



Gesture and intonation are “sister systems” of infant communication: Evidence from regression patterns of language development



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ARTICLE INFO

Article history:

Received 20 June 2016

Received in revised form 5 October 2016

Accepted 15 October 2016

Keywords:

Infant development

Prelinguistic communication

Pragmatics

Gestures

Intonation

ABSTRACT

This study investigates infants' transition from nonverbal to verbal communication using evidence from regression patterns. As an example of regressions, prelinguistic infants learning American Sign Language (ASL) use pointing gestures to communicate. At the onset of single signs, however, these gestures disappear. Petitto (1987) attributed the regression to the children's discovery that pointing has two functions, namely, deixis and linguistic pronouns. The 1:2 relation (1 form, 2 functions) violates the simple 1:1 pattern that infants are believed to expect. This kind of conflict, Petitto argued, explains the regression. Based on the additional observation that the regression coincided with the boundary between prelinguistic and linguistic communication, Petitto concluded that the prelinguistic and linguistic periods are autonomous. The purpose of the present study was to evaluate the 1:1 model and to determine whether it explains a previously reported regression of intonation in English. Background research showed that gestures and intonation have different forms but the same pragmatic meanings, a 2:1 form–function pattern that plausibly precipitates the regression. The hypothesis of the study was that gestures and intonation are closely related. Moreover, because gestures and intonation change in the opposite direction, the negative correlation between them indicates a robust inverse relationship. To test this prediction, speech samples of 29 infants (8–16 months) were analyzed acoustically and compared to parent-report data on several verbal and gestural scales. In support of the hypothesis, gestures alone were inversely correlated with intonation. In addition, the regression model explains nonlinearities stemming from different form–function configurations. However, the results failed to support the claim that regressions linked to early words or signs reflect autonomy. The discussion ends with a focus on the special role of intonation in children's transition from “prelinguistic” communication to language.

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1. Introduction

This paper examines infants' communication development from 8 to 16 months. The age of approximately 12 months, when the first words appear, divides this 8-month period into the prelinguistic or nonverbal stage (before 12 months) and the linguistic or verbal stage (after 11 months). In the context of infant communication research, the terms “prelinguistic” or

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“nonverbal” refer to the visual-gestural modality and pragmatic functions. Conversely, the terms “linguistic” or “verbal” refer to the vocal-auditory modality and referential functions such as those encoded in nouns, verbs, etc. Thus, the transition from nonverbal communication to words involves changes from the gestural-visual to the vocal-auditory modality and from pragmatic to referential functions.

Of special interest in this study is intonation or the melody of speech, a system that does not fit neatly into the schema of descriptors discussed above (e.g., nonverbal versus verbal). For example, with respect to the vocal modality, intonation is linguistic or verbal; but with respect to functions, it is nonverbal. In sum, intonation is a “hybrid” system with properties of communication that is sometimes verbal and sometimes nonverbal. Accordingly, researchers have speculated that intonation acts as a bridge from gestures to words (e.g., Bruner, 1974/1975), but to date little is known about the role of intonation in this milestone event.

To address this issue, the present study analyzed patterns of regression that reflect cognitive-linguistic advances in the age range of interest in this research. I begin with a sketch of regression phenomena. This will serve as the background for a study of regressions in infants’ acquisition of intonation in English.

1.1. Regressions in language development

Regressions are partial or complete losses of previously controlled skills. Temporary periods of decline are followed by an apparent reorganization and a return to pre-regression levels of mastery (Snow, 2006). A canonical example was documented by Petitto (1987) in a study of pointing gestures in two infants learning American Sign Language (ASL). At 10 months, the children used pointing gestures to designate the location of people and objects (deixis) just as hearing children do at the same age. However, at 12 months pointing to persons decreased markedly. For each of the two infants, during a three-to-six-month period between 12 and 18 months, pointing to persons dropped out completely while the children continued to point to objects or locations. Recovery from the regression occurred by 22 months when pointing to persons re-appeared as linguistic pronouns, e.g., the signed equivalents of *I* and *you*. The pronoun forms were adultlike except that the meanings were usually reversed (for an interesting discussion of this reversal pattern, see Clark, 1978). Finally, personal pronouns were produced correctly by 27 months.

How can we account for regressions of this type? To address this question, Petitto pointed out that the regression in ASL occurred when the children acquired a “new function” for an “old form” (Slobin, 1982, 1985). The old form – pointing gestures – served the deictic functions that are universal in prelinguistic communication. However, when the children were beginning to produce single signs, they arguably discovered a new function of pointing, namely to mark linguistic personal pronouns. At this juncture, one form (pointing) had two functions (deixis and personal pronouns), a violation of the 1:1 correspondence between forms and functions that children expect (Gleitman and Wanner, 1982; Slobin, 1982, 1985). To maintain the preferred 1:1 relationship, the children stopped pointing to persons until new and old forms and functions could be sorted out (Petitto, 1987).

Summarizing, regressions occur when two systems developing at the same time are closely related to one another. Deixis and pronoun reference in ASL, for example, are said to be related because they share the form of pointing. One of the related systems undergoes a sharp decline or disappearance, namely, personal pronouns, while the other (deixis) triggers the regression but continues to develop without discontinuity. Statistically, then, the regression is signaled by an inverse correlation between the two related systems of interest. Although deixis and pronouns are closely related variables during the regression, they move in different directions.

Among the broader implications for language acquisition, regressions reflect the child’s emerging awareness of a more complex sophisticated grammar than the simple 1:1 model suggests. For this reason, regressions signal significant advances in the child’s development of language. As Vihman (1993, p. 418) succinctly expressed this conclusion: “Nonlinearity or ‘regression’ in production accuracy marks emergent organization.”

1.1.1. The 2:1 pattern

The regression in ASL was precipitated by a 1:2 form–function pattern. The 2:1 pattern has also been reported (two forms having the same function). An example in English is the well-known study of the development of past tense morphology in English described by Slobin (1982, 1985). In early stages of acquisition, infants and toddlers often acquire several irregular forms like *went* and *broke* – past tense forms which are presumably memorized like other lexical items. At a later stage, when the regular *-ed* rule is acquired (*danced*, *jumped*, *played*), many children overgeneralize the *-ed* suffix to irregular forms that they had previously produced correctly, for example, *went* and *broke* are replaced by *goed* and *brokeed*. After age four, children gradually sort out correctly the regular and irregular forms.

Slobin attributed such patterns to an interaction between old and new forms and functions. Children acquired a “new form” (*-ed*) for an old function (past tense marking). In Petitto’s model, this pattern would correspond to a 2:1 relation between forms and functions (2 forms, 1 function). To maintain the preferred regularity of one form for one function, the old forms (irregular verbs) are suppressed until the new and old forms and functions can be sorted out and reorganized. This is the same kind of model that Petitto posited in her study of the 1:2 pattern in ASL.

However, the 2:1 pattern is controversial because it seems different from its 1:2 counterpart. To a greater extent than the 1:2 pattern, the 2:1 case may entail a redundancy in which, for example, the meaning of past time has a dual representation in the input. As a result of the redundancy, the meaning can be accessed via either one of two channels. If infants benefit from

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