Eliminating Overselective Stimulus Control: A Comparison of Two Procedures for Teaching Mentally Retarded Children to Respond to Compound Stimuli

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ELIMINATING OVERSELECTIVE STIMULUS CONTROL:
A COMPARISON OF TWO PROCEDURES FOR TEACHING MENTALLY
RETARDED CHILDREN TO RESPOND TO COMPOUND STIMULI

by

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ELIMINATING OVERSELECTIVE STIMULUS CONTROL:
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Keith D. Allen, M.A.
Western Michigan University, 1983

Overselective stimulus control occurs when behavior fails to come under control of all characteristics of a compound stimulus after discrimination training. The efficacy of two procedures designed to eliminate overselective stimulus control observed with six trainable mentally retarded children was compared in Experiment 1. A training procedure using S-’s which were minimally different from the S+ was designed to reduce the probability that stimulus discriminations could be based on stimulus characteristics other than experimenter specified characteristics defining the S+. This procedure proved more effective in preventing and eliminating overselective stimulus control than an alternate discrimination training procedure. Experiment 2 indicated that these improvements in stimulus control were not a function of varying degrees of difficulty between stimulus sets or of a prior history of discrimination training with the less effective procedure. The need for better assessment procedures to detect overselective stimulus control and suggestions for further improvements in discrimination training procedures are discussed.
ACKNOWLEDGEMENTS

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Keith D. Allen
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CHAPTER I

INTRODUCTION

In recent years an extensive body of literature has emerged centering on the learning characteristics of children labeled "autistic", "mentally retarded", and "language delayed". The impetus behind this research involves the desire to understand these children's lack of responsiveness to critical stimuli in their environment and the behavioral deficits associated with these stimulus control problems. For example, when presented with a discrimination task involving compound stimuli composed of a number of separate elements, these children often fail to respond to all of the available cues within the discriminative stimulus.

This phenomenon was first described and systematically studied by Lovaas, Schreibman, Koegel, and Rehm (1971). They taught autistic, mentally retarded, and normal children to press a lever in the presence of a compound stimulus (S+), composed of an auditory, visual, and tactile element. When the compound stimulus had gained control of responding, each element was presented individually to determine the extent of stimulus control each exerted. It was found that the autistic children generally responded to only one of the three elements as though it were the S+; retarded children responded to two elements; normal children responded to all three elements. Lovaas et al. (1971) suggested that the autistic and retarded children were "overselective" in their responding to available elements within the S+ and labeled the

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phenomenon "stimulus overselectivity". This phenomenon has since been demonstrated in numerous other studies with a range of autistic and mentally retarded children (e.g., Koegel, Schreibman, Britten, & Laitinen, 1979; Koegel & Schreibman, 1977; Schreibman, Koegel, & Craig, 1977; Bailey, 1981; Schover & Newsom, 1976; Review by Lovaas, Koegel, & Schreibman, 1979).

It would be best, at this point, to briefly consider the adequacy of the term "stimulus overselectivity" as a description of the phenomenon observed. Staats and Butterfield (1965) note that deficits in behavior (e.g., failure to learn complex discriminations) may arise either because the child is "unable" to acquire the behavior despite adequate teaching strategies, or because the conditions of learning have been defective. In the stimulus overselectivity literature, discrimination training procedures which were effective for some children proved ineffective for other children. In such a situation, it would be erroneous to assume that these children would be unable to learn the discrimination under alternate teaching strategies or that the children's deficits must be due to some internal, personal defect. A label such as "stimulus overselectivity" suggests such an internal defect and promotes the assumption that "stimulus overselectivity" is something that one can have, resulting in learning problems. An alternate term which accurately describes the phenomenon would be "over-selective stimulus control" (OSC). This term describes behavior which fails to come under the control of all relevant characteristics of a compound stimulus without implying a personal defect with potential causal status.
The identification of OSC, and the development of procedures to prevent it or remediate it, is of importance for a variety of reasons. For example, speech retardation in autistic and mentally retarded children may be due to the failure of each of the multiple elements of speech to control their behavior (Reynolds, Newsom, & Lovaas, 1974). Similarly, Rincover and Koegel (1975) have shown that OSC can impact generalization, and Varni, Lovaas, Koegel, and Everett (1979) have shown that OSC may result in a failure to benefit from modeling. In addition, OSC can frequently be observed in children whose number and letter identification skills fail to come under control of the orientation of printed symbols, resulting in reversals of b's and d's, or p's and q's, etc.

Given that OSC is associated with severe learning problems in children (Gersten, 1980), alternate teaching strategies are needed to bring the behavior of the child under the control of all critical features of a compound stimulus during discrimination training. If OSC could be eliminated, autistic children and others exhibiting OSC might be more likely to benefit from and respond to their environment in a more successful manner, facilitating rapid changes in behavior (Lovaas et al., 1979).

Successful reductions in OSC have been reported with a combination of overtraining and intermittent reinforcement (Schover & Newsom, 1976); a combination of overtraining, intermittent reinforcement, and repeated exposure to tests involving the presentation of separate elements of the compound S+ (Schreibman et al., 1977); intermittent reinforcement schedules alone (Koegel et al., 1979); and discrimination training with
compound stimuli (Schreibman, Charlop, & Koegel, 1982). Unfortunately, the efficacy of each of these procedures is difficult to interpret due to design and assessment problems within each study. For example, Schover and Newsom (1976) failed to present data for individual subjects, making it impossible to assess the consistency of improvements across subjects, while both Schover and Newsom (1976) and Schreibman et al. (1977) administered a combination of procedures to their treatment groups making it difficult to isolate the role of each procedure in the reduction of OSC.

A problem with Schover and Newsom (1976), Schreibman et al. (1977), and Keogel et al. (1979) is the nature of the test utilized to assess the extent of control exercised by each element of the S+. After initial discrimination training between two compound stimuli, each with two elements, a test was presented consisting of one element of the S+, alone or in combination with a novel element, versus one element of the S-, also alone or in combination with a novel element. Since the original S+ was not presented, the subject was forced to choose between two incorrect alternatives and this may not have accurately reflected the actual control maintained by each S+ element.

Finally, Schover and Newsom (1975), Schreibman et al. (1977), Koegel et al. (1979), and Schreibman et al. (1982) each relied on percentage of correct responding to assess successful learning when, in fact, 100% correct responding to the S+ does not, by itself, guarantee that the S+ characteristics specified by the experimenter are controlling responding (Sidman, 1980). When discriminations between compound stimuli can be made based on characteristics other than those
specified by the experimenter as critical features of the S+, then teaching strategies are needed which insure that irrelevant stimulus characteristics cannot form the basis of a conditional discrimination (Becker, Engelmann, & Thomas, 1975). For example, Schreibman et al. (1982) did not insure that stimulus discriminations were not based on irrelevant stimulus characteristics. They attempted to teach autistic children to respond to specified characteristics of compound stimuli by training the children on a series of discriminations using three stimuli, one designated as the S+ and two as the S-'s. Each S+ (from a total of nine different discrimination sets) was comprised of three relevant characteristics, two elements and their orientation with respect to each other. However, inconsistencies with respect to the number of elements within each set of training and test stimuli would allow for discriminations to be based, at least in part, on an irrelevant characteristic (i.e., number of elements in each stimulus). In addition, since orientation of the S+ elements remained constant during their intervention, discrimination breakdowns with respect to orientation of the S+ elements would be more likely (Becker et al., 1975).

Experiment 1 replicates the procedures of Schreibman et al. (1982). To determine whether OSC is still present after the discrimination training procedures used by Schreibman et al. (1982) shows 100% accurate responding, an additional, more stringent stimulus control test will be utilized to detect discriminations based on characteristics other than those specified by the experimenter. Experiment 1 will also evaluate the development of OSC resulting from a discrimination training procedure designed to reduce the probability that a subject will learn
a discrimination between compound stimuli based on characteristics other than those specified by the experimenter.
CHAPTER II

EXPERIMENT 1

Method

Subjects

Three mentally retarded children from a school for mentally and multiply impaired children participated in the study. Chronological ages for Bob, Mia, and Josh were 15.1, 8.6, and 17.2, respectively. All three children were labeled trainable mentally impaired (TMI), with Stanford-Binet I.Q.'s of 27, 40, and 26, respectively. In addition to their primary diagnosis, Mia and Josh were also labeled speech and language impaired. Observations and probe tests similar to those employed in the actual procedure were utilized to secure subjects who had no visual impairments, were under moderate instructional control, and who exhibited some difficulty with visual discrimination tasks.

Materials and Setting

All three stimuli for compound stimulus discrimination training consisted of geometric shapes presented on 6 cm x 9 cm laminated, white cards and positioned approximately 4 cm apart. One of the three stimulus cards was comprised of two spatially separate elements (i.e., a geometric shape and an underline or a dot), and functioned as the correct (S+) stimulus. The other two stimulus cards served as incorrect (S-) alternatives and contained only one geometric shape. Examples of
these training stimuli are presented in Figure 1. Two sets of test stimuli consisting of the original S+ and new S-'s were developed for each set of training stimuli. For one set of test stimuli, one of the two new S-'s consisted of a novel shape combined with one element of the S+ (i.e., line or dot), while the other S- contained the geometric shape of the S+ presented alone. For example, in stimulus Set 1 (Figure 1), the training stimuli consisted of an ellipse with an underline, a sector, and a circle. The first test stimuli for Set 1 consisted of the same S+ and two new S-'s (i.e., a hexagon with an underline and an ellipse alone). Because this test fails to rule our discriminations based on the number of elements and also fails to insure the discrimination is based on orientation of the elements, this test was labeled the "Multiple Differences Test" (MultiDiff Test), meaning it provides multiple ways in which the subjects could respond with 100% accuracy while still not discriminating based on experimenter specified characteristics of the S+. Another set of test stimuli contained the S+ and three new S-'s. Two of the S-'s contained a novel shape combined with one spatially separate element of the S+ while the other S- consisted of both elements of the S+ presented in reversed orientation. For example, in stimulus Set 1 (Figure 1), this second test contained the S+, an ellipse with a triangle, a whistle with an underline, and the reversed S+ elements (i.e., line over ellipse). Because this test allowed for minimal discriminations beyond those discriminations based on experimenter specified characteristics of the S+, this test was labeled the "Minimal Differences Test" (MinDiff Test). Finally, a new group of training stimuli was added to each set.
Figure 1. Training and testing stimulus sets for Experiments 1 and 2. Eighteen total stimulus sets were constructed, a representative six of which are presented here.
This group included the S+ and four new S-'s. Two of the S-'s contained a novel geometric shape paired with a spatially separate element of the S+, where the S+ elements were in their correct positions. Two other S-'s contained a novel shape paired with a spatially separate element of the S+ where the S+ elements were in the opposite position from that in which they were found in the S+. For example, in Set 1, this training group contained the S+, a square with an underline, an ellipse over a rectangle, a shield over an ellipse, and a line over a triangle. Because this group presented stimuli with minimal, but critical differences between the S+ and S-'s, the subject was forced to attend to the critical characteristics of the S+. For this reason, this training group was labeled "Critical Differences Training (CriDiff Training).

Since the MultiDiff Training phase was a replication, the first nine stimulus sets to be used with each subject were similar to those used by Schreibman et al. (1982). In all, 18 different stimulus sets were used across the two training phases. Samples of the stimulus sets are presented in Figure 1.

Training and test sessions were conducted five days a week. Each session lasted approximately 30 minutes with training and testing for each stimulus set completed within the same daily session. Sessions were conducted late in the morning to strengthen the value of food reinforcers. In all sessions, the subject was seated at a table facing the experimenter in an enclosed observation room located next to the classroom.
Interobserver Agreement

Undergraduate-level practicum students were trained to score subject responses during probe trials for subject selection. The experimenter and observer recorded data with each presentation of the stimulus cards, indicating whether the response was correct or incorrect. During training and testing, interobserver agreement observations were conducted three days a week.

Procedure

Trials were presented when the child was displaying good eye contact and was not engaged in off-task behavior. Each trial consisted of the presentation of the S+ and corresponding S-'s, and the instruction "Touch the correct card". Reinforcers included Captain Crunch cereal, Fruit Loops cereal, and fruit juice. Initially, reinforcement was presented on a continuous schedule which was gradually shifted to a variable-ratio 4 schedule to minimize the discriminability of non-reinforced test trials. Incorrect responses were followed by a verbal "no" and the removal of the training stimuli. The position of the S+ was randomized to preclude learning based on the position of the S+. When position preference was noted, the S+ was presented in a nonpreferred position for a number of trials.

Multiple Difference Training. As depicted in Figure 2, the subject was presented with the training stimuli from one of the first nine stimulus sets and reinforced for correct responses. Training was considered completed when a criterion of 90% correct on 20 consecutive
Figure 2. Procedure flowchart
trials had been reached. The subject was then presented with the MultiDiff Test. If the subject made errors on the MultiDiff Test (i.e., evidence OSC), then the discrimination was taught using the MultiDiff Test stimuli in discrimination training trials. Because this type of training fails to rule out discriminations based on the number of elements and fails to insure that discriminations are based on orientation of the S+ elements, this training was labeled "Multiple Differences Training (MultiDiff Training). Responses to the S+ were rewarded while incorrect responses were met with a verbal "no". This continued until the 90% correct over 20 consecutive trials criterion had been reached. At this point, the MinDiff Test was presented to test whether the MultiDiff Training had been effective in teaching the subject to respond to the experimenter specified characteristics of the S+. If, on subsequent stimulus sets, the subject responded correctly on the MultiDiff Test, then MultiDiff Training was not required and the MinDiff Test was presented. This entire procedure of training and testing was repeated with a new set of stimuli selected from the pool of nine sets, until the child responded at or above criterion on both the MultiDiff and MinDiff Tests on two consecutive stimulus sets. If a tenth stimulus set was required under MultiDiff Training, then a stimulus set was selected from the second pool of nine.

Critical Differences Training. As depicted in Figure 2, initial compound stimulus training was the same as that in the MultiDiff Training phase. The subject was presented with one of the second group of nine stimulus sets and reinforced for correct responding. Criterion was 90% correct over 20 consecutive trials. The subject was then
presented with the MinDiff Test to provide a baseline indication of 
OSC. If the subject made errors on the MinDiff Test, discrimination 
training was initiated with the CriDiff Training group until the 90% 
criterion was reached. The subject was then presented with the MinDiff 
Test again to assess any improvements in OSC due to the CriDiff Train-
ing. This entire procedure of training and testing was repeated until 
the subject responded correctly on initial presentation of the MinDiff 
Test on two consecutive stimulus sets.

Results and Discussion

Interobserver Agreement

Both occurrence and nonoccurrence interobserver agreement percent-
ages for response accuracy during training and testing sessions were 
100%.

Multiple Differences Training Phase

Data to the left of the phase lines in Figure 3 depict the acqui-
sition of stimulus control resulting from the MultiDiff Training. 
Results show the percent correct responding to the S+ for each conse-
cutive stimulus set for each subject on both the MultiDiff and MinDiff 
Tests. Since MultiDiff Training and CriDiff Training always required 
90% or better correct responding for completion of training, these 
data are not displayed. The figure shows that Bob's consistently low 
performances on the pre-training MultiDiff Test on eight of the nine 
stimulus sets required MultiDiff Training. Despite obtaining the 90% 
criterion on the MultiDiff Training, stimulus control by experimenter
Figure 1. Percent responding to the S+ across 18 stimulus sets.

Multiple Differences Training

Critical Differences Training

Pre-treatment MultiDiff Test

Pre-treatment MinDiff Test

Post-treatment MinDiff Test

Consecutive Stimulus Sets

Percent Responding to the (S+) Stimulus
specified characteristics of the S+ was never reliably achieved as evidenced by the variable and generally low performance on the post-training MinDiff Test. Bob did not respond at or above criterion on the post-training MinDiff Test on three of the eight stimulus sets where training was required.

Mia's results indicate consistently low percent correct responding on the MinDiff Test despite reaching 90% criterion on the Multi-Diff Training in each of the first five stimulus sets in which Multi-Diff Training was required. Mia obtained 100% correct responding on the pre-training MultiDiff Test for the last six sets of the Multi-Diff Training phase thus suggesting the absence of OSC and obviating the need for the MultiDiff Training. Mia continued, however, to obtain low percent correct on the post-training MinDiff Test.

Josh exhibited 100% correct responding on the pre-training Multi-Diff Test for the first seven stimulus sets which might have been interpreted as an absence of OSC. The generally low percent correct, however, on the MinDiff Test across the first seven stimulus sets indicates the absence of stimulus control by experimenter specified characteristics of the S+. Josh failed to meet criterion on the MultiDiff Test on set eight and was exposed to MultiDiff Training. He was able to respond with 100% accuracy on the MinDiff Test on set eight and continued to respond at or above criterion on both tests without requiring training on the last five sets of this phase.
Critical Differences Training Phase

Data to the right of the phase lines in Figure 3 depict the acquisition of stimulus control resulting from the CriDiff Training. Bob's results show that generally low baseline responding on the pre-training MinDiff Test across seven of the nine stimulus sets resulted in CriDiff Training. After exposure to CriDiff Training, Bob performed at or above criterion on six of the seven sets where CriDiff Training was required. Similar improvements resulting from CriDiff Training can be seen in the discrepancies between the pre- and post-training scores on the MinDiff Test for Mia during this phase. Like Bob, Mia's consistently high MinDiff Test scores after CriDiff Training are in marked contrast to the inconsistent and low scores observed on the same test after MultiDiff Training.

Josh required CriDiff Training only once (Set 14), and responded with 100% accuracy on the post-training MinDiff Test. Like Mia's performances on Sets 17 and 18, Josh's percent correct on the pre-training MinDiff Test met criterion on Sets 15 and 16, thus reaching criterion for termination of the experiment.

Table 1 shows the range and mean number of trials to criterion per stimulus set for subjects in Experiment 1 exposed to both the MultiDiff Training and the CriDiff Training and also for subjects in Experiment 2 who were exposed to only the CriDiff Training. Differences in mean number of trials to criterion between the two training procedures ranged from 3-5 trials per stimulus set with the CriDiff Training requiring consistently fewer trials to criterion.
## TABLE 1
Trials to Criterion

<table>
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<th>Subjects</th>
<th>MultiDiff Training</th>
<th>CriDiff Training</th>
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<tbody>
<tr>
<td><strong>Experiment 1</strong></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td>BOB</td>
<td>40</td>
<td>25-55</td>
</tr>
<tr>
<td>MIA</td>
<td>29</td>
<td>20-55</td>
</tr>
<tr>
<td>JOSH</td>
<td>30</td>
<td>25-35</td>
</tr>
<tr>
<td><strong>Experiment 2</strong></td>
<td>Mean</td>
<td>Range</td>
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<tr>
<td>VERN</td>
<td>26</td>
<td>20-35</td>
</tr>
<tr>
<td>DAVE</td>
<td>25</td>
<td>20-25</td>
</tr>
<tr>
<td>JEFF</td>
<td>30</td>
<td>25-35</td>
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These results not only attest to the sensitivity of the MinDiff Test as an assessment tool for OSC but they validate CriDiff Training procedures as an effective procedure for preventing and/or remediating OSC.

To ensure that the gains associated with CriDiff Training in Experiment 1 were not a function of a history of MultiDiff Training with compound stimuli, or a function of changes in the difficulty of the stimulus sets from one phase to another, Experiment 2 evaluated the effect of CriDiff Training alone with naive subjects using the stimulus sets of the MultiDiff Training phase of Experiment 1.
CHAPTER III

EXPERIMENT 2

Method

Subjects

Three mentally retarded children from the same school as those children in Experiment 1 participated in this experiment. Chronological ages for Vern, Dave, and Jeff were 12.6, 8.6, and 24.7, respectively. Dave was functioning in a TMI classroom but was labeled Emotionally Impaired with no reported I.Q. scores available since the child was unresponsive to testing. Vern and Jeff were both labelled as TMI with I.Q.'s of 37 as assessed by the Stanford-Binet and Wechsler Adult Intelligence scales, respectively. Vern also had a secondary diagnosis of Physically and Otherwise Health Impaired. These children were selected via the same procedures and with the same criteria as in Experiment 1.

Materials and Setting

Stimuli for initial compound stimulus discrimination training, MultiDiff Testing, MinDiff Testing, and CriDiff Training were identical to those used in the MultiDiff Training phase of Experiment 1. Sessions were conducted in the same setting and under the same conditions as those in Experiment 1.
Procedure

These subjects were not exposed to the MultiDiff Training prior to receiving the CriDiff Training. Discrimination training and testing procedures were identical to those in the CriDiff Training phase of Experiment 1.

Interobserver Agreement

Both occurrence and nonoccurrence interobserver agreement percentages for response accuracy during training and testing sessions were 100%.

Critical Differences Training

Figure 4 shows the percent correct responding to the S+ for each consecutive stimulus set for each subject. Since CriDiff Training always required 90% or better correct responding for completion of training, these data are not displayed. For Vern, generally low percent correct responding on the pre-training MinDiff Test for eight of the nine stimulus sets resulted in CriDiff Training. Post-training performance on the MinDiff Test indicated generally high percent correct responding which reached criterion levels on six of the eight stimulus sets requiring CriDiff Training.

Both Dave and Jeff also exhibited low percent correct responding on the early stimulus sets which showed marked improvements with Cri-Diff Training as evidenced by high post-training performances on Min-Diff Testing. Both Dave and Jeff responded at or above criterion on the pre-training MinDiff Test for two consecutive stimulus sets which
Figure 4. Percent responding to the S+ across nine stimulus sets in Experiment 2.
was criterion for termination of the experiment for them.
CHAPTER IV

GENERAL DISCUSSION

Experiment 1 was designed to evaluate the effectiveness of two different discrimination training procedures in the establishment of stimulus control with compound stimuli. Results indicated that all of the children were able to reach criterion responding during MultiDiff Training, thus replicating the results of Schreibman et al. (1982). The more stringent MinDiff Test of stimulus control, however, failed to reveal consistent control by experimenter specified characteristics of the S+ after MultiDiff Training. For example, Mia responded consistently low on Sets 1-5 on the post-training MinDiff Test for stimulus control despite having reached criterion on MultiDiff Training. In addition, the MultiDiff Test appears to provide a less rigorous assessment of stimulus control than the MinDiff Test. Although both Mia and Josh evidenced 100% correct responding with pre-training MultiDiff Testing on Sets 6-10 and 1-7, respectively, they consistently evidenced inadequate stimulus control when assessed with the MinDiff Test. These results indicate that even 100% accurate responding on the MultiDiff Training or MultiDiff Test does not guarantee stimulus control based on experimenter specified stimulus characteristics. The occurrence of such "faulty" stimulus control is not surprising given that MultiDiff Training provides multiple stimulus differences between the S+ and S-'s, only some of which are specified by the experimenter as defining features of the S+. In some cases, MultiDiff Training may
establish responding under control of the specified characteristics of the S+ as evidenced by Bob's post-training MinDiff Test scores on Sets 2, 3, and 7 and Josh's performance on the same test after Multi-Diff Training on Set 7. Unfortunately, such training benefits are not as reliable across subjects or across stimulus sets as those attained with CriDiff Training where only one interpretation of the critical features of the S+ is assured through careful selection of the S-'s.

Results from the CriDiff Training phase indicate that this training reliably improved stimulus control by experimenter specified characteristics of the S+. For example, starting with Set 10, Bob generally exhibited low percent correct responding on the baseline MinDiff Test. Yet, after CriDiff Training, he evidenced large improvements in percent correct responding on all sets where training was required and responded at or above criterion on six out of seven such sets. Mia and Josh showed similar gains with CriDiff Training. In addition, all three subjects showed gains without requiring more trials to criterion than were required under the MultiDiff Training phase.

Improvements between pre- and post-training MinDiff Test scores for all three subjects in Experiment 2 replicate the effects of Cri-Diff Training in Experiment 1 and eliminate subject training history and variation in stimulus set difficulty as an explanation for the results attained in Experiment 1.

The results from Experiments 1 and 2 are encouraging in that they indicate that OSC may be reliably reduced using stimulus sets containing S-'s selected to eliminate irrelevant stimulus characteristics which could form the basis of a discrimination. While all six subjects
exhibited reduced OSC after the first exposure to CriDiff Training, four of the six were able to perform at or above criterion on pre-training MinDiff Tests with prior CriDiff Training. It is unclear from these experiments whether these discrimination gains resulted from more careful attention to the S+ or the inference of a "rule" about critical elements of the S+ in these types of compound stimuli. Furthermore, whether such gains would generalize to untrained novel compound stimuli (i.e., other than the geometric forms in these experiments) needs to be assessed in future research.

It is interesting to note that all six subjects evidenced large reductions in OSC with CriDiff Training, but rarely obtained 100% accuracy. This may be attributable to the fact that during testing, subjects were observed occasionally scanning available stimuli from left to right or vice versa, and selecting the first stimulus resembling the S+ as the correct card, without observing the alternative stimuli. Such deficits in observing responses might lower the accuracy of responding and inflate the number of trials needed to reach criterion during training. It may be that teaching an observing response (i.e., touch each stimulus before selecting the correct card), might improve the acquisition of control by experimenter specified characteristics.

Failure to completely eliminate OSC might also be attributable to the fact that in CriDiff Training only vertical orientation was manipulated in a limited number of S-'s. Increasing the pool of S-'s beyond the limited number used in these two experiments and utilizing a greater variety of orientation differences between S+ and S- stimuli may improve stimulus control. Research in this area would provide
valuable information as to whether increases in the number of S-stimuli further reduces OSC without requiring significant increases in trials to criterion in training.

Clearly, assessment devices which are reliable and sensitive to the presence of OSC are prerequisites to the development of OSC treatments. Findings in these two studies suggest that tests such as the MinDiff Test are more sensitive assessments of OSC with compound stimuli than those utilized in previous research (e.g., Schreibman et al., 1982). In addition, the present studies suggest that while past treatments may improve the acquisition of discriminations, treatments such as CriDiff Training are the type of training needed to reliably insure stimulus control by experimenter specified characteristics in compound stimuli.
BIBLIOGRAPHY


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