Child Language Research Forum
12th annual meeting, March 1980

Person Marker Acquisition in Quiche Mayan

Clifton Pye (Pittsburgh)

It has long been the fashion to seek the determinants of language acquisition in syntactic and semantic complexity. The present study suggests that perceptual saliency, defined in terms of segmentability and stress, may play an important role in language acquisition. The material in this study comes from longitudinal records of three Quiche Mayan children, ages 2;1, 2;9 and 3;0 when I began, and living in the Indian town of Zunil in the western highlands of Guatemala. Quiche was the predominant language in all three households although some of the parents could speak Spanish; none of the children spoke Spanish. I visited the children in their homes over a period of nine months, approximately once every two weeks for a one-hour play session. I was not able to sample the children's speech during all of their daily activities, but I did collect samples from a wide range of activities, including meals and the changing of their clothes. To some extent, my arrival served to set up a special routine limited to my visits. It was unusual enough to have an adult from outside the household come specifically to play with the small children, let alone someone as unusual as a non-Indian. The presence of older siblings and my informant mitigated my own strangeness to some extent, not to mention the fact that I brought toys and could speak their language.

Quiche is an ergative language; one set of person markers (ergative) marks the subject of transitive verbs, the possessor in genitive constructions, and the object of relational nouns (which are similar to prepositions in English). Another set (absolutive) marks the subject of

intransitive verbs and the direct object of transitive verbs. The person markers are obligatory in these environments and are bound to the words that they mark. Each set has six person markers: three persons in singular and plural. Each of the person markers in the ergative set has two allomorphs, one before vowel (or glottal stop)-initial stems and one before consonant-initial stems. Some examples of the use of the person markers in adult Quiche speech are shown in (1). Independent personal pronouns may be used with the words for emphasis, but pronouns are usually deleted from the sentence if they refer to the same object or individual as a person marker.

In early samples, the children typically uttered only one or two syllables of a word, usually the stem or the stem plus a suffix. The person markers, by and large, were missing. For example, one subject, Al Chaay, used markers to mark person in only 1.7% of her verbs in the first sample. The intended referents of the children's utterances were clear from the linguistic and nonlinguistic contexts approximately 95% of the time (a benefit of discussing the here and now with children). The conversation shown in (2) is typical of this period. With one exception, there was no confusion between the various person markers in the children's speech; they either used the appropriate marker or none at all. This contrasts with previous findings in such fusional languages as Portuguese (Simoes and Stoel-Gammon 1979), Estonian (Lipp 1977), and Latvian (Ruke-Dravina 1973) where a single inflection encodes both person and tense, and where the third person singular of the indicative was the initial form the children used for every person. The exception in Quiche occurred in the children's use of the preconsonantal

allomorph of the first person singular in possessive environments. This possessive marker is unusual in that it has two forms: one form /nu-/ is used to form the possessive in the vast majority of words while the second form /in-/ is used with only two words in my corpus, tat 'father' and chaq' 'older sibling'. The children produced utterances with nu-taat instead of the adult form of in-taat 'my father'. This exception is easily explainable in terms of Slobin's (1973) principle of avoiding exceptions. What is surprising about the Quiche data is that the children did not apply this operating principle more thoroughly. For example, if the same semantic notion of agent underlay the subject of both transitive and intransitive verbs, one would expect the children to overgeneralize the set of ergative person markers and apply them to intransitive verbs, or one might expect the children to use preconsonantal forms of the ergative with words beginning with vowels. The fact that such overgeneralizations did not occur, despite the extremely high frequency of obligatory environments for person markers in the children's speech, implies that the children had already sorted out the different person markers in terms of their meaning before they began producing the person markers in their own speech.

The person markers showed extreme changes in their presence from sample to sample. This makes it difficult to apply Brown's (1973) and Cazden's (1968) criterion for acquisition of three successive samples of a ninety percent presence or greater. In order to reduce the variation between samples, I used only samples with five or more obligatory contexts as a basis for computing the morphemes' percentage presences.

I then ranked the person markers in acquisition orders for all three children using the sample number for the morphemes acquired during the study and the final percentage for the morphemes not acquired. I used the Spearman rho (corrected for ties) to compare the person marker acquisition orders and found a significant correlation between the orders of person marker acquisition on verbs ($p=.05$). The results for person markers on possessives and relational nouns were not significant, but this may have been due to the lack of data in these two environments. I obtained continuous data for eleven of the person markers on verbs, but only eight of the person markers on possessives, and only five of the person markers on relational nouns. When I combined the data for all three environments and measured the similarity of these general acquisition orders, I again found a correlation at the .05 level of significance, an indication that the person markers on possessives and relational nouns are acquired in very similar orders. This is an astonishing result given the nature of the morphemes being compared and the variation in the morphemes' presences from sample to sample. All of the person markers are instances of just the single morphological category of person marked on different words. The distinctions of case, person and number are much finer than the comparatively gross semantic and syntactic distinctions among the other grammatical morphemes for which invariant acquisitional orders have been demonstrated (Brown 1973, Lipp 1977).

I tested several possible determinants of the person marker acquisition orders separately for person markers on verbs, possessives and relational nouns. Syntactic complexity cannot be a major determinant

of person marker acquistion in any of the three environments since the person markers are all introduced by the same agreement rules. Semantic complexity also seems to have little to do with person marker acquisition, although it cannot be ruled out entirely in the absence of a semantic theory of person markers which would specify person marker meanings in terms of semantic features, procedures, or functions thereby providing some sort of metric with which the semantic complexity of one person marker relative to another could be specified. If semantics was a determining factor, I would have expected the person markers with the same meaning (especially the prevocalic and preconsonantal allomorphs of the ergative set) to have been acquired at approximately the same times. In fact, I tested such a set of semantic predictions in all three environments and found no significant correlation between the semantic predictions and the children's acquisition orders. The fact that the acquisition order of the person markers on verbs in Quiche was different from the acquisition orders reported for Portuguese (Simoes and Stoel-Gammon 1979), Estonian (Lipp 1977), and Latvian (Ruke-Dravina 1973) would also seem to rule out semantics as a major determinant of person marker acquisition.

Another possible determinant of person marker acquisition orders is the frequency with which the different person markers are modeled in adult speech. One would expect children first to learn the person markers that they heard most often in the speech around them. To test this possibility, I first determined the frequencies of the person markers in the speech of the children's mothers. The person markers were all present in over 90% of the obligatory environments in the mothers' speech. There

was a significant correlation between the frequency rank orders of the person markers in the mothers' speech for the verbs only. Once again, there may have been too few person markers on possessives and relational nouns to be able to measure a correlation in person marker frequencies in these environments. The correlation between the frequency rank orders for person markers on verbs, at least, implies that person marker frequency remains fairly stable throughout the developmental period (contra Moerk 1980) since the mothers were directing their speech to children at three different ages. When I tested the frequency rank orders of the person markers on verbs in the mothers' speech with the children's acquisition rank orders, I found a negative correlation (Spearman rho = -.209). I also examined the possibility that frequency was responsible for the variation between the children's acquisition orders by comparing the differences among the children's acquisition orders with the differences in the frequency rank orders among the mothers. For example, the person marker E_V3 on verbs was the first that Al Chaay learned, but the fifth that A Carlos learned. In the speech of Al Chaay's mother, E_V3 was tied with E_C4 as the fifth most frequent person marker on verbs, whereas for A Carlos' mother, E_V3 was the ninth most frequently used person marker. The difference between the acquisition rank of E_V3 for Al Chaay and A Carlos is, thus, in the same direction as the difference between the frequency of E_V3 in their mothers' speech. I cast all of these comparisons into a Sign test and found no indication in any of the three environments that frequency might account for the variation among the children's acquisition orders. This outcome is similar to one Brown (1973) found for American children learning English. I would agree with Brown that frequency does not play a

significant role in children's acquisition of grammatical morphemes.

Frequency is just one factor related to the perceptual saliency of grammatical morphemes. While relatively little work has been done on the relation of speech perception to language acquisition (c.f. Eimas 1974), there is reason to suspect that three factors: phonetic substance, stress, and phrase-final position, make grammatical morphemes more salient perceptually for young children (Blasdell and Jensen 1970). The person markers in Quiche interact in subtle ways with the rules determining word stress and syllable boundaries, producing real differences in the morphemes' perceptual saliency. I give some examples of this interaction in (3) (a slash marks a syllable boundary and an apostrophe marks the syllable receiving the main word stress).

In their early samples, the children produced forms that followed a segmentation according to syllable boundary rather than the actual boundary between morphemes. One of the children, for example, produced the utterances shown in (4). The utterance wiloh contains only the second part of the person marker E_V2 aw while the utterance teloq contains only the latter part of the person marker Abs2 at. I found a general tendency among all of the children in the early stages to reduce words to the single stressed syllable. This has a striking effect in Quiche since the language has an extremely regular system of word stress--stress always falls on the final syllable of the word.

The interaction between the forms of the person markers and the rules determining word stress and syllable boundaries might be responsible for the children's acquisition orders. A person marker that is entirely

part of a stressed syllable should be easier to hear than a person marker that forms only an unstressed syllable which, in turn, should be more salient than a person marker that is occasionally split by the syllable boundary or one that is always split by the syllable boundary. On this basis, the person markers on verbs can be ordered according to their perceptual saliency as in (5), while person markers on possessives and relational nouns are ordered as in (6). (Perceptual saliency makes slightly different predictions for person markers on possessives and relational nouns since the forms of the person markers in these two environments are slightly different from the forms of the person markers on verbs.)
I found a significant correlation between the children's acquisition orders and the predictions from perceptual saliency in all three environments ($p=.05$). Moreover, perceptual saliency would predict that person markers would be acquired in the order: 1. relational nouns, 2. possessives, 3. verbs, since relational nouns tend to be one or two syllable words appearing in utterance-final position, verbs are usually polysyllabic and appear at the beginning of utterances, while possessives fall in between verbs and relational nouns in terms of their average number of syllables and utterance position. That this is what actually occurred may be seen in (7), which shows how one child acquired the ergative markers in these three environments.

Perceptual saliency, then, defined in terms of susceptibility to word and sentence stress and lack of disjuncture caused by a syllable boundary, was significantly related to the children's acquisition of person markers in three different environments. If such is the case,

it would have some interesting implications for language acquisition. The most widely accepted approach to speech perception proposed so far is some kind of analysis by synthesis model (Stevens 1960). Hearers are said to generate their own models of what was said and then match these against the sounds retained in their acoustic memory. Such a theory accounts for the facts that hearers can follow what is being said in noisy environments or actually supply parts of sentences that were experimentally cut. Such hearers, however, have internalized an adult grammar of the language which enables them to generate models of what is being said. Hearers who are linguistically naive have no such grammar with which to generate their models of what is being said. The analysis by synthesis model of speech perception would predict that young children, for instance, find it more difficult than adults to perceive speech. If such is the case, one might expect children to first direct their attention to the more perceptually salient parts of utterances that require a minimum of auditory processing, and to use these "bright" parts of utterances as anchors for their perception and analysis of utterances. When the perception of such bright spots had become fairly well established and a matter of routine, children would move on to the next brightest parts of utterances and begin analyzing them.

My own findings indicate that children follow a similar pattern in their production of speech, i.e. they first produce those parts of utterances with the greatest degree of perceptual saliency and then move on to the parts with the next degree of perceptual saliency. One might predict that in environments where semantic understanding preceded

production, there would be few errors in grammatical morpheme usage, even though the morphemes were being supplied in only a small percentage of their obligatory environments. The person markers in Quiche and the progressive marker in English (Brown 1973) are relevant examples. Where semantic understanding lags behind the production of a particular morpheme, one could expect the morpheme to be overgeneralized to inappropriate environments as was the case with the Quiche possessive allomorphs /nu-/ and /in-/ and the past tense of irregular verbs in English. However, the the time at which a particular linguistic feature appears in children's speech is first of all dependent upon the perceptual saliency of the feature and not semantic or syntactic complexity. It may not be an accident after all that the prominent phonological features of human languages also encode the major semantic roles.

References

Blasdell, R. and Jensen, P. 1970. "Stress and word position as determinants of imitation in first-language learners." Journ l of Speech and Hearing Research 13:193-202.

Brown, R. 1973. A First Language. Cambridge, Mass.: Harvard University Press.

Cazden, C. 1968. "The acquisition of noun and verb inflections." Child Development 39:433-48.

Eimas, P. 1974. "Linguistic processing of speech by young infants." In R. Schiefelbusch and L. Lloyd (eds.) Language Perspectives. Baltimore: University Park Press.

Lipp, E. 1977. "The acquisition of Estonian inflections." Journal of Child Language 4:313-9.

Moerk, E. 1980. "Relationships between parental input frequencies and children's language acquisition." Journal of Child Language 7:105-18.

Ruke-Dravina, V. 1973. "On the emergence of inflection in child language." In C. Ferguson and D. Slobin (eds.), Studies of Child Language Development. New York: Holt, Rinehart and Winston.

Simoes, M. and Stoel-Gammon, C. 1979. "The acquisition of inflections in Portuguese." Journal of Child Language 6:53-67.

Slobin, D. 1973. "Cognitive prerequisites for the development of grammar." In C. Ferguson and D. Slobin (eds.), Studies of child Language Development. New York: Holt, Rinehart and Winston.

Stevens, K. 1960. "Toward a model for speech recognition." Journal of the Acoustical Society of America 32:47-55.

Child Language Research Forum
12th annual meeting, March 1980
Handout

Person Marker Acquisition in Quiche Mayan

Clifton Pye (Pittsburgh)

(1) x- in- pée r- úuk' lee in- táat
asp-Abs1-come E_V3-with the E_C1-father
I came with my father.

x- in- u- tíi lee tz'i7
asp-Abs1-E_C3-bite the dog
The dog bit me.

(2) M: lee katijóh katcha7. 'You eat them say.'

Al Chaay (2;9): tóh. (c.f. lee k-Ø-a-tij-oh, those asp-Abs3-E_C2-eat-status)

M: jáwii kaloq' wíi liwáa katijóh katcha charéh
'Where do you buy the food you eat, say to him'

Al Chaay: loq' wih waa? (c.f. jawii k- Ø- a- loq'^wi lee i- waa)
Where asp-Abs3-E_C2-buy ^wi the E_C5-food
Proadv.

(3) ka- Ø-/ r- íil lee w- e/tz'a/b'á71
asp-Abs3-E_V3-see the E_V1- toy
She sees my toy.

x- Ø- qa-/tíij qa-/ri/kíil
asp-Abs3-E_C4- eat E_C4- food
We ate our food.

ka- Ø- u-/q'a/lúuj lee r- áal
asp-Abs3-E_C3- hold the E_V3-child
She holds her baby.

x- Ø- in-/k'áam w- úuk'
asp-Abs3-E_C1-bring E_V1-with
I brought it with me.

(4) A Carlos (3;0): wiloh. (c.f. k-Ø-a/w-ii/lóh, asp-Abs3-E_V2-see-status)

teloq. (c.f. ch-a/t-ee/l-óq, vol.-Abs2-leave-status)

(5)

	Verbs
Most salient:	E_V3, E_V4
Intermediate:	E_C1, E_C2, E_C3, E_C4 Abs1, Abs2, Abs4
Least salient:	E_V1, E_V2

(6) Possessives and relational nouns
E_V1, E_V3, E_V4
E_C1, E_C2, E_C3, E_C4

E_V2

(7)