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THE EFFICACY OF A TWO-CHOICE MATCH-TO-SAMPLE TRAINING PROCEDURE FOR INCREASING SPONTANEOUS IMITATIVE BEHAVIOUR IN MENTALLY RETARDED INDIVIDUALS

by

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled, "The Efficacy of a Two-Choice Match-to-Sample Training Procedure For Increasing Spontaneous Imitative Behaviour In Mentally Retarded Individuals" submitted by Dwaine M. Souveny in partial fulfillment of the requirements for the degree of Master of Science.

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ABSTRACT

One explanation for the occurrence of imitation in the absence of external reinforcement is that behavioural similarity is a conditioned reinforcer. Based on this proposition the present study examined the utility of employing a two-choice match-to-sample training procedure as a technique to increase the amount of subsequent imitation in individuals who are mentally retarded. Four groups of mentally retarded subjects underwent various training manipulations. According to the conditioned reinforcer hypothesis similarity should, in those subjects for whom similarity was paired with reinforcement (similarity training), become a conditioned reinforcer and thus result in an increase in the amount of subsequent imitation. This hypothesis was not supported by the results of the present study. The similarity training group did not imitate more than subjects who received reinforcement for choosing the dissimilar stimulus (dissimilarity training); subjects who did not receive any contingent reinforcement (exposure condition); or subjects who did not participate in the training task (no training condition). All groups were comparably poor in the amount of spontaneous imitative behaviour exhibited. These results indicated that the two-choice match-to-sample training procedure is not an effective method for increasing the amount of imitative

behaviour displayed by individuals who are mentally retarded. Suggestions for further research were discussed taking into consideration some of the methodological limitations of the two-choice match-two-sample task.

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INTRODUCTION

Imitation, observational learning, and modeling are all terms which have been used to describe the phenomenon in which an individual will, after observing a model, exhibit similar "motoric or verbal performance of specific acts or sounds" (Yando, Seitz, & Zigler, 1978, p.4). Although these terms have been used interchangeably, they have individual nuances due to the particular theory from which they were derived. The convention of this thesis will be to use modeling to refer to the stimulus which an observer perceives (Flanders, 1968), imitation to denote the similar response that the observer makes (Baer & Sherman, 1964; Gewirtz & Stingle, 1968), and observational learning as a descriptive term indicating the method (i.e., viewing model) by which a behaviour was learned (Bandura, 1977).

Robinson and Robinson (1976) state that "one of the most fundamental ways in which retarded children differ from normal children of the same age lies in the slowness and ineffeciency with which they acquire knowledge and skills" (p. 265). Taking this into consideration, the following comment by Bandura (1977) may have particular significance for individuals who are mentally retarded.

> Learning would be exceedingly laborious, not to mention hazardous, if people had to rely solely on the effects of their own actions to inform them what to do. Fortunately, most human behavior is learned observationally through modeling: from observing others one forms an idea of how new behaviors are performed, and on later occasions

> this coded information serves as a guide for action (p. 22).

Investigators have demonstrated that even the severely retarded (Baer, Peterson, & Sherman, 1967) and autistic (Metz, 1965) can learn by observing another person's behaviour. The typical imitative learning situation is based upon operant procedures. A model will, for example, exhibit a behaviour, say 'Do this' and reward the subject if the behaviour is correctly performed. A wide variety of behaviours have been taught to retarded individuals through reinforcing imitation. In 1977 Mercer and Algozzine reviewed 32 studies conducted using imitation as a training technique considering separately mildly, moderately and severely retarded individuals, for the purpose of deriving teaching/treatment suggestions. Examples of behaviours that have been taught to retarded individuals through imitation include gross and fine motor (Garcia, Baer, & Firestone, 1971), simple verbal (Baer et al., 1967), complex verbal (Garcia, Guess, & Brynes, 1973), as well as personal standards (Litrownik, Cleary, Lecklitner, & Franzini, 1978).

Theories of Generalized Imitation

The significance of observational learning as a teaching tool becomes even more apparent from the studies which have demonstrated that, not only would subjects imitate the behaviours for which they were being reinforced,

but they would also imitate nonreinforced behaviours. This phenomenon [i.e., "imitation in the absence of external reinforcement" (Feder & Fouts, 1977, p. 571)] has been labeled 'generalized imitation' (Baer & Sherman, 1964). Generalized imitation has been demonstrated in normal children (Baer & Sherman, 1964), in individuals who are mentally retarded (Baer et al., 1967; Parsons & Davey, 1978), and in autistic children (Metz, 1965).

Generalized imitation has become one of the major controversies in the study of imitation (Bandura, 1971; Feder & Fouts, 1977, Steinman, 1970a). In 1971, Steinman and Boyce reviewed the three explanations that have been proposed to account for generalized imitative behaviour and, in addition, proposed an alternative view. The first explanation is that of behavioural similarity (Baer & Sherman, 1964; Baer et al., 1967). This explanation is based on the hypothesis that during a child's early years imitativeness is reinforced and therefore "behaving imitatively acquires conditioned reinforcing properties since it is often followed by reinforcement" (Steinman & Boyce, 1971, p. 252). The arguement follows that, since similarity acts as a conditioned reinforcer, in those instances where the imitative behaviours are not being extrinsically reinforced (e.g., generalized imitation) they are still being reinforced by the conditioned reinforcer behavioural similarity.

The second explanation, proposed by Gewirtz and Stingle (1968), is also a reinforcement-oriented theory (Bandura, 1977; Yando et al., 1978) i.e., imitation is the result of instrumental learning. However, rather than attributing the nonreinforced imitations to the concept of a conditioned reinforcer as do the proponents of the behavioural similarity view (Baer & Sherman, 1964; Baer et al., 1967), Gewirtz and Stingle suggested that because the nonreinforced behaviours were interspersed among the reinforced behaviours the situation resulted in an intermittent reinforcement schedule which maintained the generalized imitative behaviour. Thus the essential difference between the intermittent reinforcement explanation and the behavioural similarity explanation lies in the proposed locus of reinforcement. The behavioural similarity explanation emphasizes that generalized imitation occurs because of an "intrinsic-reinforcement mechanism" (Gewirtz & Stingle, 1968, p. 380) within the imitator, whereas the intermittant reinforcement explanation forgoes the construct of conditioned reinforcement which Gewirtz and Stingle suggest is unnecessary. They emphasize instead that it is the environmental agent which provides the 'extinsic' reinforcement. Therefore, according to the intermittent reinforcement schedule hypothesis, generalized imitative behaviours are maintained because the individual cannot

discriminate the reinforced from nonreinforced imitative behaviours.

The third explanation, proposed by Bandura (Bandura, 1971; 1977; Bandura & Barab, 1971), also stresses that it is the observer's failure to discriminate the reinforced from nonreinforced behaviours that results in generalized imitation. Bandura's explanation differs from that of the aforementioned learning theorists (e.g., Baer & Sherman, 1964; Gewirtz & Stingle, 1968) in that imitative behaviours are learned solely by exposure (stimulus contiguity) to the modeled behaviours plus the symbolic mediation of these behaviours (to enhance recall). The observers imitative response and its' reinforcement are unnecessary. Bandura makes the distinction between learning and performance and suggests that, whereas a modeled behaviour may be observationally learned on the basis of temporal contiguity and retained through processess such as symbolic coding and rehearsal (Bandura, 1977), the "performance of imitative behaviour is for the most part controlled by anticipated consequences of prospective actions" (Bandura & Barab, 1971, p.245).

Evidence that has been interpreted (Bandura, 1971; Bandura & Barab, 1971) as supporting the proposition that individuals imitate nonreinforced behaviours because they fail to discriminate them from reinforced behaviours has

been obtained from studies manipulating the topography of modeled behaviours. Researchers examining generalized imitation have demonstrated that although the imitative behaviour would generalize to topograhically similar behaviours which were not being reinforced, they would not generalize to behaviours which were topographically different (Bandura & Barab, 1971; Garcia et al., 1971). For example, if the individual was being reinforced for imitating certain gross motor movements, then the imitative behaviour would generalize to other gross motor movements but not to behaviours topographically different such as simple verbalizations. These results will be discussed further in the section on behavioural similarity as a conditioned reinforcer.

Bandura and Barab (1971), compared the conditioned reinforcement hypothesis with the discrimination hypothesis, manipulating not only the topography of the modeled behaviours but, in an effort to enhance discrimination, added a condition where subjects were reinforced for imitating one model but not another. They found that over trials both the reinforced and nonreinforced motor responses that were modeled by the 'reinforced' model were imitated at a high constant rate whereas both the motor responses modeled by the nonreinforced model and the nonreinforced vocal responses were imitated at a lower and decreasing

rate. These results were intrepreted as providing evidence of the influential role of discrimination in nonreinforced imitation while at the same time questioning the conditioned reinforcer explanation. However, the authors note that although the trend was not to imitate the nonreinforced model or the nonreinforced vocal responses, some subjects continued to imitate these behaviours even though they could discriminate them from the reinforced behaviours. A post-experimental interview with these subjects led the experimenters to conclude that the subjects imitated the nonreinforced behaviours because of "erroneous expectations that nonimitation would be punished, or that ignored imitations would eventually be rewarded" (p.254). While it would be important to experimentally study these erroneous expectations, the proposition that the situation influenced the subjects behaviour (i.e., that the situation resulted in their belief of subsequent consequences) is the basis for the fourth and alternative explanation of generalized imitation.

This position, proposed by Steinman (1970a, 1970b, Steinman & Boyce, 1971) questions the concept of 'generalized imitation' on the basis that the phenomenon occurs due to the procedures used to study it. The proposition is that the subject responds by imitating a nonreinforced behaviour because of the instructions and the social setting of the task.

> The initial or repeated instructions to imitate (e.g., "Do this"), the continued presence of the adult experimenter, and frequent paring of the experimenter, with the delivery of reinforcement, when combined with the absence of other "appropriate" behaviour on an S-delta trial and the delay between trials, may function as setting events (Steinman & Boyce, 1971, p.263).

'Setting events' can therefore be described as conditions which result in the probability of imitation being increased due to the influence of the task and/or the experimenter.

In a series of experiments designed to determine the basis for generalized imitation Steinman (1970a; 1970b; Steinman & Boyce, 1971) demonstrated that "the children imitated all responses when no reinforced alternative was available, even though results of choice procedures and special instructions clearly demonatrated that they discriminated reinforced from non-reinforced responses" (Steinman, 1970b, p. 159). Thus, on single presentation trials subjects would imitate both the reinforced and nonreinforced trials (unless instructed not to imitate the nonreinforced behaviours in which case they would comply), but on choice trials between reinforced and nonreinforced modeled behaviours the subjects would imitate the reinforced behaviours only.

Although Steinman's studies demonstrated that individuals will imitate nonreinforced modeled behaviours even when they can adequately discriminate them from

reinforced behaviours, his procedures did not adequately address the proposition that the imitated behaviours were being maintained by 'setting events' and not by behavioural similarity acting as a conditioned reinforcer. Peterson and Whitehurst (1971) examined the effects of some of the potential setting events in the typical generalized imitation paradigm. They found that both eliminating the instructions "Do this" and not giving the subjects any reinforcement had no effect, but when the experimenter left the room two of their three subjects stopped imitating. In a similar study using mildly mentally retarded subjects Striefel and Eberl (1974) demonstrated that after being instructed to imitate a gross motor response all of the females modeled all of the behaviours without receiving any reinforcement regardless of whether the model was a live adult, a videotaped adult or a videotaped child. However, for male subjects model presence differentially affected the results. The live adult model was imitated 100% of the time by all the subjects, the videotaped adult model was imitated 100% by only one out of the three male subjects, and the videotaped child model was not imitated at the 100% level by any of the male subjects.

To examine further the effect of the presence of the experimenter Peterson and Whitehurst (1971) conducted a second study using two males and two females. They demonstrated that all four of their subjects imitated fewer

behaviours when the experimenter was absent than when he was present. When the experimenter was present the subjects imitated all of the behaviours. However, when the experimenter was absent the males imitated 10% and 60% of the modeled responses whereas both females imitated 94% of the responses. Peterson, Merwin, and Moyer (1971) have also found that there is a much higher rate of imitation when the experimenter is present. Taken together, these results suggest that, although instructions and reinforcement procedures were not demonstrated to affect performance differentially, at least in these procedures the presence of an experimenter or model can function as a setting event influencing the response of the subject.

The resulting effect of the absence of the experimenter would not be expected if behavioural similarity was a conditioned reinforcer and the presence/absence of the experimenter the only factor. However, other researchers have found contrary results. The experimenter's presence has been found to result in a decrease in performance (Fouts, 1973; Fouts & Parton, 1974) suggesting that other factors may be involved. For example, Smeets and Striefel (1973), using mentally retarded children, found that when the subjects were allowed to imitate immediately following the modeled behaviour they imitated more than if they had to wait eight seconds (with the experimenter present) and this

in turn resulted in more imitations than if the subjects had to wait eight seconds and the experimenter was absent. The authors attributed the decrease in performance to a function of memory and "in addition to the response delay, the reduction of imitative behaviour under the "Experimenter Absent" condition, may have been caused by interference of the experimenters activities when leaving the room, such as walking out and closing the door" (p. 216). Support for the faulty memory hypothesis can be found in the Peterson and Whitehurst (1971) study in which the results indicated that, within the experimenter-absent condition of the nonimitations reported 60% were incorrect imitations and 40% were no responses.

This alternative interpretation of the results is not to suggest that the experimenter's presence or absence does not function as a setting event but rather to indicate the potential influence of other factors. Steinman's studies (Steinman, 1970a; 1970b; Steinman & Boyce, 1971) not only pointed to the importance of the effects of potential setting events but also demonstrated that the discrimination hypotheses alone were not adequate to account for generalized imitation. Nevertheless, while it is important to take into consideration the effect of setting events in the study of generalized imitation, to focus on this as the only explanation for generalized imitation would negate the significant contribution afforded by the aforementioned

positions. The implications of the aforementioned explanations is not merely to explain why individuals will imitate nonreinforced behaviours in the experimental situation but why people will spontaneously imitate nonreinforced behaviours outside the laboratory situation. As Bandura (1972) notes "In everyday life and in most laboratory studies of delayed imitation, modeled behaviour is often reproduced by observers in the absence of immediate external reinforcement" (p.38).

Behavioural Similarity as a Conditioned Reinforcer

The importance of spontaneous imitative behaviour (S.I.B.) relates to the enhancement of learning in those situations where extrinsic reinforcement is not available. To be considered viable the first three explantions of generalized imitation must account for this type of behaviour. The present study focused on the conditioned reinforcer hypothesis (Baer & Sherman, 1964; Baer, Peterson, Sherman, 1967; Lovaas, Berberlich, Perloff, & Schaeffer, 1966; Feder & Fouts, 1977) in an attempt not only to examine it's adequacy as an explanation for generalized imitation and S.I.B. but also to examine the utility of this hypothesis in the development of an effective training technique to enhance the acquisition of imitative skills in retarded individuals.

While Baer and his associates (Baer & Sherman, 1964; Baer, Peterson, & Sherman, 1967) have generally been acknowledged as being the first to experimentally study generalized imitation (Altman, Talkington & Cleland, 1972) the idea that behavioural similarity might be a conditioned reinforcer preceded them by authors discussing S.I.B. As Ball (1970) noted "Itard and Sequin approached imitation training from exactly the same point of departure as do the Skinnerians" (p.140), and if, for example, the child imitates the father's idiosyncratic gestures and gait it is "because it has become intrinsically rewarding to 'be like dad'" (p.136).

Both Miller and Dollard (1941) and Mowrer (1950, 1960) examined and developed theories of imitative behaviour. From their experiments examining the learning and generalization of imitation Miller and Dollard (1941) suggested that if "matching, or doing the same as others do, is regularly rewarded, a secondary tendency to match may be developed and the process of imitation becomes the derived drive of imitativeness" (p.10). While Mower (1950) criticized Miller and Dollard's (1941) theory because he felt that the theory did not emphasize contiguity as being an important principle, his analysis of vocal imitations also indicated that imitation by being paired with primary reinforcement acquired conditioned reinforcing value.

The study by Baer and Sherman in 1964 attempted determine whether similarity "functions as an important stimulus dimension in the child's behavior" (p.38). Their study found that, by using a puppet as a model who reinforced three imitated responses (head nodding, mouthing, and strange verbalizations), a fourth nonreinforced imitated response (bar-pressing) was exhibited. These authors concluded that the "increase in imitative bar pressing was taken to indicate that a generalized similarity of responding beween puppet and child could be a reinforcing stimulus dimension in the childs behaviour" (p.37). However, the interpretation of these results is questionable because the reinforcing model was present during the experimental situation, and as noted previously, this may have functioned as a setting event (Steinman, 1970a; Steinman, 1970b; Steinman & Boyce, 1971; Peterson & Whitehurst, 1971).

In addition to the design weaknesses of the Baer and Sherman (1964) study (Steinman, 1970a, 1970b; Steinman & Boyce, 1971) the hypothesis that similarity functions as a conditioned reinforcer has also been criticized on both conceptual and empirical grounds (Bandura & Barab, 1971; Steinman, 1970a). As previously mentioned, researchers (Garcia, Baer & Firestone 1971; Bandura & Barab, 1971) have demonstrated that reinforced imitative behaviour would

generalize to nonreinforced togopraphically similar behaviour but not to nonreinforced topographically different behaviour. Also, imitative behaviours would be exhibited only as long as some of the topographically similar behaviours were reinforced; nonreinforcement resulted in the extinction of all the imitative behaviours (Baer & Sherman, 1964; Baer, Peterson & Sherman, 1967; Lovaas, Berberich, Perloff & Schaeffer, 1966).

Considering the finding that topographically different behaviours are not imitated it is interesting to note that, in the Baer and Sherman (1964) study, bar pressing (the nonreinforced modeled behaviour) was considered to be topographically different from head nodding, mouthing, and strange verbalizations (the reinforced imitative responses). Furnell and Thomas (1976) also found that reinforcement for gross motor behaviours resulted in generalization to both gross motor and verbal imitative responses. In addition, while discussing the utilization of procedures in which motor imitation is reinforced prior to establishing a vocal imitative repertoire, Garcia & DeHaven (1974) suggest that "even though Garcia, Baer & Firestone (1971) demonstrated that it did not generalize it is still not clear whether initial motor imitation training facilitiated later vocal imitative acquisition" (p. 171).

The discrepant results concerning the imitation of nonreinforced topographically different behaviours as well as the rapid extinction of imitative behaviours, with the withdrawal of reinforcement, may potentially be clarified through an examination of the design of these studies. The design of studies in which the topographically different behaviours were not imitated was such that these behaviours were easily distinguished from the reinforced behaviours. While these results were interpreted as supporting the discrimination hypothesis the 'setting events' explanation proposed by Steinman (1970a; 1970b; Steinman & Boyce, 1971) could also account for the results. Steinman (1970a) proposed that if the subject can discriminate among stimuli that are occasions for nonreinforcement these may develop either neutral or aversive properties. Bucher and Bowman (1974) found support for this proposition in demonstrating that when a nonreinforced stimulus is interspersed among stimuli that signify reinforcement then that stimulus becomes punitive.

A similar argument can be construed for the extinction of nonreinforced behaviours in the experimental situation. Bandura (1977) suggested that not "rewarding behaviour after it has been consistently rewarded functions as a punisher that can reduce performance" (p.109). Thus, potential 'setting events' call into question not only the adequacy of

the design of the studies that proposed the explanations for generalized imitative behaviour but also the design of the studies which criticized them.

The conceptual or logical argument against the conditioned reinforcer hypothesis is based upon its' inability to explain why some behaviours are imitated while others are not (Steinman, 1970a; Bandura & Barab, 1971). For the behavioural similarity hypothesis to become a viable explanation to account for S.I.B. it should predict when a behaviour will be imitated and when it will not be imitated. An essential aspect of the behavioural similarity hypothesis is that behavioural similarity is intrinsically reinforcing, although no research has examined just how reinforcing (if at all) behavioural similarity is. An examination of studies which manipulated the instructions regarding imitation (Steinman, 1970a; 1970b) suggests that behavioural similarity may not be very reinforcing. Even though there were no other external consequences the subjects in these studies ceased imitating most of the nonreinforced behaviours when requested not to imitate such behaviours.

Further evidence with respect to the reinforcing value of similarity is available from studies examining the effects of stimulus-response similarity on childrens' performance. Parton and Fouts (1969) suggest that children are not only reinforced for reproducing behaviour (i.e.,

imitation) but also for matching events (e.g., reproducing letters of the alphabet) and therefore "similarity resulting from reproducing behaviour is only a subclass of the similarity relations experienced by a child" (p.461). The study by Parton and Fouts (1969) utilized a modified match-to-sample procedure which allowed for similarity or dissimilarity to be presented contingent upon the subjects response. They demonstrated that, given a choice between responding to produce a similar or dissimilar stimulus (i.e., matching a color), subjects would respond by choosing the similar stimulus suggesting that "similarity served as a positive reinforcer (and/or dissimilarity served as a punishing stimulus)" (p.466).

A subsequent study (Parton & Seibold, 1973) was designed to determine whether the tendency to match, found in the Parton and Fouts (1969) study, was due to similarity serving a reinforcing function, or whether it was due to the "experimental setting serving as a cue for extrinsic reinforcement of matching" (Parton & Seibold, 1973, p.491). The results, which indicated that subjects continued to match (in the absence of cues to match or mismatch) even though they had prior training in which mismatching was rewarded as often as matching, were interpreted as being consistent with the view that similarity served a reinforcing function. In addition, because the subjects

could be trained to mismatch by rewarding them using only one penny for each correct response, this suggests that "in comparison to pennies, similarity must be considered a weak reinforcer" (Parton & Seibold, 1973, p.494).

These studies indicate that while similarity (of at least matching colors) may be reinforcing, the reinforcing value is so low that by rewarding dissimilarity with pennies (Parton & Seibold, 1973) or merely instructing the subject not to respond to nonreinforced imitative behaviours (Steinman, 1970a; 1970b) will result in the almost total extinction of these behaviours. This could also account for the finding that subjects will imitate some behaviours in some situations while not imitating the same or other behaviours in a different situation. Feder and Fouts (1977) designed a study based upon Parton and Fouts' (1969) proposition that behavioural similarity and stimulus similarity are components of the larger category of similarity relations which a person experiences. That study examined the effect of increasing the reinforcement value of one subclass of similarity relations (i.e., matching or 'stimulus' similarity) on the reinforcement value of another subclass of similarity (i.e., imitation or 'behavioural' similarity).

Feder and Fouts (1977) provided three groups of children with different types of training on a modified

match-to-sample task. The similarity group was reinforced for choosing the similar card (attempting to make similarity a conditioned reinforcer or increase its reinforcing value), the reinforcement control group was reinforced for choosing one of the two positions of the card, and the exposure control group was not given any rewards until the task was completed. After the training phase the subjects viewed a videotape and then, without the experimenter present, were allowed to 'play' in a room which contained articals similar to those that the model used on the videotape. An important feature of this study is that, although the subjects in the similarity group were initially reinforced for choosing a similar card, they were allowed to view the film and then spontaneously imitate it. The situation occurred without any social interaction, instructions, or reinforcement.

If similarity acquires conditioned reinforcing qualities by being paired with reinforcement (Baer & Sherman, 1964; Baer, Peterson & Sherman, 1967; Feder & Fouts, 1977; Lovaas et al., 1966; Mowrer, 1950; 1960) then training designed to establish or increase the reward value of similarity should result in an increase of S.I.B. as evidenced by an increase in task-incidental imitative behaviours. Feder and Fouts (1977) found that males in the similarity group imitated more task-incidental behaviours than males in the reinforcement control group. However, for

the results to clearly confirm the hypothesis the subjects in the similarity group should have also imitated more task-incidental behaviours relative to the subjects in the exposure control group. Feder and Fouts (1977) proposed that, based on the assumption that the children in their study entered the experimental situation with a set to imitate (i.e., match) then the difference between the reinforcement and similarity groups "may be due to similarity increasing in reinforcing value in the similarity group and/or decreasing in the reinforced control group (since similarity was often followed by no reinforcement and dissimilarity by reinforcement)" (p.576).

Feder and Fouts (1977) suggested that mentally retarded individuals may benefit from training designed to enhance the acquisition of imitative skills because retarded individuals "have often been observed to have limited abilities to imitate" (p. 577). Studies have been conducted which both support (Altman, Talkington, & Cleland, 1972) and refute (Yoder & Forehand, 1974) this position. The apparent discrepancy, concerning the amount of S.I.B. exhibited by mentally retarded individuals may be due to the level of retardation being examined (Grossman, 1973). For example, Spradlin and Girardeau (1966), discussing those individuals classified as severely retarded comment that, "imitation of children or adults is often extremely limited or nonexistent" (p. 258) whereas, in their discussion of

moderately retarded individuals they remark that "they are frequently able to imitate rather wide ranges of adult or peer activities" (p. 258). Talkington and Altman (1973) found results consistent with this proposition and concluded that "imitation as a generalized self-reinforcing behaviour occurs only in the higher IQ ranges with a retarded population" (p. 423).

As such, the two-choice match-to-sample training procedure (Feder & Fouts, 1977) should result in an increase in the reinforcing value of similarity for individuals who are mildly or moderately retarded and this should be followed by an increase in S.I.B. However, the importance of examining this issue is not only restricted to demonstrating the adequacy of the conditioned reinforcer hypothesis but also includes the potential for developing an effective and efficient training procedure for those individuals who are mentally retarded. Thus, the present study was designed to examine the utility of the two-choice match-to-sample training procedure as a technique to increase the amount of S.I.B. in individuals who are mentally retarded.

Design of the Present Study

Training conditions

The procedure employed in the present study to examine the conditioned reinforcer hypothesis and the utility of a two-choice match-to-sample training task, attempted to increase the reinforcement value of similarity by consistently rewarding a subject for choosing a similar card or object on a two-choice (similar or dissimilar stimulus) match-to-sample task. The subjects who were trained in this way (similarity training) were compared to three control groups. One control group received the same consequences as the similarity training group but the rewards were contingent upon the subject choosing a dissimilar card or object (dissimilarity training). One control group did not receive any consequences during the training trials but received the same consequences as the similarity trained group at the end of the training session to control for exposure to the training task and the effects of receiving consequences (exposure training). The final control group who did not receive any training was included to obtain an estimate of S.I.B. which would be uncontaminated by training.

Behavioural Imitation

The four groups of mentally retarded individuals were compared as to the frequency of task-oriented and task-incidental behaviours on a subsequent imitation task. An important feature considered in the Feder and Fouts (1977) study was the type of responses imitated. These authors distinquished between task-oriented (T.O.) responses [i.e., responses "which were directly relevant to the completion of a task" (p.18)] and task-incidental (T.I.) responses [i.e., responses "which were irrelevant and did not facilitate completion of the task" (Feder & Fouts 1977, p.18)]. Other researchers have also argued that the distinction between TO and TI behaviours is useful because they have differential developmental trends (Hartup and Coates, 1970; Yando, Seitz & Zigler, 1978). Feder and Fouts (1977) argued that while task-oriented imitative behaviour involves learning a behaviour directed towards a particular goal with an expected outcome (e.g., extrinsic reinforcement) task-incidental behaviour involves imitating the model "per se" and "in these cases the degree of similarity between the behaviour of the model and that of the observer is what determines reinforcement" (p.22). Thus, it is the task-incidental imitative behaviour which would be comparable to the behavioural similarity which Baer

and his colleaques (Baer & Sherman, 1964; Baer et al., 1967) hypothesized develops conditioned reinforcing qualities.

During the imitation phase of the present study all four training groups were expected to be comparable on the frequency of task-oriented behaviours because the behaviours were necessary for the completion of the required task. However, for the conditioned reinforcer hypothesis to be supported, and the training to be considered effective, the group receiving the similarity training should have demonstrated a significantly higher frequency of the task-incidental behaviours relative to the three control groups. In addition, extending the conditioned reinforcer hypothesis to the dissimilarity training it was predicted that dissimilarity would acquire conditioned reinforcing qualities and thus result in a decrease in task-incidental imitation relative to the other three groups.

Retarded and Nonretarded Subjects

Researchers have suggested that nonretarded individuals may evidence a propensity to produce similarity both on the match-to-sample discrimination task (Parton & Fouts, 1969) and within the imitation situation (Miller & Dollard, 1941). Scott (1964) examined the ability of mentally retarded individuals to learn to choose either the similar or odd stimulus of a tri-stimulus presentation. Scott did not find any differences in the speed of learning between the similar

stimulus and odd stimulus trained groups suggesting that these subjects did not have a differential predisposition to match or mismatch in that situation.

To examine the propensity of individuals who are mentally retarded to match, relative to nonretarded individuals, two groups of nonretarded children (both comparable in mental age to the retarded subjects) were utilized in the present study. One of these two groups was placed in the exposure condition to examine possible matching predispositions on the two-choice match-to-sample task. The second group received no training.

A correlational analysis was also performed to determine if a propensity to match on the two-choice match-to-sample task would be correlated with a propensity to match in the imitation phase. A significant positive correlation would support the proposition that similarity is an important stimulus dimension encompassing both stimulus and behavioural components.

METHOD

The design of the present study includes the modifications derived from a pilot study (see Appendix A).

Subjects

Twenty-four mentally retarded individuals from the Vocational and Rehabilitation Research Institute, Calgary, Alberta and twenty-four mentally retarded individuals from The Michener Centre, Red Deer, Alberta served as subjects.[1] Each of the subjects from The Michener Centre was required to return a parental consent form (see Appendix B) before participating in the study. Each mentally subject was randomly assigned to one of four conditions (ie. similarity training, dissimilarity training, exposure training, and no training) with the restriction that each group contained an equal number of males and females. These individuals were chosen on the basis of the following criteria:

1) no obvious sensory deficits;

2) a current estimate of their I.Q. between 50-75 as measured by administering Form A of the Peabody Picture Vocabulary Test (P.P.V.T.);

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(1) Three individuals, two within the dissimilarity condition and one in the similarity condition, did not achieve criterion during acquisition and were therefore replaced. In addtion, one subject had to be requested to view the monitor more than once, in the imitation phase, and was also replaced.

3) their clinical records did not indicate the presence of organic etiological factors;

4) the subjects were not taking any medication at the time of the study.

In addition, a sample of twenty-four nonretarded subjects were selected from the University Elementary school, Calgary and matched to the mentally retarded sample according to mental age on the basis of the P.P.V.T. All mental age matched subjects were randomly assigned to one of two conditions (i.e., exposure training and no training) with the restriction that there was an equal number of males and females in each group. The means and standard deviations of the mental ages and intelligence quotients (P.P.V.T.), as well as the chronological ages for each group are presented in Appendix C.

TRAINING PHASE:

Apparatus

The materials that were used in the training phase consisted of thirty sets of white cards (11.5 by 14 cm.) on which black line drawings of people and/or objects were depicted. Each set consisted of three cards, two identical and one different. In addition, thirty sets of objects were used (see Appendix D). Twenty-five of the sets of objects consisted of two identical objects and one different object.

To inrease to probability of transfer, in the other five sets of objects two of the objects were conceptually the same but differed slightly in physical characteristics while the final object of each set was totally different. The order of presentation of the cards and objects was ramdomly predetermined with the restriction that there was an equal number of card and object trials in acquisition and overtaining and that the five sets of conceptually similar objects were in overtraining.

Procedure

Acquisition

Each subject in each of the three training groups was tested individually in a small room (3.0 X 2.5 meters) containing a table and two chairs. On the table, for those subjects in the similarity training and dissimilarity training groups, there were two shallow containers, one filled with nickels and the other empty. The container with the nickels was situated to the left of the experimenter while the other container was situated on the subject's right. Both containers and their contents were within view of the subject.

Similarity Training:

Each subject in the similarity training group was given the following instructions:

"I have a game for you to play. I will put down three cards or objects in the following manner (researcher demonstates by placing two of the cards above the third). If you pick the correct card or object I will put a nickel into this container but if you are wrong I will take a nickel out. When we are finished you may keep all the nickels in your container. Here are five nickels to begin with".

During the training procedure the experimenter put a nickel in the subject's container every time the subject placed the similar stimulus beside the target stimulus. If the subject chose the dissimilar card or object then the experimenter said 'that's wrong' and took a nickel. If there were no nickels remaining the experimenter said 'that's wrong' and continued with the training task. After delivering the consequences (ie. verbal comment and nickel manipulation) the experimenter recorded the subjects response on a recording sheet and waited approximatly six seconds (Harter and Zigler, 1972) before proceding with the next trial.

Criterion for having learned the task was responding correctly (choosing the similar card or object) on 9 out of 10 trials. This criterion had to have been reached within 30 trials or training was terminated, wherein the subject was thanked for his participation and dismissed from the study.

Dissimilarity Training:

The subjects in this group received the same instructions as those in the similarity training group and the procedures for training remained the same except that the consequences for the subject's response were that the subject was rewarded for choosing the dissimilar card or object and received the penalty (ie. hearing the experimenter say 'that's wrong' and having him take a nickel away) for choosing the similar card or object.

Exposure Training:

The subjects in the exposure condition received the instructions: "I have a game for you to play. I will put down three cards or objects in the following manner. Please place one of these two cards (researcher indicates) beside this one (target stimulus)." Each subject in the exposure group was yoked with one subject in the similarity training group according to number of trials run and number nickels obtained. These subjects did not receive any consequences (penalty or reward) during the training situation. The delivery of the nickels was withheld until the end of the session at which time the subject was thanked for playing the game.

Overtraining

After each subject in the similarity and dissimilarity groups reached the criterion of 9/10 correct during acquisition overtraining was initiated utilizing the same training procedures as acquisition for another thirty trials. Criterion (9/10 correct) had to have been maintained during overtraining for the subject to continue onto the imitation phase of the study. Again, subjects in the exposure condition were yoked with their counterparts in the similarity training group for overtraining.

IMITATION PHASE:

Apparatus

To expose each subject to a sequence of modeled behaviours two 1/2" casette videotapes were made. On one a female modeled a sequence of task-oriented (TO) and task-incidental (TI) behaviours. On the other tape a male modeled exactly the same behaviours in the same sequence. One half of the female subjects and one half of the male subjects in each condition were randomly assigned to view the female model. The remaining subjects viewed the male model. Of the behaviours, one half were focal to the building of a house (TO) while the other half were incidental to the building of the house (TI). Each subject

viewed the 3.5 minute videotape of modeled behaviours on an 27.94 cm. black and white Sony monitor (model CVM-11OUA) located on the table approximately .65 meters away. The sequence of modeled behaviours was as follows:

1) erases scribbles from the blackboard (TO)

2) picks the longest piece of chalk from a container with four pieces of chalk (TI)

3) draws a house on the blackboard (TO)

4) draws a chimney with smoke coming out (TI)

5) takes all the materials out of the box (TO)

6) stacks the eight blocks of wood into two piles (TI)

7) builds a house out of the eight blocks of wood (TO)

8) builds the house on a 30 cm. X 30 cm. piece of black cardboard taped to the table (TI)

9) folds an 20 cm. X 20 cm. piece of cardboard in half (TO)

10) flaps the cardboard like a fan (TI)

11) places the piece of cardboard down in the shape of an upside down 'V' for the roof of the house (TO)

12) places a checkmark on the blackboard with a piece of chalk (TI).

At the beginning of the tape the model said, "I am going to build a house". On the table in front of the model was a cardboard box containing eight blocks of wood (27 cm. X 5 cm X 10 cm.), a blackboard eraser, and a piece of cardboard (20 cm. X 20 cm. X .1 cm.) with a fold in the

middle. Also on the table was a 10 cm. X 10 cm. X 2 cm. cardboard box with four pieces of chalk protruding through the top arranged in a line from largest (left) to smallest (right). The chalk was of varying lengths from 2 cm. to 8 cm.. As the model proceeded through the sequence of behaviours the Sony VCR camera (model AVC-3400) zoomed in for a closeup of each of the twelve individual behaviours.

The same materials that the model utilized during the videotape were made available to each subject to play with for five minutes during the imitation phase of the study. During this time a Sony Batemax (model SLO-340) videotape recorder recorded the subjects behaviour.

Procedure

Immediately after each subject in the similarity training, dissimilarity training, and exposure training groups had finished their respective training they were individually escorted to the imitation assessment room. The subjects in the no training group were individually escorted to the assessment room on approximately the same days as the subjects in the other groups but they did not receive the preliminary training. The assessment room was a small room (2.5 X 2.5 meters) within which the model was videotaped or a space of approximately equal size that had been partioned from a larger room. This room was adjacent to an

observation room and connected by a one-way mirror. For one half of the mentally retarded subjects (V.R.R.I.) the size of the mirror was 1.3 X 1.3 meters. For the other half of the mentally retarded subjects (The Michener Centre) and all of the mental age matched subjects the size of the mirror was 20 X 25 cm. The size of the latter mirror was smaller as it was built into a portable partition (1.2 X 2 meters) and utilized as a wall. In the assessment room was a table, one chair and a large (1.3 meters X 1.3 meters) blackboard. On the table was the videotape monitor and under the table was the recorder and the box with the materials that the model used during the videotape. When each subject was brought into the room he was given the following instructions:

> Please sit in this chair (experimenter indicates). I am going to show you a film of a man(woman) building a house. After the film is over I will ask you to build a house. Now watch the screen (pointing) please.

The subject was approximately .65 meters away from the monitor with the two-way mirror situated approximately 1 meter to his right. The experimenter turned on the monitor and recorder and stood to the subject's left side observing to ensure that the subject watched the monitor. If the subject did not watch the monitor the experimenter repeated the instructions to watch the monitor. If the subject had

to be instructed to watch the monitor more than once the subject was thanked for his participation and dismissed from the study.

The videotaped sequence of behaviours lasted 3.5 minutes after which the experimenter turned off the monitor and recorder, placed the monitor beneath the table, and lifted the box of materials onto the table. The experimenter then looked at his watch and said "I have to leave now to do some work, while I am gone I would like you to build a house. If you finish before I return please wait here".

During the next five minutes all behaviours of the subject were videotaped through the one-way mirror. Subsequently two observers, naive with respect to the design and objectives of the study, independently coded the task-incidental and task-oriented behaviours from the videotape of the five minute imitation period. Both raters had undergone individualized prior training using the same coding procedure to record the behaviour of subjects who were in a pilot study.

RESULTS

Interrater reliability between the two coders was determined by dividing the number of agreements of theoccurrence of the imitated behaviours by the number of agreements plus the number of disagreements and multplying by 100 to obtain a percentage. The resulting interrater reliability score was 95.29% indicating high agreement between the two raters.

Training Condition Comparisions: Mentally Retarded Subjects

Training Phase

To allow for the comparison of the responses of the subjects in the exposure condition with the similarity and dissimilarity conditions the subjects in the exposure condition were assumed to have made a 'correct' response if they chose the similar stimulus. The subjects in the similarity and dissimilarity conditions were correct if they respectively chose the similar and dissimilar stimulus.

Acquisition. Every subject in both the similarity and dissimilarity conditions and all but one subject in the exposure condition chose the similar stimulus (a card) on the first trial. Every subject in the similarity condition achieved criterion (9/10 correct) in 9 trials, 50% of the

subjects in the dissimilarity condition achieved criterion in 10 trials.

A Condition (3) X Sex of Subject (2) X Type of Stimulus (2) mixed analysis of variance was performed on the percent of correct stimuli chosen during acquistion. The Sex of Subject main and interactive effects were not significant ($p > .05$) and this factor was collapsed in the subsequent analysis.[2] The ensueing Condition (3) X Type of Stimulus (2) mixed analysis of variance (see Appendix E) revealed a significant Condition effect ($F(2,33) = 5.90$, $p < .01$) a significant Type of Stimulus effect ($F(1,33) = 14.95$, $p < .01$) and a significant Condition x Type of Stimulus interaction ($F(2,33) = 18.69$, $p < .01$). Duncan's New Multiple Range Test (Duncan, 1955) was utilized to examine all main and interaction effects. The Duncan analysis revealed that the Condition effect was the result of the dissimilarity condition ($\bar{x} = 73.63\%$) performing more poorly than both the similarity ($\bar{x} = 100\%$) and exposure conditions ($\bar{x} = 86.04\%$), which were comparable. The Type of Stimulus effect was due to the cards ($\bar{x} = 83.86\%$) being chosen correctly less often than the objects ($\bar{x} = 89.25\%$). The nature of these main

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(2) The Sex of Subject factor was collapsed to increase the number of data points per cell. This procedure did not alter the significant main or interaction effects (or levels of such effects) in any of the analyses where it was performed. Thus, the outcomes of the analyses including the Sex of Subject as a factor were not reported.

effects is elucidated within the Condition X Type of Stimulus interaction (see Figure 1). The subjects in the dissimilarity condition chose cards incorrectly more often than objects, whereas the subjects in the exposure and similarity conditions chose the cards and objects equally well. The difference between the cards and objects for the subjects in the dissimilarity condition may have occurred because the first trial was a set of cards and all of the subjects in this group chose the incorrect stimulus (similar card).

Overtraining. Every subject in the similarity condition chose the correct stimulus 100% of the time compared to an average of 98.06% for the dissimilarity condition and 94.72% for the exposure condition.

A Condition (3) X Sex of Subject (2) X Type of Stimulus (2) mixed analysis of variance was performed on the number of correct stimuli chosen during overtraining. The effect of the Sex of Subject was not significant and did not interact and was thus collapsed. The only significant effect obtained in the Condition (3) X Type of Stimulus (2) mixed analysis of variance for the number of correct stimuli chosen (see Appendix F) was the Type of Stimulus main effect ($F(1,33) = 6.63$, $p < .05$). This main effect was the result of more cards ($\bar{x} = 14.78$) being chosen correctly relative to objects ($\bar{x} = 14.50$).

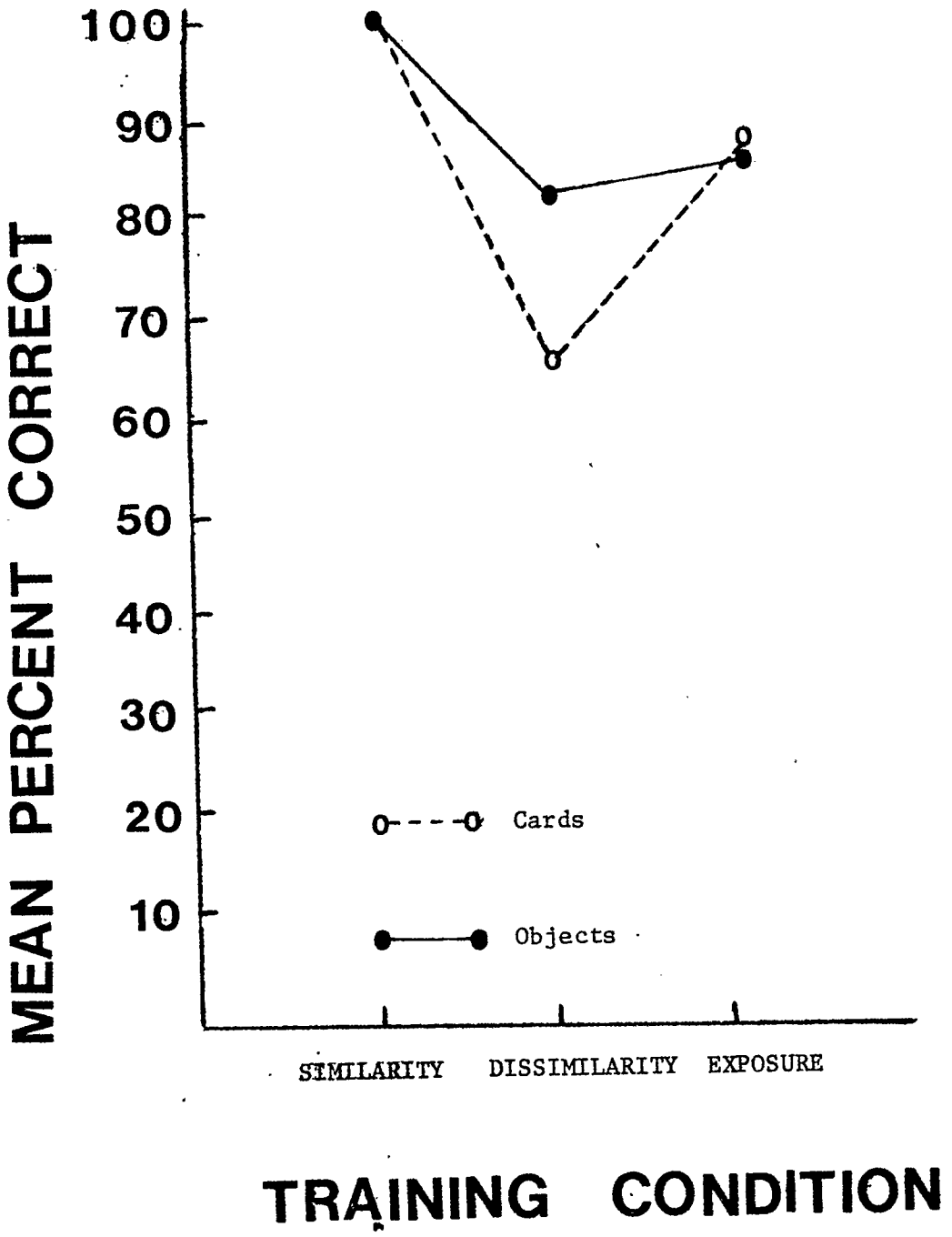

Figure 1. Mean Percent Correct of the Type of Stimulus Chosen During Aquisition, as a Function of the Three Training Conditions

In summary, the training phase data revealed that mentally retarded subjects could be trained to choose the dissimilar stimulus on a two-choice match-to-sample task and that once trained would perform comparably to subjects who received rewards for choosing the similar stimulus. These data also revealed that mentally retarded individuals who did not receive any rewards contingent upon performance (exposure condition) would choose the similar stimulus as often as the subjects who did receive rewards for choosing the similar stimulus.

Imitation Phase

A Condition (4) X Sex of Model (2) X Sex of Subject (2) analysis of variance was performed on both the number of task-oriented and the number of task-incidental behaviours displayed. The task-oriented analysis did not reveal any significant ($p > .05$) main or interaction effects (see Appendix G). The task-incidental analysis revealed a significant Sex of Model main effect ($F(1,32) = 8.85$, $p < .01$) (see Appendix H) with the female model being imitated significantly more often ($\bar{x} = 3.29$) than the male model ($\bar{x} = 1.91$).

Exposure and No Training Condition Comparisons: Mentally Retarded and Mental Age Matched Subjects

Training Phase

All subjects in the exposure condition within each of the mentally retarded and mental age matched groups performed 39 trials, 9 during acquisition and 30 in overtraining. Of these 39 trials each subject was exposed to 19 object trials and 20 card trails. Two independent analyses were performed on the acquisition and overtraining trials.

Acquisition. A Group (2) X Sex of Subject (2) X Type of Stimulus (2) mixed analysis of variance was performed on the percent of similar stimuli that the subjects in the exposure condition chose during acquisition. The effect of the Sex of Subject was not significant ($p > .05$) and was thus was collapsed. The subsequent mixed analysis of variance [Group (2) X Type of Stimulus (2)] on the percent of similar stimuli chosen during acquisition revealed no significant main or interaction effects (see Appendix I).

Overtraining. A Group (2) x Sex of Subject (2) X Type of Stimulus (2) mixed analysis of variance was performed on the number of similar stimuli that the subjects in the exposure condition chose during overtraining. Again the Sex of Subject factor did not yield a significant main effect,

nor did it interact with any of the other factors and was therefore collapsed. A Group (2) X Type of Stimulus (2) mixed analysis of variance (see Appendix J) on the number of similar stimuli chosen (maximum 30) revealed a significant Group main effect ($F(1,22) = 14.04$, $p < .01$). The Group main effect was the result of the mentally retarded subjects choosing significantly more of the similar stimuli ($\bar{x} = 28.40$) during the 30 overtraining trials relative to the mental age matched subjects ($\bar{x} = 18.67$).

In summary, the comparisons of the mentally retarded and mental age matched subjects under the exposure condition in the training phase revealed no significant differences during acquisition. During overtraining, however, the mentally retarded subjects chose the similar stimulus significantly more often than the mental age matched subjects.

Imitation Phase

During the imitation phase the mentally retarded and mental age matched subjects in the exposure and no training conditions were compared. A Group (2) X Condition (2) X Sex of Model (2) X Sex of Subject (2) analysis of variance was performed on the number of task-oriented (see Appendix K) and the number of task-incidental (see Appendix L)

behaviours displayed. The task-oriented analysis did not reveal any significant ($p > .05$) main or interaction effects.

The analysis performed on the task-incidental behaviours revealed two significant interaction effects only. Post-hoc comparisons (Duncan) were utilized to examine these effects. The Group (2) X Sex of Model (2) X Sex of Subject (2) interaction ($F(1,32) = 5.6818$, $p < .05$) revealed that females in the mentally retarded group imitated significantly ($p < .05$) more of the behaviours modeled by the female model than by the male model (see Figure 2). The Group (2) X Condition (2) X Sex of Model (2) X Sex of Subject (2) interaction effect ($F(1,32) = 5.6818$, $p < .05$) (see Figure 3) revealed that the mentally retarded males and females (in the exposure and no training conditions respectively) and the mental age matched males performed more of the task-incidental behaviours after viewing the female model than (1) the mentally retarded females (exposure) and the mental age matched males (no training) after viewing the male model; and (2) the mental age matched females (no training) who viewed the female model.

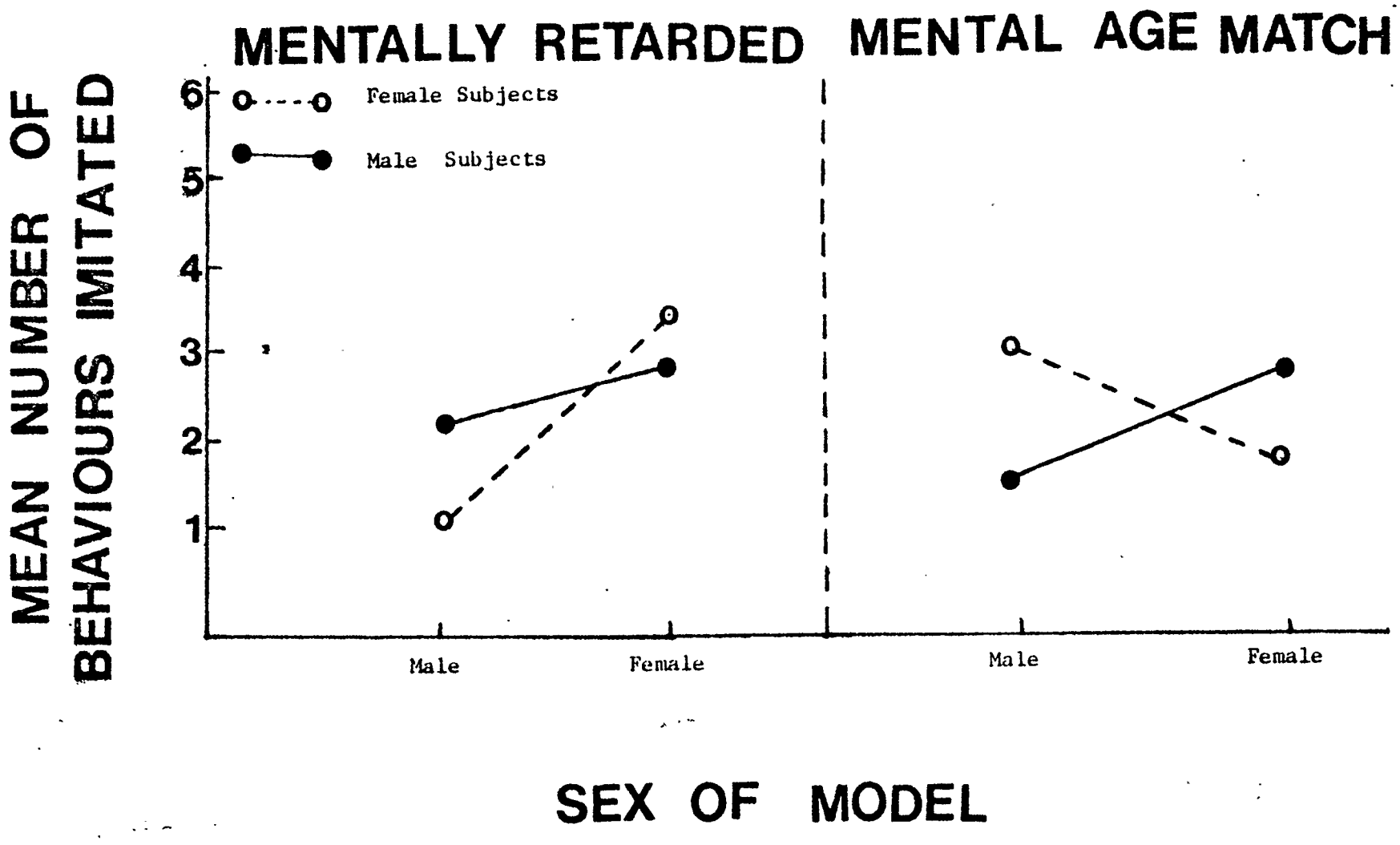

Figure 2. Mean Number of Task-Incidental Behaviours Imitated by the Male and Female Subjects, as a Function of the Group and the Sex of the Model.

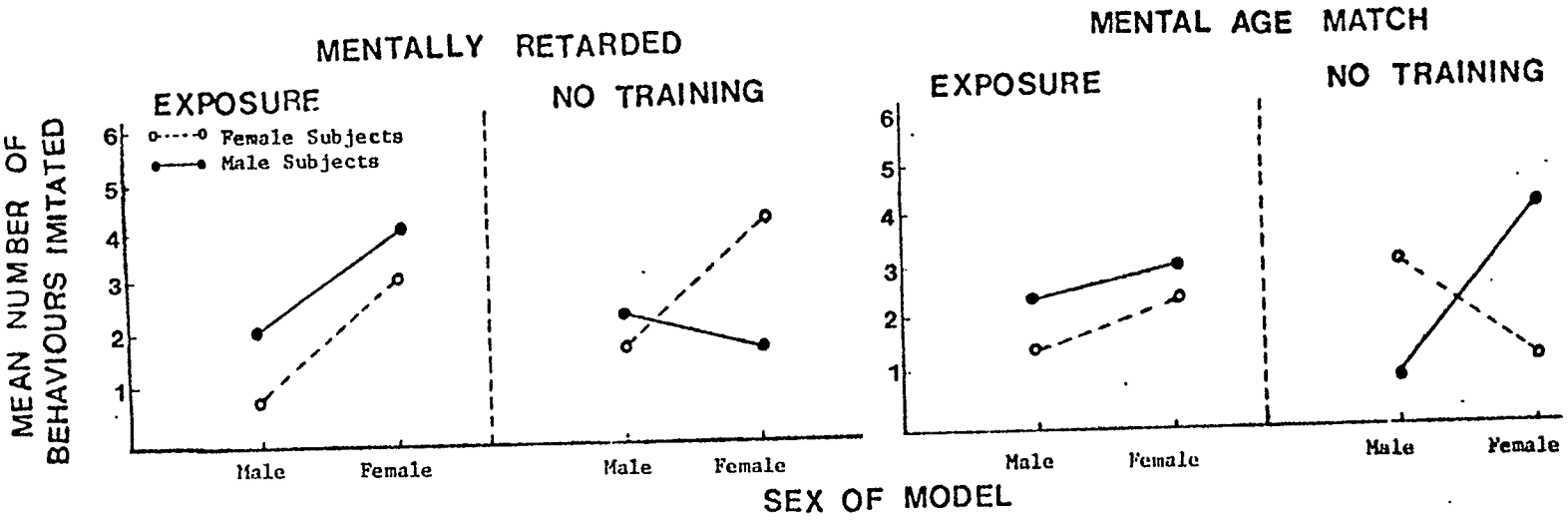

Figure 3. Mean Number of Task-Incidental Behaviours Imitated by the Male and Female Subjects, as a Function of the Group, the Training Condition, and the Sex of the Model.

Correlational Analysis

To examine the proposition that the strength of similarity as a conditioned reinforcer would be reflected in the proportion of similarity responses that each subject made analyses were performed to determine whether there was a correlation between the percentage of similarity responses made during the training phase and the subsequent amount of imitation. The Pearson Product Moment Correlation was utilized to examine the relationship between the percentage of similar responses and the amount of task-incidental and task-orientated imitation for the mental age matched exposure subjects and mentally retarded exposure and mentally retarded dissimilarity subjects (see Appendix M). Correlations were not performed for the mentally retarded similarity subjects because every subject had the same training phase score (ie. 100%). No significant ($p>.05$) correlations were found suggesting that the two tasks were not perceived as being similar.

DISCUSSION

According to the conditioned reinforcer hypothesis similarity acquires conditioned reinforcing qualities by being paired with reinforcement. Researchers have argued that stimulus similarity and behavioural similarity are components of the larger category of similarity relations which a person experiences (Parton & Fouts, 1969; Parton & Seibold, 1973; Feder & Fouts, 1977). Thus, pairing reinforcement with one component-stimulus similarity (two-choice match-to-sample task) should result in an increase in the incidence of the other-behavioural similarity (S.I.B.). This hypothesis was not supported by the results of the present study. The various training manipulations of the present study did not differentially affect subsequent imitative behaviour.

Training Phase

The subject's performance in the training phase of the two-choice match-to-sample task indicated that the subjects reinforced for choosing the similar stimulus (similarity training) did not choose significantly more similar stimuli relative to those subjects not receiving external reinforcement (i.e., the exposure condition). Two factors that may account for the failure to find performance differences between the similarity training and the exposure

conditions, viz. a predisposition to choose a similar stimulus and a task-related ceiling effect. First, all but one of the mentally retarded subjects in the present study chose the similar stimulus on the first trial. Also, the dissimilarity subjects made significantly more mistakes during training than either the similarity or the exposure subjects who did not differ significantly even though the similarity subjects chose the similar stimulus on every trial. Taken together these data suggest that the mentally retarded subjects entered the experimental situation with a predisposition to respond to the similar stimulus. In addition, this predisposition was further demonstrated by the performance of the mentally retarded and mental age match subjects under the exposure condition in overtraining which revealed that the mentally retarded subjects chose the similar stimulus significantly more often than did the nonretarded subjects of the same mental age.

The second factor involved the lack of response variability afforded by the dichotomous nature of the two-choice match-to-sample task. All the subjects in the similarity condition achieved the maximum possible score (i.e., 100%), indicating that a ceiling effect may have occurred. This ceiling effect may be related to the fact that the subjects had only two alternatives. A modified match-to-sample training task containing a greater number of alternatives along the similarity continuum (from dissimilar

to identical) may be effective in minimizing the potential ceiling effect while allowing for a more powerful assessment of the predisposition to respond similarly.

The present results, however, do indicate that training was effective in establishing differential responding between the dissimilarity condition subjects and the similarity condition subjects on the two-choice match-to-sample task. The effectiveness of the dissimilarity training is further demonstrated by the differential performance of the dissimilarity condition subjects and the exposure condition subjects.

Two manipulations were utilized in the present two-choice match-to-sample task to maximize the probability of transfer from the training situation to the imitation phase of the present study. First, two types of stimuli were employed (cards and objects) to facilitate the response to similarity or dissimilarity "regardless of the absolute cues in the display" (House, Brown, & Scott, 1974, p. 27). Second, overtraining was required since this has been demonstrated to be an effective technique for facilitating generalization (Shepp & Turrisi, 1966).

Imitation Phase

The above referenced manipulations, however, were not successful in facilitating the transfer of the appropriate response set. The differential responding displayed by the dissimilarity condition subjects (mean percent of similar stimuli chosen = 26.36) relative to that of the similarity and exposure condition subjects (mean percent of similar stimuli chosen = 100.00 and 86.04 respectively) during the training phase did not influence subsequent spontaneous imitative behaviour as measured by the number of task-incidental behaviours (maximum = 6) demonstrated during the imitation phase of the study. The similarity condition subjects imitated very few of the task-incidental behaviours ($\bar{x}$ = 2.75) as did the exposure condition subjects ($\bar{x}$ = 2.42). The dissimilarity condition subjects alone behaved as expected ($\bar{x}$ = 2.83).

An explanation for the low number of task-incidental behaviours demonstrated by the similarity condition subjects is suggested by the performance of the mentally retarded and equal mental age matched subjects under the exposure condition. The performance of the exposure condition mental age matched subjects of the present study (task-oriented $\bar{x}$ = 4.33; task-incidental $\bar{x}$ = 2.21), suggests that these subjects were able to make a discrimination between the task-oriented and task-incidental behaviours. Such a

discrimination was most likely related to the instruction "now I want you to build a house". The performance of the exposure condition mentally retarded subjects in the imitation phase (task-oriented $\bar{x}$ = 4.33; task-incidental $\bar{x}$ = 2.42) was comparable to that of the equal mental age matched subjects. This suggests that the mentally retarded subjects were also able to make the appropriate discrimination even though their imitation phase performance was not totally consistent with their demonstrated predisposition to respond similarly.

An extrapolation to the imitation phase performance of the similarity condition subjects (task-oriented $\bar{x}$ = 4.92; task-incidental $\bar{x}$ = 2.75) suggests that these subjects may have employed a similar response strategy. Such a strategy is contrary to the assumed predisposition to respond similarly and also to the intended increase in the reward value of responding similarly (if such occurred). However, such a strategy is consistent with the "setting events" explanation (Steinman, 1970a; 1970b; Steinman & Boyce, 1971) of generalized imitation. The similarity condition subjects were able to discriminate among the task-incidental and task-oriented behaviours on the basis of the instructions given for the imitation task and this may have occasioned the low incidence of task-incidental imitation.

The finding that the subjects were able to discriminate between the two types of behaviour does not provide an explanation as to why the similarity and exposure condition subjects imitated so few task-incidental behaviours given their demonstrated predisposition to produce similarity during the training phase. Acknowledging the results from studies examining the topographical boundaries of generalized imitation (Bandura & Barab, 1971; Garcia, Baer, & Firestone, 1971) the training phase of the present study was designed to develop similarity (or dissimilarity) responding "per se". However, the structure of the two phases of the present study were different. Miller and Dollard (1941) argued that the "effects of learning in one situation transfer to other situations; the less similar the situation the less transfer occurrs" (p. 44). Thus, the subjects in the present study did not, it would seem, perceive the training phase to be similar to the imitation phase. This conclusion is based on the finding that there were no significant correlations between the percent of similar stimuli chosen during the entire training phase and the subsequent imitative behaviours demonstrated during the imitation phase for any of the conditions across the mentally retarded and mental age matched subjects.

Transfer of the similarity response set from the two-choice match-to-sample training procedure to the imitation phase of the present study and to subsequent

imitation in situations outside the laboratory is an essential reqirement if the two-choice match-to-sample training procedure is to be useful. The results of the present study suggest that such transfer did not occur. Future research should therefore be directed at examining the two-choice match-to-sample training procedure with the goal of increasing the transsituational value of such a training procedure. As noted earlier, the provision of more alternatives along the similarity dimension may provide (1) a more powerful assessment of the demonstrated predisposition to respond similarly on the part of the retarded subjects; (2) a reduction in the potential ceiling effect inherent in the two-choice match-to-sample situation, and (3) an expansion in the discrimination base which, in turn, could lead to greater training task-imitation compatibility.

An alternative explanation for the failure of the the similarity and exposure condition subjects to demonstrate task-incidental behaviours focuses on memory. Researchers (e.g., Bandura, 1971; 1977; Yando, Seitz, & Zigler, 1978) have suggested that retention of the modeled behaviours is an important component in imitation. The arguement follows that if the subjects could not remember the behaviours, no matter how reinforcing behaving similarily was or could have been, the behaviours would not have been performed.

While it is possible that the subjects could not recall the behaviours it is unlikely that they did not remember more than they performed considering the length (only 3.5 minutes) of the film and the immediacy of the imitation situation. Yando, Seitz, & Zigler (1978) maintain that "most researchers ... have neglected to compare children's imitation with their recall of modeled acts' (p. 93). This is not surprizing since most studies are interested in examining the performance of the behaviours. For example, Feder and Fouts (1977) did not employ a recall measure but their results revealed that their subjects imitated even though the sequence of modeled behaviours was seven minutes and the subjects were younger (mental age). Similarily, other researchers (e.g., Sibulkin & Uzgiris, 1978; Ross, 1966; Bandura & Huston, 1961) have reported theoccurrence of task-incidental imitative behaviour even though these behaviours have been included in a sequence of both task-oriented and task-incidental behaviours. In addition, these studies also employed an instruction related to the task-oriented behaviours.

Most studies examining imitative behaviour have either found no sex differences (Bandura & Kupers, 1964; Holt, Richard, & Ellis, 1972; Yando, Seitz, & Zigler, 1978) or such differences have not been consistent (Flanders, 1968). Within the present study both the sex of the model and the sex of the subject were influential factors. The female

model was generally imitated more often than the male model. This finding was qualified by significant interactions which indicated that the female retarded subjects imitated the female model more than the male model.

Summary

The results of the present study do not indicate that rewarding a mentally retarded individual for choosing a similar stimulus on a two-choice match-to-sample task (similarity training) will increase the amount of spontaneous imitative behaviour in comparison to mentally retarded individuals who were either reinforced for choosing a disssimilar stimulus (dissimilarity training) or who did not receive any reinforcement contingent upon performance (exposure and no training). Thus, the proposition that two-choice match-to-sample training (similarity training) may be an effective procedure for increasing the amount of spontaneous imitative behaviour displayed by individuals who are mentally retarded is not supported.

The present study, however, did reveal a matching predisposition in individuals who are mentally retarded. Individuals who are mentally retarded may have a greater propensity to choose a similar stimulus in the two-choice match-to-sample situation (as compared to nonretarded equal

mental age matched subjects), yet this propensity was not evident in the imitation phase of the present study.

In addition, the results of the present study underscore the importance of considering the sex of the subject and the sex of the model in studies on imitation.

References

Altman, R., Talkington, L.W., & Cleland, C.C. Relative effectiveness of modeling and verbal instructions on severe retardate's gross motor performance. Psychological Reports, 1972, 31, 695-698.

Baer, D.M., & Sherman, J.A. Reinforcement control of generalized imitation in young children. Journal of Experimental Child Psychology, 1964, 1, 37-49.

Baer, D.M., Peterson, R.F., & Sherman, J.A. The development of imitation by reinforcing behavioral similarity to a model. Journal of the Experimental Analysis of Behavior, 1967, 10, 405-416.

Ball, T.S. Training generalized imitation: Variations on an historical theme. American Journal of Mental Defeciency, 1970, 75, 135-141.

Bandura, A. Analysis of modeling process. In A. Bandura (Ed.), Psychological modeling:Conflicting theories. Chicago: Aldine-Atherton, 1971.

Bandura, A. Modeling theory: Some traditions, trends, disputes. In R.D. Parke (Ed.), Recent trends in social learning theory. New York: Academic Press, 1972.

Bandura, A. Social learning theory. New Jersey: Prentice-Hall, 1977.

Bandura, A., & Barab, P. Conditions governing nonreinforced imitation. Developmental Psychology, 1971, 5, 244-255.

Bandura , A., & Huston, A.C. Identification as a process of incidental learning. Journal of Abnormal and Social Psychology, 1961, 63, 311-318.

Bandura, A., & Kupers, C.J. Transmission of patterns of self-reinforcement through modeling. Journal of Abnormal and Social Psychology, 1964, 69, 1-9.

Bucher, B., & Bowman, E. The effects of discriminative cue and an incompatible activity on generalized imitation. Journal of Experimental Child Psychology, 1974, 18, 22-33.

Duncan, D.B. Multiple range and multiple F tests. Biometrics, 1955, 11, 1-42.

Feder, J., & Fouts, G.T. Effect of similarity traing on imitation. Perceptual and Motor Skills, 1977, 45, 571-578.

Flanders, J.P. A review of research on imitative behavior. Psychological Bullitin, 1968, 69, 316-317.

Fouts, G. The effects of number of modeling presentations and an audience on imitation in children. JSAS Catalog of Selected Documents in Psychology, 1973, 3, 43.

Fouts, G., & Parton, D. Imitation by children in primary grades: Effects of vicareous habit and social drive. Peceptual and Motor Skills, 1974, 38, 155-160.

Fryrear, J.L., & Thelen, M.H. Effect of sex of model and sex of observer on the imitation of affectionate behavior. Developmental Psychology, 1969, 1, 298.

Furnell, J.R., & Thomas, G.V. Stimulus control of generalized imitation in subnormal children. Journal of Experimental Child Psychology, 1976, 22, 282-291.

Garcia, E., & DeHaven, E.D. Use of operant techniques in the establishment and generalization of language. American Journal of Mental Defeciency, 1974, 79, 169-178.

Garcia, E., Baer, D.M., & Firestone, I. The development of generalized imitation within topographically determined boundaries. Journal of Applied Behavior Analysis, 1971, 4, 101-112.

Garcia, E., Guess, D., & Brynes, J. Development of syntax in a retarded girl using procedures of imitation, reinforcement, and modeling. Journal of Applied Behavior Analysis, 1973, 6, 299-310.

Gewirtz, J.L., & Stingle, K. Learning of generalized imitation as the basis for identification. Psychological Review, 1968, 75, 374-397.

Grossman, H.T. (Ed.) Manual on terminology and classification in mental retardation. Baltimore, Maryland: Garamond/Pridemark Press, 1973.

Harter, S., Brown, L., & Zigler, E. The discrimination learning of normal and retarded. children as a function of penalty conditions and etiology of the retarded. Child Development, 1971, 42, 517-536.

Harter, S., & Zigler, E. Rate of stimulus presentation and penalty conditions. Developmental Psychology, 1972, 6, 85-91.

Hartup, W.W., & Coates, B. The role of imitation in childhood socialization. In R.A. Hoppe, G.A. Milton, & E.C. Simmel (Eds.), Early experiences and the process of socialization. New York: Academic Press, 1970.

Hetherington, E.M., & Frankie, G. Effects of parental dominance, warmth, and conflict on imitation in children. Journal of Personality and Social Psychology, 1967, 6, 119-125.

Holt, M.M., Richard, H.C., & Ellis, N.R. A note on word modeling in retarded adolescents. American Journal of Mental Defeciency, 1972, 77, 237-239.

House, B.J., Brown, A.L., & Scott, M.S. Children's discrimination learning based on identity or difference. In H. W. Reese (Ed.) Advances in child development and behaviour. (Vol. 9), New York: Academic Press, 1974.

Litrownik, A.J., Cleary, C.P., Lecklitner, G.L., & Franzini, L.R. Self-regulation in retarded persons: Acqisition of standards of performance. American Journal of Mental Defeciency, 1978, 83, 86-89.

Lovaas, O.I., Berberlich, J.P., Perloff, B.F., & Schaeffer, B. Acquisition of imitative speech by schizophrenic children. Science, 1966, 151, 705-707.

Mercer, C.D., & Algozzine, B. Observational learning and the retarded: Teaching implications. Education and Training of the Mentally Retarded, 1977, 12, 345-353.

Metz, J.R. Conditioning generalized imitation in autistic children. Journal of Experimental Child Psychology, 1965, 2, 389-399.

Miller, N.E., & Dollard, J. Social learning and imitation. New Haven, Conn.:Yale University Press, 1941.

Mowrer, O.H. Learning theory and personality dynamics. New York:Ronald Press, 1950.

Mowrer, O.H. Learning theory and the symbolic processes. New York:John Wiley & Sons, 1960.

Parsons, J., & Davey, G.C. Imitation training with a four-year old retarded person: The relative effeciency of time-out and extinction in conjunction with positive reinforcement. Mental Retardation, 1978, 16, 241-245.

Parton, D.A., & Fouts. G.T. Effects of stimulus-response similarity and dissimilarity on children's matching performance. Journal of Experimental Child Psychology, 1969, 8, 461-468.

Parton, D.A. Priefert, M.J. The value of being imitated. Journal of Experimental Child Psychology, 1975, 20, 286-295.

Parton, D.A., & Seibold, J.R. Stimulus-response similarity and children's imitation. Perceptual and Motor Skills, 1973, 37, 491-494.

Peterson, R.F., & Whitehurst, G.J. A variable influencing the performance of generalized imitative behaviors. Journal of Applied Behavior Analysis, 1971, 4, 1-9.

Peterson, R.F., Merwin, M.R., & Moyer, T.J. Generalized imitation: The effects of experimenter absence,

differential reinforcement, and stimulus complexity. Journal of Experimental Child Psychology, 1971, 12, 114-128.

Robinson, N.M., & Robinson, H.B. The mentally retarded child. (2nd ed.). New York: McGraw-Hill Inc., 1976.

Ross, D. Relationship between dependency, intentional learning, and incidental learning in preschool children. Journal of Personality and Social Psychology, 1966, 4, 374-381.

Scott, K.G. A comparison of similarity and oddity. Journal of Experimental Child Psychology, 1964, 1, 123-134.

Sherman, J.A., Saunders, R.R. & Brigham, T.A. Transfer of matching and mismatching behaviour in preschool children. Journal of Experimental Child Psychology, 1970, 9, 489-498.

Shepp, B.E., & Turrisi, F.D. Learning and transfer of mediating responses in discrimination learning. In N.R. Ellis (Ed.) International review of research in mental retardation. (Vol. 2). New York: Academic Press, 1966.

Sibulkin, A.E. & Uzgiris, I.C. Imitation by preschoolers in a promblem-solving situation. The Journal of Genetic Psychology, 1978, 132, 267-275.

Smeets, P.M., & Striefel, S. The effect of experimenter absence and response delay on nonreinforced imitation. Journal of Psychology, 1973, 84, 119-127.

Spradlin, J.E., & Girardeau, F.L. The behavior of moderately and severely retarded persons. In N.R. Ellis (Ed.), International review of research in mental retardation. New York: Academic Press, 1966, 1, 219-253.

Steinman, W.M. Generalized imitation and the discrimination hypothesis. Journal of Experimental Child Psychology, 1970, 10, 79-99 (a).

Steinman, W.M. The social control of generalized imitation. Journal of Applied Behavior Analysis, 1970, 3, 159-167 (b).

Steinman, W.M., & Boyce, K.D. Generalized imitation as a function of discrimination difficulty and choice. Journal of Experimental Child Psychology, 1971, 11, 251-265.

Striefel, S., & Eberl, D. Imitation of live and videotaped models. Education and Training of the Mentally Retarded, 1974, 92, 83-88.

Talkington, L.W., & Altman, R. Effects of film-mediated aggressive and affectual models on behavior. American Journal of Mental Defeciency, 1973, 77, 420-425.

Yando, R., Seitz, V., & Zigler, E. Imitation: A developmental perspective. New Jersey: Lawrence Erlbaum Associates, 1978.

Yoder, P., & Forehand, R. Effects of modeling and verbal cues upon concept acquisition of normal and retarded children. American Journal of Mental Defeciency, 1974, 78, 566-570.

APPENDIX A

Pilot Study

According to the behavioural similarity hypothesis similarity will acquire conditioned reinforcing qualities by being paired with reinforcement. Thus training designed to establish or increase the reward value of similarity should result in an increase in spontaneous imitation. However, as Parton and Priefert (1975) note, the thesis that "similarity has, or acquires a reinforcing function ... has not been investigated experimentally because within an imitation paradigm, similarity is inextricably tied to the occurrence of a matching response" (p. 287).

Researchers have suggested that imitation is analogous to the match-to-sample discrimination learning paradigm (Miller & Dollard, 1941; Gewirtz & Stingle, 1968; Sherman, Saunders, & Brigham, 1970). Feder and Fouts (1977) examined whether pairing reinforcement with choosing a similar card on a two-choice match-to-sample task would result in an increase in the amount of subsequent imitation. They found that the males who were reinforced for choosing the similar stimulus imitated more than the males who were reinforced for a position response on the two-choice match-to-sample task. However, the similarity trained subjects did not imitate significantly more than a control group of subjects who were not reinforced. As such, a pilot study was

conducted to determine whether the training conditions employed by Feder and Fouts on the two-choice match-to-sample task would lead to an increase in spontaneous imitative behaviour in mentally retarded subjects.

Method

Subjects

Nine mentally retarded adults (I.Q.= 55-70) from the Vocational and Rehabilitation Research Institute, Calgary were randomly assigned to one of three training conditions (i.e. similarity, position, and exposure).

Apparatus

The materials that were used in the training phase consisted of one hundred sets of white cards (11.5 by 14 cm.) on which black line drawings of people and/or objects were depicted. Each set consisted of three cards, two identical and one different.

The materials that were used in the imitation phase consisted of a cardboard box containing eight blocks of wood (27 cm. X 5 cm. X 10 cm.), a blackboard eraser, and a piece of cardboard (20 cm. X 20 cm. X .1 cm.) with a fold in the middle. In addition a 10 cm. X 10 cm. X 2 cm. cardboard box with four pieces chalk protruding through the

top was utilized. The chalk was of varying lengths from 2 cm. to 8 cm. and was arranged in a line from largest (left) to smallest (right).

Procedure

Each subject was escorted individually to a small room containing a table and two chairs. Two shallow containers were on the table, one filled with nickels and the other empty. When seated, the subject was given the instructions "I have a game for you to play. I will put down three cards in the following manner" (researcher demonstrates by placing one of the two cards above the third). In addition, the similarity and position subjects were told that if they chose the correct card they would receive, and get to keep, a nickel.

The similarity subjects received a nickel and the verbal comment 'that's good' each time the subject chose the similar stimulus. The position subjects received the same consequences as the similarity subjects but the positive consequences were associated with the subjects choosing one of the randomly predetermined positions of the choice stimuli. The exposure subjects did not receive any consequences during the training trials but received the same number of nickels as the similarity subjects at the end of the training session.

For the similarity and position subjects, criterion for having learned the task was responding correctly on 9 out of 10 trials. The exposure subjects received the same number of trials as the subjects in the similarity condition.

Immediately after each subject had concluded their respective training they were escorted to another small room where they viewed a 3.5 minute videotape of a female model performing a sequence of twelve behaviours on a 27.94 cm. black and white Sony monitor (model CVM-11OUA). Six of these behaviours were relevant to the building of a house (TO) and the other six were incidental (TI). The subjects were then exposed to the same materials that the model had utilized and were told that the experimenter had to leave for a short time to do some work but while he was gone the subject could play with or use anything in the room. The experimenter then left the room and the subject was videotaped, for a five minute period, with a Sony VCR camera (model AVC-3400) and Batemax recorder (model SLO-340). Subsequently two observers independently coded the behaviours. The sequence of modeled behaviours and their coding criterion were as follows:

1) erases scribbles from blackboard; if any part of the blackboard was erased this behaviour was recorded as having occurred. This behaviour was designated as TO as it was necessary for the pattern of the house to be drawn on the

blackboard free from any interference.

2) picks the longest piece of chalk from a container with four pieces of chalk; this behaviour was recorded as soon as the chalk was removed from the box. This behaviour was designated as TI as it did not matter which piece of chalk was used.

3) draws a house on the blackboard; any kind of a structure that resembled a house with four walls and a roof was recorded. This 'blueprint' was relevant (TO) to the task.

4) draws a chimney with smoke coming out; both the chimney and smoke were required for recording this behaviour. As this feature is unnecessary it was designated as TI.

5) takes all the materials out of the box; if the materials were taken out of the box, regardless if they were put back in, this behaviour was recorded. Since the materials in the box were necessary for the successful completion of the house this was a TO behaviour.

6) stacks the eight blocks of wood into two piles; regardless of how many blocks of wood were in each pile, if there was two piles using all of the blocks of wood the behaviour was recorded. What the subject does with the blocks of wood prior, or subsequent, to the building of the house is TI.

7) builds the walls of the house using the eight blocks of wood; any structure which resembled four walls constructed with the blocks of wood. This behaviour was necessary and

therefore TO.

8) builds the house on a piece of cardboard taped to the table; at least 3/4 of the walls of the house must be built on the cardboard. It does not matter where the house is built therefore this behaviour is TI.

9) folds a piece of cardboard in half; any attempt at folding the cardboard aprroximately in the middle. This behaviour is necessary for the peak on the roof of the house (TO).

10) flaps cardboard like a fan; any waving of the cardboard in at least three consecutive opposite directions. This behaviour did not facilitate the building of the house (TI).

11) places the piece of cardboard down in the shape of an upside down 'V'; regardless of where it is placed the cardboard had to be set down in the requred shape. This was the roof of the house and was required (TO).

12) places a checkmark on the blackboard with a piece of chalk. This is not relevant to the building of the house (TI).

These behaviours were chosen because they were easily observable, appropriate for, and within the capabilities of the individuals that participated in this study.

Results

The similarity subjects responded by choosing the similar stimulus on the first nine trials of the two-choice match-to-sample task and imitated an average of 2.3 behaviours (maximum 12) (mean task-incidental behaviours = 1; mean task-oriented behaviours = 1.3). Two of the subjects in the exposure condition responded by choosing the similar stimulus on all nine trials whereas the third subject responded by choosing the dissimilar stimulus on all nine trials. These three subjects imitated an average of 2.3 behaviours (mean task-incidental behaviours = 1.3; mean task-oriented behaviours = 1). Only one of the position condition subjects was able to achieve criterion in under 100 trials and this occurred on the eighty-fourth trial. This subject imitated only one behaviour (task-oriented).

Discussion

On the basis of these results the following modifications were made to the two-choice match-to-sample task and to the imitation phase of the thesis study:

1) Due to the apparent difficulty of the position training a dissimilarity condition in which the subjects were rewarded for choosing the dissimilar stimulus, was employed.

2) To increase the probability of learning a penalty plus reward contingency (Shepp & Turrisi, 1966; Harter, Brown, & Zigler, 1971) was utilized.

3) To increase the probability of transfer both cards and objects were utilized and an overtraining component (Shepp & Turrisi, 1966) was included.

4) A group of subjects which did not have any exposure to the training task (no training) was employed as a control.

5) To examine a possible predisposition to match, as indicated by the the exposure pilot subjects' responses on the two-choice match-to-sample task, two groups (exposure and no training) of nonretarded subjects of comparable mental age were utilized.

6) The results of the imitation phase revealed that that when the experimenter left the room the subjects generally performed few of the modeled behaviours indicating that these behaviours have a low probability of occurrance in this situation. To ensure that the subject knew that there was a task to perform the instruction "Now I would like you to build a house" was included prior to the experimenter leaving the room.

APPENDIX B

Parental Consent Form

Dear Parent/Guardian(s):

I am conducting a study examining a training procedure designed to increase the amount of imitation in individuals who are mentally handicapped. I would like _____ to participate in this project which, if the training is effective could facilitate learning in a number of situations. The project will consist of a training procedure during which each individual will be shown pictures and objects and rewarded for choosing either a similar or dissimilar picture or object. After the training task each person will veiw a videotaped series of simple behaviours performed by a model and then be allowed to imitate them. To secure exact recording of the responses that each person makes he or she will be videotaped, however to ensure confidentiality only two coders will view the tape and then it will be erased. In addition, complete confidentiality of individual responses can be assured because only group results will be examined. This project takes approximately 50 minutes to complete and will be conducted during the work hours at The Michener Centre.

If you are willing to have _____ participate in this project, please sign below and return the lower portion of this letter to The Michener Centre, Psychology Department, Box 5002, Red Deer, Alberta. Please note that in addition to obtaining your consent I will ensure that participation is completely voluntary by not only obtaining each individuals initial permission but also by making sure that the individual knows he or she is free to withdraw at any time. If you would like further information please feel free to phone Olga Haras (1-403-343-5660) at The Michener Centre.

Thank you very much,

Dwaine Souweny

Dwaine Souweny,
Graduate Student

J. L. Mosley, Ph.D.,
Supervisor
Associate Professor

I approve of _____ participation in this study.
name

_____
Parent/Guardian signature

APPENDIX C

Group Characteristics According to Condition: Mean and Standard Deviation for Mental Age, Chronological Age, and Intelligence Quotient

		MENTAL AGE		CHRONOLOGICAL AGE		INTELLIGENCE QUOTIENT	
	N*	MEAN	SD	MEAN	SD	MEAN	SD
Mentally Retarded Subjects							
Similarity	12	9.65	1.89	30.30	7.67	65.33	10.11
Dissimilarity	12	9.98	1.61	27.15	7.50	67.25	7.51
Exposure	12	9.39	1.36	24.80	3.40	63.50	6.60
No Training	12	9.32	2.28	28.61	6.72	63.0	11.05
Mental Age Matched Subjects							
Exposure	12	9.80	1.85	8.05	.56	110.42	17.28
No Training	12	9.96	1.05	8.07	.56	114.58	9.43

* equal males and females per condition

Note. Age is in years

APPENDIX D

Objects Utilized During Training

Choice Stimuli	Target Stimulus
Acquisition	
bobby pins	paper clip
army men	cowboy
combs	brush
corks	plug
pennies	dollar bill
bottle caps (large)	bottle cap (small)
pen tops	pencil eraser
bike pedals	handle bar grip
wooden coasters	leather coaster
tacks	nail
male hose connectors	female hose connector
licenses	metal plate
straws	pencil
cigarette package	cigar package
pucks	golf ball
Overtraining	
square batteries	round battery
film containers	pill container
poker chips	checker
keys*	key holder
red wire connector	blue wire connector
matches*	lighter
screws	bolt
glasses*	paper cup
bandaids*	tape
square tiles	round tiles
range arms (barton box)	window bracket
arm shafts (barton box)	arm connectors (barton box)
pencils*	pen
golf balls	rubber ball

* pair of choices are not identical

APPENDIX E

Summary of Analysis of Variance for the Percent of Correct Stimuli Chosen During Acquisition: Condition Comparisons

Source	SS	df	MS	F
Condition (C)	8357.19	2	4178.59	5.91**
Type of Stimulus (T)	522.72	1	522.72	14.94**
Subj w. C	23341.58	33	707.32	
C x T	1306.69	2	653.35	18.69**
T x Subj w. C	1153.58	33	34.96	

**p <.01

APPENDIX F

Summary of Analysis of Variance for the Number of Correct Stimuli Chosen in Overtraining: Condition Comparisons

Source	SS	df	MS	F
Condition(C)	7.69	2	3.85	1.99
Type of Stimulus(T)	1.39	1	1.39	6.63*
Subj w. C	63.91	33	1.94	
C x T	.69	2	.35	1.66
T x Subj w. C	6.92	33	.21	

*p<.05

APPENDIX G

Summary of Analysis of Variance for the Number of Task-Oriented Behaviours: Condition Camparisons

Source	SS	df	MS	F
Condition (C)	4.90	3	1.63	.73
Sex of Model (M)	7.52	1	7.52	3.37
Sex of Subject (S)	.52	1	.52	.23
C x M	9.73	3	3.24	1.45
C x S	5.40	3	1.80	.81
M x S	7.52	1	7.52	3.37
C x M x S	2.06	3	.69	.30
Subj w. (C x M x S)	71.33	32	2.23	

APPENDIX H

Summary of Analysis of Variance for the Number of Task-Incidental Behaviours: Condition Comparisons

Source	SS	df	MS	F
Condition (C)	1.73	3	.58	.22
Sex of Model (M)	22.69	1	22.69	8.85**
Sex of Subject (S)	.02	1	.02	.01
C x M	7.90	3	2.63	1.03
C x S	6.56	3	2.19	.85
M x S	7.52	1	7.52	2.94
C x M x S	3.06	3	1.02	.39
Subj w. (C x M x S)	82.00	32	2.56	

**$p<.01$

APPENDIX I

Summary of Analysis of Variance for the Percent of Similar Stimuli Chosen During Acquisition: Group Comparisons

Source	SS	df	MS	F
Group(G)	4900.52	1	4900.52	2.73
Type of Stimulus (T)	.52	1	.52	.004
Subj w. G	39519.79	22	1796.35	
G x T	25.52	1	25.52	.017
T x Subj w. G	3186.46	22	144.84	

APPENDIX J

Summary of Analysis on the Number of Similar Stimuli Chosen During Overtraining Group Comparisons

Source	SS	df	MS	F
Group (G)	285.19	1	285.19	14.04**
Type of Stimulus (T)	.21	1	.21	0.01
Subj w. G	446.79	22	20.30	
G X T	2.52	1	2.52	1.54
T X Subj w. G	35.95	22	1.63	

**p<.01

APPENDIX K

Summary of Analysis of Variance for the Number of Task-Oriented Behaviours: Group Comparisons

Source	SS	df	MS	F
Group (G)	.00	1	.00	.00
Condition (C)	.08	1	.08	.04
Sex of Model (M)	2.08	1	2.08	1.12
Sex of Subject (S)	.75	1	.75	.40
G x C	.08	1	.08	.04
G x M	.75	1	.75	.40
C x M	1.33	1	1.33	.72
G x S	.08	1	.08	.04
C x S	.33	1	.33	.18
M x S	1.33	1	1.33	.72
G x C x M	.33	1	.33	.18
G x C x S	5.33	1	5.33	2.88
G x M x S	5.33	1	5.33	2.88
C x M x S	.75	1	.75	.40
G x C x M x S	6.75	1	6.75	3.64
Subj w. (G x C x M x S)	59.33	32	1.85	

APPENDIX L

Summary of Analysis of Variance for the Number of Task-Incidental Behaviours: Group Comparisons

Source	SS	df	MS	F
Group (G)	.52	1	.52	.22
Condition (C)	.02	1	.02	.01
Sex of Model (M)	6.02	1	6.02	2.63
Sex of Subject (S)	.02	1	.02	.01
G x C	.02	1	.02	.01
G x M	7.52	1	7.52	3.28
C x M	.02	1	.02	.01
G x S	.52	1	.52	.22
C x S	.52	1	.52	.22
M x S	.52	1	.52	.22
G x C x M	6.02	1	6.02	2.62
G x C x S	7.52	1	7.52	3.28
G x M x S	13.02	1	13.02	5.68*
C x M x S	1.68	1	1.68	.74
G x C x M x S	13.02	1	13.02	5.68*
Subj w. (G x C x M x S)	73.33	32	2.29	

*$p < .05$

APPENDIX M

Summary of Pearsonian Correlations between the Percentage of Similarity Responding and Subsequent Task-Oriented and Task-Incidental Imitation for Treatment Groups

		Behaviors	
Group	Condition*	Task Oriented	Task Incidental
M.A.	Exposure	.1304	-.1926
M.R.	Exposure	-.2868	.0951
M.R.	Dissimilarity	-.1667	-.1251

* Note. six males and six females were in each condition