A Review of Correspondence Training: Suggestions for a Revival

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Doing what is promised or accurately reporting what has been done increases with correspondence training. Early research showed that training produced positive correlations between saying and doing, but did not always produce useful generalized correspondence to new, untrained say-do sequences (Baer, 1990). Recent research (reviewed here in detail) questioned early procedures and introduced new issues: functional criteria, functional verbal responses, baseline measures, and response chains in correspondence training. Correspondence research was almost abandoned after 1992. This review suggests new procedures and directions to revive this important research area. Specific suggestions are to combine correspondence procedures with similar features from ongoing research in compliance and self-instruction; consider important guidelines for future research derived from recent studies; consider interactions between applied and basic research with correspondence issues; compare correspondence between different participant cohorts; examine the use of descriptive and functional terms; examine punishment procedures; and provide a behavioral analysis of the relations between verbal and nonverbal behaviors related to correspondence.

Key words: say-do correspondence training, generalization, functional verbal control, naturalistic baseline, compliance, self-instruction

This review is about correspondence between some form of verbal behavior and nonverbal behavior or other verbal behavior. Doing what you promised to do, or not doing what you promised not to do, are two types of correspondence; two others are accurately reporting what you have or have not done. Correspondence is valued by the listener. Valued descriptors like *trustworthy*, *truthful*, and *reliable* suggest a positive regard for high correspondence.

Lack of correspondence, when a speaker reports a behavior that did not occur (lying) or promises a behavior that never occurs, is often aversive for listeners. Several folk sayings illustrate this: “the most promising student in the class—always promising but never doing” or “talk is cheap.”

Promises or reports occur in social

situations in which other persons may provide consequences (when a child says that she is going to play with a truck, the teacher may respond, “good girl”). When the behavior being promised or reported does not occur in a social situation, then its natural consequences (playing with a truck) may affect future promises or reports. When the behavior does occur in a social situation, then the responses of others (e.g., teacher approval) will also affect future promises and reports.

If the promised behavior is verbal (e.g., saying “please” after making a request), then future promising or reporting will depend entirely upon responses from other persons. Such verbal interactions may lead to situations in which correspondence is not supported. If the behavior occurs at a different time or place from the promise or report, confirmation of its occurrence may be difficult. Speakers sometimes receive reinforcers simply for promising or reporting, regardless of whether the actual behavior ever occurs. For example, parents sometimes approve of a child who says his bedroom has been cleaned without examining the room. Alternatively, the be-

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havior may occur and be unnoticed (not reinforced) by group members.

The present review is restricted to behavior-analytic research, but behavior analysis is not the only discipline concerned with correspondence. Social psychologists have devoted much research to attitude-behavior congruence, that is, correlations between what a person says, prefers, or endorses (often on a questionnaire) and some other measure of nonverbal or verbal behavior (Eagly & Chaiken, 1993; Lloyd, 1994a). Anthropologists also encounter correspondence issues if they rely only upon village informants as a source of data. If direct observation of village behavior is lacking, then the accuracy of information from informants can only be assumed (Harris, 1979; Lloyd, 1994b). Our everyday interactions with other people often depend upon some level of correspondence between what we discuss and how we would behave in a related situation. The ease of verbal descriptions (instructions, requests, promises, threats, etc.) in influencing human behavior may maintain such responses relative to the effort involved in direct observation and contingency management of the promised or reported behavior. Effective verbal behavior requires assumptions that some correspondence exists between talking and doing. It behooves us to make the degree of that correspondence as explicit as possible. This is a major goal of correspondence research.

Most social theories, as well as laymen's common sense, suggest that saying and doing are closely related, and that saying has a causal role over doing; that so-called mental events precede behavioral ones. These approaches seem limited by the notion that a mental or personality force somehow has priority over an overt response system. Behavior analysis, on the other hand, has studied correspondence as two response classes that may or may not be related. Priority is given to the environments, both social and nonsocial, that support these classes and their interventions.

Behavioral research on correspondence training has contributed to an understanding of the relations between words and deeds. However, after a promising beginning (Baer, 1990; Risley & Hart, 1968) this research was largely abandoned after 1992. Two reviews of correspondence training research are available (Baer, 1990; Paniagua, 1990). Paniagua cited recent correspondence studies, but did not discuss them. Baer discussed four recent studies as noted below. Neither emphasized recent research. This paper briefly reviews early correspondence studies to provide background for an analysis of the recent studies. Changes in procedures and interpretations distinguish recent from early research. Additional procedures and directions are suggested with the hope of restarting this research area.

Terminology

Correspondence training is designed to alter a relation between a verbal response (which describes another response) and the target response (which is often nonverbal). The former is called *saying*; the latter is called *doing*. The say component of the sequence may precede (promise) or follow (report) the do component; for example, "I shall play with blocks today" (Israel & O'Leary, 1973) or "I played with blocks today" (Risley & Hart, 1968). Saying applies to both sequences; promising and reporting distinguish between the sequences (Baer, 1990; Paniagua & Baer, 1982; Wilson, Rusch, & Lee, 1992).

Most early studies used do-report sequences (e.g., Israel & O'Leary, 1973; Karoly & Dirks, 1977; Paniagua & Baer, 1982; Risley & Hart, 1968; Rogers-Warren & Baer, 1976). Most recent studies used promise-do sequences (e.g., Baer, 1990, p. 382; Baer & Detrich, 1990; Williams & Stokes, 1982). Reports of faster correspondence training with promise-do sequences (Israel, 1973, 1978; Israel & Brown, 1977; Israel & O'Leary, 1973; Karoly & Dirks,

1977) may have led to this preference. However, over multiple sessions with either sequence, saying during one session might affect doing during subsequent sessions; that is, doing X in Session N could affect promising or reporting X in Session N+M as well as in Session N. Such cross-session effects may confound sequence comparisons (see also Israel & O'Leary, 1973; Paniagua & Baer, 1982, pp. 787–788, 796–798; Risley & Hart, 1968, pp. 271, 275, 280; Rogers-Warren & Baer, 1976, p. 336).

Early Research

Although participants were often nursery school children, other populations included individuals with mental retardation (Whitman, Scibak, Butler, Richter, & Johnson, 1982), adolescents (Deacon & Konarski, 1987), and university students (Sowers, Lloyd, & Lloyd, 1977). Examples of target responses were playing with toys, being seated or on task, demonstrating good posture or social skills, or doing academic tasks (Baer, Detrich, & Weninger, 1988, p. 345; Baer, Williams, Osnes, & Stokes, 1984). Response consequences included praise, tokens, toys, edible items, money, classroom points, and games. Early studies reported data from groups of participants (Risley & Hart, 1968). After comparisons of group and single-subject designs failed to show differences, the latter designs were usually chosen (Israel, 1978; Williams & Stokes, 1982).

Three conditions were typically used: baseline, reinforcement of saying, and correspondence training. During baseline, doing was measured, (e.g., the frequency of using various toys during playtime). After playtime, verbal responses were sometimes prompted ("What did you do that was good today?") followed by nonspecific comments of a teacher (e.g., Risley & Hart, 1968) or by noncontingent snacks or toys (e.g., Israel & O'Leary, 1973; Williams & Stokes, 1982).

Behaviors that occurred infrequently

during baseline typically became target responses in subsequent experimental conditions. For example, during reinforcement of saying, the experimenter prompted a promise to use, or a report of having used, a target toy; reinforcement followed the saying. This condition tested whether increased saying alone would increase doing (i.e., correspondence). Reinforcement increased saying but seldom increased doing. This condition has sometimes been omitted (e.g., Israel & Brown, 1977; Paniagua & Baer, 1982; Whitman et al., 1982; Wilson et al., 1992).

During correspondence training, reinforcement was contingent upon both promising and doing or both doing and reporting. In promise-do sequences, reinforcers followed doing; in do-report sequences, reinforcers followed reporting. Usually the frequency of doing equaled or approached that of saying. If saying decreased to the level of doing, it was also scored as correspondence (Risley & Hart, 1968). All studies reported some degree of correspondence. Ordinarily, saying and doing occurred in close proximity, but delays between saying and doing (Baer, Osnes, & Stokes, 1983; Guevremont, Osnes, & Stokes, 1986a; Sowers et al., 1977; Weninger & Baer, 1990) and between saying and reinforcement of saying (Baer et al., 1983; Sowers et al., 1977) were also used.

Given successful correspondence training, a reversal to reinforcement of saying tested maintenance of correspondence (Guevremont, Osnes, & Stokes, 1986b). Generalization of correspondence was tested by observing if a new verbal response also produced new corresponding play (Israel & Brown, 1977; Risley & Hart, 1968; Stokes & Baer, 1977; Williams & Stokes, 1982). The possibility of establishing generalized correspondence with new say-do sequences (or with former sequences in new settings) would justify the additional labor involved in correspondence training (over simply reinforcing nonverbal responses).

Procedures to obtain and maintain generalized correspondence (Baer, 1990) included correspondence training with several targets (Risley & Hart, 1968), reinforcement of saying following correspondence training (Whitman et al., 1982), intermittent reinforcement of correspondence (Baer, Blount, Detrich, & Stokes, 1987), delayed reinforcement of saying following correspondence training (Baer et al., 1984), a combination of the above contingencies (Guevremont et al., 1986b), and use of positive and negative consequences for correspondence and non-correspondence, respectively (Osnes, Guevremont, & Stokes, 1987). A summary of these several studies indicated that "although some studies have documented . . . generalized correspondence . . . , the variables that control the occurrence or nonoccurrence of generalization remain unclear" (Baer, 1990, p. 390).

Recent Research

Although recent studies continued to examine generalized correspondence, they also examined new issues that are reviewed here in detail.

Functional criteria for demonstrating correspondence and generalization. Fortright discussions of early correspondence training research (Catania, Shimoff, & Matthews, 1987; Karlan & Rusch, 1982; Martella, 1994; Matthews, Shimoff, & Catania, 1987; Stokes, Osnes, & Guevremont, 1987) raised the general problem of defining and measuring relations between verbal and nonverbal behavior as well as important questions about the experimental designs of this research.

Early research had demonstrated high probabilities of doing X after saying X (i.e., correspondence of a particular say-do sequence), but had not demonstrated correspondence as a response class (Matthews et al., 1987). Doing so would have required evidence of low probabilities of doing X after not saying X (e.g., saying not X, saying Y, refusing to say) as well as

high probabilities of doing X following saying X with sequences that had not been directly reinforced. "When this combination of conditional probabilities is observed, it is appropriate to speak of the maintenance of the response class of *generalized positive correspondence* between saying and doing" (p. 72). The appearance of correspondence in early studies may have been due to other correlated variables. These studies did not "distinguish correspondence from the superficially similar case in which verbal and non-verbal responding both occur frequently but are functionally independent" (p. 70).

Matthews et al. (1987) reanalyzed published data; they did not present new data to support their arguments. Subsequent researchers have published relevant data demonstrating differential outcomes after saying X and after not saying X. Wilson et al. (1992) contains one example. Their measures of doing (or not doing) were made after promises *and* before reports.

Participants were 4 adolescent boys who had been diagnosed with moderate mental retardation. To assess their reporting skills, they were observed performing various activities and later were asked to report which activities they had used; their reports were 83% accurate. The target behaviors involved use of exercise machines in a weight-training room. Participants chose to use four of seven machines. Training sessions included seven steps: experimenter requests promises, participant promises or not, participant exercises or not, experimenter requests reports, participant reports or not, and experimenter presents consequences for accuracy of reports.

During baseline, neither prompts nor consequences were delivered. During the only session of correspondence training, an experimenter modeled all phases of the experiment before participants rehearsed and received feedback. In subsequent sessions, reinforcers (verbal praise, coins, or edible items) followed accurate reports. No

TABLE 1

Mean percentage correspondence and noncorrespondence for promise and report sequences during baseline and correspondence training

Sequences	Conditions	
	Baseline	Correspondence training
Promise sequences		
Correspondence		
Promise/do	20	75
Promise not/not do	0	0
Noncorrespondence		
Not promise/do	21	8
Promise/not do	55	17
Report sequences		
Correspondence	26	88
Do/report	(Data not categorized)	
Not do/report not		
Noncorrespondence		
Do/not report	21	4
Not do/report	53	8

Note. Adapted from Wilson, Rusch, and Lee (1992).

consequences were ever programmed after promises. These features of the design were intended to eliminate possible escape contingencies inadvertently imposed on participants' verbalizations (Baer & Detrich, 1990). Experimenter-specified prompts for specific machines and reinforcers for participant promises were also avoided to eliminate additional confounding of reinforcer contingencies on verbal and nonverbal behavior (e.g., Baer, Williams, Osnes, & Stokes, 1985). Finally, the dependent variable was percentage correspondence rather than the typical frequency of occurrence of the target response (Matthews et al., 1987, p. 70).

The results are summarized in Table 1. Sequences in column 1 are divided into promises or reports, and then subdivided into correspondence or noncorrespondence. The two promise correspondences are promise-do (a participant promised to perform an activity and did) and promise not/not do (a participant promised not to perform an ac-

tivity and did not). The two sequences of promise noncorrespondence were not promise/do (a participant did not promise to perform an activity but did it) and promise/not do (a participant promised to perform an activity but did not). Similar sequences of report correspondence and noncorrespondence are in the bottom half of column 1.

The mean percentages of report correspondence and noncorrespondence from baseline and correspondence training for the sequences in column 1 are shown in columns 2 and 3, respectively. (Data from individual participants can be found in Wilson et al., 1992.) Report correspondence increased from 26% during baseline to 88% following correspondence training. Overall report noncorrespondence decreased from 74% to 12%.

During the same sessions, promise correspondence increased from 20% in baseline to 75% following correspondence training *for reporting*. Overall promise noncorrespondence decreased from 76% in baseline to 25% following correspondence training. The results of the contingency analysis provided "additional evidence that changes in verbal-nonverbal correspondence were attributable to the intervention package" (Wilson et al., 1992, p. 688). They provide "evidence of low probabilities of doing X following not saying X or following saying Y" (Matthews et al., 1987, p. 70). Similar results have been reported by Baer et al. (1988).

Wilson et al. (1992) obtained these results without direct experimenter prompts for particular promises; nor were reinforcers ever presented until after reports were made. These procedures were intended to control for possible confounding effects present in some prior studies. The study did not provide direct analysis of the factors responsible for the high levels of promise-do correspondence that occurred. However, the seven steps could have become linked in a chain (see Paniagua & Baer, 1982, below). To test this, research could compare the effects of reinforcing promises or not on later re-

ports. The degree of correspondence shown in Table 1 during baseline (20% for promises and 26% for reports), when participants freely chose their exercise machines, was greater than that reported in early studies. In early studies when experimenters had often specifically prompted low-frequency responses as targets for reinforcement, baselines were often zero. Baseline correspondence measures are discussed further below.

Functional verbal responses in correspondence training. Five recent studies examined the functional role of saying during correspondence training. Early researchers suggested that correspondence training may develop verbal self-regulation; that is, a person's own verbal responses may come to control their nonverbal responding (Baer, 1990; Deacon & Konarski, 1987; Osnes, Guevremont, & Stokes, 1986). Deacon and Konarski (following Rogers-Warren & Baer, 1976) reasoned that because "the verbal and nonverbal behaviors are both followed by reinforcement in correspondence training, one can predict an increase in both behaviors due to this reinforcement alone" (p. 391). Speculation about verbal self-regulation may be unnecessary. What participants promise or report may correlate with what they do, but are still not functional determinants of what they do.

Deacon and Konarski (1987) compared the performance of a reinforcement training group (do only) with that of a correspondence training group (say-do). Two adult groups (7 men and 5 women; mean age 28 years; mean Wechsler adult IQ of 53) served as participants. They were paid minimum wages at the start of each session. Five conditions lasted one session each. Conditions consisted of 12 trials; 20 responses defined a trial. During baseline, participants could manipulate any of seven different response devices, each associated with unique audio or visual consequences. The three responses with the lowest frequency of use during baseline became target be-

haviors. During the second condition (Verbal Control 1), participants were prompted to name one specific target on each trial, and reinforcers were delivered when they named the prompted response. All response options remained available. They received an additional 10 cents per trial contingent upon correct naming and were then left to complete the trial.

During treatment, reinforcement for the correspondence group was contingent upon promise-do correspondence with one targeted response. Reinforcement was accompanied by explicit feedback on the correspondence required by the contingency. For the reinforcement group, no promises were prompted. Reinforcers followed trial completion only if the target response occurred 20 times. Again, reinforcement was accompanied by explicit feedback, this time on the response that satisfied the contingency. A second verbal control condition, identical to the first, was then conducted, and follow-up measures were collected for some participants 2 months later. Other than the reinforcement contingency during treatment, the groups were treated identically during baseline, both verbal control conditions, treatment, and follow-up.

Performance of the target response was near zero for both groups during baseline and Verbal Control 1 conditions, and was near maximum during treatment. During the second verbal control condition, 4 participants from each group showed say-do correspondence with the treatment target response, and this pattern generalized to two new targets. When these 8 participants were tested during follow-up, correspondence was maintained with all three targets. No differences were observed between the correspondence training and the reinforcement training groups during any condition. "Clearly, these data indicate that the process of developing correspondence is more complex than simply reinforcing a verbal/nonverbal sequence of behaviors" (Deacon & Konarski, 1987, p. 398).

Further discussion of Deacon and Konarski follows an examination of four follow-up studies.

Each follow-up experiment replicated parts of Deacon and Konarski (1987). Baer et al. (1988) reported two studies. The first tested normal preschool children in a single-subject multiple baseline design (across activities in their usual setting). Compliance training (i.e., experimenter requests child to do X; child does not speak) was alternated with correspondence training (i.e., child promises to perform) to observe any differences in outcome of the two procedures. During baseline, any response to the prompt, "What are you going to do during playtime today?" produced a verbal "okay" from the experimenter. During reinforcement of saying, target answers were prompted and reinforced. During compliance training, the experimenter specified a toy to play with, and reinforcers were contingent upon playing with that toy. During correspondence training, the child was prompted to name a toy, and reinforcers were contingent upon playing with that toy.

During baseline and reinforcement of saying, playing with target toys remained low or at zero. Compliance and correspondence training resulted in similar increases in percentage of play. The probabilities of compliance and correspondence were essentially equal; thus, saying and doing were independent, because "making a verbal promise to [emit the target response] had no apparent effect on the probability that the children would do so" (Baer et al., 1988, p. 349; Matthews et al., 1987). One implication is that children's saying may have been unnecessary in prior studies.

In a second study, Baer et al. (1988) again tested 4 preschool children with a similar design and activities, but controlled for order effects between compliance and correspondence conditions and included a condition comparable to Deacon and Konarski's (1987) reinforcement training condition. Reinforcement training (no experimenter

prompts; reinforcement followed doing) was alternated with compliance and correspondence training each day to control for order effects. During reinforcement training, the experimenter did not interact with the participant until after the play period. In correspondence and compliance conditions, reinforcement was contingent upon use of a toy that had been specified prior to the play period.

During baseline and reinforcement of saying, playing with target toys remained low or at zero. Unlike the results of Deacon and Konarski (1987), target play during correspondence training, despite wide variability, exceeded that during reinforcement training. Performance during correspondence and compliance training did not differ. These results suggest that some form of saying, by the participant or the experimenter, may play a role in facilitating correspondence.

A third follow-up study (Weninger & Baer, 1990) compared correspondence and compliance conditions with 5-year-old kindergarten children in their classroom. Following baseline and reinforcement of saying, the experimental conditions were randomly mixed across sessions to control for possible order effects. A multiple baseline design across two target behaviors (completion of letter or number worksheets) was used. Saying and doing were separated by 5.5 hr.

Worksheet completion for letters and numbers was low for all participants during baseline and reinforcement of saying. It was consistently high during the alternation of both training conditions. No differences in worksheet completion between correspondence and compliance training were observed.

The fourth follow-up study (Ward & Stare, 1990) sought to identify the role of participant verbalization during maintenance and generalization. The 12 5-year-old participants, enrolled in a kindergarten class, had access to a variety of activities. Baseline was followed by prompts and reinforcement

of saying Target Activity 1. A reversal to baseline conditions was implemented next for Target 1, and reinforcement was arranged for saying Target 2. Next the children were divided into a correspondence training group and a reinforcement training group. Saying the target activity was prompted during correspondence training but not during the reinforcement conditions. Both training conditions targeted play with Activity 1. Following training, subsequent conditions included reinforcement of saying Target 1; and then training Target 1 with baseline conditions in effect for Target 2; and, finally, reinforcement of saying Target 2 with baseline conditions in effect for Target 1.

During baseline, reinforcement of saying, and reversal to baseline, both groups played at similarly low rates with both target activities. The authors summarized their main results as follows:

[Both] groups performed the target behavior both times the [two training conditions] were provided. Maintenance usually occurred among the correspondence training subjects but was almost absent for those in the reinforcement group. Assessment of generalized correspondence revealed that the behavior of the students exposed to correspondence training generalized to a new response, whereas the behavior of those assigned to the reinforcement treatment did so to a lesser degree. (Ward & Stare, 1990, p. 132)

To summarize, Deacon and Konarski (1987) had reported "little, if any, difference between the generalized correspondence behavior of individuals exposed to either [training procedure]" (p. 396). Ward and Stare (1990) reported that both maintenance and generalization occurred more often following correspondence training. These studies used group designs to compare the critical training procedures. Baer et al. (1988) and Weninger and Baer (1990), using single-subject designs, found no differences between correspondence and compliance conditions. Baer et al. also reported reinforcement training to be less effective than either compliance or correspondence training. They did not measure maintenance or generalization. Additional discussion

of these varied results can be found in Ward and Stare. To date, the functional role of saying under correspondence conditions remains unclear.

Both Deacon and Konarski (1987) and Ward and Stare (1990) speculated that rule-governed behavior might influence correspondence training. That is, instead of a self-regulation hypothesis, participants might have come to follow the rules regarding contingencies of reinforcement that were provided as feedback and then receive reinforcement for following the rule. These authors specifically acknowledged that empirical support for the role of rule-governed behavior is both lacking and needed.

All of these studies included a reinforcement-of-saying condition (verbal control) before either correspondence training or reinforcement training; that is, participants received reinforcers for saying they would perform some activity. Prompts and promises by experimenters and participants during reinforcement of saying may have alerted the reinforcement training group to name target activities even when this was not required, thereby facilitating correspondence without directly training it. Additional reasons for caution regarding possible unintended effects of including a reinforcement-of-saying condition are discussed in the next section.

The relatively equal performance of correspondence and reinforcement groups, as well as of correspondence and compliance groups, emphasizes the importance of analyzing the contingencies that may contribute to this similarity (e.g., learning rules, sequential effects of experimental conditions, verbal control). The fact that the groups behaved similarly need not imply that they are responding to the same contingencies. At issue here is determining those variables that contribute to performance during both reinforcement and correspondence training. Failure to find differences between the two training conditions does not help to identify

TABLE 2

Mean percentage corresponding and noncorresponding reports of play and not play during each condition

Conditions	Corresponding		Noncorresponding	
	Play	Not-play	Play	Not-play
Baseline alone	36	63	0	1
Reports of play alone	40	42	17	1
Reports of play group	39	26	35	0
Correspondence group	34	61	3	2
Baseline alone	38	62	0	0

Note. Adapted from De Freitas Ribeiro (1989).

relevant variables for either training condition.

Measures of baseline and correspondence. Early researchers targeted for training play activities with low baseline frequencies. They did not measure correspondence until after baseline and reinforcement of saying. De Freitas Ribeiro (1989), however, measured naturally occurring correspondence between doing and reporting during all conditions (cf. Atwater & Morris, 1988; Strain, Lambert, Kerr, Stagg, & Lenkner, 1983). Eight 3- to 5-year-old nursery-school participants had access to six toys; sessions ended after three toys had been chosen. Report correspondence was measured after every session. Children reported "play" or "not play" to photos of the six toys. Accurate reports were scored as correspondence; inaccurate reports were scored as noncorrespondence.

Conditions are listed in column 1 of Table 2. During baseline alone, children played and reported alone. During the reports-of-play alone condition, all reports of play, whether accurate or not, were reinforced. Reports of not playing had no consequences. During the reports-of-play group condition, children reported aloud. Some children had not previously contacted reinforcers for noncorresponding reports of play; group reporting permitted them to observe others receiving reinforcement for any report of play. During the correspondence group condition, only

accurate reports of play or not play were reinforced.

The results are summarized in Table 2. Individual participant and session data are presented in de Freitas Ribeiro (1989, p. 365). During baseline alone, 99% of the reports corresponded; 36% of those were reports of play and 63% were reports of not play. Six children corresponded on every report; 2 children made one or two noncorresponding reports.

In every condition, corresponding reports of play and not play exceeded noncorresponding reports of play and not play. Compared to baseline alone, corresponding reports of play and not play decreased during reports-of-play conditions, whether reports were given alone or in a group. Correspondence increased during both correspondence group and reversal to baseline-alone condition.

Early experimenters had measured frequency of toy use during baseline. Responses with low baseline frequencies were chosen as targets; neither reinforcement of promising nor reinforcement of reporting increased these frequencies. Because baseline correspondence was not measured, the effects of reinforcement for saying on baseline correspondence were not known. De Freitas Ribeiro's (1989) data showed that reinforcement of saying (a) was not responsible for correspondence and (b) actually decreased whatever correspondence had previously existed in baseline.

Baer and Detrich (1990) extended de Freitas Ribeiro's (1989) results by measuring percentage correspondence in promise-do (rather than do-report) sequences with 4 normal 4-year-olds in a daycare center. Participants promised alone and later played in a room with other children present. A free-choice condition (children could choose any of six toys) was compared to a restricted-choice condition (children could choose from three toys selected by the experimenter) in a multielement multiple baseline design. The promise-do data were similar to the do-report data of de Freitas Ribeiro. High correspondence occurred during free-choice conditions with no reinforcement contingencies in effect and when correspondence was reinforced. Correspondence decreased during restricted-choice conditions with no programmed reinforcement and during reinforcement of saying. Correspondence did not require training in either of the above studies. It was already present in preschoolers' repertoires.

Many studies have included a reinforcement-of-saying condition after baseline and before correspondence training. Only after de Freitas Ribeiro (1989) and Baer and Detrich (1990) measured baseline correspondence before introducing reinforcement for saying were the apparent disruptive effects of the latter condition on baseline correspondence observed (see also Baer et al., 1984, p. 439). Experimenters who introduce a reinforcement-of-saying condition without isolating its effects risk misinterpreting their results.

Both sets of authors discussed their results in terms of tacts and mands (Skinner, 1957). During restricted choice, correspondence decreased; saying could have functioned as a mand with escape from the experimenter and access to the playroom as reinforcers. During free choice (no contingencies imposed on saying or doing), correspondence increased; saying may have functioned as a tact. Correspondence may have been controlled by different

contingencies during different experimental conditions.

Sequences of events (chains) in correspondence training. Paniagua and Baer (1982) suggested an analysis of correspondence in terms of response chains. For example, if the target response was painting, then, after the experimenter's query, "What are you going to play with today?" and the participant's verbal response, "paint," the participant would likely need to walk to a painting area, put on an apron, set up an easel, and so on. These "intermediate responses" might become part of a response chain beginning with a promise followed by intermediate responses and ending with doing. Completing intermediate responses puts the participant closer to the terminal response. A reinforcer could be placed anywhere along this chain (after promise, intermediate response, do, or report). Delivering reinforcers at certain points in the chain might produce more correspondence than at other points (see also Fowler & Baer, 1981; Paniagua, Stella, Holt, Baer, & Etzel, 1982).

The conditions in one preschool experiment (Paniagua & Baer, 1982) were baseline, reinforcement of report, reinforcement set up for promise, reinforcement of promise, and reinforcement set up for intermediate responses. During set-up, a reinforcer was placed in view of the child but was not delivered. Promises and reports were prompted throughout the study. Observers recorded promises, reports, and two measures of doing: presence (being near the target materials) and participation (playing with the target materials). The dependent variable was percentage of 20 30-s intervals that were scored as presence or participation (e.g., if presence occurred during 15 of 20 intervals, this measure of correspondence was scored as 75%).

During baseline, correspondence as measured by either presence or participation was low (mostly 0%). Presence correspondence increased during all reinforcement conditions (90% to 100%).

Participation correspondence increased to 50% during reinforcement of reports and to 95% during reinforcement setup for either promise or intermediate responses. Participation correspondence decreased to less than 50% during reinforcement of promise. Reinforcement setup produced the highest participation.

No follow-up studies of Paniagua and Baer's (1982) chaining research were found. The closest approximation (Wilson et al., 1992) was described above. The chaining research not only highlighted the presence of intermediate responses in correspondence but also measured more than one dependent variable (presence and participation). The dependent variables differed in their outcome and merit further examination (see Rogers-Warren & Baer, 1976).

De Freitas Ribeiro (1989) and Baer and Detrich (1990) invoked tacts and mands to interpret their results. Their interpretations could be combined with chaining interpretations. Empirical identification of a functional role of tacts and mands would be a first step. Paniagua et al. (1982) have already examined the reinforcing effectiveness of consequences for responses earlier in a chain; the discriminative functions of these same events for responses later in a chain have not been analyzed. This might be another example of different contingencies operating during different experimental conditions.

SUGGESTIONS FOR A REVIVAL

Combining Related Research with Correspondence Training

Two ongoing behavioral research areas offer new suggestions for correspondence research. Like correspondence training, compliance training and self-instruction seek to relate verbal and nonverbal behaviors. The successful procedures used in these areas could be modified and incorporated into future correspondence studies.

Compliance training. Baer et al.

(1988), Weninger and Baer (1990), and Matthews et al. (1987) have already noted similarities between correspondence and compliance. In correspondence training a child promises to do X; in compliance training an experimenter requests a child to do X. If correspondence or compliance occurs, then reinforcement follows. For example, Neef, Shafer, Egel, Cataldo, and Parrish (1983) made "do" requests to initiate a response (e.g., "come here") and "don't" requests to terminate a response ("don't touch"). Appropriate materials (arts, crafts) and inappropriate materials (matches, sets of keys) were available. Compliance with the requests was reinforced. Noncompliance was followed by verbal feedback and remedial practice (see also Adelinis & Hagopian, 1999). Differential responses to do and don't requests met the criteria for a response class advocated by Matthews et al. (1987).

Training involved one target do request and one target don't request. Sessions also contained probe trials with many do and don't requests. No consequences occurred in probe trials; these were used to assess training and generalization effects. During baseline, children complied at least once with all requests (cf. discussion of de Freitas Ribeiro, 1989, above). Training increased compliance with both trained and untrained requests of a given type (do or don't). Generalized compliance occurred within request types but not between request types (unless both types resulted in reinforcement in the same session).

Another compliance procedure interspersed requests for a response with low baseline compliance among requests for responses with high baseline compliance. Low-compliance responses increased (e.g., Belfiore, Lee, Vargas, & Skinner, 1997; Mace et al., 1988). A similar momentum effect in correspondence training might occur if low-probability correspondence sequences were interspersed within a series of high-probability sequences. Such combinations should be possible

given the variation in baseline correspondences observed in de Freitas Ribeiro (1989), Baer and Detrich (1990), and Wilson et al. (1992).

Other compliance procedures that could be incorporated into correspondence training include multiple targets and multiple do and don't prompts both within a session and across sessions (Hughes & Rusch, 1989; Rusch, Martin, Lagomarcino, & White, 1987); gradually lengthened intervals between promising, doing, and reinforcement; maintaining the same experimenter and setting during saying, doing, and reinforcement; and remediating occurrences of noncorrespondence. Probes could be introduced during training to test for discriminations between trained and untrained requests as well as during generalization tests of responses to untrained requests. Compliance training could precede or overlap correspondence training; the role of the experimenter could be gradually faded. After participants consistently complied, the experimenter could prompt them to state the request themselves. Participants, complying to their own requests, would be corresponding. Concurrently, participants would be requested to do Y and Z and occasionally prompted to state a request to do A—a test for a momentum effect (see also Rusch, Hughes, & Wilson, 1995).

Self-instruction. Discussions of correspondence training have invoked many “self” constructs (e.g., self-regulation or self-control; Baer, 1990; Deacon & Konarski, 1987; Duarte & Baer, 1994; Matthews et al., 1987; Williams & Stokes, 1982), but these constructs have seldom been empirically studied. Self-instruction research is an exception (Fjellstrom, Born, & Baer, 1988; Martella, 1994).

Self-instruction includes elements of saying and doing (Duarte & Baer, 1994). Unlike correspondence training, self-instruction emphasizes conditional stimulus control of behavior (Grote, Rosales, & Baer, 1996). Children comply to multiple requests within a verbal sequence of responses (a chain of be-

havior). The children's responses are initiated by and relevant to a problem. Their responses facilitate a solution and generalize to similar problems. Self-instruction is not designed to train any specific target behavior directly. Failures during criterion tasks or generalization tests are followed by prompts. Behavior that is consonant with prior self-instructions about relevant stimulus features is essentially a correspondence of saying with doing (Duarte & Baer, 1994).

The only correspondence training study to approximate these procedures (Williams & Stokes, 1982, Experiment 3) successfully remediated a participant's failure to correspond by requesting her to repeat a correspondence rule (“You have to do what you say you will do”; p. 26) after promising and before doing. Replication and extension of this study are warranted. Williams and Stokes taught their rule within a criterion task, but a general correspondence rule independent of the content of any specific say-do sequence could also be taught (Grote et al., 1996; Rusch et al., 1995).

Like compliance training, self-instruction includes multiple instances of the task, multiple requests, and multiple prompts. There is immediate feedback for stating self-instructions and delayed feedback for compliance with the self-stated instructions. Like correspondence training, self-instruction research must demonstrate that the task analysis bears a functional rather than a correlated relation to a solution (Fjellstrom et al., 1988; Grote & Baer, 1998).

The success of compliance and self-instruction training suggests procedures that could be readily adapted to correspondence training and thus could be a model for behavior analysts who are interested in correspondence research.

New Lines of Research

The focus of the literature described earlier has been on correspondence

training. A first step in the revival of this area should be to broaden the focus of *correspondence*. The training notion should not be discarded, but a more inclusive label will be more heuristic. Suggestions for the direction of correspondence research from this broader perspective follow.

Guidelines for the conduct of future research. The quality of new research will be enhanced if researchers attend to important guidelines drawn from earlier literature.

1. Demonstrate the functional criteria that define correspondence or its generalization (Matthews et al., 1987).

2. Identify criteria for determining when saying is and is not functional in occasioning nonverbal or other verbal behavior (Deacon & Konarski, 1987).

3. Obtain direct measures of baseline correspondence from baseline to the end of the study (de Freitas Ribeiro, 1989).

4. Analyze the conditions during which participants achieve correspondence; for example, de Freitas Ribeiro's (1989) children corresponded more often in their reports of not play than in their reports of play. It might be argued that this response pattern does not seem to be the most desirable, at least not in applied contexts. Other patterns of responding are noted in Wilson et al. (1992); Baer and Detrich (1990) discussed evidence of participants giving hints about reinforcement to other participants.

5. Examine the possibility that correspondence may be controlled by different contingencies during different experimental conditions (Baer & Detrich, 1990). For example, escape from the experimenter's prompts may maintain correspondence under some conditions, but support for this possibility would require direct analysis.

Applied problems in the laboratory. Early researchers approached correspondence from an everyday, commonsense, applied point of view. This was appropriate because the work was conducted in applied settings. Textbooks in psychology often describe a

two-way street between basic and applied research. Basic research issues may address an applied goal just as applied issues may induce a researcher to examine analogous problems in the laboratory. It seems that correspondence research was largely abandoned just at the point when basic research issues were being considered. A revival of interest in correspondence could begin from either a basic or applied orientation.

In an example of a basic orientation (Lattal & Doepke, 2001), pigeons were trained on a conditional discrimination task (matching to sample). On each trial, the pigeon pecked one of two stimuli. This first choice (the say component) determined which stimulus would be the sample. After a delay, the pigeon made a second choice (the do component) between the stimulus chosen in the say component and another stimulus. If the pigeon's second choice matched the first choice (correspondence) reinforcement was delivered; errors produced a 3-s time-out. Five of 6 pigeons attained accuracy scores of 80%. The authors discussed the functional, not topographical, similarities between correspondence and matching to sample. The study "used a simple motoric operant response as a homologue of the human verbal report because in both cases the response functions to indicate selection of one stimulus object or activity over others" (p. 129). This study illustrates the investigation of an applied correspondence issue in the laboratory.

Laboratory analyses in applied settings. Early correspondence researchers wrote about developing generalized response classes (Stokes et al., 1987). A broader research area would consider how any two response classes (not just saying and doing) are related or unrelated to each other or combined into a new class (Catania et al., 1982; Lattal & Doepke, 2001; Pierce & Epling, 1995; Shimp, 1983; Shimp, Sabulsky, & Childers, 1989). Research on interactions among response classes has occurred largely in the laboratory

in situations in which the emphasis has been on preventing interactions among the classes rather than combining them into one class (changeover delays; Catania, 1984). However, just because a behavioral analysis has been restricted to the laboratory does not mean that contingencies similar to those in the laboratory cannot be adapted to an applied situation (see momentum effects in compliance training; Houlihan & Brandon, 1996; Mace, 1996; Nevin, 1996; or other examples in Pierce & Epling, 1995).

Cohort comparisons. Research has shown very high baseline correspondence with 3- to 5-year-olds (Baer & Detrich, 1990; de Freitas Ribeiro, 1989). Wilson et al. (1992) observed lower levels of baseline correspondence with retarded adolescents. The latter results are similar to the reported low levels of correspondence with normal adults (Eagly & Chaiken, 1993; Lloyd, 1994a, 1994b). Could correspondence be negatively correlated with age? Obtaining baseline correspondence levels with a variety of participants of different ages would reveal the parameters of "natural" correspondence. Indeed, if additional studies of natural baselines were to reveal a decreasing trend, then *maintaining* correspondence may be a more important research problem than *training* correspondence.

Functional and descriptive terms. Except in de Freitas Ribeiro (1989) and Baer and Detrich (1990), the terms *saying* and *doing* have been used descriptively in the correspondence literature. Yet, functionally, these two response classes are, presumably, often controlled by different reinforcers (Skinner, 1957), that is, social (verbal) and natural (nonverbal), respectively. In correspondence research, the immediate reinforcers for saying are mediated socially. Reinforcers for doing are more complex. The natural (nonverbal) reinforcing features of play activities are continuously available; socially mediated reinforcers may or may not be present. The reinforcing values

of play activities (whether low-probability targets selected by experimenters or high-probability activities preferred by participants) have been largely ignored by researchers.

If saying and doing are maintained by different (and perhaps unequally effective) reinforcers, and if attempts to connect them (i.e., correspondence training) use reinforcers primarily associated with only one of the classes, difficulties may arise. Studying verbal-verbal correspondence (e.g., Baer et al., 1985; Brodsky, 1967; Cialdini, 1984; Rogers-Warren & Baer, 1976) or nonverbal-nonverbal correspondence (Paniagua et al., 1982; Whitman et al., 1982) rather than verbal-nonverbal correspondence might be a simpler first step.

Punishment. Because verbal behavior occurs in a social situation, it is often easier for the listener to reinforce or punish than is nonverbal behavior, which may occur in isolated, nonsocial situations. However, reinforcing verbal responses has been seen to reduce correspondence (Baer & Detrich, 1990; de Freitas Ribeiro, 1989). Efforts to punish noncorrespondence may require complex arrangements of contingency management. If a promised or reported behavior does not occur, then the behavior itself cannot be punished. Instead the trainer must withhold or remove a reinforcer that would have followed correspondence. Attempts to punish the promise would entail a delay. If a report of behavior is inaccurate or if a nonpromised behavior occurs, then direct punishment might produce generalized behavior suppression, and that might be undesirable. Solutions to these problems require continuing research.

Behavioral control of mental events. The introduction noted that laymen's common sense and some social scientists assume that mental events precede behavioral ones. An opposite approach is also tenable, that is, that nonverbal behavior has a controlling role over saying (Bem, 1967, 1972; Brodsky, 1967; Harris, 1979, p. 282; Lloyd,

1994a, 1994b). Behavior analysts view this issue in terms of the empirical relations among verbal and nonverbal response classes (Lloyd, 1994a), which may or may not be functionally related to prior behavior (Catania et al., 1982; Risley & Hart, 1968). This in itself constitutes an important research agenda. For example, the understanding that chains develop backwards (Malott, Whaley, & Malott, 1993) from a terminal reinforcer suggests that similar relations may operate among say-do sequences (Baer & Detrich, 1990, p. 29; Brodsky, 1967). Can participants be trained to respond such that prior nonverbal behavior controls their current verbal responses (Hineline & Wacker, 1993, pp. 272–273; Perone & Kaminski, 1992, p. 573)? Finally, if correspondence can be reliably established, then it should be possible to reliably produce noncorrespondence.

Recent correspondence research has left more questions than answers. It has also opened this field to wider arenas for empirical investigation. The present review is offered to encourage a revival of this important research.

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