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DIFFERENTIAL COVERT CONDITIONING: A REPLICATION OF A STUDY BY EPSTEIN AND PETERSON

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DIFFERENTIAL COVERT CONDITIONING: A REPLICATION OF A STUDY BY EPSTEIN AND PETERSON

The effect of covert behavior upon overt response has recently been addressed by a number of behavioral scientists. Notable among the theorists in this area is Cautela who has suggested several covert therapeutic approaches including covert sensitization (Cautela, 1967), covert reinforcement (Cautela, 1970b), covert negative reinforcement (Cautela, 1970a), and covert extinction (Cautela, 1971). Each of these techniques employs imagined scenes (covert behavior) in a systematic manner to encourage a subsequent increase or decrease in specific overt behaviors. The therapist trains the client to employ these imagery techniques to influence the rate of occurrence of a given target behavior.

Although there are numerous case reports to support the effectiveness of covert conditioning approaches (Yager, 1974), there have been very few well-designed experimental studies which support Cautela's ideas (Ascher & Cautela, 1972; Wish, Cautela, & Steffen, 1970; Epstein & Peterson, 1973). Additionally, there are several studies which seriously question the covert conditioning perspective (Ladouceur, 1974; Foreyt & Hagen, 1973; and Marshall, Boutilier, & Minnes, 1974). One of these studies (Foreyt & Hagen, 1973) had hypothesized that the effectiveness of the covert techniques may well rest upon such factors as attention, demand characteristics, or suggestion. At very least, the simple operant conditioning explanation of covert positive reinforcement and covert negative reinforcement has been severely challenged by Ladouceur (1974) and Marshall et. al. (1974). Thus, it seemed highly relevant to replicate one of the studies which has provided the best experimental support for the covert positive reinforcement and covert negative reinforcement hypotheses: Epstein and Peterson's (1973) study of differential covert conditioning. The present replicates Epstein and Peterson's investigation.

METHOD

Subjects

Thirty-eight volunteers from one upper division education class and two beginning master's degree counseling and guidance courses at the University of North Dakota completed the Reinforcement Survey Schedule (Cautela & Kastenbaum, 1967). On this survey subjects are asked to rate possible reinforcing stimuli from "like not at all" to "like very much". The twenty-two experimental subjects were chosen on the basis of having the same reported reinforcing and aversive stimuli. These twenty-two subjects were randomly assigned to one of two experimental groups.

Experimental Setting and Procedure

The procedures of this experiment were identical to those of the Epstein and Peterson study (1973) except where specifically indicated.

The experimental setting involved a table with a chair on either side. A tape recorder was used to present instructions, training scenes, and auditory cues for the operants. The experimenter carried only a clipboard with a recording sheet.

The twenty-two subjects involved in this study all selected the "like very much" category for item 34 on the Reinforcement Survey Schedule, "talking with people who like you." This item became the reinforcing stimulus and was the basis for the reinforcing scene. All subjects checked "like not at all" in response to item 20c, "shopping for auto parts and supply." This, then, was incorporated into the aversive scene. For group 1, the reinforcing scene was labeled A and the aversive scene B; for group 2, the labels were reversed. The effects of cueing all subjects with the same letters were thereby controlled.

As in Epstein and Peterson's study (1973, p.97), "each subject participated in a 1-hr. session consisting of three parts. In part 1, a baseline

was obtained; in part 2, subjects were trained in imagining the reinforcing and aversive scenes; and in part 3, conditioning was attempted. Two experimenters (Es) were used with each subject. Experimenter 1 presented parts 1 and 3, and E2 presented part 2." This ensured that there would be no obvious experimenter bias deriving from knowledge of the value of the experimenter-emitted cues.

Upon entering the experimental room, subjects were asked to generate 50 numbers between 0 and 100. Emission of each number was cued by auditory stimuli (dings) on an audiotape every 10 seconds. After E1 had recorded baseline responses, E2 traded places with E1 in order to train subjects in imagining the two scenes. The Reinforcing Scene was:

> "Try to picture this. You are in your room. You have been studying for three hours and have just finished studying for the evening, and you have nothing to do, but you aren't very tired. There's a knock on your door and your best friend comes in to talk. Your friend who you haven't seen for a couple of days because you have both been busy, has also finished studying and you both have plenty of time to talk. You turn on some music and get into a friendly discussion. You are very relaxed and happy to be talking with this friend and the time drifts by."

The Aversive Scene was:

> "Try to picture this. It's the middle of a North Dakota winter. You are expected at 2:00 o'clock on the other side of the state to meet some old friends. Just as you are ready to leave, the window crank on your old car broke off while the window was rolled down. Since 11 o'clock this morning you have been searching for a handle that will fit your door. After looking at three automotive supply stores, you haven't found one. It's now 4 o'clock

in the afternoon. You go to the last store and the best they can do is give you a big old box of door handles that you have to go through and try on your door one at a time. You're cold. You're bored. You resent being late for your appointment. And you are extremely frustrated. There is nothing you can do until you find that part." (This scene was not used in Epstein and Peterson. It was created as a result of the Reinforcement Survey Schedule responses of this particular sample.)

All subjects were initially trained to imagine the reinforcing scene. The four-step training process involved: (a) playing the recording of the scene to make sure it was clear to the subject; (b) cueing the scene five times, playing the recording each time (approximately 45 seconds) and requesting that the subject imagine that scene clearly and vividly; (c) asking the subject to verbally describe the scene out-loud as it was again visualized; and (d) instructing the subject to self-present the scene upon each of five cueings and to indicate its successful imagination by signalling the experimenter. After the positive scene had been trained, an identical procedure was instituted to train the visualization of the aversive scene. After training of both scenes, subjects rated each scene on a 7-point scale from unpleasant to pleasant. Subjects were told that the purpose of the training was to teach them a scene to visualize in response to E1's later emitting of the letter A or B.

After training, E1 again entered the room as E2 left. The subject was requested to present the appropriate scene by the following instructions:

"Your task will be to respond with a number between 0 and 100 after each ding. When I say scene A (or B) you are to imagine the scene that you and Experimenter 2 practiced. Any questions?"

As during baseline, subjects heard 50 auditory stimuli, one each ten seconds. For all subjects, E1 said "A" after numbers ending in 1-3, and "B" after all numbers ending in 7-9. Thus, for group 1, the response class reinforced was numbers ending in 1-3, and the numbers ending in 7-9 were punished. With Group 2, the numbers ending in 1-3 class were punished while numbers ending in 7-9 were reinforced. Experimenter 1 attempted to avoid all eye contact and changes in voice inflection.

RESULTS

The ratings of the pleasantness of scenes were analyzed by a related measures t-test. There was a significant difference between the two scenes at the .001 level [$t(21)=21.4$] . Thus, the reinforcing scene was rated significantly more pleasant, mean of 6.3, than the aversive scene, mean of 1.6.

The data relative to the conditioning effect were analyzed by an analysis of variance with a two factor design over repeated measures. The only between subject factor was groups, while both type of scene and baseline to conditioning changes compromised the two within subject factors. Table 1 contains the results from this analysis. There was no group effect [$F(1,20)=.23$], indicating that the reversing of cues for reinforcing and aversive scenes did not affect response rates. Additionally, there was no effect for the type of contingent scene [$F(1,20)=.16$] or for baseline to conditioning changes [$F(1,20)=.005$]. The Conditioning X Scenes interaction (which would have had to be significant to support the covert conditioning hypothesis) was also nonsignificant [$F(1,20)=2.2$]. The mean rates of responses during baseline were 14.7 and 16.1 for those to be reinforced and those to be punished. During conditioning average reinforced responses rose to 16.6

and punished responses fell to 14.3. Once again, however, these changes in the direction of the hypothesis were not sufficiently large to be significant. All other interactions between the three major variables were not found to be significant.

Insert Table 1 about here

DISCUSSION

The results of this investigation fail to support the Epstein and Peterson (1973) findings. Such results may be looked at in either of two ways: (a) the researchers could suspect a Type I error had occurred in the original study by Epstein and Peterson such that a valid null hypothesis was inappropriately rejected, or (b) the researchers could hypothesize a Type II error in their own data which has "fogged" the analysis in such a way that true differences were not discernable. Since this was a direct replication of the earlier study (using exactly the same methodology) and in light of the accumulating literature questioning the generally-accepted effectiveness of covert procedures (Mahoney, 1974), the present experimenters feel the first to be the more likely explanation of the contradictory results.

The most important alteration from the original study that occurred in this replication was the change in the population investigated. It is here that any differences, other than simple chance discrepencies, must be located. In examining the distinctions between samples, the question was raised concerning the likelihood of subject awareness of the experimenter's purpose. Is it possible that subjects in an introductory psychology class (as in Epstein and Peterson) would be more likely, as a result of recent exposure to operant learning, to seek, and find an operant conditioning explanation for the experiment? Perhaps, the upper level education students and master's degree candidates in counseling and guidance had not been exposed to operant theories for a sufficiently long period of time that this

explanation was not as likely to occur to them.

As Foreyt & Hagen (1973) indicate, suggestion, demand characteristics, and attention may well be the major contributors to the demonstrated effectiveness of covert conditioning in published case reports. Perhaps a meaningful comparison with the verbal conditioning literature would be appropriate. In reviewing the verbal conditioning data, Bandura (1969) concludes that the "overall evidence would seem to indicate that learning can take place without awareness, albeit at a slow rate, but that symbolic representation of response-reinforcement contingencies can markedly accelerate appropriate responsiveness (p. 577)." An analogy drawn to the covert conditioning area would suggest that some conditioning can, perhaps, occur independent of awareness, but the most rapid change will occur concurrent with an understanding of the experimenter's or therapist's, expectancies and suggestions.

As a preliminary test of the above hypothesis, a brief assessment was made at the end of treatment relative to subject awareness of the intent of the experiment. Of the twenty-two subjects, six were partially correct in their interpretations (e.g., they stated the Es were attempting to influence their production of numbers by the presentation of reinforcing or punishing scenes.) Only one subject determined the exact contingencies that were employed. Six additional subjects suspected that Es were assessing how images would affect the selection of the subsequent number: this, in effect, is the opposite of the actual focus where the scenes were expected to affect the frequency of the numbers preceding the image. The remaining nine subjects had absolutely no idea of the experiment's purpose.

Based on these informal self-reports, one might expect that, were the "awareness assumption" correct, there might be a small, non-significant tendency in the predicted direction reflecting those few subjects who did have an idea of the experimenter's purpose. In a subsidiary analysis, the

data of the seven subjects who had indicated at least partial awareness of the experiment's purpose supported this suggestion. The conditioning X type of imagery interaction was significant [$F(1,6)=7.76$, $p<.01$] in the expected directions. Baseline means for these seven subjects were 13.5 for the reinforced response class and 16.4 for the punished response class. During conditioning, the reinforced response class frequency junped to 18.5 while the punished response class fell to 10.0. The removal of these seven subjects from the remaining data yields baseline and conditioning means that are virtually identical: 15.9 and 15.7 for the pre and post tests on the reinforced response class and 15.9 and 16.2 in the punished response class.

In the clinical setting, there is no question that the client knows what is expected of the treatment. In the successful treatment of behavior problems (e.g., Blanchard & Draper, 1973; Wisocki, 1970; Ashem & Donner, 1968; Curtis & Presly, 1972), the behavior to be altered is associated directly with the pleasant and unpleasant imagery. If future laboratory studies were to ask the subject to include the number just emitted in the imagery, the likelihood of association (and conditioning) would be greatly increased.

Although this replication tends to cast doubt on the covert conditioning model, the present researchers tend to agree with Mahoney's (1974) statement: "My tentative hunch at this point in our ignorance is that attempts to change covert behavior may well turn out to be some of the most powerful clinical strategies." These strategies, however, will be based on more complex models of covert or cognitive behavior than has been suggested by the covert conditioning literature.

TABLE 1

Repeated Measures Analysis of Variance for Groups, Positive/Aversive Imagery and Baseline/Conditioning Changes in Response Frequency of Designated Operants

Source of Variation	df	SS	MS	F
Between Subjects				
Type of Cue Groups (G)	1	5.50	5.50	.234
Subjects within Groups	20	469.59	23.48	
Within Subjects				
Positive/Aversive Imagery (I)	1	4.54	4.54	.159
IG	1	52.55	52.55	1.842
I X Subjects within Groups	20	570.41	28.52	
Baseline/Conditioning Changes (B)	1	.04	.04	.005
BG	1	2.23	2.23	.282
B X Subjects within Groups	20	158.23	7.91	
BI	1	72.74	72.74	2.184
BIG	1	1.63	1.63	.049
BI X Subjects within groups	20	666.13	33.31	

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