

CORRESPONDENCE TRAINING: A REVIEW OF THE LITERATURE

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Correspondence training involves modification of nonverbal behavior via changes in verbal behavior. The procedure has a long history of effectiveness with a wide range of learners, but its potential for use with young children with disabilities remains largely unrealized. In an effort to identify the most appropriate applications of correspondence training procedures for this population, the authors conducted a comprehensive review of the existing literature base. The purpose of this article is to provide an in-depth, critical analysis of empirical research on the effectiveness of correspondence training. Thirty-three data-based articles are included in the review, which is organized into 4 categories, including: (1) early correspondence training research; (2) the role of the verbalization/content condition in correspondence training; (3) issues related to reinforcement; and (4) procedures to promote generalization.

Over the course of the past 30 years, correspondence training procedures have been used to modify the behavior of individuals with and without disabilities. Researchers have evaluated the impact of correspondence training on children's use of specific play materials (e.g., Baer, Williams, Osnes, & Stokes, 1985; deFreitas Ribeiro, 1989; Israel & O'Leary, 1977; Risley & Hart, 1968), engagement (Bevill, Gast, Maguire, & Vail, 2001), appropriate social behaviors (e.g., Odom & Watts, 1991; Osnes, Guevremont, & Stokes, 1986; Rogers-Warren & Baer, 1976), domestic and work-related skills (e.g., Crouch, Rusch, & Karlan, 1984; Paniagua, 1985), academic behaviors (e.g., Weninger & Baer, 1990; Keogh, Burgo, Whitman, & Johnson, 1983), health and safety behaviors (Baer, Blount, Detrich, & Stokes, 1987; Olsen-Woods, Miltenberger, & Foreman, 1998), leisure/recreational skills (Wilson, Rusch, & Lee, 1992), and self-control (Karoly & Dirks, 1977). While the general format of correspondence training has remained the same over time, theory and practice related to the procedure have evolved and changed in response to research outcomes.

The purpose of this article is to provide a critical analysis of the empirical research on the effectiveness of correspondence training with learners with and without disabilities. This review expands on the work of Baer (1990) by providing in-depth analysis of critical investigations, as well as an overview of studies completed since publication of that review. Because the literature base on correspondence training is relatively large and varied, review of individual studies is organized into 4 categories, including: (1) early correspondence training research (2) the role of the verbalization/content condition in correspondence

training; (3) issues related to reinforcement; and (4) procedures to promote generalization.

METHOD

Research studies related to use of correspondence training procedures were identified through electronic and archival searches of refereed professional journals. The archival search was conducted by reviewing the abstracts of journals listed in Table 1 to identify studies related to the topic. The electronic search was conducted using ERIC and PsychInfo databases at the University of Georgia. Key words used in the electronic search were: Correspondence training, reinforcement of correspondence, verbal behavior, nonverbal behavior, rule-governed behavior, behavior regulation, generalized verbal control, mental retardation, intellectual disability, and developmental delay. Reference sections of articles found through the electronic and archival searches were reviewed to identify additional studies.

RESULTS

Thirty-three empirical studies, 2 literature reviews, and 5 articles addressing specific issues related to correspondence training were identified via electronic, archival, and reference searches. Summaries of research on use of correspondence training procedures with and without disabilities are provided in Table 2. The following sections of this paper examine the evolution of correspondence training research, and discuss directions for future research.

EARLY CORRESPONDENCE TRAINING RESEARCH

Four investigations conducted in the late 1960s and 70s set the stage for future research by

Table 1
Journals Reviewed for Research on Use of Correspondence Training
Procedures with Individuals with and without Disabilities

Journals reviewed	Years reviewed
Behavior Modification	1984-2003
Behavior Therapy	1984-2003
Child and Family Behavior Therapy	1984-2003
Child Development	1984-2003
Education and Training in Mental Retardation	1984-2003
Education and Treatment of Children	1984-2003
Exceptional Children	1984-2003
Journal of Applied Behavior Analysis	1984-2003
Journal of Early Intervention	1984-2003
Journal of the Experimental Analysis of Behavior	1984-2003
Research in Developmental Disabilities	1984-2003
Topics in Early Childhood Special Education	1984-2003

delineating the basic components and sequences involved in correspondence training. Table 3 provides an overview of procedural parameters.

The first study to directly evaluate use of correspondence training procedures was conducted by Risley and Hart (1968). Drawing on early research by Lovaas (1961, 1964) and Sherman (1964) that attempted to change observable nonverbal behavior via changes in participants' verbalizations, Risley and Hart developed a set of procedures aimed at producing generalized correspondence between nonverbal and verbal behavior in preschool children. The effective procedures employed in this study came to be referred to as "do-say" correspondence training (Israel & O'Leary, 1973). In a do-say sequence, participants are given an opportunity to engage in a specific behavior (the "do" component) and reinforcement is delivered if they (a) engage in the target behavior; and (b) accurately report engaging in that behavior (the "say" component). Risley and Hart identified classroom materials that were rarely chosen by children during free play (e.g., blocks and paints) and used do-say correspondence training to increase participants' use of those specific materials. Following each day's free play period, children participated in Circle, during which time they were asked what they had played with. Initially, children were prompted to verbalize that they had played with

the target materials and then praised for the verbalizations, regardless of whether or not the verbalizations were accurate. This condition, which came to be known as Reinforcement of Content (Risley & Hart), was implemented in order to determine whether changes in verbal behavior would be associated with changes in nonverbal behavior during the next day's play period. When changes in nonverbal behavior were not observed during subsequent periods, the Reinforcement of Correspondence condition was implemented. In order to access reinforcers during this condition, children's verbal reports of play with target materials had to be consistent with actual play behavior (i.e., verbal-nonverbal correspondence was required). Results of this study indicated that the do-say correspondence training procedure was effective for increasing specific play behaviors, but the Reinforcement of Content condition alone did not produce verbal-nonverbal correspondence in the absence of a history of reinforcement of correspondence. Following repeated exposure to the Reinforcement of Correspondence condition with several different target materials, Reinforcement of Content was sufficient to produce changes in nonverbal behavior with novel materials. The authors concluded that such changes with nontrained materials demonstrated generalized verbal-nonverbal correspondence.

Israel and O'Leary (1973) conducted a group design study that compared the effectiveness of the do-say sequence employed by Risley and Hart (1968) with a "say-do" sequence. The say-do procedure consisted of asking children to verbalize plans to perform a behavior (the "say" component) and providing reinforcement if they engaged in the target behavior as verbalized (the "do" component). Like Risley and Hart, this study targeted use of rarely chosen materials during classroom free play periods. While results supported the findings of Risley and Hart (1968) that Reinforcement of Content was insufficient to produce changes in nonverbal behavior and Reinforcement of Correspondence did produce such changes, data indicated no demonstration of generalized verbal-nonverbal correspondence to novel materials.

Israel (1973) and Karoly and Dirks (1977) also conducted group design studies which they described as comparison of do-say and say-do sequences, but these researchers actually used a variation of the say-do sequence which Paniagua

Table 2
Chronological Listing of Research on Use of Correspondence Training Procedures (1968-2001)

Author(s)	Participant(s)	Purpose/ Question	Dependent Variable(s)	Independent Variable(s)	Experimental Analysis	Results	Generalization	
							Eval	Demo
Risley & Hart (1968)	n = 12 7M/5F; 4-5 yrs; low SES (2 groups)	Evaluated procedures to establish correspondence between v an nv behavior	% children saying; % children doing	CT1	3 experiments; (I) Multiple baseline across groups (II)(III) Multiple baseline across behaviors	(I) R+ content lead to increased reports, no change in tgt. behavior; R+ correspondence lead to increase in behavior; (II)(III) Repeated R+ of correspondence resulted in generalized correspondence.	B	Yes
Israel & O'Leary (1973)	n = 16 Head Start; 5M/11F; 4 yrs. (2 groups)	Compared effectiveness of do-say vs. say-do sequence	% children exhibiting correspondence	CT1;CT3	ANOVA	Say-do sequence more effective in producing v-mv correspondence	B	No
Israel (1973)	n = 6 Head Start	What effect does learning a do-say CT sequence have on performance of a say-do sequence?	% children exhibiting correspondence	CT1;CT3	t-test	R+ content lead to increased verbalization; no change in target behavior; Generalized corr. demonstrated following do-say CT; did not carry over when sequence switched to say-do	B	Yes*
Rogers-Warren & Baer (1976)	n = 32 univ. lab preschool; 4 yrs. (2 groups)	Examined impact of CT procedures on sharing and praising Evaluated role of content condition	% children saying; % children doing	CT1	Multiple baseline across behaviors	(I) R+ content lead to increase in reports but not behavior; R+ correspondence lead to increases in behavior (II) R+ correspondence effective in increasing sharing and general praise with or without R+ content (III) CT procedures effective in increasing specific praise statements	B	Yes
Israel & Brown (1977)	n = 16 x = 4-8 (2 groups)	What is the role of the verbalization (content) in establishing correspondence between v and nv behavior?	% children exhibiting correspondence	CT2	T-test	No ss difference between group with content phase and group without; both demonstrated target behavior only during R+ correspondence; both demonstrated generalized corr. with untrained toy	B	Yes
Karoly & Dirks (1977)	n = 12 church preschool; inner city (2 groups)	Is CT effective for teaching "tolerance" tasks to young children?	% children exhibiting correspondence	CT3	Nonparametric trend analysis for correlated data	R+ correspondence necessary for change in behavior; group using say-do sequence performed better than group using do-say	No	-
Jewett & Clark (1979)	n = 4 4-5 yrs.	What is impact of CT at school on children's mealtime conversation skills at home?	# appropriate comments made by child during meal	Modified CT1: verbal rehearsal; role play; feedback; practice	Multiple baseline across behaviors (topics)	Participants consistently introduced topics practiced at school during meal in home	B	Yes
Ballard & Jenner (1981)	n = 2 female; 6 & 7 yrs.	Evaluated effect of CT to increase social interactions of socially withdrawn child in free play setting	# social interactions; score on play scale	CT2	Multiple baseline across participants	# of social interactions increased when CT implemented; effects on play score inconclusive	T	Yes
Paniagua & Baer (1982)	n = 8 6M/2F; univ. lab preschoolers	Does it make a difference where in the chain R+ is programmed?	% intervals engaged in target behavior	CT1;CT3 CT4;CT5	Multiple baseline across participants	R+ set up contingent on promises or intermediate behavior consistently resulted in higher levels of target behavior than R+ of promises or reports alone	No	-
Whitman, Scibak, Butler, & Johnson (1982)	n = 8 5M/3F; Mi/MoID; 9-12 yrs.; Each participated in 1 of 3 experiments	Examined effectiveness of CT in changing behavior of students w/intellectual disabilities	(I) # times out of seat; (II) % intervals appropriate posture; (III) % intervals on-task	CT2	(I) ABAB (II & III) Multiple baseline across participants	All participants demonstrated criterion levels of tgt beh following CT participants in Exp (II) generalized tgt beh to an untrained setting; participants in Exp (II) & (III) completed more work during CT but no change in accuracy	B	Yes
Baer, Osnes, & Stokes (1983)	n = 1 male; 4 yrs. univ. preschool	Evaluated effectiveness of CT to program generalization of correspondence across settings, behaviors, & time	occurrence of tgt behaviors	CT2	Multiple baseline across behaviors	R+ of correspondence necessary to increase 1 st 2 target behaviors; R+ of content sufficient to change 3 rd behavior; behaviors maintained w/R+ of content but not w/return to baseline condition	B T	Yes Yes*
Keogh, Burgo, Whitman, & Johnson (1983)	n = 4; male; EMH class; 9-12 yrs.	Evaluated effect of CT on students' listening beh across settings	% intervals correspondence; % correct responses on listening task; % correct responses on multiple choice test	CT2	Multiple baseline across participants	CT resulted in increased listening beh for 2 participants across training & generalization settings; feedback on tgt beh resulted in criterion-level responding in all 4 participants; no consistent change in academic performance	S	Yes
Baer, Williams, Osnes, & Stokes (1984)	n = 4; 4-5 yrs.	Examined effect of delayed R+ on generalization & maintenance	occ/nonocc of play w/tgt toy during play session; % intervals child engaged w/tgt toy	CT2	Multiple baseline across behaviors	Immediate or delayed R+ of content did not result in changes in target behavior; R+ of corr. did; delayed R+ of content maintained behavior	B T	Yes* Yes*
Crouch, Rusch, & Karlan (1984)	n = 3 2M/1F;	Evaluated use of CT to produce change in work	# minutes to complete task;	CT2	Multiple baseline across participants	Two participants met criterion on both measures following R+ content	No	-

Author(s)	Participant(s)	Purpose/ Question	Dependent Variable(s)	Independent Variables(s)	Experimental Analysis	Results	Generalization	
							Eval	Demo
	MoID; 23-33 yrs.	behavior	# days began task on time			(no R+ content implemented); Third participant met criterion when increased by 5 minutes and content R+		
Baer, Williams, Osnes, & Stokes (1985)	n = 1 female; 4 yrs.	How long will verbal control of behavior maintain in the absence of R+? What impact will CT have on recovering verbal control of behavior?	occ/nonocc of tgt behavior; % intervals target behavior performed	CT2	Multiple baseline across behaviors	R+ of content initially increased target behavior & maintained for 12 days, then dropped to 0 levels; R+ of corr lead to immediate recovery of previous levels; R+ of content alone resulted in changes in 3 untrained behaviors	B	Yes
Paniagua (1985)	n = 6 male; 15- 17 yrs.; group home residents due to "family problems" & "borderline juvenile delinquency"	Evaluated use of CT to increase home & personal care behavior in group home residents	% tgt behaviors completed	CT1	Multiple baseline across participants	R+ corr resulted in increases in tgt beh to 100% for all boys	T	Yes*
Guevremont, Osnes, & Stokes (1986)	n = 3 2M/1F; 4 yrs.	Analyzed use of CT to achieve verbal control of untrained behaviors across time & settings	occ/nonocc of tgt behavior (different for each child)	CT2	Multiple baseline across behaviors	R+ of content resulted in change in behavior only after R+ of corr; generalized to untrained behavior at school but not home	B S	Yes No
Guevremont, Osnes, & Stokes (1986)	n = 2 1M/1F; 4 yrs.	Evaluated impact of 2 strategies (indiscriminable contingencies & delayed R+ of content) on maintenance following CT	% intervals engaged in target behavior	CT2 paired w/1 of 2 maintenan ce strategies	Multiple baseline across participants	Use of indiscriminable contingencies resulted in longer periods of maintenance that R+ of content	T	Yes
Ralph & Birnbrauer (1986)	n = 3; male; M/MoID; 18- 24 yrs; residential facility in Australia	Evaluated effectiveness of CT package that R+ both tgt beh and accurate reporting	# of target social skills performed	CT2	Multiple baseline across behaviors	CT resulted in increases in all tgt beh and accurate reports; Follow-up data indicate tgt beh maintained at high levels, accurate reporting did not	T	Yes*
Baer, Blount, Osnes, & Stokes (1987)	n = 3 2M/1F; 4-5 yrs.	Evaluated a maintenance program using intermittent R+ condition after successful CT	% nutritious snacks selected by child	CT2 paired w/intermit tent R+	Multiple baseline across participants	R+ content resulted in all children promising to choose healthy foods, no change in behavior; R+ corr resulted in criterion responding; Intermittent R+/fading resulted in maintenance over 7 weeks w/no further CT	T	Yes
Osnes, Guevremont, & Stokes (1986)	n = 2; male; dvmtl delays; 2-3 yrs	Evaluated effectiveness of CT w/young children with dvmtl delays	% intervals peer- directed talk during free play; % intervals within 1 m of peer (2 yr old only)	CT2	Multiple baseline across participants	CT resulted in increases in tgt beh of both children (surpassed mean of peers); proximity to peers increased	No	-
Osnes, Guevremont, & Stokes (1987)	n = 1; female; unspecified dvmtl delays; 4 yrs.	Examined effectiveness of CT package that incorporated both positive & negative consequences	% intervals peer- directed talk; % intervals proximity to peers; # hand raises	CT2	Multitreatment (ABACA)	CT w/positive consequences did not result in increases in tgt beh from baseline levels; addition of negative consequence (3 min TO) resulted in increases in all tgt beh; maintained @ 1 month w/no intervention	No	-
Deacon & Konarski (1987)	n = 12 7M/5F; MoID; adults (2 groups)	Compared outcome of CT w/R+ of tgt behavior	# of times activated 1 of 7 response devices	CT1 R+ tgt beh	Multitreatment (ABCBA)	4 of 6 participants demonstrated increases in tgt beh, regardless of procedure; increases maintained for both groups @ 2 mos.	T	Yes
Baer, Detrich, & Weninger (1988)	n = 6 4M/2F; preschoolers	What is the functional role of the child's verbalization & the teacher's prompt in CT?	% intervals toy play	CT2; R+ of tgt beh only	2 experiments; (I) Multiple baseline across behaviors (II) Multiple baseline across behaviors w/embedded ATD	R+ of tgt beh w/verbalization & R+ of corr superior to R+ of tgt beh w/o verbalization (teacher directive); Suggests antecedent verbalization critical, but source may be unimportant	No	-
deFreitas Ribeiro (1989)	n = 8 4M/4F 3-5 yrs.	What is the effect of group R+ of verbalization on accuracy of self-reports in CT program?	occ/nonocc correspondence	CT1 w/indiv and group R+ of content conditions	Multitreatment	All children exhibited accurate reports of play when free to choose any activity; R+ of content for teacher-chosen activities increased reports but not behavior; R+ of corr introduced, engagement in teacher- chosen activities increased	No	-
Weninger & Baer (1990)	n = 4 2M/2F; kindergarten	Compared R+ of corr and R+ of compliance w/time delay between verbalization & opportunity to engage in tgt beh (worksheets)	score on worksheets	CT2; R+ of complian ce	Multiple baseline across behaviors (types of worksheets) w/embedded multielement	Worksheet completion rates high during both R+ of corr & R+ of compliance conditions; no significant differences in tgt beh between conditions	No	-
Ward & Stare (1990)	n = 12 8M/4F; 4-5 yrs. (2 groups)	Which procedure is more likely to result in generalized corr to untrained behaviors: R+ of corr or R+ of compliance?	% intervals toy play	CT2; R+ of complian ce	Multiple baseline across behaviors w/reversals	Both groups engaged in tgt beh at similarly high rates in both R+ conditions; CT group generalized to an untrained behavior, R+ of compliance group did not	B	Yes*
Baer & Detrich (1990)	n = 4 2M/2F; 4 yrs.	Examined v/nv correspondence under 3 conditions: No contingencies (self- report/tact); R+ content (restricted choice); R+	% intervals correspondence	CT2 w/multipl e conditions	Multiple baseline across participants w/reversals	Children accurately verbalized behavior when no contingencies or restrictions on choice; R+ of content w/restricted choice resulted in decrease in correspondence; R+ of corr w/restricted choice resulted in	No	-

Author(s)	Participant(s)	Purpose/ Question	Dependent Variable(s)	Independent Variables(s)	Experimental Analysis	Results	Generalization	
							Eval	Demo
		content (restricted choice) to evaluate tacting and manding functions in CT programs				increased corr but behavior change did not maintain w/o R+ of corr		
Wilson, Rusch, & Lee (1992)	n = 4; male; MoID & severe lang. delays; 13 yrs.	Can students w/MoID accurately report their own behavior? Will changes in say-do corr occur following do-say CT?	% correspondence	CT1;CT2	Multiple baseline across participants	When do-say CT implemented, corr b etween v&nv beh increased for all 4 boys; similar reports in say-do, though never trained.	B T	Yes Yes
Roca & Gross (1996)	n = 3 2M/1F; 9 yrs.	Evaluated effect of CT on students' praise prompting across settings	# praise prompts by student; # worksheet problems completed; % correct	CT2	Multiple baseline across participants	All dependent measures increased with CT; praise-prompting behavior generalized to untrained setting (different class); Behavior maintained thru end of school year (3.5 wks)	B T	Yes Yes
Olsen-Woods, Miltenberger, & Foreman (1998)	n = 31 Head Start; 4-5 yrs	Compared effects of CT and traditional methods to teach abduction prevention skills to young children	Score on 0-4 point scale rating child's response to lure	Traditional safety skills training; CT2 safety skills training	Pre/post test ANOVA	No statistically significant difference between pre and post test scores of 2 groups (role play and in situ)	S	No
Bevill, Gast, Maguire, & Vail (2001)	n = 4 4-5 yrs; significant developmental delays	Evaluated effects of CT and picture cues on engaged play behavior of young children	% of intervals engaged in planned play behaviors; # planned behaviors completed	CT2 with picture cues	Multiple probe across participants	2 participants met criterion without R+ of correspondence; 2 participants required R+ of correspondence	No	-

Note. CT key:
v = verbal
nv = nonverbal
CT1 = do-say sequence
CT2 = say-do sequence
CT3 = CT2 and R+ set-up upon report
CT4 = immediate R+ of intermediate behavior
CT5 = R+ set-up upon intermediate behavior

Generalization key::
B = generalization across behaviors
S = generalization across settings
T = generalization across time

* = limited demonstration

(1990) later labeled “reinforcement set-up upon report”. This correspondence training sequence was implemented in a similar fashion to the say-do sequence described previously, except that during the Reinforcement of Correspondence condition, a snack was placed in participants’ cups upon verbalization of a plan to engage in the target behavior. While consumption of the snack was contingent upon actual behavior during free play (i.e., verbal-nonverbal correspondence), the placement of the snack in the cup following the verbalization may have served as a cue for children to engage in the target behavior, making this a slightly different procedure from the say-do sequence previously described.

In summary, the 4 studies described above provided a foundation for later correspondence training research by describing the basic components (Reinforcement of Content, Reinforcement of Correspondence) and three difference sequences (do-say, say-do, reinforcement set up upon request) that would appear consistently throughout the literature in the years to come. All 4 studies included interventions designed to increase behaviors not

typically exhibited by children in a free play setting. None found the Reinforcement of Content condition effective for changing behavior in the absence of a history with the Reinforcement of Correspondence condition, and only Risley and Hart (1968) provided a demonstration of generalized correspondence to untrained behaviors.

INVESTIGATIONS ON THE ROLE OF THE VERBALIZATION

Eight studies were identified that specifically evaluated the role of the verbalization within correspondence training procedures.

Rogers-Warren and Baer (1976) conducted a series of 3 multiple baseline across behavior investigations that evaluated the effectiveness of do-say correspondence training to increase sharing and praising behaviors of 32 typically developing preschool children. Data from all 3 experiments, which were reported as group means, supported previous findings in that the Reinforcement of Correspondence condition corresponded with increased rates of target behaviors. The second of

these 3 experiments was unique, however, due to omission of the Reinforcement of Content condition. Participants in this study moved directly from the baseline condition, in which occurrences of sharing and praising were recorded in the absence of programmed antecedents or consequences, to Reinforcement of Correspondence. Results of this experiment were consistent with those of Experiments I and III: both target behaviors increased with Reinforcement of Correspondence, and sharing generalized to an untrained setting. This called into question the necessity of the Reinforcement of Content condition for successful correspondence training.

Table 3
Overview of Procedural Parameters
REINFORCEMENT OF CONTENT

Say-do Sequence	Do-Say Sequence	R+ Set-up Upon Report	R+ Set-up Upon Intern. Behavior
Participant prompted to emit verbalization related to target behavior (e.g., "I'll play with blocks.")	Opportunity to engage in target behavior is provided	Same as Say-Do	Same as Say-Do
Reinforcement is given contingent on verbalization	Participant prompted to verbalize he/she engaged in target behavior		
Opportunity to engage in target behavior is provided	R+ provided contingent on verbalization		
REINFORCEMENT OF CORRESPONDENCE			
Say-do Sequence	Do-Say Sequence	R+ Set-up Upon Report	R+ Set-up Upon Intern. Behavior
Participant prompted to emit verbalization related to target behavior (e.g., "I'll play with blocks.")	Opportunity to engage in target behavior is provided	Participant prompted to emit verbalization related to target behavior	Participant prompted to emit verbalization related to target behavior
Opportunity to engage in target behavior is provided	Participant prompted to verbalize he/she engaged in target behavior	R+ placed in view of participant following verbalization	Opportunity to engage in target behavior is provided; R+ given for all intermediate steps (e.g., walking on block area, getting block box off shelf)
R+ provided contingent on verbal-nonverbal correspondence	R+ provided contingent on correspondence*	Opportunity to engage in target behavior is provided	Exchangeable traded for individual R+ contingent on correspondence
		R+ provided contingent on correspondence	

*Completion of a Do-Say sequence is expected to impact behavior during the next opportunity to emit the target behavior. This sequence is therefore procedurally similar to a say-do sequence, but the next opportunity to engage in

the target behavior typically does not occur until the next day, rather than a short time later.

A study by Israel and Brown (1977) examined the relationship between the Reinforcement of Content and Reinforcement of Correspondence conditions with 16 Head Start students. Half of the participants experienced a training sequence that consisted of Baseline, Reinforcement of Content I, Reinforcement of Correspondence, and Reinforcement of Content II. The other group of participants did not experience the first Reinforcement of Content condition. Resulting data were similar for the two groups, indicating that the initial Reinforcement of Content condition was unnecessary to achieve verbal-nonverbal correspondence. The authors suggested that Reinforcement of Content might best be conceptualized as a control condition employed to establish the absence of verbal-nonverbal correspondence and not as a necessary precursor to correspondence training.

By the mid 1970s consensus across researchers appeared to be that the Reinforcement of Content condition was important as a control phase, but could not be expected to increase behavior in the absence of a history with reinforcement of correspondence. Additional issues existed, however, related to the role of the verbalization in correspondence training. One such issue involved use of correspondence training with learners who had intellectual disabilities and demonstrated low or no verbal skills. Whitman, Scibak, Butler, Richter, and Johnson (1982) conducted a series of 3 experiments to determine what impact a say-do correspondence training procedure would have on the classroom behaviors of elementary school students with mild and moderate intellectual disabilities. The first investigation utilized an A-B-A-B design, while the second and third employed a multiple baseline across participants design. Experiments I and II were conducted with students who had low verbal abilities. In these experiments, the researchers prompted participants to verbalize plans to engage in appropriate classroom behaviors (staying in seat; sitting appropriately in chair), then provided specific verbal feedback and demonstration during the Reinforcement of Correspondence condition in order to clarify expectations and sources of error. Experiment III was implemented with 2 nonverbal students and targeted on-task behavior. During this

study, the verbalization used in Experiments I and II was replaced with students' rehearsal/demonstration of the appropriate behaviors in which they planned to engage. Specific verbal feedback and modeling was employed as in the first two experiments during the Reinforcement of Correspondence phase. Data indicated that all participants demonstrated substantial increases in target behaviors upon introduction of the Reinforcement of Correspondence condition. This study was important for 2 reasons: It was the first to employ correspondence training procedures to modify the behaviors of participants with intellectual disabilities and the first to include participants who lacked the ability to emit verbalizations related to the target behavior.

While the studies discussed to this point were different in some respects, all were based on the idea that correspondence training facilitated development of verbal self-regulation. In fact, the assumption that correspondence training was a means for establishing a verbal mediator to control nonverbal behavior was explicitly identified as a rationale for much of the early correspondence training research. Stokes and Baer (1977) cited correspondence training as a means to mediate generalization and expressed concern that application of the procedure could be problematic with persons with intellectual disabilities and language delays. Clearly, the learner's verbal behavior was viewed as critical to achieving generalized verbal control over nonverbal behavior. Following the investigations by Rogers-Warren and Baer (1976) and Whitman, et al. (1982) that eliminated or modified the verbal component of correspondence training procedures, however, researchers began to re-evaluate the link between correspondence training and verbal mediation of behavior. Deacon and Konarski (1987) raised the possibility that changes in nonverbal behavior were a result of differential reinforcement only, rather than a demonstration of verbal self-regulation. They cited the failure of most previous research studies to demonstrate generalized verbal control over nonverbal behavior in the absence of reinforcement as further indication that verbal mediation was not the mechanism responsible for behavior change. In order to test their hypothesis, these researchers compared the effects of a say-do correspondence training procedure with a "do only" (p. 391) reinforcement procedure in which participants were reinforced for emitting target behaviors in the absence of any related verbal behavior. A multitreatment design (A-B-C-B-A) was used in order to carry out the investigation.

Six of the twelve adults with moderate intellectual disabilities who participated in this study received typical say-do correspondence training (Correspondence Training Group). The other 6 participants received no prompts and were required to make no verbalizations before the opportunity to engage in the target behavior, but were given specific verbal feedback after that opportunity explaining why they were or were not receiving a reinforcer (Reinforcement of Target Behavior Group). Results indicated that 4 of the 6 participants in each group demonstrated substantial increases in target behavior, regardless of treatment. Participants in both groups continued to emit the target behavior at high levels for 2 months. The authors interpreted these results to be further evidence that correspondence training was rule-governed behavior. Rule-governed behavior occurs when an individual is given (or generates) a description of the contingencies of reinforcement and is then reinforced for following the "rule". Success in teaching rule governed behavior, therefore, lies in helping learners to formulate the right rule. Because the components of the contingency could be found in either the Reinforcement of Content condition for participants in the Correspondence Training group or in the Verbal Feedback condition for the Reinforcement of Target Behavior group, the authors concluded that what had previously been considered verbal mediation was most likely rule-governed behavior.

Baer, Detrich, and Weninger (1988) followed up on the work of Deacon and Konarski (1987) by comparing the effects of 3 different reinforcement contingencies on toy play behavior with 3 typically developing preschool children within the context of a multiple baseline across behaviors design. Reinforcement of Target Behavior (with no prior verbalization), Reinforcement of Doing (following the experimenter's verbal directive to play with specific materials), and Reinforcement of Correspondence (following child's verbalization of a plan to play with target materials) were presented in random order. Results indicated that use of target materials increased substantially in the Reinforcement of Doing and Reinforcement of Correspondence conditions but not in the Reinforcement of Target Behavior condition. Based on these results, the authors concluded that some antecedent verbalization was necessary, although it was unclear whether the source of the verbalization mattered. A similar study conducted by Weninger and Baer (1990) compared reinforcement of correspondence with reinforcement of compliance

and found no difference between participants' performance on a worksheet completion task.

In yet another study aimed at evaluating the function of verbalizations, Ward and Stare (1990) employed a multiple baseline across behaviors design in order to evaluate the impact of the participant's verbalization on specific play behaviors of kindergarten children. Six of the twelve children participated in say-do correspondence training procedures in which they were prompted to verbalize plans to play with the target behaviors and reinforced for correspondence after the play period ended. The other 6 participants were told by the experimenter what toys to play with and reinforced after the play period if they complied with the verbal directive. Results indicated that the two groups engaged in target behaviors at similar rates, but that children in the correspondence group demonstrated generalized correspondence to an untrained play behavior while those in the compliance group did not. The authors suggested that, while reinforcement of correspondence and compliance may be equally effective for increasing behavior, the antecedent verbalization by the learner may play some role in generalization.

Findings of these studies appeared to support the findings of Deacon and Konarski (1987), yet they did not provide a definitive answer to the questions regarding verbal mediation. In a review of the correspondence training literature, Baer (1990) indicated that the aforementioned studies did not rule out the possibility of verbal mediation; they simply failed to "prove" (p. 388) its role in this procedure.

All research discussed to this point targeted instructor-chosen behavior, in which a child was prompted to verbally state that he/she would engage. The role of the participant's choice in the content of the verbalization remained unclear. Wilson, et al. (1992) took a unique approach by allowing participants to determine the content of their own verbalizations. Four 13 year-old boys with moderate intellectual disabilities and severe expressive language delays participated in a multiple baseline across participants study which: (a) used a do-say model to increase verbal-nonverbal correspondence between their boys' exercise activities in a community recreational facility and their subsequent reports of behavior; and (b) examined collateral changes in accuracy of their pre-workout plans. Participants were asked during a warm up and stretch session

which 4 machines they planned to use that day during their workout. Responses were recorded, as were the boys' behaviors during the workout session. No comment or reinforcement was provided regarding the accuracy of participants' pre-workout plans. During a cool-down session, participants were asked which 4 machines they had worked out with that day. Accurate responses were reinforced with specific verbal praise ("You said you worked out on the ___ and you really did! Great!) and, for some participants, tangible or exchangeable items. All participants demonstrated an increase in accurate reporting after their workout, although this behavior changed quickly for 2 participants and very gradually for the others. Accuracy of plans verbalized prior to the workout also increased, though these verbalizations were never reinforced or trained. The authors discussed the possibility that indiscriminate contingencies of reinforcement (Stokes & Baer, 1977) may have contributed to changes in both behaviors, since reinforcers were given at the end of the session and the boys may have mistakenly believed they were delivered based on accurate verbalizations both before and after the workout session.

Research Related to Reinforcement

Although reinforcement played a role in all of the studies included in this review, 5 studies specifically examined the role or placement of reinforcers in correspondence training. Paniagua and Baer (1982) conceptualized correspondence training as a chain of verbal and nonverbal behaviors and conducted 3 multiple baseline across participant experiments to determine how location of reinforcement along this chain impacted correspondence training outcomes. All 3 experiments included 5 conditions which were introduced in a different order in each experiment. In the Baseline condition, participants were allowed to play with a variety of toys, some of which were target materials. Following the play period, children were asked what they had played with and reinforcement was provided noncontingently after any verbalization. During Reinforcement of Reports, children were again asked what they had played with during the preceding period. Verbal praise was provided for any report, but a tangible reinforcer (toy) was provided for true reports of behavior. The Reinforcement Set-Up Upon Contingent on Promises condition involved asking children what toys they would play with during the upcoming period, praising them for verbalizing any plan, and placing a toy in their locker for verbalizing plans to play with target materials. Following the

play period, children were allowed to keep the toy that had been placed in their locker only if they had actually played with target materials. In the Reinforcement of Promises condition, children received the reinforcer for verbalizing a plan to play with the target materials, regardless of the accuracy of these promises. The fifth condition, Reinforcement Set-Up Contingent on Intermediate Behaviors, involved providing children with specific verbal praise and tokens for behaviors leading up to play with the materials. Tokens were exchanged for toys following the play session if the child engaged in the target behavior. Results of all 3 experiments indicated that Reinforcement Set-Up Contingent on Promises and Reinforcement Set-Up Contingent on Intermediate Behaviors conditions were more effective than Reinforcement of Reports or Promises alone. Reinforcement of Promises was found to be least effective in changing participants' play behaviors with target materials. The authors hypothesized that the differences between conditions were due to the fact that, in both Reinforcement Set-Up conditions, reinforcement was programmed at 2 points along the chain instead of just one. They suggested that the frequency of reinforcement may be a more important factor in the success of a correspondence training program than the sequence (do-say vs. say-do) employed.

Baer, Williams, Osnes, and Stokes (1984) also examined the effects of placement of the reinforcer in their study on the use of delayed reinforcement to promote maintenance and generalization in correspondence training procedures. The investigators used a multiple baseline across behaviors design to evaluate the effects of a say-do correspondence training procedure with typically developing preschool participants. Results of this training were consistent with earlier findings in that Reinforcement of Content did not change nonverbal behavior prior to Reinforcement of Correspondence. A third condition, Delayed Reinforcement of Content, was added after participants met criteria in the Reinforcement of Correspondence condition in an effort to promote generalization and maintenance. This condition involved delivery of the reinforcer after the play period (as in Reinforcement of Correspondence in a say-do sequence) contingent on the child's verbalized plan to play with target materials before the play period. This condition was implemented in an effort to render the contingencies of reinforcement indiscriminable to participants. Results indicated that, following experience with the

Reinforcement of Correspondence condition, Delayed Reinforcement of Content alone was sufficient to increase use of 3 untrained materials. While indiscriminable contingencies appeared to have been responsible for promoting generalized correspondence, maintenance was not observed when Baseline conditions were reintroduced.

While the two studies discussed above evaluated the impact of the location of the reinforcer, a study conducted by Osnes, Guevremont, and Stokes (1987) examined the effects of introducing both positive and negative consequences in correspondence training. These researchers implemented an A-B-A-BC-A design with a 4 year-old girl with unspecified developmental delays and a history of noncompliant behavior. When Reinforcement of Correspondence (the B condition) failed to substantially impact behavior, a Reinforcement of Correspondence with Positive and Negative Consequences condition (C) was introduced. Application of "minor sanctions" (p. 72) in the form of a 3 minute time out from positive reinforcement period corresponded with increased levels of the appropriate (target) behavior. This was the first and only correspondence training study to employ negative consequences in addition to reinforcement of correspondence.

A final area of inquiry related to reinforcement is the impact of reinforcement on children's self-reports of their behavior. deFreitas Ribeiro (1989) and Baer and Detrich (1990) studied the accuracy of children's self-reports of play behavior with and without experimenter-imposed reinforcement, and discussed their findings in terms of Skinner's (1957) concepts of tacting and manding. Both studies found that children tended to provide highly accurate reports of their own play behavior in the absence of experimenter-imposed reinforcement or restricted choice of play activities. These self-reports were conceptualized by the authors as tacts, or "verbalizations under the control of the properties or characteristics of objects or events" (Baer & Detrich, p. 24). In other words, children's verbal statements were generally accurate reflections of an event (play) in the absence of external reinforcement. Following this unrestricted verbalization condition, children were asked to plan their play activities from a restricted range of choices and were reinforced for verbalizing plans to engage in specific target behaviors. Participants in both studies increased verbalizations regarding target behavior, but actual

play behavior did not change. Both Baer and Detrich and deFreitas Ribeiro interpreted the children's verbal behaviors in this condition to be mands, or "verbalizations under the control of consequences" (Baer & Detrich, p. 24). The authors further theorized that verbalizations under these conditions were controlled by negative reinforcement, since the child was committing to a specific experimenter-chosen behavior in order to leave the situation with the experimenter and join others in free play. A Reinforcement of Correspondence condition was introduced in both studies, resulting in increased correspondence between verbal and nonverbal behavior. Children's accurate verbal reports of target behavior after the free play condition were conceptualized as tacts of past behavior which served as actually served as mands for the reinforcers given for correspondence. Results of this study indicated that correspondence between verbal and nonverbal behavior was most likely under 2 conditions: A No Contingency condition, in which children verbalized reports of any play behavior, and a Reinforcement of Correspondence condition, in which children were reinforced for verbal-nonverbal congruence.

RESEARCH ON PROMOTING GENERALIZATION

Correspondence training has been described as a means for establishing verbal control over nonverbal behaviors. The majority of researchers in this area have stated that the value of correspondence training lies in its potential to modify nonverbal behaviors in settings that are not easily accessible, by changing verbal behaviors in teaching settings. Those researchers who believe correspondence training to be a function of rule-governed behavior (e.g., Deacon & Konarski, 1987) have suggested that the same outcomes may be accomplished by teaching rules in accessible settings for use in other environments. Whether the result of verbal mediation or rule-governed behavior, verbal-nonverbal correspondence is viewed as valuable because, theoretically, it allows access to behavior across many settings and situations.

It would seem logical, given the fact that many researchers espouse the above rationale for conducting correspondence training studies, that this literature base would be replete with investigations related to generalization. After all, continued use of correspondence training with all target behaviors in all settings is no more efficient (and perhaps even less

so) than differential reinforcement of target behavior on a continuous schedule of reinforcement (CRF). Curiously, this is not the case. While a number of the previously described studies measured generalization in some manner, only a handful of research specifically addresses generalization. This section describes studies that targeted generalization of behavior to new settings, with different people, or across time.

Generalization across settings: School to home. Three studies were found that addressed generalization of target behaviors from school settings to home. All 3 investigations employed single-subject research methodology with a total of 7 participants. The first of these studies, conducted by Jewett and Clark (1979), utilized a multiple baseline across behaviors (topics of discussion) design to evaluate the impact of correspondence training on mealtime conversation skills of 4 preschoolers. This study was unique in that training of specific skills was provided through a simulated family meal during lunch in the preschool classroom. Participants were provided with models, prompts, and specific verbal feedback on their conversational initiations during the meal and asked to introduce similar topics at home that evening. Participants increased appropriate initiations on the target topics of work, school, or appreciation only when correspondence training procedures were implemented in the preschool classroom. All 3 topics taught in the school setting generalized to the home meal and maintained at a 3 week follow-up. Generalization across time may have occurred because parents, who were aware of the purpose and nature of the study throughout, were asked to respond to appropriate initiations by their children with enthusiasm and praise. Natural communities of reinforcement may therefore have maintained high rates of target behavior in the absence of school training and reinforcement.

Baer, Osnes, and Stokes (1983) also evaluated use of school-based correspondence training procedures to change behavior in the home. These researchers used a multiple baseline across behaviors design to evaluate the impact of school-based correspondence training on home behavior of one typically developing 4 year-old boy. Results indicated that while a Delayed Reinforcement of Content condition resulted in increased verbalizations regarding the target behaviors, Reinforcement of Correspondence was necessary for actual behavior change at home. Following Reinforcement of

Correspondence for picking up his pajamas after dressing in the morning and putting his clothes in the hamper after his bath, the participant consistently completed both tasks in the home setting. A Delayed Reinforcement of Content condition was then sufficient to change the third home behavior, choosing fruit for dessert. A final return to Baseline condition for the first two behaviors indicated that the behaviors did not maintain in the absence of school-based training and reinforcement.

Guevremont, Osnes, and Stokes (1986) attempted to facilitate generalization of target behavior across settings (different classrooms and home) by implementing say-do correspondence training procedures, then systematically increasing the interval between participants' verbal reports and the opportunity to engage in target behaviors. A multiple baseline across behaviors design was used to evaluate the effectiveness of correspondence training in changing social, toy play, and worksheet completion behaviors in 3 typically developing 4 year-olds. Results indicated that this procedure was effective in promoting target behaviors (playing with specific toys, hand raising during Circle time, straightening mats after Circle) in school settings throughout the day. Generalization to the home behavior (worksheet completion) was not observed, however, and none of the behaviors maintained during a final return to Baseline condition.

Generalization across settings: Training to classroom. Two studies were identified that examined generalization from a training setting to participants' classrooms. Keogh, et al. (1983) first used a behavioral shaping procedure to teach four 10-12 year-old boys with mild to moderate intellectual disabilities to verbalize rules for good listening, then implemented a say-do correspondence training procedure in an attempt to increase those behaviors in multiple classrooms. Target behaviors were demonstrated in generalized settings only after the researchers added specific feedback and error correction to the original correspondence training procedure. This Multiple baseline across participants study demonstrated that correspondence training procedures may be used to change behaviors across settings for persons with intellectual disabilities, but that modifications to traditional procedures may be necessary. No data on maintenance of the behavior in the absence of training and reinforcement procedures were provided.

Roca and Gross (1996) evaluated the effectiveness of correspondence training to increase 3 third grade students' use of prompts to recruit praise from their classroom teachers within the context of a multiple baseline across participants design. Correspondence training and reinforcement took place in a small room near participants' classroom. Praise prompting was monitored in two different classroom settings: math and language arts. Results indicated that students increased their use of praise prompting in the math class, which immediately followed the correspondence training session, and in the language arts class, which occurred later in the day. Following removal of all correspondence training and reinforcement procedures, all participants maintained their levels of praise prompting through the end of the school year (3.5 weeks).

Generalization across settings: Training to community. Ralph and Birnbrauer (1986) used a multiple baseline across behaviors design to evaluate the effects of a correspondence training procedure, in combination with a social skills training program, to improve the social behaviors of 3 men with mild or moderate intellectual disabilities. Training was conducted at the residential facility in which all 3 men resided. Participants practiced appropriate social behaviors for entering and exiting rooms in which people were gathered and verbalized plans regarding the behaviors they would use in such situations. Videotapes of each participant entering and exiting a break room was used to evaluate verbal-nonverbal correspondence and to provide feedback and error correction to participants. Data indicated that correspondence training procedures were effective in increasing appropriate social behavior in a generalized setting. Follow-up probes conducted 4 days after treatment ended indicated that participants continued to emit target behaviors at criterion levels, but this is clearly a very limited demonstration of maintenance.

Olsen-Woods, et al. (1998) evaluated the value of correspondence training procedures for teaching abduction prevention skills to typically developing preschool children. The 31 Head Start students who served as participants in this study were divided into 2 groups. One group participated in a typical Behavioral Skills Training (BST) package consisting of instruction, modeling, role play, error correction, and praise. A second group participated in BST and say-do correspondence training. Participants were scored on a 0-4 scale based on their

responses when presented with a lure from a stranger in a community setting. Analysis of variance procedures indicated that there was a statistically significant difference ($p < .001$) between the pre- and post-test scores for both groups, but that no statistically significant difference existed between scores of the BST group and those of the Correspondence Training group ($p > .05$). In addition to failing to prove the authors' hypothesis that correspondence training would result in greater improvement in the performance of young children with regard to abduction prevention than BST alone, results of this study indicated that the critical behavior of moving quickly away from the potential abductor did not generalize from the role play situation to community probes. Failure of young children to generalize safety skills to relevant settings has been widely reported in the literature (Bevill & Gast, 1998), and correspondence training has been recommended by a number of researchers as a possible means to promote generalization of critical safety behaviors to relevant settings. Unfortunately, the utility of correspondence training procedures for this purpose appears questionable based upon the outcomes of the Olsen-Woods, et al. study.

Generalization across people. One study was identified that included an evaluation of generalization across trainers. Ballard and Jenner (1981) taught 2 elementary school children to verbalize statements about appropriate social behaviors ("I go over to other children"; "I ask them what they are doing"; "I smile"), then implemented a say-do correspondence training procedure in an effort to increase rate of appropriate interactions during free time. Results indicated that both participants met criterion quickly upon introduction of correspondence training procedures and that their rates of interaction maintained 9 weeks after the last correspondence training session in the presence of a different teacher. No procedures were described that programmed maintenance or generalization to the new teacher.

Generalization across time. Two studies were found that systematically programmed for maintenance of target behavior following correspondence training. Following a say-do correspondence training procedure that resulted in 2 preschool children reaching criterion levels of social and helping behaviors, Guevremont, et al. (1986) implemented a multiple baseline across participants design to evaluate two methods for facilitating maintenance of behavior: Reinforcement of

Verbalization and Indiscriminable Contingencies. In the Reinforcement of Verbalization condition, participants were reinforced immediately after verbalizing a plan to engage in target behaviors. During this condition, the target behavior maintained at high rates, but dropped sharply upon a return to Baseline condition. In the Indiscriminable Contingencies condition, 5 different reinforcement contingencies were implemented over a period of 5 days in an effort to make contingencies of reinforcement indiscriminable to participants. Target behaviors maintained in this condition and during a final return to Baseline condition, indicating that programming indiscriminable contingencies may be a more effective means for promoting generalization over time than reinforcement of verbalizations following successful correspondence training.

Baer, Blount, Detrich, and Stokes (1987) gradually thinned the schedule of reinforcement following a say-do correspondence training procedure that resulted in 3 typically-functioning preschoolers making more nutritious snack choices. A multiple baseline across participants design was used to evaluate the effectiveness of the intervention. Following criterion-level responding during the Reinforcement of Correspondence condition, the researchers thinned delivery of the reinforcer from 100% (CRF) to 67%. Once participants responded at criterion levels for 5 days under this schedule of reinforcement, it was further thinned to 33%. After 5 days of criterion-level responding under this schedule, reinforcement was eliminated completely and participants' responses maintained for up to 7 weeks.

While the number of studies that evaluated procedures to promote maintenance is limited, the two studies described above systematically programmed for maintenance. Additional replications of these studies are needed to further evaluate methods to promote maintenance of behavior in the absence of intervention. The need for research on strategies to promote generalization across both time and settings for persons with intellectual disabilities is especially strong, given the problems this population typically exhibits with generalization.

SUMMARY

The studies included in this review have contributed to the knowledge base on use of correspondence training procedures to modify the behavior of persons with and without disabilities.

While the theoretical perspectives that serve as a foundation for this procedure have been debated in recent years, researchers have agreed that, regardless of the mechanism responsible for behavior change, correspondence training is a potentially valuable tool for promoting appropriate behavior in settings where direct intervention is difficult or inappropriate. In order to realize the potential of correspondence training, however, additional research is needed in several areas. First, replications of existing studies are needed. Much of the research conducted to this point used single subject research methodology or group research designs with a small *n*, both of which have limited external validity. Second, research that evaluates specific procedures for promoting generalization across settings, behaviors, and time is needed in order for correspondence training to be truly useful in applied settings. The existing literature base provides evidence that correspondence training procedures can be an appropriate means to change behavior in the training setting; future research must go a step further, with studies that systematically program for maintenance. Third, additional information is needed on the efficacy of correspondence training for individuals with developmental disabilities and delays. A number of studies included in this review demonstrated that correspondence training may be effective with this population, but further research is needed to evaluate the effectiveness of this procedure in promoting generalized behavior change. While the majority of the research on correspondence training with persons without disabilities has been conducted with preschool children, most of the existing research with individuals with special needs was conducted with school-aged and adult participants. Additional investigations on the use of correspondence training with young children with developmental delays and disabilities would contribute to the literature in this area. Studies comparing correspondence training to other instructional strategies may be especially informative. A number of investigations that included participants with special needs introduced additional training or reinforcement packages to promote behavior change. Use of such supplemental strategies should also be evaluated in future studies. Finally, the use of correspondence training procedures to increase rates of experimenter-dictated behavior has been well documented in the literature. Little attention has been given to the effectiveness of correspondence training when participants are given the opportunity to make choices about their behavior in a future setting.

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