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The Learnability of English Demonstratives

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1. Introduction¹

One of the most important goals of linguistic theory is to explain how and why children can acquire their first language. Chomsky (1986) draws our attention to what he terms 'Plato's Problem': How is it that we can know so much given that we have such limited evidence? That is, it is a significant problem why and how children acquire their first language in a relatively short span of time despite the fact that the input children get is insufficient in quantity (poverty of stimulus) and degenerate in quality (degeneracy of stimulus). Linguistic theory has to explain how and why children make the transition from the initial state to the final state on the basis of the primary linguistic data. It is further assumed that the data available to the learner is highly limited in character. That is, the negative data -- evidence that certain sentences are ill-formed -- is not available for acquisition of grammar.

Pinker (1984) proposes a number of general mechanisms and some specific procedures which are designed to enable the child to progress from the initial state to the adult grammar. In the present paper, we focus on the Uniqueness Principle, one of his general mechanisms. We deal with the acquisition and learnability of English demonstratives 'this' and 'that', especially in terms of the Uniqueness Principle. We firstly review Murasugi (1985, 1986a and 1986b). Then, we examine whether or not the process of acquisition of these terms proposed in these papers can be accounted for by Pinker's model. We will propose that the Uniqueness Principle, which was originally applied to syntax and which has also been applied to morphology, might be extended to the acquisition of demonstratives, that is, to lexical acquisition.

2. The Adult System of English Demonstratives

The adult system of English demonstratives has been regarded as being defined by two parameters in many previous studies: 'the point of reference' and 'distance'. R. Lakoff (1974) considers that an object is identified by use of 'this' when it is near at hand and 'that' when the object is far from the speaker. Accordingly, studies on the acquisition of 'this' and 'that' have mainly focussed on the developmental order and process which reflect the child's cognitive maturity dealing with the parameters of 'distance' and 'shifting-reference-point'.

A close analysis of the empirical evidence, however, reveals that there are some examples which raise problems for the widely acknowledged definitions of the meaning of demonstratives. For example:

- (1) (Something rings in the vicinity of the speaker.)
A: What is *that*?
- (2) (Linda is giving a massage to Allison's stiff shoulder. Linda is standing behind Allison.)
Allison: *That* point. Right.
- (3) (A shows a doll she made to B. A has a doll in her hand. Stretching the arm toward B)
A: Look at *that*.

A general definition of English demonstratives is proposed in Murasugi (1985, 1986b): 'this' refers to an object in a pragmatically given area which is psychologically in the vicinity of the speaker at the coding time; 'that' refers to the object in a pragmatically given area which is psychologically not in the vicinity of the speaker. This general definition is further divided into subcomponents:

- (4) Language Internal Formula
 - (a) Distance Formula
 - (b) Possessive Formula
 - (c) Invisibility Formula
 - (d) Vector Formula
- (5) Speaker Formula

These formulae are for the most part independently motivated in interacting theories. It is assumed in Murasugi (1985) that these principles have certain possibilities for parametric variation, and are included in Universal Grammar. It should also be mentioned that just as the adult system of demonstratives must be systematically re-analyzed, so some of the aspects in children's acquisition of demonstratives must be reanalyzed, according to the above formulae.

3. The Adult System of the Invisibility Formula

As a stepping stone to full understanding of the English demonstratives, in this section we focus on firstly the Distance Formula, and then on the Invisibility Formula.

Judging from the empirical data, it seems fair to say that the Distance Formula explains to various usages of English demonstratives. In many cases, 'this' refers to the object which is near to the speaker; 'that' refers to the object which is far from the speaker. However, there seem to be some cases in which the discrimination of the usage of 'this' and 'that' cannot be explained only by the Distance Formula. Therefore, it seems necessary to study data from natural speech more carefully, and to formulate a new formula to describe the usage of the English demonstratives 'this' and 'that'.

First, let us see some counterexamples to the Distance Formula.

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- (6) (A hears something squeaking behind the refrigerator, which is beside A's chair.)
A: What's *that*?
- (7) (Something rings loudly in the vicinity of the speaker)
A: What is *that*?
- (8) (Someone blindfolds the speaker from the back)
A: Who is *that*?
- (9) (Linda smells a flower. The flower is about 0.1 meter away from Linda.)
Linda: *That* smells nice.
- (10) (Allison smells something burning in the kitchen. She is in the kitchen. She is about 0.6 meter apart from the burning object.)
Allison: What's *that* smell?

Analyzing these data shown in (6) through (10), it seems reasonable to conclude that all the usages of 'that' in those data correlate with the feature [+ visible]: in (6) and (7), 'that' refers to the sound heard, (8), to the object which is out of the speaker's sight and (9) and (10), to the smell. The common characters concerning voice, unseen objects and smell can be summed up as parameters of "invisibility". Furthermore, it should be noted that the usage of 'that' which incorporates the feature [- visible] is not basically affected by the Distance Formula. That is, whether or not the object in question is in the vicinity of the speaker, 'that' is employed, unless the speaker can touch or feel the object which is invisible to him/her. On the basis of this empirical evidence an invisibility parameter must be invoked. In this paper, we term the parameter concerning invisibility the Invisibility Formula.

The central notion of the Invisibility Formula (IF) is that 'that' is generalized in terms of the parameter [+ visible]. 'That' is used for the both object with [+ proximal₁] (= in the Individual space) and [- proximal] (= outside the individual space), if the object is invisible.² The relationship between the Distance Formula and the Invisibility Formula is shown in the following table.

² In this paper, [+ proximal] is sub-categorized into two features: [+ proximal₁] and [+ proximal₂]. The former represents the meaning "the object in focus is in the physical space of the speaker (e.g., the speaker is touching the object in focus)" and the latter represents the meaning "the object in focus is in the individual space of the speaker (e.g., the speaker regards the object as being in the personal space of himself/herself)". The feature [- proximal] represents the meaning "the object in focus is outside the physical space (which also means that the object in focus is outside the individual space)".

Table 1

Distance Formula	[+ proximal ₁]	[+ proximal ₂]	[- proximal]
Invisibility Formula			
[+ visible]	this	this	that
[- visible]	(this)/that	that	that

As Table 1 shows, 'that' can appear under two conditions: (a) when the object in focus is [- proximal, + visible] and (b) when it is [+ proximal, - visible]. When the object bears the feature of [+ visible], the Distance Formula is dominant in determining the use of demonstratives 'this' and 'that'. However, when the object bears the feature [- visible] the Invisibility Formula is dominant, regardless of differences in distance from the speaker.³ Here it should be mentioned that when the object in focus is in the physical space of the speaker, [- visible] does not concern the determination of the usage of 'this' and 'that'. In this case, the Distance Formula is dominant. Hence, 'this' is employed.

Summing up, in the adult system the Invisibility Formula is formulated as follows: Human vision governs the use of the English demonstratives 'this' and 'that'. If the object in focus is in the physical space of the speaker and is invisible, either 'this' or 'that' can be used. If the object is outside the physical space of the speaker and is invisible, 'that' is employed.

In older English, 'yon' and 'yonder' are reported to be variation in respect of distance versus visibility. Furthermore, in Present-Day English, Scottish English differs from standard English in using 'they' as a marker of distant plural reference and 'thon', which derives from 'that' + 'yon' as a marker of more distant reference (Romain, 1984). These facts support an analysis of English demonstratives which incorporates the parametric feature of [+/- visible].

From the point of view of language acquisition, it is of interest whether blind people discriminate these demonstratives in terms of the Invisibility Formula. We refrain at this point from considering further the acquisition process of the Invisibility Formula in blind people, for few observational and experimental data are available at present. It should be mentioned, however, that theoretically, studies of the acquisition of the Invisibility Formula in blind people may provide some insight into the universal nature of the Invisibility Formula, as well as to the relationship between human cognition and the functioning of the innately endowed language acquisition device, and, ultimately perhaps, to studies of the grammar of English demonstratives.

4. The Acquisition of the Invisibility Formula

We turn now to children's acquisition of the Invisibility Formula. Murasugi (1985, 1986a) studied the acquisition of children's discrimination of the use of 'this' and 'that' for an object which is in the individual's space but not in their physical space (i.e., the object is not touched by the speaker but it is 'near' to him/her) and is also invisible. That is, the highlighted section in Table 2 was focussed on, and the problem of how

³ In other words, the Distance Formula seems to be the unmarked case, and the Invisibility Formula overrides the Distance Formula by prescribing the usage of 'that' even for close things if they are invisible.

children acquire the Invisibility Formula concerning the demonstratives with the features of [+ proximal₁, - visible] was studied from both observational and experimental methods.

Table 2

Distance Formula	[+ proximal ₁]	[+ proximal ₂]	[-proximal]
Invisibility Formula			
[+ visible]	this	this	that
[-visible]	(this)/that	that	that

As a result, it has been found that children seem to acquire the Invisibility Formula in their fourth year, and that they acquire 'that' in a series of key steps: first, children use 'this' or 'it', and only later do they use 'that' correctly. This developmental process has been found in naturalistic observational and experimental types of studies cited above. Furthermore, it was noted in the experimental study that some children, who could not use 'that' for a proximal and invisible object, used 'it' instead, but significantly, not 'this'. Most of these same children used 'this' for a proximal and visible object when they were tested. We can assume that the reason why 'it', but not 'this', was employed for an object whose features are represented as [+ proximal₂, - visible] is that the children do not have 'that' as defined by the Invisibility Formula in their lexicon at that stage. Although they seem to realize that the visible/invisible conditions concern the use of demonstratives in the language system, they do not know how to make use of the distinctions in their own verbal production. If this assumption is plausible, this leads us to consider that those children who do use 'it' can be assumed to have partially acquired the Invisibility Formula underlying the use of the English demonstratives 'this' and 'that'. In other words, it can be assumed that those children who used 'it', not 'this', for proximal and invisible objects but used 'this' for proximal and visible objects are in a transitional stage of total acquisition of 'this' and 'that' in terms of the Invisibility Formula. (For further details, see Murasugi 1986a.)

5. The Uniqueness Principle and Learnability

In this section, the developmental process for the "it' to 'that' phenomena" will be analyzed in terms of the Uniqueness Principle.

Before presenting this analysis, a few remarks are in order about the way in which the Uniqueness Principle functions.

The Uniqueness Principle plays a role in learnability, where children overgeneralize of syntactic and morphological rules. To see this, suppose a child generates a language L' that contains a superset of the adult Language L. If there is no negative evidence available, how does the child retreat from the hypothesized grammar of language L' to the adult grammar of language L?

Many studies have shown that motherese does not provide children with ungrammatical strings labelled as such. That is:

- (11)
- Parents do not systematically correct their children's grammar when the children speak ungrammatically.

- (12)
- Even if the parents give negative information to children, the corrections are on the truth value of the child's utterance rather than its well-formedness and grammaticality.
- (13)
- Even if children are corrected for speaking ungrammatically, they do not take the corrections on grammar to the heart.

In the absence of negative evidence, how do children attain the grammar which does not generate any ungrammatical sentences?

The Uniqueness Principle has been proposed as a solution to the overgeneralization and retreat problem in the absence of negative evidence. The Uniqueness Principle, as applied to syntax, states that each deep structure is realized as one and only one surface structure, unless there is evidence in the input that more than one surface structure is derived from a given deep structure. In Roeper (1981), the Uniqueness Principle is invoked to explain the acquisition of the structure *for to* infinitives, which is a marked structure in Case theory. He points out that *for to* infinitives is not the unmarked universal form and it is acceptable in adult English only with lexical NP: 'I hope for Bill to win' is grammatical; but not 'I hope for to win'. He analyzes how a child learns these exceptional structures as follows:

...the logic of linguistics suggests that the child would first establish the presence of the unmarked form: *I hope to win* ... Next a sentence with an infinitival subject would be registered by the child: *I want for John to win*. The child knows that the subject must be case-marked and therefore immediately understands that the function of the preposition *for* is to give case to *John*. Finally the incorrect form *I want for to win* would be excluded by the Uniqueness Principle, since it does not differ from *I want to win* in deep structure. (Roeper 1981: 141)

The Uniqueness Principle is also applied to morphology in Randall (1983). Randall states that each verb has one and only one past tense form in the unmarked case. Roeper (1981) suggests that the Uniqueness Principle has an implication for the representation of subcategorization frames. When applied to syntax, The Uniqueness Principle says that in the unmarked case every deep form has a single surface structure and that only with positive evidence do we allow a marked second surface form in syntax. Extending the Uniqueness Principle to the level of lexicon, Roeper states that in the unmarked case each functional structure has a single subcategorization for a function. In exceptional cases, the second subcategorization is marked on a separate line as in the case of the double set of subcategorizations of the verb 'read': (1) ___ NP (PP)/ (2) ___ NP NP. Furthermore, the Pinker's (1984) application of the Uniqueness Principle to the level of lexicon suggests that children set up paradigms with an empty cell for each expected entry. The Uniqueness Principle solves the problem of overgeneralization as follows: the mechanism of the Uniqueness Principle establishes only temporary, preemptable forms ⁴ that give way to positively attested forms. The incorrect forms created by the child are replaced by the adult forms heard in the input because of the stipulation that two entries cannot enter one cell at the same time. As soon as children realize from positive data that there is another entry in the adult grammar L to put in the cell in question, they replace the temporary entry by the newly acquired entry. It should be noted here the information specifying that only one entry can enter one cell is considered to be endowed innately in the language faculty of the human mind.

Refraining from any hasty conclusion regarding whether or not the Uniqueness Principle adequately describes the universal mechanisms of human language acquisition in general, in this paper, we will present an analysis of the acquisition of demonstratives in terms of the Uniqueness Principle.

⁴ Pinker uses the question mark symbol to denote the preemptable status of an item.

Analyzing the observational and experimental studies shown in Murasugi (1985, 1986a, 1986b), the following solution is suggested. Children who are in the transitional stage (as shown above) would know that an object which is proximal and invisible will not be referred to as 'this'; thus, the demonstrative for [+ proximal, + visible] and the demonstrative for [+ proximal, - visible] would be regarded as belonging to different cells. However, at this stage, children do not know the exact lexical entry that enters the latter cell, and so, they choose instead a lexical item they have already acquired and which is not currently preempted by other form. Then, at the next developmental stage, children notice that in the positive data given, there IS such a lexical item, that is, there is a demonstrative 'that' in English which refers to an object which is proximal and invisible. This would explain the "it-to-that" developmental process'.

However, there is still a problem: how 'it' and 'that' enter the same cell. There are two possible analyses for the question raised above. The first analysis is simple. As there is no positive data given to children showing that 'it' is a demonstrative (or, it is also possible to analyze that children know innately or at a very early stage that 'it' does not belong to the category of demonstratives, but to that of pronoun), they put a question mark (?) on 'it' when they enter 'it' to the cell in question. Once they have acquired the lexical demonstrative 'that' which satisfies the Invisibility Formula, they replace the previous lexical item marked with '?' by the newly acquired 'that', thereby observing the Uniqueness Principle.

The second analysis is not so simple. Suppose children initially miscategorized 'it' and identify it as a demonstrative lexical item whose function is the same as that of 'that' in the adult system. Then, neither of the lexical items will be assigned the preemptability feature '?'. Thus, neither one will drive out the other. Hence, it is theoretically possible that the child will retain both. That is, these apparently incorrect categorizations might remain in the child's grammar for a long time since negative evidence about their incorrectness cannot be used. Then, how do children know that 'it' is not the preferred term for the context but 'that' must be used instead? How do children, who have for now hypothesized that those lexical items be demonstratives, get the information telling them that either of the two is not a demonstrative in the adult system, despite the absence of negative evidence? Here, the Uniqueness Principle should work. The Uniqueness Principle should determine one possible entry that can enter the cell in question. Pinker (1984: 114) explains how it works as follows:

...If a child uses semantics to categorize a word correctly, and if the word has no other categorization in the adult language, that categorization will forever remain unchanged. If a child uses semantics to categorize a word incorrectly, then when the word is heard in a syntactic context that the child has correct rules for, the child will correctly recategorize the word on distributional grounds and expunge the incorrect entry.

The second analysis suggests that even if the child should miscategorize 'it', the Uniqueness Principle can solve the problem. By the Uniqueness Principle, the learning procedure could distinguish between categorizations that were initially made on semantic grounds and those made on distributional grounds. In the case described above, the '?' sign is not put on the preemptable orphan, but on the problematic word itself, i.e., on 'it'. In this case, 'it' is eliminated from the cell, not because it is driven out by another form, but because it doesn't meet distributional criteria.

Thus, we have seen that theoretically the Uniqueness Principle might be able to explain how children retreat from the conflating of 'it', which is acquired first, and 'that'. We mentioned above that this problem depends on whether the child categorizes these items as demonstratives or pronouns. Whether or not we take the position that children

have *a priori* knowledge of the basic grammatical categories given by Universal Grammar, the developmental process of the English demonstratives (in terms of the Invisibility Formula) can be given an explanation by the Uniqueness Principle. Therefore, we can conclude at the present stage that the lexical developmental process of 'it' to 'that' can be explained elegantly in terms of the Uniqueness Principle.

6. Conclusion

In this paper, the learnability of the English demonstratives 'this' and 'that' was discussed with reference to the language acquisition data. Firstly, we suggested several formulae govern the usage of these terms in the adult system. We proposed that some of the aspects of acquisition of English demonstratives should be reanalyzed in the same way as the adult system. In this paper, we focussed in particular on the acquisition of one formula, i.e., the Invisibility Formula. We analyzed the developmental process which was observed in both naturalistic and cross-sectional (experimental) studies in terms of the Uniqueness Principle, and suggested that the principle could also be applied to lexical acquisition.

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Children's comprehension of temporal sentences in Japanese

(A preliminary version)

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1. Introduction¹

It has been reported that children comprehend sentences with temporal terms like "before" and "after" more easily when the order of mention matches the order of occurrence (E. Clark 1971). For example, sentences like (1) and (2) are comprehended more easily than sentences like (3) and (4).

- (1) John jumped the gate before he patted the dog.
(Event 1 before Event 2)
- (2) After John jumped the gate, he patted the dog.
(After Event 1, Event 2)
- (3) Before John patted the dog, he jumped the gate.
(Before Event 2, Event 1)
- (4) John patted the dog after he jumped the gate.
(Event 2 after Event 1)

Sentences (1) - (4) depict the same event. Since the order of main and subordinate clauses can be changed in English, the choice of the clausal order seems to bring different processing demands. Sentences (1) and (2) match the order of occurrence. In Clark's act-out task, sentences like (1) and (2) evoked more correct responses than (3) and (4). This is called an order of mention strategy. Clark also finds that "before" (1) evokes more correct responses than "after" (2). This is interpreted as evidence that "before" is acquired earlier than "after". With this interpretation, E. Clark (1973) proposes a "Semantic Feature Hypothesis" (henceforth SFH). The SFH suggests that when children acquire the meanings of words, what they do is to fix values of the semantic features of the term in question. For instance, temporal terms have [+Time], [+/-Simultaneous], and [+/-Prior] (e.g., "before" = [+Time, -Simultaneous, +Prior] and "after" = [+Time, -Simultaneous, -Prior]). Since it is interpreted that "before" is acquired earlier than "after", Clark suggests that the default value of [+/-Prior] is [+Prior]. Therefore, once children set up values like [+Time, -Simultaneous], automatically [+Prior] is obtained. Similarly, to explain E. Clark's data and its interpretation, H. Clark (1973) proposes a "Complexity Hypothesis" (henceforth CH), which predicts that words with a "positive" semantic concept will be acquired earlier than those with a "negative" concept. The concept of "positive/negative" for temporal terms was advanced from spatial relationships and it is considered to be correlated with perceptual space. Therefore, the spatial term "before" is positive because the space indicated by this term is easily perceptible while "after" is negative because everything behind is not easily perceptible. Since "before" is positive in the "before/after" pair, the CH predicts the early acquisition of "before". Therefore, by hypothesis, "before" is acquired early and sentences with "before" should be better comprehended than sentences with "after".² Since these hypotheses are based on semantics, (particularly, the CH is formulated based on

¹ We would like to thank Diane Lillo-Martin and Stephen Crain for their helpful discussions and comments.

² In Clark (1971), "after" evoked more correct comprehension than "before" when the order of mention doesn't match the order of occurrence. That is, (4) was easier than (3). If the difficulty of processing in