

EXAMINING IMPOVERISHED INPUT: VIEWING THE CRITICAL PERIOD AS A PERIOD OF FORMALIZATION*

Jeffrey L. Bernath
University of Connecticut

1. Introduction

Examining cases of impoverished input can allow us to see into the tendencies of Universal Grammar in ways that regular acquisition often cannot. Children, who have some special kind of access to UG that adults lack, appear to have the ability to deviate from their input, and specifically formalize that input. In this paper I will propose that only children have the ability to formalize language into features and projections, and adults lack this ability. Below we will see evidence of children reorganizing inconsistent data, reliably outperforming their models in areas specifically associated with formal syntactic features.

2. Nativization as Formalization – Aspect in ASL

To begin we will examine a case study of a child formalizing his language. While linguists like Bickerton (1984) have certainly observed children organizing and in many cases restructuring inadequate input, I will be using the term formalizing to describe situation in which children are augmenting the formal features of their input, to create consistent patterns that were absent in their input. To make such a claim we will need to focus on individual acquisition, and for this I have chosen the case of Simon.

Simon is the pseudonym used by Singleton (1991) and Newport (1999) for a particular Deaf child of Deaf parents. This child is of particular interest as his parents were extremely late learners of ASL. English was their only language for the first 20 years of their lives, and only later did they discover ASL and begin to use it as their primary mode of communication, between each other and with Simon. Singleton asserts that Simon did not have any access to ASL apart from his parents. He went to a school that did not use ASL, and none of his other classmates had Deaf parents. Because Simon only had access to ASL from his non-native parents, he is in many ways like a creolizing child. His parents' use of ASL was rule-based but imperfect, and he was faced with input very similar to children in a pidgin-speaking community.

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Newport (1999) examined Simon and his parents in their use of ASL number and aspectual morphology. ASL morphology can become somewhat cumbersome in this domain, as the language contains dozens of aspectual morphemes, and can inflect for single, dual, multiple, and exhaustive numbers (Klima & Bellugi 1979). Both kinds of inflection include a change in the movement of the sign, and multiple inflections can overlap to create complex movements that are difficult to master for the non-native. A small sample of a verb inflected in various ways is shown in figure 1.

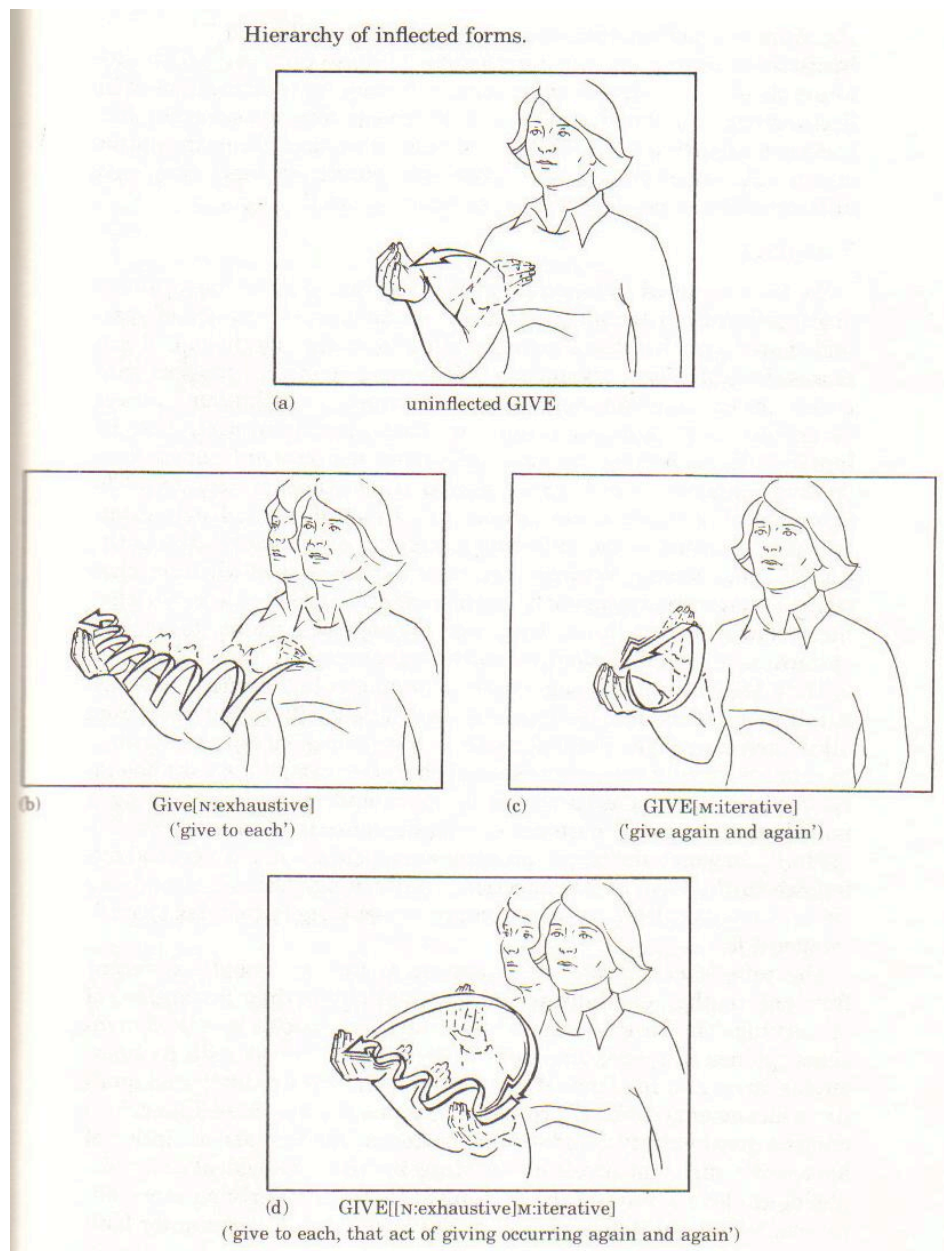


Figure 1. Examples of the ASL sign GIVE (a) uninflected, (b) with a number marking, (c) with an aspect marking, and (d) with both. (Reprinted from Klima & Bellugi 1979.)

Simon’s parents’ use of ASL aspectual and number inflection was rather poor. While they performed reasonably well at adding a single inflection to a verb stem, they failed rather

dramatically at combining two such morphemes on to a single stem. In such cases Simon's mother added inflections to the verb correctly only 25% of the time, while his father never did, and both preferred periphrastic strategies to express the relevant concepts. However, on the same task Simon added two inflections to the verb stem correctly **100%** of the time. He did not mimic his parents' periphrastic strategies, nor their limit of one bound morpheme per verb stem. Singleton (1989) pointed out that a very similar pattern was observed by Muhlhauser (1980) for Tok Pisin; in this case, pidgin-speakers (adults) were limited to a single inflectional morpheme per verb stem, while creole speakers (children) use any number of morphemes quite productively, as Simon did.

Under my hypothesis of formalization, Simon's parents, as extremely late learners of ASL, were not able to integrate ASL number and aspect morphology into their syntax as formal features or structure. They were forced to co-opt some other (non-linguistic) mechanism to inflect their verbs, perhaps other cognitive modules, or a strategy of memorization of each inflected form they were exposed to. Simon, however, as a natively exposed child, not only had the ability to formalize his language into formal features, but integrated the data into his grammar despite its high inconsistency. He was able to combine morphemes in a productive, native-like way. He not only has an ability to formalize the language that his parents lack, but was obliged to use it even in the face of other patterns.

3. Nativization as Formalization – Agreement in NSL

Nicaraguan Sign Language (NSL) began with the opening of a school for the Deaf in Managua, which brought together a critical mass of Deaf people for the first time in Nicaragua. Although the school there did not advocate the use of sign language, the community of Deaf people there quickly began communicating manually, and over the decades this has been recognized as a true situation of language genesis by Anne Senghas and her colleagues (Senghas 2003; Kegl, Senghas & Coppola 1999).

Senghas tested several Deaf users of NSL that had entered the school in different years. In this way, she is able to track the progress of the language as older language users have transmitted it to younger users. This could be seen as another type of creolization situation, however there is no target or superstrate language in this case; it could be said that the evolution of NSL is driven strictly by innate linguistic constraints. Either way, it can be seen as an ideal case for us to examine in our investigation of nativization as formalization.

In Senghas' study of verb agreement in NSL, she asked for grammaticality judgments from each signer about whether, in specific contexts, a verb is obliged to show agreement. In most developed sign languages there exists at least a subclass of verbs for which agreement is obligatory, suggesting that, for those classes of verbs, syntactic features are at work in the manner described for spoken language in the generative tradition (as in Chomsky 1995).

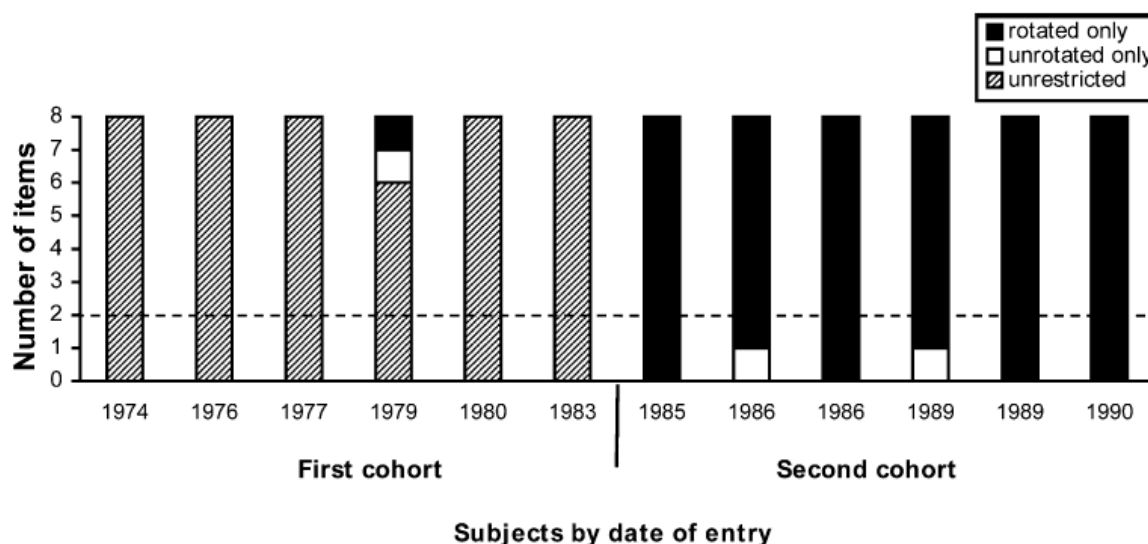


Figure 2. Results for the acceptability of inflected vs. uninflected verbs for NSL users. ‘Rotated’ here means inflected, ‘unrotated’ means uninflected. (Reprinted from Senghas 2003).

Figure 2 shows an interesting pattern with respect to which informants accepted verb agreement. All the informants in the first cohort (those entering the school before 1984) accepted either an inflected or uninflected verb in most situations. Being exposed to very early, rudimentary forms of the language, they perhaps did not have sufficiently regular input to produce agreement. However, informants from the second cohort (those entering the school after 1984) almost always required verbs to be inflected. This is interesting because members of the first cohort are older, and have been using the language longer than those in the second cohort. However it is the younger, second cohort signers that have a restriction which the older, first cohort signers lack. Those in the second cohort appear to have the additional requirement that verbs be inflected for person, despite the fact that we would not expect this to be consistently modeled in their input, which came from the first cohort.

If we assume that the members of the first cohort sometimes used agreement and sometimes lacked agreement, then we can come up with a nativization story just like the one used for Simon. It would seem that, while the input from the first cohort was inconsistent, it had hints of agreement, and the learners in the second cohort had sufficient input to develop a syntactic system that required agreement. Figure 3 shows that, in fact, the first cohort did sometimes use agreement, albeit inconsistently. That being the case, the second cohort had sufficient input to create a paradigm, and because they have been using this language from a young age, they were able to formalize this paradigm with syntactic features, which creates the necessity of agreement associated with such features. Interestingly, the older first cohort signers are using their version of the language concurrently with this more complex version, yet have not changed with the times. This is because they are now older, and lack the mechanism to transform their agreement paradigm into syntactic features.

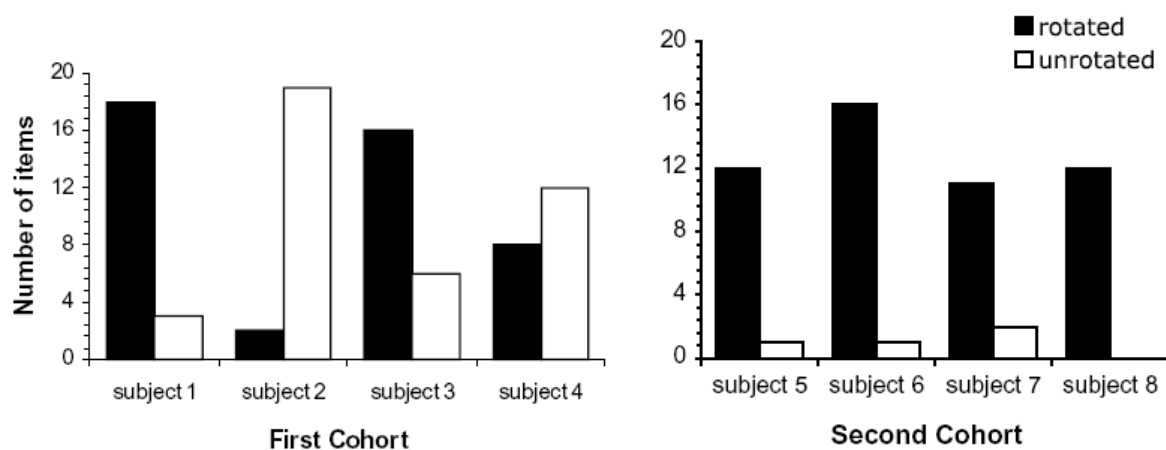


Figure 3. Elicited NSL verbs with or without inflection. ‘Rotated’ here means inflected, ‘unrotated’ means uninflected (reprinted from Senghas 2003).

4. Verb Types in ASL – Where Formalization is Unnecessary

Our final investigation of formalization comes from a case that is in many ways the opposite of the creolizing child. Below we will examine the acquisition of ASL verb agreement by late learners of the language, and we will see that they have trouble with formal features, but not other aspects of the language. We will examine their performance with respect to ASL verb agreement, which is of particular interest because formal features play different roles in different kinds of verbs.

4.1. The ASL Verb Agreement Paradigm

The paradigms involved in ASL verb agreement paint a large and complex picture, so we will examine the adult patterns before discussing acquisition. ASL, like many other sign languages, has a verb agreement paradigm that is divided into three groups (Sandler & Lillo-Martin 2006, Padden 1983).

- *Plain* verbs do not undergo any kind of regular agreement process.
- *Person-agreeing* verbs agree specifically with animate referents.
- *Spatially agreeing* verbs agree with loci in space, which may or may not be associated with animate referents.

I will not be discussing plain verbs in this paper, but rather will focus on the distinction between person-agreeing and spatially agreeing verbs. This distinction has not always been clear in the literature, as the process of agreement for the two types of verbs is phonologically very similar. In both cases, the beginning and/or end point of a verb is modulated so that it is associated with a specific point in space. Ambiguity arises because person-agreeing verbs show agreement with a referent by agreeing with a spatial locus that is associated with that referent, while spatially agreeing verbs agree directly with a spatial locus.

Liddell (2003) perhaps made this distinction in the clearest manner. Rather than using features like person and number, which are common in spoken language agreement processes, verbs in ASL either agree with specific, unique, animate referents (for person-agreeing verbs), or directly with semantically relevant points in space (for spatially agreeing verbs), which are often co-indexed with other specific, unique entities. Liddell points out that, while person-agreeing verbs (and pronouns) in ASL might seem to be undergoing agreement with spatial loci, on an abstract level they are agreeing with specific referents, and only using space as a medium to express this idea. Spatially agreeing verbs are the only ones that agree directly with spatial loci.

An example of Liddell's will be illustrative in distinguishing between agreement with a spatial locus, and person agreement. If my friend has a box of mine, and asks where I would like the box to be put, I can answer in different ways. If I respond, "on the lawn," then my friend accesses her abstract representation of the lawn and can choose any place within that space to place the box. This is analogous to the case of the person-agreeing verb; an abstract referent is referred to in both cases, and it is merely a phonological accident that it looks like spatial agreement in ASL. However, if I respond to my friend by pointing to a specific place on the lawn, my friend can refer to the spatial locus I indicated in deciding where to place the box. This is like a spatially agreeing verb, where a specific spatial locus is referred to, and whatever abstract entity the locus refers to can be seen as irrelevant for communication. The reader can see here that, while all referents we make mention of exist at particular points in space, and it may even be those points in space that we use to refer to them, we can make the distinction between referring to spatial loci and the entities that occupy them

The distinction between referents and spatial loci is directly observable across the two ASL verbs types in question. In much the same way that the pointing gesture in the example above makes a finer spatial distinction than words, spatially agreeing verbs also make finer spatial distinctions compared to person-agreeing verbs. Figure 4 contrasts agreement with multiple objects for a person-agreeing verb (GIVE) and a spatially agreeing verb (PUT). While smaller changes in location do not change meaning for person-agreeing verbs (as the gloss shows), specific changes of spatial loci are meaningful for spatially agreeing verbs.

What I take this asymmetry to reflect is the fact that spatial verbs are, in the case of their agreement process, regulated by the gestural component of the mind in a way that person-agreeing verbs are not (Berk 2003). While both verb types, and indeed the entire language, exists in space to some degree, spatially agreeing verbs need to refer to that space directly in order to agree, as do other constructions like classifier predicates. Reference to real space is necessary for the kinds of agreement used with spatially agreeing verbs, like the kind of agreement seen in figure 4, and while we label this as agreement, the mechanism behind it is not syntactic in nature. Person-agreeing verbs, on the other hand, refer to abstract referents rather than actual space, and as such are not mediated by the gestural component in this way. I will be assuming that person-agreeing verbs agree in the usual syntactic manner, through features and movement, in the tradition of Chomsky (1995) and others.

There is some evidence for this particular division between spatially agreeing and person-agreeing verbs. Lillo-Martin (1991), in her investigation of null arguments in ASL, found that person-agreeing verbs, and not other verb types, licensed Italian-type argument drop, commonly called *pro-drop*. This pattern of argument drop is of the type associated with, and licensed by, rich overt agreement, and is not available for those verbs in the language which lack agreement. While this supports the idea that person-agreeing verbs are operating with formal features in the usual way, we unfortunately do not have information on spatially agreeing verbs, as Lillo-Martin excluded them from her analysis. While more research is needed in this area, the current evidence is in line with the division we will use here.

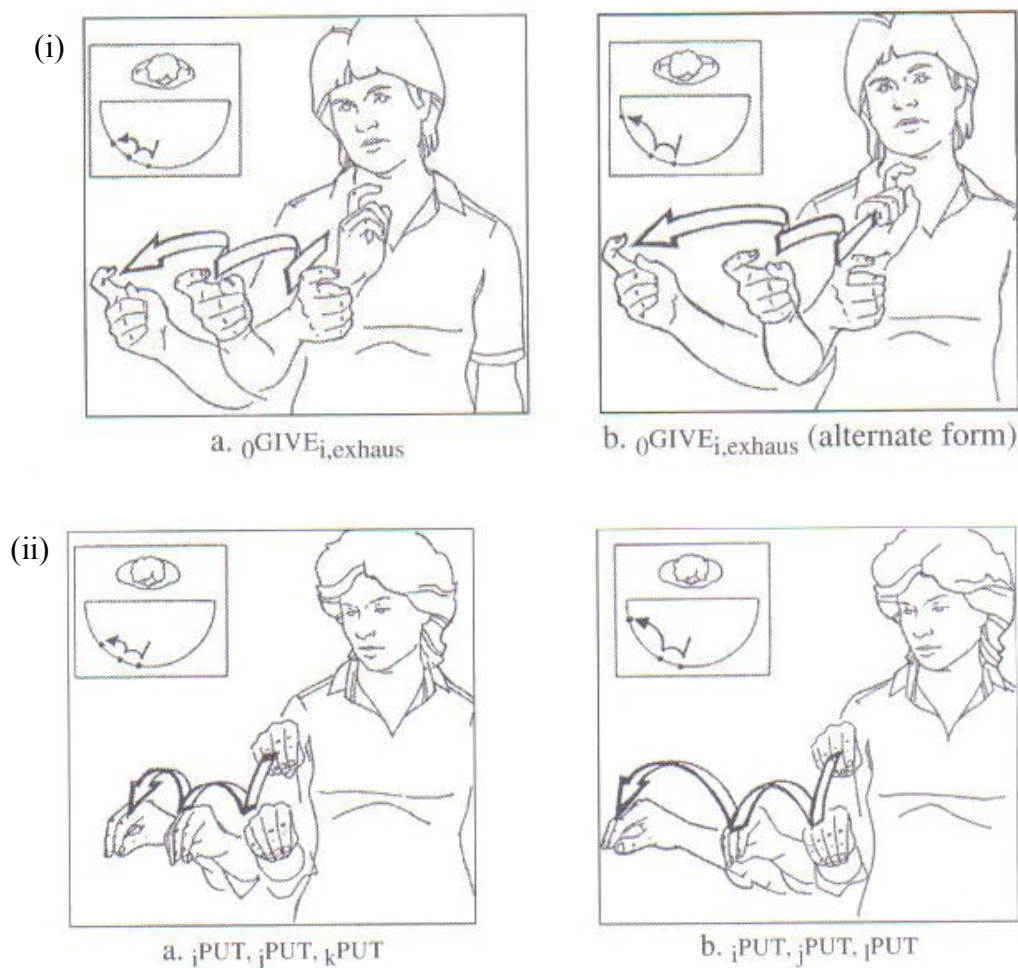


Figure 4. (i) GIVE, a person-agreeing verb, conveys the same exhaustive meaning in (a) and (b). Both mean “give to each person.” (ii) PUT, a spatially agreeing verb, conveys different meanings in (a) and (b). In particular, (a) means “put three objects in a row at equal distances from each other,” and (b) means “place two objects close together and one further away.” (Reprinted from Padden 1983).

Given the division between person-agreeing and spatially agreeing verbs as we have outlined it, we can look for the effects of the use of formal features in acquisition. We have seen above that the active organization of formal features is something that is unique to

children, and as such they should be able to use person-agreeing verbs in a way late learners cannot. Spatial verbs, however, being mediated by the gestural component for their agreement processes, should pose no problem to adults (assuming they have the same kind of access to this non-linguistic module).

4.2. How Late Learners Manage with ASL Agreement

Berk (2003), in her dissertation, examined the ASL acquisition of two Deaf children, called CAL and MEI, who were first exposed to ASL at ages 5;9 and 6;1, respectively. These children had not been exposed to regular linguistic input before those ages, but at that time were completely immersed in an ASL environment. Berk hypothesized that the delay of input to these children would have an effect on their verb agreement systems, and her hypothesis was borne out.

Berk observed CAL and MEI, as well as a native signer, JIL, in a naturalistic setting for some months to study their use of verb agreement. She examined each of their uses of plain, spatially agreeing, and person-agreeing verbs, and paid particular attention to where the children made agreement errors. The native signer, JIL, showed almost no errors in verb use and inflection, as expected (see figure 5a). She had no trouble with the gestural elements of spatially agreeing verbs, nor with the formal features of person-agreeing verbs, being exposed to the language from birth. CAL and MEI, however, showed a particular error rate, which was itself very regular. In particular, they almost always made some error when producing a person-agreeing verb, but erred rarely with plain or spatial verbs (see figure 5b-c). While the gestural component of spatial verbs posed no problem for these late learners, verbs which required the manipulation and expression of formal syntactic features were a problem for them. In addition, this error pattern did not decrease over time.

It should also be noted that Berk found that all three children attempted similar proportions of the verb types; that is to say, there was no difference between the children as to their preference for one type of verb over another. Each child used person-agreeing verbs a little more than half the time, and plain verbs less than 15% of the time. Their congruence on this measure shows that elevated error rates in one category or another would not be reasonably attributable to avoidance or preference for that category.

Person-agreeing verbs are most clearly set apart from plain and spatial verbs by the fact that person-agreeing verbs involve the overt realization of formal syntactic features. Plain verbs do not require the same amount of morphological synthesis, and spatial verbs have the benefit of being mediated through a non-linguistic component. If we assume that the ability to manipulate formal features within one's language is only held by the youngest language learners, then this result is expected and explained.

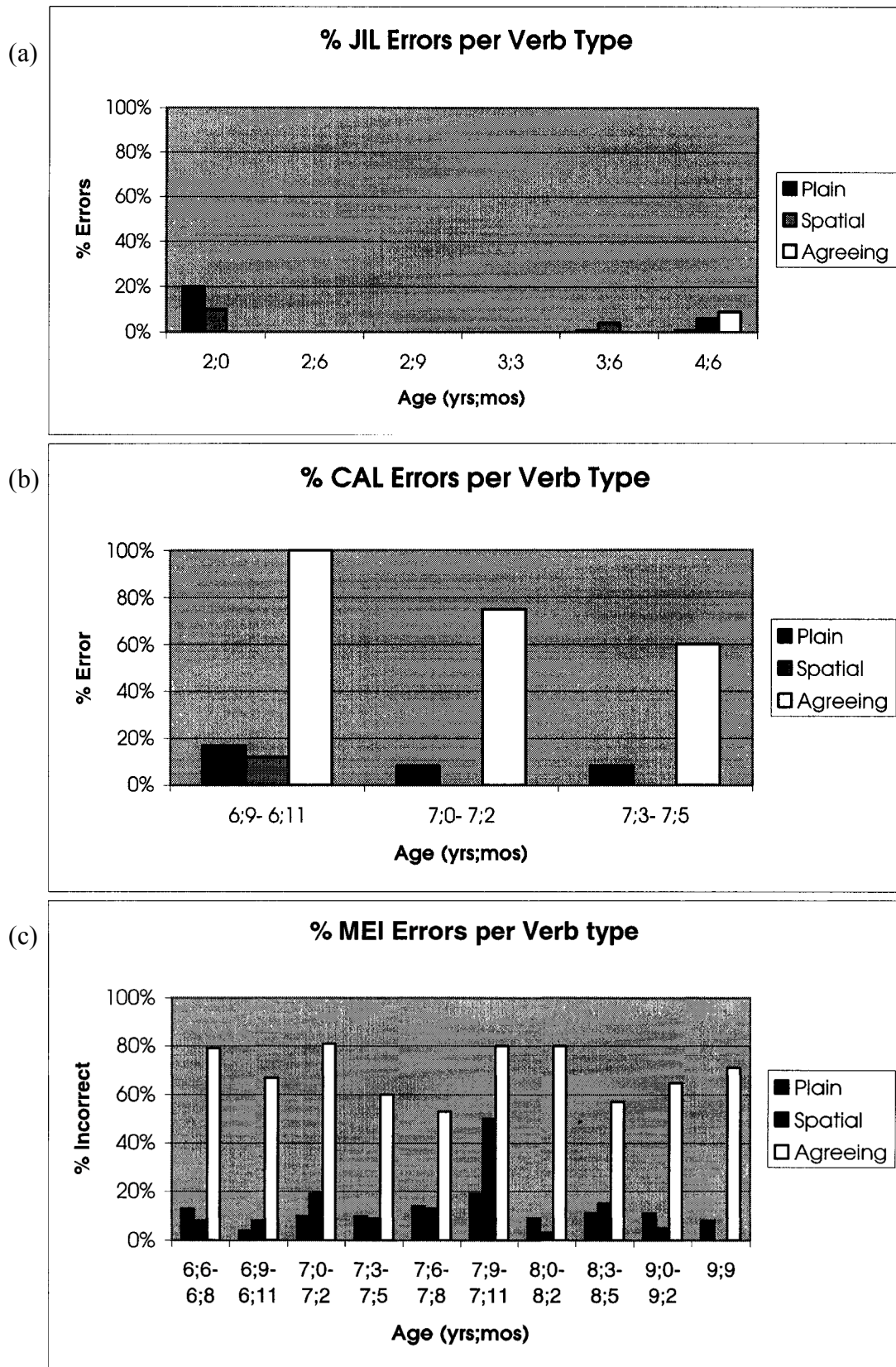


Figure 3. Berk’s subjects’ errors by verb types. JIL (a), a native signer with Deaf parents, produced almost no errors. CAL (b) and MEI (c), late learners, produced many errors with person-agreeing verbs (called “agreeing” by Berk), but not with plain or spatial verbs. (Reprinted from Berk 2003).

5. Conclusions and Future Directions

We have seen here that person agreement and other features of verbal inflection are not merely morphological reflexes of syntactic processes. Universal Grammar has a bias toward their use, which is reflected in children's acquisition of language and their penchant for formalizing language. Other logical options exist, such as stripping out agreement processes from the language when they are imperfect. However, given sufficient exposure to partial or degraded agreement paradigms, children seem to reorganize and even add to their input and produce a language that has true agreement.

However, the behavior of the children in Berk's (2003) study shows us that such reorganization is restricted to the proficient, child language learner. It is critical that input be present at this stage, whatever its form. It seems ironic that, at the youngest ages children obligingly restructure their input, such as in the cases of Simon and NSL, while afterward children like MEI and CAL cannot even copy the language around them accurately. Their use of the linguistic system is limited, and may depend in a large way on other mechanisms like the gestural component.

Of course, many unanswered questions remain in this domain. The most glaring is the question about the nature of the gestural component, and how it interacts with the linguistic module. Linguistic forms that are grounded in real space, such as classifier predicates and spatially agreeing verbs, necessitate some kind of link between a gestural/spatial component and language. However the nature of the relationship between this component and other aspects of linguistic competence remains unclear. In a similar vein, we may ask the question, what other mechanisms does the late learner use, and in what fashion, to produce some correct agreement forms in the midst of her errors? While we often focus on the shortcomings of non-natives, we need to remember that in nearly all cases, they are not wholly incompetent. MEI and CAL, for example, still produced correct agreement forms about 20% of the time. But if they lack formal organization necessary for such structures, how do these utterances surface? This is a question not only for the field of verb agreement in ASL, but for any linguist that attempts to explain the nature of non-native output.

A final issue relates to the observed proclivity of young language learners to regularize their input, and even enhance paradigms that were incomplete (as in the case of Simon and NSL). This idea predicts that languages should not lose their agreement patterns, despite the fact that this is a process that does occur over time. While this is an issue, a positive aspect is that we do predict upkeep of weaker agreement patterns. While many people learning English as a second language could find it a wonder that English actively maintains the lone third person singular *-s* morpheme, UG's penchant for agreement would predict its maintenance. (Indeed, when the language is used by a large amount of non-native speakers, such as pidgin speakers, this morpheme is the first thing to go. It can do so because these adult users do not have the same ear for agreement that children seem to have.) However, the proposal in this paper does not predict that an agreement paradigm should so weaken in the first place.

Perhaps at least this final issue can be twisted into a positive. Work on diachronic changes in agreement, launched largely by Givón (1976), has shown that languages will both build up and tear down their agreement paradigms over time. If we are trying to explain why both kinds of changes occur, then this paper gives us half of the explanation. We know that children will build agreement up, given the opportunity, as part of a larger formalization mechanism. This mechanism operates, even in the face of contrary input, to maintain language as the ordered entity linguists know it to be. As for why an agreement paradigm might atrophy over time, that is a problem I will generously donate to my colleagues.

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