Bilingual Children's Acquisition of English Verb Morphology: Effects of Language Exposure, Structure Complexity, and Task Type

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This study investigated whether bilingual-monolingual differences would be apparent in school-age children's use and knowledge of English verb morphology and whether differences would be influenced by amount of exposure to English, complexity of the morphological structure, or the type of task given. French-English bilinguals (mean age = 6;10) were given a standardized test with two production probes and a grammaticality judgment probe for English verb morphology. Results indicated that all three factors—exposure, complexity, and task type—influenced how closely bilinguals approached monolingual norms. These results are consistent with Gathercole's (2007) constructivist model of bilingual acquisition for the exposure and complexity effects. The task effects can be explained in view of cognitive differences in processing between bilinguals and monolinguals and, thus, are also argued to be compatible with a constructivist model. The implications of bilingual-monolingual differences for language assessment are discussed.

Keywords bilingual development; child language; tense morphology; constructivist theory; acquisition of English

Children who are learning two languages experience more variability in their input than monolingual children. Bilingual children, on average, receive less input in each of their two languages than monolingual age-mates, and this input is seldom equally balanced between them. Bilingual children may have their exposure to one or both languages restricted to certain contexts, interlocutors, and registers/dialects. Finally, shifts in these quantitative and qualitative variations of exposure can occur over time due to changes in family structure, childcare arrangements, schooling, or place of residence. Assuming that variation in input conditions will affect language development, researchers have asked the following question: How robust or sensitive is morphosyntactic acquisition in the face of dual-language learning? This question has been addressed from both constructivist and generative theoretical perspectives, focusing on both rates and patterns of acquisition (Gathercole, 2007; Müller & Hulk, 2001; Nicoladis, Palmer, & Marentette, 2007; Paradis, Nicoladis, & Crago, 2007; Pérez-Leroux, Pirvulescu, & Roberge, 2009). This study is concerned with the impact of dual-language learning on children's rate of morphosyntactic acquisition. Bilingual and monolingual children's acquisition of English verb morphology was examined with the aim of testing the predictions of constructivist models of acquisition, in general, and Gathercole's (2007) constructivist model of bilingual acquisition, in particular.

Comparing Bilingual and Monolingual Rates of Morphosyntactic Acquisition

The majority of studies comparing the morphosyntactic acquisition rates of bilingual and monolingual preschool and early school-age children have found that bilinguals lag behind their monolingual age-peers. More specifically, studies have found that the amount of exposure a bilingual has had in each of the languages and the relative complexity of the grammatical structure being examined play a role in increasing or decreasing monolingual-bilingual differences. In a large-scale study in Miami, Gathercole (2002a, 2002b, 2002c) and Pearson (2002) studied the English and Spanish morphosyntactic acquisition of bilingual children in the second grade in either English-only or Spanish-English bilingual schools. Gathercole (2002a, 2002b, 2002c) reported the results of grammaticality judgment tasks probing children's knowledge of the following structures: the mass/count noun distinction in quantification structures, which does not exist in Spanish; grammatical gender, which does not exist in English; and the *that-trace* effect in embedded clauses in questions, for which the grammatical structure in English is the ungrammatical structure in Spanish and vice

versa. In all three studies, bilinguals had lower scores for correct judgments than monolinguals, although for the *that-trace* task in English, even the monolinguals' scores were low, suggesting that this grammatical property might be too subtle for children this age to grasp. The impact of differences in relative amounts of exposure to Spanish and English were examined through two variables: language(s) spoken at home and the language of instruction at school. For the target structures in English, whether English was spoken at home had little impact on children's grammatical knowledge, but for the minority language, Spanish, language use in the home affected outcomes. Language of instructional program—English only or English and Spanish—also positively affected bilinguals' performance when the language of testing matched the instructional language. Pearson (2002) investigated these children's accuracy with morphology and their use of complex syntax in a story-telling task in each language. Her analyses revealed a similar pattern to the one found for the grammaticality judgment tasks: Bilinguals performed worse than monolinguals overall, but if a bilingual had received more linguistic exposure to the language being examined, differences with monolinguals were diminished. Other research with Spanish-English bilinguals, aged 4 to 6 years old and residing in various regions of the United States, has shown that when bilingual children's morphosyntax is examined in their more proficient language, group differences with monolinguals can largely disappear (Gutiérrez-Clellen, Restrepo, & Simón-Cereijido, 2006; Gutiérrez-Clellen & Simon-Cereijido, 2007). These studies contrast somewhat with the research findings from Miami, in that the bilingual children in Miami came closer to monolingual levels of performance in English when they received more input exposure to English, but monolingual-bilingual differences were still evident.

Gathercole and Thomas (2005) and Gathercole, Laporte, and Thomas (2005) reported research on the acquisition of Welsh in North Wales with a similar design to the Miami study. They examined children's acquisition of grammatical gender and word order in Welsh with production and comprehension tasks. The expression of grammatical gender in Welsh involves complex processes at the morphophonological interface and can be quite opaque for some structures, making it a potentially difficult-to-acquire structure for learners. The children were attending schools with either Welsh or Welsh and English as the language(s) of instruction. Gathercole and colleagues found that, like the Miami study, the language(s) spoken at home and, to a lesser extent, language of instruction influenced children's performance. In addition, the study of grammatical gender yielded evidence that the relative complexity of the

target structure influenced acquisition rates significantly, in interaction with the input frequency variables.

Studies of French-English bilingual children in Canada have also focused on bilingual-monolingual differences and the role of input exposure or language dominance and relative difficulty of the target structure. Nicoladis et al. (2007) found that French-English bilingual 4-year-olds lagged behind monolinguals in their accuracy in producing past tense morphology in both languages, but they did not examine bilingual children's performance as a function of their dominant language or language of greatest exposure. Paradis et al. (2007) found that French-English bilingual 4-year-olds performed similarly to monolinguals in their accuracy with the regular past tense in their dominant language; thus, bilingual children only lagged behind monolinguals in their nondominant language. Similarly, both Pérez-Leroux et al. (2009) and Paradis, Crago, and Genesee (2005/2006) investigated the production of pronominal object clitics in French by monolingual and bilingual 3-year-olds, and yet, Pérez-Leroux et al. found the bilinguals to lag behind monolinguals and Paradis et al. did not. One reason for this discrepancy could have been the larger proportion of English-dominant bilinguals in Pérez-Leroux and colleagues' sample. Furthermore, other research by Paradis and colleagues found that 7-year-old French-English bilingual children with specific language impairment (SLI) did not lag behind their monolingual age-peers with SLI for accurate use of pronominal object clitics in French and verb morphology in both languages, in contrast to what might be expected from dual-language learners who also have a language learning disability (Paradis et al., 2005/2006; Paradis, Crago, Genesee, & Rice, 2003). Finally, Thordardottir, Rothenberg, Rivard, and Naves (2006) examined French-English bilingual preschoolers' performance on standardized tests normed for monolinguals and found that for morphosyntactic measures, these children often lagged behind monolingual norms. Thordardottir et al. had as an inclusion criterion that bilingual children had to have balanced input in their two languages. However, post hoc, these researchers noted that the bilingual children had higher vocabulary scores in French than English. They speculated that, in spite of their inclusion criterion, some children might have had more exposure to French than to English. Interestingly, the bilingual-monolingual differences they documented were actually inconsistent for the French tests but consistent for the English tests.

Turning to the issue of structure difficulty, Nicoladis et al. (2007) and Paradis et al. (2007) examined bilingual children's accuracy with regular and irregular past tense forms in both languages. Both studies found more pronounced bilingual-monolingual differences for irregular than regular forms in

English. The English past tense, in general, is complex because different morphological patterns mark the same grammatical feature. However, irregular past tense forms can be considered more difficult to acquire than regular past forms. Irregular verbs in English must be acquired mainly on the basis of token frequency, whereas regular forms can be acquired on the basis of type frequency of the pattern, as well as token frequency of the individual verb + affix collocation, making them easier to acquire (Bybee, 2001; see Nicoladis et al., 2007, and Paradis et al., 2007, for more details). Paradis et al. (2007) found an interaction between dominance and structure difficulty such that English dominant bilinguals were as accurate as their monolingual age-peers with the regular past tense in English but lagged behind for the irregular forms.

To summarize, many studies have shown young bilingual children to lag behind monolingual age-peers in morphosyntactic development across different social contexts. However, there are conflicting findings for two related issues: (1) Whether bilingual-monolingual differences disappear when bilinguals are examined in their dominant language/language of greatest exposure and (2) whether bilingual-monolingual differences are spread across numerous morphosyntactic structures or appear for complex/difficult-to-acquire structures only. As discussed below, relative exposure to each language and structure complexity are two important input factors predicted to determine rates of bilingual morphosyntactic development in constructivist approaches. Thus, further research on the role of these factors in bilingual acquisition would be theoretically relevant.

The Acquisition of Verb Morphology in English

In the present study, children's use and knowledge of the following English verb morphology was examined: third-person singular [–s] on the habitual present, *he walks*, past-tense (regular [–ed] and irregular), *he walked*/*he ran*, and BE (copula and auxiliary), *he is happy*/*he is walking*. All of these morphemes mark the grammatical feature tense and, in some cases, agreement on the verb, in contrast to another verb morpheme [–ing], which marks progressive aspect (Rice & Wexler, 1996). A long-standing and robust finding in English first language (L1) and child second language (L2) acquisition research is that this set of tense-marking morphemes is acquired relatively late compared to other grammatical morphemes such as the nominal morpheme plural [–s] and the aspectual verbal morpheme [–ing] (Brown, 1973; de Villiers & de Villiers, 1973; Dulay & Burt, 1974; Jia & Fuse, 2007; Paradis, 2005; Rice & Wexler, 1996; Rice, Wexler, & Cleave, 1995; Rice, Wexler, & Hershberger,

1998; Zobl & Liceras, 1994). In these studies, the concept of "acquired" was interpreted in terms of percent accurate use in obligatory context, and accurate use was found to be over 90% earlier in development for non-tense- than tense-marking grammatical morphemes, on average, across children. When children made errors with these tense morphemes, they tended to omit them rather than making errors in form choice (e.g., *He walking* was a typical error, but *He am walking* was not; see especially, Rice & Wexler, 1996).

Jia and Fuse (2007), Paradis (2005), and Paradis, Rice, Crago, and Marquis (2008) found that school age child L2 learners of English showed some evidence of a sequence within this set of tense morphemes that is not evident in L1 learners (but, see Wilson, 2003). More specifically, child L2 learners show precocious acquisition of BE morphemes compared with the inflectional tense morphemes. The bilingual children in this study began to learn both French and English at birth or at least before 3 years of age; thus, they were not child L2 learners (Genesee, Paradis, & Crago, 2004). However, because they are dual-language learners, potential differences between BE and the inflectional tense morphemes might be possible; therefore, this possibility is considered in the analyses in the present study.

Because tense morphemes in English are late-acquired in monolinguals, it is logical to examine whether bilinguals would lag behind monolinguals in their acquisition. Tense morphemes were also chosen for examination because Paradis et al. (2007) and Nicoladis et al. (2007) found differences in the acquisition of the past tense forms between French-English bilingual and monolingual children aged 4 years old, approximately 2 years younger than the children in the present study. It would be interesting to know if these differences persist in the older children examined here who are from the same social context. A third reason for examining English tense morphemes has to do with their status as a clinical marker in English for discriminating children with typical language development from those with SLI. Much research by Rice and colleagues has shown that omissions of these morphemes in the speech of monolingual children with SLI is a hallmark characteristic of this disorder in children aged 4 to 8 years old, and these findings provided the impetus for the development of a standardized test for assessment based on this aspect of English morphosyntax, the Test of Early Grammatical Impairment—TEGI (Rice & Wexler, 2001). If bilingual children are slower to acquire these morphemes than monolinguals in this age range, their language abilities could be mistaken as a sign of SLI, resulting in over identification of SLI in this population (Genesee et al., 2004). Therefore, it is not only relevant to theoretical concerns to examine bilingual

children's acquisition of English verb morphology, but it is also relevant to applied concerns, such as interpreting speech and language assessments.

Constructivist Models of (Bilingual) Acquisition

Constructivist, usage-based, and emergentist accounts[1] of acquisition have in common the assumption that language learning is accomplished without the guidance of domain-specific knowledge like that posited to be part of Universal Grammar (O'Grady, 2008). Instead, acquisition is thought to be driven forward through a variety of domain-general (not specifically linguistic) mechanisms, such as structure of the perceptual and conceptual system, social interaction and pragmatics, input processing capacities, properties of the input, and cognitive learning mechanisms like analogical reasoning and statistical computation of distributional contingencies (Bybee, 2001; O'Grady, 2008; Tomasello, 2003). Properties of the input as a mechanism are focused on in this study because bilingual children would have reduced input in both languages compared with monolinguals on average; therefore, bilingual acquisition is important for testing constructivist theory predictions about the role of input properties in acquisition (Tomasello, 2004).

Constructivist accounts of the lexicon and morphological acquisition assume that constructions or collocation units can be the basic unit of storage in addition to individual words. Thus, multimorphemic words, like verb bases with affixes and periphrastic constructions consisting of an auxiliary and a thematic verb, can be stored as wholes. What are commonly construed as "rules" for inflectional affixation, like [verb + ed] = verb<past>, or periphrastic constructions, [is verb + ing] = verb<present, progressive>, are actually abstract schemas that emerge gradually across the numerous stored types of [verb + ed] and [is verb + ing] concatenations in the lexicon (Bybee, 2001; Tomasello, 2001, 2003; Wilson, 2003). Schemas emerge from specific lexical/collocation units but remain linked to them at the same time, meaning that there is a conflation of morphological form and abstract knowledge of that form in this approach (Bybee, 2001; Tomasello, 2003). This is a point of contrast with most generative/Universal Grammar approaches, where abstract principles underlying well-formedness in morphosyntactic output can be disassociated from the morphophonological details of individual items in the lexicon (see, e.g., Wexler, 1998). We return to this point in the Discussion section when considering task effects.

Acquisition of verb morphology in a constructivist approach is considered to be piecemeal at first, meaning that children's first productions of "correct"

morphemes are not truly productive but are the result of item-based learning (Gathercole, 2007; Gathercole, Sebastián, & Soto, 1999; Tomasello, 2001, 2003; Wilson, 2003). Fully productive abstract schemas for verb morphology develop slowly over time, as a function of exposure to the input. Input factors that have been brought forward to explain the rate at which children would acquire a morphological schema include token frequency of the morpheme, type frequency of the morphological schema, semantic transparency of form-to-function mapping for the morpheme, and distributional consistency of the morphological paradigm/collocations in which the morpheme and its schema appear (Bybee, 2001; Gathercole & Thomas, 2005; Gathercole et al., 2005; Theakston, Lieven, & Tomasello, 2003; Tomasello, 2003; Wilson, 2003). All of these factors can contribute to the relative complexity of a morphological schema, and more complex schemas would take longer to acquire because more experience with the input would be needed compared to less complex structures. In the previous section we reviewed research showing that English tense morphology is relatively late-acquired by both L1 and child L2 learners. Here we review research that might explain why this set of English tense morphemes can be considered complex within a constructivist framework and, hence, predictably difficult to acquire.

Inflectional tense morphemes like third-person singular [–s] and past tense [–ed] have a number of properties that, taken together, could make them more complex than other grammatical morphemes, hence late-acquired. First, each of these inflectional morphemes is less frequent in the language than the BE morphemes *is* and *are*, and none of the tense morphemes is as frequent as nontense grammatical morphemes like the plural [–s], according to the British National Corpus (spoken corpora) (Paradis et al., 2008; Sorenson & Paradis, 2006). Second, past tense involves multiple-form to one-function mapping because of the regular/irregular split, and third-person singular [–s] involves multiple-functions to one-form mapping because of the multiple grammatical functions the [–s] marks. Furthermore, the inflectional tense morphemes in English alternate with DO forms in interrogative and negative sentences and, thus, show more distributional inconsistency than the BE morphemes—for example, *He walks to school every day/Does he walk to school everyday* versus *He is walking to school now/Is he walking to school now*? (Paradis et al., 2008; Theakston et al., 2003). Theakston et al. (2003) conducted an experiment demonstrating that young children are sensitive to the distributional inconsistency of verb inflections in English. Finally, the irregular past tense forms in English are, on average, high in token frequency compared with the regular past tense inflection, but they can be considered more difficult to acquire on the grounds

that there is limited type frequency in the schemas and, thus, learners must acquire the correct form on a individual basis (Bybee, 2001; Nicoladis et al., 2007). Note that these irregular forms also display distributional inconsistency in interrogative and negative sentences, like the regular past tense forms.

Regarding BE morphemes, their overall greater frequency and distributional consistency in interrogative and negative sentences should render them less complex than the inflectional morphemes. Paradis et al. (2008) argued that this difference between the tense inflections and BE forms could explain, in part, the relatively precocious acquisition of BE among the tense morphemes in child L2 learners. However, Wilson (2003) discussed how, according to constructivist approaches, the BE *constructions* present complexities, and these approaches assume that children would hear and store BE morphemes in constructions in memory. For instance, BE morphemes appear in a variety of periphrastic constructions, such as copular and auxiliary verb constructions, collocated with different lexical categories (e.g., [*is* verb + ing], [*are* adjective]). BE morphemes appear in both contracted and uncontracted forms (*He's going* vs. *He is going*/*They're happy* vs. *They are happy*), which can overlap superficially with the possessive construction *Mark's book* versus *Mark's going*. Furthermore, contracted BE forms distribute unevenly between being collocated with closed-class and open-class subjects. Thus, BE morpheme constructions display multiple form-to-function mapping, and distributional complexities and inconsistencies that could make them more difficult to learn than some other grammatical morpheme constructions. For example, BE morphemes contrast in complexity to the progressive morpheme [–ing], whose phonological form is invariant and whose distribution always follows a verb. Wilson (2003) showed that children's initial use of BE forms was sensitive to collocation frame frequency and distributional consistency, and he argued that true productivity with these forms develops gradually, as constructivist approaches would predict. In sum, English tense morphology tends to be late-acquired by children, and this empirical finding could be explained by considering their morphological schemas to be relatively complex structures from a constructivist perspective.

Based on her research with Spanish-English and Welsh-English bilingual children, Gathercole (2007) has put forward a constructivist model of bilingual morphosyntactic acquisition. Because bilinguals, on average, receive less input than monolinguals in each language, she argued that it should take them longer to accrue the critical mass of input necessary for morphological schemas to emerge and that critical mass would vary depending on how complex a morphological schema is to acquire. Less complex morphological schemas require less critical mass of input to master; thus, bilingual-monolingual differences

in acquisition time should be less for these structures. Furthermore, bilinguals are likely to perform closer to their monolingual peers in the language to which they have had more exposure because they can accumulate the critical mass of input earlier in development. Finally, the assumption that morphological schemas are item- and language-specific leads to two additional claims: that bilinguals will acquire their two languages rather autonomously in this domain, such that grammatical morphology in the language of greatest exposure could be acquired faster than in the other language, and that carryover or sharing between the languages would be more limited for correctness in morphophonological forms than for cognitive interface components like semantics. This last assumption suggests that factors that could decrease the "workload" for a dual-language learner are less likely to be helpful for the acquisition of very language-specific constructions like morphological schemas; thus, this domain of language would be arguably more reliant than others on critical mass of exposure in order to be acquired.

The set of tense-marking morphemes in English could potentially require a larger critical mass of exposure to be acquired compared with other morphemes because of the variety of factors discussed earlier. Following the logic of constructivist approaches, differences would be likely to emerge in the rate of tense morpheme acquisition between bilinguals and monolinguals, and among bilinguals, as a function of differential exposure to English. Such differences might be more pronounced than those for less complex morphemes, like progressive [–ing].[2]

Task Effects in Measuring Linguistic Knowledge

Prior research comparing bilingual and monolingual rates of morphosyntactic development has been mainly based on either production data or grammaticality judgment data alone (e.g., Gathercole, 2002a, 2002b, 2002c; Nicoladis et al., 2007; Paradis et al., 2007; Pérez-Leroux et al., 2009). Thordardottir et al. (2006) compared bilinguals with monolingual norms on standardized measures of both expressive and receptive syntax, but the same target structures were not probed in each measure. Gathercole and Thomas (2005) examined both production and comprehension data for grammatical gender in Welsh, but among bilinguals only, and did not include task-based differences in their analyses. To the best of my knowledge, no recent studies have examined bilingual and monolingual children's abilities to produce correctly, and to judge correct use of, the same morphosyntactic structure at the same age.

Grammaticality judgment tasks are not equivalent to comprehension tasks and, therefore, provide additional information about receptive language development than what comprehension tasks provide. It is commonly understood that comprehension-style receptive tasks are less demanding than expressive tasks and, therefore, children often show superior performance on the former than the latter, for the same structure. For example, toddlers display knowledge of verb argument structure through comprehension tasks before they regularly use these structures in their spontaneous speech (Hirsh-Pasek & Golinkoff, 1996). In the lexical domain, Windsor and Kohnert (2004) found quantitative and qualitative differences in performance between Spanish-English bilinguals and English monolinguals (aged 8–13 years old) for comprehension (word recognition) and production (picture naming). For word recognition, participants had to identify a word they heard aurally as a real or nonsense word as quickly as possible. For picture naming, the participants had to name each picture as quickly as possible when it appeared on a computer screen. In both tasks, stimulus words were divided into sets based on how frequently they appear in the language and at what age they are typically acquired by children. Both accuracy and reaction time measures were taken. No bilingual-monolingual differences in overall accuracy and reaction time emerged for real word recognition, but differences in both accuracy and reaction time emerged for picture naming and, especially important, the increase in latencies for the bilinguals for the late-acquired words was of a different magnitude than for the monolinguals. These findings suggest that there is an interaction between difficulty of linguistic target and task type, with production being the more difficult task for bilinguals.

Grammaticality judgments, on the other hand, differ from comprehension tasks in that they involve metalinguistic awareness, requiring the child to use his/her implicit grammatical knowledge to assess the well-formedness, rather the than meaning of, a structure. Thus, even though grammaticality judgments typically include a minimal response like a comprehension task, they are arguably more demanding than comprehension tasks. In her reviews, Bialystok (2001, 2007) noted that although several studies have shown young bilinguals to have superior metalinguistic awareness and superior abilities to perform grammaticality judgments when compared with monolinguals, many other studies have not found this effect. Bialystok explained these mixed findings by deriving superior metalinguistic awareness from the broader cognitive outcome of bilingual language learning: superior executive control functions. Bialystok argued that managing the development and processing of two competing linguistic systems confers superior abilities on bilingual children to ignore irrelevant information in order to concentrate on relevant information in the task at hand.

Grammaticality judgment tasks that expressly require children to do this are more likely to find the bilingual superiority effect. Although the dual-language experience may confer cognitive advantages on young bilinguals, Bialystok (2007) suggested that there might also be a cost from their two competing language systems when it comes to language production, which is supported by Windsor and Kohnert's (2004) study. This raises the possibility that task-based effects could be expected when comparing bilinguals and monolinguals on production and grammaticality judgments for the same target structure.

Research Questions for This Study

This study was designed to address the following questions: (1) Do French-English bilingual children lag behind monolinguals in the acquisition of English verb morphology? If so, how do the input factors of relative exposure to each language and structure complexity play a role in determining these differences? Question 1 was formulated as a follow-up to Paradis et al.'s (2007) study of morphological acquisition with younger children from the same social context in order to investigate whether bilingual-monolingual differences would diminish or neutralize over time. (2) Do bilingual-monolingual differences in morphological acquisition, if there are any differences, change depending on whether a production or grammaticality judgment task is given to the children? Consideration of the cognitive processing differences between bilinguals and monolinguals suggests that bilinguals might show superior performance on a grammaticality judgment task when compared to a production task, for the same target structure.

Method

Participants
Forty-three French-English bilingual children in the first grade in French mother tongue schools in Edmonton, Canada participated in this study. Their mean age was 82 months/6;10 ($SD = 3.9$ months; range = 74–89 months). Edmonton is an English majority city with a long-standing and growing minority population of French speakers, French books in public libraries, local French radio and television stations, and various French-language cultural and sports associations. The French language school board, the *Conseil scolaire Centre-Nord*, oversees five French mother tongue elementary schools in the city of Edmonton. The instructional language at these schools is exclusively French until the third grade, when English Language Arts is introduced as a subject. Thus, French mother

tongue schools are distinct from French immersion schools, which offer French as a medium of instruction for English monolingual children. To qualify for registration in *Conseil scolaire Centre-Nord* schools, children typically must speak some French at home, have parents who attended French schools, or have attended school in French elsewhere. Children at these schools differ, however, in how much French and English they hear and speak outside of school. Details on a parental questionnaire are given in the next section, but the results of the questionnaire yielded three subgroups of bilingual children in this study: those who spoke mainly French at home (MFR, $N = 13$), those who spoke both French and English equally at home (FR-ENG, $N = 20$), and those who spoke mainly English at home (MENG, $N = 10$). Children were divided into these subgroups for the analyses intended to probe the impact of relative exposure to each language outside of school on children's verb morphology measures. The 43 children in this study came from a larger participant sample of 55 children. Twelve children were not included in this study because they did not speak enough English to complete the tasks.

Monolingual English-speaking children were not recruited for this study because, as discussed later, the measures used were from a standardized test normed with monolinguals (TEGI; Rice & Wexler, 2001). Thus, the norming sample means and criterion scores from the Examiner's Manual corresponding to the bilingual children's age group were used to compare bilingual and monolingual performance.

Procedures

The TEGI consists of elicitation and grammaticality judgment probes. For this study, children were given the third-person singular (THIRD SING) and past tense (PAST TNS) elicitation probes. For the THIRD SING probe, children were shown a series of pictures of professionals engaged in typical activities and given prompts like "here is a teacher. Tell me what a teacher does," with an expected response of "a teacher teach*es*" or "a teacher writ*es* on the board." For the PAST TNS probe, the children were shown a series of picture pairs, where in the first picture a child is engaged in an activity, and in the second picture, the activity has been completed. Children were given prompts like "here the boy is raking. Now he is done. Tell me what he did." with an expected response of "he rak*ed*." The past tense probe included both regular and irregular verbs (e.g., *dig-dug*). Scoring for both probes consisted of calculating percent correct scores, following the instructions of the TEGI Examiner's Manual. Percent correct scores consisted of the number of scorable responses that had the target morpheme added out of the total of scorable responses. Unscorable responses

consisted of responses using different verb tense/aspect forms, or structures with modal verbs. Bare verbs with no inflection were scorable but incorrect. Responses were considered scorable even if the children used a different verb than the one given in their response. For irregular verbs in the past tense, responses were scored as correct if the children used overregularizations (i.e., said *digged* instead of *dug*) following the TEGI Examiner's Manual. Comparisons between the bilingual children's accuracy with regular and irregular past tense verbs was not included in this study because the monolingual norming sample means used for comparison were based on the combined percent correct across both verb types. In-depth analyses of these children's use of regular and irregular past tense forms in both French and English will be the subject of another study.

For the grammaticality judgment probes, the experimenter acted out a scenario with two toy robots, who were learning English, and asked the children to judge if their sentences were "said right" or "not so good." Sentences included three types of grammatical errors: (a) DROP TNS (*he running away*, *he look happy*), (b) BAD AGR (*he am hurt*, *I drinks milk*), (c) DROP ING (*he is smile*, *the bear is jump*). Notice that the target structures for errors and well-formed sentences within each probe include both BE morphemes and inflections. In this respect, the grammaticality judgment probes contrast with the production probes because the latter only target inflectional morphology. This difference is considered in the analyses. It is important to keep in mind that because the TEGI norming sample was used as the monolingual control group, it was necessary to administer the grammaticality judgment probes exactly as instructed in the manual, which meant including targets for BE morphemes. Regarding the scoring of the grammaticality judgment probes, the proportion of children's correct rejections (of ungrammatical targets), false alarms (incorrect rejections of grammatical targets), misses (incorrect acceptances of ungrammatical targets), and hits (correct acceptances of grammatical targets) were calculated. The results of the calculations for hits and false alarms were entered into a formula to calculate A-prime scores, which are designed to correct for the "yes" bias children often show (see Rice, Wexler, & Redmond, 1999). Even though the different target error forms are interdistributed throughout the task given to the child, the scoring procedure yields A-prime scores for three probes: DROP TNS, BAD AGR, and DROP ING.

In the present study, tense-marking morphology in English constituted the complex/difficult-to-acquire structure. Therefore, the THIRD SING, PAST TNS, and DROP TNS probes were all testing children's abilities with tense-marking morphological structures, whereas the BAD AGR and DROP ING

probes were testing children's abilities with control structures. It has already been noted that progressive [–ing] could be considered less complex than tense morphemes like BE (Wilson, 2003). Additionally, progressive [–ing] is acquired early in spontaneous production (e.g., Brown, 1973) and children's well-formedness judgments for the presence of [-ing] become more accurate earlier in development than those for the presence of tense marking morphemes (Rice & Wexler, 2001; Rice et al., 1999). The research leading to the development of the TEGI showed that the errors in form choice with BE morphemes (i.e., the BAD AGR probe) are also detected more accurately by children earlier in development, and, furthermore, form choice errors with BE morphemes in production are rare compared to the omission of BE (Rice & Wexler, 1996, 2001; Rice et al., 1999). Therefore, in the present study, it is expected that the DROP TNS probe would be testing a more difficult target structure than the BAD AGR and DROP ING probes.

The parents were also given a questionnaire, over the telephone, concerning a variety of topics, including parental language history, parental fluency in both languages, parental educational background, current language use among family members in the home, and the child's experience with each language outside of speaking with family members. For example, parents were asked what language the mother, father, and siblings use most often with the child—French, English, or both—with a separate answer for each interlocutor. They were asked what language the child uses most often with friends—French, English, or both. They were also asked to specify the language the child watches television in, plays video games in, and does extracurricular activities in—French, English or both. Parents as interlocutors were given double the weight of the other response categories on the grounds that parents can be assumed to be the most frequent and important interlocutors of young children. Responses were counted such that if the majority of responses were "French," then the child was categorized as "mainly French at home" (MFR); if the majority of responses were "English," then the child was categorized as "mainly English at home" (MENG). If the majority of the responses were "both,"—an equal number of "French" and "English"—or an equal number of "French" and "English" and some "both" answers, then the child was categorized as "French and English at home" (FR-ENG).

Results

The mean proportion correct scores on the THIRD SING probe for the bilinguals are presented in Figure 1 along with the monolingual norming sample
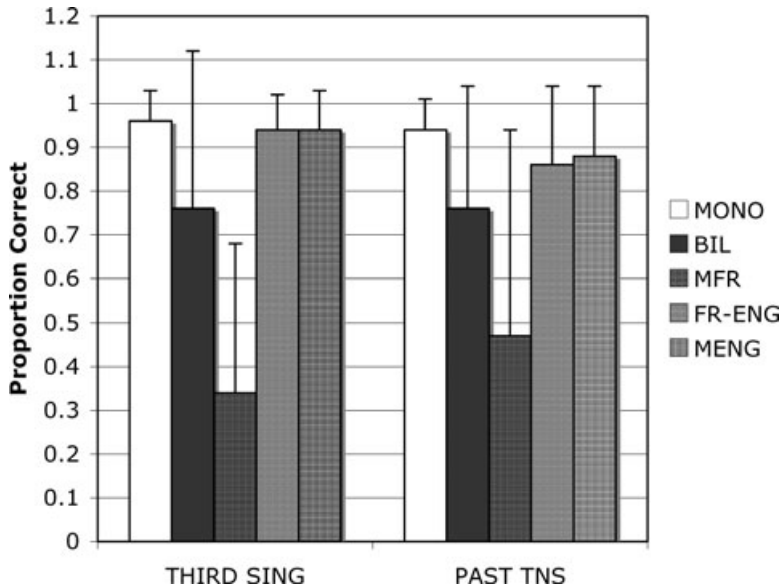
Figure 1 Mean proportion correct scores on production probes.

mean (MONO). Data from the bilinguals include the mean score for all participants (BIL) as well as the mean scores for the exposure groups: MFR, FR-ENG, and MENG. First, a one-way ANOVA was conducted on the scores between the exposure groups, and it yielded a significant result, $F(2, 42) = 31.31$, $p < .0005$, partial $\eta^2 c = .610$. Post hoc pairwise LSD comparisons revealed that the MFR group had significantly lower scores than both the FR-ENG (.34 vs. .94) and MENG (.34 vs. .94) groups but that the FR-ENG and MENG groups did not differ significantly in their scores. Second, a one-sample t test was conducted between the bilingual group as a whole and the monolingual norming sample mean, and it showed the bilinguals to have significantly lower scores, .76 versus .96, $t(42) = -3.86$, $p < .0005$, $d = 0.81$.[3] A series of one-sample t tests was also conducted between the monolingual mean and the means of each exposure group. Both the MENG and FR-ENG groups did not differ significantly from the monolinguals, but the MFR group did, .34 versus .96, $t(12) = -5.70$, $p < .0005$, $d = -2.18$.

The mean proportion correct on PAST TNS for the bilinguals, both total and exposure groups, and for the monolingual sample are also given in Figure 1. A one-way ANOVA on the exposure groups was significant, $F(2, 39) = 12.73$, $p < .0005$, partial $\eta^2 = .408$, and the post hoc comparisons showed the same
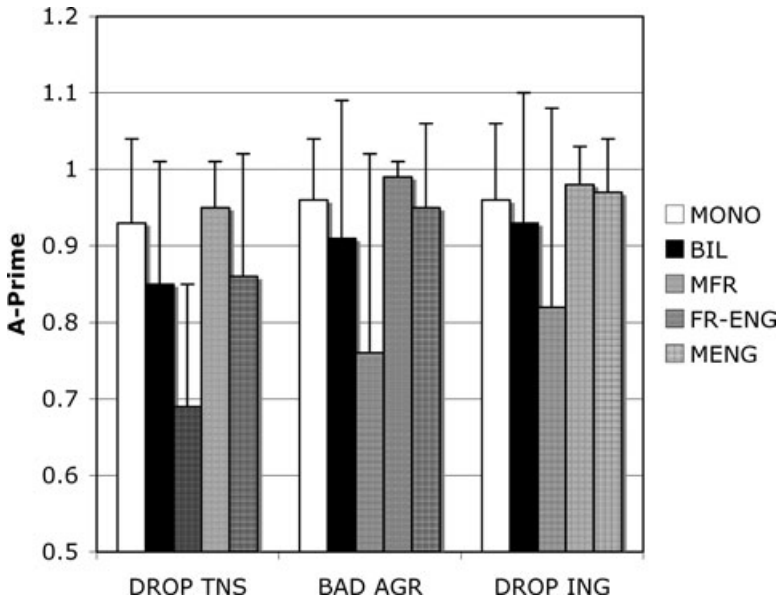
Figure 2 Mean A-prime scores for grammaticality judgment probes.

pattern as for THIRD SING: MFR had lower scores than the FR-ENG (.47 vs. .86) and MENG groups (.47 vs. .88), but the FR-ENG and MENG groups did not differ from each other. The bilinguals as a group had lower scores than the monolingual norming sample, .76 versus .94, $t(39) = -3.79$, $p = .001$, $d = 0.88$. Among the exposure groups, only the MFR group had significantly lower scores than the monolingual norming sample, .47 versus .94, $t(10) = -4.66$, $p = .001$, $d = -1.97$.

In Figure 2, the bilingual children's performance on the grammaticality judgment probes is shown, divided according to error-type probes. For each probe, the monolingual norming sample mean is given as well. As with the production probes, the bilingual data are presented in total, as well as divided into exposure groups. A one-way ANOVA, $F(2, 42) = 18.81$, $p < .0005$, partial $\eta^2 = .485$, followed by post hoc comparisons on the DROP TNS data for the exposure groups revealed the same pattern as for the production probes: The MFR group performed significantly worse than the other exposure groups (MFR: .69 vs. FR-ENG: .95; MFR: .69 vs. MENG: .86), but the FR-ENG and MENG groups did not differ significantly from each other. A one-sample t test between the bilingual and monolingual means was significant, .85 versus .93,

$t(42) = -3.03$, $p = .004$, $d = 0.62$, and between the MFR bilingual and monolingual means, .69 versus .93, $t(12) = -5.51$, $p < .0005$, $d = -1.76$. The FR-ENG and MENG means did not differ significantly from the monolingual mean.

For the BAD AGR probe, a one-way ANOVA was significant, $F(2, 42) = 9.38$, $p < .0005$, partial $\eta^2 = .319$, and parallel pairwise comparison results emerged: The MRF group had lower scores than the other two groups (MFR: .76 vs. FR-ENG: .99; MFR: .76 vs. MENG: .95), but the other groups did not differ significantly. However, the total bilingual mean was not significantly different from the monolingual norming sample mean. The monolingual mean was higher than the MFR mean, .76 versus .96, $t(12) = -2.78$, $p = .017$, $d = -1.04$, but the FR-ENG mean was higher than the monolingual mean, .99 versus .96, $t(19) = 6.10$, $p < .0005$, $d = 0.58$. There was no significant difference between the MENG and the monolingual means.

The final probe results shown in Figure 2 relate to DROP ING. The pattern among the exposure groups was the same as the other probes: A significant one-way ANOVA, $F(2, 42) = 4.96$, $p = .012$, partial $\eta^2 = .199$, followed by post hoc comparisons showed that the MFR group differed significantly from the other two (MFR: .82 vs. FR-ENG: .98; MFR: .82 vs. MENG: .97). There were no significant differences between the bilingual and monolingual norming sample means, between the MFR and monolingual means, or between the MENG and monolingual means. The FR-ENG mean was significantly higher than the monolingual mean, .98 versus .96, $t(19) = 2.29$, $p = .034$, $d = 0.25$.

A one-way repeated measures ANOVA was conducted on the bilinguals' scores on the three grammaticality judgment probes to determine if children showed superior performance on the probes with control morphemes versus the DROP TNS probe. The ANOVA yielded a significant result, Wilks' lambda $= .720$, $F(2, 41) = 7.971$, $p = .001$, multivariate $\eta^2 = .280$. Follow-up paired t tests showed that the scores for DROP TNS were lower than those for BAD AGR, .85 versus .91, $t(42) = -3.63$, $p = .001$, and DROP ING, .85 versus .93, $t(42) = -3.71$, $p = .001$, but the BAD AGR and DROP ING scores were not significantly different from each other.

Because the DROP TNS probe included targets with lexical verbs as well as targets with BE, it was important to determine whether the patterns held when only the lexical targets were considered for the purpose of interpreting comparisons with the production probe results. Accordingly, the children's A-prime scores were recalculated for this probe for the lexical targets only. The recalculated scores were as follows: BIL = .80, MFR = .62, Fr-ENG = .91,

and MENG $= .82$. Thus, children's scores were slightly lower for lexical targets only, but their mean score on the lexical targets was within .05 of their mean on the combined probe. A one-way ANOVA on the lexical target scores was significant, $F(2, 42) = 15.89$, $p < .0005$, partial $\eta^2 = .442$, and the same pairwise patterns emerged: The MFR groups had lower scores than the other two groups. Therefore, the inclusion of BE targets in this probe did not change the overall result pattern among the bilinguals.

The bilingual children have not yet been compared directly on the production and grammaticality judgment probes; instead, children's performance on the two tasks has been compared indirectly through interpreting their performance with respect to monolinguals. This is because proportion correct in production scores is not calculated in the same way as A-prime scores, and for the latter, the .50–1.0 portion of the scale is the most important for interpretation. A more direct approach of cross-task comparison was pursued by calculating the percentage of the bilingual children in the study who performed at or above the criterion score appropriate for their age on the TEGI probes. Criterion scores are distinct from the norming sample means. They are the lowest score a child could obtain and still have his/her score be within the bounds of their typically developing age group. This analysis revealed that more bilingual children met the criterion score for the grammaticality judgment probes (DROP TNS: 62.8%; BAD AGR: 76.7%; DROP ING: 72.8%) than the production probes (THIRD SING: 51.2%; PAST TNS: 52.5%). Specifically, more bilingual children met the criterion when detecting errors with tense morphology (62.8%) than when producing tense morphology themselves (51.2% and 52.2%). In addition, among the grammaticality judgment probes, bilingual children were more likely to meet the age-expected criterion scores for the probes with the control morphemes (76.7% and 72.8%) than for the probe focused on omissions of tense morphology (62.8%).

Another method of comparing across the two task types is to analyze effect size information for the differences in the means between the bilingual and monolingual groups for the production probes focused on tense morphology (THIRD SING, PAST TNS), and the grammaticality judgment probe focused on tense morphology (DROP TNS). The d, r, and r^2 values are given in Table 1. The d values for the two production probes can be interpreted as large effect sizes, whereas the d value for the grammaticality judgment probe can be interpreted as showing a medium effect size (Cohen, 1988). The r^2 values also show an important contrast. These values reveal the percentage of variance in the dependent variable that can be accounted for by membership in the bilingual or monolingual groups (Cohen, 1988). Larger percentages indicate greater

Table 1 Effect size measures between production and grammaticality judgment probes of tense morphology

	BIL	MONO	d	r	$r^2\%$
THIRD SING	.76 (.36)	.97 (.07)	0.81	.38	13.8
PAST TNS	.76 (.28)	.94 (.07)	0.88	.40	16.8
DROP TNS	.85 (.16)	.93 (.09)	0.62	.29	8.3

Note. Proportions for the bilingual (BIL) and monolingual (MONO) groups are means. Standard deviations are in parentheses.

Table 2 Correlation coefficients between production and grammaticality judgment probes of tense morphology

	PAST TNS	DROP TNS	DROP TNS (LEX)
THIRD SING	.798**	.789**	.747**
PAST TNS	—	.714**	.733**
DROP TNS	—	—	.929**

**$p < .01$.

separation between the two groups; thus, the two groups overlap more for DROP TNS.

The final comparison across tasks was a series of Pearson correlations conducted between the bilingual children's scores on the two production probes and the grammaticality judgment probe DROP TNS, and DROP TNS with lexical-targets only. Results are presented in Table 2. Correlation coefficients ranged from .714 to .798 between probe types, and all were significant at $p < .01$. These moderate-to-large correlations suggest that the children were drawing on similar sources of knowledge to perform on both production and grammaticality judgment tasks with tense morphology, even though they differed in how closely they approached monolingual norms for them.

Discussion

This study investigated whether amount of exposure to English, structure complexity, and task type would influence bilingual children's accuracy with English verb morphology, vis-à-vis their monolingual peers. The overall objective was to test the predictions of a constructivist approach to bilingual morphosyntactic acquisition. A constructivist approach to language acquisition emphasizes the importance of input properties as a mechanism in the acquisition process and, consequently, the variable input experienced by bilingual children should impact their acquisition rates if this approach is on the right track. More

specifically, the constructivist model put forward by Gathercole (2007) predicts that French-English bilingual children would lag behind monolinguals at some point in their development of morphosyntax and that this pattern would be sensitive to their differential exposure to each language and to the complexity of the target structure being examined.

The results of this study are largely consistent with the predictions of Gathercole's (2007) model. First, the bilingual children as a group had lower scores than the monolingual norming sample for the production probes and for the DROP TNS grammaticality judgment probe. Second, the children who were exposed mainly to French at home had consistently lower scores than the groups with more exposure to English at home. Third, bilingual-monolingual differences were nearly absent for the control morphemes focused on in the BAD AGR and DROP ING probes, suggesting the influence of structure complexity. Finally, the narrowing of differences between the exposure groups on the DROP TNS versus the control morpheme probes suggest an interaction between amount of exposure and structure complexity. These results concerning the effects of exposure and complexity are generally compatible with findings from younger bilinguals in the same social context (Nicoladis et al., 2007; Paradis et al., 2007) and bilinguals of the same age in other social contexts (Gathercole, 2002a, 2002b, 2002c; Gathercole & Thomas, 2005; Gathercole et al., 2005; Pearson, 2002). Together this body of research supports the contention that rates of morphosyntactic acquisition are sensitive to input properties, as put forward in constructivist approaches.

However, the methods used to examine the influence of differential exposure and structure complexity had some limitations that could be addressed in further research. First, differential exposure was explored through children's home language use only, whereas the studies undertaken by Gathercole and colleagues also included differential exposure at school through instructional programs (e.g., Gathercole, 2002a, 2002b, 2002c; Gathercole & Thomas, 2005; Gathercole et al., 2005). Thus, exposure to English was only explored in this study in one domain of the children's experience, and a fuller account of the impact of this variable should include additional domains. Second, this study was not designed to test the relative contribution of individual factors, like type frequency, token frequency, semantic transparency, or distributional consistency of constructions, to the acquisition rates of individual morphemes. It would be interesting to know which of these factors carries more weight in predicting how difficult a structure is to acquire. For example, does token frequency in the input alone explain the differences in children's performance with third-person singular [–s] versus progressive [–ing] in the grammaticality judgment task,

or is it a combination of distributional consistency, semantic transparency, and token frequency? Further studies designed to address this question would be relevant to constructivist approaches generally.

Despite the overall similarities, there are nonparallel findings between this study and those conducted with bilingual children in Miami and Wales. In this study, first-grade children who were exposed to both English and French and to mainly English at home performed like monolinguals with tense morphology on all probes, even though their language of schooling was entirely in French. In the research conducted in Miami and Wales, bilingual-monolingual differences and differences among bilinguals due to differential exposure extended for longer periods of time. For example, Gathercole reported that Spanish-English bilinguals in the second grade in a Spanish-English bilingual school program had a mean score of 61.3% correct on a grammaticality judgment task with Spanish gender, significantly lower than monolinguals outside the United States, who received a mean score of 86.3% correct (Gathercole, 2007, p. 232; see also Gathercole, 2002b). To give another example, Gathercole and Thomas (2005) reported that for the more complex Welsh gender forms, only the participants who spoke exclusively Welsh at home displayed any degree of mastery, even though some participants in the study were 9 years old. One possibility for this discrepancy is that the structures examined in the other studies were more complex than English verb morphology, therefore requiring more time to reach a critical mass of exposure. Although a logical possibility, it would be difficult to find objective and independent measures for determining this. Another possibility is that because English, and not Spanish or Welsh, is the majority language in all these social contexts, bilingual children might have more opportunities to hear and use English, regardless of the language of schooling. This possibility does not completely explain the discrepancy because both Pearson (2002) and Gathercole (2002a) reported bilingual-monolingual differences on English morphosyntactic measures in the second grade, even for bilingual children who spoke some English at home and were attending all-English schools.

A third reason for the discrepancy might lie in the broader social context in which bilingual children are growing up. Because of the social context, French-English bilingualism in Canada could be considered the quintessential additive form of bilingualism (Genesee et al., 2004). French is an official language of government, French Canadians are recognized as a "founding people," French is the second most widely spoken language in Canada after English, French-speaking children have the right to French language education, and there is widespread availability of French language media, even in areas of the country

where French is a minority language. Spanish is a widely spoken and relatively high-status language in the Miami area and can be a language of instruction in schools. However, Spanish is not an official language of the United States and Spanish-speaking people are not officially recognized as a founding population; in fact, in Miami the Spanish-speaking community has a rather shallow immigration depth—that is, first- and second-generation members are numerous (Eilers, Oller, & Cobo-Lewis, 2002). Thus, Spanish-English bilingualism would not have the same status as French-English bilingualism in Canada.

In sum, perhaps French-English bilinguals "catch up" to their monolingual counterparts more quickly because of the more positive social context for bilingualism. Perhaps the concept of input properties as a mechanism of acquisition ought to be expanded to a concept like input environment, to include sociolinguistic and social-psychological variables regarding dialect, status, and attitudes. It is beyond the scope of this study to thoroughly investigate these speculations. The important point is that although bilingual children's sensitivity to input properties in their rates of morphosyntactic acquisition is evident across social contexts, the *extent* of that sensitivity may differ according to social context. It would be interesting for future research to focus on understanding the factors explaining differences across social contexts, going beyond the factors of differential exposure to each language at home and in school.

Explaining Task Effects

Comparisons between the production probes and the DROP TNS grammaticality judgment probe revealed that the bilinguals' performance was closer to that of monolinguals for the latter task. That children were drawing on a common knowledge base to perform on both these tasks was suggested by the correlational analysis. Although two of the factors influencing bilingual-monolingual differences—exposure and structure complexity—could be derived from input properties, it is not straightforward that task effects could be. On one interpretation of constructivist accounts of the lexicon, the use of different types of tasks to measure morphological acquisition might not be expected to result in variation in bilingual-monolingual differences. This is because abstract linguistic knowledge and details of morphophonological forms are largely conflated in this approach in item-based, language-specific schemas (see especially Bybee, 2001) and, thus, children should be drawing on a common source for production of morphological forms and for judging their well-formed use in the speech of others. However, another interpretation that includes the contrastive metalinguistic, or, more precisely, executive control abilities of bilinguals and

monolinguals could provide an explanation for task effects within a constructivist model.

It is possible that the cognitive-linguistic differences between bilinguals and monolinguals could result in differences between the adequacy of certain tasks for measuring bilinguals' linguistic knowledge. As mentioned earlier, the dual-language experience confers superior executive control functions on young bilingual children compared with their monolingual age-mates (Bialystok, 2001, 2007). Bialystok attributed this superior ability to ignore background informational noise to concentrate on the task at hand to bilinguals' ability to suppress one of their two languages in linguistic processing, an ability for which monolinguals have no need. On the other hand, although competition for processing between two languages may hone executive control skills, they could also cause a performance limitation in speech production for bilinguals, particularly while the two languages are still developing.

Experimental evidence with adult bilinguals has shown that the lexical and phonological systems of both languages can be activated in speech production, even when the conversation is ostensibly in one language (Bialystok, 2007; Costa, 2004; Grosjean, 2001). Therefore, it is logical to assume that developing bilinguals in particular might experience some cognitive cost in speed and accuracy in morphological production when compared with monolinguals. Production entails accuracy in the execution of fine-grained morphophonological details, but well-formedness judgments do not. Automaticity in accessing and pronouncing stored forms in real-time speech production would be sensitive to the amount of practice with a language, and bilinguals would likely have less practice than monolinguals. Furthermore, competition between the two languages of a bilingual is possibly fiercer in production than it is for other linguistic tasks; thus, production requires more attentional resources, in the nondominant language in particular (cf. Bialystok, 2007). Recall that Windsor and Kohnert (2004) found bilingual-monolingual differences in accuracy and reaction time for their word production but not for their word comprehension task.

These cognitive-linguistic differences between bilinguals and monolinguals could cause bilinguals' performance, vis-à-vis monolinguals, to be different when given a grammaticality judgment task versus a production task, for the same target structure. The performance gap between bilinguals and monolinguals could be narrowed on a grammaticality judgment task because bilingual children might be more efficient at reflecting on their knowledge of correct forms than at producing the same correct forms. Note that the claim being made here is not that bilinguals are generally superior to monolinguals

in grammaticality judgment tasks, as indeed the data in this study are not consistent with this claim, and prior research has shown conflicting results supporting this claim (Bialystok, 2001, 2007). If bilinguals perform worse than monolinguals on a grammaticality judgment task, this most likely means that they have accumulated less knowledge of the target structure (cf. Gathercole, 2002c). Instead, it is being proposed that production tasks might underestimate the knowledge bilinguals possess (as referenced to monolinguals) because they are additionally demanding for bilingual children, and grammaticality judgments might provide a more accurate picture of their accumulated knowledge (again as referenced to monolinguals) because bilingual children have a facility for them. To turn the argument around, in monolingual children, differences between production and grammaticality judgment tasks as measures of the same linguistic knowledge would be expected to be smaller than in bilinguals. Paradis et al. (2008) found evidence to support this expectation in their comparison of child L2 learners and monolingual children with SLI on the same TEGI probes used for this study. In addition, a recurrent finding in research with L2 adults is that their underlying linguistic knowledge of the properties of grammatical morphemes can outstrip their ability to accurately produce them (see White, 2003, for a review).

Applied Implications of Bilingual-Monolingual Differences

Bilingual-monolingual differences in language abilities can be theoretically interesting, but they are not always directly relevant to applied concerns. Take, for example, a study producing the following results: Bilinguals had a lower mean score than monolinguals on a task in a between-group experiment, but their mean score, and most individual scores, fell within the (low) normal range of monolingual performance. In this case, the bilingual-monolingual differences for this task might not be a cause for concern if the task were used to assess the language development of bilingual children for signs of delay/impairment. In contrast, if bilingual-monolingual differences on a task meant that the bilinguals' mean score, and many individual scores, fell below the lower bound of the normal range for monolinguals, then such differences would be a cause for concern if the task were used for language assessment. Viewed from this perspective, the findings from the present study show direct relevance for applied concerns.

Paradis et al. (2007) found that overidentification of SLI might occur in bilingual 4-year-olds on the TEGI, and the present study indicates that it could also occur in bilingual 6-year-olds (cf. Paradis, 2005, for child L2 learners). This is because 40–50% of the children in this study scored below the criterion

for age-appropriate accuracy with production and grammaticality judgment probes on this standardized test, meaning that their scores fell outside the range of performance for monolinguals with typical language development. However, the risk for overidentification on standardized tests would vary according to how much English the bilingual child was being exposed to at home and which task was used to determine levels of language development. This study signals the need for general caution in interpreting the results of tests normed with monolinguals when assessing bilingual children (see also Paradis, 2005; Thordardottir et al., 2006). It also highlights the need for speech and language pathologists to gather information about a bilingual child's exposure patterns to each language, in order to fully interpret the results of tests (see also Gutierréz-Clellen & Simón-Cereijido, 2007; Gutierréz-Clellen et al., 2006) and to not consider all tasks to be equally accurate measures of a bilingual child's linguistic abilities. In other words, it is not the case that bilinguals are merely, say, 2 years behind monolinguals across the board on all measures. Instead, they have an uneven or unique profile in terms of whether they meet monolingual norms. The presence of this unique profile also highlights the need to develop bilingual norm referencing for standardized tests (see also Thordardottir et al., 2006).

Revised version accepted 15 April 2009

Notes

1 O'Grady (2008) noted certain differences between constructivist, usage-based, and emergentist theories, and, indeed, among certain emergentist theories. These differences are not central to the general perspective and specific analyses in this article. The term "constructivist" has been chosen to refer to this family of theories to be in line with Gathercole (2007), whose model is central to the specific analyses in this study.

2 It is relevant to point out that this study was not designed to isolate the individual factors that have been proposed as contributors to structure complexity in order to assess their relative contribution to acquisition outcomes for individual tense morphemes. In other words, the study was not designed to explore the construct of complexity itself; instead, complexity has been invoked in order to predict a certain pattern of between-group differences based on the assumption that complex morphemes would require a larger critical mass of input to acquire than less complex morphemes.

3 One-sample t tests were used for comparisons with monolinguals because only the mean and standard deviation of the norming sample group were available.

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