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Establishing reports of saying and doing and discriminations of say–do relations☆

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Abstract

The purpose of the present study was to investigate a new procedure for establishing accurate discriminations of delayed acts of saying, of doing and discriminations of say–do correspondence and non-correspondence with three developmentally delayed subjects. A corrective feedback procedure for incorrect discrimination responses, that involved multiple-exemplars, was initially employed, but failed to establish most of the target discriminations for all three subjects. A near-errorless training intervention was subsequently employed that also involved multiple-exemplars. This training used two referents (one for acts of saying and another one for acts of doing) as prompts to produce accurate delayed reports of what they promise to do presently, and accurate delayed reports of what they did. Prompts were also used to indicate whether the say–do relations were the 'same' in terms of correspondence or not the same in terms of non-correspondence. Prompts were subsequently eliminated. All three subjects demonstrated highly accurate reports of delayed saying, doing and say–do correspondence or non-correspondence discriminations in the absence of prompts and with novel stimuli. The results are discussed in terms of generalized classes of behavior. The implications of these findings for the use of the errorless learning paradigm as a means of establishing complex behavior are also discussed.

Keywords: say–do discriminations; one's own behaviors; errorless training; generalized classes; multiple-exemplar training; correspondence training

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1. Introduction

A number of researchers have employed say–do correspondence training interventions to establish arbitrary relations between what a person says and does, or vice versa (Israel & O'Leary, 1973). These interventions have generally established arbitrary say–do relations by training across multiple-exemplars in which differential social contingencies are applied to instances of say–do correspondence or non-correspondence (Dymond & Barnes, 1997; Guevremont, Osnes, & Stokes, 1986; Herruzo & Luciano, 1994; Luciano, Herruzo, & Barnes-Holmes, 2001; Paniagua, 1990; Ward & Ward-Stare, 1990). These researchers have employed a range of interventions across a variety of saying and doing behaviors, mostly in children of average intelligence. Only a limited number of studies have been concerned with say–do relations observed with children diagnosed as developmentally delayed (Luciano, Molina, & Gómez, 2000, for reviews).

Research on say–do relations has not addressed specifically the prerequisite behavioral repertoires that may be necessary for say–do correspondence training to be implemented. With developmentally delayed populations in particular, it is important to determine whether subjects can make accurate discriminations of saying and doing as independent behaviors. The most common intervention for establishing accurate discriminations of saying and doing involves the provision of verbal feedback for inaccurate discriminations of these behaviors. That is, after subjects incorrectly report what they have said or done, they may be instructed, for example, "This is not what you promised, you promised . . ." or "No, that is not what you did, you did . . ." (Herruzo & Luciano, 1994). Moreover, the literature on language development contains no studies that identify the conditions under which a child normally learns to discriminate what s/he said or did in the past. Nevertheless, the majority of typically developing children appear to learn these important skills with relative ease and speed at a young age.

The key aim of the present study was to establish accurate reports of saying and doing, and of say–do correspondence or non-correspondence with developmentally delayed subjects, who demonstrated no prior evidence of these repertoires. Specifically, we aimed to develop a procedure for establishing accurate delayed reports of a subject's own behaviors (i.e., saying and doing) and for establishing the conditions under which the relations between these two types of behaviors are discriminated in terms of 'same' (i.e., correspondence) or not the same (i.e., non-correspondence). The first intervention consisted of a traditional corrective feedback procedure in which the teacher provided corrective feedback consequent upon subjects' incorrect discriminations of saying and doing, and of whether these behaviors were or were not the same. As this procedure failed to establish the target discriminations, a near-errorless discrimination training procedure, based on those to establish conceptual behavior, was subsequently employed (Etzel, Milla, & Nicholas, 1996; Lancioni & Smeets, 1986; Luciano, 1986; Sidman & Stoddard, 1966). The near-errorless intervention, designed directly for the current study, included a number

of object referents adapted from work reported by Luciano et al. (2001). In the Luciano et al. study, written notes (on which subjects indicated what they were going to do subsequently) were found to be particularly useful for the generalization of the target behaviors. In the present study, a similar procedure was designed to establish the three target discriminations of saying, doing, and say–do correspondence and non-correspondence. Specifically, a red sticker was placed on a sketch that depicted the activity which the subject had promised to engage in (i.e., saying behavior), and a box was used to hold the object which the subject actually engaged in (i.e., doing behavior). Participants were three developmentally delayed individuals who had not learned (by way of the natural language community) to correctly discriminate what they said or did or to discriminate the relationship between these events in terms of correspondence or non-correspondence.

2. Method

2.1. Participants

Three developmentally delayed persons participated in the present study. Rita was an 11-year-old girl with an IQ of 48 (as measured by the Weschler Intelligence Scale for Children) and was diagnosed with no specific syndrome other than developmental delay. Jose and Felipe, boys with Down Syndrome, aged 15 and 13 years old, with IQ's of 35 and 45, respectively. Rita and Felipe attended a mainstream school and Jose attended a vocational school. All three educational establishments had special provision for students with special needs. Prior to the experimental procedures, the three demonstrated difficulties in discriminating a number of target behaviors. For example, they correctly described what they were currently doing, but were unable to provide accurate delayed reports of what they had done. Similarly, they were unable to provide delayed reports of what they had said they would do. That is, they responded incorrectly when asked, for example, ''Have you done what you have promised to do?''

2.2. Apparatus and experimental setting

The experimental stimuli consisted of a range of toys or play activities, and sketches of these objects. Sketches of three of the play items were depicted together on a single drawing. A number of drawings depicting various combinations of play items commonly preferred by the three subjects were employed. The toys/activities used were as follows: a range of puzzles; dolls; a bears game; a dice game; differently-colored pencils, chalks and pens; rings; spinning tops; cars; a train; a plane; books; balls; and, a memory game. In addition to the above toys, the subjects had access to the following activities; bowling; drawing different numbers, letters, and figures; and wood construction. Various combinations of these play items were employed during training with each of the three subjects,

and some of these toys/activities were employed as novel items in the last part of the study. The play items were stored in a closet until designated playtimes. During the near-errorless training intervention, a red sticker, a play box large enough to contain any play item selected by the subject, and a cover under which the play box could be concealed were also employed.

The experimental sessions were conducted as part of extra-curricular classes at a clinical/educational setting. All three subjects attended these classes individually after school, 1 hr each day, 5 days per week in order to improve their language and cognitive deficits. Felipe and Jose worked with one teacher and Rita worked with another. The teachers met with the Experimenter on a daily basis to implement any necessary changes prior to each session. All subjects participated in the experiment individually.

2.3. Experimental design

The three target discriminations recorded throughout the current study were (1) actual saying (responding to: what do you promise to do at playtime?) and delayed reports of saying (responding to: what did you promise to do?); (2) immediate and delayed reports of doing (i.e., responding to: what are you doing? and, what did you do at playtime?); and (3) say–do discriminations (i.e., responding to: have you done what you promised to do?).

An ABC experimental design was employed. Phase A consisted of a corrective feedback procedure as a baseline in which there was an active ongoing treatment: the teacher provided the correct response following a subject's incorrect discrimination response and the subject was then asked to repeat the correct response. Differential consequential feedback and social approval for reports of saying, doing and say–do discriminations were implemented. In addition to these consequences, experimental tokens were used. For ethical reasons, tokens were only available for correctly discriminated instances of say–do correspondence. Correctly discriminated instances of non-correspondence were reinforced only with positive feedback (see Section 2.4).

Phase B consisted of a near-errorless training procedure with several prompts and additional questions to establish the three discriminations. Along this phase, the additional questions were eliminated and the referents used to prompt correct responding were gradually faded out. Consequences of responding were the same as with the corrective feedback training.

Prompted trials involved the use of two referents, one each for the behaviors of saying and doing. Respectively, placing a red sticker beside the appropriate sketch that depicted the particular play object the subject had specified that s/he would promise to play with, and a play box to conceal the item used at playtime. Referents were employed both as a prompt and feedback of responding (see Section 2.4). The red sticker and the box were, respectively, employed as referents of saying and doing behaviors for four reasons. First, symbolic referents were better than vocal referents to avoid subjects echoing. Second, these referents could be presented during both initial and delayed reports of saying and doing.

Third, they could be used for prompts as well as feedback. Fourth, they could be consistently used across a number of exemplars of saying and doing, although the content of these actions differed.

Phase C consisted of a block of at least 15 unprompted criterion trials containing two or three novel objects or drawings.

2.4. Procedure

At the beginning of the experimental sequence, each subject was asked to select an item from an array of objects commonly requested by these individuals, which could be exchanged for experimental tokens (i.e., what do you like? in the presence of toys or sweets). A brief instructional token training with the experimental tokens was provided because the subjects in the current study had many years experience with tokens. Subjects were told that the chosen toy/sweet could only be selected in exchange for this particular type of token. Then, corrective feedback training began.

2.4.1. Phase A: corrective feedback training

Phase A provided the initial assessment of whether each subject could respond in accordance with the three target discriminations and whether these could be established with corrective feedback alone. During the corrective feedback the teacher vocally corrected each incorrect discrimination response, and invited the subject to repeat (see next paragraphs). For each child, this phase consisted of 25 trials. Each trial throughout the study consisted of three basic parts relating to the three target discriminations (saying, doing and say–do types of relations). The content of saying differed across trials.

2.4.1.1. Part 1: saying. Two aspects were identified: actual saying and delayed reporting of saying. At the beginning of each trial, subjects were asked a question about what they would like to do during playtime. No toys or play items were actually present at this time. The teacher asked, ''What do you promise to do at playtime?'' The subject's response to this question is referred to as actual saying (e.g., ''I will play with the balloon''). If the subject referred to a particular toy/activity that would not be available subsequently or that s/he selected in the most close preceding trial, the teacher indicated that by saying ''there is not, say another one.'' When an appropriate play item was indicated, the teacher simply repeated this choice (e.g., ''Okay, you promise to play with the balloon''). The subject was then immediately engaged in alternative educational activities. After 2 min, subjects were asked to report on what they had promised to do during playtime. The teacher asked ''What did you promise to do at playtime?'' The subject's response to this question is referred to as a delayed report of saying (e.g., ''I promised to play with the balloon'').

A correct saying response was recorded when a subject's actual and delayed reports of what s/he promised to do during playtime were the same. Correct saying responses were followed by verbal praise (e.g., ''Good, you did promise to play

with the balloon''), and the subject immediately returned to educational activities. An incorrect response was recorded when a subject's actual saying and delayed reports of saying were different. All incorrect reports of saying during this phase were followed by the teacher repeating the question (i.e., ''What did you promise to do at playtime?''), providing the correct answer, and inviting the subject to repeat this answer (i.e., ''so, you promise to play with . . .'').

2.4.1.2. Part 2: doing. Part two of each trial was similar to Part 1, except that it involved the activity of doing and reports of doing, rather than saying. Approximately 3–5 min after the delayed report of saying, the teacher indicated that it was playtime and said, ''Okay, let's play.'' Subjects were then allowed to select a play item among several choices that were available. Subjects were allowed to engage in the chosen activity for approximately 3–4 min, either with the participation of the teacher or alone (depending on the activity). For example, if the subject was playing with a balloon, the teacher also participated in this activity, but if the subject was writing, the teacher did not participate. During this playtime period, subjects were asked to report what they were currently doing (i.e., ''What are you doing?''). A subject's response to this question is referred to as an immediate report of doing. If the subject responded incorrectly, the teacher repeated the question, provided the correct response, and asked the subject to repeat this response. At the end of playtime, subjects returned to educational activities. After 2 min, the teacher asked the subject to report on what s/he had played with during playtime (e.g., ''What did you do at playtime?''). A subject's response to this question is referred to as a delayed report of doing. An incorrect response was followed by the teacher repeating the question, providing the correct answer, and inviting the subject to repeat this answer, as before.

2.4.1.3. Part 3: say–do relations. Immediately following the delayed doing report, subjects were asked for the say–do relationship (e.g., ''Have you done what you had promised to do?''). In instances where the subject had actually done what s/he had promised (i.e., correspondence between saying and doing) a correct response was, for example, ''Yes'' or ''Yes I did what I promised.'' When non-correspondence occurred, the correct response was, for example, ''No'' or ''No I didn't done what I promised.'' Correct responding to both correspondence and non-correspondence were followed by verbal praise and feedback (e.g., ''yes, good, you did what you promised, here is a token''). Only correct discriminations of say–do correspondence were consequated by a token. Incorrect responses of either correspondence or non-correspondence were followed by the teacher repeating the question while the teacher prompted a correct ''yes'' or ''no'' response by moving her head up and down (for yes) or from side to side (for no).[1] Subjects exchanged tokens for play items or candies at the end of each 1 hr session (i.e., one token per item).

All three parts of a trial had to be completed (i.e., saying, doing and say–do relations) for a full trial to be recorded. Fifteen to 20 min later, a new trial was commenced. Two trials per 1 hr session were conducted although occasionally

there were one or three trials. Phase A ended when 25 trials corrective feedback trials were completed.

2.4.2. Phase B: near-errorless training

Subjects were first required to complete in a single session 30 trials containing three matched name–object–drawing tasks as essential components of near-errorless training. During one type of matching task (i.e., object–name–drawing), subjects were presented with an object (e.g., a ball) and were asked to name the object (i.e., ''What is this?''). During another type of matching task, subjects were presented with an array of drawings, one of which depicted the selected item (e.g., a ball) and were asked to point to the picture that matched the name (e.g., ''Point to the ball''). During another type of matching task (i.e., object–drawing), subjects were presented with two stimuli, an object and either a drawing of the object or a drawing of an alternative object. On these trials subjects were asked to identify whether the object and the drawing were the same (e.g., ''Are they the same?''). All subjects responded correctly. Social praise (i.e., ''Good, you know well'') was provided for all correct responses on matching trials.

The near-errorless training intervention had a format similar to that used during the corrective feedback procedure. This phase, however, differed from Phase A in two distinct ways. First, two referents (a sticker and a box) were employed, and second, a number of additional questions and gestures were added to further facilitate correct responding on the target discriminations. These features of Phase B were subsequently eliminated or faded. The referents and additional questions employed during prompted near-errorless training trials were, respectively for the three parts of a trial.

In Part 1: *Saying*: (a) Referent for the behavior of saying (i.e., placing the red sticker beside appropriate sketch of selected play item). (b) Question for immediate report of saying (''What have you promised to do during playtime?''). (c) Question for first delayed report of saying. (d) Prompt for first delayed report of saying (sketch with the red sticker present). (e) Prompt for second delayed report of saying (sketch with the red sticker present).

In Part 2: *Doing*: (f) Referent for the behavior of doing (the box with the object inside). (g) Question for immediate report of doing (''What are you doing?''). (h) Question for first delayed report of doing (''What did you do during playtime?''). (i) Prompt for first delayed report of doing (the uncovered box). (j) Prompt for second delayed report of doing (the uncovered box).

In Part 3: *Say–do relations*: (k) Question: ''Are they the same?'' (l) Prompts for the behaviors of saying and doing presented during the say–do question, ''Have you done what you promised to do? (the presence of the red sticker beside the appropriate sketch and the uncovered box with the object inside). (m) Teacher pointing to both saying and doing referents when asking the say–do question. (n) Gestural head prompt for yes/no responses to say–do question.

All initial near-errorless training trials conducted with each subject were prompted.[2] At the beginning of each prompted trial, subjects were presented with

three sketches of play items depicted on a single drawing (different combinations of sketches of play items were presented from one trial to the next). Subjects were then asked, ''What do you promise to do during playtime?'' The subject was then required to respond vocally and by pointing to one of the sketches. For example, the subject may have said ''I will play with the doll'' while simultaneously pointing to the sketch of a doll. Subjects were immediately presented with the red sticker and instructed to place the sticker beside the sketch that depicted the preferred item (e.g., the doll). During the first and second trials only, subjects were gesturally guided (by pointing) to place the sticker on the appropriate sketch with the teacher. The teacher then confirmed the item choice by saying, ''Okay, you say you will play with the doll'' and simultaneously pointed to the sketch with the red sticker.

Immediately after the confirmation of the choice, subjects were asked ''What have you promised to do during playtime?'' If a subject emitted a correct response, the teacher reinforced this response with words such as ''Yes, you did promise that,'' while simultaneously pointing to the sketch with the red sticker. The drawing and the red sticker were subsequently removed, and subjects were engaged in educational activities for approximately 1–2 min. The teacher then presented the drawing with the sticker once again and subjects were asked ''What did you promise to do at playtime?'' The response to this is referred to as a first delayed report of saying. A correct response to this question was reinforced with the words such as ''Yes, that is what you promised'' and the teacher simultaneously pointed to the sketch with the red sticker. The drawing was then removed and subjects were re-exposed to educational activities for 3–5 min.

At the appropriate time, the teacher then indicated that it was playtime. Subjects were allowed to select one item from the array of play items available. During playtime, subjects were asked ''What are you doing?'' A response to this question is referred to as an immediate doing report. When playtime was over, subjects were each presented with an empty play box and were asked to place the chosen play item inside. The play box was then covered and removed, and subjects then participated in educational activities. After 2 min, the play box was returned and subjects were asked ''What did you do during playtime?'' During the question, the teacher pointed to the box which remained uncovered during the first trials. A subject's response to this question is referred to as a first delayed doing report. Correct responses were followed by feedback such as ''Yes, here it is'' and the teacher pointed to the box. Two additional questions to elicit a delayed saying report and a delayed doing report were presented before the say–do questions.

Prior to the say–do questions in Phase B, both referents (i.e., the sketch with the red sticker and the uncovered box) were presented to the subjects. Subjects were then asked ''So, are they the same?'' With the referents still visible, the subject was immediately asked ''Have you done what you promised to do?'' During initial trials, the teacher gesticulated the correct yes/no answer with appropriate head movements. Correct discrimination of say–do correspondence responses were followed by verbal praise, feedback, and a token (i.e., ''You are right. You

have done what you promised, and I can give you a token''), while correct discrimination of non-correspondence were followed by verbal praise and feedback, but no token (i.e., ''you are right, but I cannot give you a token because you have not done what you promised''). Fifteen to 20 min later, a new trial was commenced. It is important to point out that during prompted near-errorless training trials, the saying and doing prompts were never presented at the same time, so as to enable the subject to distinguish between these two behaviors. During training of the say–do relations, in which both referents were presented simultaneously so as to establish accurate discriminations of whether the behaviors of saying and doing, were or were not the same.

After responding correctly to all target discriminations in four consecutive prompted trials in Phase B, the fading of the prompts and the elimination of the additional questions commenced. Components of the near-errorless training (see previous paragraphs) were eliminated following these steps: (1) gestural yes/no head movement as prompt for the say–do question (identified as n in previous paragraphs); (2) question for immediate doing report (identified as g); (3) referent present during first delayed doing report (i) so, the box was subsequently covered; (4) referent present during second delayed doing report (j): the box was subsequently covered; (5) referent present during first delayed saying report (d): the drawing with the red sticker was subsequently placed face-down; (6) question for the first delayed doing report (h); (7) referent present during second delayed saying report (e): the drawing with the red sticker was subsequently placed face-down; (8) question for immediate saying report (b); (9) pointing to both referents during the say–do question (m); (10) question: ''Are they the same?'' (k); (11) first delayed saying report (c); (12) presence of the referents during the say–do question (l); and (13) referent for the behavior of doing (f): no box present. The referent for saying behavior was not eliminated although it was not used to prompt any further response.

It is important to point out that when the referents to prompt delayed reports of saying or doing were eliminated, they remained to function as a form of feedback to consequate correct or incorrect discriminations of these reports. During fading, for example, when subjects were asked to provide a delayed saying report, the drawing was initially placed faced down, but was changed to face-up after subjects' responses to the question (irrespective of whether the response was correct or incorrect). The exact point at which prompts and questions were eliminated along training varied across subjects as well as varied the number of trials needed to complete the last step of the fading procedure (step 13th) (see Figs. 1–3).

2.4.3. Phase C: criterion trials and test probes

When the fading procedure was completed (i.e., step 13 was completed), subjects were then required to reach a criterion of 15 consecutively correct trials. These unprompted trials included novel objects and drawings. Also, the subjects continued to put the red sticker beside the appropriate sketch, although it was not used to prompt any further response. Subjects were free to choose any of the items

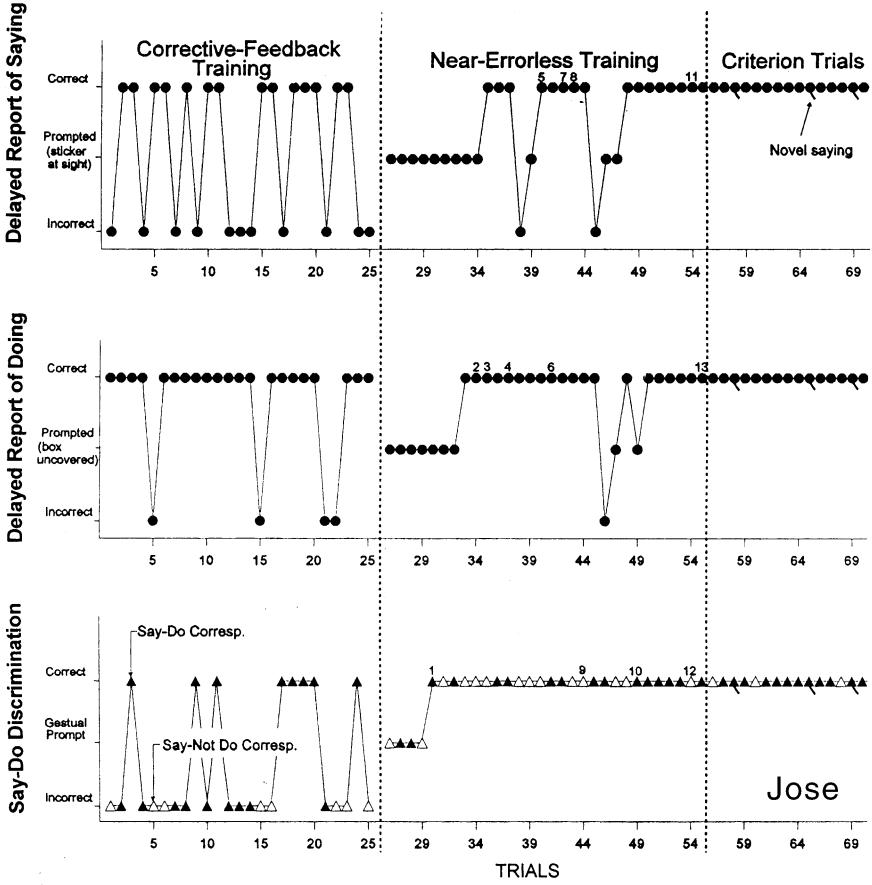

Fig. 1. Data for Jose during the corrective feedback intervention, the near-errorless training intervention, and the criterion trials with new stimuli. The upper and middle graphs show each subject's delayed reports of saying and doing, respectively, as correct, incorrect and prompted responses. The lower graph shows subject's responding (correct, incorrect, and gesturally prompted responses) to both say–do relations: correspondence relations (filled triangles) and non-correspondence relations (open triangles). The points at which components of the near-errorless training intervention were eliminated are indicated with numbers that relate to each feature as described in Section 2.4.

presented. Across the 15 trials, two or three novel items were selected by each subject and served as test probes. Reaching the mastery criterion of 15 trials signaled the end of the experiment for each subject. The following is an example of these trials:

T: What do you promise to do at playtime?
S: I will play bowling. (Actual Saying) (The subject puts the red sticker beside the appropriate sketch, although it was not used to prompt any further response.)

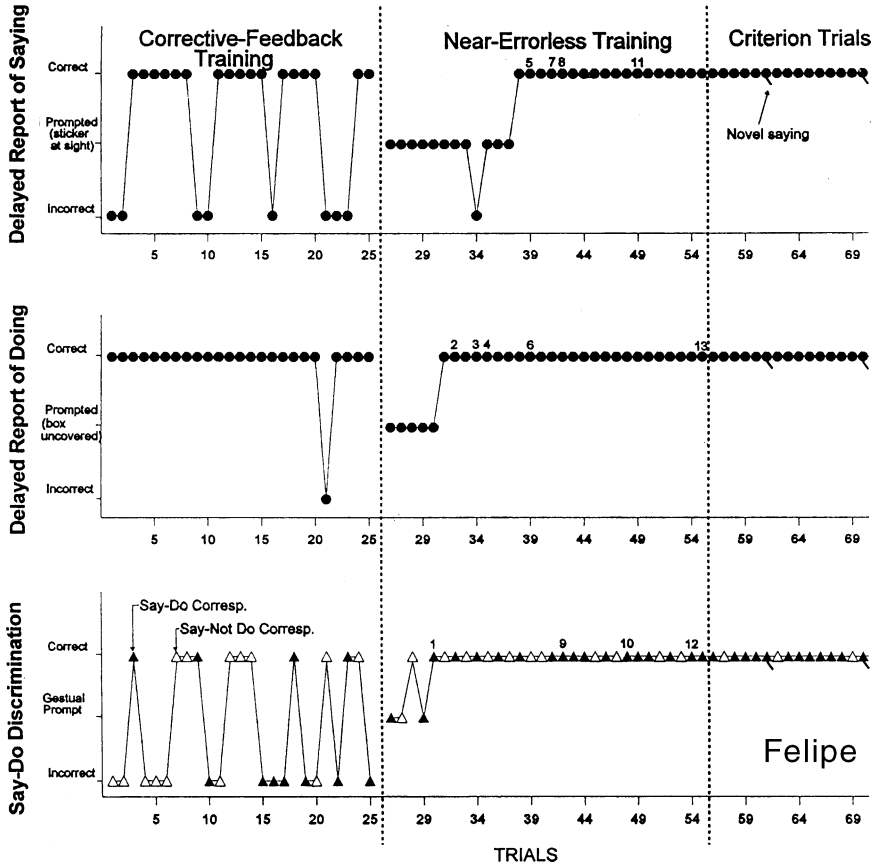

Fig. 2. Data for Felipe during the corrective feedback intervention, the near-errorless training intervention, and the criterion trials with new stimuli. The upper and middle graphs show each subject's delayed reports of saying and doing, respectively, as correct, incorrect and prompted responses. The lower graph shows subject's responding (correct, incorrect, and gesturally prompted responses) to both say–do relations: correspondence relations (filled triangles) and non-correspondence relations (open triangles). The points at which components of the near-errorless training intervention were eliminated are indicated with numbers that relate to each feature as described in Section 2.4.

T: O.K. You said you would play bowling. (3–5 min later)
T: Let's play. (The subject plays bowling.) (2 min later)
T: What did you promise to do at playtime?
S: Bowling. (Delayed report of saying)
T: And, what did you do?
S: Played bowling. (Delayed report of doing)
T: Then, have you done what you promised to do?
S: Yes/Yes, I have done what I promised to do). (say–do discrimination)
T: O.K. You are right, you have done what you promised. Here is a token.

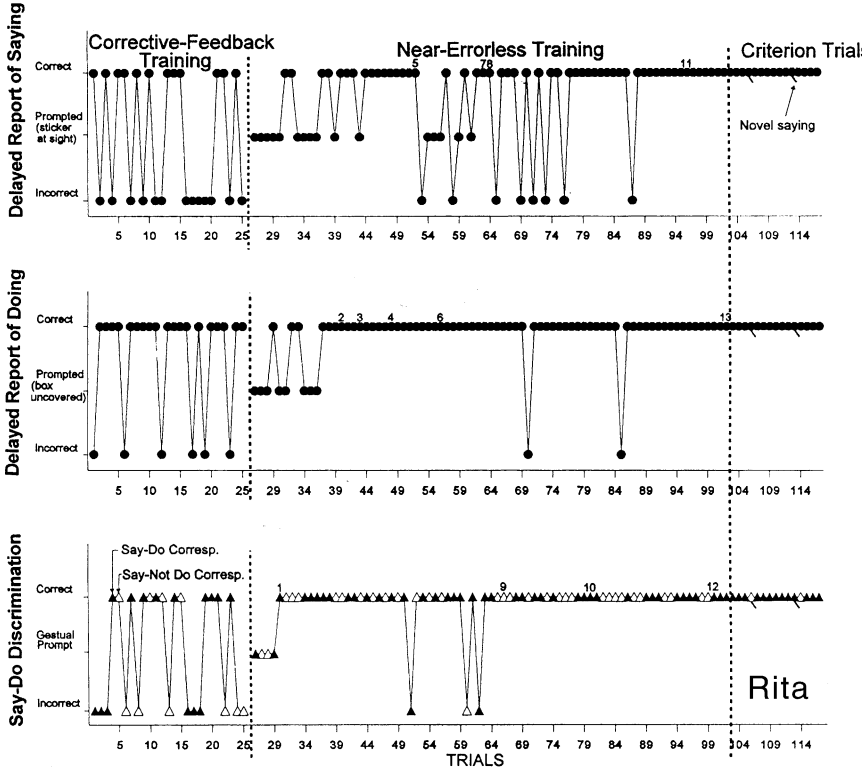

Fig. 3. Data for Rita during the corrective feedback intervention, the near-errorless training intervention, and the criterion trials with new stimuli. The upper and middle graphs show each subject's delayed reports of saying and doing, respectively, as correct, incorrect and prompted responses. The lower graph shows subject's responding (correct, incorrect, and gesturally prompted responses) to both say–do relations: correspondence relations (filled triangles) and non-correspondence relations (open triangles). The points at which components of the near-errorless training intervention were eliminated are indicated with numbers that relate to each feature as described in Section 2.4.

2.4.4. *Interobserver reliability*

Daily observations on the three target discriminations were recorded between a trained observer and each teacher. That is, the teachers and the observer recorded what subjects said they would do, what subjects actually did, and how they reported the relationship between these behaviors. The observer also recorded the use of prompts and feedback. A second observer was also employed intermittently on 52, 49 and 55% of the trials (distributed in an equivalence way across phases) for Rita, Felipe and Jose, respectively. This second observer also recorded subject's responses and the use of prompts and feedback. Interobserver reliability was calculated by dividing the number of agreements by the number of agreements plus disagreements (multiplied by 100). Agreement between each teacher and each observer was 100%. Agreement between the two observers regarding all responses per trial produced by Rita, Felipe, and Jose was 88, 95 and 90%, respectively.

3. Results

The data for Rita, Felipe and Jose are presented in Figs. 1–3, respectively. Subjects' responses to the say–do discriminations as correspondence and non-correspondence (bottom graph of each figure) are summarized in Table 1. None of the subjects reached criterion on delayed reports of saying during the corrective feedback procedure. During this phase of the experiment, two subjects (Felipe and Jose) showed accurate delayed reports of doing, with Felipe's accuracy being particularly high. None of the subjects demonstrated accurate say–do discriminations of either correspondence or non-correspondence. Subjects' performances on both types of say–do discrimination were almost random with 52–48, 44–56, and 32–68 correct–incorrect responding for each subject, respectively. In contrast, the near-errorless training procedure clearly established highly accurate response patterns on all three target discriminations. Felipe, Rita, and Jose required a total of 30, 77, and 30 trials, respectively, for the complete elimination of prompts and additional components. Accurate discriminations of both types of say–do relation were 91, 90 and 87%. Furthermore, correct delayed reports of saying and doing recorded during the criterion trials were maintained in the absence of prompts and generalized to novel stimuli (two each for Felipe and Rita and three for Jose). Accurate discriminations of both types of say–do relation were 100% for all subjects. It was also reported anecdotally by teachers that all three subjects

Table 1
Discrimination of both types of say–do relations (correspondence and non-correspondence)

Participant	Corrective feedback training		Near-errorless training			Criterion trials	
	Correct	Incorrect	Correct	Prompted	Incorrect	Correct	Incorrect
Rita							
Say–do correspondence	(9) 36%	(6) 24%	(40) 52%	(2) 2.5%	(2) 2.5%	(13) 86%	(0) 0%
Say–do non-correspondence	(4) 16%	(6) 24%	(30) 39%	(2) 2.5%	(1) 1.25%	(2) 14%	(0) 0%
Total	52%	48%	91%	5%	4%	100%	0%
Felipe							
Say–do correspondence	(4) 16%	(7) 28%	(16) 53%	(2) 7%	(0) 0%	(12) 80%	(0) 0%
Say–do non-correspondence	(7) 28%	(7) 28%	(11) 37%	(1) 3%	(0) 0%	(3) 20%	(0) 0%
Total	44%	56%	90%	10%	0%	100%	0%
Jose							
Say–do correspondence	(8) 32%	(9) 36%	(14) 47%	(2) 7%	(0) 0%	(12) 80%	(0) 0%
Say–do non-correspondence	(0) 0%	(8) 32%	(12) 40%	(2) 7%	(0) 0%	(3) 20%	(0) 0%
Total	32%	68%	87%	13%	0%	100%	0%

Number (in parentheses) and percentage of correct, prompted and incorrect responding to the question: have you done what you promised to do?

benefited greatly from their participation in the study. In fact, in a subsequent study say–do correspondence training was successfully employed with two of these subjects to reduce inappropriate behavior (Luciano et al., 2000).

4. Discussion

Corrective feedback was ineffective in establishing accurate delayed discriminations of saying and say–do relations, although it did appear to be effective in establishing accurate discriminations of doing. These findings conflict with those commonly observed with typically developing children, who learn these discriminations readily with corrective feedback alone (Hayes, 1984; Herruzo & Luciano, 1994).

The near-errorless training intervention employed here was highly effective in establishing highly accurate discriminations of saying and say–do relations in all three subjects. The target repertoires established during this intervention remained intact when the referents were not used as prompts and additional questions were removed. Furthermore, these newly established responses generalized to a novel stimuli. It could be argued that the questions themselves regarding saying and doing functioned as the necessary contextual cues controlling correct responding irrespective of stimulus form.

There are a number of reasons to believe that the results obtained in the current study are the result of the near-errorless training intervention. First, similar results were obtained for all three subjects. Second, variations in the content of the saying and doing behaviors precludes the suggestion that the results may be due simply to the repetition of the target discriminations. This finding is supported by the generalization to novel stimuli. Third, for many years these repertoires appeared to be absent for these subjects. Thus, it would seem unlikely that the subjects's extra-experimental environment played a significant role in their correct performances. This finding is also supported by the fact that the corrective feedback procedure had only limited success.

The corrective feedback procedure included a number of features commonly found in successful training. For example, training across exemplars and differential consequences for correct and incorrect discriminations (Baer, Peterson, & Sherman, 1967; Etzel et al., 1996; Guevremont et al., 1986; Luciano, 1986, 1996; Stokes & Baer, 1977). These features may have accounted at least in part for subjects' progress with doing behaviors. What differentiates this first intervention from the near-errorless training is that the latter also contained the use of specific referents as prompts for establishing the target discriminations of saying, doing and say–do relations. The combination of all of these features is important in leading to the near-errorless training the more effective. The near-errorless training also incorporated multiple-exemplars for each of the behaviors of saying and doing. Hence, this fact along with the use of referents as prompts may also have contributed to the success of this intervention by enhancing the flexibility of the subjects' discriminations, irrespective of the content of the actions.

A number of interpretations of the current findings are possible. One could argue, for example, that the referents employed in near-errorless training established two separate classes of saying and doing behaviors for the three subjects. Alternatively, it could be argued that the prompts established the words in the saying and doing questions as contextual cues that controlled appropriate transformations of functions for reports of saying and doing because they were spatially and temporally related to these words during training. One might even combine these interpretations and suggest that the current performances provide evidence of generalized contextually controlled classes or relational operants (Dougher, 1997; Hayes & Barnes, 1997; Hayes & Wilson, 1993; Hayes, Gifford, & Wilson, 1996). According to Dougher (1997) all operants are in fact classes, because what is reinforced by a contingent consequence in a particular instance is not a single response but all topographically defined responses that are functionally related. Hayes et al. (1996) have further suggested that when relational responses are abstracted out so that they come under the contextual control of specific cues, then these cues control behaviors that do not resemble each other topographically. That is, in this case, multiple reports of saying and doing come under the control of the words saying and doing and then these cues control new content. Although replication is emphasized, this intervention extends the literature on discrimination training procedures which has proven to be effective with less complex repertoires (see Etzel et al., 1996), and it is the first successful attempt to establish complex discriminations on delayed reports of one's own previous behaviors with developmentally delayed. Say other way, this intervention was effective in establishing complex repertoirs that enable a child to bring previous behaviors into the present so as to facilitate more complex verbal discriminations of the world and the role of one's own behavior in it.

Notes

1. Transcript of a corrective feedback trial is available upon requesting to the first author.
2. A complete transcript of the prompted near-errorless training trial is available upon requesting to the first author.

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