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ABSTRACT

A study used a paradigm in which adults believed they were teaching a simple video game to an unseen child. In fact, the adults saw computer-generated responses that were modeled on actual child behavior. Subjects were 160 mothers, who were randomly assigned to view simulations of either responsive or unresponsive behavior. The simulations of responsive behavior showed steady improvement during the game, while simulations of unresponsive behavior involved random errors. The total number of errors was the same for both types of simulations. Adults could provide feedback by giving "happy" or "mad face" computer responses, half at any time during the game, and half at the end. Adults were videotaped during the experiment. Analysis of the tapes revealed that simulations of unresponsive behavior were viewed as reflecting low improvement or qualified improvement on the part of the children. Adults used more "mad face" responses and fewer "happy faces" with simulations of unresponsive behavior than with simulations of responsive behavior. Individual beliefs about parenting qualified responses: more negative responses came from parents with low perceived control as parents. Nine references and two charts are appended. (SAK)

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Computer Simulated Child Behavior as an Elicitor of Adult Reactions

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Continuing concern has been directed in the developmental literature to the varying ways in which adults interpret and respond to the behaviors of children (e.g., Goodnow, 1988). Strategies to determine the influences of child behavior or child characteristics on their own socialization have included a number of research strategies. Probably the most commonly used strategy has involved the use of sequential analysis or longitudinal analysis to assess reciprocal influences that occur over time between adults and children (e.g., Crockenberg, & McCluskey, 1986; Elder, Caspi, & Downey, 1986; Snyder & Patterson; 1986). But we have also seen an increase in the use of experimental strategies to determine the influences of child behavior or child characteristics on adult response pattern. Jack Bates was an early pioneer in assesing adult responses to the performance of child confederates (e.g., Bates & Pettit, 1981). In 1984, Bill Shennum and I conducted an investigation in which we trained or preselected 8 to 12 year old boys to behave in a responsive or unresponsive fashion with unrelated adults (Bugental & Shennum, 1984).

For even greater control, some investigators have simulated child responses and determined the reactions of adults. This method was first explored by the work of Mulhern and Passman (1978) and Vasta and Copitch (1982) who simulated child responses in a training situation and assessed adult use of reward and punishment. In the present investigation, we attempted to build on this earlier work by the use of computer simulation of responsive and unresponsive child behavior. Our ultimate goal in developing this methodology was to create an analog of dysfunctional caregiving systems. By creating an interactive system in the lab, it was possible to systematically vary apparent child responses to adult teaching efforts and then determine the differential reactions and responses of adults.

What I will be describing today is a computer-controlled paradigm in which adults engage in an interaction that nominally involves teaching a child a simple video game. Adults explain and demonstrate the correct ways of going through a maze displayed on their own computer screen and said to be displayed for a child at another location; they also provide feedback to the child concerning their performance. Adults see their own mouse-controlled line as they go through the maze, and they also see a second line that is supposedly produced by the child. In actuality, the child "behavior" seen reflects computer-generated displays of child performance (systematically varied to create the impression of a responsive or an unresponsive child). During "responsive" enactments, the child's progress through the maze becomes increasingly accurate (slower and more careful). During "unresponsive' enactments, the child's progress through the maze improves and then detiorates--giving the impression of willful disregard.

Procedures

In our first use of this paradigm, 160 mothers were brought into a laboratory setting with the stated intent of teaching a child a "computer game." Their goal was to give initial instructions verbally to the child, go through an initial game together with the child (without verbalization), provide verbal feedback to the child, and then go through a second game together with the child. Subjects were randomly assigned to interact with either "responsive" or "unresponsive" children. This experimental induction was instantiated as a function of the course of the child's movement through the maze in the initial game; that is, responsive enactments showed a steady course of improvement whereas unresponsive enactments involved initial improvement followed by declining performance. There were, however, no differences between children in the absolute number of errors made. The absolute level of performance competence (i.e., number of movements outside the maze, and approximate time to go through the maze) of responsive and unresponsive children was matched.

All adult subjects had access to computer-displayed feedback, i.e., display of happy faces and mad faces on the child's screen. Half of the adult subjects in each child condition had access to reward and punishment on an ad lib basis, i.e., they could could make use of happy faces and mad faces during the game. And half of the subjects could only administer this type of feedback at the end of each game. This comparison was introduced to insure that any differences we observed between child conditions were not simply an artifact of the use of feedback controls during the game.

The course of child progress through the maze was based upon the actual behavior of boys in going through computer displayed mazes. Four children between the ages of 6 and 9 came to the lab, and were asked to go through a set of mazes. Their performances were then simulated in our computer displays. For example, children often drew a picture in the middle of the maze when they reached the goal; so our simulated children did they same. Children followed a jerky, erratic course--first speeding up and then slowing down--so our computer simulated children did the same. To increase the realism of child enactments, the computer program was designed to depict the child slowing down as he approached the line of the adult, giving the impression of a reaction to the adult. Additionally, the depicted child response to happy faces and mad faces was also controlled to provide an analogy to actual child reactions to reward and punishment. Specifically, the child's line stopped very briefly (one sec) following the adult's use of a happy face, and stopped for a somewhat longer time period (three sec) following the adult's use of a mad face. The one sec delay gave the impression that the happy face had been noted; the three sec delay simulated the short-term stopping power of punishment.

In this talk, I will be focusing on common reactions to responsive and unresponsive children, i.e., the ways in which adult subjects reacted in similar ways to these two enactments. I will only briefly mention some of the individual differences we have observed during interactions with responsive and unresponsive children. I should point out, however, that our ultimate goal was to develop a stimulus situation that would be perceived in approximately the same way by all subjects but would elicit different processing and interactional patterns from adults with different histories and caregiving beliefs.

The procedures we employed included the following steps:

1. Premeasures of adult on parenting beliefs and demographic variables.

2. Training on use of mouse in connection with computer game, including use of mouse controls to provide happy faces (in yellow) and mad faces (in red) to child. In one practice session, the experimenter plays the role of the child to show the subject how they will go through the maze together with someone else. The subject's line is displayed on their screen in pink and the child's line (or experimenter's line) is displayed in green. In actuality, the line attributed to the experimenter (nominally in the back room) was computer-generated.

(color slide of faces)

(color slide of maze)

3. Viewing video of child with whom they believed they would interact (tapes were drawn from previously-recorded interactions beween 20 elementary school-aged boys and a stranger). Tapes were counterbalanced across conditions, and randomly assigned within conditions.

4. Subject given opportunity to explain and demonstrate maze

task for child believed to be watching at a distant location.

5. Subject plays maze game together with child. (Let me interrupt at this point and show you an example of a woman giving initial instructions, and then playing the first game with the child. The tape is in black and white rather than color, but you will be able to distinguish her line as the lighter of the two lines. When she plays the game with the child, the child's line will appear from the top and will move immediately out of control, and over the course of the maze will show clear improvement.) The first game constitutes the experimental induction.

6. Second viewing of child videotape.

7. Subject provides verbal feedback to the child on their first peformance.

8. Second game (the second game is used as the period of interest for assessing dependent variables.

9. Thought listing procedures. After all videotaping procedures were concluded, videotapes were replayed for subjects and they were asked to tell us what their thoughts had been at various points during the experiment. Thought listing procedures were based on initial work by Gottman and Levenson (1985). Videotapes were stopped at two preset points during each of the two games. When the tape was stopped, subjects were asked to write down what their thoughts had been at that point, or to write down "don't know" if they couldn't recall their thoughts. Our focus of interest was on the ideation shown during Game 2, i.e., the time period after the experimental induction had been

instantiated.

Responses given to thought listing procedures were coded for affective valence. That is, each message was coded as being affectively positive, negative, ambivalent, or neutral.

The focus of interest in this paper is on those measures that reflect the adult°s perception of the responsive and unresponsive child enactments, i.e., the adult's appraisal of the child's improvement and the adult's immediate thoughts in response to apparent child behavior. We also, however, obtained other measures that may be thought of as measuring styles of adaptation or ways of coping with the two types of child enactments. For example, we recorded the adult's use of happy faces and mad faces, and we obtained running measures of the adult's autonomic responses during interactions with responsive and unresponsive children (described more fully in another symposium during the ongoing meetings).

Results and Discussion

Adult perception of child behavior

Two main effects were found that reflected adult's differential perception of responsive and unresponsive child enactments. The first effect essentially constituted a manipulation check. As shown in Figure 1, responsive children were seen as showing greater improvement in their performance

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Insert Figure 1 about here

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than were unresponsive children; $F(1, 139) = 16.20$, $p < .001$.

Thus the intended enactment was produced.

The second main effect involved the valence of adult ideation elicited by responsive and unresponsive children. Scores reflecting the proportion of positive messages, ambivalent messages, and negative messages were analyzed for the two experimental conditions, i.e., for the two child enactments. Significant effects were found both for ambivalent affect ($F(1, 157) = 4.31$, $p = .039$) and for positive affect ($F(1, 157) = 9.10$, $p = .003$). As can be seen in Figure 2, responsive children

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Insert Figure 2 about here

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elicited more positive ideation and less ambivalent ideation than did unresponsive children. Let me give you a couple of examples of positive and ambivalent thoughts reported by subjects:

Positive: Great. He's going slower.

Positive: All right. This kid's doing O.K.

Ambivalent: He has better control over the mouse now but he still wants to go too fast.

Ambivalent: I was pleased he was excited but it meant his corners were getting erratic.

Timing of access to feedback (ad lib versus post hoc access to happy faces and mad faces) produced no significant effects. Thus the observed valence effects appear to have resulted from reactions to child enactments rather than to the adult's access to positive or negative feedback during games.

It appears, then, that unresponsive child enactments constituted behavioral stimuli that were seen as reflecting low improvement or qualified improvement in comparison with responsive child enactments. The unresponsive child enactment was rarely seen as reflecting a performance decrement or purely negative behavior, however. No differences were found in the perceptions of or thoughts about children as a function of individual differences between subjects in parenting beliefs or demographic variables.

Adult coping responses.

We also obtained differences beween subjects in coping responses shown to responsive and unreponsive child enactments. These response patterns were, however, strongly subject to individual differences between subjects. For example, subjects made relatively low use of reward (happy faces) and relatively high use of punishment (mad faces) when attempting to teach unresponsive children. Additionally, subjects show higher levels of autonomic mobilization during interactions with unresponsive children than they did during interactions with responsive children. These response patterns were, however, qualified by individual differences between subjects in their beliefs about parenting. Specifically, negative response patterns to unresponsive children were more likely to be shown by subjects with low perceived control as parents.

Our findings suggest that the computer-simulated child behavior described here has similar stimulus value for subjects.

The differences between subjects appears in their styles of adaptation or ways of coping with the apparent differences in children. As a result, we believe that the child simulation paradigm described here provides a useful analog of child behavior and can be used to assess differential adult reactions to relatively responsive and unresponsive children.

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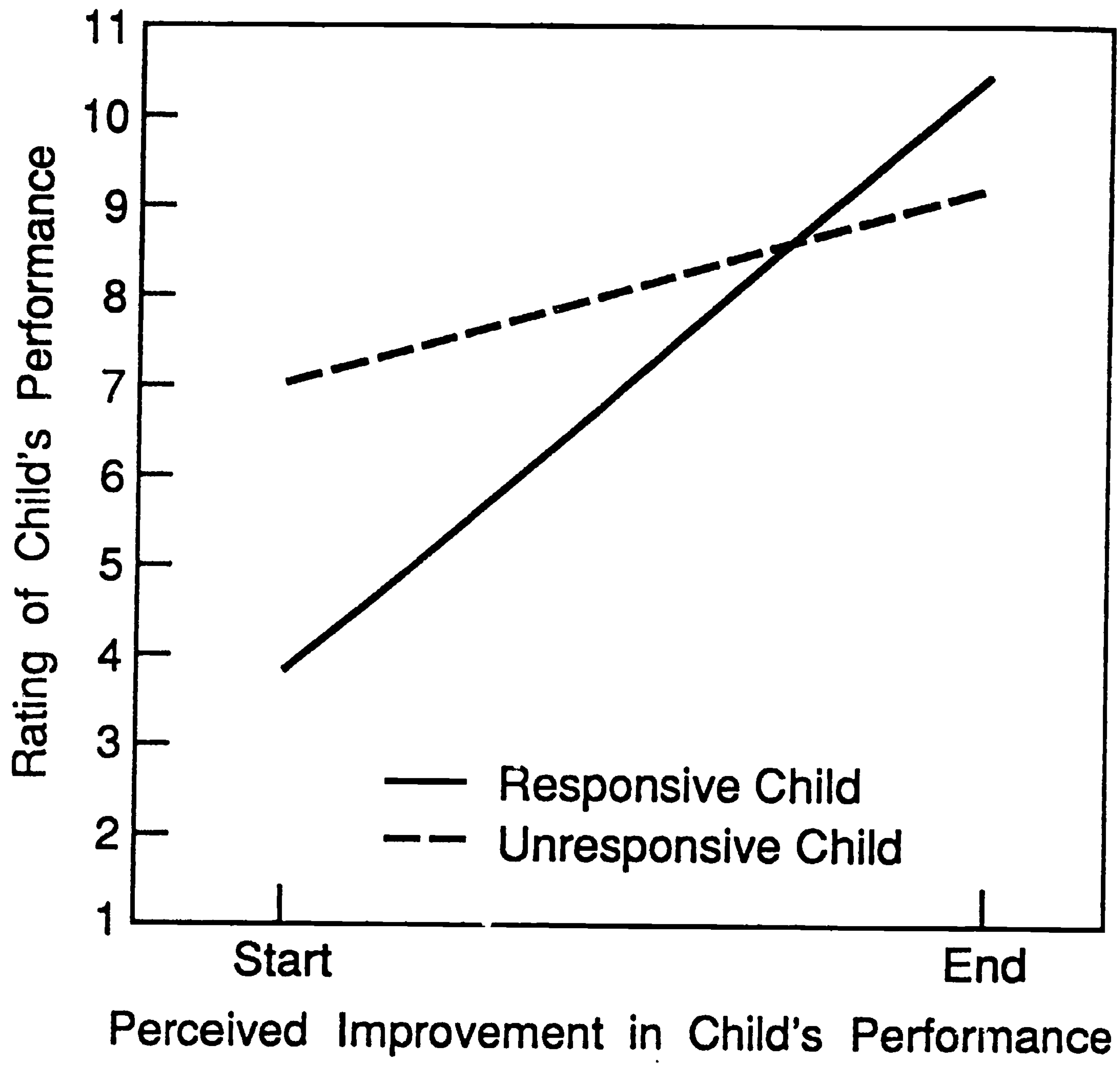
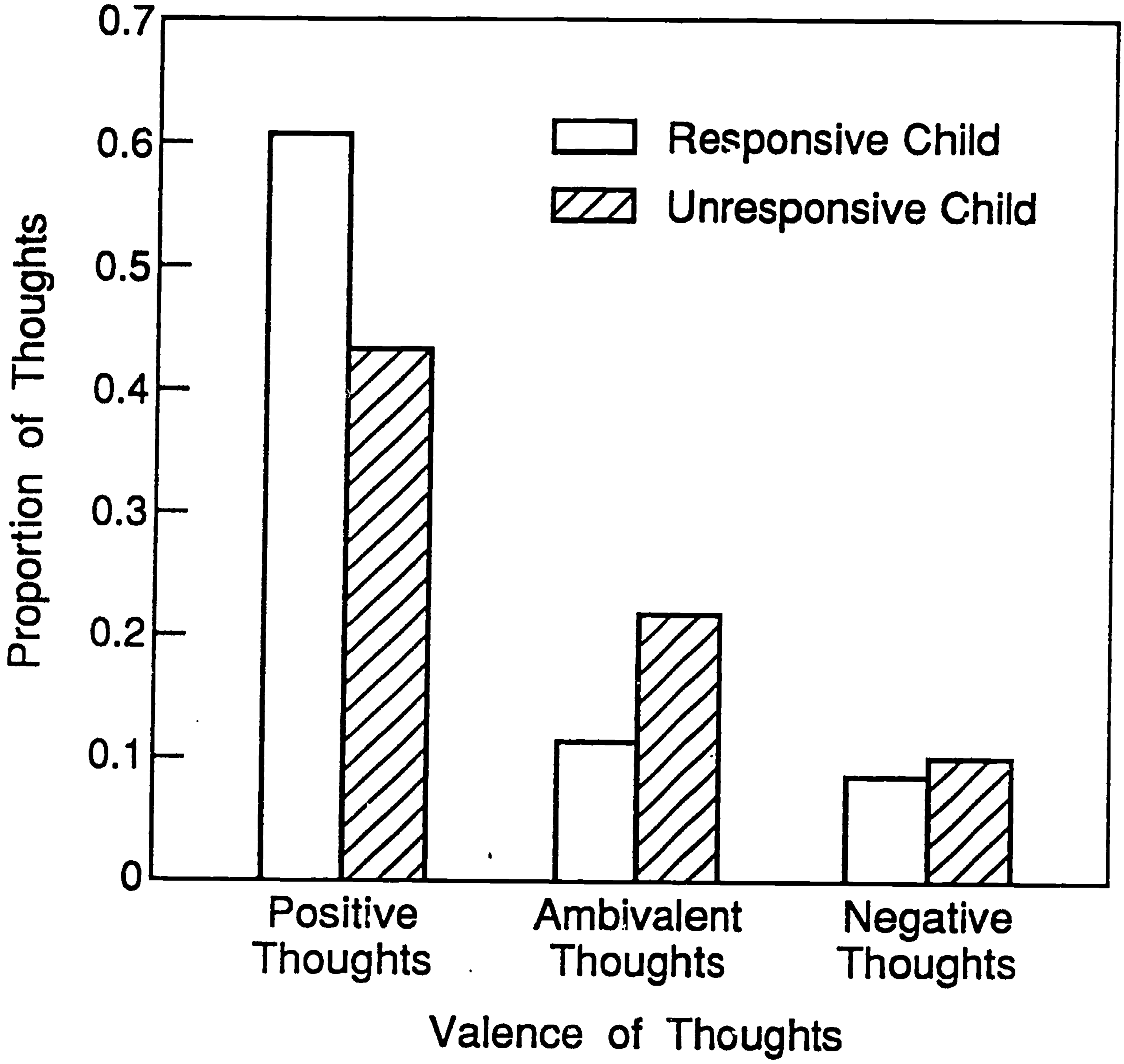

Rating of Child's Performance
11
10
9
8
7
6
5
4
3
2
1
Responsive Child
Unresponsive Child
Start
End
Perceived Improvement in Child's Performance


0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Proportion of Thoughts
Responsive Child
Unresponsive Child
Positive Thoughts
Ambivalent Thoughts
Negative Thoughts
Valence of Thoughts