CENTER FOR RESEARCH IN LANGUAGE

April 1991 **Vol. 5, No. 3**

The newsletter of the Center for Research in Language, University of California, San Diego, La Jolla CA 92093. *(619) 534-2536*; electronic mail: *crl@crl.ucsd.edu*

CONTENTS

Due to an oversight, we regret that certain information was not included in the paper "Preposition Use in a Speaker with Williams Syndrome: Some Cognitive Grammar Proposals" which appeared in newsletter Vol. 5, No. 3. Following is the definitive version. Our apologies to the authors for the omission.

EDITOR'S NOTE

This newsletter is produced and distributed by the **CENTER FOR RESEARCH IN LANGUAGE**, a research center at the University of California, San Diego that unites the efforts of fields such as Cognitive Science, Linguistics, Psychology, Computer Science, Sociology, and Philosophy, all who share an interest in language. We feature papers related to language and cognition (1-10 pages, sent via email) and welcome response from friends and colleagues at UCSD as well as other institutions. Please forward correspondence to:

Jill Weckerly, Editor
Center for Research in Language, C-026
9500 Gilman Drive
University of California, San Diego 92093
Telephone: (619) 534-2536
Email: *crl@crl.ucsd.edu*

SUBSCRIPTION INFORMATION

If you are currently receiving a hardcopy of the newsletter only and have an email address to which the newsletter can be sent, please forward that information to CRL.

Can we send you the email version only to save printing and mailing costs? If you require a hardcopy in addition, please request it and we will be happy to send you one.

If you require the unformatted nroff version of the newsletter, please request it from CRL after you have

received the current regular formatted version.

If you know of others who would be interested in receiving the newsletter, please forward the email or postal mailing address to CRL. Thank you.

Back issues of this newsletter are available from **CRL** in hard copy as well as soft copy form. Papers featured in previous issues include the following:

The Cognitive Perspective
Ronald W. Langacker
Department of Linguistics, UCSD
vol. 1, no. 3, February 1987

Toward Connectionist Semantics
Garrison Cottrell
Institute for Cognitive Science, UCSD
vol. 1, no. 4, May 1987

Dimensions of Ambiguity
Peter Norvig
Computer Science, UC Berkeley
vol. 1, no. 6, July 1987

Where is Chomsky's Bottleneck?
S.-Y. Kuroda
Department of Linguistics, UCSD
vol. 1, no. 7, September 1987

Transitivity and the Lexicon
Sally Rice
Department of Linguistics, UCSD
vol. 2, no. 2, December 1987

Formal Semantics, Pragmatics, and Situated Meaning
Aaron Cicourel
Department of Sociology, UCSD
vol. 2, no. 3, January 1988

Rules and Regularities in the Acquisition of the English Past Tense
Virginia Marchman
Department of Psychology, UC Berkeley
vol. 2, no. 4, April 1988

A Geometric Conception of Grammar
S.-Y. Kuroda
Department of Linguistics, UCSD
vol. 2, no. 5, June 1988

Harris and the Reality of Language
S.-Y. Kuroda
Department of Linguistics, UCSD
vol. 3, no. 1, September 1988

A Connectionist Perspective on Prosodic Structure
Mary Hare, Dept. of Linguistics, UCSD
David Corina, Dept. of Psychology, UCSD
G.W. Cottrell, Dept. of Computer Science, UCSD
vol. 3, no. 2, November, 1988

Competent Scientist Meets the Empiricist Mind
Valerie Walker
Department of Philosophy, UCSD
vol. 3, no. 4, April, 1988

Foreign Policy By Metaphor
Paul Chilton, University of Warwick, U.K.
George Lakoff, UC Berkeley
vol. 3, no. 5, June, 1989

Guarani Possessive Constructions
Maura Velazquez
Department of Linguistics, UCSD
vol. 3, no. 6, July, 1989

Anticipatory Coarticulation and Aphasia: Implications for Connectionist Models of Speech Production
William F. Katz
Department of Psychiatry, UCSD
vol. 4, no. 1, December, 1989

Toward a Connectionist Representation of Grammatical Knowledge
Catherine L. Harris
Department of Cognitive Science, UCSD
vol. 4, no. 2, January, 1990

The Rule Controversy: A Cognitive Grammar Perspective

Ronald W. Langacker
Department of Linguistics, UCSD
vol. 4, no. 3, June 1990

Language and the Primate Brain
Martin I. Sereno
Department of Cognitive Science, UCSD
vol.4, no. 4, August, 1990

The Segmentation Problem in Early Language Acquisition
Kim Plunkett
University of Aarhus, Denmark
vol.5, no. 1, November, 1990

Neo-structuralism: a commentary on the correlations between the work of Zelig Harris and Jeffrey Elman
Peter Bensch
Department of Computer Science, UCSD
vol.5, no.2, March 1991

Preposition Use in a Speaker with Williams syndrome: Some Cognitive Grammar Proposals

Jo Rubba and Edward S. Klima Department of Linguistics University of California, San Diego

0 Introduction

What degree of conceptual sophistication is necessary to attain adult-like language use? This paper makes a preliminary exploration of this question with reference to preposition use in adolescents with Williams syndrome, a syndrome incorporating both cognitive deficits and, typically, certain physical traits. A theory of language allowing a high degree of flexibility in the conceptual underpinnings of language, Cognitive Grammar, is used as a framework for explanations of non-conforming preposition use in Williams syndrome subjects.

The proposals made here were formulated on the basis of a specific data sample, and are intended as exploratory and suggestive of ways to proceed with the larger database. **1.0 Non-conformist language use in Williams syndrome subjects**

Williams syndrome (WS) adolescents show remarkable sophistication in language use, in spite of severe cognitive deficits in other areas. Bellugi, Sabo & Vaid (1988), for instance, report that Williams subjects show signs of mild to moderate mental retardation in many cognitive areas. In spite of this, their language use shows mastery of sophisticated structures such as complex embeddings (Bellugi, Bihrle, Jernigan et al, 1990; Reilly, Klima & Bellugi, 1990).

Nonetheless, close examination of even a very limited data sample from WS subjects shows usages that seem not to conform with standard adult English usage, in areas of syntax and semantics. We examined data from several WS subjects[1], in which unusual usages are observable in the areas of vocabulary selection, pronoun use, and use of sentence and discourse connectors, as well as certain facets of morphology/syntax.

The focus of this paper is unusual preposition use in a WS subject. In the data sample we used, unconventional uses of prepositions were most evident in data from "Crystal", with examples from other subjects, "Ben" and "Amy".

We narrowed the sample to Crystal's data, consisting of two brief stories she recounts and a few miscellaneous sentences out of context. Within this sample prepositions occur 130 times. We judged 25 of these tokens to be divergent from normal usage. This is 19% of the total preposition tokens. The occurring prepositions and how many times each occurred are given in Table 1 (Appendix).

Regarding the usages we consider to be non-deviant[2], several prepositions (especially *to*) were used in various meanings, indicating possible polysemy, as is the norm in adult English usage. Also, there are usages in abstract as well as concrete spatial domains. Here we see some samples of conformist spatial uses:

(1) a. *Frog story*:
i. ...and he is *in* the house...
ii. ...he goes *out of* the house, *to* the back yard...

b. *Chocolate story*:
i. And you can also have chocolate candy bars or something that has chocolate *in* it.
ii. She was *on* her chocolate throne...

The next examples illustrate abstract, non-spatial relations signalled by the prepositions. Note the multiplicity of uses of *to*: not only allative, as in (1), but use as an infinitival marker and purpose marker.

(2) a. *Frog story*:
i. Once *upon* a time....
ii. ...the frog is trying *to* get out of the jar...
iii. ...the dog looked *to* see if the frog was there...
iv. ...he was amazed *at* what the frog had done...

b. *Chocolate story*:
i. Chocolate is sweet and comes *in* many ways.
ii. It's fun *to* have when you can eat it and drink it.
iii. ...you might melt to the ground *like* melted butter.

These data and others (e.g. Amy's frog story) show that WS subjects' usage of prepositions often conforms to adult English norms, and spans abstract as well as concrete relations.

The non-conformist uses are given in Table 2, in the Appendix. The expected form is given in square brackets at the end of each line. We will refer to these usages from now on with the tags

given there: *F* stands for the frog story, *C* for the chocolate story, and *M* for miscellaneous data. As is clear from the data, deviant uses occur in the form of *substitutions*, i.e. choice of a different preposition from the expected conventional usage, and in the form of *omissions* -- non-occurrence of a preposition where one would be expected or required (always *to* in these data). In one case, F6, our judgment would call for no preposition; we could call this an *insertion*. In M2, the deviation is less in the preposition than in the grammatical class of the object -- a non-derived nominal such as *job* or *position* seems more in order.

It is also clear that certain deviant uses make up a substantial portion of the total: There are 8 deviant uses of *through*, all apparently having the same meaning in the story; 2 deviant uses of *for*, again with similar meanings (*call for* and *yell for*), and 5 omissions of *to*, 4 of these in the expression *change a different color*. If we consider these 15 uses to be tokens of 3 deviant usage types, the number of deviant uses is reduced significantly to 13.

Both the normal and non-conforming uses of prepositions by Crystal and other WS subjects need to be accounted for. We will next examine empirical and theoretical questions raised by these data. **1.1 Empirical questions raised by the data**

The reader will have noted that we have been careful to avoid labelling the WS preposition usages errors, preferring to call them deviant (in a non-pejorative sense) or non-conformist. Several empirical questions must be answered before the exact status of the WS data can be determined.

First, we need to discover whether this sample is a) representative of Crystal's overall language use and b) representative of language use in other WS subjects. Second, we need to determine the systematicity (or lack thereof) of non-conformist uses in WS speakers. If we find that these uses follow a system, we would have the intriguing possibility of an alternative semantic system for this subset of language in WS speakers. Also required is comparison of the WS usages to actual speech data (rather than armchair intuitions such as those used here) from normal English-speaking adults and children. If we find that either of these populations make a similar percentage of errors of similar types, we will still have an interesting language problem, but WS speakers will cease to be a special case. Our hunch at this point is that the WS usage would prove to be at variance with the usage of adult normals, especially such persistent items as Crystal's deviant use of *through*. Comparison with normal children may yield a different picture. One recent study shows that children do use some prepositions (*from, by*) in non-conformist yet systematic ways in the process of language acquisition, in spite of 'correct' input from adults in the nurturing environment (Clark & Carpenter 1989). Clark & Clark (1977) also cite other evidence that children overextend and systematically 'misuse' prepositions. If the 'errors' of the respective groups (normal children and WS speakers) turn out to be similar, we may have, in WS, a case of developmental arrest or linguistic retardation expectable in subjects showing retardation in other cognitive domains.

For the present, we shall assume that the WS data does in fact diverge from normal adult usage in persistent and significant ways, but we shall make no such assumption with respect to normal children's usage.

Having made these assumptions, we turn to the theoretical question of the source(s) of the WS language use. **1.2 Theoretical views of Crystal's data**

As is recognized in, e.g., research on aphasia (Ellis & Young 1988, Caplan 1987), there are two possible sources for divergent linguistic usages: differences in the affected population in linguistic knowledge, i.e. linguistic representations; and differences in processing, or access to these representations and activation of connections between various components of linguistic knowledge (and possibly other kinds of knowledge such as motor memory, etc.). If we accept the representation/processing division, then there are several logical possibilities as to what underlies the usages of prepositions found in WS:

(3)
i. WS subjects have essentially the same semantic system as normal adults, but processing differences induce the deviant uses

ii. WS subjects have the same processing mechanisms as normal adults, but a different semantic system underlying preposition use

iii. WS subjects have mastered only an incomplete or partial version (some subset) of the semantic

system of adults, but have normal processing

iv. WS subjects have both a different or partial semantic system *and* different processing from normals

The difference between ii. and iii. is subtle and will be made clearer below. It is clear that we cannot settle on any one of these options here. What we wish to do in the sections below is consider the compatibility of these options with Crystal's data. We will see that they are all plausible to some extent in a Cognitive Grammar framework, but some accord better with the facts of the data than others. **2.0 Cognitive Grammar**

Cognitive Grammar (CG) is a psychologically-based theory of linguistic structure and language processing. Modularity of language is neither assumed nor rejected out of hand by this framework; its major exponent claims to take no position (Langacker 1987:13). However, the strong claim is made in CG that the cognitive abilities that underlie semantic representation and language use are not essentially different in nature from other cognitive abilities of the human. Language learning and language use are viewed as, essentially, problem solving activities, which exploit the same strategies as other kinds of problem solving.

The processing claims of CG are few, but broad. Both representations and language use are described in processing terms.

> *Mind* is the same as mental processing; what I call a *thought* is the occurrence of a complex neurological, ultimately electrochemical event; and to say that I have formed a *concept* is merely to note that a particular pattern of neurological activity has become established, so that functionally equivalent events can be evoked with relative ease. (Langacker 1987:100)

The notion of *activation* of neural structures plays a central and broad role in this theory of language. A representation or bit of knowledge is a pattern of activation which leaves some kind of trace "that facilitates recurrence" (Langacker 1987:100). The use of knowledge is the activation of such traces. These representations are our store of concepts; some subset of our store of concepts is said to make up our semantic inventory -- the set of concepts which happen to be the meanings of linguistic expressions. Phonological forms are simply cognitive routines which are *associated* or connected in some unspecified fashion with semantic representations; they serve to *symbolize* the concepts. Syntax is merely the conventional patterning which signals relations between conceptualized entities. Our knowledge of syntax is represented as schematized versions of these patterns, abstracted from observation of many instances of use, as well as being influenced by certain cognitive biases or predispositions (see Clark & Clark 1977 for detailed discussion of some examples). If these tenets seem overly simplistic to the reader, their actual complexity can be appreciated in Langacker (1987 & forthcoming).

A major advantage of CG in applications to psycholinguistics is the flexibility it allows in what may be a semantic representation, what may be a linguistic expression, and what may be a syntactic 'rule' (actually something more like a schematic template). A linguistic expression is any symbolic pairing of a phonological form and a semantic representation which has become firmly established as a cognitive routine. All established cognitive routines are called *units*, whether they be individual units (a particular concept or a particular phonological form) or paired units, called *symbolic units*, in which a phonological form is associated with and symbolizes a semantic representation. A unit can be of any size which is cognitively manageable (probably determined by processing constraints such as short-term memory). Single morphemes, morphemically complex words, phrases, and sentence patterns can all be units.

The semantic system of any normal adult speaker of a language is very rich, exploiting many aspects of the rich detail with which we perceive the world and represent it in our conceptual system. Certain general cognitive abilities apply in our structuring of semantics and syntax, so that our conceptual system is not merely an image of individual past experiences. Our capacity to *schematize* is very important here. That is, we can extract the commonalities present across situations and represent them in underspecified notions such as *agent* or *path*. Many levels of schematicity may be found in different semantic representations, from highly specific to highly underspecified representations. Levels of schematicity may differ across individuals for any given expression. The basic question we would like to raise with respect to the

WS individuals is whether they develop semantic systems of equal complexity to adult speakers, or to normal children of their mental age. In particular, we wonder whether they schematize in the same fashion as adults, and whether they develop as rich an inventory of semantic representations as normals do.

The semantics of prepositions[3] is particularly schematic, since prepositions apply across so many situations in the real world. In CG, a preposition is a *relational predication* -- it signifies a spatial or other relationship between two entities. The entity being located is referred to as the *trajector*; the entity with respect to which it is being located is the *landmark*. There seems to be a limited inventory of relations expressed by prepositions in human languages, including spatial relations as well as relations such as source, association, partitive relations, etc.

Prepositions are highly polysemous. In CG terms, we expect the senses of a preposition to be related in some fashion, even if the relation is a distant one. In some cases, a single schema can be extracted which represents the features found in all the senses of a preposition. Sometimes there are related senses which have some of the specifications found in other senses, but lack other specifications. In English, for instance, it is common for prepositions to have both a PATH sense and a LOCATION sense, e.g. *in*. In (4) the meaning of *in* can either include or not include a path.

(4) Susan fell in the water.

Susan may either have fallen into the water from a point outside of it, or she may have been standing in the water and fallen down within it. The second sense includes a container, as does the first sense, but does not include the path. We shall suggest later that WS subjects may not develop families of senses for prepositions as extended as those which normals develop.

Another important fact about prepositions is that they often become part of fixed expressions such as *pick up, turn on, take off*, etc. In such fixed expressions, they often have a very subtle and specific meaning. Below we raise the question as to whether WS subjects grasp these subtleties. **3.0 Alternative explanations for Crystal's data**

3.1 WS subjects have essentially the same semantic system as normal adults but processing differences induce the deviant uses.

There are many possibilities that could be considered under this heading. For example, WS speakers may suffer from difficulties in lexical access, causing them to retrieve random substitutes -- or semantically similar substitutes -- for a target word (cf. Pinker, 1991 for a discussion of lexical access problems in WS speakers). Systematicity in WS usage would speak against a random access hypothesis, but not against the idea that semantically similar words are retrieved. The data examined here indicate some systematicity in WS preposition use, but not enough data was available for this study to determine the extent to which WS usage is systematic.

We would like to consider here another sort of processing difference that might induce nonconforming usage of prepositions: a difference in the online conceptual construal of the situation being encoded. In any situation presenting relations between entities in the world, it is possible to focus on different aspects of the relationship. For example, if there is a woman walking and the location of her walking is a park, both the following are acceptable construals:

(5)
a. She is walking in the park.
b. She is walking through the park.

In (5)a., we focus on the park as a bounded container within which her walking takes place. In (5)b., we focus on the nature of her path as beginning and ending outside the boundaries of the park; or possibly, we focus on her walk covering some more complete or more extensive path than with *in*. The two usages involve construing the scene at hand in different ways; in (5)a. we do not necessarily include the endpoints of her walk, while in (5)b. this is more likely. In the WS usages, what could be going on is that the speaker has a perfect mastery of the semantics of English prepositions, but simply picks out of the scene to be encoded available relations which accord with the meanings of prepositions other than the ones conventionally used for such scenes.

Crystal's usages C4 *arrived to* and C3 *working out on a field* can be explained in this way. In a sentence with *arrive*, the goal-oriented trajectory of the subject is highly salient, due to the meaning of the verb. Crystal may preserve this construal in

her preposition choice, opting for *to*, which in at least some senses codes a path with endpoint focus. Crystal shows knowledge of this sense in her usage *he goes out of the house to the back yard*, in the frog story. The relations associated with the form *to* are indeed present in the arrival scene, and hence available for coding.

In the case of working *on* a field, it is clear that a field can be construed as a bounded container-like space, sanctioning the conventional use *in a field*, as in a sentence like *Along the highway we saw five cows standing in a field*. It is also possible to focus on the two-dimensional extension of the field -- its surfacey nature, as is common in sports, e.g. *After the game, the victors stayed on the field for a team photo*.

This explanation seems quite plausible for at least some of the usages in Crystal's data. Also, it is not in disaccord with the fact that Crystal does not always use an unexpected preposition. Construal of a scene is a local and situation-bound phenomenon, and a given speaker is free to analyze out any relational aspect of a scene that her imagination makes available. On one occasion, Crystal may pick out the surfacey nature of a field and use *on*; in another she may well pick out the container-like nature and use *in*. We would thus be alerted to look for such alternate usages in her data.

What remains special about her data is its unconventionality. This may be due to her not having noticed the *lack* of such uses in adult speech -- it seems plausible that a retarded child might not notice that something does *not* occur. It is also quite possible that Crystal has not been made aware of the deviance of her usage by her interlocutors. There are probably very few cases where her deviant usages actually disrupt communication, and people in her environment may also have lowered expectations, being accustomed to her cognitive difficulties in other areas. We might also note the general tendency for caregivers *not* to correct language use in young learners (Clark & Clark 1977:325-326). **3.2 WS subjects have undisturbed processing, but a different semantic system underlying preposition use.**

In this case, we would posit different meanings for prepositions corresponding to the English phonological forms. This could be compared to, say, a foreign speaker whose language has a different way of apportioning the set of relations usually coded by prepositions across languages. Take as an example German *an*, which in some cases is equivalent to English *on* as in *an der Wand* 'on the wall' and in other cases expresses the notion we express with *at*, as in *an der Universität* 'at the university'. While learning English, such an individual is likely to use some English prepositions incorrectly, mapping them onto her own language's semantic inventory. In the case of WS speakers, their inventory of phonological forms would correspond exactly to that of other English speakers, but the pattern of symbolization relations from these phonological forms to the semantic structures within the inventory of prepositional relations would be different.

To explore one example, consider the usages C3 *working out on a field* and M1 *being on a [birthday] party*. It is possible to imagine a semantic system in which the preposition *on* includes, among its family of senses, a sense of merely 'being located', similar to English *at*. The surfacey or container-like properties of the landmark are just neglected in this meaning, remaining unspecified in the semantic structure. Thus being *on a party* is equivalent to conventional *at a party*, and being *on a field* is equivalent to being *in a field*.

So many prepositions are used in what seems to be a fashion corresponding to conventional English usage, that this would in any case be only a partial solution for the WS data. It seems difficult to account for omissions in this way, although we could say that some relational meanings are simply left uncoded in the linguistic system of WS subjects. This is still unsatisfactory, however, given that the most frequent case of omission in the data we are concerned with alternates with a prepositional use (*change a different color* vs. *change to a different color*, in the chocolate story). To confirm this solution we would need to examine a large data base and map the meanings of prepositions for each speaker, in order to discover whether the English phonological forms really have different semantic content for WS speakers. **3.3 WS subjects have mastered only an incomplete or partial version (some subset) of the semantic system of adults, but have normal processing**

There are several ways we can interpret this statement. One is that WS subjects have a semantic inventory for prepositions which is less rich than that of adults. For example, they may have

fewer meanings in a family of senses for a given preposition. Another possibility is that they have not grasped all of the detail of a given meaning, and hence use a preposition which matches a less detailed subportion of the scene. Consider Crystal's uses of *through*. *Through* presupposes *in*, but not vice versa. Thus looking through something entails looking in it, as well as seeing the region of space on the other side of the object, by virtue of the transparency of the landmark object (*I looked through the window*) or by virtue of holes in the object (*I looked through the hole in the wall at the construction site*). Perhaps Crystal has not grasped all of the detail of the meaning of *through*, specifically, the mention in the semantics of the prepositions of the space on the other side of the object.

This situation is similar to ii., since incomplete grasp of the full detail of the prepositional semantic inventory would result in WS speakers having a different semantic inventory from normal speakers. But this system would overlap with the adult system rather than being essentially different from it; it would be a subset of the adult system rather than a set with a distinctly different membership.

There is another way of interpreting iii. which we feel is of significant promise for Crystal's data. This has to do with the phenomenon of verb-preposition pairs having highly specific semantics. The proposal is that WS speakers become very familiar with such pairs by virtue of frequently hearing them in the environment; but because of their underdeveloped cognitive abilities, they do not master the use of these in accurate detail.

In CG terms, this would consist of associating the phonological form of these verb-preposition pairs with more semantic construals than is the case in the adult system; i.e., WS speakers overgeneralize these pairs.

In the course of analyzing Crystal's data, we extracted a list of verb-preposition pairs that she would be likely to hear frequently in her everyday environment. Note that these pairs are not necessarily used 'correctly' in her data; but they are common pairings she might hear. These are shown in Table 3 (Appendix).

To explore one example, let us again consider Crystal's use of *through*, especially *look through*. Upon thought, we realize that this expression occurs quite often in the context of searching for lost items. Consider sentences like those in (6).

(6)
a. I *looked through* the pockets of every coat in the house before I finally found the keys in my dresser drawer.
b. Mom was *looking through* a pile of magazines for a recipe.
c. We *looked through* all the rooms in the house for the cat.
d. I *looked through* my wallet for my Visa card.
e. I *looked in/*through* my pocket for the lost ring.
f. I *looked in/*through* my pocket, my shoe and the gift box but I couldn't find the ring.

Now this expression involves a subtle semantic specification: the search proceeds by progressing from one to another of a series of *identical* locations ((6)a., c.) or from one to another part of a single object ((6)d., the compartments in a wallet); or from one to another of a series of similar objects (e.g. credit-card like objects in a wallet, (6)d.; magazines, (6)b.). It does not work for an individual object ((6)e.) or a series of non-identical objects ((6)f.). It is possible that Crystal has not picked up on this subtlety and equates *look through* with *look in*, which can be used to describe a visual search proceeding from one to another of a series of *non*-identical locations.

Several other unusually used pairs are amenable to such an explanation. The semantic differences between *listen for* and *listen to* and *call* and *call for* are quite subtle and may also be missed by WS subjects.

The pairing phenomenon could be used to explain pairs including material other than verbs as well. Table 4 (Appendix) shows additional, nonverbal expressions including a preposition which might occur with high frequency in Crystal's language experience. In the CG view, such pairs can easily achieve unit status. And given the flexibility of semantic systems across individuals, it is very plausible that an individual could arrive at a different, less specific semantic structure for a frequently-heard form.

The incidence of such prepositional pairings in this sample of data is very high. There are 77 tokens of such pairings, constituting 59% of the total number of tokens of prepositions in Crystal's data, including many conformist uses. If this explanation is correct, it could account for a good

subset of non-conformist preposition use in WS speech.

Interference from multi-word units without prepositions may also be occurring. Consider the alternations *change __/to/into a different color*. *Change color*, *change to*, and *change into* are all likely to be units in English. The latter two involve a change in the properties of the entity changing; so does the first, though the property is specifically color. It is easy to see how the semantic subtleties of the differences here could be missed. It seems that the notion of overgeneralization of the meanings of multi-word units would be a promising avenue to explore in examining WS data. **3.4 WS subjects have both a different or partial semantic system** *and* **different processing from normals**

We shall not explore this option here. Differences in both representational structure and, say, associations to phonological forms, or activation patterns and activating connections between subparts of the linguistic system, would be likely to produce strongly aberrant uses of prepositions that would disrupt communication and be much more noticeable than what we find in this small data sample. The data actually point to fairly subtle differences, and not gross differences of this nature. So many of the WS usages of prepositions conform to convention, that we must assume a body of overlap in some sense. **4 Conclusion**

It is likely that several explanations will be required to account for the deviant preposition use found in the WS data. Unusual use of prepositions in WS data put us on the alert for other ways in which their language use may miss subtle points of semantics/syntax. CG provides a framework in which speakers having a lesser degree of cognitive sophistication than normals of their chronological age can still have a functional semantic system. It remains to be seen whether examination on a large scale of WS language use will bear out the 'semantic deficit' explanations explored here. It may turn out that WS subjects have greater impairment in their linguistic capabilities than was previously thought, and that the 'language faculty' has not been completely spared in this case.

Acknowledgements

This research was supported in part by the National Institutes of Health Grants HD 26022 and DC 00146 to

Ursula Bellugi and Edward S. Klima at The Salk Institute for Biological Studies, La Jolla, California 92037.

Footnotes

[1]The WS subjects referred to in this paper were adolescents with IQ's between 40 and 60.

[2]Use of the term *deviant* here is without pejorative connotation. We use it to mean simply divergent from the norm of adult English usage.

[3]For a detailed discussion of the semantics of English spatial prepositions in CG, see Hawkins (1984).

References

Bellugi, U., Bihrle, A., Jernigan, T., Trauner, D., & Doherty, S. 1990. Neuropsychological, Neurological, and Neuroanatomical Profile of Williams Syndrome. *American Journal of Medical Genetics, 6*, 115-125.

Bellugi, U., Sabo, H. & Vaid, J. 1988. Spatial deficits in children with Williams Syndrome. In J. Stiles-Davis, M. Kritchevsky & U. Bellugi, eds., *Spatial Cognition: Brain bases and development*, 273-298. Hillsdale, N.J.: Lawrence Erlbaum.

Caplan, David. 1987. *Neurolinguistics and linguistic aphasiology.* Cambridge, UK: Cambridge University Press.

Clark, E. & K. Carpenter. 1989. The notion of source in language acquisition. *Language* 65:1, 1-30.

Clark, H. & E. Clark. 1977. *Psychology and language: An introduction to psycholinguistics*. New York: Harcourt Brace Jovanovich.

Ellis, A. & A. Young. 1988. *Human cognitive neuropsychology*. Hillsdale, NJ: Lawrence Erlbaum.

Hawkins, Bruce. 1984. The semantics of English spatial prepositions. Ph.D. thesis, University of California, San Diego.

Langacker, Ronald. 1987. *Foundations of Cognitive Grammar*, vol. I: *Theoretical prerequisites.* Stanford, CA: Stanford University Press.

-----, forthcoming. *Foundations of Cognitive Grammar, vol. II: Descriptive Application*. Stanford, CA: Stanford University Press.

Pinker, Steven. 1991. Rules and Associations. Paper presented to the Seventeenth Annual meeting of the Berkeley Linguistics Society, February 15th, 1991.

Reilly, J., Klima, E.S., & Bellugi, U. 1990. Once More with Feeling: Affect and Language in Atypical Populations. *Development and Psychopathology*, Vol. 2, 4, 367-391.

Table 1
Prepositions & frequency of occurrence in Crystal's data

Prep	times occurring	Prep	times occurring	Prep	times occurring	Prep	times occurring
about	1	off	1	after	1	on	7
as	1	on top of	1	at	7	out of	4
behind	1	over	3	by	2	through	9
for	3	to	40	from	4	under	1
in	12	up	3	inside	1	out	1
upon	2	into	2	with	5	like	1
of	18						

Table 2
Deviant preposition uses in Crystal's data

l l l. F1 So, he looked everywhere, he looked *through* his boots, [in] F2 he looked *through* his slippers, [in] F3 he even looked *through* the table, [in? under?] F4 and the dog even looked *through* the jar, but he [in] couldn't find his frog that he catched. F5 There the dog has the jar *in* his face. [on, or *his face in the jar*] F6 and he's calling *for* the frog but he still can not find him. [zero] F7 So what he did is he looked *through* an anthole [in] F8 He looked *through* the hollow tree [in] F9 he didn't see any frog *through* there. [in] F10 Then when suddenly he was yelling *for* the frog [to?] F11 standing on the tall rock, and then looking *through* the trees [in?] F12 he got up *from* the water and the dog too [in] F13 he was trying __ listen for sompin [to] F14 he was trying listen *for* sompin [to] F15 He looked over [the log] and *inside out* it [inside] C1 You can be saved if the sun changes __ a different color [to] C2 see if he can change the sun *into* a different color [to] C3 One of the leaders that has been working out *on* a field. [in] C4 The Princess arrived *to* one of the leaders and told him [at] C5 If you want me to change the sun __ a different color [to] C6 What can I do to help you change the sun __ a different color? [to] C7 use my magic powers to change the sun __ a different color [to] C8 So they stand *to* each other. [near, next to] M1 This is your first experience of being *on* a [birthday] party. [at] M2 He retired *from* working in that

Table 3
High-frequency verb-preposition pairs in Crystal's data

office. [that job]
l l. look at listen for wake up look under try to climb over take care of be amazed at call for decide to have to look in come after (chase) get in run away from be going to yell for come in (colors,flavors) stand on have fun with look through bow to lay on come to see bark at say to keep on VERB-ing want to fall off change to get up change into go to see

Table 4
Other high-frequency expressions in Crystal's data

l l. Once upon a time one of at all a family of all of a sudden the end of out of nowhere experience of on top of retire from inside out selection of as a fami-