

## Vocal Congruence in Mother–Infant Play

Beatrice Beebe,<sup>1</sup> Diane Alson,<sup>1</sup> Joseph Jaffe,<sup>2</sup> Stanley Feldstein,<sup>3</sup>  
and Cynthia Crown<sup>3</sup>

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*Turn-taking is the fundamental temporal structure of adult dialogue. This structure defines two types of joint silence: intrapersonal pause (silence bounded by the vocalizations of a single speaker) and switching pause (silence bounded by the vocalizations of different speakers). Switching pauses mark the boundaries of the turn exchange. In adult conversation the mean durations of both types of pause are characteristically matched between partners. This matching, termed "vocal congruence," occurs developmentally earlier in the case of switching pauses. We hypothesized and confirmed that mothers and infants match switching pauses but not intrapersonal pauses at 4 months, even though the infants' vocalizations are prelinguistic. Second, since there are known affective correlates of vocal congruence in adult conversation, we hypothesized a similar affective correlate for mother–infant vocal congruence. We found, for the intrapersonal pause only, that the degree of matching within a dyad correlates with infant affective engagement. We conclude, from switching pause congruence, that a turn-taking dialogic structure is being regulated in the mother–infant pair at 4 months in the same way as seen in adult conversation. Thus, both the temporal structure of adult dialogue and its affective correlate are prelinguistic.*

Partners in adult conversation tend to match certain timing parameters of their speech (Jaffe & Feldstein, 1970). This phenomenon has been termed *vocal congruence*. To the extent that this matching occurs, the partners rate each other as warm and similar (Welkowitz & Kuc, 1973; see Feldstein & Welkowitz, 1978, for a review). We now document that

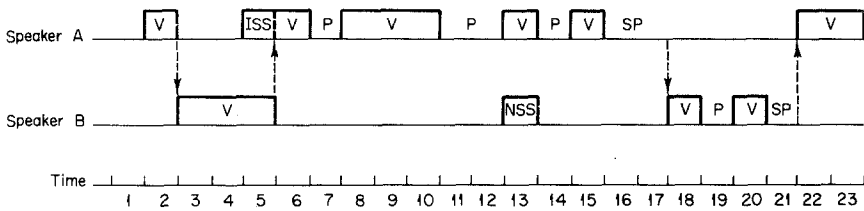
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<sup>1</sup>Ferkauf Graduate School of Psychology, Yeshiva University, 1300 Morris Park, Bronx, N.Y. 10461.

<sup>2</sup>New York State Psychiatric Institute and Columbia University.

<sup>3</sup>University of Maryland Baltimore County.



**Fig. 1.** A diagrammatic representation of a conversational sequence. The numbered line at the bottom represents time in 300-msec units. Thus, the duration of the segment is 6.9 seconds. V stands for vocalization, P for pause, and SP for switching pause (the silence that frequently occurs immediately prior to a change in the speaking turn). The arrows that point down denote the end of speaker A's turns; the arrows that point up denote the end of speaker B's turns. ISS and NSS stand for interruptive and noninterruptive simultaneous speech, respectively. (Adapted from Jaffe and Feldstein, 1970).

mothers and infants, when engaged in social play at 4 months, match the temporal patterns of their vocal exchange in a manner similar to that observed in adult conversation; furthermore, this matching has an affective correlate analogous to that observed in adult conversation. The theoretical importance of the prelinguistic appearance of adultlike patterns of communication will be discussed.

We used the Jaffe and Feldstein model (1970), which classifies the sound-silence patterns of a conversation in terms of five parameters: speaking turns, vocalizations, intrapersonal pauses, switching pauses, and simultaneous speech. The first four parameters are relevant to this study.

These parameters are illustrated in Figure 1. Turn-taking is the fundamental temporal structure of adult dialogue, in which speaker and listener exchange roles. In this model, when a speaker utters a unilateral sound, he gains the turn and retains it until his partner utters a unilateral sound, at which moment the turn is switched. Thus, the duration of a turn is the time between speaker switches. A *vocalization* is a segment of uninterrupted sound (speech) uttered by the speaker who has the turn.

The turn-taking structure defines two types of joint silence: *interpersonal pauses*, which are joint silences bounded by the vocalization of the same speaker, and *switching pauses*, which are joint silences bounded by the vocalization of different speakers, i.e., terminated by a speaker switch. The switching pause is assigned to the speaker who loses the turn.

Although the vocalizations of 4-month infants are prelinguistic, the rhythm of the vocal interactions between mothers and infants of this age