

---

Feature Blindness: A Case Study

Author(s): M. Gopnik

Source: *Language Acquisition*, Vol. 1, No. 2 (1990), pp. 139-164

Published by: [Taylor & Francis, Ltd.](#)

Stable URL: <http://www.jstor.org/stable/20011348>

Accessed: 16/06/2011 12:51

---

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=taylorfrancis>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).



Taylor & Francis, Ltd. is collaborating with JSTOR to digitize, preserve and extend access to *Language Acquisition*.

# Feature Blindness: A Case Study

M. Gopnik

*Department of Linguistics  
McGill University*

This article provides evidence that supports the hypothesis that developmental dysphasia results from a deficit in marking a specific class of linguistic features. The data show that this deficit is not the result of a perceptual problem or any general cognitive problem in representing hierarchical relationships, but rather appears to be a specifically linguistic problem. Moreover, it is not a deficit that affects all parts of language equally. Syntactico-semantic features are affected, whereas some other language processes, like thematic relations in simple sentences, are unimpaired. Because these features are absent, morphophonemic rules and rules that match features in the syntax are also absent. The fact that the same errors are found in all manifestations of language—spontaneous speech, grammatical judgment, repetition, and writing—supports the hypothesis that the deficit is in the underlying grammar rather than merely a problem of performance. Data from a wide range of features (including number, person, tense, aspect, and gender) confirm specific predictions that follow from the feature-deficit hypothesis but that cannot be accounted for by a perceptual or cognitive deficit hypothesis. This explanation is supported by data from a detailed case study as well as by data reported in the literature to be typical of dysphasia. There is also evidence that suggests that the form of dysphasia described in this article may be genetic in origin.

## 1. INTRODUCTION

This article demonstrates that a wide range of seemingly diverse linguistic errors characteristic of developmental dysphasics can be accounted for by a deficit in one particular level in the underlying grammar. Developmental dysphasia has been characterized as a marked delay in the onset of language and disorders in language once it has been acquired in the absence of

any neurological, cognitive, or psychological difficulties (Wyke, 1978; Zangwill, 1978). However, as Cantwell and Banker (1987) pointed out, the clinical diagnosis of dysphasia or developmental language disorder does not determine a single entity, but rather is a collective term covering a wide range of abnormal development involving differing aspects of speech and language. The diagnosis of developmental dysphasia is not based on the properties of the dysphasic language itself, but rather on the fact that language in the affected children is unexpectedly late in developing and, when it does develop, differs from normal language in ways that are not well specified. It is therefore unlikely that any particular description of the language disorders would hold true for the whole class of dysphasics. Moreover, I deal here with only a subset of possible dysphasic phenomena.

With these caveats in mind it can still be said that there is a class of language errors<sup>1</sup> reported to be typical of dysphasic children. One of the problems with the reports in the literature is that they are fragmentary, reporting primarily on single, isolated errors or error rates for a particular structure. Moreover, perhaps because the clinicians who are providing the descriptions have very little linguistic training, these reports often do not provide crucial data for testing linguistic hypotheses about the underlying problem. The data presented in this article are not only from the literature but more importantly are from an extensive corpus of material collected from a bilingual dysphasic boy.<sup>2</sup> The data cited are judged to be typical of dysphasics by experienced clinicians.

Whether feature-blindness also occurs in other language-disordered populations, such as agrammatic or paragrammatic asphasics, is still to be determined. There has been a lively debate about the underlying linguistic properties that characterize these disorders (see, e.g., Grodzinsky vs. Caplan & Hildebrandt, 1986). The particular concern of this debate is why agrammatics make errors in assigning thematic roles in sentences in which there has been NP movement. (The behavior of agrammatics in this respect appears to be quite different than dysphasics.)

Although the authors argue about the details of the appropriate explanation, they agree about the desirability of providing a linguistically principled account of language disorders. It is clear that there is no a priori logical necessity that such a principled account be available. Linguistic theories designed to provide a description of normal language need not

---

<sup>1</sup>It is important to clarify the concept of *error* in cases of language disorders. If subjects with language disorders have deficits in their underlying grammar, then all of the forms produced by these incorrect underlying rules are wrong from the point of view of the normal grammar. For example, if dysphasics do not mark features in their lexicon, then all feature-marked forms are wrong even when they resemble surface forms of the normal grammar: *a boy* is just as wrong as *a boys* because neither of them is produced by feature-matching rules.

<sup>2</sup>See Appendix for P. B.'s medical history.

necessarily be reflected in language disorders. If, however, it can be shown that such a principles relationship does exist, then we are led to a deeper understanding of the disorder. Moreover, though some of the errors seen also occur in the language of very young children and of adult second-language learners, the general pattern of errors is not at all representative of these other populations.<sup>3</sup> For example, though young children frequently make overgeneralization errors, such as *foots* or *hitted*, these types of errors do not occur in the dysphasic population. On the other hand, errors such as the use of determiners with proper names do not occur in young children.

If the aim is to arrive at an understanding of the underlying grammar that results in dysphasia, then an item-by-item comparison of which forms are produced by which population is not the appropriate way of looking at the data. An underlying grammar must be assumed to produce all of the forms of the subject. Even if the data sets from two different populations appear to contain some identical items, there is no reason to believe that those items that are identical on the surface are derived by the same rules from the same underlying representations. What is important to characterize are these underlying rules and representations, not the similarities or dissimilarities in the final surface forms.

Until now, the etiology of dysphasia was a mystery. It was known that it could occur in a single sibling in a family, therefore it was unlikely that the deficit could be caused by something in the environment, and no such case has been found. However, it has also been observed that dysphasic could run in families. Both minimal brain damage at birth and inadequate oxygen supply during gestation have been suggested. There now is evidence from case studies (Gopnik, 1990; Hurst, Baraitser, Auger, Graham, & Norell, 1990; Samples & Lane, 1985), twin studies (Borges-Osario & Salzano, 1985; Tomblin, 1990), and large statistical studies (Tallal, Ross, & Curtis, 1989; Tomblin, 1989) that at least some cases of dysphasia are caused by a defect in a single dominant gene.

Almost all of these reports provide little if any description of the language impairment itself, though they all acknowledge the need for such linguistic accounts. Instead, they concentrate on showing that the patterns of familial aggregation support the hypothesis that some cases of dysphasia are genetic in origin. In Gopnik (1990), a very brief description of the language of the dysphasics and normals in a three-generational family of 30 individuals was provided. A much more detailed explanatory account appears shortly. Prompted by this evidence, the original subject reported on in this article was retested on the same tests that were used on the family of dysphasics, and his genetic history was elicited. His performance on these tests was

<sup>3</sup>From L. White (personal communication, April 1990) who has written extensively on both first and second language acquisition (White, 1980, 1989).

identical to those of the family and it was discovered that both a cousin and an uncle of his were also dysphasic. Therefore, the detailed explanatory account provided here should be seen as both an interesting case study in itself and as a possible model for the description of genetic dysphasia.

## 2. EXPLANATORY HYPOTHESES

Three different types of hypotheses have been advanced to account for developmental dysphasia: perceptual, cognitive, and linguistic. The perceptual hypothesis supposes that the primary problem is in the auditory system. Because the child cannot process certain kinds of acoustic information, linguistic information encoded by these acoustic signals is not available to the child. It has been hypothesized that "some cases of developmental dysphasia are the direct consequence of defective processing of rapidly changing acoustic information and an associated, possibly consequential reduced memory span for auditory sequence" (Tallal & Piercy, 1978, p. 82). A second hypothesis is that dysphasia is the result of a general cognitive deficit. Eisenson (1984) argued that general learning mechanisms, which may interact with cultural and emotive factors, subsume all learning, including language, and deficits in language should be accounted for in terms of these general learning mechanisms. A much more specific cognitive hypothesis was proposed by Cromer (1978). He supposed that "the deficit in these children may be some kind of hierarchical structuring disability" (p. 130). Because rules in the grammar often involve hierarchical relationships, this specific cognitive deficit has consequences for language learning. The third hypothesis is that the deficit is specifically linguistic. The impairment is hypothesized to be in the underlying rules for constructing grammars (Crystal, 1987; Crystal, Fletcher, & Garman, 1976). Crystal and his colleagues said that

what we note now is a readiness to *list* information about syntactic features, without relating this inventory to some general framework. . . . Assessment on the basis of such an inventory is unreliable because there is no guarantee that one has spotted the most important syntactic processes. (p. 14)

Crystal used a Quirk and Greenbaum (1973) model, but he did not succeed in finding a general underlying principle to account for the data.

These three hypotheses constitute different theoretical claims about the modularity of mind. The perceptual hypothesis supposes that the auditory system operates in a similar way for language and nonlanguage sounds. The deficit is hypothesized to be in some general auditory processing and auditory memory system. The language errors are therefore a secondary

result of a more general processing problem: Morphological distinctions that are carried by unperceivable acoustic signals cannot be represented in any grammar.<sup>4</sup> Unfortunately for this theory, the same sounds that are claimed to be unperceivable in morphological contexts are perceived in lexical items. The child who is presumed to have a perceptual problem with the final sound in *boys* has no problem with the word *noise*. In order to account for this difference, the theory would have to show that there is a significant perceptual difference between morphological and lexical *s*, and in general it would have to show that there is a principled acoustic property that distinguishes between morphological and lexical elements. It is demonstrated later that even if such an unlikely linguistic hypothesis were true, there are other data that this hypothesis cannot account for.

The cognitive hypothesis denies that the deficit can be accounted for simply by positing a defect in perception. The deficit is seen to be in an underlying, internalized cognitive system. It is the defect in this generalized cognitive system that gives rise to the language problems. In other words, it is not language itself that is impaired in dysphasic children, but rather a more general specific aspect of cognition. Such a hypothesis would deny the existence of a separate language module with its own internal properties. For such a hypothesis to be true, it would have to be shown that a significant cognitive generalization could account for the language problems typical of dysphasic children, and further that all other nonlanguage systems with the same property are also impaired. In addition, it would have to be demonstrated that those aspects of language that are unimpaired are controlled by different cognitive principles. Of course, it is impossible to prove the general case that there could be no such account. All one can say is that no such comprehensive explanation has been provided to date. Moreover, one of the striking things about dysphasic children is the disparity between their performance on language tasks and their performance on other cognitive tasks. Indeed, one of the criteria for diagnosing the problem as dysphasia is that there are no obvious cognitive problems except for language. For example, the particular child I report on here is well beyond his age level in mathematics and is an avid hacker. It is difficult to imagine, therefore, that a cognitive explanation rich enough to account for the wide range of language problems that he manifests could at the same time allow him his observed competency in mathematics and computation.

The linguistic hypothesis assumes that language itself constitutes a

---

<sup>4</sup>Developmental dysphasias almost always have associated phonological problems. Why there should be this association is still unclear. The author and G. Piggott are presently investigating the precise nature of the phonological impairment. Preliminary data point to an inability to construct the normal underlying phonological system, different from problems encountered by normal children. It would be interesting if the deficit that occurs in the grammar were to have an analogue in the phonology.

separate autonomous module and that the deficit that results in dysphasia is specifically linguistic and is caused by an impairment to a particular part of the language module. Such a hypothesis is consistent with the observed linguistic specificity of dysphasia, but in order for such an explanation to be convincing, it would have to be shown not only that the deficit was linguistic but more importantly that the impairment could be accounted for by a significant linguistic generalization. If we hold the hypothesis that there is a language module, and further that it has some internal organization, then it might be expected that a specific linguistic deficit will not show up as merely sporadic local deficits throughout the module, but rather will reflect this internal organization.

These three hypotheses can be distinguished not only by their theoretical claims but also by the empirical consequences of these claims. These empirical claims make different predictions about the kinds of errors that could and should occur. Under the perceptual hypothesis, morphological endings that are phonologically weak will not be perceived and therefore will not be incorporated in the child's grammar. However, those endings that are more phonologically saliently will be perceived and incorporated. This predicts, correctly in the case of our data, that regular past tense marker *ed* will be missing but that progressive tense *ing* will occur. However, it also predicts, incorrectly, that all instances of phonologically weak endings will not occur. More importantly, whereas such a hypothesis can account for the characteristic absence of nonsalient phonological segments, it cannot account for systematic errors that occur among separate elements in a sentence.

The particular cognitive proposal that has been made, the hierarchically processing hypothesis, does not account for the phonological problems that the perceptual hypothesis claims to, but it does account for errors among elements in a sentence when they are the result of a hierarchical rule. It would correctly predict that there would be errors between determiners and number marking on nouns. However, this hypothesis would also predict, incorrectly, that all hierarchical rules in the grammar would be impaired.

The linguistic hypothesis requires that an inability to construct a particular type of rule in the grammar will produce characteristic errors in language. If there is such an impairment in an underlying rule, then all instances of this kind of rule will be impaired independent of the particular surface realization of the rule. The hypothesis that the deficit is in the form of the underlying grammar also predicts that errors should occur in all manifestations of language: spontaneous speech, grammatical judgment, repetition, and writing. The data confirm the linguistic hypothesis and show that one specific kind of rule, syntactico-semantic feature marking and agreement, is impaired and that this impairment results in a wide diversity of surface errors in both English and French, in morphological marking, in

occurrence of determiners, in progressive tense representation, and in pronoun deletion, and that these errors occur in all manifestations of language. In addition, the data show that another component of language, thematic relations (which is independent of syntactico-semantic features) is unimpaired and that sentences that manifest a complex underlying structure also occur.

### 3. SYNTACTICO-SEMANTIC FEATURES

Three different kinds of information, other than phonological information, must be provided for each item in the lexicon: (a) grammatical class specifications, (b) syntactico-semantic features, and (c) specific semantic information. These three classes of information reflect significantly different levels in the organization of grammars. Not only are these levels formally different in grammars, but there are arguments that suggest that they arise from different sources. Elliott and Wexler (1985) argued that knowledge about grammatical classes must be part of the innate endowment of children because there is no way in which grammatical classes could be learned from the data available to them. On the other hand, syntactico-semantic features and specific semantic information, which are clearly associated with properties of the world, need not be postulated as being innate, because they are learnable from looking at the relationship of properties of language and properties of the world. In a similar vein, Jackendoff (1985) argued that syntactico-semantic features are not specific properties of language, but rather they reflect fundamental, universal cognitive categories such as number and animacy. Whereas not every fundamental category is marked in every language, there does seem to be a small set of such distinctions from which each particular language selects. Therefore, syntactico-semantic features are distinct from grammatical class features on the one hand and from the specification of particular semantic information on the other.

The hypothesis in this article is that the grammatical symptoms typical of developmental dysphasia are the result of a grammar without syntactico-semantic features. Such a grammar need not result in an accompanying deficit in knowledge about the cognitive categories of the world because these can be represented as part of the semantic specification of the word. Nor need there be major deficits in the syntax because the level of grammatical classes would still be intact.

This explanation clearly locates the deficit in a discrete level of the grammar that, for other independent theoretical linguistic reasons, is recognized to be linguistically necessary and significant. This explanation therefore fulfills the conditions specified at the beginning of this article for



providing an account of dysphasia in terms of the language modularity hypothesis. The remainder of this article provides arguments and evidence to show that such an hypothesis is in fact true.

The surface manifestation of features are primarily of two different kinds: the morphological form of the feature-marked word and constraints among items in the sentence that must have the same feature marking. A particular feature may have several different surface consequences. For example, the feature (plural) is marked morphologically on most nouns with an *s*, it cannot take the determiners *a* or *one*, it constrains the form of some verbs, it requires a plural pronoun, and it refers to more than one object in the world. If the hypothesis that the deficit is in the level of grammar that marks syntactico-semantic features is true, then it must be the case that each and every one of the manifestations of plural marking must be shown to be impaired. Moreover, it must be shown that all of the syntactico-semantic features in English in all of their surface manifestations are also impaired. Data are presented later that show that there is no feature marking on number, gender, animacy, mass/count, proper name, person, tense, or aspect and that, as a consequence, a wide range of different surface manifestations controlled by features are impaired.

#### 4. THE DATA BASE

The data in this study were collected in four sessions over a year and a half when the subject, P. B., was 8 to 9 years old. Each session included spontaneous conversation as well as prompted storytelling. The third session, in addition to eliciting spontaneous speech, also tested grammatical judgments as well as repetition and production of specific features. The fourth session tested thematic relations by means of grammatical judgments, repetition, and description of puppet shows. Writing data were also available from six spelling and dictation tests administered in school. The final data base consists of 500 spontaneous English utterances, 70 spontaneous French utterances, and 500 test responses.

If it is postulated that the deficit is in the language module itself, then it is important to show that the error data are the result of some systematic underlying problem and not a momentary lapse. Therefore, our criterion for citing a particular kind of error is that it occur in spontaneous speech in at least two different sessions and in the test sessions. In fact, the errors cited from spontaneous speech are very frequent in the corpus. In a random sample of 30 utterances in continuous spontaneous speech, there are 24 indefinite noun phrases that begin with *a*. Of these, 11 are incorrect from the point of view of the normal grammar. It should be emphasized, however, that if features are not marked in the underlying grammar, then

all of the forms are incorrect even though they may on occasion resemble correct surface forms. In some cases, for example, regular past tense, the correct form is never produced. There were no errors resulting from grammatical class marking in spontaneous speech, and the fourth session confirmed that P. B. understood the rules constraining thematic relations in simple sentences and could make reliable grammaticality judgments about errors of this kind. This provides evidence not only about his ability to process thematic relations, but it also indicates that he does understand the task of making grammaticality judgments. Therefore, his inability to make these judgments for features reflects his inability to process features and not his misunderstanding of the grammaticality judgment task.

#### 4.1. Noun Phrase

**4.1.1 Number.** All of the surface manifestations of the feature (number) mentioned in the first section are impaired. Dysphasics characterically make errors in the morphological marking of number on nouns (Crystal, 1987; Crystal, Fletcher, & Garman, 1976; Eisenson, 1984). The nonoccurrence of the plural *s* has been taken as evidence in favor of the perceptual deficit hypothesis. Our data show a more complex pattern that argues against a perceptual deficit. Nouns occur both with and without *s*, though the unmarked form is more prevalent. However, this *s* is clearly not a marker for the semantic meaning of plural because it often has a singular referent. For example, the subject certainly knows that there is only one Montreal Forum, yet he said:

- (1) Can watch them at the Montreal Forums.

In describing a picture of a Christmas tree with presents under it he said:

- (2) They put present under the Christmas trees.

These *s*-marked forms also occur syntactically incorrectly with the indefinite determiner:

- (3) a. You got a tape recorders.  
b. I find a cops.

Nouns also occur incorrectly with numerical determiners:

- (4) a. I was make 140 box.  
b. He only got two arena.  
c. You make one points.

It should be noted that numerical determiners occur quite frequently in spontaneous speech and seem to be used to encode number lexically rather than to indicate the precise quantity. It is clear that the subject understands numeration; he is the best in his class in mathematics. Because he cannot encode number by means of features, he uses the lexical route when number is important to indicate. We see later that he does the same with respect to tense.

Similar examples occur in reports in the literature of other dysphasic children.

- (5) a. three Christmas tree
- b. two motor boat (Crystal et al., 1976, p. 150)
- c. a cups (Crystal, 1987, p. 128)

In discussing these examples, Crystal argued that it is difficult to decide whether to assign the error to the choice of the article or to the incorrect number marking on the noun or both. The feature deficit hypothesis provides a single coherent explanation for the data. Without the feature (plural), the *s* cannot be generated in the morphological component nor can feature-matching rules between the noun and the determiner operate. In this child's grammar, *s* is regarded as a variant phonological form with no associated meaning. The fact that *s* is produced, though not to mark number, argues against the auditory deficit hypothesis.

The grammatical judgment tests (Tables 1 and 2) and the repetition tests (Tables 3 and 4) confirm the hypothesis that feature marking for number does not occur in this grammar.

Errors in marking number also occur in written dictated sentences (Table 5). Five words do occur correctly with an *s*, however, four of these words are spelling words that have been practiced and tested in the word list, with no corresponding singular form. Therefore, the *s* is likely to have been represented as part of the underlying phonological form of the word and not generated by the morphology.

Errors in number also occur with pronouns. *He*, *it*, and *they* occur in spontaneous speech but are not reliably used to distinguish between singular

TABLE 1  
Grammatical Judgment: Indefinite Article + Noun (+ *S*)

	<i>Good</i>	<i>Bad</i>
Correct		
a N	4	1
Incorrect		
a N + <i>s</i>	5	

TABLE 2  
Grammatical Judgment: Numerical Determiner + N (+ s)

	<i>Good</i>	<i>Bad</i>
Correct number + N + s	2	1
Incorrect number + N	2	1

TABLE 3  
Repetition: Indefinite Determiner + N (+ s)

	<i>Accurate</i>	<i>Inaccurate</i>
Correct a N	2	3
Incorrect a N + s	2	5

TABLE 4  
Repetition: Numerical Determiner + N (+ s)

	<i>Accurate</i>	<i>Inaccurate</i>
Correct number N + s	3	1
Incorrect number N	1	1

TABLE 5  
Writing: Singular and Plural Nouns

	<i>Accurate</i>	<i>Inaccurate</i>	<i>Missing</i>
Singular nouns	32	0	11
Plural nouns	5	19	10

and plural referents. There are many texts in which *they* is clearly used anaphorically to refer to a singular noun.

- (6) Red Riding Hood arrive at his *grandma's* house. Now *they* say  
"Oh, what big eyes you got."

In one picture book context where there is only one little boy involved, both *he* and *they* are used to refer to the same singular referent.

- (7) Jimmy starting eat his breakfast. *He* don't like it. Now *they* drop  
the bowl on the floor.

Singular pronouns can refer to plural subjects. In a picture context in which the referent is clearly the king and queen together, we find:

- (8) The king and the queen they look at the tree and say, "Who did that?" *He* don't know so *he* look at the other side of the tree.

In the repetition task, we find that the plural pronoun is substituted for the singular.

- (9) When *it* rains gets wet.

is repeated as

- (10) When *they* rain get wet.

The same sorts of pronoun errors in number are reported in the literature. For example, in a dialogue between an experimenter (E) and a dysphasic child (D) we find:

- (11) E: Your airplane's got two of those. What are they?  
D: Wing. (Crystal et al., 1976, p. 151)

**4.1.2. Number in French.** Our corpus of French data is much more restricted than that in English, in part because the referral was from an English-speaking school to an English-speaking hospital and therefore the focus of this study was on English. However, the data do point to the same sorts of problems in French as in English.<sup>5</sup> Not only is the French corpus smaller than the English one, but because of the phonological system of French, many features represented in the written language and seen to be part of the underlying grammar are not distinguished in the spoken language. For example, in spoken French, because final *s* is silent, singular and plural nouns are phonologically identical. Therefore, the only marker

---

<sup>5</sup>French-speaking language pathologists, on hearing the English data, report that the picture in French appears to be similar. It is hoped that more extensive studies of French will be undertaken shortly. The author along with M. Crago, who has been studying normal language acquisition in Inuktitut, have made a proposal to study dysphasic in Inuktitut, a feature-rich language. Although both of these studies are still in prospect, there are data from German dysphasics that show a very similar pattern of impairment (Clahsen, 1989). Clahsen argued that these German dysphasics cannot construct feature-matching agreement rules. These data are consistent with the feature-blindness hypothesis presented in this article. If features are not marked, then agreement rules cannot be constructed. However, some of the data in this study (and in the new data), like pro-drop, cannot be accounted for by the agreement deficit hypothesis. Therefore, the more inclusive feature-blindness hypothesis is preferable.

for plural in the spoken language is the form of the article. In those few contexts in which the diagnostic feature errors can occur, they do occur. In describing a single picture, we find:

- (12) a. Puis après il prend *les* marshmallows.  
           Then after he takes the (plural) marshmallows  
       b. Puis après il cook *le* marshmallows.  
           Then after he cook the (singular) marshmallows

Both the singular and plural form of the French articles occur with exactly the same noun to refer to exactly the same object. (Please note that the word *marshmallow* is an attested form in the Quebec dialect.)

Nouns can occur without any determiner, which is always incorrect in French. For example, we find:

- (13) Après tire fleur.  
       after pick flower

in which the obligatory article for *fleur* as well as the subject pronoun is missing.

**4.1.3 Animacy.** In spontaneous speech, errors in animacy also occur.

- (14) When the cup break, *he* get repair.

In the repetition task,

- (15) When the bus goes fast *it* has an accident.

was repeated as:

- (16) When the bus goes fast *he* has an accident.

(Note that both *cup* and *bus* are feminine in French so it cannot be a simple case of interference.)

**4.1.4 First person.** In French, the subject never uses the plural form *nous* but rather uses the impersonal singular form *on*. This is not unusual in his dialect, but it does not mean that he need not mark plural in the first person. In English, *we* occurs very infrequently in spontaneous speech. In almost all cases, P. B. seemed to be using *we* as a referent for *I*. In spontaneous discourse describing his own actions, he said:

- (17) I can take a bus. We got a lotta bus at Longueuil. Got a whole series there, any numbers. And after lunch when we're going back jusqu'à Longueuil we're go take a bus.

and:

- (18) We're gonna ride some bicycle.

Although it is not absolutely certain in these cases that the intended referent was himself, it seems to be the most likely reading of the passages.

**4.1.5 Mass/count.** The mass/count distinction is not marked morphologically; however, it triggers surface constraints. Mass nouns cannot occur with either a plural marker or with the indefinite determiner. Both forms are found in spontaneous speech.

- (19) a. I play musics.  
b. The final is going to be a music.

Count nouns cannot occur without a determiner nor in the singular with *some*. Yet we find:

- (20) a. We're gonna ride some bicycle.  
b. I love bicycle.

In the grammatical judgment test, there were four examples of incorrect mass/count forms. All four were judged to be grammatical.

**4.1.6 Proper names.** Names also constrain the use of determiners. An individual name takes no determiner. In spontaneous speech, this rule is violated.

- (21) a. The Marie-Louise look at the bird.  
b. The wolf is hide on the back of the trees on the Red Riding Hood.

Within a single test, in describing a puppet show, P. B. used both forms interchangeably in referring to the same object.

- (22) a. Superman jump.  
b. The superman is say good-bye and hiding.

**4.1.7 Gender.** Feminine pronouns do not occur in spontaneous speech. P. B. used either masculine pronouns to refer to feminine nouns:

(23) The Red Riding Hood arrive at his grandma's house.

or he avoided the use of pronouns by using feminizing proper names. For example, in narrating a picture book about a mother and son, he used his mother's name throughout, even in those contexts where a pronoun would seem more appropriate. This same strategy is reported elsewhere: "The language impaired child never used third person feminine pronouns; rather he relied on nouns" (Trantham & Pedersen, 1976, p. 37).<sup>6</sup>

**4.1.8 Gender in French.** Most nouns in French have a single, fixed gender. It is reasonable to suppose, therefore, that the article is learned and produced as a fixed unit with the noun rather than selected on the basis of a feature specification on the noun. The gender errors that P. B. made support this hypothesis because they all occur in contexts in which an adjective intervenes between the noun and the article. For example, in spontaneous speech we find the incorrect form:

(24) Il prend un gros respiration.  
He takes a (masculine) big (masculine) breath (feminine).

In telling a story in response to a picture book about a mother and son in French, P. B. always used the masculine pronoun several times, even when it is clear that he is referring to the mother. For example:

(25) La mère il prend le garçon.  
The mother *he* takes the boy.

## 4.2 Verb Phrase

**4.2.1 Past.** Regular past tense forms never occur in spontaneous speech, though frequent irregular past forms do. The present tense is used even when the context clearly refers to past events. In recounting a story which happened the year before, P. B. said:

(26) I wait in the Berri-de-Montigny. [a metro stop]

---

<sup>6</sup>There are data both in this study and in the family study that show that feature-blind dysphasics avoid the use of anaphoric pronouns as cohesive devices in long stories. This is probably because the anaphoric use of pronouns, especially over intervening nouns, requires the use of features.



The test for the past tense consisted of 33 sentences, 12 regular past forms with *ed*, 17 irregular past forms, and 4 with the same form in the past and the present. In the first test, P. B. was given a sentence in the present tense prefixed with the word *today* and asked to tell what happened in the past. The prompt *yesterday* was given after each stimulus sentence. In the second test, past tense sentences starting with *yesterday* were given, and he was asked to tell what was happening today. The prompt *today* was given after each stimulus sentence. In both cases, three demonstration sentences were given before the test began. In the first test, P. B. did not produce any regularly marked past tense verbs (Table 6). In the second, all regularly marked past tense verbs were changed to present forms (Table 7).

The written data show a similar pattern (Table 8). Of the six which were written correctly, five were on the spelling list in their past tense form and could have been learned as specified lexical items. The sixth was the irregular form *made*, which we know is in P. B.'s spontaneous vocabulary.

Although P. B. did not have a regular way of marking past tense by means of features, he often marked it semantically with a lexical term, *last time*, prefixed to the sentence as a whole.

- (27) a. Last time we arrive.  
b. Last time I bring a one box of doughnuts.

In addition to *last time* to mark past events, we find *now there* used to mark present and *and after* used to mark future. Therefore, it is clear that the subject understands temporality and can represent it in the semantic component. (This device of indicating relative time by using a lexical item instead of a grammatical marker is found both in pidgin languages and in the speech of some aphasics.)

**4.2.2 Third person singular present s.** P. B. virtually never added *s* to the verb to mark the third person singular present. In spontaneous speech we find:

- (28) a. One machine clean all the two arena.  
b. He look at the other side of the tree.  
c. The ambulance arrive.

TABLE 6  
*Today S Changed to Yesterday S*

	<i>Right</i>	<i>Wrong</i>
<i>V + ed</i>	0	12
<i>V (irregular)</i>	2	15
<i>V + ∅</i>	4	0

TABLE 7  
Yesterday S Changed to Today S

	<i>Right</i>	<i>Wrong</i>
<i>V</i> + <i>ed</i>	12	0
<i>V</i> (irregular)	4	13
<i>V</i> + $\emptyset$	4	0

TABLE 8  
Writing: Past Tense Verbs

	<i>Accurate</i>	<i>Inaccurate</i>	<i>Missing</i>
<i>V</i> + <i>ed</i>	5 <sup>a</sup>	1	7
<i>V</i> (irregular)	1	3	3

<sup>a</sup>These may have been learned from the spelling list as specified lexical items.

In the repetition task (Table 9), for example:

(29) No one sees the cat.

is repeated as:

(30) No one see the cat.

**4.2.3 Aspect.** Aspect in English is marked by *be V ing.* in our data, three different forms occur in spontaneous speech.

- (31) a. This one is look. *be V*  
 b. The dragon drying himself. *V ing*  
 c. The witch is coming. *be V ing*

This pattern is reported widely in the literature. For example, Crystal (1987, p. 117) reported his subject saying:

TABLE 9  
Repetition: 3rd Person V (+ s)

	<i>Accurate</i>	<i>Inaccurate</i>
Correct		
3rd person <i>V</i> + <i>s</i>	3	16
Incorrect		
3rd person <i>V</i>	5	6

- (32) a. Man is fall down.  
      b. Man smiling.

and he commented that “the profile chart is confusing with approximately equal numbers of correct vs. incorrect uses of the auxiliary and *ing*.” Trantham and Pedersen (1976) reported that their subject produced *ing* forms:

- (33) Dad taking camera.

but had not established them correctly by 3 years old, in contrast to the normal children in their study.

In a test of 20 items describing the actions of hand puppets, 19 progressive aspect verb forms were produced, 7 with both *be* and *ing*, 6 with only *be*, and 6 with only *ing*. For example:

- (34) a. The queen is sleeping.  
      b. The dragon jumping.  
      c. The dragon is walk.

There is additional evidence that these forms are equivalent in the grammatical judgment task (Table 10).

The same sorts of interchanges among the forms can be seen when the subject is asked to make up sentences for particular words. For *starting*, he said:

- (35) I am start to clean up my room.

For *ride*, he said:

- (36) I am riding a bicycle.

TABLE 10  
Grammatical Judgment: Progressive Aspect

	<i>Good</i>	<i>Bad</i>
Correct		
be <i>V</i> + <i>ing</i>	10	1
Incorrect 1		
<i>V</i> + <i>ing</i>	11	1
Incorrect 2		
be <i>v</i>	9	1

In a repetition test with 14 short, simple sentences, 4 with *be + ing*, 5 with *be V*, and 5 with *V ing*, P. B. made no errors. However, in some tests that involved more complex sentences, we do find inaccurate repetitions involving aspect.

(37) All the girls sing and they are dancing.

is repeated as:

(38) When the girls sing, they dancing.

This is consistent with the finding of Menyuk and Looney (1972) that three-word sentences are repeated accurately by both normal and language-disordered children; however, in longer sentences their performances differ significantly because short sentences can be repeated directly from memory, whereas longer sentences require an intermediate representation using underlying linguistic forms.

The fact that all three forms occur with about the same frequency can be accounted for by theory of feature matching, which hypothesizes that in English the *ing* affix is freely generated on the verb and marked with the feature [+progressive] and *be* is freely generated in the preverbal position and also marked [+progressive]. At some later point in the generation, a feature-matching rule eliminates all sentences in which the feature on the verb does not match the feature in the preverbal position (see, e.g., Travis, *in press*). This predicts that in the absence of features this rule could not operate, therefore verbs would occur with *ing* alone or with *be* alone or with both because all three forms would be freely generated by the grammar.

#### 4.3. Pronoun Deletion

In spontaneous speech, the subject often deletes pronouns in subject position where they are obligatory both in English and in French.

- (39) a. Can watch them at the Forums.  
b. Ramène le feu.

Brings back the fire.

In the grammatical judgment task, sentences with illegally deleted pronouns such as:

- (40) When the girls lose are sad.

were accepted as grammatical (Table 11).

In a similar repetition task (Table 12), the subject dropped pronouns four times in repeating correct sentences and only once inserted a pronoun where it was needed.

(41) When they play, they get points.

is repeated as:

(42) When they play get points.

It has been hypothesized by Guilfoyle (1984) that subject pronouns get their case marking from the existence of the feature (tense) in the position in the tree that carries information about inflectional markers on the verb (Infl.). If this feature is not present, then the noun is not case marked and can be dropped. This hypothesis is supported by data from languages in which subject-pronoun dropping does occur and from data that show that normal children often drop subject pronouns before they acquire tense. Because our data show that the feature (tense) is not present, this theory correctly predicts that subject pronouns can be dropped.

#### 4.4 Conclusion

The data presented in the previous sections are all consistent with a deficit in the ability to mark syntactico-semantic features. As predicted by linguistic theory, the absence of these features means that the rules in the morphology usually triggered by such features cannot operate; constraints among elements such as determiners and nouns that operate by matching features are absent; and because the meanings usually carried by these features are not available, lexical devices must be used if it is important to convey these meanings. As we have seen, the full range of syntactico-semantic features is affected by this deficit.

TABLE 11  
Grammatical Judgment: Pronoun Deletion

	<i>Good</i>	<i>Bad</i>
Correct	21	1
Incorrect	17	1

TABLE 12  
Repetition: Pronoun Deletion

	<i>Accurate</i>	<i>Inaccurate</i>
Correct	12	4
Incorrect	10	1

## 5. GRAMMATICAL CLASSES AND THEMATIC RELATIONS

The hypothesis that has been proposed is that a wide range of errors typical of dysphasics can be accounted for by a deficit in a single component of the language module. The data presented show that this is so. However, it is interesting to be able to show that other components of the language module are unimpaired. The component studied was thematic relations. First, there are independent arguments, for example, by Pinker (1989), that establish thematic relations as being linguistically and significantly different than syntactico-semantic features. Therefore, if they can be shown to be unimpaired, then it can be argued that this deficit is not general in the language.

Moreover, as discussed at the beginning of this article, Cromer's (1978) hierarchical cognitive hypothesis supposes that dysphasia is the result of a general cognitive inability to process hierarchically ordered structures. Normally, those properties of sentences controlled by grammatical class features which govern the number and kinds of objects that particular verbs can take are processed hierarchically. It has been pointed out that though the normal structure for these sentences is hierarchical, there is an alternative representation in which the underlying structure is not hierarchical but rather a flat template into which the verb and the nouns are inserted. Therefore, even if the subject can be shown to be able to process thematic relations, it is not, in itself, conclusive evidence that they are represented hierarchically. However, if it can be shown that the subject produces other sentences that must be represented hierarchically, then it seems reasonable to assume that P. B. is representing thematic relations in the same hierarchical way. In the next section, data are presented that show that the subject understands the rules governing thematic relations and, further, that he produces sentences that must be represented hierarchically.

Except for subject deletion, which is accountable for in terms of features, there were almost no errors in the number or kinds of noun phrases occurring with particular verbs in spontaneous speech. The subject was tested on 30 sentences that he had to repeat, make a grammaticality judgment about, and act out with puppets. The verbs used were intransitive

verbs like *sleep*, one object verb like *clean*, and two object verbs like *give*. All three verbs occurred with no objects, one object, and two objects. In order to make the length of the sentences similar, adjectives were added to those with no objects. Fifteen of the sentences were correct from the point of view of thematic structure, 15 were incorrect such as:

- (43) a. The big furry elephant puts.  
b. The girl sleeps the elephant.

Ten of the correct sentences were judged to be correct. The other five were changed by the subject, but they still remain correct. One of these changes added optionally deleted objects.

- (44) The pretty girl brings the book.

This change was repeated and acted out as:

- (45) The pretty girl brings the book to the boy.

The other change corrected semantic anomalies:

- (46) The elephant is feeding the flower to the girl.

and was corrected and acted out as:

- (47) The elephant is giving the flower to the girl.

These changes are supporting evidence that my subject understood the constraints on noun phrases occurring with particular verbs.

Three of the incorrect sentences were judged to be incorrect and were accurately repeated. Nine were corrected by the subject. These corrections demonstrate that P. B. understood the details of these relationships. For example, in appropriate cases he supplied missing objects.

- (48) The girl gives a book.

This was corrected and acted out as:

- (49) The girl give a book to the elephant.

In other cases he changed the order of objects.

- (50) The girl gives to the book the boy.

This was repeated and acted out as:

- (51) The girl give the book to the boy.

The subject was quite explicit about these corrections. He usually said something like, "You can't say that. You have to say \_\_\_\_."

In a grammatical judgment test for aspect, P. B. also showed that he understood thematic relations but did not understand aspect.

- (52) *I saying* false, you cannot say *I am saying*. You have to say something.

He seemed to be very anxious to show us by his corrections and additions that he understood thematic relations. Of the 30 sentences in the test, he failed at only 3.

- (53) a. The boy asks to the elephant.  
b. The elephant asks to the girl.  
c. The boy cleans the floor to the girl.

The test for thematic relations showed that the subject could not only make accurate grammaticality judgments about thematic relations, but he could also correct and expand such relations. These data support the hypothesis that the deficit is in a specific component of the language module and is not general to language.

In spontaneous speech, P. B. produced sentences that must be represented hierarchically even if the sentences themselves are not necessarily correct.

- (54) a. I know how to play basketball.  
b. I know what is it.  
c. They're easy to beat them. (Probably from "It's easy to beat them," with no number marking, which results in a substitution of *they* for *it*. This substitution occurs in the subject's spontaneous speech elsewhere and is consistent with the postulated featureless underlying grammar.)  
d. What is it they doing, the army truck? (The subject asked this question while he was looking out of the window and saw an army truck with soldiers. Probably from "What is it that they are doing, the army truck?" with an allowable deleted *that*, an error in aspect, and an error in number marking between the pronoun and the noun in apposition to which it refers.)  
e. The one there they go fast. (number error)



- f. It's boring repeating.
- g. The queen is like it, to hide. (A mental state verb with progressive aspect form, which argues that this form does not carry progressive meaning.)

These data demonstrate that the subject did produce sentences with an underlying hierarchical structure. Moreover, we know that the subject can process hierarchical structures in nonlanguage tasks like mathematics and programming. It seems not unreasonable to argue that these data are inconsistent with Cromer's hypothesis that dysphasia is a result of the inability to handle hierarchical structures.

## 6. CONCLUSION

It has been demonstrated that the feature-deficit hypothesis provides a coherent and principled account of the data both from the extensive corpus of the case study presented and from data cited in the literature as typical of dysphasia. It has also been shown that thematic relations, which are hypothesized to be in an independent component from syntactico-semantic features, are unimpaired. Moreover, it has been shown that neither the perceptual hypothesis nor the hierarchical hypothesis can account for the data. In addition, it is likely that this deficit can be caused by a genetic disorder. Taken altogether, these data provide a linguistically principled account of some aspects of dysphasia.

## REFERENCES

- Borge-Osario, M. R. L., & Salzano, F. M. (1985). Language disabilities in three twin pairs and their relatives. *Acta Geneticae Medicae et Gemellologiae (Roma)*, 34, 95-100.
- Cantwell, D. P., & Baker, L. B. (1987). *Developmental speech and language disorders*. New York: Guilford.
- Caplan, D., & Hildebrandt, N. (1986). Language deficits and the theory of syntax: A reply to Grodzinsky. *Brain and Language*, 27, 168-177.
- Clahsen, H. (1989). The grammatical characterization of developmental dysphasia. *Linguistic*, 27, 897-920.
- Cromer, R. F. (1978). The basis of childhood dysphasia: A linguistic approach. In M. A. Wyke (Ed.), *Developmental dysphasia* (pp. 85-134). New York: Academic.
- Crystal, D. (1987). *Clinical linguistics*. Baltimore: Arnold.
- Crystal, D., Fletcher, P., & Garman, M. (1976). *The grammatical analysis of language disability*. London: Arnold.
- Eisenson, J. (1984). *Aphasia and related language disorders in children*. New York: Harper & Row.
- Elliott, W. N., & Wexler, K. (1985, November). *A principled theory of categorical acquisition*. Paper presented at the meeting of the Northeastern Linguistic Society, XVI, Montreal.

- Gopnik, M. (1990). Dysphasia in an extended family. *Nature*, 344, 715.
- Grodzinsky, Y. (1986). Language deficits and the theory of syntax. *Brain and Language*, 27, 135-159.
- Guilfoyle, E. (1984). The acquisition of tense and the emergence of lexical subjects in child grammars of English. *McGill Working Papers in Linguistics*, 2(1), 20-31.
- Hurst, J. A., Baraitser, M., Auger, E., Graham, F., & Norell, S. (1990). An extended family with a dominantly inherited speech disorder. *Developmental Medicine and Child Neurology*, 32, 347-355.
- Jackendoff, R. (1985). *Semantics and cognition*. Cambridge, MA: MIT Press.
- Menyuk, P., & Looney, P. (1972). A problem of language disorder: Length versus structure. *Journal of Speech and Hearing Research*, 15, 264-279.
- Pinker, S. (1989). *Learnability and cognition: The acquisition of argument structure*. Cambridge, MA: MIT Press.
- Quirk, P., & Greenbaum, S. (1973). *A concise grammar of contemporary English*. New York: Harcourt Brace Jovanovich.
- Samples, J. M., & Lane, V. W. (1985). Genetic possibilities in six siblings with specific language learning disorders. *ASHA*, 27(12), 27-32.
- Tallal, P., & Piercy, M. (1978). Defects in auditory perception in children with developmental dysphasia. In M. A. Wyke (Ed.), *Developmental dysphasia* (pp. 63-84). New York: Academic.
- Tallal, P., Ross, R., & Curtiss, S. (1989). Familial aggregation in specific language impairment. *Journal of Speech and Hearing Disorders*, 54, 167-173.
- Tomblin, J. B. (1989). Familial concentration of developmental language impairment. *Journal of Speech and Hearing Disorders*, 54, 287-295.
- Tomblin, J. B. (1990). Unpublished raw data.
- Trantham, C. R., & Pedersen, J. K. (1976). *Normal language development: The key to diagnosis and therapy for language disordered children*. Baltimore: Williams & Wilkins.
- Travis, L. (in press). *Parameters and effects of word order variation*. Dordrecht, The Netherlands: Reidel.
- White, L. (1980). *Theory of linguistics and language acquisition*. Bloomington: Indiana Linguistics Club Publications.
- White, L. (1989). *Universal grammar and second language acquisition*. Philadelphia: Benjamin.
- Wyke, M. A. (Ed.). (1978). *Developmental aphasia*. New York: Academic.
- Zangwill, O. L. (1978). The concept of developmental dysphasia. In M. A. Wyke (Ed.), *Developmental aphasia* (pp. 1-12). New York: Academic.

## APPENDIX

### Medical History

P. B. was born on December 7, 1975. His mother was admitted to the hospital with Placenta Previa 6 weeks before his birth, but there was no significant blood loss and she was sent home. He weighed 7 lb. 5 oz. at birth, and, because of a precipitate delivery, was incubated for 48 hr. The patient was first seen in the Developmental Progress Clinic of the Montreal Children's Hospital in June 1982 for assessment. At that time his verbal IQ was 79, his full-scale IQ was 98, and his motor score was 118. He has had

a CAT scan, which reported enlarged ventricles, but within the normal range. His mother reports that he did not speak at all until he was 4 and that his speech was not really intelligible until he was 5. At the present time, he has only a few problems with phonology, though he does have major problems with other aspects of language. His general cognitive abilities are unimpaired and he is above his age level in mathematics. His pragmatic linguistic skills seem normal. He speaks freely and fluently. He tells long stories with little or no prompting, makes jokes, teases, questions, and generally interacts linguistically in a way typical of his age. His mean length of utterance in a spontaneous narrative of 145 words is 13.5, although this is a result primarily of adjunction with *and* rather than syntactic complexity. His mother reports that outsiders often have difficulty in understanding him.

His mother is a native speaker of English and his father is a native speaker of French, not at all unusual in Quebec. There are three children in the family, an older sister and a younger brother. All of the children are bilingual. The primary language in the household is English. Neither of his siblings has any problems with language. P. B. attends school in English and is in a grade appropriate to his age.