Critical Review:
Which elements of morphosyntax act as reliable clinical markers of SLI in French-speaking school-age children?

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This critical review examines evidence regarding morphosyntax impairments that distinguish French-speaking school-age children with SLI from their typically developing peers. Study designs included eight case control designs and one case study. Overall, the review's results provide suggestive evidence that object clitics, tense marking and frequency and variability of complex forms are reliable clinical markers of SLI in this population. Clinical implications and recommendations for future research are discussed.

Introduction

Delays in morphological and syntactic development are a characteristic feature of children with specific language impairment (SLI) in English (Bedore & Leonard, 1998). These findings have since been extended to several other languages, including Spanish (Bedore & Leonard, 2001) and Greek (Stravrakaki, 2010). While difficulties with grammatical morphology appear to be a consistent finding cross-linguistically, the structures affected and extent of the deficits are, to a great extent, determined by the specific linguistic properties of the language spoken and the richness of its inflectional system (Stravrakaki, Chrysomallis & Petraki, 2011; Lidner & Johnston, 1992).

French employs a moderately rich inflectional system as well as structurally complex forms involving syntactic movement coupled with tense and agreement marking. These grammatical properties presumably pose challenges for the syntactic computation and working memory limitations inherent to children with SLI (Marton & Schwartz, 2003). Given these factors, weak morphosyntax skills are also suspected to be a characteristic feature of SLI in French, necessitating further analysis to establish a cohesive language-specific profile of impairment. While morphosyntax abilities did not distinguish French preschoolers with SLI from their typically developing peers (Thordardottir & Namazi, 2007), these deficits are likely to become more prominent in the school-aged years as later-developing complex structures emerge and performance gaps widen.

To date, research on the morphosyntactic abilities of French school-age children with SLI has been largely driven by theories of universal syntax or the underlying causes of SLI, with limited clinical interpretation. Given the more limited standardized testing options in French and infrequent exposure to this population in clinical practice, it is especially important to explore which errors serve as potential diagnostic indicators. Such knowledge would inform speech-language pathologists' guidelines for assessment and prioritization of structures to be targeted in therapy.

Objectives

The primary objective of this paper is to outline and critically evaluate the existing literature regarding the potential use of morphosyntax as a clinical marker of SLI in French school-age children. This analysis will subsequently inform the secondary objective of proposing evidence-based recommendations for practice and future directions for research.

Methods

Search Strategy

Online databases including PubMed, PsycInfo, Scopus and Google Scholar were used to locate articles using the following search strategy: (specific language impairment OR SLI OR developmental language disorder) AND (French) AND (morphosyntax OR grammar OR grammatical morphology).

Selection Criteria

Articles selected for inclusion in this review were required to investigate expressive and/or receptive measures of morphosyntax in native French speakers between 5;0 and 13;0 years old with a formal diagnosis of SLI.

Data Collection

Results of the database search yielded studies evaluating various aspects of morphosyntax in French monolinguals and simultaneous bilinguals. The structures examined included: object clitics, tense marking, subject-verb agreement, wh-questions and overall frequency and variety of complex forms. The

study designs consisted of eight case control studies and one case study.

Results

Case Control Studies

Case control studies provide level 2b evidence and are an appropriate design given that the condition of interest is inherent to the participants, and comparison with typically developing peers is required to examine the research question. However, restricted sample pools and lack of randomization bias the sample, limiting generalizability of results as the groups may not be representative of the greater population. Additionally, the studies all had small sample sizes for both case and control groups, further compromising result generalizability.

Franck et al. (2004) examined the expressive language abilities of French monolingual children with SLI (5-9 years; n = 8) by measuring subject-verb number agreement accuracy. The control group consisted of 60 typically developing (TD) monolingual children of the same age range. Appropriate inclusion criteria for both the SLI group and TD controls was provided. All SLI participants had relatively strong comprehension skills to control for the extraneous variable of poor understanding of task instructions. Controls underwent standardized testing of both syntactic production and working memory abilities to ensure there were no major deficits in areas central to task performance. However, the specific assessment batteries used to select the SLI group were not reported, and there is no research addressing the validity of the tests used to assess the control group.

The elicitation task design was sound and age-appropriate. The stimuli were carefully constructed to ensure the linguistic processing load was consistent across experimental conditions and were presented in a semi-randomized order. Limitations of this study included a small number of test items (four) per condition. Additionally, while appropriate statistical analyses were conducted within groups, no inferential analysis was done to compare the performance of the SLI group and TD controls. Only descriptive statistics were provided.

Results of the study indicated that children with SLI made more agreement errors than TD controls, though the effect size was quite small. Qualitative analysis of error patterns revealed that the SLI group perseverated in their use of the default singular form. Because of the study's limitations, notably the absence of inferential statistical analysis and small effect size, it only provided somewhat suggestive evidence for subject-verb agreement as a clinical marker of SLI in French-speaking children.

Gruter (2005) investigated French-speaking monolinguals with SLI's (6 years; n = 6) production and comprehension of object clitics. Their receptive and expressive outcomes were compared to age-matched TD controls (n = 12). Selection criteria for the SLI group was appropriate, and the standardized test used has been shown to be both reliable and valid. However, criteria for the TD control group relied solely on parent-report of language abilities. Experimental tasks were well designed and administered by the same examiner to ensure consistency across participants. The study utilized a large number of test stimuli to minimize outlier effects, and presented items in a semi-randomized order. Irrelevant stimuli were also included to ensure children were tending to the task rather than selecting randomly. The elicited data was then recorded and transcriptions were later cross-checked by a second native speaker to verify data accuracy. Appropriate inferential statistics were used, with additional statistical analysis conducted to rule out the effect of suspected extraneous variables.

Results indicated that the SLI group performed significantly worse than TD controls on the expressive object clitic task. However, no between-group differences were observed on the receptive task, indicating that children with SLI only demonstrate expressive delays with respect to object clitics. Because the study was well-designed, but had a limited sample size with considerable individual variation within the SLI group, it provided tentative evidence for object clitic production abilities as a reliable clinical marker of SLI in French.

Hamann et al. (2003) compared French monolinguals with SLI under the age of 5-years-old (n = 6) to an older French SLI group (n = 5) to examine which morphosyntactic difficulties persist beyond the preschool years. The inclusion criteria for both SLI groups was appropriate, however only one test from the assessment battery used was listed. Spontaneous language samples were obtained from previously transcribed corpus data that had been verified by three independent transcribers. Limited detail was provided on the context of the language sample and the coding procedure used. The major limitation of this study was the absence of inferential statistical analyses to determine whether differences observed between age groups were statistically significant. It also lacked an age-matched TD control group needed to examine the research question of whether the identified persistent

difficulties deviate from normal peers and can be used as a diagnostic indicator.

Results indicated that the older SLI group rarely used ungrammatical non-finite forms or omitted subjects, and consistently used subject clitics in obligatory contexts. However, similar to the preschool group, they seldom used object clitics. Given the study's limitations, particularly its inability to fully address the research question of interest, it only provided somewhat suggestive evidence for expressive object clitic performance as a clinical marker of SLI in the school-aged population.

Jakubowicz, Nash, Rigaut and Gérard (1998) studied the elicited production and comprehension of determiners and clitic pronouns in French monolinguals with SLI (mean age of 9 years; n = 13). Their task performance was compared to that of TD controls (mean age of 5;7 years; n = 20), who were selected based on normative data suggesting clitic pronoun mastery is achieved by 5;8 years old. A robust inclusion criteria that consisted of both clinical assessment and standardized testing results was used to select the SLI group. All verbal and non-verbal assessment measures used were reported, some of which were gold standard tests. However, no criteria were provided for the TD controls. The methodology was thoroughly outlined, and the experimental tasks were carefully constructed to ensure face validity and age-appropriate stimuli. Appropriate inferential statistical analyses were also conducted.

On the expressive task, the results demonstrated that children with SLI performed significantly worse than TD controls on clitic pronouns items. Between-group performance for determiner items was comparable. Within-group analysis revealed that children with SLI were less accurate on object clitic items than reflexive clitic and subject clitic items. On the receptive task, no between-group differences were observed. Overall, this study provided very suggestive evidence for impaired clitic pronoun production deficits, specifically object clitics, as a clinical marker of SLI in French-speaking children.

Paradis and Crago (2001) examined whether French-Canadian children with SLI (7 years; n = 10) experience significantly more difficulty with tense morphology in expressive language compared to subject-verb agreement, distributional rules associated with finiteness and non-tense morphemes. Their performance on these measures was compared to that of 10 age-matched TD controls and 10 mean length of utterance (MLU) matched TD controls. Appropriate and robust selection criteria was reported for children with SLI, including a standardized test normed specifically on French-Canadian children. However, inclusion criteria for TD controls relied solely on parent report of language skills.

Spontaneous language samples were elicited during an informal 45-minute play session, which was videotaped and later transcribed with 93% interrater reliability. Language samples are more ecologically valid than elicitation tasks, but introduce subjectivity in the data analysis as personal judgment must be exercised to determine obligatory contexts. Results were reported in percent correct use, so the total number of obligatory contexts for each condition was not stated. It was therefore difficult assess the representativeness and validity of the language samples. Additionally, tense markings were grouped under broad categories (present, past and future), so the specific tenses used were not reported. Appropriate inferential statistics were used to evaluate significant effects between groups, apart from the distributional contingency condition, where performances over 90% (typically indicative of mastery) in all groups were deemed to be sufficient.

Results of the study indicated that children with SLI omitted tense morphology more frequently than TD peers, but performed similarly on subject-verb agreement, distributional contingencies associated with finiteness and non-tense morphemes. Overall, the study provided highly suggestive evidence that impaired tense marking may be a clinical marker of SLI in French, while subject-verb agreement may not be a reliable indicator.

Paradis, Crago and Genesee (2003) examined whether object clitic omission in expressive language is a viable clinical marker of SLI in French speaking children. They compared French-English bilinguals with SLI (7 years; n = 7) to MLU-matched TD French-English bilingual controls (3 years; n = 9). All participants spoke the same regional dialect and were simultaneous bilinguals to eliminate confounding variables inherent to second language learning. While selection criteria for the SLI group was appropriate, no criterion for TD controls was specified. Spontaneous language samples were videotaped in both French and English on separate occasions and were later transcribed. The coding procedure was sound and described in detail, however it was not specified whether the samples were transcribed by native speakers or verified by additional coders.

Results showed that both SLI and TD groups produced significantly more ungrammatical object pronoun forms in obligatory contexts in French than in English,

and primarily demonstrated object omission errors rather than anaphoric reference agreement errors. There were no between-group differences, indicating that children with SLI were performing at the same level as TD 3-year-olds. Appropriate inferential statistical analyses were conducted for this data.

Additional analysis was done comparing the SLI bilingual group to age-matched TD monolinguals and age-matched SLI monolinguals. Monolinguals and bilinguals with SLI had similar object clitic accuracy rates, and these rates were much lower than those of the TD controls. However, only descriptive statistics were provided for this data, so the study was unable to confidently conclude that bilingualism was not a confounding variable affecting morphosyntax development and performance. Overall, this study provided suggestive evidence that object clitic pronoun production impairment appears to be a feature unique to French-speakers with SLI, and is a promising clinical marker.

Prigent, Parisse, Leclerq and Maillart (2015) investigated the total frequency and variety of complex forms used by French-speaking school-age children with SLI (mean age of 11;5 years; n = 20). The data, which was collected from spontaneous language samples, was compared to that of 20 TD controls matched for MLU, morphosyntactic comprehension and maternal education level. Robust standardized testing was used to select both the SLI and TD control groups. Their assessment procedure also included several gold standard tests as well as parent questionnaires to confirm all participants were native speakers of French. Four different activities were used to collect language samples in order to maximize productions and address a variety of interaction types. A limitation of this study was that several specific forms were grouped together when coded to facilitate analysis, making it difficult to determine whether all forms were impaired in children with SLI, or if only one or two items within the grouping were problematic. Additionally, the use of an MLU-matched control group instead of an age-matched controls posed challenges for the clinical interpretation of this data in terms of assessment, where performance is compared to age norms.

The results indicated that modals, conjunctions, complex verb tenses (imperfect, future and conditional), prepositions, pronouns and adverbs were less frequent in the productions of children with SLI. They also produced a more limited variety of verbs overall, prepositions, complex verb tenses and modals. Additional statistical analyses were used to determine which of these morphosyntactic forms best discriminated children with SLI from TD controls. Frequency of relative pronouns + interrogative pronouns + interrogative adverbs was found to have the greatest sensitivity, and an overall classification power of 70%. Combining these forms with the frequency of conjunction use improved the classification power to 75%. Tense marking was least effective at identifying children with SLI. Overall, this study provided very suggestive preliminary evidence for the classification strength of various grammatical markers and potential utility of lower variability and frequency of complex forms as a clinical marker.

Jakubowicz and Nash (2001) examined the expressive and receptive language skills of French-speaking children with SLI using elicitation tasks to measure present tense and passé composé performance. The case group consisted of 28 monolingual French-speaking children with SLI divided into two age groups (mean age of 7;5 and 10 years). Their results were compared to three TD control groups: 3-year-olds (n = 12), 4-year-olds (n = 12) and 6-year-olds (n = 12). Appropriate criteria were used to select the SLI group, however the assessment battery was not specified. No inclusion criteria were provided for the TD control group. The elicitation tasks were age-appropriate and had good face validity. Responses were videotaped and transcribed. To ensure accurate data collection, half of the responses were verified by a second transcriber and all coding was reviewed by a second expert coder. Appropriate inferential statistics were used to determine whether within- and between-group differences were statistically significant.

Expressive and receptive task results both indicated that the younger SLI group (7;5 years) performed significantly worse on past tense items compared to present tense items. Given the study's sound experimental design and statistical analyses, it provided highly suggestive evidence that impaired production and comprehension of passé composé forms may be a reliable clinical marker of SLI in this age group.

Case Studies

Case studies provide level 4 evidence and are beneficial in that they provide valuable in-depth qualitative analysis of morphosyntactic error patterns in children with SLI. However, given that SLI is a rather heterogenous disorder, these studies pose inherent concerns to result generalizability. As such, inferences from one case to the larger population cannot confidently be made.

Stavrakaki, Chrysomallis and Petraki (2011) investigated the subject-verb agreement, object clitic and wh-question productions of a 9-year-old simultaneous French-Greek bilingual. The measures used to confirm his SLI diagnosis were described in detail and included gold standard tests. His results were compared to those of two TD simultaneous French-Greek bilinguals matched for language skills and gender, as well as existing data on French monolinguals with SLI. All morphosyntactic structures were tested using elicitation tasks similar or identical to ones in previous studies to maximize the validity of the data comparisons. Confounding variables in this case study included the child's previous language therapy experience, as he had already undergone therapy specifically targeting object clitic pronouns at the time of the study. Another confound was the possibility of skill and strategy transfer between languages. This was particularly problematic for wh-forms because wh-fronting is obligatory in Greek, but is an optional, more complex form in French.

No significant differences were found between the French-Greek child with SLI and bilingual TD controls. Appropriate nonparametric statistics were used to analyze these results. Comparison with SLI monolinguals revealed that the French-Greek child's high error rate on object clitic production tasks in French were similar to those found in previous studies, but he demonstrated a more sophisticated error pattern. His relatively accurate performance on subject-verb agreement tasks in French was also consistent with previous studies. The French-Greek bilingual did however perform better than monolinguals on French wh-question tasks. He produced more wh-questions using fronting without inversion in contrast to the simpler in-situ form preference typically observed in children with SLI. No inferential statistics were used to examine whether these differences were significant. Lastly, language effects were examined. The French-Greek bilingual's performance on object clitic and subject-verb agreement tasks was significantly worse in French than in Greek. Appropriate nonparametric statistics were used to analyze this data. Because of the inherent limitations of the study design and additional confounding factors, this study only provided weak evidence for object clitic impairment as a clinical marker of SLI. Subject-verb agreement and wh-questions were not found to be accurate markers.

Discussion

The studies of this review examined four morphosyntactic features: object clitics, tense marking, subject-verb agreement and overall frequency and variety of complex forms. All studies addressing object clitics reported significant expressive delays in French-speaking children with SLI, ultimately providing highly suggestive evidence that these pronouns are a reliable clinical marker. Similarly, studies examining tense marking all found that children with SLI experienced delayed production of the past and future tenses. However, these impairments appeared to be less pronounced in children over 10-years-old. Overall, there was suggestive evidence for tense marking as a reliable diagnostic indicator of SLI in younger French-speaking children. Results for both object clitics and verb tense were consistent across data collection methods (spontaneous language sample or elicitation task) and various French dialects, improving the robustness of the findings.

Based on the results of one study, there was also suggestive preliminary evidence for overall frequency and variety of later-developing structures in spontaneous speech as an indicator of SLI. Additional studies with age-matched control groups are needed to examine the effect size of differences in performance on these identified vulnerable structures as well as their diagnostic specificity and sensitivity to better evaluate their clinical applicability. Evidence for subject-verb agreement was equivocal. Moreover, small effect sizes and phonological homophony of most singular and plural verb endings in French ultimately limit its clinical utility as a marker of SLI.

Future Research Considerations:

To improve the level of evidence available, it is recommended that future research takes the following into consideration:

a) Future research should further explore the diagnostic sensitivity and specificity of vulnerable morphosyntactic structures.

b) Larger sample sizes should be used to improve result generalizability. This could possibly be achieved by utilizing corpus data.

c) Researchers should examine morphosyntax comprehension in children with SLI to develop a more comprehensive profile.

d) Control groups should undergo standardized testing to ensure sample representativeness and be age-matched to increase clinical applicability of findings.

Clinical Implications

Based on the results of this review, it is recommended that speech-language pathologists examine object clitic and tense marking performance when assessing the expressive language abilities of French-speaking school-age children. Forming impressions of the overall grammatical complexity of children's utterances may also be of benefit. Because there is insufficient evidence to suggest these factors alone can accurately identify French children with SLI, they should be used in conjunction with standardized tests.

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