR performance in order to investigate how these skills relate to each other across and within bilingual children's languages. The study was conducted in Slovakia, a cultural and linguistic context that has rarely been explored in studies on bilingual children. The Slovak language, a member of the West Slavic language group, has a rich morphology, is heavily reliant on inflections, and has a relatively free word order. These features are all in contrast to English with its sparse morphology and reliance on function words within a stricter word order. Slovak is a pro-drop language and pronominal subjects are usually omitted unless special emphasis is required (Kesselová & Slančová, 2010).

The MAIN, developed by Gagarina et al. (2012), was used for the narrative assessment (see Method). The MAIN's theoretical framework for macrostructure was provided by the "story grammar" model, seen as universal knowledge about story telling and defined by story components, characters, and sequence of events (Stein & Glenn, 1979). It has been suggested that macrostructure performance is partly dependent on cognitive schemas and is thus relatively less dependent on language skills than microstructure performance (Iluz-Cohen & Walters, 2012; Pearson, 2002). Thus, one might expect children with intensive exposure to an L2 to show roughly similar

performance in their L1 and L2. This expectation is reflected in hypothesis 1: Production of macrostructural components in L1 and L2 will not significantly differ in children with a minimum of 12 months intensive exposure to English as an L2.

Narrative production and comprehension can be seen as distinct skills (Boudreau 2008), and it is well documented that comprehension skills precede production skills in language development (English: Bates, Dale & Thal, 1995; Slovak: Kapalková, Slančová, Bónová, Kesselová & Mikulajová, 2010). Previous research has also shown that children with language impairment have difficulties in the comprehension of connected discourse (e.g., Norbury & Bishop, 2003). If comprehension scores of TD bilingual children with sustained exposure to the L2 do not differ across languages, this finding could have implications for future use of the MAIN (i.e., gaps in comprehension between the L1 and L2 under similar conditions of exposure might be interpreted as atypical and as needing further investigation to rule out language impairments). In the present study, we explore narrative comprehension of Slovak-English bilinguals, leading to the second hypothesis: Comprehension of macrostructural components in participants' L1 and L2 will not be significantly different in children with a minimum of 12 months intensive exposure to English as an L2.

Microstructure scores depend directly on knowledge of a particular language (L1 or L2) and its lexical items (word level), grammatical rules (sentence level) and links between these elements (discourse level). Our microstructure scoring focused on the word level, which has previously been proposed to effectively reflect language knowledge and used as a measure in bilingual research (Ebert, Pham & Kohnert, 2014). Previous research has shown a link between NWR skills and vocabulary measures in L1

and L2 vocabularies (e.g., Gathercole & Baddeley, 1989). We aimed to establish if this relationship remains the case in successively bilingual children and if this holds across both of their languages, leading to our third hypothesis: NWR skills will be significantly related to lexical diversity in both L1 and in L2.

The last research question investigates whether there are significant relations between bilingual children's performance on a NWR task and macrostructure skills. While macrostructure tasks assess language skills above the word level, NWR is mainly linked with phonological/sublexical processing and knowledge so it is unclear if performance on these tasks will be linked. But if children's language skills are weak, they might be weak across a whole range of tasks and, if so, combining two psycholinguistic markers of language difficulties (e.g., narrative and NWR) would strengthen the diagnostic potential of these measures.

Method

Participants

Forty TD Slovak-English sequential bilingual children participated in the present study. The 21 girls and 19 boys were all between 5-6 years of age, with a mean age of 70.55 months (*SD* = 7.30). The children had all been exposed to Slovak (L1) from birth and the mean length of exposure to English (L2) was 38.22 months (*SD* = 18.98). The children in our sample all met the additional following criteria at the time of the experiment: (a) they had been exposed to English in exclusively English-speaking nurseries or schools in Slovakia (three in Bratislava and one in Trnava); (b) their mothers were all native speakers of Slovak; (c) the children lived in the Slovak Republic; (d) the children were attending a nursery (n = 34) or school (n = 6) where the language of

instruction was English; (e) the children attended their nursery/school daily for 30-40 hours per week; (f) the minimum length of exposure to English was 12 months; (g) the children had not been diagnosed with any emotional or neurological disorders and had no known visual or auditory impairment. In addition, four children from our sample (10%) had parents who used English to communicate with each other.

All of the children attended international schools in Slovakia that followed the UK school curriculum with all schooling and interaction in the nursery/school conducted exclusively in English. A clear majority (85%) of the teachers in the schools were native speakers of English from the UK or Ireland. Four of the children were born outside of Slovakia (in the Czech Republic, Greece, Luxembourg, and USA), but no child stayed past the age of 18 months in an English-speaking country. All of the mothers of the children were native speakers of Slovak and 8 were Slovak monolinguals. In addition, amongst the mothers, 25 could also speak English, and 7 others spoke another language: German (3), Russian (3), or French (1). Most fathers were native, monolingual speakers of Slovak, while 5 of the fathers were native speakers of other languages (2 English, 2 Hungarian, 1 Dutch). Based on the questionaire, the distribution of L1 (Slovak)/L2 (English) spoken at home for 12 of the children was L1 75 % and L2 25 %, while for the remainder (n = 28) it was L1 50 % and L2 50 %.

Parents did not express any concerns about the children's development on the parental questionnaire, nor did teachers report any concerns. No standardized language assessments are available for 5-7 year-old Slovak-speaking children (either monolingual or bilingual), so an experimental version of a Slovak sentence repetition task was used to check that all of the participants were typically developing. Sentence repetition has

previously been shown to be a good clinical marker of language impairment across a number of languages (e.g., Conti-Ramsden et al., 2001, Kapalková et al., 2013). No norms were available, but percentiles based on 20 typically-developing children of the same age (and from the same area in Slovakia) were calculated, and all of the children in our sample scored above the 10th percentile.

Materials

Short version of the Beirut-Tours Questionnaire. The questionnaire was adapted to Slovak from the *Alberta Language Environment Questionnaire* and the *Alberta Language and Development Questionnaire* (Paradis, 2010; Paradis, 2011) and included questions about the children's L2 background such as length of exposure, age of initial exposure, and family history of language impairment.

MAIN (Gagarina et al., 2012). The MAIN was developed within the framework of the COST Action IS0804 *Language Impairment in a Multilingual Society: Linguistic Patterns and the Road to Assessment* (i.e., a pan-European research network funded by COST), in order to assess narrative production and comprehension skills in children from 3 to 10 years. The tool consists of parallel picture sequences to elicit narratives in the two languages of bilingual children. The current study used the version developed for English and Slovak which is divided into production and comprehension tasks. For the production tasks, narratives are elicited in two different modes: (1) story generation (i.e., story telling) and (2) story retelling, each later analyzed in terms of macrostructure. The comprehension task focuses on macrostructure components and internal state terms. The children's narrative productions and their responses to questions are later scored according to the MAIN guidelines (see sections on Scoring and Reliability below).

NWR task. The NWR measure by Polišenská and Kapalková (2014b) was also developed as part of the COST Action described in the preceding section. This task consisted of 26 novel items varying in phonological complexity and syllable length. The stimuli were recorded and administered individually over a laptop computer, following the protocol described in Polišenská and Kapalková (2014b). The administration of the task took approximately 5 minutes. Whole-item scoring applied and was carried out from recordings: items were scored as correct if all phonemes were produced in the correct order; any omissions, substitutions or additions resulted in an incorrect answer, earning zero points. The maximum score was 26.

Procedure

The participants were tested individually in a quiet area of their nursery/school by a qualified speech and language therapist who was a native speaker of Slovak and an advanced second language learner of English. In accordance with the MAIN manual, data from each language were collected in separate sessions with a testing interval of 5-7 days between each language in order to minimize cross-language influence and also training and carry-over effects (Gagarina et al., 2012). Both languages were tested by the same tester, as would usually be the case in a clinical setting.

The experimenter sat opposite the child and started the session with six simple wh-questions (e.g., “What’s your name?”; “Who is your best friend?”), with the dual purpose of putting the child at ease and ensuring their ability to understand simple wh-questions (Gagarina et al., 2012). All of the children in our sample were able to provide answers to these questions. Testing of the narrative skills immediately followed the warm-up questions. The four MAIN stories (*Dog, Cat, Baby Birds* and *Baby Goats*)

served as prompts for L1 story telling and retelling; L2 telling and retelling. During the first session, L2 telling and retelling was assessed, both for production and comprehension. The second session, which took place 5-7 days later, assessed L1 telling and retelling skills. The order of story presentation was counterbalanced (for details see Gagarina et al., 2012).

The four MAIN stories (6 images each) were all hidden in separate envelopes. Three envelopes containing the same picture sequence were placed on the table and the child was asked to choose one envelope (the child was given to believe that the experimenter did not know which story had been chosen to control for the effect of shared knowledge). The experimenter took out the selected picture story and gave it to the child with instructions to look at the whole story but not to show any of it to the experimenter. When the child was ready to tell the story, the pictures were folded so that only the first 2 images could be seen. When the child was finished describing pictures 1-2, the next pair of images were shown so that 4 pictures were unfolded. After the child had finished their description of pictures 2-4, the last 2 pictures were unfolded so the whole story could be seen. The comprehension part of the task was assessed by questions asked after the production part of the narrative task. In the case of story retelling, the experimenter read the story to the child and then the child was asked to retell the story. The whole session was audio-recorded and the responses were later transcribed and scored. The overview of the testing sessions is summarized in Table 1.

TABLE 1 INSERT ABOUT HERE

Scoring

Macrostructure production. A maximum of 17 points was possible from

producing the story components in the following ways:

1) *Setting* (information about the time and place that events took place): 2 points for time and place; 1 point for either time or place; and 0 points if neither mentioned.
2) *Initiating event* (an event or internal state that sets the events of the story in motion): 1 point.
3) *Goal* (an expression of the protagonist's intention of how to deal with the initiating event): 1 point.
4) *Attempt* (an indication of an action to obtain the goal): 1 point.
5) *Outcome* (a statement describing if the goal was reached following the attempt, whether successful or not): 1 point.
6) *Mental state as reaction* (a statement defining how the protagonist(s) feels e.g., "happy", "disappointed", "angry") or thinks about the outcome: 1 point.

Each story contained three episodes and each episode contained one main character, making it possible within each episode to assess 5 of the 6 components above (mental state as initiating event, goal, attempt, outcome and mental state as reaction). The only exception, *Setting*, was assessed once at the beginning of the story. A child could score a maximum of 17 points per story. Macrostructural scores were derived by combining scores from the story telling and story retelling in each language (maximum 34 points in Slovak and 34 points in English).

Macrostructure comprehension. Nine comprehension questions that focused on macrostructure components and internal state terms were presented as part of the assessment procedure, with 1 point available for each question up to a maximum of 9 points per story. Comprehension scores (maximum 18 points in Slovak and 18 points in

English) were derived by combining scores from the story telling and story retelling tasks in each language.

Microstructure production (word lemmas). The children's narratives were transcribed in the CHAT format of the Child Language Data Exchange System (CHILDES, MacWhinney, 2000) and the number of different word lemmas per story was calculated. Microstructure scores were derived by combining the scores from story telling and retelling within each language.

Reliability

The scorer for the Slovak measures was a native speaker of Slovak, while a native speaker of English scored the English tasks. The narratives and comprehension question responses from four children (10% of the sample) were scored by an independent second rater. Following Streiner and Norman (1995), the intraclass correlation coefficient (ICC) was used to assess inter-rater reliability. The reliability coefficients for macrostructure were as follows: Slovak $\alpha = .78$ for telling, $\alpha = .94$ for retelling; English $\alpha = .78$ for telling, $\alpha = .81$ for retelling. The reliability coefficients for microstructure were: Slovak $\alpha = .91$ for telling, $\alpha = .97$ for retelling; English $\alpha = 1$ for telling, $\alpha = .96$ for retelling. Cicchetti (1994) suggested cutoff points for agreement based on ICC values; values between .60 and .74 are considered good, and values between .75 and 1.0 are considered excellent. Using these cutoffs, the inter-rater agreement was excellent for all production measures.

The reliability coefficient for Slovak comprehension was $\alpha = .85$ for telling, $\alpha = .62$ for retelling; for English comprehension, $\alpha = 1$ for telling, $\alpha = .88$ for retelling. All comprehension measures achieved good or excellent levels of inter-rater agreement. The

NWR test has previously been shown to have excellent inter-rater agreement (ICC = .96) and test-retest reliability (ICC = .87); for details see Polišenská and Kapalková (2014b).

Results

Compliance Rate and Outline of Analyses

The compliance rate of the participants was high, and only 1 child refused to tell a story in English. Due to an experimenter error, 4 of the children did not receive the comprehension task. All of the children completed the NWR task. Thus, the data of 39 children (97.5 %) were analyzed to address hypotheses 1 and 3, and the data of 36 children (90%) were analyzed to address hypothesis 2.

The data generated in the production tasks (macrostructure - story structure and microstructure - number of different word lemmas) were normally distributed and analyzed with a set of ANOVAs. The macrostructural data of comprehension did not meet the assumption for parametric analysis (data were not normally distributed as many children scored at or close to ceiling) and were therefore analyzed with non-parametric tests.

Preliminary Analyses

A series of one-way ANOVAs with "Story" as the independent variable (4 levels: *Dog, Cat, Baby Birds* and *Baby Goats*) confirmed that narrative performance did not significantly differ by story (that is, no set of pictures elicited fewer or more responses, either for macrostructure or microstructure) (all ANOVAs: $p > .05$). Thus, the results could not be explained by the choice of story alone as all of the stories produced the same degree of difficulty.

Results According to Hypotheses

The effect of language on production of macrostructure. The first hypothesis was addressed by a comparison of macrostructure production scores across two languages (L1 vs. L2). A paired-samples t-test with production components of macrostructure as the dependent variable revealed a significant effect of *Language, t*(38) = 4.34, $p < .001$, mean difference 95% CI [1.12, 3.08], with the children achieving higher scores in their L1 (M = 15.49, SD = 2.69) compared to their L2 (M = 13.39, SD = 3.38).

Data were further analyzed for each narrative component and each language by summing the points per component for all the children in each language, and then dividing this sum by the total possible points to yield a percentage score. For example, for the narrative component *Goal,* 67 points were obtained across children in Slovak, and divided by the maximal score of 234 (3 *Goals* per story x 39 children x 2 stories per child in each language), yielding a score of 28.63%. The percentage scores for each narrative component and language are presented in Table 2. Their order of frequency was similar for L1 and L2: *Reactions* were expressed the least often (20 and 13% respectively for Slovak and English), followed by *Setting* and *Goal,* which were expressed at a similar rate (28 and 29% in Slovak; 28 and 32% in English). The next component was *Initiating event,* which was expressed for 48% of the Slovak stories and 36% of the English stories. The most often expressed components were *Outcome* (64% and 47% respectively for Slovak and English) and *Attempt* (71% and 69% respectively for Slovak and English).

TABLE 2 INSERT ABOUT HERE

The effect of language on comprehension of macrostructure. The second hypothesis investigated if language had a significant effect on comprehension of the macrostructural components. A Wilcoxon Signed Ranks Test with comprehension

components of macrostructure as the dependent variable showed no significant effect of *Language* (z = -1.25, p = .211). The children did not achieve significantly higher scores in their L1 (*Median* = 15) compared to their L2 (*Median* = 15).

The qualitative analysis is summarized in Table 3. There were nine possible points awarded in the comprehension part of MAIN, fewer than in the production part. Some question responses could be double-scored (i.e., a child could receive credit for Initiating Event and Goal for the same answer). Therefore, only questions that addressed a single component were chosen for the qualitative analyses: two questions in each story for *Initiating Event*, *Goal*, and *Reaction*. The order of difficulty was similar for L1 and L2. *Goal* was the least well comprehended component (70% in Slovak, 65% in English), followed by *Initiating Event* (83% in Slovak and 81% in English) and *Reaction* (86% in both Slovak and English).

TABLE 3 INSERT ABOUT HERE

The relationship between lexical diversity and NWR skills. The third hypothesis was investigated through a correlational analysis that examined if ability to repeat nonwords and lexical diversity were related across the two languages, as suggested by previous research. NWR performance was significantly related to lexical diversity in the children's L1 (r = .37, p < .05) but not in their L2 (r = .26, p = .113).

The relationship between macrostructural narrative abilities and NWR skills. A correlational analysis was also used to assess the relationship of NWR and narrative macrostructure (two measures identified by previous research as having diagnostic potential) in each language. NWR performance was not significantly related to macrostructure scores in Slovak, the L1 (r = .06, p = .729), or in English, the L2 (r = .27,

p = .093). A summary of results is provided in Table 4.

TABLE 4 INSERT ABOUT HERE

Discussion

The current study presents data from sequential bilingual Slovak-English children who were tested using the MAIN. Kapalková et al. (2010) asked parents of 1750 children living in Slovakia about their children's language background and 18 % of the respondents said that their children had been exposed to a language other than Slovak. This relatively high number of bilingual children provided motivation for employing a task such as the MAIN in the cultural environment of Eastern Europe and for establishing certain psychometric properties of the instrument in this context, while also providing an opportunity to compare results on the MAIN to a NWR task currently used in Slovakia.

The MAIN task elicited high levels of compliance (39 out of 40 children completed the assessment) and provided excellent levels of inter-rater reliability across all its components (story telling, story retelling, comprehension, and lexical diversity). In addition, the results showed that the four MAIN stimulus stories produced equivalent results, suggesting that the stories are appropriate for assessment of both Ll and L2 and also for test-retest purposes. The lack of significant differences between stories also suggests that the stories are equally appropriate for the cultural environment of Eastern Europe. Overall, the MAIN assessment was easy to administer, reliable, and appeared to be culturally appropriate.

Reviewing the hypotheses in light of the results

Our first hypothesis that there would be no difference in macrostructural story

components between L1 and L2 due to cross-linguistic transfer was not supported by the quantitative analysis. Instead, we found that macrostructure scores in the children's L1 were significantly higher than in their L2. These findings are at odds with previous studies such as Fiestas and Pena (2004), Pearson (2002) and Iluz-Cohen and Walters (2012) which found that the use of story grammar categories was similar across children's languages. It should be noted that this finding does not exclude the possibility of cross-linguistic transfer, but the extent of any transfer was not sufficient to override the significant differences between L1 and L2. Indeed, the means for L1 (M = 15.49) and L2 (M = 13.39) suggests that the difference was not large.

The more detailed analysis of the macrostructural components (see Table 2) showed that some components, e.g., *Goal and Attempt* were expressed at similar rates across both languages. On the other hand, children expressed *Initiating event, Outcome* and *Reaction* more often in Slovak (L1) than in English (L2), even though the same order of frequency was found across both languages. The same order could be explained by transfer or might be related to more general cognitive development. Children might find it easier to express specific macrostructural components earlier, while the remaining components could be expected to follow as their language/cognition develops (Marková, 2011). Further research may reveal if this is the case and whether this development is manifested across both of their languages.

Although L1 macrostructure performance was stronger, the similar L2 score suggests that transfer from L1 to L2 did occur to some extent (though it is also possible that the children were developing similar skills independently in the L1 and L2, or that the L2 was influencing the L1). Some children only had 12 months of exposure to

English and a lower level of proficiency could explain the limited transfer. Using the MAIN task, future studies could investigate language transfer in simultaneously bilingual children to establish if performance is comparable after more evenly distributed exposure across languages.

The second hypothesis regarding the performance on the comprehension part of MAIN was supported by our results, with no significant differences found between children's L1 and L2 comprehension. Although the children in our sample showed differences in their production, comprehension of the macrostuctural components was equivalent for both languages. The qualitative analysis confirmed that the children showed the same order of difficulty for both languages in comprehending specific macrostructural components. *Goal* was followed by *Initiating event* and the best-comprehended component was *Reaction*. In addition, the percentage of successfully comprehended items was very similar across languages, even in the components that were not close to ceiling (e.g., *Goal*). This suggests that the lack of significant differences in comprehension should not be attributed to ceiling effects. The findings are in line with our suggestion that delayed comprehension in bilingual children could be indicative of language impairment. The comprehension results can also be contrasted to the production results. Of particular interest are the results for the component *Reaction* (86% for both Slovak and English), which far exceeded production in both languages (20 and 13% for Slovak and English, respectively), with 100% representing the total number of possible points per component across children, in each language. It is possible that the children were too young to productively express this component, but more easily understood it when they were asked about it, and this trend was seen in both languages.

The maximum score for the comprehension part in our study was 18 points. The median score for our children (5- and 6-year-olds) was 15, which suggests that they were approaching ceiling and that the comprehension part is unlikely to show enough variation in older children. In clinical practice, the comprehension part could be used as a criterion-referenced task: if we expect 6-year-old children to achieve 15 points for each tested language, a lower score by an older child might suggest that the child is at risk of language impairment.

It appears that the minimum exposure of 12 months in our study was sufficient for comprehending the stories equally in the L1 and L2, but not for producing stories. These findings confirm previous results from typical language development studies that suggest comprehension skills precede production skills (Bates et al., 1995; Paris & Paris, 2003), indicating that bilingual children will make gains with their comprehension before gains are made with production. This has important clinical implications. Early recognition of delayed comprehension allows for the important opportunity to identify language impairment (Bishop et al., 2012; Paul & Roth, 2010). The TD bilingual children in our study did not show worse performance in their L2 comprehension after a minimum exposure of 12 months to an L2. This raises the possibility that TD bilingual children with a similar length of exposure will show equivalent comprehension performance in both their L1 and L2.

Bilingual children with language impairment, on the other hand, might be expected to show a weaker profile in both comprehension and production than TD bilingual children, and this would be the case for both their L1 and L2. Future studies that include bilingual children with language impairment could confirm if such predictions

can be substantiated. As Boudreau (2008) pointed out, analyses of narrative production alone may not provide a complete picture of narrative skills. As a result, researchers and SLTs should consider separately evaluating comprehension and production when using narrative assessments.

The third analysis assessed the relation between NWR skills and lexical diversity. We found that children's ability to repeat nonwords in their L1 and ability to learn new words as measured by the lexical diversity score was significantly related. This was in line with findings from previous studies with monolingual children (e.g., Gathercole & Baddeley, 1990; Stokes & Klee, 2009; Polišenská & Kapalková , 2014b). However, we failed to find a significant link to vocabulary acquisition in children's L2. Similarly, Summers, Bohman, Gillam, Peña & Bedore (2010) did not find a significant link between NWR and semantics in bilingual children, but did find a link with morphosyntax. Inclusion of a measure of morphosyntax in future studies could lead to finding a significant relation with NWR.

Other possible explanations for the lack of a significant link between NWR and L2 lexical diversity have been suggested in previous research. A study by Gutiérrez-Clellen and Simon-Cereijido (2010) suggested that children's NWR performance in bilinguals is related to individual differences in language exposure and usage. Chiat, Polišenská and Szewczyk (2012) and Chiat (2015) have proposed an alternative approach to assessing NWR that involves a novel set of quasi-universal set of nonwords based on the phonemes and phonological combinations that are most commonly found in European languages. These nonwords decreased the effect of exposure and our own unpublished data suggests that TD bilingual children (English L2, various L1s) who differed on a

measure of receptive vocabulary did not differ on the NWR quasi-universal test.

The last analysis was exploratory, and did not show a significant link between NWR skills and macrostructure scores in either the L1 or L2 of the children in our study. The relationship between the macrostructure scores and phonological processing appeared to be weak, likely due to the fact that NWR is mainly linked to phonological processing while macrostructural scores depend more on story grammar and also cognitive development (e.g., Halamová, 2013; Kim-Sum To et al., 2010). Since the correlation between macrostructure and NWR tasks was not significant, this suggests that the NWR task and the MAIN task reveal different information about children's language performance.

Limitations and Future Directions

The current study did not assess proficiency of L2, or examine whether length of exposure to English predicted performance. Future studies could obtain more precise measures of L2 proficiency and establish how this relates to language transfer and NWR performance. It may be that benefits from transfer are likely to increase in simultaneously bilingual children or in children with more extensive exposure to both L1 and L2.

Another possible limitation relates to the languages of the tasks; each child started with tasks in the children's L2 (English). Given that we were testing the hypothesis that there is transfer of macrostructure from L1 to L2, we wanted to test performance in the L2 (less dominant language) first, without the influence of L1. Although a 5-7 day interval between sessions and the use of parallel stories would have mitigated practice effects, such effects might still have occurred and could have contributed to the higher L1 performance. Counterbalancing the language of testing, followed by an analysis of order

effects, could have improved the design.

The present study did not include a group of bilingual children with language impairment and therefore it is not possible to establish sensitivity and specificity of the narrative task, the NWR task, or a combination of the two. In order to further evaluate the usefulness of the tasks in identifying language impairment, future research should evaluate performance on the MAIN task by both bilingual TD children and monolingual and bilingual children with language impairment, all in combination with NWR tasks in children's L1 and, if applicable, their L2. If bilingual children with language impairment show a weak narrative comprehension profile in both languages, this could indicate that assessing the child's narrative comprehension in one language (either L1 or L2) may be sufficient in clinical practice. Being able to assess only one language would be particularly helpful in the many cases where the SLT does not speak both of the child's languages and so has no way of assessing the child in both their L1 and L2. Additionally, NWR assessment could add valuable information to the child's profile, particularly when low-wordlike nonwords are used, for example the quasi-universal NWR task developed by Chiat, Polišenská and Szewczyk (2012) and Chiat (2015).

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Table 1

Overview of testing sessions and assessments administered

Session 1 (20 minutes)	
Warm-up wh-questions (for all 40 children)	
Group A (20 children)	Group B (20 children)
L2 telling Production	L2 retelling production
L2 telling comprehension	L2 retelling comprehension
L2 retelling production	L2 telling production
L2 retelling comprehension	L2 telling comprehension
All children Sentence repetition	

Table 2

Percentage scores (total points/total possible points across participants) for macrostructural components produced in Slovak and English

Macrostructure component	Slovak (L1)	English (L2)
Setting	28.21% (44/156)	32.05% (50/156)
Initiating Event	47.86% (112/234)	36.32% (85/234)
Goal	28.63% (67/234)	28.21% (66/234)
Attempt	70.51% (165/234)	69.23% (162/234)
Outcome	64.10% (150/234)	46.58% (109/234)
Reaction	20.08% (47/234)	12.82% (30/234)

Table 3

Percentage scores (total points/total possible points across participants) for comprehension of macrostructural components, in Slovak and English

Macrostructure component	Slovak (L1)	English (L2)
Initiating Event	82.63% (119/144)	80.56% (116/144)
Goal	70.13% (101/144)	64.58% (93/144)
Reaction	86.11% (124/144)	86.11% (124/144)

Table 4

Summary of results according to the hypotheses

Hypotheses	Results
H1: macrostructure production	sig. difference between L1 and L2, $t(38) = 4.34$, $p < .001$
H2: macrostructure comprehension	ns. difference between L1 and L2, $z = -1.25$, $p = .211$
H3: correlation between lexical diversity and NWR	sig. correlation in L1, $r = .37$, $p < .05$ ns. correlation in L2, $r = .26$, $p = .113$
H4: correlation between macrostructure and NWR	ns. correlation in L1, $r = .06$, $p = .729$ ns. correlation in L2, $r = .27$, $p = .093$