Domain-General versus Domain-Specific Accounts of Specific Language Impairment:
Evidence from Bilingual Children’s Acquisition of Object Pronouns

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Abstract

This study tested the predictions of two 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. The children’s use of direct object clitics/pronouns and definite articles in French and English were analyzed. 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. It is argued 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.
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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 children – they have normal social-emotional development and non-verbal intelligence, normal-range hearing abilities, and no frank neurological damage. SLI is a developmental language disorder inherent to the individual; however, the underlying cause of this disorder is still the subject of on-going debate (e.g. Tager-Flusberg and Cooper, 1999; Rice & Warren, 2005). The purpose of this study was to bring crosslinguistic 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 crosslinguistic variations in its surface manifestations in both monolingual and bilingual children. Examining the morphosyntax of bilingual children can contribute unique evidence to understanding crosslinguistic 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 crosslinguistic 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 extra-linguistic 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 this study was not aimed at the above-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, since tense-marking is noted to be problematic in both monolingual French and English SLI, the Paradis et al (2003)
study could not reveal whether crosslinguistic 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, typically-developing (TD) bilingual 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 crosslinguistic differences and about the relationship between the performance of typically-developing language-matched children and older children with SLI. The present study is a follow-up to Paradis et al (2003) where an aspect of morphosyntax predicted to show crosslinguistic differences, direct object pronouns, is examined in both the English and French of the bilingual children with SLI as well as in younger, unaffected bilingual children. In so doing, this investigation was designed 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 & Hesketh, 1999; Leonard & Eyer, 1996; Leonard, Caselli, Bortolini, & McGregor, 1992; Leonard, Eyer, Bedore & Grela, 1997; Marton & Schwartz, 2003; Miller, Kail, Leonard & 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 & Huang, 1999; Windsor, Milbrath, Carney, & Radowski, 2001; but see Lahey, Edwards & Munson, 2001). Thus, the GSH predicts that a child 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, typically-developing (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. Most important, the GSH would predict that bilingual children with SLI should display more profound global delay in language development than monolinguals with SLI in each language. Since 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

1 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, where 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 & Warren, 2005).
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 has been 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 (Leonard et al, 1992; Leonard & 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 like final consonant and weak syllable deletion more than unaffected age-mates, Leonard and his colleagues hypothesized that grammatical morphemes of short duration, or otherwise phonologically non-salient, would be more difficult for children with SLI to perceive and encode in a stable representation. By extension, these non-salient 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 gleaning grammatical information like NUMBER or PERSON from inflectional morphemes and establishing paradigmatic relations between them.

A combined GSH and Surface Hypothesis (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, while 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 inflection (Bortolini, Caselli & Leonard, 1997; Leonard & Eyer, 1996; Leonard et al, 1992; Leonard et al, 1997). This crosslinguistic difference can be explained by the SH since finite verb inflections in English like third person singular [-s] and past [-ed] are mainly expressed through single consonantal allophones of brief phonetic duration, while all of the Italian morphemes except third person plural 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, since Leonard and colleagues wrote that “…a greater number of exposures will be required before these brief grammatical morphemes are established in the grammar” (Leonard et al, 1997: 743).

In contrast to domain-general approaches like GSH/SH, other accounts hypothesize that specific deficits in linguistic representation are an etiological component of SLI (Bottari, Cipriani, Chilosi & Pfanner, 1998, 2001; Clahsen, Bartke & Göllner, 1997; Jakubowicz & Nash, 2001; Rice & Wexler, 1996; Rice, 2003; van der Lely, 2003; Wexler, 2003, to appear). 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) has put forward a Disruption-within-Delay (DD) account
of SLI wherein certain grammatical morphemes in a language are much more affected, “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’ research has shown the following findings that support this description of SLI morphosyntax: (1) English-speaking children with SLI have significantly greater difficulties with tense-marking morphemes than they do with non-tense-related morphemes. This effect emerges even for homophonous morphemes that appear in similar phonological positions and have similar allomorphs, e.g., third person singular [-s] and plural [-s]; (2) Children with SLI are less accurate with tense morphemes than younger, language-matched TD children, but not necessarily with non-tense-related morphemes (Rice, 2003, 2004; Rice & Wexler, 1996; Rice, Wexler & Cleave, 1995; Rice, Wexler & Hershberger, 1998; Oetting & Rice, 1993; Rice and Oetting, 1993). Crago and Paradis (2003) and Paradis and Crago (2001) found parallel patterns for tense- and non-tense-related morphemes in French SLI. Children frequently omitted the third person past auxiliary verb, a ‘have’, while they produced the homophonous preposition, à ‘to’, most of the time, and furthermore, the children with SLI performed worse than the younger TD children for the past auxiliary (see also Jakubowicz & Nash 2001). Finally, Paradis et al (2003) found that tense morphemes were used less accurately than their homophonous non-tense counterparts in both languages of French-English bilinguals with SLI. In sum, these among other empirical
outcomes form the basis of Rice’s proposal that children with SLI have a selective deficit in linguistic representation pertaining to the grammatical feature tense that cannot be explained straightforwardly by extra-linguistic factors such as perceptual salience, or by global language delay as interpreted to mean equivalency with younger, TD language-level matches.

Domain-specific accounts like 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; to appear). Adopting a minimalist approach (e.g. Chomsky, 1995), Wexler assumes that subject DPs, move to check D features against Tns and AgrS projections because on these projections D features are [-interpretable], and so must be checked and deleted or the derivation will not converge. Wexler proposes that in the immature grammars of children younger than three years of age, checking DPs twice may be too complex, and 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) assumes 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
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morbidity 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 and so they gradually use tense morphology more reliably. Wexler proposes 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 (Wexler, 2003; to appear). 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, and 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 described above from Leonard and colleagues for finite verb morphology (Wexler, to appear). 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; to appear), which we discuss in Section 1.3. In sum, the EUCC proposal defines, in formal terms, computational limitations on the impaired linguistic system that are domain-specific, i.e., 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, typically-developing 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.

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 make them difficult for learners with impaired linguistic systems. Inherent means that complexity is defined within the linguistic system, i.e., the computational component and

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 DD account in particular with respect to delayed versus deviant profiles of SLI. But we would like to point out that other domain-specific SLI accounts, such as the Computational Complexity Hypothesis, make similar predictions regarding children with SLI’s performance with object clitics and tense in French (Jakubowicz & Nash, 2001; Jakubowicz, Nash, Rigaut & Gérard, 1998).
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 atypical acquisition. Children with SLI have pronounced difficulties when compared to TD children in accurately producing object clitics in both Italian (Bortolini, Caselli, Deevy, & Leonard, 2002; Bottari et al, 1998, 2001; Leonard at al, 1992) and Spanish (Bedore & Leonard, 2001; Bosch & Serra, 1997; De la Mora, Paradis, Grinstead, Flores & Cantu, 2004; Jacobson & Schwartz, 2002; but see Wexler, Gavarró & 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 to 3;0, and object omissions are the most common errors in contexts where pronominalization is felicitous (Chillier, Arabatzi, Baranzini, Cronel-Ohayon, Deonna, Dubé, Franck, Frauenfelder, Hamann, Rizzi, Starke & Zesiger, 2001; Clark, 1985; Hamann, Rizzi, & Frauenfelder, 1996; Granfeldt & Schlyter, 2004; Hulk, 2000; Jakubowicz & Rigaut, 2000; Jakubowicz, Müller, Kang, Riemer & Rigaut, 1996; Kaiser, 1994). As in Italian and Spanish, the acquisition of object clitics is highly problematic for French-speaking children with SLI since they use object clitics intermittently, frequently producing sentences with object omissions even past the age of

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 & Wexler, 1996). Prior research shows 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 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, McGregor, 1993; Paradis, 2004; Paradis & Crago, 2004). By contrast, Italian-speaking children with SLI display difficulties with both clitics and definite articles (Bottari et al, 1998, 2001; Bortolini et al, 1997; Bortolini et al, 2002; 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, where strong pronouns have a full DP shell, and weak and clitic pronouns’ maximal structure is a subconstituent of DP (e.g. Cardinaletti & Starke, 1999; 2000; Déchaine & 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 & Wilschko, 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 (1a) and (1b), while clitic pronoun direct objects appear preverbally, (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 banane 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 while English direct object pronouns do not? Both 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 & Starke, 1999; Kayne, 1975), or base-generation and movement combined (Sportiche, 1996; Jakubowicz et al, 1998); purely morphological base-generated approaches are more developed for subject rather than object clitics, even for Canadian French (e.g. Auger, 1995 Roberge, 1986). Adopting Sportiche (1996)’s combined account, Wexler and colleagues offer an explanation of why sentences with object clitics violate the UCC while sentences with DP object pronouns like in English do not (Tsakali & Wexler, 2003; Wexler, to appear; 2002; Wexler, Gavarró & Torrens, 2004). In this account,
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Object clitics are base-generated as heads of a functional projection in INFL, Clitic Phrase (CIP). The object clitics are in a dependency relationship 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, while 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 discussed above for the tense/agreement omission, clitic use and omission would alternate in the speech of a child, since 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 Tskali & Wexler 2003; Wexler, 2002; to appear; 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, e.g. GENDER and NUMBER (see predictions in Leonard & Eyer, 1996 and Leonard et al, 1992 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, e.g. je le vois ‘I see him’ vs. 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 since English has natural not grammatical gender, and so paradigm building is more complex in French. (although presumably not as complex as Italian or Spanish where 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 under go elision before a vowel-initial noun, e.g., le professeur de mon fils ‘the teacher of my son’, vs. 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. (1) For domain-specific theories like DD/EUCC, acquisition timetables for object pronouns need not be slower in bilinguals in comparison to monolinguals; whereas, domain-general theories like GSH/SH would predict bilingual children with SLI to be slower. (2) 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, typically-developing 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.\footnote{Although some of the studies designed to test the SH found children with SLI to be worse than MLU-matched TD children on some measures (Bortolini et al, 1997; Leonard et al, 1992; Leonard et al, 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.}

3 In the case of GSH/SH, clitics should be as difficult as other morphemes that are equally perceptually non-salient, for example, definite articles; whereas, the DD/EUCC does not explicitly predict definite articles to be disrupted in impaired acquisition\footnote{Difficulty with definite articles is not ruled out by the UCC, as Wexler (1998) speculates on the possibility of a developmental stage where children assume D features in the DP to be non-interpretable, in which case, checking D-features within the DP twice would be blocked in the computation by the UCC. However, Wexler (1998, 2003) does not present empirical findings or straightforward predictions for how such a stage would result in omission of determiners; whereas, he does explicitly predict the omission of object clitics. See also Jakubowicz et al (1998) and Bottari, Cipriani, Chilosi & Pfanner (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.}, 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: 7 French-English simultaneous bilingual seven-year-olds with SLI (BILSLI) and 9 typically developing simultaneous bilingual French-English three-year-olds who were matched by mean length of utterance in words (MLUw) to the bilingual children with SLI in both languages (BILTD). The BILSLI 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 BILSLI and BILTD 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, where each parent spoke mainly or exclusively their native language to the child. The other two children, both in the BILSLI 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: (1) hearing levels within normal limits; (2) no stuttering; (3) no severe phonological disorder; (4) no frank neurological problem; (5) non-verbal intelligence
within the normal limits, and verbal intelligence at least 1.5 standard deviations (SDs) below the age-expected mean, or in a substantially lower percentile than their nonverbal IQ score; (6) 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 in order to ensure that they met our inclusion criteria. For further details, see Paradis et al (2003).

Table 1 summarizes the mean ages and MLUws in both languages for the two groups of children. Mann Whitney U comparisons between the two groups’ MLUws were not significant (English: BIL3TD 3.49 vs. BIL7SLI 3.86, $z = -1.157, p = .2472$; French: BIL3TD 3.71 vs. BIL7SLI 3.56, $z = -.579, p = .5628$). Wilcoxon Signed Rank tests between the MLUws in French and English for the BIL3TD group (FRE 3.71 vs. ENG 3.49, $z = -0.840, p = .4008$) and the BILSLI group (FRE 3.56 vs. ENG 3.86, $z = -1.183, p = .2367$) were also non-significant. 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 seven-year-olds (MON7TD), 10 typically-developing three-year-olds (MON3TD), and 10 seven-year-old children with SLI (MON7SLI). All these children participated in other studies, some of which included an examination of use of object clitics and determiners in French (Paradis, 2004; Paradis

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5 Non-parametric tests are used for all the analyses because of the small sample sizes.
& 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, (1) to (5) above, as the bilingual children. For the language level criterion, (6), 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. In order to be certain that these monolingual children made appropriate comparison groups for the bilingual children, we conducted a series of Mann Whiney U and Kruskal-Wallis tests on ages and MLUws. There is no significant difference in the ages (in months) of the bilingual and monolingual three-year-old groups (BIL3TD 39.4 vs. MON3TD 38.8, \( z = -0.408, p = .6831 \)), or in the ages of the monolingual and bilingual seven-year-olds (BIL7SLI 86.9 vs. MON7TD 87.9 vs. MON7SLI 91.7, \( H(2) = 2.978, p = .2256 \)). A comparison of the French MLUws among the children with SLI and the three-year-olds was non-significant (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 MLUws than the normally-developing monolingual seven-year-olds.
Object Pronouns in Bilingual SLI

(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, 45-minute spontaneous language samples were recorded 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 both a research assistant or with 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 a child would feel most comfortable with. For the monolingual children, 45-minute spontaneous language samples were recorded on videotape as well in the children’s homes. For the seven-year-old children, MON7TD and MON7SLI, the children interacted with a research assistant or a parent, but the three-year-olds, MON3TD, interacted mainly with a parent, following the same rationale as for the bilingual three-year-olds.

2.3 Transcription and Coding

Videotapes were transcribed and coded following the conventions of the CHAT system and analyzed using CLAN (MacWhinney, 2000; childes.psy.cmu.edu). First, the language samples were coded 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, the object the child
used in those contexts was coded (French: zero object, clitic, ça, strong personal pronoun, lexical object; English: zero object, personal pronoun/demonstrative pronoun, lexical object). The data were also coded 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, the language samples were coded 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, i.e., the sun, the kitchen. The children’s use of a definite article in these contexts versus another type of determiner was coded. If another kind of determiner other than a definite article was equally acceptable in the context, these cases were excluded from the present analyses. For example, a definite article or a possessive like 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) 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 a detailed error analysis was not conducted for this language.

(2) Clitic/personal pronoun
   a. MOT: fais une comme ça.
      ‘do one like this’
      CHI: on va toute le faire maman? (joh: BIL7SLI)
       ‘we are going to do all of it, Mommy?’
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’

(c) 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’

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’

c. CHI: I’m gonna give it at my brother  
cause he like a lot.  

(3) Zero object

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?
Inter-rater reliability checks were conducted for both the transcripts and the coding. Approximately 10% of the corpus for each group of children was transcribed and coded independently by a different research assistant, and then word for word and code for code comparisons were made with the originals, and an agreement percentage was calculated. For the bilingual children, 10% of the corpus in each language was checked for inter-rater reliability. Agreement percentages for transcription and coding ranged from 85% to 95%, with the lowest scores being for transcription of the children with SLI. All discrepancies were reviewed by the two research assistants together, and a final decision arrived at 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

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 were calculated, 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 between the French and English means for the TD bilingual children and the bilingual children with SLI were significant, indicting the children used direct object clitics/pronouns more often in context in English than in French (BIL3 TD: 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 Whiney 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. BILSLI 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 seven-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 three-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 three-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 the 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 non-significant Wilcoxon Signed Rank tests (BIL3TD: FRE 76.7% vs. ENG 96.5%, \( z = -0.944, p = .3452 \); BIL7SLI: FRE 98.3% vs. ENG 96.5%, \( z = -0.39, p = .7150 \)). Note that the absolute mean for the bilingual three-year-olds in French is substantially lower than the absolute mean score for English. This 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 non-significant when performed with this child’s score excluded, \( z = -0.365, p = .7150 \).

Mann Whitney U comparisons showed that the bilingual children with SLI used definite articles to the same extent as the three-year-old bilinguals in both languages (FRE: BIL3TD 76.7% vs. BIL7SLI 98.3%, \( z = -0.794, p = .4273 \)). Again, because of the single anomalous score in the bilingual three-year-old group in French, we re-ran the analysis without this score, and it was still non-significant, \( z = -0.231, p = .8170 \).

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 than object clitics 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 three-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 three-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 distribution of the other object types are presented in Table 3. Because of the small number in each category, the strong pronouns and the demonstrative \( çà \) are combined. The most common non-clitic 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 non-clitic non-zero 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 \( (X^2(6) = 49.79, p < .0001) \) 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 percent of correct forms used out of the total number of pronouns used. Codes for incorrect forms included errors in
person, number, gender (French only) or wrong clitic, i.e., *y* or *en* or *lui* (French only), and 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. The monolingual TD seven-year-olds were excluded 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 since the percent 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 85.7% vs. BIL7SLI 81.6%, \(z = -0.637, p > .05\); ENG: BIL3TD 100% vs. BIL7SLI 98.4%, \(z = 0.524, p > .05\)), but the monolinguals with SLI were less accurate than the monolingual TD three-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 three-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 indicate no differences in accuracy with form choice of object clitics between the seven-year-olds with SLI or between the TD three-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 like object clitics than monolingual children, whereas, the DD/EUCC does not predict a monolingual/bilingual difference. We found that the bilinguals with SLI did not perform worse than the monolinguals on either percent use of clitics in context, nor on 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 GSH/SH, it has been suggested elsewhere for typical acquisition that dual language learning may have a facilitatory effect on the emergence of
late-acquired structures in one language, if the other language’s counterpart structure emerges earlier in acquisition (Gawlitzek-Maiwald & Tracy, 1996; Kehoe, Tujillo & Lleo, 2001; Paradis & Genesee, 1996). Perhaps the co-extensive development of the earlier-acquired English pronoun system 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 out-perform their monolingual age-mates in use of object clitics overall, and furthermore, a superior performance of the bilinguals over the monolinguals with SLI was not evident in form choice accuracy for clitics, nor was it evident 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 crosslinguistic influence between the languages of simultaneous bilingual children at the discourse-pragmatics syntax interface with respect to argument omission and pronominalization (Hulk, 2000; Müller & Hulk, 2001; Paradis & Navarro, 2003; Serratrice, Sorace & Paoli, 2004). Such crosslinguistic effects may be at the root of the skew in error types shown in Table 3, where the bilingual children used more strong pronouns in direct object position than the monolinguals. Because French and English both have strong pronouns, post-verbal lexical direct objects, and strong pronouns in French can appear post-verbally 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 & Hulk, 2001; Paradis & 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 L1-French L2 children (Paradis, 2004). However, this crosslinguistic influence in error forms notwithstanding, the performance of monolinguals 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, typically-developing 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 three-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.

In order 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 percent means for clitic use: TD seven year olds (mean = 97.6%, SD = 2.9),
TD three-year-olds (mean = 81.6%, SD = 12.8) and seven-year-olds with SLI (mean = 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-subjects ANOVA ($F(2, 41) = 25.2, p < 0.0001$) followed by post hoc Fisher’s LSD 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%, $t(35) = 3.209, p < 0.003$).

In sum, while the monolingual data and pooled data are compatible with the DD/EUCC, the data from the bilingual children alone is 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, while 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 DD/EUCC.  

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 (in press) argue that
distributional variations in French input with respect to direct objects are a probable
cause of French-English crosslinguistic differences in monolingual children’s acquisition
of transitive constructions. However, even if we extend the Usage-based account to SLI
in order to explain the discrepancy in definite article and clitic production, this account
would, like the GSH/SH, 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).

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As an alternative explanation to that offered by EUCC, one anonymous reviewer
suggested that the distinction between why object clitics on the 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
(2004) 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.
While prior research has found definite articles to be early-acquired 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 & Wexler, 1996). The discrepancy between these results and those of the present study is most likely due to the age of the children with SLI. The other researchers studied five-year-olds and our participants were seven-year-olds, and so, it is possible that article omission resolves by age seven in children with SLI. Another relevant crosslinguistic difference lies between French and Italian for definite articles. Since Italian is predicted to have the same EUCC-driven 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) argue 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 do not elaborate 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, and 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 crosslinguistic pattern with tense morphemes and pronouns across the two studies. Target comparisons between homophonous tense and non-tense morphemes, and homophonous clitics and articles revealed how the vulnerability is due to linguistic structure and not to surface phonological form. Furthermore, in both studies, the bilingual children achieved similar or superior levels of accuracy with both vulnerable and non-vulnerable 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 since they produced the past
auxiliary in 80.2% and 82.8% of obligatory contexts (Paradis et al, 2003), but in the present 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; Jakubowicz & 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. This study was not designed to test processing directly through working memory tasks or by measuring reaction times, and moreover, there is empirical evidence that such processing limitations are apparent in children with SLI, as cited in Section 1.1. What this study suggests is 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 would like to suggest that some target structures have inherent morphosyntactic 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, e.g. the Computational Complexity Hypothesis (Jakubowicz & 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, the present study together with Paradis et al (2003) and Paradis and Genesee (1996) show 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 crosslinguistic 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.
Acknowledgements

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Object Pronouns in Bilingual SLI


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Table 1.

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

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Number</th>
<th>AGE</th>
<th>FRENCH MLUw</th>
<th>ENGLISH MLUw</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIL3TD</td>
<td>9</td>
<td>39.4 (2.6)</td>
<td>3.71 (0.73)</td>
<td>3.49 (0.59)</td>
</tr>
<tr>
<td>BIL7SLI</td>
<td>7</td>
<td>86.9 (7.4)</td>
<td>3.56 (0.60)</td>
<td>3.86 (0.54)</td>
</tr>
<tr>
<td>MON3TD</td>
<td>10</td>
<td>38.8 (5.9)</td>
<td>3.67 (0.80)</td>
<td>-</td>
</tr>
<tr>
<td>MON7SLI</td>
<td>10</td>
<td>91.7 (7.3)</td>
<td>3.98 (1.4)</td>
<td>-</td>
</tr>
<tr>
<td>MON7TD</td>
<td>10</td>
<td>87.9 (4.6)</td>
<td>5.70 (0.83)</td>
<td>-</td>
</tr>
</tbody>
</table>

Note. Typically-developing bilingual three-year-olds: BIL3TD; bilingual seven-year-olds with SLI: BIL7SLI; typically-developing monolingual three-year-olds: MON3TD; monolingual seven-year-olds with SLI: MON7SLI; typically-developing monolingual seven-year-olds: MON7TD.

*aStandard deviations are in parentheses.
Table 2

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

<table>
<thead>
<tr>
<th></th>
<th>French</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clitics</td>
<td>Articles</td>
</tr>
<tr>
<td>BIL3TD</td>
<td>77.14 (14.8)</td>
<td>76.7 (30.9)/94.3</td>
</tr>
<tr>
<td>BIL7SLI</td>
<td>70.6 (19.9)</td>
<td>98.3 (2.3)</td>
</tr>
<tr>
<td>MON3TD</td>
<td>85.6 (9.9)</td>
<td>96.3 (7.3)</td>
</tr>
<tr>
<td>MON7SLI</td>
<td>47.3 (14.7)</td>
<td>90.4 (0.3)</td>
</tr>
<tr>
<td>MON7TD</td>
<td>97.6 (2.9)</td>
<td>99.7 (0.7)</td>
</tr>
</tbody>
</table>

*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.*

*The percent 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. This is because the definite articles are homophonous with third person clitics, and because indefinite feminine article une ‘a’ is a closed syllable and is thus not phonologically non-salient.*

*Standard deviations are in parentheses*

*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)*
Table 3. Frequencies of Non-Clitic Objects Used by the Monolingual and Bilingual Children in Object Pronominalization Contexts

<table>
<thead>
<tr>
<th></th>
<th>Lexical</th>
<th>Strong Pronoun and çà</th>
<th>Zero Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIL3ND</td>
<td>0</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>BILSLI</td>
<td>0</td>
<td>12</td>
<td>27</td>
</tr>
<tr>
<td>MON3ND</td>
<td>8</td>
<td>1</td>
<td>19</td>
</tr>
<tr>
<td>MONSLI</td>
<td>18</td>
<td>4</td>
<td>122</td>
</tr>
</tbody>
</table>

*Note. $X^2 (6) = 49.8$, $p < .0001$.  

Table 4

Percent Correct Form Choice for Object Clitics and Object pronouns for Bilinguals (French and English) and Monolinguals (French Only)

<table>
<thead>
<tr>
<th></th>
<th>French</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIL3TD</td>
<td>81.6 (14.2)(^a)</td>
<td>100 (0)</td>
</tr>
<tr>
<td>BIL7SLI</td>
<td>85.7 (14.1)</td>
<td>98.4 (3.2)</td>
</tr>
<tr>
<td>MON3TD</td>
<td>97.3 (4.2)</td>
<td>—</td>
</tr>
<tr>
<td>MON7SLI</td>
<td>70.5 (20.1)</td>
<td>—</td>
</tr>
</tbody>
</table>

\(^a\)Standard deviations are in parentheses