

*TACTING AND MANDING IN CORRESPONDENCE TRAINING:
EFFECTS OF CHILD SELECTION OF VERBALIZATION*

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We investigated correspondence between verbal and nonverbal behavior in preschool children in a play setting. Four children (4 years old) participated in a multiple baseline across subjects design. Children were asked what toy(s) they were going to play with during an immediately upcoming play period. When no contingencies were placed on either verbal or nonverbal behavior, children showed high rates of correspondence. When children were required to verbalize about a toy from a restricted range of infrequently used toys, but no contingencies were placed on correspondence, low rates of correspondence were observed. High rates of correspondence were noted when reinforcement was contingent on it. Results are discussed in terms of tacting and manding.

Key words: correspondence training, tacting, manding, toy play, preschool children

Recent research in correspondence training has raised questions about the functional properties of the child's verbalization in the typical correspondence training paradigm. Baer, Detrich, and Weninger (1988) and Deacon and Konarski (1987) reported results suggesting that the child's verbalization was not necessary to promote change in the target response. Deacon and Konarski (1987) showed that a group of subjects who had received typical correspondence training and a group of subjects who had received reinforcement for engaging in the target behavior, but had emitted no verbalizations, showed equivalent degrees of change in the target response, and both groups appeared to develop generalized correspondence. Baer et al. (1988) found that an antecedent verbalization may be necessary to promote change in the target response, but that it may not matter whether this verbalization is emitted by the experimenter or by the child (with an experimenter's prompt). These findings have theoretical importance because they raise doubts about whether correspondence should be conceptualized as a form of self-regulation (Baer et al., 1988). In the correspondence training literature, self-regulation

is usually viewed as a process in which a child's self-produced cues function as discriminative stimuli (Guevremont, Osnes, & Stokes, 1986).

Baer et al. (1988) pointed out that most correspondence training research with children shares a common feature: The content of the child's verbalization is selected by the experimenter. That is, the experimenter teaches the child to say, "I'm going to X," where X is an experimenter-selected target response. Usually, target responses are selected because they have a low probability of occurrence. Typically, the child is prompted by the experimenter to state that he or she will engage in this response (e.g., Baer, Blount, Detrich, & Stokes, 1987; Guevremont et al., 1986; Whitman, Scibak, Butler, Richter, & Johnson, 1982). Several prompts may be provided if necessary to evoke the correct verbalization. In the early phases of most studies, when no reinforcement is contingent on actually engaging in the stated response, most children show low rates of correspondence. This pattern has been interpreted as demonstrating a low probability of correspondence in young children prior to training (e.g., Baer, Williams, Osnes, & Stokes, 1984; Guevremont et al., 1986).

The low levels of correspondence usually observed prior to training may be related to the experimenter-selected nature of the verbalization and to the conditions under which the verbalization is emitted. de Freitas Ribeiro (1989) noted that few studies have assessed the general accuracy of children's verbalizations

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about their own behavior. Following the example of Risley and Hart (1968) and Rogers-Warren and Baer (1976), de Freitas Ribeiro required children to report on their past behavior rather than to verbalize about their upcoming behavior. During a baseline condition, de Freitas Ribeiro found that when preschool children were asked to report on the toys they had played with during a preceding play period, they showed nearly perfect correspondence between actual and reported behavior. No toy had been targeted for intervention, and no specific verbalization was trained; children were simply asked what toys they had used. de Freitas Ribeiro suggested that these results demonstrated a "reliable repertoire of self-tacting of recent past behavior" (p. 366).

Skinner's (1957) concepts of tacting and manding are not often discussed in the correspondence training literature, but may be helpful in the analysis of correspondence. Verbalizations under the control of properties or characteristics of objects or events are tacts; those controlled by the consequences that usually follow are mands (Skinner, 1957). Identical verbalizations may function as tacts or mands, depending on the conditions under which they are emitted. As de Freitas Ribeiro (1989) suggested, verbalizations made by children during correspondence training procedures may be either tacts or mands, depending on the experimental condition in effect. When reinforcement is contingent upon a specific verbalization, the verbalization may be functioning as a mand. When no reinforcement follows the verbalization, the verbalization may be under the control of the behavior the child was asked to describe, and thus a tact. When no reinforcement follows the verbalization but the content of the verbalization is selected by the experimenter, who will provide prompts if necessary, then an implicit escape contingency is in effect: The child cannot leave the experimenter and go to the play area or classroom until the correct verbalization is emitted. Under these conditions, the verbalization may be functioning as a mand, with escape from the experimenter being the reinforcing consequence.

We investigated correspondence between verbal and nonverbal behavior under several conditions. Like de Freitas Ribeiro (1989), we examined correspondence when no contingencies were placed on either verbal or nonverbal

behavior; thus, children selected their verbalizations from an array of possibilities presented by the experimenter. Unlike those of de Freitas Ribeiro, however, our subjects verbalized about future rather than past behavior. This procedure allowed examination of the accuracy of self-tacting of immediately upcoming behavior. In addition, we investigated correspondence when children's verbalizations were restricted to a group of low-rate responses. We also imposed reinforcement contingencies on verbal behavior and on correspondence. These procedures allowed examination of possible manding functions of the child's verbalization.

METHOD

Children and Setting

Four children (Laura, Steve, Chuck, and Holly) enrolled in a preschool and day-care center were selected based on parental consent for participation. All were developmentally normal 4-year-olds with no major behavior problems. All attended the daycare center daily and were present until at least 3:45 p.m.

Sessions were conducted daily at approximately 3:15 p.m., following the children's snack time, in an unused classroom. The 4 children and one or two research assistants were present. The children's classmates were on the playground or in their regular classroom during this time. The experimental room was equipped with six play materials: Lincoln Logs®, Lego® blocks, Play-Doh®, wooden blocks, puzzles, and coloring materials (crayons, markers, and pages cut from coloring books). Coloring materials and Play-Doh® were placed on a broad table surrounded by child-size chairs. The remaining toys were placed on a carpeted area beside the table. No other children or play materials were present in the room.

Definition and Measurement of Target Behavior

Lincoln Log®, Lego® block, wooden block, Play-Doh®, and puzzle play were all defined as holding or touching a piece (block, log, etc.) and looking at the same piece or another piece. Coloring was defined as touching crayon or marker to paper or selecting another crayon or marker or piece of paper.

All types of target behavior were observed

daily during a 10-min play period in the experimental room. The observation period was divided into 10-s intervals. Observers, cued by an audiotape, noted each child's behavior during each interval. Data were expressed as the percentage of intervals in which each child played with each toy.

Interobserver Agreement

All observers were trained to at least 80% agreement. A second observer independently recorded data during 24% of sessions, distributed across experimental conditions. Agreement was calculated for both children and toys. An agreement was counted if both observers recorded play with the same toy during the same interval by the same child. Percentage of agreement was calculated by dividing the number of agreements by the total number of agreements and disagreements. Percentages of agreement averaged, for Chuck, 97%; Holly, 98%; Laura, 91%; Steve, 99%; coloring, 96%; Legos®, 95%; Lincoln Logs®, 99%, Play-Doh®, 99%; puzzles, 99%; wooden blocks, 89%.

Procedures

Preobservation. Each day, one or two research assistants arrived at the day-care center at approximately 3:00 p.m. to set up the toys in the experimental room. One research assistant then went to the snack room and brought the subjects to the experimental room. The first author or a research assistant then took each child individually into the hallway outside the room. Each child was shown photographs of toys available in the play room and was asked what he or she intended to play with that day. Consequences for the child's verbalization varied across experimental conditions, which are described below. The child's response was noted, and the child was returned to the play room. Observation began when all children had completed this procedure, which required 1 or 2 min.

Observation. The children's behavior was observed for 10 min. All observers were blind to the purposes of the study and to the experimental condition in effect. Observers spoke briefly to the children when they were spoken to, but did not direct activity or discuss the toys. The experimenter who had elicited the children's verbalizations during the preobservation period was not present during the observation.

Postobservation. On some days, consequences were delivered, contingent on play behavior, immediately after the observation. A small plastic box containing stickers, balls, plastic cars, dinosaurs, decorative pencils and erasers, ribbons, and other such trinkets served as the reinforcing consequence.

Experimental Conditions

Baseline. No pre- or postobservation procedures were conducted. Children were brought to the play room and allowed to play freely while their behavior was observed.

Verbalization—free choice. During the preobservation period, the experimenter showed each child photographs of the six experimental toys and asked, "What are you going to play with today?" Each child was prompted to respond with a complete sentence. Although each child was told that he or she could choose more than one toy to play with, all children chose only one on nearly all occasions. The child's response was noted, and the child was returned to the play room for observation. No postobservation procedures were conducted.

Verbalization—restricted choice. Prior to observation, each child was shown photographs of three toys that he or she had used infrequently up to this point and asked, "Which of these toys are you going to play with today?" If a child mentioned a toy whose photograph was not shown, the experimenter told the child to choose one of the shown toys. The child's response was noted, and the child was returned to the play room for observation. No postobservation procedures were conducted.

Reinforcement of correspondence—restricted choice. Prior to the observation, each child was shown photographs of the three toys used in the previous condition and asked what he or she intended to play with. After verbalizing, each child was told that he or she could earn a prize by playing *only* with the promised toy(s). On the first day of this condition, each child was allowed to examine the box of prizes before returning to the play room. After the observation, the experimenter entered the play room, examined the data sheet to determine whether each child had earned a prize, and then took each child individually into the hallway. The experimenter then said either, "You said you would play with just _____ today, and you did, so you can pick a prize!" or "You

said you would play with just _____ today, but you didn't, so you can't pick a prize today. Try again tomorrow." Requiring that children play only with the stated toy(s) prevented the awarding of prizes to children who had played with the stated toy(s) only briefly.

Reinforcement of verbalization—restricted choice. During the preobservation period, each child was asked to choose from the restricted selection of three photographs the toy(s) he or she would play with. The child was allowed to choose a prize immediately and was then returned to the play room for observation. The experimenter put the selected prizes into the children's lockers for later retrieval, thus preventing their playing with them during the observation period.

Design

A multiple baseline across subjects design was used. Within-subjects reversals were incorporated. Following a brief baseline period designed to accustom the children to the room and the toys, the verbalization—free choice condition was implemented with the first subject, followed by verbalization—restricted choice, then reinforcement of correspondence. Next came a return to verbalization—restricted choice, to determine whether a history of reinforcement of correspondence would lead to maintenance of correspondence. This was followed by reinforcement of verbalization, and lastly, by a return to the verbalization—free choice condition. This sequence of conditions was repeated across all subjects except Steve, who left the day-care center midway through the project.

RESULTS

Results for all children are presented in Figure 1. Percentage of intervals in which each child engaged in play with a promised toy (correspondence) is on the ordinate, with consecutive sessions on the abscissa. Baseline points are not plotted, because children made no verbalizations during baseline. Condition means are shown with dotted horizontal lines.

Laura averaged 89% correspondence between verbalization and play behavior during verbalization—free choice. She stated that she would play with coloring materials and did so on most days. During verbalization—restricted choice, she averaged only 23% corre-

spondence. Her restricted choice consisted of Legos®, Lincoln Logs®, and Play-Doh®. She usually stated that she would play with Play-Doh® but colored for most of the play period. During reinforcement of correspondence, Laura averaged 79% correspondence. On each day of this condition, she stated that she would use Play-Doh® and did so on most days. During the return to verbalization—restricted choice, she averaged 49% correspondence, with considerable variability. Again, she verbalized Play-Doh® on all days of this condition. When not using Play-Doh®, she was coloring. During reinforcement of verbalization, Laura averaged 30% correspondence. Responding fell to 0% for the last 4 days of the condition. With the return to verbalization—free choice, Laura's rate of correspondence increased to a mean of 81%.

Steve showed similar results until he left the center. During verbalization—free choice, his mean rate of correspondence was 79%. He usually played with Lincoln Logs® or Play-Doh®. During verbalization—restricted choice (Legos®, puzzles, wooden blocks), rate of correspondence fell to 20%. Steve usually stated that he would play with wooden blocks, but often colored instead. During reinforcement of correspondence, Steve played with the promised toy (usually puzzles or wooden blocks) an average of 88% of the time.

Chuck showed a similar pattern, though with generally higher rates of correspondence. During verbalization—free choice, he showed a mean rate of correspondence of 99%, usually playing with Play-Doh® or Lincoln Logs®. This dropped slightly to 79% during verbalization—restricted choice (Legos®, puzzles, coloring), when Chuck most often verbalized and played with coloring materials. During reinforcement of correspondence, rate of correspondence increased to 96%. Chuck spent most of his time coloring during this condition. During the return to verbalization—restricted choice, Chuck's toy selection was changed to Legos®, puzzles, and wooden blocks. Chuck showed a mean rate of correspondence of 76%, most often playing with wooden blocks. During reinforcement of verbalization, Chuck averaged 58% correspondence, with a steep declining trend. Finally, during the return to verbalization—free choice, Chuck averaged 70% correspondence, with variability.

Holly averaged 79% correspondence during

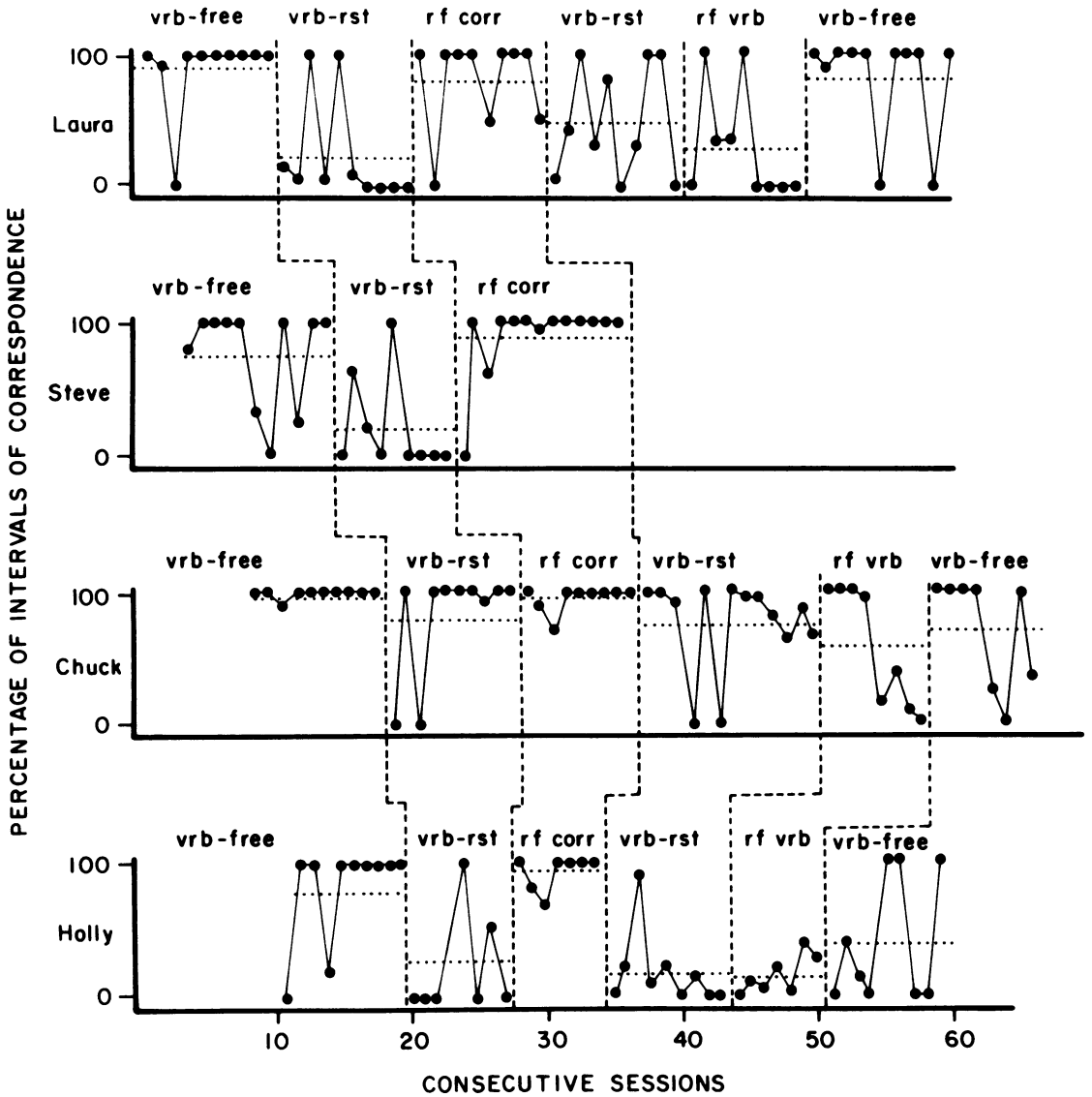


Fig. 1. Percentage of intervals of correspondence for all subjects during verbalization—free choice (vrbs-free), verbalization—restricted choice (vrbs-rst), reinforcement of correspondence—restricted choice (rf corr), and reinforcement of verbalization—restricted choice (rf vrb). Dotted horizontal lines indicate condition means.

verbalization—free choice, most often playing with coloring or wooden blocks. During verbalization—restricted choice (Legos®, Lincoln Logs®, puzzles), her rate of correspondence fell to 27%. She verbally selected puzzles most often, but spent most of her time coloring. During reinforcement of correspondence, Holly showed a mean rate of correspondence of 94%, most often selecting and playing with puzzles. During the return to verbalization—restricted

choice, Holly's rate of correspondence fell to a mean of 18%. She played with a variety of toys during this condition. During reinforcement of verbalization, her pattern of responding remained generally unchanged, with a mean rate of correspondence of 14%. Finally, during the return to verbalization—free choice, her mean rate of correspondence increased somewhat to 39%, with considerable variability.

DISCUSSION

Results suggest that children may make accurate verbalizations about their immediately upcoming behavior when the content of the verbalization is not selected by the experimenter. During the initial verbalization—free choice conditions, percentage of intervals of correspondence averaged 86% across the 4 children. Children spent at least part of the observation period playing with the verbalized toy during 92% of these sessions. These results are consistent with those of de Freitas Ribeiro (1989), who found that children accurately described past play behavior when reinforcement was not contingent on any particular verbalization or play with a specific toy. Thus, it appears that, under our “free choice” conditions, preschool children frequently describe their own immediately upcoming behavior accurately, without programmed reinforcement for doing so.

Results also suggest that the probability that children’s nonverbal behavior will correspond to their verbalizations is influenced by the conditions under which the verbalization is emitted. During verbalization—restricted choice, children were not allowed to verbalize the toys that they had been using most often and verbalized another toy instead. This procedure involved an implicit escape contingency, in that children could not enter the play room until they had made a verbalization acceptable to the experimenter. Because correspondence occurred at low rates during these conditions, it seems likely that these verbalizations functioned largely as mands, with escape from the experimenter and opportunity to enter the play room functioning as the reinforcing consequences.

During reinforcement of correspondence—restricted choice, children showed high rates of correspondence. This result is consistent with most of the correspondence training literature, which suggests that children show consistent correspondence when reinforcement is contingent on it. Under this condition, verbalizations may again have functioned as mands. Escape from the experimenter, opportunity to enter the play room, and opportunity to earn a prize for correspondence may all have functioned as reinforcing consequences.

During reinforcement of verbalization—restricted choice, correspondence occurred at low

rates. This result is also consistent with previous literature, in that rates of correspondence are often low when children receive reinforcement immediately following the verbalization rather than after the opportunity to correspond (e.g., Baer et al., 1984). During this condition, verbalizations may have functioned as mands, with the prizes functioning as reinforcing consequences.

In general, then, these results suggest that children are likely to show high rates of correspondence under two conditions. First, when no contingencies are imposed on verbal or nonverbal behavior, children are likely to describe their upcoming behavior accurately. These verbalizations may be tacts. Second, when reinforcement is contingent on correspondence, children are likely to emit an acceptable verbalization and engage in the corresponding play behavior thereby earning the contingent reward. In this case, the verbalization may be functioning as a mand.

These findings are relevant to the relationship between correspondence training procedures and the concept of self-regulation. Many authors have described correspondence training as a form of self-regulation or as a method of promoting self-regulation (Guevremont et al., 1986; Israel, 1978; Kanfer & Karoly, 1972; Karlan & Rusch, 1982), because the procedures involve an antecedent cue in the form of a verbalization emitted by the subject. This verbalization is viewed as a controlling variable that increases the likelihood that the corresponding nonverbal response will occur. However, Baer et al. (1988) found that, if the typical experimenter’s prompt occurred, the child’s verbalization could be omitted with no effect on the rate of occurrence of the corresponding nonverbal behavior. If the verbalization does not exert functional control over the corresponding behavior, then “self-regulation” is an inaccurate label for the process.

Our data suggest that the relationship between the corresponding verbal and nonverbal behavior might be better understood in terms of tacts and mands. Analysis of correspondence in these terms suggests that the verbalization and the nonverbal behavior may be controlled by separate contingencies. The verbalization is often controlled by an escape contingency, as described above, whereas the nonverbal behavior is often controlled by a reinforcement contingency in which the nonverbal behavior

must correspond to the preceding verbalization in order to earn reinforcement. Under these conditions, the interaction in which the experimenter prompts the child to verbalize may function as a setting event (Bijou & Baer, 1978), which then exerts some influence over the subsequent play behavior. When no contingencies are placed on the content of the verbalization, it appears that the child is likely to tact upcoming behavior accurately. Thus, the upcoming behavior is determining the verbalization, rather than the verbalization determining the upcoming behavior.

This analysis raises the issue of how a tact can be under the control of future behavior. Skinner (1957) suggests that a statement such as "I shall go skiing tomorrow" is not literally under the control of future behavior. Instead, the speaker is tacting private events that are concomitants or precursors of behavior, such as a strong "inclination" to engage in a particular behavior (p. 144), or is tacting variables of which the behavior is a function. In our study, when a child says, "I'm going to play with Legos®," and then does so, the child cannot be directly tacting Lego® play that has not yet occurred, but may be tacting private events or covert behavior that has led to Lego® play under similar conditions in the past.

One variable that we did not control in this study was the effect of the children's social relationships on correspondence. Observers reported that, early in the study, the 4 subjects (who came from two different classrooms) did not appear to have developed friendships with one another, because they spoke little during the play period. As the study progressed, however, patterns of social relationships began to develop. Laura, who often whined and cried, was often ignored and sometimes teased by the other subjects, who conversed increasingly frequently with each other. After Steve left the center, Chuck and Holly conversed with each other frequently, but rarely with Laura. During the final weeks of the study, Chuck and Holly often played with the same toy, regardless of which each had promised to play with. On two occasions late in the study, Holly was noticed leaning out of the doorway of the classroom in an attempt to overhear which toy Chuck would state that he would play with. Although not experimentally controlled, these occurrences suggested that the social consequences of playing together had become powerful for

these 2 subjects. Lower rates of correspondence noted for both of these subjects in the final verbalization—free choice condition suggest that these social consequences may have interfered with their accurate tacting of their upcoming play behavior. Avoidance of this problem in future research would require that subjects play alone. Although playing alone is not typical of most preschool settings, a more rigorous experimental analysis would result.

In summary, our study adds to de Freitas Ribeiro's (1989) findings an examination of self-tacting of upcoming behavior when no contingencies are placed on either content of verbalization or on play with any specific toy. In addition, our findings shed additional light on the conditions under which children's verbal and nonverbal behavior is likely to correspond. Future research might investigate the competing contingencies in the natural environment that interfere with accurate self-tacting of behavior.

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