

# Domain-General Versus Domain-Specific Accounts of Specific Language Impairment: Evidence From Bilingual Children's Acquisition of Object Pronouns

Johanne Paradis  
*University of Alberta*

Martha Crago and Fred Genesee  
*McGill University*

In this study, we tested the predictions of 2 opposing perspectives on the nature of the deficit in specific language impairment (SLI): the domain-general, cognitive/perceptual processing view and the domain-specific, linguistic representational view. Data consisted of spontaneous speech samples from French–English bilingual children with SLI; younger, typically developing, bilingual language peers, and monolingual French comparison groups. We analyzed the children's use of direct object clitics/pronouns and definite articles in French and English. The bilingual children had more difficulty with clitics in French than articles in French and pronouns in English; and bilingual children with SLI performed like their younger, unaffected bilingual peers and like monolinguals with SLI. We argue that these findings present challenges to the domain-general perspective and support the claim that domain-specific limitations in linguistic representation are a component of SLI.

## 1. INTRODUCTION

Children with specific language impairment (SLI) exhibit language development that is protracted and consistently below age expectations from the early stages through to elementary school. In other respects, children with SLI are like typically developing (TD) children—they have normal social–emotional development and nonverbal intelligence, normal-range hearing abilities, and no frank neurological damage. SLI is a developmental language disorder inherent to the in-

dividual; however, the underlying cause of this disorder is still the subject of ongoing debate (e.g., Rice and Warren (2005), Tager-Flusberg and Cooper (1999)). The purpose of this study was to bring cross-linguistic and cross-population evidence to bear on a fundamental question concerning the nature of SLI: Is this disorder best characterized in terms of domain-general limitations in cognitive/perceptual processing mechanisms that impact on language development or in terms of domain-specific and selective limitations within the computational component of linguistic representation?

On the assumption that the underlying cause of SLI must be the same for all affected children regardless of which and how many languages they are exposed to, any theory of the underlying cause of SLI must be compatible with cross-linguistic variations in its surface manifestations in both monolingual and bilingual children. Examining the morphosyntax of bilingual children can contribute unique evidence to understanding cross-linguistic differences in SLI and, in turn, to determining the underlying cause of this disorder. First, simultaneous bilingual children, those who have learned two languages from birth, are useful participants for cross-linguistic research because each child acts as her or his own “matched pair” (de Houwer (1990)) in the sense that there is one social environment (albeit complex in some cases), one cognitive/perceptual system, but two languages. Therefore, bilingual children can serve as a unique group for controlling extralinguistic variables that may confound research carried out on two groups of monolinguals acquiring different languages. Second, deficits in general cognitive/perceptual processing could have a common and pervasive impact on both languages of a bilingual child affected with SLI, whereas specific deficits in the linguistic domain could impact selectively and differentially on the developing grammar of each language. Therefore, children acquiring two languages offer the ability to test the predictions of these opposing theoretical perspectives in a way that children acquiring one language cannot.

Paradis, Crago, Genesee, and Rice (2003) found that French–English bilingual children with SLI showed similar difficulties with tense-marking morphology to monolingual peers with SLI in both French and English. Although the Paradis et al. (2003) study was not aimed at the previously mentioned theoretical debate on SLI, it poses a challenge to accounts attributing the deficit to domain-general processing mechanisms. This is because affected bilinguals showed the same level of attainment with respect to tense-marking accuracy as affected monolinguals in each language, even though the bilinguals, by dint of their dual language experience, had roughly half the amount of time-on-task to process input from each language compared to the monolinguals. However, because tense marking is noted to be problematic in both monolingual French and English SLI, the Paradis et al. (2003) study did not reveal whether cross-linguistic differences in morphosyntactic manifestations of SLI emerge in the two languages of a bilingual the same way they would in monolingual children acquiring each language. In addition, Paradis et al. (2003) did not include a group of younger, TD children matched for level of language to the bilingual children with SLI. As discussed in

section 1.1, domain-general and domain-specific theories make different predictions about the source of cross-linguistic differences and about the relation between the performance of TD, language-matched children and older children with SLI. This study is a follow-up to Paradis et al. (2003) in which we examined an aspect of morphosyntax predicted to show cross-linguistic differences—direct object pronouns—in both the English and French of the bilingual children with SLI as well as in younger, unaffected bilingual children. In so doing, we designed this investigation to directly address the domain-general versus domain-specific question.

### 1.1. Domain-General and Domain-Specific Accounts of SLI

Numerous researchers have put forth the hypothesis that the protracted language development exhibited by children with SLI is the result of deficits in basic cognitive and perceptual processes that are essential for learning and producing language as well as for certain other cognitive operations (Ellis Weismer, Evans, and Hesketh (1999), Leonard, Bortolini, Caselli, McGregor, and Sabbadini (1992), Leonard and Eyer (1996), Leonard, Eyer, Bedore, and Grela (1997), Marton and Schwartz (2003), Miller, Kail, Leonard, and Tomblin (2001); and see review in Leonard (1998)). For example, the Generalized Slowing Hypothesis (GSH) holds that because children with SLI have demonstrable limitations in speed of processing, interpreted through reaction time in both linguistic and nonlinguistic tasks when compared with unaffected age-matched children, these limitations slow down their ability to take in linguistic input, store it in memory, and in turn access appropriate structures in language production (Miller et al. (2001), Windsor and Huang (1999), Windsor, Milbrath, Carney, and Rakowski (2001); but see Lahey, Edwards, and Munson (2001)). Thus, the GSH predicts that children affected with SLI will exhibit a global delay in language development compared with unaffected age peers because their limitations in processing speed mean that given the same amount of input as unaffected peers, their uptake of linguistic input would proceed more slowly and less efficiently, and this would retard overall language attainment. Children with SLI would then be expected to resemble younger, TD, language-level peers in their linguistic performance because presumably, children with SLI have the same kinds of learning mechanisms; these mechanisms just operate more slowly. Put differently, a GSH account is more consistent with a delay rather than a deviant profile of the language abilities of children with SLI.<sup>1</sup> Most important, the GSH would predict that bilingual children with SLI should display

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<sup>1</sup>We use the terms *delay profile* and *deviant profile* to refer to how children with SLI would compare in their abilities across certain morphemes to younger, language-level-matched TD children. A delay profile would indicate that SLI and TD have similar abilities across all morphemes; a deviant profile would indicate that SLI and TD have uneven abilities in which SLI may appear worse than TD for certain morphemes. We are not using deviant to mean that children with SLI have difficulties with completely different aspects of morphosyntax than TD children (cf. Rice and Warren (2005)).

more profound global delay in language development than monolinguals with SLI in each language. Because bilingual children's linguistic exposure is divided between two languages, their time-on-task is less for each language than for monolingual children. If children with SLI have a slower system of uptake, less time-on-task would logically result in lower levels of attainment for affected bilinguals as compared with affected monolinguals, all other things being equal. This notion of the quantitative effects of time-on-task on speed of acquisition in bilinguals also follows from domain-general theories of typical language acquisition, such as Constructivist/Usage-based approaches (e.g., Tomasello (2003; 2004)), and was argued for elsewhere for typical bilingual development (Gathercole (2002)).

All other things are seldom equal, and accordingly, Leonard (1998) put forward a domain-general account of SLI that combines the GSH with a perceptual limitation account, the Surface Hypothesis (SH) (Leonard et al. (1992), Leonard and Eyer (1996), Leonard et al. (1997)). Building on research showing that children with SLI have limitations compared to unaffected age mates in their abilities to perceive perceptual contrasts differentiated by sounds with brief phonetic duration and display phonological processes such as final consonant and weak syllable deletion more than unaffected age mates, Leonard and his colleagues (Leonard (1998), Leonard et al. (1992), Leonard and Eyer (1996), Leonard et al. (1997)) hypothesized that grammatical morphemes that are of short duration or otherwise phonologically nonsalient would be more difficult for children with SLI to perceive and encode in a stable representation. By extension, these nonsalient morphemes would also be more difficult to retrieve during language production. Morphemes of short duration are considered even more vulnerable when processing requires additional cognitive operations such as gleaned grammatical information such as [number] or [person] from inflectional morphemes and establishing paradigmatic relations between them.

A combined GSH and SH account can be used to make predictions about why certain target structures may be more affected than others. Morphemes of short duration that require additional cognitive processing will be more difficult for children with SLI to acquire than other morphemes, and the morphemes that fall into this category would vary within one language and between languages. For example, whereas English-speaking children with SLI produce finite verb inflections with lower accuracy than age peers, Italian-speaking children with SLI only differ from age peers with respect to the third-person plural (3Pl) inflection (Bortolini, Caselli, and Leonard (1997), Leonard et al. (1992), Leonard and Eyer (1996), Leonard et al. (1997)). This cross-linguistic difference can be explained by the SH because finite verb inflections in English, such as third-person singular (3Sg) [-s] and past [-ed], are mainly expressed through single consonantal allomorphs of brief phonetic duration, whereas all of the Italian morphemes except 3Pl consist of vowels, which have longer phonetic duration.

It is important to note that a combined GSH/SH account would still retain the predictions concerning bilingual–monolingual differences and delay profiles be-

cause Leonard et al. (1997) wrote that “a greater number of exposures will be required before these brief grammatical morphemes are established in the grammar” (p. 743).

In contrast to domain-general approaches like GSH/SH, other accounts have hypothesized that specific deficits in linguistic representation are an etiological component of SLI (Bottari, Cipriani, Chilosi, and Pfanner (1998; 2001), Clahsen, Bartke, and Göllner (1997), Jakubowicz and Nash (2001), Rice (2003), Rice and Wexler (1996), van der Lely (2003), Wexler (2003; in press)). Domain-specific accounts are able to explain certain patterns in morphosyntactic acquisition in children with SLI that are difficult to explain on the assumption that the sole deficits affected children possess are in general cognitive/perceptual mechanisms whose impact can be construed as global or “across-the-board.” Rice (2003; 2004) put forward a Disruption-within-Delay (DD) account of SLI wherein certain grammatical morphemes in a language are much more affected, or “disrupted,” than others in children with SLI such that, with respect to these morphemes, children appear more delayed than their overall language development would suggest. In other words, children with SLI’s morphosyntactic profiles are unique in terms of production and comprehension of certain structures in comparison with younger, TD children; such unique profiles are consistent with the notion of deviant development for SLI. Rice and colleagues’ (Oetting and Rice (1993), Rice (2003; 2004), Rice and Oetting (1993), Rice and Wexler (1996), Rice, Wexler, and Cleave (1995), Rice, Wexler, and Hershberger (1998)) research has shown the following findings that support this description of SLI morphosyntax: (i) English-speaking children with SLI have significantly greater difficulties with tense-marking morphemes than they do with non-tense-related morphemes, and this effect emerges even for homophonous morphemes that appear in similar phonological positions and have similar allomorphs, for example, 3Sg [-s] and 3Pl [-s]; (ii) children with SLI are less accurate with tense morphemes than younger, language-matched TD children but not necessarily with non-tense-related morphemes. Crago and Paradis (2003) and Paradis and Crago (2001) found parallel patterns for tense-related and non-tense-related morphemes in French SLI. Children frequently omitted the third-person past auxiliary verb *a* ‘have’, although they produced the homophonous preposition *à* ‘to’ most of the time; furthermore, the children with SLI performed worse than the younger TD children for the past auxiliary (see also Jakubowicz and Nash (2001)). Finally, Paradis et al. (2003) found that tense morphemes were used less accurately than their homophonous nontense counterparts in both languages of French–English bilinguals with SLI. In sum, these among other empirical outcomes form the basis of Rice’s (2003; 2004) proposal that children with SLI have a selective deficit in linguistic representation pertaining to the grammatical feature tense that cannot be explained straightforwardly by extralinguistic factors such as perceptual salience or by global language delay as interpreted to mean equivalency with younger, TD language-level matches.

Domain-specific accounts such as DD appeal to the notion of deficits in linguistic representation, but what would such deficits consist of? One example of a proposed deficit is the (Extended) Unique Checking Constraint (UCC; Wexler (1998; 2003; in press)). Adopting a minimalist approach (e.g., Chomsky (1995)), Wexler (1998; 2003; in press) assumed that subject determiner phrases (DPs) move to check D features against tense (Tns) and agreement subject (AgrS) projections because on these projections, D features are [–interpretable] and so must be checked and deleted, or the derivation will not converge. Wexler proposed that in the immature grammars of children younger than 3 years of age, checking DPs twice may be too complex, so immature grammars are constrained by a principle, the UCC, which stipulates that D features cannot be checked twice. If D features cannot be checked twice, then either AgrS or Tns has to be omitted from the underlying sentence structure to avoid violating the UCC, resulting in omission of tense-marking morphology or the presence of non-nominative subjects in children’s speech production. Wexler (1998) assumed that the UCC competes with other grammatical principles, one of which demands that sentences contain both Tns and AgrS. Because a sentence without Tns or AgrS violates one principle, and a sentence with both violates the UCC, children will intermittently produce tense-marking morphology in their utterances depending on which principle wins out for that individual numeration. Thus, sentences including a Tns projection may have the morphology spelling out tense features, but sentences without a Tns projection may not. The UCC is a developmental principle of grammar because it eventually fades away in TD children, so they gradually use tense morphology more reliably. Wexler (2003; in press) proposed that one component of SLI is an extended UCC (EUCC), which operates in affected children’s grammars for much longer than in unaffected children’s grammars and is the underlying source of their deficit with tense/agreement morphology. Even though the UCC is present in all immature grammars, this does not mean that children learning all languages omit tense morphology. In null-subject languages, AgrS is assumed to have a [+interpretable] D feature, which does not need to be checked, so a subject DP in these languages checks the [–interpretable] D feature in Tns only, not creating a derivation that violates the UCC. Thus, tense-marking morphology is not omitted by children learning null-subject languages. Because Italian is a null-subject language, the vacuous operation of the EUCC in this language can explain the discrepancy between the English SLI and Italian SLI findings we described previously from Leonard and colleagues (Leonard (1998), Leonard et al. (1992), Leonard and Eyer (1996), Leonard et al. (1997)) for finite verb morphology (Wexler (in press)). The (E)UCC does not pertain only to subject DPs checking against Tns and AgrS; it also pertains to other structures that involve double checking of [–interpretable] D features such as preverbal object clitics in Romance languages (Wexler (2002; 2003; in press)), which we discuss in section 1.3. In sum, the EUCC proposal defines, in formal terms, computational limita-

tions on the impaired linguistic system that are domain specific, that is, are not reducible to general cognitive/perceptual mechanisms outside of language.

A combined DD/EUCC account predicts that affected children will have special difficulties with morphosyntactic structures that involve double-checking in the computation such that they will optionally omit the surface morphological reflexes of those structures more than for other structures, and this difficulty will be protracted in their acquisition such that their abilities will be worse than younger, TD children. Two additional differences emerge with GSH/SH. First, on a DD/EUCC approach, phonological similarities between morphemes will not determine difficulty in acquisition. Second, the DD/EUCC does not predict that simultaneous bilingual children with SLI will appear more profoundly impaired than monolinguals with SLI in their acquisition of disrupted structures because the nature of the problem with these morphemes is an internally controlled mechanism that is not related to the amount of input children receive.<sup>2</sup>

To summarize this contrast between the domain-general and domain-specific theories, the heart of the matter is this: If a target structure appears difficult to learn for children with SLI, one perspective would claim this difficulty should be entirely explainable assuming the deficits affected children have are in cognitive/perceptual mechanisms not specific to language, and thus, the definition of a difficult structure for learners should be derived from complexity in domains outside of the linguistic representation. Another perspective would claim that certain target structures have an inherent complexity that makes them difficult for learners with impaired linguistic systems. Inherent means that complexity is defined within the linguistic system—that is, the computational component and its interfaces—and need not be derived from more general aspects of perception or cognition. Chief among the different predictions these domain-general and domain-specific perspectives make is whether children with SLI acquiring two languages simultaneously will show similar attainment levels for a complex structure as their monolingual age peers with SLI.

## 1.2. The Acquisition of Object Pronouns in French

Much research on the acquisition of Romance languages suggests that object pronouns (clitics in these languages) are vulnerable morphemes in typical and atypi-

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<sup>2</sup>We adopt the EUCC as the formal characterization of a domain-specific deficit for this study because it makes predictions about both tense marking (cf. Paradis et al. (2003)) and object pronouns in the English and French of children with SLI and is consonant with Rice's (2003; 2004) DD account in particular with respect to delayed versus deviant profiles of SLI. However, we point out that other domain-specific SLI accounts, such as the Computational Complexity Hypothesis, make similar predictions regarding the performance of children with SLI with object clitics and tense in French (Jakubowicz and Nash (2001), Jakubowicz, Nash, Rigaut, and Gérard (1998)).

cal acquisition. Children with SLI have pronounced difficulties when compared to TD children in accurately producing object clitics in both Italian (Bortolini, Caselli, Deevy, and Leonard (2002), Bottari et al. (1998; 2001), Leonard et al. (1992)) and Spanish (Bedore and Leonard (2001), Bosch and Serra (1997), De la Mora, Paradis, Grinstead, Flores, and Cantu (2004), Jacobson and Schwartz (2002); but see Wexler, Gavarró, and Torrens (2004)). With respect to French, the use of object clitics is relatively late in the language production of TD monolingual and bilingual children; they emerge later than subject and reflexive clitics, between the ages of 2;6 and 3;0, and object omissions are the most common errors in contexts where pronominalization is felicitous (Chillier et al. (2001), Clark (1985), Granfeldt and Schlyter (2004), Hamann, Rizzi, and Frauenfelder (1996), Hulk (2000), Jakubowicz, Müller, Kang, Riemer, and Rigaut (1996), Jakubowicz and Rigaut (2000), Kaiser (1994)). As in Italian and Spanish, the acquisition of object clitics is highly problematic for French-speaking children with SLI because they use object clitics intermittently, frequently producing sentences with object omissions even past the age of school entry in contrast to unaffected age mates (Chillier et al. (2001), Grüter (2005), Hamann (2004), Hamann et al. (2002), Jakubowicz, Nash, Rigaut, and Gérard (1998), Paradis (2004)).

The strikingly protracted development of object clitics in French SLI raises the possibility that object clitic omissions could be a potential clinical marker in this language as has been proposed for tense in English (Jakubowicz (2002), Rice and Wexler (1996)). Prior research has shown parallels between French-speaking children's acquisition of object clitics and English-speaking children's acquisition of tense discussed in section 1.1. French-speaking children with SLI are less accurate than TD mean length of utterance (MLU)-matched younger children in producing object clitics, and they have comparatively less difficulty producing definite articles than object clitics even though the definite articles *le*, *la*, and *les* are homophonous with third-person direct object clitics (Hamann (2004), Jakubowicz et al. (1998), Le Normand, Leonard, and McGregor (1993), Paradis (2004), Paradis and Crago (2004)). By contrast, Italian-speaking children with SLI display difficulties with both clitics and definite articles (Bortolini et al. (1997; 2002), Bottari et al. (1998; 2001), Leonard et al. (1992)); however, we base our predictions for French–English bilinguals on prior monolingual findings for French and discuss the Italian–French differences in section 4.3.

### 1.3. Object Pronouns in French and English

Although details differ between accounts, much theoretical work has shown that pronouns can be categorized as strong, weak, or clitic in which strong pronouns have a full DP shell, and weak and clitic pronouns' maximal structure is a subconstituent of DP (e.g., Cardinaletti and Starke (1999; 2000), Déchaine and Wiltschko (2002), Jakubowicz et al. (1998), Kayne (1975)). We adopt the following categorization for the French and English pronominal systems based mainly



on Cardinaletti and Starke (1999; 2000): French direct object pronouns (*me, te, le/la, nous, vous, les*) are preverbal clitics, French tonic pronouns (*moi, toi, lui, elle, nous, vous, eux*) and the demonstrative/deictic *ça* are strong pronouns, and English direct object personal pronouns and demonstratives (*me, you, him/her/it/them, this, that, these, those*) are strong pronouns (but see Déchaine and Wiltschko (2002) for a different analysis of English third-person pronouns). Examples in (1) illustrate properties of the French and English systems relevant to this study. French lexical objects and the demonstrative *ça* appear in the postverbal object position in (1a) and (1b), whereas clitic pronoun direct objects appear preverbally in (1c) and (1d). Strong tonic pronouns cannot occupy the direct object position as lexical objects can (1e), but may appear to the right of the verb as indirect objects in a prepositional phrase (1f). The English glosses for examples (1a) to (1d) show that lexical, demonstrative pronoun, and personal pronoun objects all appear in the postverbal direct object position.

- (1) a. Brigitte mange la banane.  
 Brigitte eat-PRES the-ART:FSG banana  
 ‘Brigitte is eating the banana.’
- b. Brigitte mange ça.  
 Brigitte eat-PRES that-DEM  
 ‘Brigitte is eating that.’
- c. Brigitte la mange.  
 Brigitte it-DO:CLI:FSG eat-PRES  
 ‘Brigitte is eating it.’
- d. \*Brigitte mange la.  
 Brigitte eat-PRES it-DO:CLI:FSG  
 ‘Brigitte is eating it.’
- e. \*Brigitte mange elle.  
 Brigitte eat-PRES it-DO:SPRO:FSG  
 ‘Brigitte is eating it.’
- f. Brigitte donne une banane à elle.  
 Brigitte give-PRES a-ART:FSG banana to her-IO:SPRO:FSG  
 ‘Brigitte is giving a banana to her.’

Why do French direct object clitics cause difficulties for learners with language impairment, whereas English direct object pronouns do not? The DD/EUCC and GSH/SH perspectives offer different explanations for why the French system would be difficult for children with SLI, and we discuss each explanation in turn.

Theoretical accounts of object clitics in Romance in general and French in particular can be characterized as either movement based (e.g., Belletti (1999), Cardinaletti and Starke (1999), Kayne (1975)) or base generation and movement combined (Jakubowicz et al. (1998)), Sportiche (1996)); purely morphological

base-generated approaches are more developed for subject than object clitics, even for Canadian French (e.g., Auger (1995), Roberge (1986)). Adopting Sportiche's (1996) combined account, Wexler and colleagues have offered an explanation of why sentences with object clitics violate the UCC, whereas sentences with DP object pronouns as in English do not (Tsakali and Wexler (2003), Wexler (2002; in press), Wexler et al. (2004)). In this account, object clitics are base generated as heads of a functional projection in Infl: Clitic Phrase (CIP). The object clitics are in a dependency relation with an XP in the verb complement position, analyzed as *pro*. CIP has a [-interpretable] D feature that must be checked by *pro*. In addition, *pro* also checks a [-interpretable] D feature in AgrO like lexical DP objects in both French and English. Hence, a derivation with an object clitic includes double-checking of D features and violates the UCC, whereas a derivation with a lexical DP does not. If CIP is omitted from the derivation to satisfy the UCC, then the clitic cannot be spelled out, and the clitic would then be missing from the surface clause. Omitting CIP would violate another constraint, but parallel to the logic we discussed previously for the tense/agreement omission, clitic use and omission would alternate in the speech of a child because single-violation outputs would compete. Derivations with an omitted AgrO would crash because they would violate more constraints, the details of which are too lengthy for us to go into here (see Tsakali and Wexler (2003), Wexler (2002; in press), Wexler et al. (2004)). In sum, the DD/EUCC account would predict French object clitics, but not object pronouns in English, to be a disrupted aspect of impaired acquisition.

The processing-based SH would also predict French object clitics to be more difficult for learners than object pronouns in English based on their phonological properties and on the additional cognitive operations they require in acquisition, for example, [gender] and [number] (see predictions in Leonard et al. (1992) and Leonard and Eyer (1996) for Italian). First, unlike many English pronouns, all French direct object clitics are of brief phonetic duration with a CV structure. The vowel is elided in the case of a singular clitic appearing before a vowel-initial verb, for example, *je le vois* 'I see him' versus *je l'aime*/\**je le aime* 'I love him'. Furthermore, as preverbal clitics, object pronouns in French are pronounced within the prosodic or stress domain of the verb, and because stress is assigned word- or phrase-finally in French, they never receive stress. Hence, object clitics are morphemes with low phonetic salience. With respect to additional cognitive operations, object clitics are marked for the grammatical features of [gender] and [number], whereas in English, object pronouns are only marked for [number] because English has natural not grammatical gender, so paradigm building is more complex in French (although presumably not as complex as Italian or Spanish in which gender distinctions are not neutralized in the plural like they are in French). Note that the French definite articles are homophonous with the third-person direct object clitics (*le*, *la*, and *les*) and they appear in unstressed prenominal position within the prosodic domain of the following noun. Like object clitics, singular definite articles undergo elision before a vowel-initial noun, for example, *le professeur de mon fils* 'the teacher of my son' versus *l'ami de mon fils*/\**le ami*

*de mon fils* ‘the friend of my son’. Definite articles in French are also marked for the features [gender] and [number].

#### 1.4. Predictions for Object Pronoun Acquisition by Bilingual Children With SLI

Both the GSH/SH and the DD/EUCC accounts predict that object clitics in French would be a vulnerable structure in impaired acquisition but not object pronouns in English. However, these accounts make different predictions beyond clitics being vulnerable in general, which we summarize here. First, for domain-specific theories such as DD/EUCC, acquisition timetables for object pronouns need not be slower in bilinguals in comparison to monolinguals, whereas domain-general theories such as GSH/SH would predict bilingual children with SLI to be slower. Second, the DD/EUCC predicts disrupted/deviant development for object clitics in French, meaning children with SLI would be expected to have greater difficulty with them than younger, TD language matches. In contrast, the GSH/SH hypothesis predicts delayed development only, so children with SLI could be expected to have similar difficulties as younger, TD language matches.<sup>3</sup> Third, in the case of GSH/SH, clitics should be as difficult as other morphemes that are equally perceptually nonsalient—for example, definite articles—whereas the DD/EUCC does not explicitly predict definite articles to be disrupted in impaired acquisition,<sup>4</sup> and thus clitics should pose more difficulties than definite articles.

## 2. METHOD

### 2.1. Participants

#### 2.1.1. French–English Bilingual Children

Two groups of bilingual children participated: seven French–English simultaneous bilingual 7-year-olds with SLI (BIL7SLI) and nine TD simultaneous bilin-

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<sup>3</sup>Although some of the studies designed to test the SH have found children with SLI to be worse than MLU-matched TD children on some measures (Bortolini et al. (1997), Leonard et al. (1992; 1997)), the combined GSH/SH theoretical perspective, in our view, does not offer a principled reason why children with SLI would be worse than language-level matches—only that they would be worse than age mates. By contrast, the DD/EUCC perspective does specifically predict children with SLI to be worse than language-level matches for disrupted structures.

<sup>4</sup>Difficulty with definite articles is not ruled out by the UCC, as Wexler (1998) speculated on the possibility of a developmental stage when children assume D-features in the DP to be noninterpretable, in which case checking D-features within the DP twice would be blocked in the computation by the UCC. However, Wexler (1998; 2003) has not presented empirical findings or straightforward predictions for how such a stage would result in omission of determiners, whereas he has explicitly predicted the omission of object clitics. See also Jakubowicz et al. (1998) and Bottari et al. (1998; 2001) for discussion of how computational complexity (defined by movement) involved in the control of Det is possibly less than it is for other functional categories.

gual French–English 3-year-olds who were matched by MLU in words (MLU<sub>w</sub>) to the bilingual children with SLI in both languages (BIL3TD). The BIL7SLI group are the same children who participated in Paradis et al. (2003), with the exception of one child who was not included in this study because her age was too close to the younger bilingual group.

Both the BIL7SLI and BIL3TD children were residing in the greater Montreal or Ottawa areas in Canada at the time of testing. According to parental report, all had been exposed to both languages in the home continuously since birth from parents who were native speakers of each language. The majority of parents reported having either some or a great deal of fluency in their spouses' language, and the communities the children were growing up in are bilingual. As such, their situation contrasts with some other bilingual children in the literature whose situation is one where bilingualism is strictly confined to their own household and where one parent, often the mother, is their only source of input in one language—so-called family bilingualism (Lanza (1997)). The majority of the children in this study were being raised with the one-parent-one-language style of interaction in which each parent spoke mainly or exclusively their native language to the child. The other two children, both in the BIL7SLI group, experienced different patterns: one child received mixed French and English input from one parent and English input from the other, and another child received both French and English input from his single-parent mother. All children were productive and spontaneous in each language at the time of testing according to parental report and according to the observations of the bilingual research assistants who visited the homes before the testing sessions.

The bilingual children with SLI were all referred from the caseloads of certified Speech-Language Pathologists and had to meet the following criteria to be accepted in the study: (i) hearing levels within normal limits, (ii) no stuttering, (iii) no severe phonological disorder, (iv) no frank neurological problem, (v) nonverbal intelligence within the normal limits and verbal intelligence at least 1.5 *SDs* below the age-expected mean or in a substantially lower percentile than their nonverbal IQ score, and (vi) scores lower than 1 *SD* below the mean on the majority of subtests of a standardized language test battery in both languages. If the children had not been tested within a year before the time of testing, we tested them for nonverbal IQ and for language level using standardized tests for English and for French to ensure that they met our inclusion criteria. For further details, see Paradis et al. (2003).

Table 1 summarizes the mean ages and MLU<sub>w</sub>s in both languages for the two groups of children. Mann–Whitney *U* comparisons between the two groups' MLU<sub>w</sub>s were not significant (English: BIL3TD 3.49 vs. BIL7SLI 3.86,  $z = -1.157$ ,  $p = .2472$ ; French: BIL3TD 3.71 vs. BIL7SLI 3.56,  $z = -.579$ ,  $p = .5628$ ).<sup>5</sup> Wilcoxon Signed Rank tests between the MLU<sub>w</sub>s in French (FRE) and English

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<sup>5</sup>Nonparametric tests are used for all the analyses because of the small sample sizes.

TABLE 1  
 Number in Sample, Ages in Months, and Mean Lengths of Utterance  
 in Words (MLUw) for the Bilingual and Monolingual Children

Group	Number	Age		French MLUw		English MLUw	
		Months	SD	No.	SD	No.	SD
BIL3TD	9	39.4	2.6	3.71	0.73	3.49	0.59
BIL7SLI	7	86.9	7.4	3.56	0.60	3.86	0.54
MON3TD	10	38.8	5.9	3.67	0.80	—	—
MON7SLI	10	91.7	7.3	3.98	1.40	—	—
MON7TD	10	87.9	4.6	5.70	0.83	—	—

*Note.* BIL3TD = typically developing (TD) bilingual 3-year-olds; BIL7SLI = bilingual 7-year-olds with specific language impairment (SLI); MON3TD = TD monolingual 3-year-olds; MON7SLI = monolingual 7-year-olds with SLI; MON7TD = TD monolingual 7-year-olds.

(ENG) for the BIL3TD group (FRE 3.71 vs. ENG 3.49,  $z = -0.840$ ,  $p = .4008$ ) and the BIL7SLI group (FRE 3.56 vs. ENG 3.86,  $z = -1.183$ ,  $p = .2367$ ) were also nonsignificant. Thus, these TD and SLI groups are matched with respect to overall language development, and the children within each group are reasonably balanced in their morphosyntactic abilities in French and English.

### 2.1.2. French Monolingual Children

This study includes three groups of monolingual French-speaking children: 10 typically developing 7-year-olds (MON7TD), 10 typically developing 3-year-olds (MON3TD), and 10 7-year-old children with SLI (MON7SLI). All these children participated in other studies, some of which included an examination of the use of object clitics and determiners in French (Paradis (2004), Paradis and Crago (2000; 2001; 2004), Paradis et al. (2003)). These children provide monolingual French comparison groups for the bilingual children who are the main focus of this study. All these monolingual children spoke the same dialect of French as the bilingual children and resided in the same area of Canada.

The monolingual children with SLI were recruited from special classes for children with language disorders at schools in the Greater Montreal and Sherbrooke areas; all children were receiving services from speech-language pathologists at the time of data collection and had to meet the same inclusion criteria, (i) to (v) in section 2.1.1, as the bilingual children. For the language-level criterion ((vi)), these monolingual children had to score at least 1.5 *SDs* below the age expected mean on a standardized test of language development.

Table 1 also includes the mean ages and French MLUws for the monolingual children. To be certain that these monolingual children made appropriate comparison groups for the bilingual children, we conducted a series of Mann–Whitney *U* and Kruskal–Wallis tests on ages and MLUws. There was no significant differ-

ence in the ages (in months) of the bilingual and monolingual 3-year-old groups (BIL3TD 39.4 vs. MON3TD 38.8,  $z = -0.408$ ,  $p = .6831$ ) or in the ages of the monolingual and bilingual 7-year-olds (BIL7SLI 86.9 vs. MON7TD 87.9 vs. MON7SLI 91.7,  $H(2) = 2.978$ ,  $p = .2256$ ). A comparison of the French MLUs among the children with SLI and the 3-year-olds was nonsignificant (BIL7SLI 3.56 vs. MON7SLI 3.98 vs. BIL3TD 3.71 vs. MON3TD 3.67,  $H(3) = .198$ ,  $p = .9779$ ), so these four groups can be considered matched on overall level of language development. As expected, each of these four groups had significantly lower MLUs than the normally developing monolingual 7-year-olds (BIL3TD 3.71 vs. MON7TD 5.70,  $z = -3.429$ ,  $p = .0006$ ; MON3TD 3.67 vs. MON7TD 5.70,  $z = -3.553$ ,  $p = .0004$ ; BIL7SLI 3.56 vs. MON7TD 5.70,  $z = -3.416$ ,  $p = .0006$ ; MON7SLI 3.98 vs. MON7TD 5.70,  $z = -2.797$ ,  $p = .0052$ ).

## 2.2. Procedures

For the bilingual children, we recorded 45-min spontaneous language samples on videotape in both French and English on separate occasions in the children's homes. In the case of the BIL7SLI group, the children interacted with a research assistant and a parent, both of whom spoke the language of the testing session natively. In the case of the BIL3TD group, the children interacted mainly with the parent who spoke the language of the session natively because it was thought that for children this age, the parent was the interlocutor with whom a child would feel most comfortable. For the monolingual children, we recorded 45-min spontaneous language samples on videotape as well in the children's homes. For the 7-year-old children, MON7TD and MON7SLI, the children interacted with a research assistant or a parent, but the 3-year-olds, MON3TD, interacted mainly with a parent, following the same rationale as for the bilingual 3-year-olds.

## 2.3. Transcription and Coding

We transcribed and coded videotapes following the conventions of the CHAT system and analyzed them using CLAN (MacWhinney (2000); see <http://childes.psy.cmu.edu>). First, we coded the language samples for contexts where direct object pronominalization was permissible. "Permissible context" was operationalized as follows: The referent for the direct object was mentioned within the previous 10 lines in the transcript. Along with identifying contexts where object pronominalization was permissible, we coded the object the child used in those contexts (French: zero object, clitic, *ça*, strong personal pronoun, lexical object; English: zero object, personal pronoun/demonstrative pronoun, lexical object). We also coded the data for whether the correct form of the pronoun was used in terms of person; number; and, for French, gender and wrong clitic (*y*, *en*, or *lui*). Finally, we coded the language samples for contexts where determiners were obligatory and definite articles would be the most felicitous choice, because the

specific referent was known to both speaker and hearer either through prior mention in the discourse or through general knowledge of surroundings, that is, *the sun, the kitchen*. We coded the children's use of a definite article in these contexts versus another type of determiner. If another kind of determiner other than a definite article was equally acceptable in the context, we excluded these cases from these analyses. For example, a definite article or a possessive such as *mon/my* were equally acceptable choices in many instances when the child was talking about the toys being played with.

Excerpts from the transcripts in (2) to (4) between mother (MOT), child (CHI), and father (FAT) illustrate different object types produced by the bilingual children in permissible contexts for pronominalization. No examples of lexical objects are given because, as shown in section 3, bilingual children did not use this option in French and made so few errors in English at all that we did not conduct a detailed error analysis for this language.

(2) Clitic/personal pronoun

- a. MOT: fais une comme ça.  
'do one like this.'
- CHI: on va toute le faire, maman?  
'we are going to do all of it, Mommy?'  
(Joh: BIL7SLI)
- b. FAT: tu veux montrer comment tu coupes des papiers?  
'you want to show how you cut paper?'
- CHI: le coupe avec ça.  
'cut it with this.'  
(Noa: BIL3TD)
- c. FAT: where did she land?
- CHI: the fire truck helped her.  
(Eri: BIL7SLI)
- d. MOT: and you'll have a pretty bedroom.
- CHI: eh, we'll paint it pink and purple?  
(Bea: BIL3TD)

(3) Zero object

- a. MOT: je va(is) la prendre tout à l'heure, okay?  
'I'm going to take it later, okay?'
- CHI: non, toi prendre.  
'no, you take.'  
(Eri: BIL7SLI)
- b. CHI: je veux d'autres cheveux.  
'I want other hair.'
- FAT: j'en ai déjà beaucoup.  
'I already have a lot.'

- CHI: je vais enlever.  
 ‘I’m going to take off.’  
 (Oli: BIL3TD)
- c. CHI: I’m gonna give it at my brother cause he like a lot.  
 (Eri: BIL7SLI)
- d. MOT: good, now do you wanna draw Franklin’s mommy?  
 CHI: can you do you(r)self (be)cause you’re a mommy turtle?  
 (Noa: BIL3TD)
- (4) Strong pronoun (French only)
- a. CHI: oui, mon grandpapa il dit je va(is) pas aider toi.  
 ‘yes, my grandpa says I’m not going to help you:SPRO.’  
 (Kyl: BIL7SLI)
- b. CHI: on va toi mettre dans le coin.  
 ‘we are going to put you:SPRO in the corner.’  
 (Gen: BIL3TD)

We conducted interrater reliability checks for both the transcripts and the coding. A different research assistant independently transcribed and coded approximately 10% of the corpus for each group of children, and then we made word-for-word and code-for-code comparisons with the originals, and we calculated an agreement percentage. For the bilingual children, we checked 10% of the corpus in each language for interrater reliability. Agreement percentages for transcription and coding ranged from 85 to 95%, with the lowest scores being for transcription of the children with SLI. The two research assistants together reviewed all discrepancies and arrived at a final decision through consensus. If the two assistants could not agree, the utterance was discarded from the analyses. For further details on reliability checks for these corpora, see Paradis (2004), Paradis et al. (2003), and Paradis and Crago (2000; 2001).

### 3. RESULTS

#### 3.1. Use of Pronouns by the Bilingual Children

We calculated the bilingual and monolingual children’s percent use of direct object clitics in French in pronominalization-permissible contexts and the bilingual children’s percent use of direct object pronouns in English (personal and demonstrative) in pronominalization-permissible contexts, and the results are presented in Table 2. Note that these percentages do not take into account correctness in form choice, so if a pronoun was used, even if it was the wrong number or gender, it was included in the numerator for these analyses. Wilcoxon Signed Rank tests



TABLE 2  
Percent Use of Object Clitics, Object Pronouns, and Definite Articles  
in Context by Bilingual and Monolingual Children in French and English

Group	French				English			
	Clitics		Articles <sup>a</sup>		Pronouns		Articles	
	%	SD	%	SD	%	SD	%	SD
BIL3TD	77.14	14.8	76.7/94.3 <sup>b</sup>	30.9	96.2	6.8	96.5	6.1
BIL7SLI	70.6	19.9	98.3	2.3	96.7	3.4	96.5	3.3
MON3TD	85.6	9.9	96.3	7.3	—	—	—	—
MON7SLI	47.3	14.7	90.4	0.3	—	—	—	—
MON7TD	97.6	2.9	99.7	0.7	—	—	—	—

*Note.* Direct object clitics = *me, te, le, la, (nous, vous), les*. Direct object pronouns = *me, you, him, her, it, them, that/this*. Definite articles in French = *le, la, les*. Definite article in English = *the*; BIL3TD = typically developing (TD) bilingual 3-year-olds; BIL7SLI = bilingual 7-year-olds with specific language impairment (SLI); MON3TD = TD monolingual 3-year-olds; MON7SLI = monolingual 7-year-olds with SLI; MON7TD = TD monolingual 7-year-olds.

<sup>a</sup>The percentage scores for articles in French are slightly different from those for determiners reported in Paradis and Crago (2004) and Paradis et al. (2003) for the bilingual children, because the scores in this study were calculated for definite articles only and not all determiners. We did this because the definite articles are homophonous with third-person clitics and because the indefinite feminine article *une* 'a' is a closed syllable and is thus not phonologically nonsalient.

<sup>b</sup>Two scores are presented because there is one anomalous score in this set that lowers the mean considerably. Analyses are conducted with both scores in the Results (section 3).

between the French and English means for the TD bilingual children and the bilingual children with SLI were significant, indicating the children used direct object clitics/pronouns more often in context in English than in French (BIL3TD: FRE 77.1% vs. ENG 96.2%,  $z = -1.960$ ,  $p = .0499$ ; BIL7SLI: FRE 70.6% vs. ENG 96.7%,  $z = -2.366$ ,  $p = .0180$ ). Mann–Whitney  $U$  comparisons between the two bilingual groups for each language revealed that the bilingual children with SLI used object pronouns and clitics to the same extent in each language as the TD younger bilingual children, as no significant differences were found (FRE: BIL3TD 77.1% vs. BIL7SLI 70.6%,  $z = -0.579$ ,  $p = .5628$ ; ENG: BIL3TD 96.2% vs. BIL7SLI 96.7%,  $z = -0.423$ ,  $p = .6720$ ).

### 3.2. Comparisons Between Bilinguals and Monolinguals in Pronoun Use in French

Regarding comparisons between the monolinguals and the bilinguals in French, a series of Mann–Whitney  $U$  tests showed the following: Both groups of bilingual children used clitics less often in context than the monolingual TD 7-year-olds

(BIL3TD 77.1% vs. MON7TD 97.6%,  $z = -3.465$ ,  $p = .0005$ ; BIL7SLI 70.6% vs. MON7TD 97.6%,  $z = -3.025$ ,  $p = .0025$ ). The bilingual children with SLI used clitics more often than the monolingual children with SLI but to the same extent as the monolingual TD 3-year-olds (BIL7SLI 70.6% vs. MON7SLI 47.3%,  $z = -2.440$ ,  $p = .0147$ ; BIL7SLI 70.6% vs. MON3TD 85.6%,  $z = -1.535$ ,  $p = .1248$ ). The bilingual TD 3-year-olds showed the same pattern in that they used object clitics more often than the monolinguals with SLI, but they used them to the same extent as their monolingual TD age peers (BIL3TD 77.1% vs. MON7SLI 47.3%,  $z = -3.110$ ,  $p = .0019$ ; BIL3TD 77.1% vs. MON3TD 85.6%,  $z = -1.155$ ,  $p = .2482$ ).

### 3.3. Comparisons in Use of Pronouns and Definite Articles in French and English

Returning to Table 2, the children's percent use of definite articles in contexts requiring a definite article in French and English or French only are given in addition to their percent use of object clitics. Unlike the data for clitics and pronouns, both bilingual groups had similar scores for the use of definite articles in both languages, as indicated by nonsignificant Wilcoxon Signed Rank tests (BIL3TD: FRE 76.7% vs. ENG 96.5%,  $z = -.944$ ,  $p = .3452$ ; BIL7SLI: FRE 98.3% vs. ENG 96.5%,  $z = -8.39$ ,  $p = .4017$ ). Note that the absolute mean for the bilingual 3-year-olds in French is substantially lower than the absolute mean score for English. This result is due to the effect of one child's score; without this child's score included, the group mean is 94.3%, and the Wilcoxon test is also nonsignificant when performed with this child's score excluded,  $z = -.365$ ,  $p = .7150$ .

Mann-Whitney  $U$  comparisons showed that the bilingual children with SLI used definite articles to the same extent as the 3-year-old bilinguals in both languages (FRE: BIL3TD 76.7% vs. BIL7SLI 98.3%,  $z = -.159$ ,  $p = .8738$ ; ENG: BIL3TD 96.5% vs. BIL7SLI 96.5%,  $z = -.794$ ,  $p = .4273$ ). Again because of the single anomalous score in the bilingual 3-year-old group in French, we reran the analysis without this score, and it was still nonsignificant,  $z = -.231$ ,  $p = .8170$ .

Comparing the use of object clitics and articles in French with Wilcoxon Signed Rank tests revealed the following: Both the bilingual and monolingual children with SLI had a higher percent use of definite articles (ART) than object clitics (CLI) in French (BIL7SLI: CLI 70.6% vs. ART 98.3%,  $z = -2.366$ ,  $p = .0180$ ; MON7SLI: CLI 47.3% vs. ART 90.4%,  $z = -2.803$ ,  $p = .0051$ ). The monolingual TD 3-year-olds also had a higher percent use of articles than clitics in French (MON3TD: CLI 85.6% vs. ART 96.3%,  $z = -2.310$ ,  $p = .0209$ ), and the bilingual TD 3-year-olds did not show this pattern with the anomalous score included (BIL3TD: CLI 77.1% vs. ART 76.7%,  $z = -1.540$ ,  $p = .1235$ ), but a significant difference emerged in the analysis with the score excluded (BIL3TD: CLI 77.1% vs. ART 94.3%,  $z = -1.992$ ,  $p = .0464$ ).

### 3.4. Use of Other Objects in Contexts for Pronominalization in French

When the bilingual and monolingual children did not use an object clitic in French, they used a variety of other object types, and the frequency distributions of the other object types are presented in Table 3. Because of the small number in each category, the strong pronouns and the demonstrative *ça* are combined. The most common nonclitic object type was a zero object, or object omission, for both the bilingual and monolingual children. However, bilinguals and monolinguals differed in their use of nonclitic nonzero object types. The bilinguals used only strong pronouns, and the monolinguals tended to use more lexical objects than strong pronouns. A significant chi-square analysis,  $\chi^2(6, N = 36) = 49.79, p < .0001$ , confirms that there was an interaction between group and object type.

### 3.5. Accuracy With Pronoun Forms in French and English

We now turn to examining the children's form choice accuracy with object clitics and pronouns when they did use them. We calculated the percentage of correct forms used out of the total number of pronouns used. Codes for incorrect forms included errors in person, number, or gender (French only) or wrong clitic, that is, *y* or *en* or *lui* (French only); gender and wrong clitic were the most prevalent error forms in French. Results of this analysis for both the bilingual and monolingual children are presented in Table 4. We excluded the monolingual TD 7-year-olds because they had a negligible number of substitution errors. Overall, both the bilingual and monolingual children were more accurate in their form choice for pronouns than they were at supplying them in French because the percentage means are higher in Table 4 than in Table 2. Mann–Whitney *U* comparisons revealed no difference between the bilingual groups in their levels of form choice accuracy in either French or English (FRE: BIL3TD 81.6% vs. BIL7SLI 85.7%,  $z = -0.637, p > .05$ ; ENG: BIL3TD 100% vs. BIL7SLI 98.4%,  $z = 0.524, p > .05$ ), but the

TABLE 3  
Frequencies of Nonclitic Objects Used by the Monolingual and Bilingual Children in Object Pronominalization Contexts

<i>Group</i>	<i>Lexical</i>	<i>Strong Pronoun and ça</i>	<i>Zero Object</i>
BIL3TD	0	5	10
BIL7SLI	0	12	27
MON3TD	8	1	19
MON7SLI	18	4	122

*Note.*  $\chi^2(6, N = 36) = 49.8, p < .0001$ . BIL3TD = typically developing (TD) bilingual 3-year-olds; BIL7SLI = bilingual 7-year-olds with specific language impairment (SLI); MON3TD = TD monolingual 3-year-olds; MON7SLI = monolingual 7-year-olds with SLI.

TABLE 4  
 Percentage Correct Form Choice for Object Clitics and Object Pronouns  
 for Bilinguals (French and English) and Monolinguals (French Only)

Group	French		English	
	%	SD	%	SD
BIL3TD	81.6	14.2	100	0.0
BIL7SLI	85.7	14.1	98.4	3.2
MON3TD	97.3	4.2	—	—
MON7SLI	70.5	20.1	—	—

*Note.* BIL3TD = typically developing (TD) bilingual 3-year-olds; BIL7SLI = bilingual 7-year-olds with specific language impairment (SLI); MON3TD = TD monolingual 3-year-olds; MON7SLI = monolingual 7-year-olds with SLI.

monolinguals with SLI were less accurate than the monolingual TD 3-year-olds (MON7SLI 70.5% vs. MON3TD 97.3%,  $z = -3.429$ ,  $p = .0006$ ).

There was a difference in accuracy levels between the two languages of both groups of bilinguals. According to Wilcoxon Signed Rank tests, the bilingual 3-year-olds were more accurate in English than in French (BIL3TD: FRE 81.6% vs. ENG 100%,  $z = -2.023$ ,  $p = .043$ ). Although the absolute scores for the bilinguals with SLI showed the same tendency, their between-language comparison fell short of conventional statistical significance (BIL7SLI: FRE 85.7% vs. ENG 98.4%,  $z = -1.859$ ,  $p = .063$ ). Turning now to bilingual and monolingual comparisons for French, Mann–Whitney  $U$  tests indicated no differences in accuracy with form choice of object clitics between the 7-year-olds with SLI or between the TD 3-year-olds in spite of the differences in the absolute scores (BIL7SLI 85.7% vs. MON7SLI 70.5%,  $z = -1.025$ ,  $p > .05$ ; BIL3TD 81.6% vs. MON3TD 97.3%,  $z = -1.877$ ,  $p > .05$ ).

#### 4. DISCUSSION

Both theoretical perspectives on SLI predict object clitics in French to be vulnerable in impaired language learners; however, these perspectives differ in some more specific predictions concerning the acquisition of object clitics, and we now discuss which predictions are supported by these data.

##### 4.1. Bilingual Versus Monolingual Children

According to the GSH/SH, bilingual children with SLI should be more delayed in their acquisition of a vulnerable structure such as object clitics than monolingual children, whereas the DD/EUCC does not predict a monolingual–bilingual differ-

ence. We found that the bilinguals with SLI did not perform worse than the monolinguals on either percent use of clitics in context or correctness with form choice, which would be expected if they were delayed compared to monolinguals in their acquisition. Indeed, the bilingual children had a higher percentage of object clitic use than the monolinguals. Definite articles are another structure the GSH/SH would predict to be more delayed in affected children acquiring two languages, and yet the bilingual children with SLI in this study were acquiring them at the same rate as monolinguals. Therefore, the results of this study are not consistent with the GSH/SH's predictions concerning bilingual–monolingual differences among the children with SLI.

That bilinguals would be more advanced than monolinguals in their acquisition of a complex morphosyntactic structure seems to be a surprising finding. However, in contrast to the predictions of the GSH/SH, it has been suggested elsewhere for typical acquisition that dual-language learning may have a facilitative effect on the emergence of late-acquired structures in one language if the other language's counterpart structure emerges earlier in acquisition (Gawlitzek-Maiwald and Tracy (1996), Kehoe, Trujillo, and Lleó (2001), Paradis and Genesee (1996)). Perhaps the coextensive development of the English pronoun system acquired earlier confers some advantages on children's French pronominal development. This speculation on a potential facilitation effect of dual language development must be tempered by the fact that the TD bilinguals in this study did not outperform their monolingual age mates in use of object clitics overall; furthermore, a superior performance of the bilinguals over the monolinguals with SLI was evident neither in form choice accuracy for clitics nor in tense morpheme production in Paradis et al. (2003). Thus, this difference between the bilinguals and monolinguals in clitic use still awaits a conclusive explanation.

In addition to facilitation effects in bilingual acquisition, researchers have examined cross-linguistic influence between the languages of simultaneous bilingual children at the discourse-pragmatics syntax interface with respect to argument omission and pronominalization (Hulk (2000), Müller and Hulk (2001), Paradis and Navarro (2003), Serratrice, Sorace, and Paoli (2004)). Such cross-linguistic effects may be at the root of the skew in error types shown in Table 3 in which the bilingual children used more strong pronouns in direct object position than the monolinguals. Because French and English both have strong pronouns and postverbal lexical direct objects, and strong pronouns in French can appear postverbally in peripheral positions, this language pair displays the kind of overlap in the surface distribution for an interface structure that is often associated with transfer (Müller and Hulk (2001), Paradis and Navarro (2003), Serratrice et al. (2004)). For these bilingual children, the English system seems to be exerting an effect on the French system. The appearance of strong pronouns in direct object position in lieu of the more felicitous clitic has also been documented in English first language/French second language children (Paradis (2004)). However, this cross-linguistic influence in error forms notwithstanding, the performance of monolin-

guals and bilinguals was not qualitatively different overall. For example, form choice errors in clitics were not substantially distinct for the two groups, and object omissions were the most common error for both groups when a clitic was not used.

#### 4.2. Children With SLI Versus Unaffected Language-Matched Children

According to the DD/EUCC, object clitics in French should be a disrupted structure in impaired acquisition, and thus, children with SLI should display more of a delay with this structure than younger, TD children matched for level of language development. In contrast, the GSH/SH predicts that children with SLI will show a straightforward delay in their acquisition of object clitics and thus should appear similar to language-matched younger children in their use of object clitics. The monolingual children with SLI performed worse than the TD monolingual 3-year-olds for both percent use in context and correct form choice; however, the bilingual children with SLI performed the same as their unaffected language peers for both percent use in context and correct form choice. Hence, the monolingual children with SLI show a deviant profile, whereas the bilinguals show a delay profile.

To investigate further whether children with SLI show greater difficulties than TD MLU-matched children in the acquisition of object clitics in French, we pooled the data from the bilingual and monolingual children to make three groups, with the following percentage means for clitic use: TD 7-year-olds ( $M = 97.6\%$ ,  $SD = 2.9$ ), TD 3-year-olds ( $M = 81.6\%$ ,  $SD = 12.8$ ), and 7-year-olds with SLI ( $M = 56.9\%$ ,  $SD = 20.3$ ). Pooling creates a large base from which the mean is calculated and hence might yield more reliable results. The pattern illustrated by the pooling is the one predicted by the DD/EUCC, a stepwise decrease in use rates from the TD age peers to the TD language peers to the children with SLI. The stepwise pattern is confirmed by a significant one-way between-subject analysis of variance,  $F(2, 41) = 25.2$ ,  $p < .0001$ , followed by post hoc Fisher's least significant difference  $t$  tests showing  $SLI < 3TD < 7TD$ . The pooled data from monolinguals and bilinguals for form choice also showed the  $SLI < 3TD$  pattern as confirmed by a significant unpaired  $t$  test on the resulting means: 3TD 91.8% vs. SLI 75.04%,  $t(35) = 3.209$ ,  $p < .003$ .

In sum, although the monolingual data and pooled data are compatible with the DD/EUCC, the data from the bilingual children alone are more consistent with the GSH/SH.

#### 4.3. Object Clitics Versus Definite Articles

According to the GSH/SH, object clitics and definite articles in French should be equally difficult for children with SLI, whereas the DD/EUCC predicts object clitics to be more difficult than definite articles in either French or English (but

see footnote 4). Our results show that both the bilingual and monolingual children with SLI were at near-ceiling accuracy in their use of definite articles in French, which contrasted significantly with their use of object clitics. The bilingual children displayed similar and high accuracy between their languages in the use of articles. This comparison shows that the difficulty children with SLI experience with respect to object clitics is not easily reducible to perceptual salience (see also Bottari et al. (1998), Jakubowicz et al. (1998)), contrary to the assumptions of the GSH/SH account, and therefore more likely resides in the linguistic domain, as predicted by the DD/EUCC.<sup>6</sup>

From Tomasello's (2003) domain-general Constructivist/Usage-based theory, an additional difficulty object clitics pose for learners that definite articles do not could be the distributional variation associated with direct objects in French. Lexical DPs are verb complements, but pronouns are preverbal clitics, whereas definite articles always appear first in the DP whether the DP is a subject or object and whether there is an adjective present or not. Matthews, Lieven, Theakston, and Tomasello (2004) argued that distributional variations in French input with respect to direct objects are a probable cause of French–English cross-linguistic differences in monolingual children's acquisition of transitive constructions. However, even if we extend the Usage-based account to SLI to explain the discrepancy in definite article and clitic production, this account, like the GSH/SH, would make incorrect predictions regarding the performance of bilinguals compared to monolinguals. As mentioned in section 1.1, a Usage-based theory of acquisition predicts bilinguals to be delayed (Tomasello (2004)).

Whereas prior research has found definite articles to be acquired early by French-speaking children with SLI, prior research on English has found that children with SLI omit articles, although not as frequently as tense-marking morphology (Leonard et al. (1997), Rice and Wexler (1996)). The discrepancy between these results and those of this study is most likely due to the age of the children with SLI. The other researchers studied 5-year-olds, and our participants were 7-year-olds, so it is possible that article omission resolves by age 7 in children with SLI. Another relevant cross-linguistic difference lies between French and Italian for definite articles. Because Italian is predicted to have the same EUCC-driven

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<sup>6</sup>As an alternative explanation to that offered by EUCC, one anonymous reviewer suggested that the distinction between why object clitics on one hand are vulnerable and subject clitics and articles on the other hand are accurately produced could boil down to syntactic necessity, along the lines of Sorace (2004). Determiners are required almost all the time in French, and subject clitics can be analyzed as agreement morphology, so both could be construed as part of "narrow" syntax, whereas choice of pronoun or lexical DP depends on the interface between syntax and discourse pragmatics. In Sorace's framework, interface syntactic structures are considered vulnerable in a variety of acquisition and attrition contexts. However, choice of definite versus indefinite article does depend on the discourse-pragmatic interface with syntax, and thus, the D-domain is not free of interface properties in the same way as subject–verb agreement is. Therefore, an analysis based solely on the notion that interface structures will pose problems for children with SLI would not be as consistent with our data as the EUCC.

effects on object clitic acquisition in children with SLI, why do Italian-speaking children with SLI also have difficulty with articles? Bottari et al. (1998; 2001) argued that the language-specific, parameter-based syntactic properties of Det underlie why they are so difficult in Italian rather than other factors such as perceptual salience, although they have not elaborated fully on what those properties are. This contrast in French and Italian SLI with respect to articles could potentially be explained by a fine-grained comparison of the syntactic properties of DP internal structure in the two languages, although such an analysis is beyond the scope of this study.

## 5. CONCLUSION

The data from these bilingual children are not consistent with theories of SLI claiming that morphosyntactic deficits are *solely* the outcome of general limitations in cognitive/perceptual processing; therefore, theories like the DD/EUCC that claim domain-specific deficits to be components of SLI make a more parsimonious account of these data. Examining the results of this study together with those of Paradis et al. (2003) adds further support for this domain-specific account. The DD/EUCC predicts that tense-marking morphology will be vulnerable in both French and English and direct object pronouns will be vulnerable in French but not in English. The French–English bilingual children displayed exactly this cross-linguistic pattern with tense morphemes and pronouns across the two studies. Target comparisons between homophonous tense and nontense morphemes and between homophonous clitics and articles revealed how the vulnerability is due to linguistic structure and not to surface phonological form. Furthermore, in this study and Paradis et al. (2003), the bilingual children achieved similar or superior levels of accuracy with both vulnerable and nonvulnerable morphemes as their monolingual peers with SLI, which is also consistent with a DD/EUCC account because vulnerability of a morpheme is not determined by quantity of input. Finally, a EUCC analysis of these bilingual children's morphosyntactic development illustrates how one universal linguistic constraint can impact similarly on the acquisition of tense morphology in two languages but differentially on the acquisition of the pronominal system in the same two languages, even when these languages reside within the mind of one child.

On the other hand, there are still some unresolved issues regarding how our data fit with a DD/EUCC account. For example, a deviant profile for SLI was not borne out by the bilingual data for object clitic acquisition. It would be worth examining tense morpheme use in the bilingual TD group to ascertain whether the bilinguals with SLI display a deviant profile for this vulnerable structure in French, English, or both. Another issue is the inability of the EUCC to explain differences in degree of difficulty with disrupted structures. The bilingual and monolingual children with SLI had much more difficulty with clitics than with tense in



French because they produced the past auxiliary in 80.2% and 82.8% of obligatory contexts, respectively (Paradis et al. (2003)), but in this study, they produced clitics in 70.6% and 47.3% of permissible contexts, respectively. If the EUCC underlies both tense morphemes and clitic omission, why is children's difficulty producing one of these structures resolving faster than the other? Further refinement of the EUCC account is needed to explain this asymmetry (see also Hamann (2003) and Jakubowicz and Nash (2001)).

It is important to point out that even though our data are more consistent with a DD/EUCC account, this study does not suggest that children with SLI have no limitations in cognitive/perceptual processing. We did not design this study to test processing directly through working memory tasks or by measuring reaction times; moreover, there is empirical evidence that such processing limitations are apparent in children with SLI as cited in section 1.1. This study suggests that the impact of these domain-general processing limitations on language-learning outcomes may not be as straightforward as one might expect. For example, Lahey et al. (2001) and Ellis Weismer et al. (1999) failed to find a relationship between children with SLI's speed of processing and verbal working memory on one hand and measurements of their language attainment on the other. This study of bilingual children with SLI also provides evidence pointing to the need for some bridging explanation linking cognitive/perceptual limitations in children with SLI to their actual language learning outcomes. In our view, part of such a bridging explanation could be that certain domain-specific deficits are a component of the etiology of SLI. We suggest that some target structures have inherent morpho-syntactic complexity for impaired learners and thus will undergo a very protracted acquisition path and be mastered much later, if at all. In the case of the EUCC, complexity refers to structures that require double-checking of D features, but other approaches pinpoint different defining characteristics, for example, the Computational Complexity Hypothesis (Jakubowicz and Nash (2001), Jakubowicz et al. (1998)). The main point is that complexity can be defined in terms of domain-specific, linguistic criteria and not necessarily be derivable from general perceptual and cognitive mechanisms. Effectively, domain-specific deficits in SLI could be considered orthogonal to domain-general deficits such that a hybrid theoretical account of SLI could incorporate both.

Finally, this study, together with Paradis et al. (2003) and Paradis and Genesee (1996), shows that bilingual children, with and without SLI, can attain levels of grammatical ability akin to their monolingual age peers; they are capable of similar accomplishments with less time-on-task experience with each language (but see Gathercole (2002)). This outcome is a striking indication that the mind has the capacity to acquire the morphosyntax of more than one language in childhood without significant developmental delay for typical learners and without increased complications for children learning language under conditions of impairment. As such, the success of dual-language learning in children poses a challenge to the aforementioned theories of morphosyntactic acquisition, both for typical

and atypical learners, that rely heavily on input frequency or time-on-task as an explanatory factor for rate of acquisition and cross-linguistic differences. On the practical side, the linguistic strengths displayed by bilingual children with SLI should be recognized by parents, educators, and speech-language pathologists when making decisions about whether dual-language learning should be encouraged for children affected by this disorder.

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