GRAMMATICAL MORPHOLOGY IN FRENCH LANGUAGE-IMPAIRED CHILDREN

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ABSTRACT

Various accounts have been proposed to explain the deficits found in children with specific language impairment (SLI). Since many of these hypotheses have been evaluated using English speaking subjects, there is an important need for cross-linguistic evidence. In this study, the language of Québec French speaking language-impaired children was examined in an attempt to provide further information about the nature and characteristics of this impairment.

The research examined the language of ten 7-year-old unilingual French language-impaired children. Their language was compared to language samples elicited from ten 7 year-old and ten 5-year-old normally developing children. Spontaneous language samples were elicited and analyzed in terms of correct use and error type in six linguistic structures: auxiliaries, copulas, verbs, articles, adjectives, and possessive adjectives. The findings were discussed in light of current competing explanatory hypotheses and were found to support hypotheses that suggest that language impairment is at the level of functional categories. Finally, future directions and clinical implications were addressed.

RÉSUMÉ

Plusieurs hypothèses tentent d'expliquer la nature des déficits reliés aux difficultés chez les enfants présentant une dysphasie développementale (DD). Dans la majorité de ces études, les enfants DD n'ont pas le français comme langue maternelle. Des études avec les enfants francophones atteint de troubles de langage peuvent apporter une contribution importante à la recherche sur le DD. Le but de cette recherche est de déterminer si les enfants DD franco-québecois ont des difficultés au niveau de certains morphèmes grammaticaux.

Des échantillons de langage spontané ont été recueillis de trente enfants, soit dix enfants de cinq ans et dix enfants de sept ans qui ont un développement normal de langage et dix enfants DD agé de sept ans. L'analyse a été effectuée en terme de pourcentage de production adéquate et erreurs produites pour six contextes linguistiques: l'auxiliaire, la copule, le verbe, l'article, l'adjectif qualificatif, et l'adjectif possessif. Les résultats sont discutées dans le cadre des hypothèses linguistiques qui proposent que les enfants DD ont entre autres des déficits spécifiques au niveau du développement de la morpho-syntaxe, surtout au niveau des catégories fonctionnelles. Les directions pour des recherches futures et les implications cliniques de cette recherche sont discutées.

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Chapter 1

INTRODUCTION

Specific language impairment (SLI) is a term that has been used to classify children with a language impairment in the absence of gross intellectual, neurological, behavioural or emotional problems, or hearing loss. In characterizing this language deficit, some investigators believe that certain aspects of grammar are more problematic than others. One area of impairment that has been described in detail is the difficulty that SLI children have with grammatical morphology (see Bishop, 1992 for review; Johnston, 1988).

A large majority of the research on SLI in North America has been conducted using English-speaking subjects. However, there is a growing number of cross-linguistic studies of SLI children who speak German (Clahsen, 1989, 1992; Lindner & Johnston, 1992), Italian (Leonard, Sabbadini, Leonard, & Volterra, 1987), Hebrew (Dromi, Leonard, & Shteiman, 1993), Inuktitut (Crago & Allen, in press), Japanese (Fukuda & Fukuda, 1994), Greek (Dalalakis, 1994) Swedish (Hansson & Nettlebladt, 1995), and French (LeNormand, Leonard & McGregor, 1993). Although the research to date has expanded the knowledge of the nature and characteristics of SLI, there remain a number of unanswered questions.

To answer these questions and to build a theory that
accounts for the characteristics found in SLI, information
from three domains must be integrated (Watkins, 1994).
First, it is necessary to specify the linguistic
characteristics displayed by SLI children. This area of
information is not entirely separate from the second
important area, that of documenting the developmental
changes in the language of SLI children. Fundamental to
these two areas is the importance of having a well-defined
description of normal language development in children
before attempting to describe the characteristics of
impaired language. Finally, the third area is the
convergence of cross-linguistic studies in determining the
nature and characteristics of SLI. Each new piece of cross-
linguistic evidence serves to help complete the puzzle of
the nature of language impairment in much the same way that
cross-linguistic studies have been highly informative to the
understanding of normal language development (Slobin, 1985,
1992).

This study was designed to address each of the three
areas designated by Watkins. It is a descriptive study of
linguistic characteristics of language-impaired speakers of
Québec French. The subjects studied are distributed in a
commonly-used three group design (Bishop, 1992) in which a
language-impaired group is compared to a normally-developing
age-matched group and a younger normally-developing group.

The comparison groups will provide important information about the normal development and characteristics of Québec French. Study of the language-impaired group will provide further information regarding the characteristics of SLI French speakers.

The second chapter of this thesis describes the competing explanatory hypotheses of this impairment. The third chapter describes the linguistic structure of Québec French and presents the characteristics that make this language an interesting and important language for study within the field of language impairment. The next two chapters describe the methodology and results of this study respectively. The final chapter includes a discussion of the findings, addresses some of the methodological issues that surfaced during this study, and provides some directions for future research.

This thesis does not address the issue of the etiology of the language impairment found in SLI children (i.e. the causal factors). Instead it will focus on the characteristics of the disorder i.e. how language is affected by the impairment. In keeping with the philosophy of one of the prominent researchers in this field, the direction of this research is based on the belief that "there is much to be gained by the close scrutiny of grammatical particulars and associated theoretical models" (Rice, 1994a, p. 70).

Chapter 2

THE NATURE OF SPECIFIC LANGUAGE IMPAIRMENT

Converging evidence suggests that the deficits observed in children with SLI are found in all aspects of language but a more serious deficit is observed in the use of morphology (see Watkins & Rice, 1994 for a comprehensive review; McGregor & Leonard, 1994; Rice & Oetting, 1993). Although the morphology of English-speaking SLI children has been well-studied and found to be problematic, studies of the morphology of other languages do not necessarily support this notion (Leonard, 1994). In English, children with SLI often omit affixes and function words (McGregor & Leonard, 1994). In other languages, (e.g. Italian and Hebrew) SLI children appear to have relatively less difficulty with morphology than their English counterparts (Dromi, Leonard, & Shteiman, 1993). These findings lead to differing accounts of the nature of the impairment. For instance, SLI could be caused by a deficit of a linguistic nature affecting the underlying grammar and thus affecting grammatical systems across languages in similar ways. It could also represent a delay in particular aspects of linguistic development. Or it could be an impairment that is not specifically linguistic in nature (such as perceptual or cognitive processing). In such a processing account, the

linguistic mechanisms may be intact but perceptual or

cognitive impairment is considered to have an indirect

effect on language development.

The explanatory hypotheses using a linguistic framework

are varied. Some of these hypotheses claim that the

morphological impairment displayed by SLI children stems

from a disorder at the level of Universal Grammar (UG)

(Rice, 1994a, 1994b; Gopnik & Crago, 1991; Clahsen, 1992),

others report an intact grammatical system that has

selective delays in its development (Eyer & Leonard, 1995;

Rice, Wexler & Cleave, 1995). The non-linguistic accounts

do not rely on assumptions about grammatical structure but

rather on the surface characteristics of language (Leonard,

1989, Leonard, Bortolini, Caselli, McGregor, & Sabbadini,

1992). The following sections of this chapter provide a

description of several recent accounts of SLI. The nature

of each account will be described followed by predictions

for French-speaking children with SLI.

Linguistic Deficit Framework

The linguistic accounts described here examine

grammatical morphemes as they interact with other aspects of

the grammar rather than as a surface form of spoken language

(Eyer & Leonard, 1995). These various explanations have in

common the belief that the linguistic characteristics noted

in children with SLI stem from an impairment in the
underlying linguistic mechanisms that, in turn, adversely
affect their acquisition of language (Rice, 1994a). The
first three hypotheses propose that the difficulties that
SLI children have with morphology stem from an impairment in
their underlying grammar. The final two hypotheses presume
that the underlying grammar is intact but the development of
certain grammatical structures is delayed.

Missing Feature Hypothesis/
Impaired Morphological Rule Hypothesis

The Missing Feature account posits that the impairments
noted in the grammar of SLI children are characterized by an
absence of abstract grammatical features such as number,
tense, gender, aspect, animacy, person, and mass-count.
According to this account, SLI individuals are not missing
the features but missing the notion of obligatory marking of
grammatical features (Gopnik, 1990a, 1990b; Gopnik & Crago,
1991). This impairment surfaces in the grammar as
optionally marked grammatical features and uncertain
grammaticality judgements. This account presumes that
features such as agreement that do not have lexical
equivalents may therefore be more difficult to learn.
Gopnik (1994) has more recently proposed that the
impairments in SLI are caused by an inability to construct
implicit grammatical rules. According to Gopnik, the

grammars of SLI individuals reflect strategies that compensate for this inability. One such strategy would be to store the inflected form as an unanalyzed unit. This hypothesis also predicts certain patterns of production. For instance, the expression of plurality can be achieved through the use of a lexical item (e.g. some, many, etc.) rather than through the inflection "-s". Therefore, it is predicted that the SLI subjects will produce a lexical item rather than an inflected item and in doing so produce less inflectional marking than their age-matched equivalents.

Predictions for French Language-Impaired Children

This explanatory hypothesis predicts that grammatical features may sometimes be marked because they are perceived as optional by language-impaired individuals. Agreement features such as number, gender, and person may or may not be marked correctly depending on whether the form produced is stored as a lexical item or not. Assuming that this is a less efficient system than analyzing the morphological structure of a word, the language-impaired children should differ significantly from their age-matched counterparts on all inflectional marking.

Agreement Deficit Hypothesis

The Agreement Deficit Hypothesis was based on the language impairments observed in German SLI children (Clahsen, 1989). Difficulties were found with gender and

number markings in the noun phrase, agreement errors in the verb phrase and problems with placement of the verb in the sentence. This account postulates that morphological errors are caused by an impairment in the underlying grammar that does not permit agreement relations between sentence constituents including determiner-noun, subject-verb and case assignment.

Other investigators have found similar errors. For example, English SLI children were found to have difficulty with sentential agreement (Rice & Oetting, 1993). They were also found to use fewer morphemes indicating subject-verb agreement than language-matched comparison groups (Loeb & Leonard, 1991).

Predictions for French Language-Impaired Children

The agreement deficit hypothesis predicts that French language-impaired children will have difficulty with agreement within the noun phrase (e.g. determiner and adjective agreement), subject-verb agreement, verb-controlled case marking (e.g. nominative case), and referential pronouns. There should be no difficulty with inflections that do not involve agreement relations (Clahsen, 1992).

Differential Agreement Checking Hypothesis

The Differential Agreement Checking Hypothesis (Rice, 1994a; Rice & Oetting, 1993) differs slightly from Clahsen's

(1989) hypothesis. Clahsen predicts difficulty with all types of agreement whereas the differential agreement checking hypothesis makes more specific predictions. It predicts that the impairments found in SLI children result from the impairment of a specific type of agreement relationship. Based on Government-Binding theory (Chomsky, 1992), there are two types of agreement. The first is Spec-head agreement. This type of agreement is involved in verbal agreement and agreement between quantifiers and nouns, possessive adjectives and nouns, as well as case agreement. Head-head agreement is involved in agreement within the nominal system (determiner and adjective agreement with the noun) and participle agreement in the verb system.

This account postulates that the problems with inflection noted by other investigators might actually be difficulties more specific to Spec-head agreement (Rice, 1994a; Rice & Oetting, 1993). This proposal was based on the results obtained from English SLI children who were found to perform better with determiner-noun agreement than with quantifier-noun agreement and noun-verb agreement (Oetting & Rice, 1993; Rice & Oetting, 1993; Rice, 1994a, 1994b).

Predictions for French Language-Impaired Children

The Differential Agreement Checking Hypothesis predicts that language-impaired children should show more impairments

in Spec-head agreement than in head-head agreement. This
impairment should result in problems with nominative case
and with subject-verb agreement. Errors should include
omissions or substitutions of verbal inflections,
auxiliaries and copula forms.

Selective Delay in Linguistic Development

The following theories propose that certain aspects of
grammar develop at a slower rate than others. They do not
presume that parts of the grammar are absent or inaccessible
nor do they claim that the language is deviant from the
normal stages of development.

Extended Optional Infinitive (EOI) Hypothesis

The Extended Optional Infinitive Hypothesis (Rice,
Wexler & Cleave, 1995) is an explanatory hypothesis based on
research on normal acquisition (Wexler, 1994). This
hypothesis does not intend to account for all of the
difficulties found in the language of SLI children.
Instead, it offers a framework which can account for similar
data cross-linguistically. This account offers very
specific predictions about errors in production.

Normally developing children typically pass through a
stage where they do not mark verb inflection consistently
(Wexler, 1994). It is assumed that during this stage

children are lacking the understanding of tense and therefore do not recognize that verbal inflections are obligatory and as a result, their grammars optionally permit the use of infinitive forms for finite forms. An important feature of this theory is that children are not omitting verbal inflection (e.g. using the bare stem form in English), they are substituting the infinitival form.

At the optional infinitive stage, agreement inflections may be acquired during and after tense acquisition but not before (Wexler, 1994). Wexler's model then, assumes that children have an agreement checking mechanism even though they may not yet obligatorily mark verbs in matrix clauses for finiteness. Normally children pass through this period by age two and a half.

This model of normal development has been adapted as an explanation of the errors that SLI children make with respect to tense marking (Rice, Wexler & Cleave, 1995). Such an explanation proposes that the optional infinitive stage is extended in SLI children and the substitution of the infinitival form for the finite form may be used by much older children. The EOI hypothesis makes six predictions for English. They are summarized as follows:

1. For lexical verb markings, infinitival forms may be used optionally where inflected forms are required in the adult grammar.

2. SLI children have the capacity to check agreement,

but they do not know that in matrix clauses finiteness is obligatory. If agreement marking is apparent, it will be used correctly.

3. SLI children have the capacity to mark tense. However, tense marking may be omitted.

4. The auxiliary and the main verb copula may be omitted.

5. Auxiliary DO may be omitted.

6. SLI children have the capacity for marking agreement. When the auxiliary or copula is used in contexts that require a finite form, the correctly agreeing form will be used.

As an extension of the Differential Agreement Checking Hypothesis (Rice, 1994a), it has been proposed that the difficulties that SLI children display with Spec-head agreement, specifically with subject-verb agreement may be a result of the extended optional infinitive stage of development in SLI children. Hadley (under review) has found longitudinal evidence that supports this hypothesis. She proposes that the impairment noted may be caused by difficulties with the Inflectional system (I-system), specifically movement of tense and agreement features.

Predictions for French Language-Impaired Children

Specific predictions for French relative to the predictions for English just outlined are as follows:

1. In the case of English lexical verb markings, bare

stems may be used optionally where inflected forms are required in the adult grammar. The infinitival form is the bare stem, therefore it would appear that the English speaking children are using the infinitive form. In French the infinitive form is linguistically marked. This hypothesis predicts that language-impaired children will optionally use the infinitive form. They should not be using the stem form optionally since the stem form in French is in fact marked for tense.

2. Since the EOI hypothesis presumes that agreement is not problematic, there should be no difference between the language-impaired group and the age-matched group in terms of agreement errors.

3. The EOI hypothesis assumes that language-impaired children know how to mark tense but tense marking may be omitted. The language-impaired group should omit tense more often than the age-matched group but there should be no difference between the comparison groups in terms of correct marking of tense.

4. The auxiliary and the main verb copula may be omitted. The rate of omissions should be higher for the language-impaired group than the age-matched group.

5. Since there is no process such as DO-support in French, this prediction is not applicable.

6. When the auxiliary or copula is used in contexts that require a finite form, the correctly agreeing form will

be used. No differences should be found between the language-impaired group and the age-matched group.

Structure Building Hypothesis

This account posits that the impairments found in the grammatical morphology of SLI children may be related to functional categories rather than particular grammatical morphemes (Leonard, 1995; Eyer & Leonard, 1995; Guilfoyle, 1991; Crago, Gopnik, Guilfoyle, & Allen, 1991) and that the difficulties noted can be explained by a delay in the development of the functional category system.

The three functional category systems are the D-system (determiner), the C-system (complementizer), and the I-system (inflectional). Functional categories are a closed class set of words that mark grammatical and relational features.

Much research has been done on the acquisition of functional categories in English (Radford, 1990a, 1990b). This research offers several assumptions about how functional categories are acquired and how they might be impaired. According to Radford, in the normal acquisition of language, functional categories are thought to emerge within a developmental time frame. It is assumed that the saliency of the input to the child plays a role in setting this developmental stage into motion. The more salient the category is in a language, the earlier it is acquired. This

framework predicts that SLI is a disorder of delayed maturation and the impairment in grammatical inflection is caused by a protracted period with a predominant use of lexical categories. This hypothesis predicts that in languages with more salient functional categories such as Italian, SLI children would develop control of functional categories earlier than children acquiring other languages with less salient functional categories such as English (Crago et al. 1991).

Leonard (1995) and Eyer & Leonard (1995) found that functional categories were not absent in the language of English SLI children; however, they were used to a much lesser degree than MLU-matched controls suggesting that there may be a protracted period of development in mastering the use of functional categories.

Predictions for French Language-Impaired Children

The Structure Building Hypothesis predicts that the functional categories in the grammar of French language-impaired children are not absent but would be used to a much lesser degree than by a language-matched comparison group. Language-impaired children should have difficulties with the I-system surfacing as errors in subject-verb agreement, difficulties in tense and agreement marking of copulas, auxiliaries and verbs, omissions of auxiliaries and copulas, and the use of infinitives for finite verbs. Problems with the D-system should include problems with determiner-noun

and agreement of the possessive adjective. French language-impaired children should not have difficulty with adjective agreement because adjectives form a lexical category not a functional category.

Since this hypothesis assumes that the impairment noted in language-impaired children is caused by a developmental delay, it is possible that by seven years old the language-impaired children would have fully mastered the agreement system. However, many studies report persistent problems with grammatical morphology well into childhood and possibly into adulthood in the SLI population (Marchman & Weismer, 1994; Tomblin, 1994; Ullman & Gopnik, 1994). Therefore, it might be possible to find residual evidence of an impairment at the level of functional categories in the language-impaired group.

Processing Impairment Hypotheses

There are also various explanatory hypotheses put forth that do not presume that the difficulties noted in SLI children's language are caused by impairments in the underlying grammar or by a delay in the development of particular aspects of grammar. These accounts are not formulated based on a linguistic framework but rather use theories of perception, cognition, or psycholinguistics. The following sections will outline some of these hypotheses

and their predictions for French language-impairment.

Surface Hypothesis

The Surface Hypothesis (Leonard, 1989; Leonard, Sabbadini, Leonard & Volterra, 1987; Leonard, Sabbadini, Volterra & Leonard, 1988) postulates that the underlying grammars of SLI children are intact. This account presumes that SLI children are normal language learners whose language output represents the distorted input they have received.

In this account, it is presumed that SLI children have impairments at the level of perceptual processing and the unstressed portions of the language input is filtered out. Since many grammatical morphemes in English and some other languages are unstressed and have relatively short durations (compared to the adjacent syllables) they are often not perceived by SLI children in the same manner as normally-developing children. As a result the ability to build linguistic paradigms is impaired.

Predictions for French Language-Impaired Children

French language-impaired children should have difficulty with unstressed morphemes of short duration. However, French inflectional morphemes resemble their adjacent syllables in duration and relative stress and therefore may not be affected by an impaired perceptual processing mechanism (see discussion of stress patterns in

French in Chapter 3). One study of French SLI children (LeNormand et al., 1993) found the French SLI children use a higher number articles than English or Italian SLI children lending support to this hypothesis.

Sparse Morphology

The Sparse Morphology Hypothesis arose from the evidence in cross-linguistic studies that attempted to support the surface hypothesis. In these studies, results showed that SLI children had more trouble with grammatical morphology in languages with sparser or less complex morphology (Leonard, Bortolini, Caselli, McGregor & Sabbadini, 1992; Lindner & Johnston, 1992; Dromi, Leonard & Shteiman, 1993; Leonard, Sabbadini, Leonard, & Volterra, 1987; Rom & Leonard, 1990).

This hypothesis is based on the concept that during the normal language acquisition process, children are most attentive to the structural components that convey the most information. This property of the language acquisition process accounts for the differences in the time period of morphological development across children learning different languages. If grammatical morphology plays an important role in the language (i.e. the language has a rich morphology) children acquire and master the morphological properties earlier than if the language has a sparser morphology (Leonard et al., 1992). This account predicts

that the development of morphology in SLI children should
follow the same pattern as their normal counterparts even
though development may be delayed. This hypothesis is
similar to the Structure Building Hypothesis, however it
does not specify the particular linguistic mechanisms that
might be affected.

Predictions for French Language-Impaired Children

To test this hypothesis, the results from this study
need to be compared to results from studies of SLI children
who speak other languages. Since there are no cross-
linguistic studies that examine seven-year-old SLI children,
this hypothesis cannot be tested at this time.

Rationale for the Present Study

This study was designed to address the explanatory
hypotheses that have been described with evidence from
Québec-French SLI children. Specifically, this study
attempted to address the following questions:

1. Do seven-year-old Québec-French SLI children use
inflectional morphology in a similar manner as normally
developing age-matched children or normally developing
children who are two years younger?

2. If not, do Québec-French SLI children show patterns
of impairment similar to those reported in the literature
for SLI children who speak other languages?

3. Do the results of this study provide supportive evidence for any of predictions of current explanatory models of language-impairment in SLI?

This chapter described a number of competing explanatory hypotheses for SLI. In order to address these hypotheses with respect to Québec French, the grammatical characteristics of Québec French are outlined in the following chapter.

Chapter 3

CERTAIN GRAMMATICAL COMPONENTS OF QUÉBEC FRENCH

Very little research has been done on specific language impairment in French-speaking children, either from France or from Québec, Canada. One preliminary study (LeNormand et al., 1993) looked at article use in a group of SLI children in France. This study introduced the French language as an important language of study within the domain of SLI because of its distinct linguistic characteristics. The manifestation of a language disorder in French-speaking children then, may offer important insights into the nature of the impairment.

French like other languages spoken in numerous countries has more than one dialect. Not all of these dialects have identical linguistic structures. The dialect spoken in Québec, Canada is called Québec French. The subjects in this study speak this dialect.

In this chapter only those components of the grammar that have relevance to this particular study will be described. They include aspects of the nominal system, verbal system and adjectival system.

Aspects of the Morphological System of Québec French

Although French historically had a very rich morphology that is still evident in its orthography, spoken French has dropped much of its overt morphology. It can nevertheless be considered a language with a relatively rich morphological system in its spoken form. Inflections in French mark tense, aspect, gender, number and person although not all are phonologically realized. The following describes the grammatical morphology of spoken French.

Verbal System

Conjugation

There are three typological groups of verbs in French. First and second conjugation verbs, -er (e.g. *aimer* "to love") and -ir (e.g. *finir* "to finish") respectively, follow regular rules in their conjugation. The -er form includes approximately 90% of all French verbs (Clark, 1985). The third conjugation verbs include all other forms of verbs and are considered to be irregular verbs. A large majority of these irregular verbs fall within three patterning groups: (a) verbs ending in -ir that do not follow the second conjugation -ir pattern (e.g. *tenir* "to hold"), (b) -oir (e.g. *recevoir* "to receive"), and (c) -re (e.g. *plaire* "to please") verbs. Even though there are only approximately 160 verbs that are considered third

conjugation, these are the verbs most frequently used by both adults and children (Clark, 1985).

Tense

The most common finite tense formations in spoken French are present indicative, imperfect, pluperfect, compound past, simple future, and a periphrastic future form. Also used in the spoken form is the conditional, the imperative (identical to the present indicative) and a number of rarer forms that will not be treated further in this thesis (e.g. simple past, and anterior forms). The first person form of each tense is demonstrated below for the verb *manger* "to eat":

Tense	Example	
present indicative	*je mange*	"I eat"
imperfect	*je mangeais*	"I was eating"
pluperfect	*j'avais mangé*	"I had eaten"
compound past	*j'ai mangé*	"I ate"
simple future	*je mangerai*	"I will eat"
periphrastic future	*je vais manger*	"I am going to eat"
conditional	*je mangerais*	"I would eat"
imperative	*mange*	"eat"

Tense in French is marked in the imperfect, conditional and simple future by a morpheme suffix added to either the stem form or the infinitive form. In the singular forms and

third person plural, the phonological form of the present indicative is usually the stem form. Certain third conjugation verbs in the present indicative are not the stem form (e.g. *je reçois; recevoir*:INFINITIVE "I receive"). The copula and auxiliary verbs in French are *avoir* "to have" and *être* "to be". Both forms are marked for tense, person and number agreement.

An important difference between French and English is that the infinitival form in French is never a bare stem. In English, many of the present tense forms are homophonous with the infinitival form. The infinitive in French has a limited number of final inflections as demonstrated in the descriptions of the first, second and third conjugation groups. The participle of a first conjugation verb is a homophone of the infinitive (e.g. *j'ai mangé* /mãʒe/ "I was eating"; *manger* /mãʒe/ "to eat").

Depending on the conjugation group of the verb, the inflected form may be the stem (*aime; aimer* "to love"), a partial stem (*dort* /dɔr/; *dormir* "to sleep"), or a suppletive (*va; aller* "to go"). Some present tense forms of first conjugation verbs resemble the bare stem (e.g. *il mange* "he eats"; *manger* "to eat"). However, bare roots of second conjugation verbs are considered ungrammatical (e.g. **fin; finir* "to finish"). On the contrary, bare stems of some third conjugation verbs are possible (e.g. *ils battent* /bæt/ "they fight"; *battre* "to fight"), while others are

impossible (e.g. *recev; recevoir* "to receive").

Agreement

The subject pronoun is the most important indicator of person. Although subject-verb agreement differs for most persons orthographically, there are many homonyms in the spoken form. For instance, for many verbs in a number of tensed forms, the first, second and third person singular and the third person plural inflectional endings have the same surface form. Furthermore, the first person plural *nous* "we:formal" rarely occurs in the spoken language. It is often replaced by the third person singular form *on* "we:informal" (Pierce, 1992).

Participle agreement is also marked for gender and number in the written form when used with the *être* "to be" auxiliary. However, rarely is the agreement marking phonologically realized in the spoken form.

Nominal System

Determiners

Although there are a number of determiner types in French, only the article system will be described in detail. Articles are marked for gender, number, and finiteness and can be combined with a preposition to form what is called a contracted article. The article types in French are:

	Definite	Indefinite	Definite	Contracted
English	*the*	*a*	*to the*	*of the*
masculine	le	un	au (à le)	du (de le)
feminine	la	une	à la	de la
plural	les	des	aux (à les)	des (de les)

In French, all nouns and their accompanying articles and adjectives must agree in terms of gender and number (Clark, 1985). Nearly all nouns except proper nouns must occur with a determiner. In spoken French, the determiner rather than the noun provides the primary information about gender and number (Chevalier, 1966).

French has two genders, masculine and feminine. Although there are a limited number of words where natural gender provides gender information, generally there are few clues as to the gender of the noun in the spoken form of the word. In spoken French, the gender of many nouns is made clear only by the singular article (LeNormand et al., 1993). Plural articles are not overtly marked for gender. The regular rule for number marking on the noun in French is a word final -*s* inflection. Although marked orthographically, it is often not phonologically realized (unless the following word begins with a vowel). There are some exceptions that have different forms other than -*s* in the plural form (e.g. *cheval/chevaux* "horse/horses") (Clark, 1985).

Possessive Adjectives

Possessive adjectives are case-marked and carry gender, number and person inflection in the singular person forms and number and person inflection in the plural person forms. The possessive adjectives in French are:

Person		MASC.SG	FEM:SG	PLUR	
Sing	1	*mon*	*ma*	*mes*	"my"
	2	*ton*	*ta*	*tes*	"your"
	3	*son* "his/its"	*sa* "her"	*ses*	"his/her/its"

		NEUTRAL:SG	NEUTRAL:PL	
Plur	1	*notre*	*nos*	"our"
	2	*votre*	*vos*	"your"
	3	*leur*	*leurs*	"their"

Adjectives

Adjectives in French must agree with the noun that they qualify. They are marked for gender and number. Number marking for adjectives is marked in the same manner as nouns, the plural marker is only evident in the orthography, not in the surface form (unless followed by a vowel). Gender is frequently marked by the addition of -e to the end of the word. This addition often causes the silent word final consonant to become phonologically realized in the surface form (e.g. *petit* /pəti/ "little:MASC"; *petite* /pətɪt/ "little:FEM").

Stress Patterns

One of the major differences between French and the Germanic languages, including English, is the variation in stress. This is an important fact to consider in determining the nature of language impairment. French is considered to have fixed phrase stress. This means that the rhythm of spoken French both within and across words is uniform. Only the final syllable of a clause has stronger stress in French. On the other hand English and German are considered to have variable word stress. Although word stress may vary within and across words, stressed syllables tend to occur at regular intervals (Ladefoged, 1982).

Stressed syllables in European French were found to be approximately one and one-half times longer than unstressed syllables. In English and Italian, stressed syllables are more than two times longer than unstressed syllables (Fant, Kruckenberg & Nord, 1991; Farnetani & Vayra, 1991). French also has fewer phonemes per stressed syllable than other languages such as Italian or English (LeNormand et al., 1993). Lengthening in French occurs in clause-final positions of both stressed and unstressed syllables but the degree of lengthening is less than in other languages (Fant et al., 1991).

Although it may be possible that the stress patterns of Québec French differ from European French, in terms of perceptual characteristics, a study by Paradis and Deshaies

(1990) on Québec French found that the although the final syllable of polysyllabic words may be the most favourable position for stress to be perceived, the final syllable was not consistently perceived as stressed. Therefore it would seem that for both European and Québec French, the ratio between the duration of stressed and unstressed syllables in French is perceived as being relatively equal. This evenness in stress is perceived for all non-clause final syllables (Ladefoged, 1982).

Furthermore, Paradis and Deshaies (1990) found that when judges were asked to assign stress to the syllables of a sentence, the relative stress of lexical and grammatical words was not perceived differently.

Therefore, because of the stress patterns of the French language, morphological marking in French SLI may be affected differently than in other languages such as English. In English, the metrical pattern of most English words has an alternating strong-weak pattern (Cutler & Carter, 1987) and grammatical (function) words usually occur in the weak stress position of the sentence (Gerken, 1991). In contrast, French grammatical words do not differ in stress from their surrounding syllables.

Issues in Acquisition

There are a number of facts about how children acquire

French that are important for this study. The following
sections provide an overview of the order of acquisition of
certain morphological and syntactic structures in French.

Early Grammatical Morphology

According to Radford (1990a), during the early stages
of acquisition of English, the grammar is comprised of
lexical categories. Gradually, functional categories begin
to emerge. In contrast, Pierce (1992) argues that
functional categories exist from the beginning of syntactic
development based on her data of French acquisition. The
existence of functional categories in early acquisition has
also been based on evidence of non-specific phonetic forms
(fillers) that supposedly play the role of place holders for
unspecified grammatical functions (Peters and Menn, 1993).
Moreover, evidence of the use of fillers as place holders
for grammatical morphemes has been reported for a young
child acquiring French and English (Dolitsky, 1983).

Verbal System

Conjugation

The earliest verbs that children produce in French are
infinitival forms that tend to emerge at the two-word stage.
Although there is a high frequency of irregular verbs in
French, irregular forms are often regularized in the speech
of 2-, 3- and 4-year-olds (Clark, 1985). The regularization

process tends to follow the pattern of first conjugation verbs. Finite verbs are used very early suggesting that verb raising is available from the beginning of syntactic development (Pierce, 1992).

Tense

French-speaking children begin to use tense (specifically present and compound past) around the age of two. The imperfect begins to emerge around age three. Future tense tends to be marked at this stage using the periphrastic form (Clark, 1985). In normally developing French-speaking children, mastery of tense evolves over a number of years. Tense has been found to also emerge before agreement (Brown, 1973).

One aspect of tense marking that is difficult to determine is that of the first conjugation infinitive form. This form is homophonous with the first conjugation past participle (*aimer* /εme/ "to love"; *aimé* /εme/ "loved"). It is impossible to tell whether a child is using the first conjugation infinitive form or whether the child has omitted the auxiliary. Lightbown (1977) argues that since young children tend to speak of the here-and-now, they are not omitting the auxiliary and are rather using the infinitive form in a finite context. Pierce (1992) argues that it is possible that French children are using the participle form and are missing the subject and the auxiliary. This debate has not been resolved.

Agreement

Number and person agreement in French verbs is acquired early with few errors (Clark, 1985). The first occurrences of pronouns are found around two years of age. Pierce (1992) argues that since pronouns are generated in Infl (I), the functional category I is present at this early stage.

Nominal System

Determiners

In the early stages of French acquisition, children's first nouns often appear without a determiner. Determiners begin to appear when the first word combinations are produced. Acquisition of the determiner system may not be completely mastered until age six (Clark, 1985). Young children use definite articles more than indefinite articles even where their use is inappropriate. The earliest forms that children use are phonetic forms that are indistinguishable as to whether they are definite or indefinite. Generally, French children omit articles up to the age of three (François, François, Sabeau-Jouannet, & Sourdot, 1978; Lightbown, 1977).

When French children include the article they make some agreement errors but seem to master number agreement before gender agreement (Clark, 1985). Although there is little overt marking of number on nouns in French, errors tend to involve the use of the singular form for the plural form.

Overall, number appears to be mastered early and to develop
relatively error-free in French; first in the nouns and
determiners and then in pronouns (Clark, 1985).

Possessive Adjectives

There are several systems that mark possession in
French. Possessive adjectives are interesting because,
unlike in English, they are marked for gender, number and
person and agree with both the referent and the possessor
(e.g. *ma maison* "my:1PSG:FEM:SG house"; *mes maisons*
"my:1PSG:PL houses").

This chapter has described some of the grammatical
characteristics of French that were analyzed for this study.
Analyses of these linguistic structures were used to address
the explanatory hypotheses put forth in the previous
chapter. The methodology that was used to examine these
contexts will be described in the following chapter.

Chapter 4

METHODOLOGY

Criteria for Subject Selection

Classifying children into a diagnostic category such as
SLI is not a straight-forward matter. Early studies have
used exclusionary criteria (Stark & Tallal, 1981) to
differentiate SLI children from normally-developing
children. The use of such criteria has been problematic in
research studies because of the heterogeneity of the subject
group. Hence, stricter inclusionary criteria were added to
the diagnostic criteria. These criteria include specified
performance on standardized intelligence and language tests
(Craig & Evans, 1993). They have narrowed the subject pool
substantially and have provided a more homogeneous group of
subjects.

Even though there is increasing agreement on the
methods of evaluating and classifying children with SLI
there are numerous classification systems currently in
existence (Rapin & Allen, 1983; American Psychiatric
Association, 1987; Aram & Nation, 1975; Wilson & Riscussi,
1986). However, there is little empirical evidence
supporting the use of these various classification systems
(Watkins, 1994). For most of North America, there is a

unitary classification system of specific language impairment (SLI). In Québec however, there is a clinical classification system that is widely accepted among francophone clinicians and researchers that defines six subgroups of language-impairment. The general term for the impairment is called "audimutité" (auditory-muteness) (Rapin & Allen, 1983). Two of the subgroups, "phonological-syntactic" and "lexical-syntactic" closely resemble SLI as defined by the usual inclusionary and exclusionary criteria.

Subjects

Three groups of subjects participated in this study. All subjects were unilingual French speakers. The language-impaired (SLI) group consisted of 10 children (6 male, 4 female) ranging in age from 6;8 to 8;4 (mean age 7;8) who were diagnosed with "phonological-syntactic" or "lexical-syntactic" auditory-muteness by a certified speech-language pathologist (see Table 1). Two subjects (9 and 10) were brothers[1].

The criteria for diagnosis included performance which was 1.5 standard deviation below the norm on a language assessment battery or equivalent, and a non-verbal IQ above

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[1] Although methodologically, it would be best to eliminate one of the brothers. It was felt that because of the difficulty in finding subjects that fit all of the criteria, all of the subjects would be used in the study and if any differences were found they would be discussed.

80. Language-impaired children were excluded if a) they were diagnosed under a classification other than "phonologic-syntactic" or "lexical-syntactic" b) were not unilingual French speakers c) had significant cognitive, behavioural, neurological, or oral-motor impairments d) were unintelligible e) their hearing was not within normal limits. All the children lived in southern Québec (8 from the Greater Montréal area, 2 from the Sherbrooke area). Participation was voluntary.

Table 1

Subject Characteristics: SLI Children

ID	Sex	Age	$MLCP^2$
1	F	6;8	9.69
2	M	8;1	7.97
3	M	7;10	5.51
4	F	7;11	5.69
5	F	7;4	6.54
6	M	8;3	3.61
7	F	8;1	7.26
8	M	6;11	9.08
9	M	8;4	6.00
10	M	7;0	6.29
Mean		91.7 (months)	6.76
SD		7.3	1.8
Range		6;8-8;3	3.61-9.69

The two comparison groups, an age-matched group and a younger group were recruited from a summer daycamp and

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[2] *Mesure de la Longueur et Complexité de la Phrase* "Length and complexity index"

elementary schools in the Greater Montréal area.
Participation was voluntary. The age-matched group
consisted of ten children (5 male and 5 female) ranging in
age from 6;10 to 7;10 (mean age 7;4). The younger group
consisted of ten children (5 male and 5 female) ranging in
age from 4;10 to 5;11 (mean age 5;4). Based on parental
reports, the children's birth and medical histories were
uneventful, and they achieved developmental milestones as
expected. For each child, parents reported normal hearing,
and no neurological or intellectual impairments. The MLCP
was used as a global measure to ensure the normality of
these children's language. See Tables 2 and 3 for subject
characteristics.

Table 2

Subject Characteristics: 5N Children

ID	Sex	Age	MLCP
11	M	4;10	9.58
12	F	4;10	9.75
13	M	5;2	9.51
14	F	5;5	9.49
15	M	5;6	9.70
16	F	5;4	10.12
17	F	5;9	8.81
18	M	5;4	9.89
19	M	5;11	10.75
20	F	5;2	9.39
Mean		63.9 (months)	9.70
SD		4.2	.48
Range		4;10-5;11	8.81-10.75

Table 3

<u>Subject Characteristics: 7N Children</u>

ID	Sex	Age	MLCP
21	M	7;1	11.17
22	M	6;11	8.56
23	M	7;3	13.50
24	F	6;10	13.63
25	F	7;4	9.51
26	F	7;2	9.96
27	M	7;10	10.01
28	F	7;2	7.56
29	M	7;10	11.57
30	M	7;10	10.61
Mean		87.9 (months)	10.61
SD		4.6	1.95
Range		6;11-7;10	7.56-13.63

Measuring Grammatical Complexity

In most studies of English SLI, MLU is widely used as a measure of grammatical complexity. A similar measure to MLU, the MLCP (*Mesure de la longueur et complexité de la phrase* "Length and complexity index") was chosen because it was a commonly used measure in Québec and had been adapted to the French language. MLCP counts were obtained following the guidelines described in the procedure section (Dudley & Delage, 1980).

MLU counts in English have come under attack as a valid measure in determining whether a child is language-impaired (Lahey, 1994) primarily because they may not fully represent

the linguistic complexity of a child's language and because MLU levels have not been found to be consistent across a large number of children (Lahey, Leibergott, Chesnick, Menyuk & Adams, 1992). However as a gross measure of syntactic complexity, MLU continues to be widely used. The MLCP measures are also reported with the understanding that it is a gross measure of grammatical complexity.

Procedure

Language samples of approximately thirty to forty-five minutes were elicited during video-taped play sessions between the child and the experimenter who was a native Francophone graduate student. Materials included a farm animal set and a Play-Mobil "desert-island" play set. Further language was elicited through conversations about recent events in the child's life and through telling a story using the illustrated book "Frog, where are you?" (Mayer, 1969). Sessions were recorded using a Sony TCM-5000EV audio recorder and a Panasonic VHS AG-190 video recorder.

Transcription

For each transcript, 200 complete and intelligible spontaneous utterances were orthographically transcribed, coded and analyzed using the CHAT (Codes of the Human

Analysis of Transcripts) and CLAN (Computerized Language Analysis) conventions of the CHILDES (Child Language Data Exchange System) project (MacWhinney, 1991, 1995). All transcriptions were completely checked and verified by two native French graduate students of speech-language pathology. Ambiguities were resolved by discussion.

MLCP

The procedure for counting MLCP can be found in Dudley & Delage (1980). The original guidelines required only 30 utterances to obtain the MLCP count. However, in an effort to provide a more accurate measure and to be more comparable to the guidelines of MLU counts, 100 utterances were used to compute the MLCP.

An utterance was eliminated if it contained unintelligible segments. If only one element was unintelligible, it was considered a single word and given one point. Incomplete sentences, or repetitions of the experimenter's utterance were not coded. If more than one sentence in the sample contained the same syntactic structure, the same verb and verb tense, only one sentence was counted and the rest were eliminated from the sample.

To calculate the MLCP, each word was given one point. Additional points (AP) were given for the correct and justified use of morphological and syntactic rules within the noun phrase and the verb phrase. The additional points

for the noun phrase were given for gender marking, number

marking, contracted articles, possessives, demonstratives,

etc. Within the verb phrase additional points were awarded

for subject-verb agreement, tense morphemes, auxiliaries,

past participle (not a first conjugation verb because it is

homophonous with the infinitive), subjunctive, conditional,

negation and interrogation. Subject-verb inversion and

clitics that preceded the verb were also given one point.

The MLCP was calculated using the following formula:

$$MLCP = \frac{\text{Total of points for all utterances} \quad (N + AP)}{\text{Total number of utterances}}$$

Interjudge reliability of the MLCP was calculated based

on ten percent of the samples and agreement was between 93%-

97%.

Coding

Over 6000 utterances produced by subjects were coded

for correct use in obligatory contexts for the following six

grammatical structures: articles, possessive adjectives,

adjectives, auxiliaries, copulas, and main verbs (modals

were considered main verbs since they are generated in VP

and raise to I like other verbs). Correct use of the

gender, number and person agreement features were coded when

applicable. If an error was produced, the type of error was

coded. Coding conventions were created using the guidelines provided in MacWhinney (1991, 1995) (see Appendix A for the complete coding system). Ten percent of the coding was checked by a native Francophone graduate student and interjudge reliability was 98%.

Measures

For each subject, the percentage of correct use in obligatory contexts was calculated for each of the linguistic structures coded. Tabulations were computed using the FREQ command of the CLAN system.

This chapter outlined the design of the study and the methods used for the procedure and analysis of the data. The next chapter will present the statistical analyses used and the results of the analysis.

Chapter 5

RESULTS

A number of analyses of variance were performed to explore group differences on a variety of measures. All of the reported means were based on the total number of obligatory contexts. Unless otherwise stated, all analyses were based on a mixed design with one between groups factor, Group and one within groups factor, Linguistic Structure. The factor Group had three levels: 5N, 7N and SLI; the factor Structure had six levels: auxiliary, copula, verb, article, possessive adjective and adjective. All post-hoc pairwise comparisons were done using the Newman-Keuls procedure to explore the group differences. For all linguistic structures, individual data can be found in Appendix B.

Correct Usage

Percentage Correct

The mean percentages of correct use for each linguistic structure are listed in Table 4. The analysis revealed a significant main effect of Group [$F(2, 27)=20.84$, $p<.0001$]. Pairwise comparisons of the means for this factor revealed that the SLI group had fewer percent correct productions

(p<.01) than both the 5N group and 7N group who were not significantly different from each other. A significant main effect of Structure was also found [F(5,27)=9.35, p<.0001]. Pairwise comparisons revealed that correct use of the auxiliary was significantly lower than that of the other linguistic structures (p<.01). No differences were found among the other five structures.

Table 4

Production: Mean Percent Correct of Total in Spontaneous Speech

	SLI	5N	7N
Verb	89.4% (SD=11.37)	99.0% (SD=1.05)	99.5% (SD=.97)
Auxiliaries	67.5% (SD=23.09)	96.3% (SD=4.47)	97.6% (SD=2.46)
Copulas	89.8% (SD=11.32)	99.6% (SD=1.27)	99.9% (SD=.32)
Articles	87.0% (SD=13.31)	96.9% (SD=1.29)	98.7% (SD=1.57)
Poss. Adj.	94.6% (SD=6.69)	98.8% (SD=2.70)	100.0%
Adjectives	95.9% (SD=6.98)	98.4% (SD=2.76)	98.1% (SD=4.01)

A significant Group by Structure interaction was also found [F(10, 135)=6.00, p<.0001]. Tests of simple main effects revealed group differences at the levels of auxiliary, copula, verb, and article. Further pairwise

comparisons determined that at each of these four levels, the SLI group had fewer percent correct productions than both the 5N and 7N groups who were not significantly different from each other at any level.

Percentage of Tense Marking

The mean percent of correct tense marking as a function of the three relevant structures (auxiliary, copula, and verb) are listed in Table 5. A 3 x 3 ANOVA (Group x Structure) revealed a significant main effect of Group [$F(2, 27)=16.90$, $p<.0001$]. Pairwise comparisons of the means showed that the SLI group produced fewer correct productions of obligatory tense marking ($p<.01$) than the 5N group and 7N group who were not significantly different from each other.

Table 5

Tense: Mean Percent Use in Spontaneous Speech

	SLI	5N	7N
Verbs	1.37% (SD=2.95)	12.85% (SD=9.79)	10.27% (SD=3.76)
Auxiliaries	1.18% (SD=1.18)	18.03% (SD=16.63)	15.09% (SD=12.59)
Copulas	1.38% (SD=3.73)	12.25% (SD=5.53)	22.56% (SD=14.40)

MLCP

A one-way ANOVA with Group as a factor was also performed on the mean MLCP for each group (see Tables 1, 2,

and 3). Significant differences were found among the three groups [F(2, 27) = 16.596, p<.01]. Pairwise comparisons of the means revealed that the SLI group had a lower MLCP (p<.01) than the 5N group and 7N group who were not significantly different from each other. Examples of MCLP counts on sentences that the SLI group produced can be found in Appendix C.

The following sections present the results of the error analysis. Exemplars of error types produced by the SLI children can be found in Appendix D.

Errors Produced

Percentage of Omission Errors

The mean percent of omission errors as a function of Structure can be found in Table 6. This variable was subjected to a 3 x 5 ANOVA (Group x Structure). All levels were as previously stated with the exception of the adjective context which was not considered in this analysis because adjectives are not obligatory. Significant main effects of Group [F(2, 27)=11.03, p<.001] and Structure [F(4, 27)=11.03, p<.0001] were found. Pairwise comparisons of the means revealed that overall the SLI group produced more omission errors (p<.01) than both the 5N group and the 7N group who were not significantly different from each

other. As well, more omission errors were found under the auxiliary context than the other four structures (p<.05) and significantly more copula errors were found (p<.05) than in the possessive adjective, and verb contexts.

A significant Group by Structure interaction was also found [F(8, 108)=7.07, p<.0001]. Tests of simple main effects revealed that there were group differences at the levels of auxiliary and copula. Further pairwise comparisons showed that for these two levels, the SLI group produced more omission errors (p<.01) than both the 5N and 7N group who were not significantly different from each other.

Table 6

Omission Errors: Mean Percentage of Total in Spontaneous Speech

	SLI	5N	7N
Verb	0.88% (SD=1.39)	0.18% (SD=0.41)	0.09% (SD=.28)
Auxiliaries	17.28% (SD=11.98)	2.98% (SD=4.49)	0.55% SD=1.17)
Copulas	12.32% (SD=16.74)	0.15% (SD=0.49)	0.18% (SD=0.55)
Articles	5.52% (SD=5.24)	0.35% (SD=0.76)	0.24% (SD=0.77)
Poss. Adj.	0.31% (SD=0.99)	0%	0%

Percentage of Filler Errors

Table 7 lists the mean percent of filler errors as a function of Structure. Fillers are phonetically indistinct forms that are inserted in place of a word. The analysis revealed significant main effects of Group [F(2, 27)=5.47, p<.01] and Structure [F(5, 27)=3.50, p<.01]. Pairwise comparisons of the means revealed that the SLI group produced more filler errors (p<.05) than the 5N group and the 7N group who were not significantly different from each other. As well, overall, more filler errors were made (p<.05) under the auxiliary context compared to the adjective, possessive adjective and verb contexts.

Table 7

Filler Errors: Mean Percentage of Total in Spontaneous Speech

	SLI	5N	7N
Verb	0.41% (SD=0.75)	0%	0%
Auxiliaries	8.88% (SD=10.04)	0%	0%
Copulas	4.93% (SD=6.48)	0%	0%
Articles	3.16% (SD=9.32)	0%	0%
Poss. Adj.	2.00% (SD=6.33)	0%	0%
Adjectives	0%	0%	0%

A significant Group by Structure interaction was also found [$F(10, 135)=3.50$, $p<.001$]. Tests of simple main effects revealed that there were group differences at the levels of auxiliary and copula. Further pairwise comparisons revealed that at both of these levels, the SLI group produced more filler errors ($p<.01$) than both the 5N and 7N group who were not significantly different from each other at either level.

Percentage of Agreement Errors

Table 8 lists the mean percent of agreement errors as a function of Structure. The only significant effect found

Table 8

Agreement Errors: Mean Percentage of Total in Spontaneous Speech

	SLI	5N	7N
Verb	0.73% (SD=0.87)	0.69% (SD=2.18)	0.09% (SD=.28)
Auxiliaries	0.89% (SD=2.02)	0.69% (SD=2.18)	1.75% (SD=2.32)
Copulas	1.35% (SD=2.02)	0.31% (SD=0.97)	0%
Articles	3.85% (SD=1.90)	2.09% (SD=1.24)	0.80% (SD=0.84)
Poss. Adj.	2.72% (SD=3.81)	1.14% (SD=2.58)	0%
Adjectives	3.84% (SD=3.81)	2.15% (SD=4.08)	1.90% (SD=4.00)

was a main effect of Structure [F(5, 27)=3.21, p<.01].
Pairwise comparisons indicated that there were more
agreement errors in the adjective context (p<.05) than in
the copula and verb context.

Percentage of Main Verb Errors

Table 9 lists the number and mean percentage of error
types found in the main verb context (infinitive errors,
possible infinitive errors, and bare stem errors). Since
each type of error listed is only relevant to the verb
context, simple one-way ANOVAs, with Group as a factor, were
performed on the mean percent of each type of error. For
all types of errors, the SLI group was found to produce
significantly (p<.01) more errors than both the 5N and 7N
groups who were not significantly different from each other

Table 9

Main Verb Errors: Number and Mean Percentage of Total in
Spontaneous Speech

	SLI	5N	7N
Infinitive errors (excluding first conjugation)	30 2.15%	1 0.05%	3 0.18%
Auxiliary omissions or first conjugation infinitives (also included was possible inappropriate imperative form)	91 6.5%	8 0.07%	0 0%
Bare stem errors	16 0.74%	1 0.5%	0 0%

(mean percentage of: infinitive errors [$F(2, 27)=7.07$,

$p<.01$]; possible infinitive errors [$F(2, 27)=10.68$, $p<.01$];

bare stem errors [$F(2, 27)=10.27$, $p<.01$]).

Percentage of Gender and Number Errors

Possible Group differences in gender and number errors

(found under the article context) were also examined using a

one-way ANOVA. No significant differences among the Groups

were found for either type of error.

Chapter 6

DISCUSSION AND CONCLUSIONS

This chapter addresses the three research questions put forth in the rationale of this study. A summary of the study and an interpretation of the results with respect to the competing explanatory hypotheses are discussed. The chapter also addresses issues in language acquisition and patterns of language impairment. This discussion is followed by some of the methodological issues and clinical ramifications of this study. Finally, some directions for future research are presented.

Summary of Study

This study compared a group of ten seven-year-old language-impaired children with two groups of ten normally developing children (one age-matched group and one five-year-old group). Language samples were elicited from each child and transcribed. Six linguistic structures were coded and analyzed for correct use and error type: auxiliary, copula, main verb, article, possessive adjective, and adjective.

As expected, the SLI children showed difficulties with many aspects of grammatical morphology. The SLI group had a

lower MLCP than both comparison groups who were not different from each other. The SLI group made more errors on main verbs, copulas, and auxiliaries than the comparison groups. Infinitive forms and stem forms, although few, were used more often by the SLI group than both comparison groups. Agreement errors of the main verb, copula, and auxiliary, were not significantly different across the groups. The number of omissions and the use of fillers were not significantly different across the groups for the main verb, however, the SLI group omitted more copulas and auxiliaries and substituted more fillers for the copula and auxiliary than the 5N and 7N groups did.

The SLI group marked significantly fewer main verbs, copulas, and auxiliaries with a tense marker. Of the forms marked for tense by the language-impaired group, only a few contained tense errors. Although tense errors were not analyzed in this study, Gauthier (1995) analyzed a subset of the same data used in this study and found that the SLI children produced few tense errors on the main verb, copula and auxiliary.

The SLI group produced fewer correct forms of the article in obligatory positions than the comparison groups. However, there were no differences between the groups in the use of omissions, fillers, or agreement in the article context. No differences were found between the groups in the use of possessive adjectives or adjectives.

Discussion of Research Questions

The first question this study addressed was whether the
SLI group used inflectional morphology in a similar manner
to the 7N or 5N group. The results indicated that the SLI
group differed significantly from both comparison groups on
a wide variety of structures that required inflectional
morphology and in the types of errors that they produced.

The second research question asked whether French-
speaking language-impaired children showed patterns of
impairment similar to those reported in the literature for
SLI children who speak other languages. The pattern of
impairment in the language of the SLI children in this study
appeared similar to the patterns of impairment found in
other languages.

The third research question asked whether the results
of this study provided supportive evidence for any of the
predictions of current explanatory models of language
impairment. In the next section of the chapter, the
findings of this study will be discussed with respect to the
predictions of the competing explanatory hypotheses for
French language-impaired children.

Evaluation of the Competing Hypotheses

There were a number of hypotheses that were partially
supported by the data from this study: The Missing

Feature/Impaired Morphological Rule Hypothesis, the Agreement Deficit Hypothesis, the Differential Agreement Checking hypothesis and the Surface Hypothesis.

The Missing Feature/Impaired Morphological Rule Hypothesis predicted that SLI children should have difficulty with all inflectional marking including agreement within the noun phrase. Although the SLI group showed impairments in a number of linguistic structures, no differences were found between the language-impaired and comparison groups with respect to gender, number and person agreement with articles, adjectives and possessive adjectives. Therefore this hypothesis did not offer a complete explanation for these findings.

The Agreement Deficit Hypothesis predicted that French SLI children would have difficulty with agreement within the noun phrase and with subject-verb agreement. Counter to the predictions, the SLI children were not significantly different from the comparison groups at the level of subject-verb, article-noun, adjective-noun, or possessive-referent agreement. However, the SLI children did produce a variety of omissions and fillers in both the noun and verb phrases that might be considered to reflect deficits in agreement. This hypothesis also predicted that the SLI group should not have difficulty with inflections that do not involve agreement relations. Since the SLI children produced fewer tense markers, and more stem and infinitive

forms, this hypothesis did not offer an explanation for the findings.

The Surface Hypothesis predicted that bound morphemes and functional words should be less problematic for SLI children speaking Québec French. Indeed, the SLI children in this study had a good control of bound and free-standing morphemes (e.g. copulas, auxiliaries and articles) based on their high percentage of correct use. However, the most problematic linguistic structure for the SLI children in this study was the auxiliary which was not predicted by the hypothesis since the auxiliary in French carries the same stress as the syllables that surround it. Therefore, the Surface Hypothesis is supported in a limited way by the findings with respect to certain bound morphemes but it does not account for all the of the findings including the high number of omissions of syntactic elements (auxiliaries and copulas).

The Differential Agreement Checking Hypothesis predicted a higher number of omissions and substitutions of verbal inflections, auxiliary and copula forms. The findings of this study supported these particular predictions. As expected, in terms of correct marking of agreement between the article and noun (head-head agreement), there were no differences among the groups. Counter to the predictions however, for Spec-head agreement, no differences were found among the groups in terms of

agreement errors. Therefore, it appears that certain aspects of the SLI grammar were not accounted for by this hypothesis.

There were two explanatory hypotheses to which the findings seemed to offer the most support: the Extended Optional Infinitive Hypothesis, and the Structure Building Hypothesis. The common thread between these two hypotheses is that they use a linguistic framework to explain the difficulties that SLI children have with language and the hypotheses make specific predictions about certain grammatical categories, specifically functional categories and the morpho-syntactic processes associated with functional categories.

As predicted by the Extended Optional Infinitive Hypothesis, the SLI children used the infinitive form more often than the comparison groups. However, the number of infinitive forms was very low compared to the number reported in studies of English SLI (Rice, Wexler, & Cleave, 1995). The SLI children did not differ from the comparison groups in terms of correct agreement marking. The SLI subjects used significantly fewer tense markers but showed correct mastery when such markers were used. The data, then, supported all of the predictions of the Optional Infinitive Hypothesis suggesting that with respect to the verb phrase, even at age seven, the grammar of the SLI children in this study reflected a protracted period of

development of this particular aspect of the grammatical system.

In contrast to the predictions of the Extended Optional Infinitive however, the SLI group produced a higher number of incorrect stem forms. In French, the stem form is considered a form marked for tense and therefore should not occur in the output of SLI children according to this hypothesis. This issue needs to be examined in future studies. As well, the Extended Optional Infinitive Hypothesis did not consider structures other than the verb phrase and therefore did not predict errors found within the D-system.

The results from this study also partially supported the Structure Building Hypothesis which predicted that the SLI group would have difficulties with articles, auxiliaries, copulas, and verb inflections. As predicted, the SLI group showed no differences with the comparison groups in the use of adjectives since adjectives form the lexical category (A). Counter to the predictions, however, the SLI group did not have difficulty marking possessive adjectives with agreement marking.

The Extended Optional Infinitive Hypothesis and the Structure Building Hypothesis assume that the language impairment is selective and that particular aspects of grammar are late in their development. In this light, the differences found between the SLI group and the comparison

groups as well as evidence from normal acquisition of French suggested that the SLI children did not seem to have a deficit in their underlying grammar but rather showed a delay in the development of functional categories and the grammatical processes associated with these functional categories. Overall, the findings of this study suggested that functional categories appear in the SLI children's language but are delayed in their development at least more than two years.

Although, there were some hypotheses that the data appeared to strongly support none were able to account for the data in its entirety. There may be other factors that could be considered to help to account for the data. The SLI children showed deficits in a number of areas of language, however, the functional words, devoid of semantic content appeared to be the most problematic. Therefore, it seemed that the deficits observed in this study were related to features of language that did not carry any semantic information. This is not a new concept since Lahey et al. (1992) suggested that semantic factors such as clarity and nonredundancy may play a role in the acquisition of grammatical morphemes by SLI children. Lindner and Johnston (1992) also suggested that "low meaningfulness" may play a role in the difficulty that children with SLI have with certain grammatical morphemes.

This notion can be incorporated into existing

hypotheses. For example, the Structure Building Hypothesis predicts that agreement of possessive adjectives should be problematic for SLI children because they are generated within the Spec of DP and are considered a functional category within the D-system. However, the SLI children did not mark possessive adjectives differently from the comparison groups. One explanation may be that possessive adjectives carry semantic information about the referent and the possessor and this information must be made clear for the statement containing a possessive adjective to be understood correctly.

On the other hand, the auxiliary, which is also a functional category and generated in the I-system, carries no semantic information. The SLI children omitted the auxiliary to a much higher degree than any of the other structures examined. Copulas although identical to auxiliaries in terms of perceptual characteristics, syntactic movement, and inflectional morphology, were omitted to a much lesser degree than the auxiliaries. The difference between the copula and the auxiliary is that the copula carries more semantic information. For example, in the sentence *Jean est grand* "John is tall", the copula *est* "is" indicates a state of being. In the sentence *Jean est allé chez lui* "John went home". The auxiliary *est* "is" carries no semantic information.

In the case of articles, they carry some semantic

information. Articles are marked for gender, number, and definiteness. The SLI children tended not to omit the article as frequently as auxiliaries. One explanation for this is that number agreement and number marking on the article have semantic content especially since number is generally not marked overtly in the phonology on the noun in French. Furthermore, the definiteness property of articles has semantic meaning as demonstrated in the following example: *Marie a mangé une banane* "Marie ate a banana" vs. *Marie a mangé la banane* "Marie ate the banana", the finite article *la* "the" infers previous reference to the banana, but it may also indicate semantically that "the" banana had some importance with respect to a previous situation.

This refinement of the Structure Building Hypothesis needs to be tested and replicated both with French SLI children and cross-linguistically. However, it does offer an explanation for some of the findings of this study that were not explained by the existing hypotheses.

Methodological Issues

The design of this study was a three-group research design. This is a commonly used design that compares the language-impaired group to an age-matched and a language-matched group. This method allows assumptions to be made about whether the language of SLI children is delayed or

deviant. Such a difference is of fundamental importance in distinguishing among the various competing theories. For instance, if the SLI group differs from the age-matched group one cannot presume that the language is delayed or deviant, because it is not known whether the SLI group is performing at an earlier developmental level or whether their language is different from younger normally developing children. However, with a language-matched group, this distinction can be made. If the SLI children perform differently than their language-equivalent peers, this suggests that their language may be deviant. If they perform similarly, their language may be delayed (Watkins, 1994). In other words, the null hypothesis for determining impairment versus delay is provided by the language-matched group (Rice, 1994a).

Many research studies compare five-year-old SLI children to an age-matched group and an MLU-matched group. This language-matched group tends to be on average two years younger than the SLI group, thus the children are approximately three years old. In choosing subjects for this study we hypothesized that the limited world knowledge and experience of three-year-old children may make this age group inappropriate as a comparison group to a five-year-old language-impaired group. Instead, a seven-year-old language-impaired group was chosen. Although the use of older children may render it difficult to compare results

across studies, one advantage to having the older group is the likelihood that children with true language impairment rather than "late-bloomers" will be included (Bishop, 1992).

This seven-year-old SLI group was compared to an age-matched group as well as a younger group (approximately 5 years old). This age was chosen not because it was language-matched but because it was a standard two years younger than the language-impaired group. Since there is relatively little normative information about French language development, there were no reliable preestablished MLU or age equivalents from which to determine an appropriate age for a comparison group. Finding a language-matched group for the SLI group would have been too time-consuming and unrealistic for a project of this size and therefore a group of five-year-old children was chosen.

The results of the MLCP comparisons and the analysis of specific linguistic structures demonstrated that there were few differences between the 5N and the 7N groups. Although there was a wide range of scores on the MLCP measure for the SLI group and the 7N group, this measure was able to capture the differences between the SLI group and the comparison groups. The linguistic analysis also showed that for both the 7N and 5N groups, all the linguistic structures studied are considered mastered, according to Miller's (1981) 90% criterion for mastery. These are important findings for two reasons. First, it shows that by age five, a French-

speaking child's language is as sophisticated and syntactically complex, at least in terms of the linguistic structures examined in this study as a seven-year-old child's language. Second, the results indicate that in order to find a language-matched group for the seven-year-old SLI group, children younger than five-years-old must be used as a comparison group. The important implication of this finding is that this provides some evidence that the two-year age gap between comparison groups found in many of the studies of SLI is likely to be expanding as the language-impaired children get older.

Furthermore, SLI children achieved high percentages (close to 90%) of correct usage in five of the six linguistic structures examined in this study. Although the differences were significant between the SLI group and the comparison groups for four of these five structures, only the auxiliary stood out as being especially problematic for the SLI children. Based on these results, the SLI group did seem to have a good mastery of some morphological processes. It seemed that overall the SLI children did not have exceptional difficulty with using grammatical morphology but rather it was the refinement of the morphological system that seemed to be impaired. The high percentages of correct production demonstrated that the measure of "percent correct" may not yield as much information as an in-depth error analysis.

To summarize, the five-year old group was not a language-matched group to a seven-year-old SLI group and few differences were found between the 5N and 7N groups. Previous studies have generally based their hypotheses on the language characteristics of five-year-old SLI subjects. This study showed that French seven-year-old SLI children have similar patterns of impairment to the previously studied five-year-old children. Therefore, this study provided some evidence that shows that the delay in the development of certain language structures appears to extend beyond the age of five.

Issues in Acquisition

Although an exhaustive review of the literature on language acquisition was not provided in this study, some similarities were noted between the acquisitional data presented and the SLI data of this study. The patterns of impairment noted in the language of French SLI children seemed to parallel in some respects the language development of young French children. The areas that were not mastered by age three in normally developing children seemed to remain problematic for SLI children. For instance, one aspect of language that normally emerges early and relatively error-free is gender and number agreement. This area of language did not appear to be problematic for SLI

children in this study. In normal French language development, tense systems are acquired later and are not completely mastered until well into school age. Similarly, limited tense marking was a characteristic of the language of SLI children. Furthermore, up to the two-word stage, French children optionally mark finiteness. The data of this study showed that the SLI children displayed patterns of impairment similar to younger normally developing children in this optional infinitive stage of development.

The variability in the onset and development of language in young French-speaking children is large (Clark, 1985). However, as seen in the MLCP measures, the individual differences were relatively small in the 5N and 7N groups. It would appear that as children get older and their linguistic systems reach maturity, the variability decreases. Examining the wide variability in early acquisition offers an explanation as to why the language of the SLI group is so variable. It may be that just as normally-developing children acquire linguistic features at different rates, so do the SLI children at a much later age. Therefore the same variability in the acquisition of particular linguistic structures, as found in younger normally-developing children, is seen in 7-year-old language-impaired children. Of course, such variability could have other sources as well.

Overall, it would appear then that with respect to

particular aspects of grammar the SLI children in this study showed some patterns that were similar to that of French-speaking two and three-year-old normally-developing children (Clark, 1985). In fact, this is the age of the language-matched comparison group in many studies of SLI.

Clinical Ramifications

This study was designed with two goals in mind. The first goal was to provide some cross-linguistic evidence to the existing information about the nature and manifestation of language impairment. The second goal was to provide a clinical picture of the language characteristics of Québec French as they appear in language-impaired children and normally-developing children. This information may be useful for a number of reasons.

First, this study provided some information about the language characteristics of normally-developing 5-year-old children. This is the age that children enter kindergarten and therefore, speech-language pathologists and teachers can presume that the linguistic structures examined in this study should be acquired by this age. Second, many of the diagnostic language tools used in Québec are translated from English tests and few are normed on Québec children. Therefore, a fuller description of the normal development of Québec French can provide a better basis for comparison when

assessing a French language-impaired child. Third, this study provided a developmental framework on which speech-language pathologists and teachers can base their assessment and intervention.

Future Directions

A number of areas remain to be explored in the domain of French language impairment. For instance, an age range for an appropriate language-matched group to a seven-year-old SLI group needs to be determined.

There are a number of grammatical structures associated with functional categories that could be analyzed that would provide important information in evaluating the competing explanatory hypotheses. These include pronouns and clitics, case marking, past participles, and structures associated with the C-system. etc.

Additional research methodologies are also available to tap into a child's linguistic competence. These include on-line processing studies, comprehension probes, grammaticality judgement tasks, etc. Studies using these methodologies would complement the descriptive studies of the language output of SLI children.

Spontaneous language samples do not provide information about the language-impaired child's ability to use rarer linguistic structures. Elicitation tasks designed to create

obligatory contexts for particular grammatical elements and comparison between language-matched and age-matched groups could be designed to investigate the children's specific production abilities and limitations.

Furthermore, results from this study need to be replicated using a larger number of French SLI children. Cross-linguistic comparisons between French SLI data and other languages also need to be performed.

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APPENDIX A

CODING MANUAL

Utterances not to be coded: Direct repetition of self or
experimenter, unrecognizable forms

%nph tier

1) Articles: $ART

frozen forms (not to be counted):   tout à l'heure
                                   à l'envers
                                   l'intérieur
                                   ça l'air
                                   des+fois

$ART:gc/ge/gu/gn:nc/ne/nn/nu:m/f:s/p:d/i/c/a:article_(adj)_N
 (1)   (2)   (3)   (4) (5)   (6)
                          article=correct article_(adj)_N(c,s,o)

1) Indicates an obligatory article
2) Correct or not with respect to gender agreement
        gc:correct
        ge:gender agreement error
        gu:unmarked in spoken form (different but not
                produced)
        gn:neutral (no difference between masc. and fem.)
        omission
        ur:unknown referent
3) Correct or not with respect to number agreement
        nc:correct
        nn:neutral
        ne:number agreement error
        nu:unmarked in spoken form
4) Indicates the gender it should be
        m:masculine
        f:feminine
5) Indicates the number it should be
        s:singular
        p:plural
6) Indicates type of article
        d:definite
        i:indefinite
        c:complex (e.g. à la = au)
        a:contracted l'

2) ADJECTIVES: $ADJ

forms not to be coded: tout, toute, tous, etc.

```
$ADJ:gc/ge/gn/gu:nc/ne/nu/nn:m/f:s/p:d/p/s/q/n:pc/pe/pu:1/2/3/:
     (1)         (2)              (3)    (4) (5)   (6)          (7)      (8)
adj_N
word=correct adj_N(c,s,o)
```

1) Indicates presence of an adjective
2) Correct or not with respect to gender agreement
           gc:correct
           ge:gender agreement error
           gn:neutral
3) Correct or not with respect to number agreement
           nc:correct
           ne:number agreement error
           nu:unmarked in spoken form
           nn:neutral
4) Indicates the gender it should be
           m:masculine
           f:feminine
           n:neutral
5) Indicates the number it should be
           s:singular
           p:plural
6) Indicates type of adjective
           d:demonstrative
           p:participle
           pos:possessive
           q:qualificative
           n:interrogative

For possessive:
7) Indicates the person it should be
           1:first
           2:second
           3:third
8) Correct or not with respect to person agreement
           pc:correct
           pe:person agreement error
           pu:unmarked in spoken form

%vph_tier

1) AUXILIARIES $AUX

$AUX:nc/ne/nu:pc/pe/pu:s/p:1/2/3:aux_psp
(1)   (2)   (3)   (4)   (5)   aux=correction_psp

1) Indicates obligatory presence of an auxiliary
2) Correct or not with respect to number agreement
        nc:correct
        ne:number agreement error
        nu:unmarked in spoken form
        und:impossible to tell what target was
        ncc:number correct in context (no overt pronoun)
        filler
3) Correct or not with respect to person agreement
        pc:correct
        pe:person agreement error
        pu:unmarked in spoken form
        pcc:person correct from context (no overt pronoun)
4) Indicates the number it should be
        s:singular
        p:plural
5) Indicates the person it should be
        1:first
        2:second
        3:third
        u:unknown

2) COPULAS $COP

$COP:nc/ne/nu:pc/pe/pu:s/p:1/2/3:copula
(1)   (2)   (3)   (4)   (5)   copula=correction

1) Indicates obligatory presence of a copula
2) Correct or not with respect to number agreement
        nc:correct
        ne:number agreement error
        nu:unmarked in spoken form
        und:impossible to tell what target was
        ncc:number correct in context (no overt pronoun)
        filler
3) Correct or not with respect to person agreement
        pc:correct
        pe:person agreement error
        pu:unmarked in spoken form
        pcc:person correct from context (no overt pronoun)
4) Indicates the number it should be
        s:singular
        p:plural
5) Indicates the person it should be

```
                1:first
                2:second
                3:third
                u:unknown
```

3) MAIN VERBS $VER

Note:
- Do not code: fait que, tu€ sais€, voyons (frozen form), faut
- Write whole form in code for: c'est, c'(est) est_ce_que, (s)ais
pas (as in "ché pas")
- Code for "a" in "ç(a) a"

```
$VER:nc/ne/nu/nd:pc/pe/pu/pd:s/p:1/2/3:verb
  (1)       (2)         (3)       (4)   (5)   verb=correct form
```

1) Indicates obligatory presence of a verb
2) Correct or not with respect to number agreement
            nc:correct
            ne:number agreement error
            nu:unmarked in spoken form
            nd:dialectal form
            ncc:number correct in context (no overt pronoun)
            filler
            (Suggestion: compare the singular and plural forms
            of the same person e.g. je vs. nous; il vs. ils)

3) Correct or not with respect to person agreement
            pc:correct
            pe:person agreement error
            pu:unmarked in spoken form
            pd:dialectal form
            pcc:person correct from context (no overt pronoun)
4) Indicates the number it should be
            s:singular
            p:plural
5) Indicates the person it should be
            1:first
            2:second
            3:third
            u:unknown (no overt pronoun)
            (Suggestion: compare across persons of the same
            number e.g. je vs. tu vs. il)
```

## APPENDIX B

### Total Number of Errors Produced by Each Subject

| Subject | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Auxiliaries** | | | | | | | | | | |
| Total contexts | 32 | 28 | 31 | 20 | 39 | 26 | 23 | 24 | 19 | 27 |
| number errors | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| person errors | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| omissions | 1 | 1 | 5 | 2 | 1 | 3 | 0 | 2 | 0 | 0 |
| fillers | 0 | 0 | 8 | 4 | 11 | 5 | 0 | 0 | 2 | 0 |
| omission | | | | | | | | | | |
| or infinitives | 1 | 3 | 8 | 6 | 7 | 10 | 5 | 32 | 14 | 5 |
| **Copulas** | | | | | | | | | | |
| Total contexts | 100 | 106 | 47 | 72 | 63 | 39 | 67 | 111 | 36 | 50 |
| number errors | 1 | 3 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| person errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| omissions | 0 | 4 | 12 | 4 | 1 | 7 | 0 | 7 | 3 | 0 |
| fillers | 0 | 0 | 4 | 5 | 4 | 2 | 0 | 0 | 0 | 0 |
| **Verb** | | | | | | | | | | |
| Total contexts | 143 | 108 | 94 | 109 | 114 | 90 | 149 | 106 | 66 | 124 |
| number errors | 2 | 1 | 0 | 1 | 2 | 0 | 0 | 3 | 0 | 0 |
| person errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| omissions | 0 | 0 | 4 | 1 | 0 | 2 | 0 | 2 | 0 | 0 |
| fillers | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |
| infinitive | 1 | 0 | 5 | 1 | 0 | 0 | 0 | 3 | 0 | 1 |
| stem | 1 | 0 | 3 | 4 | 0 | 4 | 2 | 1 | 1 | 0 |

| Subject | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Article** | | | | | | | | | | |
| Total Contexts | 159 | 149 | 98 | 76 | 154 | 81 | 69 | 185 | 145 | 150 |
| gender errors | 0 | 6 | 3 | 2 | 1 | 3 | 4 | 3 | 16 | 9 |
| number errors | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |
| omissions | 5 | 3 | 13 | 7 | 3 | 11 | 0 | 4 | 13 | 4 |
| fillers | 0 | 0 | 2 | 0 | 0 | 14 | 0 | 0 | 0 | 0 |
| **Possessives Adjectives** | | | | | | | | | | |
| Total contexts | 26 | 14 | 13 | 21 | 32 | 5 | 15 | 38 | 10 | 7 |
| gender errors | 1 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 1 | 0 |
| number errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| person errors | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| omissions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| fillers | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| **Adjectives** | | | | | | | | | | |
| Total contexts | 24 | 18 | 12 | 31 | 7 | 10 | 18 | 33 | 22 | 18 |
| gender errors | 5 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| number errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | 5N subjects | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| **Auxiliaries** | | | | | | | | | | |
| Total contexts | 16 | 38 | 13 | 43 | 20 | 17 | 30 | 15 | 29 | 12 |
| number errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| person errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| omissions | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 |
| fillers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| omission or infinitive | 0 | 2 | 0 | 3 | 0 | 0 | 2 | 1 | 0 | 0 |
| **Copulas** | | | | | | | | | | |
| Total contexts | 64 | 100 | 80 | 104 | 53 | 66 | 85 | 57 | 73 | 71 |
| number errors | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| person errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| omissions | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| fillers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Verb** | | | | | | | | | | |
| Total contexts | 148 | 103 | 112 | 135 | 91 | 123 | 166 | 157 | 112 | 118 |
| number errors | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| person errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| omissions | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 |
| fillers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| infinitive | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| stem | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | 5N subjects | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| **Article** | | | | | | | | | | |
| Total contexts | 148 | 152 | 111 | 123 | 112 | 166 | 139 | 146 | 116 | 105 |
| gender errors | 4 | 3 | 2 | 6 | 2 | 1 | 2 | 3 | 2 | 2 |
| number errors | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| omissions | 0 | 2 | 2 | 0 | 0 | 0 | 3 | 4 | 0 | 0 |
| fillers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Possessive Adjectives** | | | | | | | | | | |
| Total contexts | 13 | 6 | 13 | 18 | 27 | 11 | 23 | 15 | 40 | 34 |
| gender errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| number errors | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| person errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| omissions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| fillers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Adjectives** | | | | | | | | | | |
| Total contexts | 26 | 17 | 39 | 28 | 14 | 15 | 20 | 20 | 8 | 19 |
| gender errors | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| number errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| | 7N subjects | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **Auxiliaries** | | | | | | | | | | |
| Total contexts | 22 | 19 | 38 | 66 | 31 | 35 | 33 | 25 | 43 | 40 |
| number errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| person errors | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 |
| omissions | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| fillers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| omission or infinitive | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Copulas** | | | | | | | | | | |
| Total contexts | 82 | 72 | 86 | 93 | 75 | 64 | 81 | 87 | 73 | 76 |
| number errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| person errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| omissions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| fillers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Verb** | | | | | | | | | | |
| Total contexts | 101 | 96 | 131 | 96 | 115 | 166 | 72 | 143 | 114 | 115 |
| number errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| person errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| omissions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| fillers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| infinitive | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 |
| stem | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

| | 7N subjects | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| **Article** | | | | | | | | | | |
| Total contexts | 121 | 106 | 121 | 181 | 124 | 112 | 121 | 135 | 145 | 164 |
| gender errors | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 3 | 1 | 3 |
| number errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| omissions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| fillers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Possessive Adjectives** | | | | | | | | | | |
| Total contexts | 8 | 28 | 18 | 47 | 28 | 23 | 8 | 18 | 24 | 12 |
| gender errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| number errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| person errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| omissions | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| fillers | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Adjectives** | | | | | | | | | | |
| Total contexts | 17 | 23 | 19 | 55 | 21 | 36 | 5 | 16 | 32 | 53 |
| gender errors | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 5 |
| number errors | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

# APPENDIX C

## Qualitative Exemplars: MLCP

The range of MLCP scores across the SLI group is large (3.61 to 9.69) compared to the 5N group (8.81 to 10.75) and the 7N group (8.56 to 13.63). The following exemplars are provided to demonstrate the large variation in MLCP score across the SLI subjects. For all examples, the incorrect production is shown followed by the correct production.


Subject 6 (MLCP=3.61) produced the following sentences:

| *ai | besoin | e | pelle | | | = 3 points |
|-----|--------|---|-------|--|--|------------|
| have | need | FILLER | shovel | | | |

| j' | ai | besoin | d' | une | pelle | = 8 points |
|----|-----|--------|----|-----|-------|------------|
| I | have:1PSG | need | of | a:FEM | shovel | |

**"I need a shovel."**


| *ai | caché | bateau. | | = 3 points |
|-----|-------|---------|--|------------|
| have | hidden | boat | | |

| j' ai | | caché | le | bateau | = 7 points |
|-------|--|-------|----|--------|------------|
| I have:1PSG:AUX | | hidden | the | boat | |

**"I hid the boat."**


Subject 1 (MLCP=9.69) produced the following sentences.

| *la | cassette | moi | l' | | a | |
|-----|----------|-----|----|--|---|--|
| the:FEM | cassette | me | it | | had:*3PSG:AUX | |
| eu | | hier | au | patin | | = 14 points |
| gotten:PSTPART | | yesterday | at+the | skating | | |

| la | cassette | moi je | l' | | ai | |
|----|----------|--------|----|--|-----|--|
| the:FEM | cassette | me I:1PSG | it: | | had:1PSG:AUX | |
| eu | | hier | au | patin | | = 15 points |
| gotten:PSTPART | | yesterday | at+the | skating | | |

**"The cassette, I got it yesterday at skating."**


| *les | p(e)tits | va | faire | les | souris | = 8 points |
|------|----------|----|-------|-----|--------|------------|
| the:PL | children | will:*3PSG | do | the:PL | mice | |

```
les      p(e)tits  vont        faire  les      souris      = 9 points
the:PL children   will:3PPL   do     the:PL mice
```

"The little ones will be the mice."

Subject 5 (MLCP=6.54) produced the following sentences:

```
*pourquoi  é         fais     ça                             = 5 points
why:QUES   FILLER    do       that:DEMONSTRATIVE
```

```
pourquoi   tu    as               fais             ça         = 10 points
why:QUES   you   have:2PSG:AUX    done:PSTPPART   that:DEMONSTRATIVE
```

"why did you do that?"

```
*é         monté      dessus   la        roche              = 5 points
 FILLER    climbed    on       the:FEM   rock
```

```
il   est              monté      dessus la       roche      = 9 points
he   had:3PSG:AUX     climbed    on     the:FEM rock
```

"He climbed on the rock."

APPENDIX D

Qualitative Exemplars: Errors Produced by the SLI Children.

For all examples, the incorrect production is shown followed by the correct production.

<u>Main verb errors</u>:
Subject 3 produced the following infinitive in the place of a finite verb:

*quoi   on   faire?
 what   we   do:INFINITIVE

quoi   on   fait
what   we   do:3PSG

"What do we do?"

Subjects 1 and 5 produced the following number errors:

*les   grenouilles   va   aller   dans l'   eau
the:PL frogs   go:*3PSG go   in   the   water

 les   grenouilles vont   aller   dans l'   eau.
 the:PL frogs:PLUR   go:3PPL   to go   in   the   water
"The frogs are going to go in the water."

*les tortues   i(ls)   s'   en   vient.
 the turtles   they:3PPL clitic   clitic   come:*3PSG

 les tortues   i(ls)   s'   en   viennent
 the turtles   they:3PPL clitic   clitic   come:3PPL

"The turtles they are coming."

<u>Copula and Auxiliary Errors</u>:
Subject 3 produced the following omission and filler errors:

*i(l)   parti   dans l'   eau.
 he:3PSG   gone   in   the water

 i(l)   est   parti   dans l'   eau.
 he   is:3PSG   gone   in   the water

"He went in the water."

Subject 3 produced the following examples of copula omissions and fillers:

*il   *où*   *mon* *chapeau?*
 it   where my   hat

il *est*   *où*   *mon* *chapeau?*
 it is:3PSG where my   hat

"Where is my hat?"

il   *pas* *méchant.*
 he   not mean

il *(n)'est*   *pas* *méchant.*
 he   is:3PSG not mean

"He is not mean."

é   *pour* *toi.*
 filler   for you

c' *est*   *pour* *toi.*
 it is:3PSG for you

"It is for you."

Article Errors:
Subject 3 produced the following filler:

e   *to(r)tue*
 FILLER turtle

une   *tortue*
 the:FEM turtle

"the turtle"

Subject 2 produced the following number error:

près *du*   *yeux .*
 near to+the:SG eyes:PL

près *des*   *yeux*
 near to+the:PL eyes:PL

"near the eyes"