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ABSTRACT

This paper questions social interaction studies that use frequency or duration of behaviors in mother-infant relations as reliable measures of infant interactive competence. An infant's high score on frequency and duration tests may falsely indicate that the child is more communicative than other subjects. Such results may suggest that mother and child actually influence each other's behavior and consequently produce deceptively inflated scores. A methodological solution to this problem of mutual influence is proposed and the results of a study on the interactions of mothers and handicapped infants are used to illustrate the utility of this solution. In order to understand the relative influence of each actor in a social situation, it was deemed important to define and measure the stable, intrinsic characteristics each actor brings to the interaction. These "variables of independent influence" were measured by methods that prevented the immediate influence of the nontarget actor. Measures of independent influence were used to define how the degree of infant handicap influenced the frequency with which mothers of handicapped infants said their infants communicated. Researchers found that severely handicapped infants exhibited fewer communicative behaviors than their mothers supposed, indicating that mothers were predisposed to mistake pre-linguistic infant behaviors for communication, thus compensating for the scarcity of infant communication. (DR)

Determining the Relative Influence of Mothers and Infants on Various Aspects of Their Interactions: A Methodological Solution to the Problem of Mutual Influence

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Determining the Relative Influence of Mothers and Infants on Various Aspects of Their Interactions: A Methodological Solution to the Problem of Mutual Influence

My purpose in presenting to you today is threefold. (a) I want to describe the problem that mutual influence of actors may pose for some social interaction research designs. By mutual influence I mean that actors in an interaction, e.g. mother and infant, influence the frequency and duration of behaviors during that interaction. It is a problem when we try to use the frequency or duration of free-play behavior as an index of some characteristic that is intrinsic to one of the actors. The mutual influence highlights the fact that target actors are not solely responsible for the frequency and duration of their interactive behavior. (b) Second, I want to define the characteristics of one methodological solution to this problem. (c) And third, I'll present a portion of a recently completed project to illustrate the utility of such a "solution". It's use helped to clarify how mothers and handicapped infants influence one aspect of mother-child interaction.

First, I'll describe the problem mutual influence may pose for some social interaction designs. Let's say a child has a high score on a frequency or duration measure that was taken from a free-play session. The high score does not necessarily indicate that the child is more adept than the rest of the group. In addition to the child's ability level, the mother also influences the frequency and duration of behaviors. This confound is what I'm referring to here as the problem of mutual influence of actors.

As an example of a misguided design to address such a question, let's say we want to know which actor, mother or infant, is primarily responsible

for why some mothers and babies have longer mutual play episodes. All measures in this example are frequency counts taken from the same free-play session. Unfortunately a stronger correlation of, say, maternal responsiveness with mutual play does not tell us that the mother is primarily responsible for why some mothers and infants have longer mutual play episodes. Maternal responsiveness is itself influenced by at least two factors. Certainly some mothers are predisposed to respond more frequently than other. But the frequency and type of infant communication also influences whether mothers respond. In fact any time we use such free-play measures, there are at least two influences on these scores.

Place Figure 1 about here.

As figure 1 illustrates high scorers may be predisposed to act the measured way. And the nontarget actor may have immediately influenced the actor to behave in the measured way. That is, the mutual influence of the infant on the mother may prevent a reasonable inference that the mother is solely responsible for her behavior. This is a complex issue. So its easy to understand why some researchers have used frequency or duration of behaviors during a free-play session as measures of "competence". For example, a recent study published in Child Development used frequency of infant initiating or responding during social interaction as measures of infant interactive competence (Crawley & Spiker, 1983).

In summary, we may get into trouble when addressing research questions that require an inference about some characteristic that is intrinsic to the actor (e.g. competence or a predisposition to act). This intrinsic

characteristic may be confounded with the mutual influence of actors if that characteristic is measured in the social interaction context.

We've just discussed how mutual influence may be a problem. Now I'll describe one solution to this problem. If we are to understand the relative influence of each actor, it is important to measure what the actors bring to the interaction. I call these types of variables measures of independent influence. Variables of independent influence are relatively stable charateristics of an individual that influence social interaction.

These variables should be measured using a method that prevents the immediate influence of the nontarget actor. This can be done by (a) measuring the variable in the absence of the nontarget actor, (b) assessing the variable using a standard presentation and stimuli so that differences in scores will be due to differences within the target actor, and (c) assessing a variable that is theoretically related to the aspect of mother-infant interaction of interest.

Data from a recently completed research project illustrates the use of two measures of independent influence. Their use helped to understand how degree of infant handicap influences the frequency with which mothers of handicapped infants say their infants communicate.

The literature indicates that it is the mother who defines what infant behaviors are communicative in early pre-linguisitic interactions. Some theorists have suggested that mothers of handicapped infants are less likely to identify their infants' signals as communicative. Interestingly, we found that even mothers of severely handicapped babies said their babies communicate relatively frequently.

Why do some mothers of handicapped infants say their babies communicate

more than others?

Place Figure 2 about here.

This model is presented to organize our hypotheses for the presentation. It is not posed as a complete model for explaining why some mothers interpreted their babies' signals more than other do other mothers. The pluses and minuses indicate whether the predicted relation was positive or whether no direction was predicted.

1. We predicted that severely handicapped infants would exhibit fewer behaviors that we defined as communicative.
2. The "man-on-the-street" explanation for why mothers differ on the frequency with which they say their babies communicate is that some babies DO communicate more frequently and that mothers' judgments accurately reflect this difference. Therefore, we predicted that the infants who had the most coder-identified infant cues would also have the most mother-identified cues during the same free-play session. This hypothesis implies that infant differences seen during the free-play are sufficient to explain variance in the frequency of maternal attributions of communication.
3. However, given that our earlier results that even mothers of severely handicapped infants said their babies communicated frequently, we predicted that some mothers would compensate for the paucity and subtletly of their infants' cues by interpreting cues that other mothers and coders would not interpret. To test this we needed to take a measure of the tendency to interpret pre-linguistic behaviors as

communicative, i.e. a measure that mothers brought to the interaction. This is an example of a measure of independent influence. To examine whether mothers adapted in the proposed manner three hypotheses were tested.

a. We thought that a history of interaction with a severely handicapped baby would affect the mothers predisposition to attribute. Therefore, we predicted a relation between degree of infant handicap and maternal predisposition to attribute.

b. We also predicted that mothers who were predisposed to attribute communication more freely would identify different types of cues than those mothers who are more conservative with their attributing.

c. Once we've controlled for influence of infant differences on the relative frequency of "coder-identified" infant communication, "free attributers" may identify more cues than do more conservative attributers.

I'll briefly describe how these five variables were measured. For more detail on measurement procedures see Yoder and Feagans (1986). First, trained coders applied a coding system to identify the occurrence and frequency of coder-identified infant communicative cues. Second, the mothers applied their own definition of "communication" in identifying when their children communicated during the same free-play session. Third, a two step process was used to measure the types of infant behaviors mothers identified as communicative. (a) A coder located the videotaped segments that mothers had previously said contained a communicative cue on the free-play videotape. (b) The coder observed and recorded in a coded form what infant behaviors

occurred during these segments. Fourth, severity of infant handicap, one of the measures of independent influence, was assessed by a trained examiner using the Movement Assessment of Infants. This instrument involves a structured format and set of procedures to measure the neuromotor status of the child.

The most unusual variable, and one of the measures of independent influence, is the mothers' predisposition to attribute. To measure this we used a four step process.(a) One of our staff members used a semi-structured format to interact with a normally developing 12-month-old who was unfamiliar to the mothers.(b) We then selected 20 short scenes from this videotaped session to represent weak, moderate, and strong infant communicative signals. (c) A random sequence of these 20 scenes were shown to all mothers as stimuli for the mothers to rate. (d) Mothers rated on a 6 point scale how strongly they felt the infant behavior was or was not communicative. The sum of the ratings on the 20 items served as an index of the mothers' predisposition to attribute communication to pre-linguistic infant behaviors.

The results of the study demonstrate that this novel measure of independent influence, maternal predisposition to attribute, helped to explain some initially confusing results. As predicted we did find that severely handicapped infants tended to exhibit fewer behaviors that we defined as communicative. (r = -.51, p < .05, 1-tailed). However, as mentioned earlier, some mothers of severely handicapped infants indicated that their infants communicated as frequently as did some mothers of less handicapped infants (r = 18).

When testing the relation of the number of coder-identified and the number of mother-identified cues, we found two subgroups. One group of

mothers indicated that their children communicated above 30 times (i.e. one or more standard deviations above the median). The other group indicated that their children communicated less than 30 times. What's more, the relation between the two variables of interest was different in the two subgroups.

Place Figure 3 about here.

Only in the larger subgroup were the infants with the most coder-identified cues were also the infants with most mother-identified cues. (r_s = .86, $p < .001$). In the small subgroup, the number of cues according to the researcher and the mothers was not related (r = .12). The inclusion of the maternal predisposition to attribute variable, i.e. a measure of independent influence, helps explain these complex results.

First, maternal predisposition helped to understand how these groups differ. The groups did not differ on two important infant characteristics: degree of infant handicap and number of coder-identified cues (unequal group t = 1.00, $p > .05$; unequal group t = -1.27, $p > .05$, respectively). However, the groups did differ with respect to two mother characteristics. The mothers in the small subgroup were predisposed to attribute more freely (M = 106.25, SD = 5.79) than were mothers in the large subgroup (M = 97.41, SD = 8.46; unequal t = 2.33, $p < .05$). Additionally, all mothers in the larger subgroup identified fewer cues in their own children than did coders. In contrast, the four mothers in the small subgroup all identified more cues than did the coders.

Second, maternal predisposition provided evidence that some mothers of handicapped children may compensate for the paucity and subtlety of their

infants' cues. This evidence is in the form of the next three set of findings.

The finding that some mothers attribute more than do coders may explain why there's no relation between degree of infant handicap and the number of mother-identified cues. To further support that this pattern is evidence of maternal compensation for the subtlety of their infants cues, we need evidence that some characteristic intrinsic to the mother relates the degree to which mothers identified more cues than did coder.

Place Figure 4 about here.

Figure 4 illustrates a regression of the difference score of mother-identified cues minus coder-identified cues on the mother's predisposition to attribute. The same subgroups show up. In the small subgroup, those mothers who were predisposed to attribute most freely identified proportionately more cues than did coders.(r = .94, p < .05, one-tailed). In contrast, the mothers predisposition to attribute in the large subgroup was not related to the discrepancy scores (r = -.19).

If these mothers compensated for the subtlety of their infants cues, mothers of severely handicapped children should be predisposed to attribute more freely than do mothers of less handicapped children because severely handicapped infants have fewer and more subtle cues (Yoder, 1986). This prediction was supported. Mothers of severely handicapped infants tended to be predisposed to attribute communication more freely to the 20 standard scenes of infant behavior (r = .59, p < .05).

If this more liberal predisposition to attribute affects how the mother

and infant interact, then mothers who were predisposed to attribute more freely should identify different types of cues than those who were more conservative in their attributions. This was so. After controlling for number of mother-identified cues, mothers who were predisposed to attribute more freely identified a greater proportion of cues in their own children that showed attention to mother and to toy, without the co-occurrence of an attention getting vocalization (partial $r = .28$, $p < .05$).

In conclusion, the influence of the nontarget actor may prevent the reasonable sole reliance on free-play frequency or duration variables to measure the relative influence of actors on some aspect of interaction. To measure the relative influence of actors, it is often beneficial to measure what the actors bring to the interaction. Such variables of independent influence are measured using a method that prevents the immediate influence of nontarget actor.

The present data illustrate the need and benefit of such a measure in explaining why even mothers of severely handicapped infants say their babies communicate relatively frequently. We saw that individual differences on coder-identified communicative infant behaviors (i.e. a free-play variable) was not sufficient to explain why some mothers of handicapped infants attributed relatively frequently. Only by including the maternal predisposition to attribute variable were we able to explain the presence of the subgroups and discover evidence that supports how the notion of maternal compensation for the scarcity and subtlety of infant pre-linguisitic communication.

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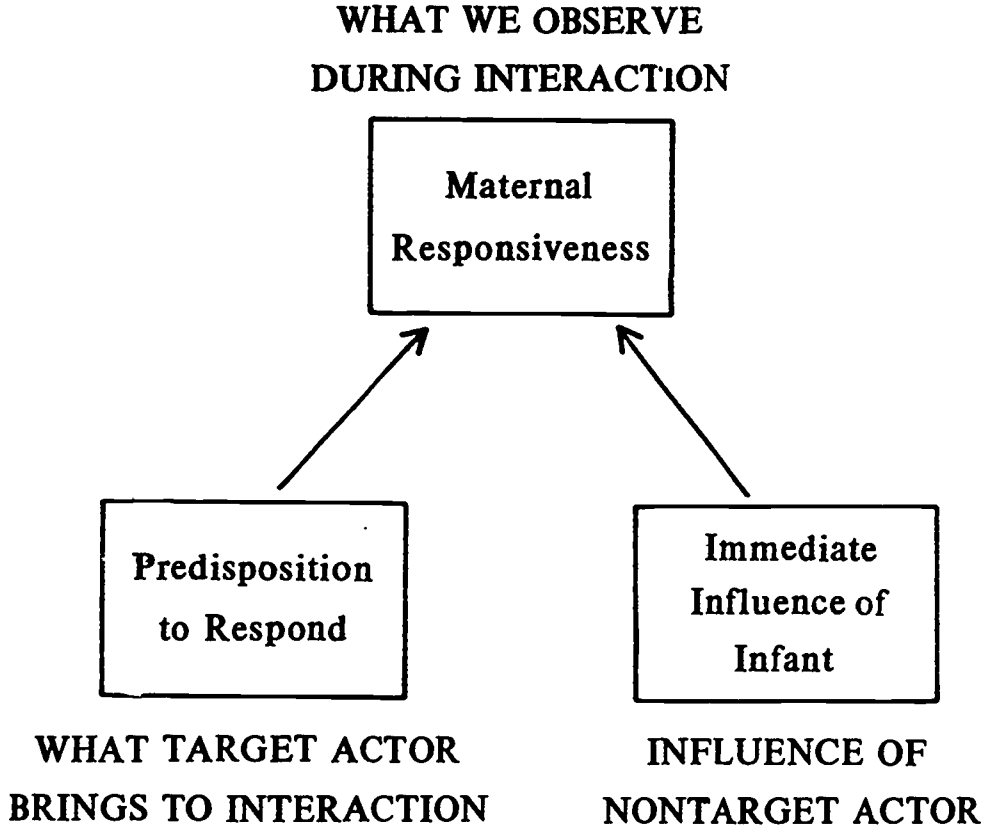
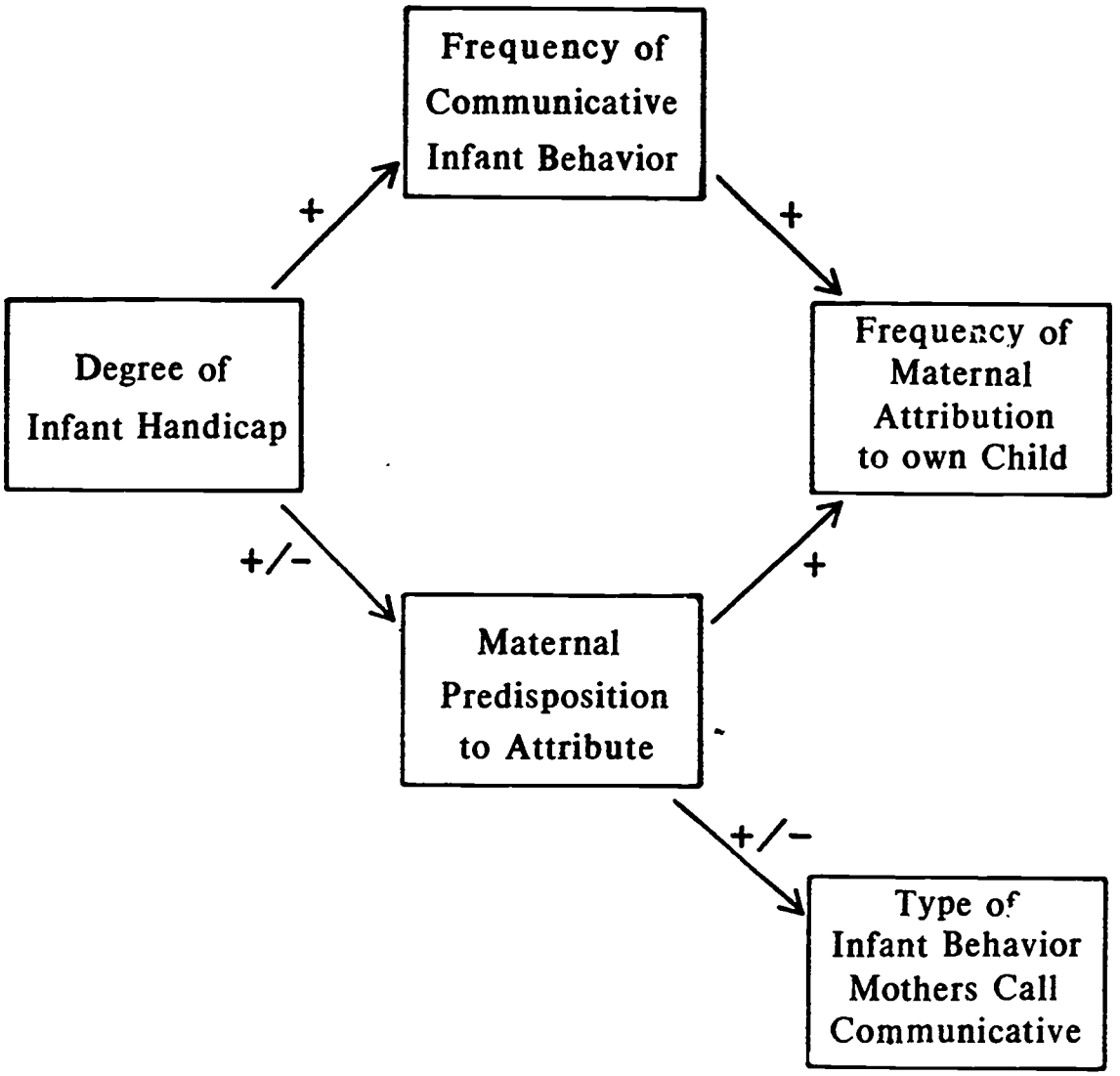
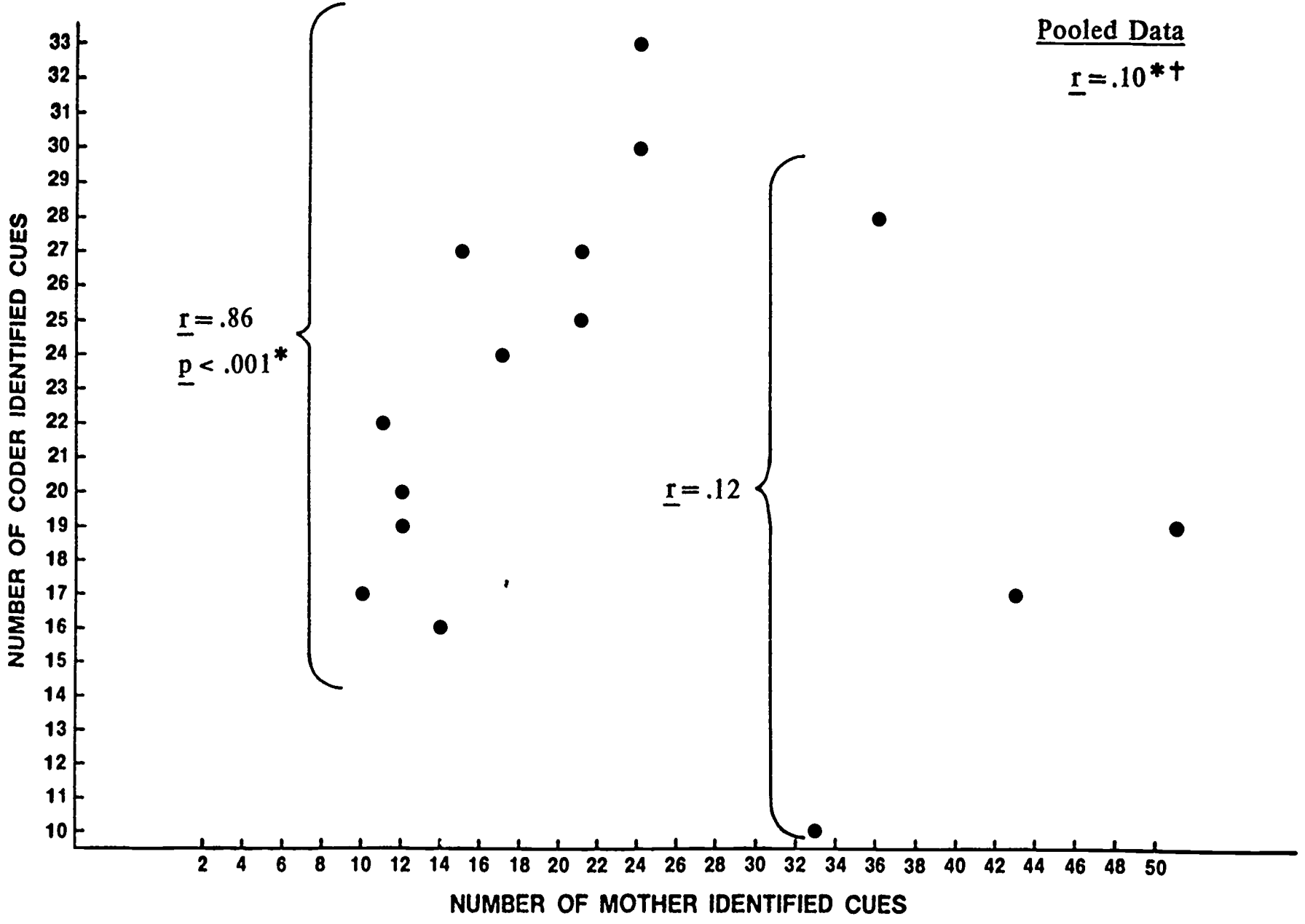
TWO INFLUENCES ON SOCIAL INTERACTION VARIABLES



PROPOSED MODEL OF HOW INFANT HANDICAP INFLUENCES MATERNAL ATTRIBUTIONS



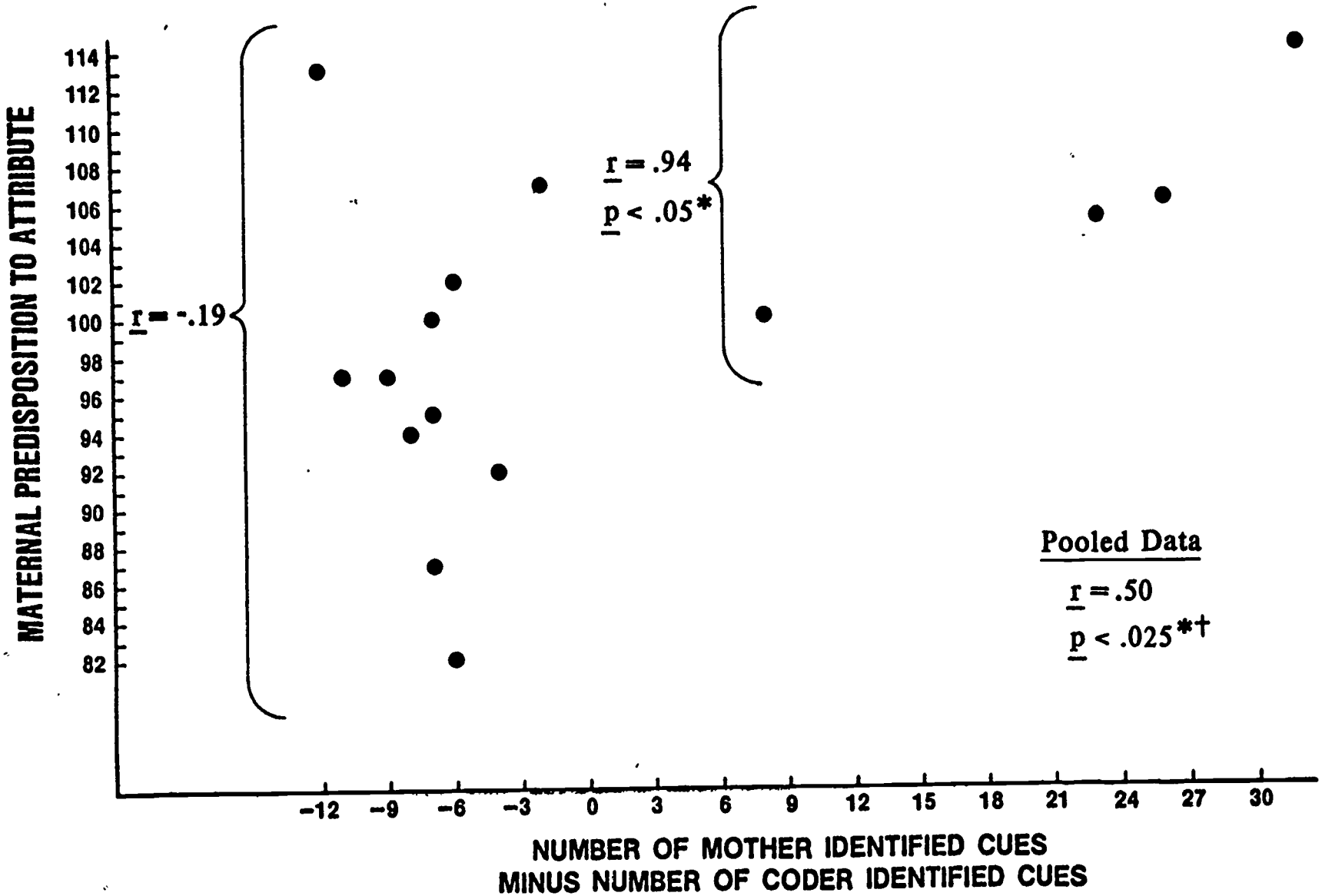
RELATION OF CODER- AND MOTHER-IDENTIFIED CUES IN POOLED + SUBGROUP DATA



* 1 tailed test

† Violation of homogeneity of residuals assumption

RELATION OF DISCREPANCY SCORE AND MATERNAL PREDISPOSITION TO ATTRIBUTE IN POOLED + SUBGROUP DATA



* 1 tailed test

† Violation of homogeneity of residuals assumption