Classical Conditioning of Consumer Attitudes: Four Experiments in an Advertising Context*

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We conducted four experiments to test various properties of classical conditioning in an advertising/consumer behavior context. Experiment 1 demonstrates attitude conditioning at each of four levels of conditioned stimulus-unconditioned stimulus pairing. In Experiment 2, latent inhibition due to subject preexposure to the conditioned stimulus is shown to retard conditioning for both 10-trial and 1-trial pairings of conditioned and unconditioned stimuli. Experiment 3 reveals that forward conditioning of attitudes is superior to backward conditioning. Experiment 4 extends the findings from the first three experiments and serves to counter some of their potential methodological problems. Collectively, these experiments provide an initial response to McSweeney and Bierley's (1984) call for more sophisticated classical conditioning research in consumer behavior.

Consumer behavior scholars are increasingly interested in the affective, noncognitive processes active in advertising. Classical conditioning is one of the topics that has captured widespread interest. Several reasons account for classical conditioning's appeal: (1) conditioning efforts are widespread in advertising practices, (2) a long history of research has shown extensive classical conditioning of behaviors in lower animals as well as in humans (Domjan and Burkhard 1985), and (3) the possibility of attitude conditioning (e.g., Staats and Staats 1958; see also Petty and Cacioppo 1981 for a brief review) has important implications for consumer behavior theory.

Despite much discussion of classical conditioning's role in advertising, only a handful of consumer behavior studies have tested for classical conditioning effects. Gorn (1982) conducted the first notable study. His widely cited research intimated that consumer attitudes and choice behavior are susceptible to classical conditioning. More recent studies have not been as supportive of the conditioning hypothesis. Allen and Madden (1985) systematically replicated Gorn's study by altering select experimental procedures (e.g., using humor rather than music as the unconditioned stimulus), but did not support the conditioning explanation. Several other recent studies have also failed to provide strong support favoring a classical conditioning interpretation (Gresham and Shimp 1985; Kleine, Macklin, and Bruvold 1986; Macklin 1985).

Additional research is needed to determine whether the lack of empirical support is because classical conditioning does not extend to affective responses in situations as complex as the typical advertising context, or because the methodology for testing classical conditioning in advertising and consumer behavior has not been up to the task. The latter possibility is suggested in the important review of recent developments in classical conditioning by McSweeney and Bierley (1984), who point out that conditioned responses will be very weak when research fails to adhere to essential requirements for proper conditioning experiments.

The present study follows McSweeney and Bierley's suggestions and aims to provide a rigorous test of classical conditioning in an advertising/consumer behavior context. Four experiments were conducted to demonstrate different characteristics of classical conditioning. Experiment 1 tested, first, whether consumer attitudes toward a product can be conditioned with advertising-type stimuli, and, second, whether classically conditioned attitudes can be strengthened with progressively

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larger numbers of conditioning trials (i.e., pairings of conditioned and unconditioned stimuli).

Experiment 2 tested whether "latent inhibition" retards the strength of classical conditioning. Latent inhibition occurs when subjects are first preexposed to the conditioned stimulus, or CS, (e.g., an advertised brand) independent of the unconditioned stimulus, or US, with which it is subsequently paired. Such may be the case in many marketing situations where established brands are familiar to consumers long before advertising campaigns attempt to condition consumer attitudes by associating brands with positively valenced unconditioned stimuli.

Experiment 3 examined "backward conditioning." A backward-conditioning procedure is used when the US *precedes* the CS in conditioning trials in comparison to forward conditioning where the CS precedes the US. Classical conditioning requires that the occurrence of the conditioned stimulus predicts the occurrence of the unconditioned stimulus. Backward conditioning procedures might be expected to produce few if any conditioning effects, relative to forward conditioning, since the CS in backward conditioning is not as predictive of the US as in forward conditioning (cf. Domjan and Burkhard 1985; McSweeney and Bierley 1984). However, at least two factors justify testing backward conditioning in the present research. First, a major recent literature review has built a compelling argument that backward conditioning is, in contradiction to earlier evidence, a legitimate phenomenon (Spetch, Wilkie, and Pinel 1981). Second, the role of backward conditioning in consumer behavior is worth testing because much advertising practice appears not to adhere to optimal conditioning procedures (i.e., CS then US), but frequently reverses this order.

A fourth experiment examined potential biases associated with the first three experiments. The rationale underlying Experiment 4 and methodological details are postponed until the first three experiments have been described and potential problems identified. In the following section, we discuss methodological desiderata for classical conditioning research and describe how our study has attempted to adhere to these requirements.

METHODOLOGICAL DESIDERATA

McSweeney and Bierley (1984) have presented consumer behavior scholars with an insightful review of classical conditioning and the methodological requirements for the study of conditioning effects. Major desiderata include: (1) presenting the CS before the US in conditioning trials to achieve optimal effects, (2) employing proper control procedures, (3) using relatively novel CSs and USs rather than familiar stimuli, and (4) using more than a single conditioning trial to achieve maximal conditioning.

Temporal Requirements

Maximal conditioning occurs with forward conditioning, i.e., when the CS precedes the US. Both simultaneous conditioning (when the onset of the CS and the onset of the US occur simultaneously) and backward conditioning (when the onset of the US precedes the onset of the CS) are generally less effective. Classical conditioning research in advertising/consumer behavior has not adhered to this temporal-priority requirement. Previous studies have used print ads where temporal order of processing could not be controlled (Kleine et al. 1986; Kroeber-Riel 1984), broadcast ads where no report of the temporal order of the stimuli was given (Gresham and Shimp 1985), or have presented the CS and the US simultaneously (Gorn 1982).

Control Procedures

While repeated pairings of a CS with a US may result in a conditioned response to the CS, there is no assurance that the conditioned response (CR) results from the association of the two and not from the repeated presentation of either the CS or the US. A random control procedure in which the CS and the US are presented the same number of times as in conditioning procedures, but in random order with respect to each other, is suggested to rule out these possibilities (Rescorla 1967). Conditioning is said to occur if a particular response develops following the conditioning trials but does not occur in the control group.

A CS-only control group is also frequently used in conditioning research. Such a control group receives the same number of presentations of the CS as the conditioning group, but without any presentations of the US, and is used to measure the response elicited by the CS alone (cf. Domjan and Burkhard 1985; Marx 1967; Terrace 1973).

Only two previous advertising studies (Bierley, McSweeney, and Vannieuwkerk 1985; Macklin 1985) have used a random control group, and only one study (Bierley et al. 1985) has included a CS-only control. Instead, researchers have simply compared the effects of positive versus negative USs on brand attitude (Allen and Madden 1985; Gorn 1982; Gresham and Shimp 1985; Kleine et al. 1986).

Novelty of Stimuli

Classical conditioning is retarded if either or both the conditioned and unconditioned stimuli are already familiar to subjects prior to a conditioning experiment. The use of a novel CS and a novel US increases the likelihood of a positive contingency. A positive contingency is experienced when the probability of the US occurring when the CS is presented is greater than the probability of the US occurring alone.

Classical conditioning studies in an advertising/consumer behavior context have violated the novelty requirement by using mature, familiar products rather than new brands. For example, Gresham and Shimp (1985) studied commercials for well-known brands of packaged goods.

Number of Trials

The vast empirical evidence suggests that the rate of conditioning varies greatly with different CSs, with different USs, and with different species; i.e., conditioning sometimes occurs with one or a very few trials and at other times only after a very large number of trials. A limitation of extant advertising/consumer behavior research is the general absence of efforts to test for the effects of different numbers of conditioning trials. One exception is Mitchell and Olson's study (1981) in which subjects viewed ads two, four, six, or eight times. Bierley et al. (1985) included 28 conditioning trials. Gresham and Shimp (1985) and Macklin (1985) included manipulations in which the stimuli were presented three times, and Kroeber-Riel (1984) showed subjects print ads up to 30 times. All other studies included only one CS-US presentation, i.e., one trial.

Summary

Advertising/consumer behavior studies of classical conditioning have generally not satisfied all of the above desiderata. The present series of experiments builds upon previous classical conditioning studies by attempting to satisfy the basic requirements for proper experimental testing. Our experiments: (1) use carefully selected conditioned and unconditioned stimuli, (2) include appropriate control groups, (3) employ manipulations that adhere to the temporal-priority requirements for conditioning, and (4) include different numbers of pairings of conditioned and unconditioned stimuli.

EXPERIMENT 1

The objective of Experiment 1 was to evaluate the amount of conditioning that might occur with various numbers of conditioning trials. While it is frequently assumed that a large number of conditioning trials are necessary for conditioning to be demonstrated, the greatest amount of conditioning occurs, in fact, on the first pairing of CS and US; smaller amounts of conditioning occur on subsequent trials until some maximum is reached (Domjan and Burkhard 1985). It seems requisite, therefore, to determine whether significant conditioning occurs with one or a few pairings or whether a greater number of conditioning trials is necessary.

We manipulated conditioning and random-control trials at four levels—1, 3, 10, and 20 pairings of conditioned and unconditioned stimuli. The choice of number of trials to manipulate was both strategic and arbitrary at the same time. We chose the 1-trial level to match the number of trials used in most prior consumer behavior studies (e.g., Allen and Madden 1985; Gorn 1982). The 20-trial level was influenced by Staats and Staats' (1958) research that obtained attitude conditioning at 18 trials, which suggested that we should also obtain conditioning at the slightly higher level of 20 trials. Our choice of a 3-trial level followed a similar number of trials by Gresham and Shimp (1985) and Macklin (1985), whereas the 10-trial level was selected arbitrarily as a mid-range between 1 and 20 trials. It is important to note that theory and prior research are virtually silent on issues such as how many trials are needed for attitude conditioning or what is the optimal level for conditioning.

Experiment 1 tested three hypotheses:

- H1: Attitude toward a brand will be more positive for subjects following repeated conditioning trials in which a neutral CS (brand) is paired with a positively valenced US (a pleasant advertising component) than for subjects exposed to the neutral CS and the US in random order with respect to each other.
- H2: Following conditioning trials in which a neutral CS (brand) is paired with a positively valenced US (a pleasant advertising component), the attitude toward the brand will be positively related to the number of conditioning trials. That is, attitude conditioning will be greater for 20 trials than 10 trials, greater for 10 trials than 3 trials, and greater for 3 trials than 1 trial.
- H3: When CS and US are presented in random order with respect to each other, attitude toward the advertised brand will be invariant across the four levels of trials.

Operationalizations

Conditioned Stimulus. The conditioned stimulus was operationalized by the visual presentation of a fictitious brand via a color slide presentation. The CS was designed and pretested to (1) elicit a neutral affective response, i.e., to not elicit the conditioned response by itself, and (2) be dissimilar to existing brands within the product category, since it is assumed that the use of a novel CS is more likely to maintain a positive CS-US contingency.

The brand selected through pretesting was a green and yellow tube labeled "Brand L Toothpaste."[1] A sim-

[1]Six product categories designated with single-letter brand names (Brand V Candy, Brand R Cola, Brand M Laundry Detergent, Brand J Soap, Brand I Toilet Tissue, and Brand L Toothpaste) were pretested. Graphic specialists designed packaging for each product following two criteria: packaging for each brand (1) should be unlike any existing (Continued p. 337.)

ple letter was used for identification of the brand rather than a fictitious brand name to assure a neutral response to the unpaired CS. The use of the letter "L" to maintain the required neutral response is supported by Mitchell and Olson (1981) whose pilot tests indicated that individuals make few associations with that letter.

Unconditioned Stimulus. The unconditioned stimulus was operationalized through the presentation of pleasant and emotionally pleasing pictures, also via a color slide presentation. The use of slides for presenting both the CS and the US is appropriate because greater conditioning occurs with similar CSs and USs (Domjan and Burkhard 1985).

Four different pictures were determined through pretesting to elicit strong positive affective responses (URs). These pictures, all of which were predetermined to elicit approximately the same positive affective reaction, were used to prevent subject adaptation to the stimulus as might have occurred had only one picture been used. The four USs were splendid scenes of (1) a mountain waterfall, (2) a sunset over an island, (3) blue sky and clouds seen through the mast of a boat, and (4) a sunset over the ocean.[2]

We had several reasons for using attractive visual scenes as unconditioned stimuli. First, because visual stimuli are processed with greater ease and faster than verbal stimuli (Paivio 1971), this increased the likelihood that classical conditioning would have a chance to occur. Second, the visual stimuli selected are virtually unrelated to the primary features of toothpaste—the conditioned stimulus, thereby avoiding the possibility that the USs would serve unintentionally as product-relevant arguments rather than in their intended role as peripheral cues (cf. Petty and Cacioppo 1980). Third, from a practical perspective, pleasant visual stimuli are frequently used in print and television advertising. Finally, previous conditioning research (e.g., Mitchell and Olson 1981) has also used visuals as unconditioned stimuli.

Conditioned Response: Attitude toward the Brand. In classical conditioning in advertising, it is assumed that when a product is presented along with some other advertising element that elicits a pleasant attitudinal response, the brand alone will later elicit a similar pleasant attitudinal response or attitude toward the brand. Four measurements operationalized attitude toward the brand: (1) a summated score of seven 7-point semantic differential items (good-bad, high quality-poor quality, like very much-dislike very much, superior-inferior, attractive-unattractive, pleasant-unpleasant, and interesting-boring), (2) a 7-point global evaluative item ("Overall my feeling about Brand L Toothpaste is favorable-unfavorable"), (3) an 11-point measure of purchase intentions ("All things considered, if you were to purchase toothpaste on one of your next several trips to the supermarket, what are the chances in 10 that you would purchase Brand L Toothpaste if it were available?"), and (4) a graphic rating scale consisting of a 120-millimeter line on which subjects placed an "X" to indicate their feelings toward Brand L Toothpaste, from very positive to very negative.

Methodology

Subjects. A total of 202 business and psychology undergraduate students (a minimum of 24 per treatment) were used as subjects. The use of students is justified on the grounds that (1) theory testing represented the primary goal (Calder, Phillips, and Tybout 1981), and (2) the use of relatively homogeneous respondents is advantageous by controlling for random sources of error (Cook and Campbell 1979). Subjects participated in small groups (one to six per group) with treatments randomly assigned to morning, afternoon, and evening sessions.

Experimental Manipulations. Four experimental groups were exposed to 1, 3, 10, or 20 conditioning trials. Each conditioning trial employed a short-delay conditioning procedure (Domjan and Burkhard 1985) involving a three-slide sequence: (1) a five-second presentation of the CS (Brand L Toothpaste), (2) followed by a five-second presentation of the US (one of the four pleasant scenes), and (3) ending with a five-second presentation of the CS superimposed on the US. Two seconds of "down time," during which the screen was dark, followed each 15-second trial.

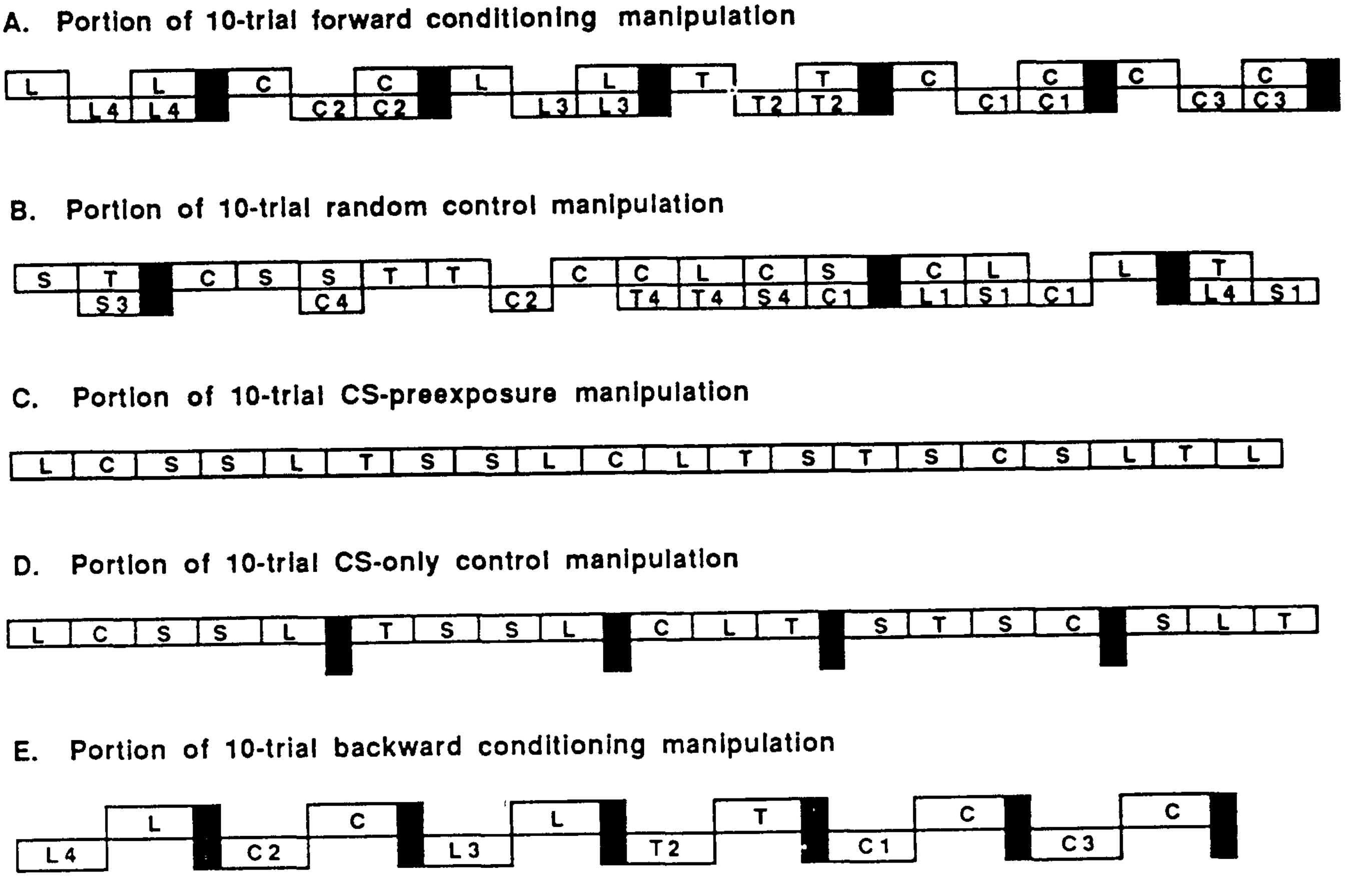
Also included in each conditioning presentation were presentations of "filler material." The filler material in-

brand in that category, and (2) should not elicit strong positive reactions. A convenience sample of 42 students, who were similar to the subjects in the final experiments, viewed color slides of each brand for approximately 30 seconds. After each brand exposure, subjects rated how similar that brand was to others in the product category (very similar-very different) and also rated the brands on seven evaluative items (good-bad, like-dislike very much, pleasant-unpleasant, etc.), which were subsequently summated. Brand L Toothpaste was chosen to represent the conditioned stimulus because it (1) was evaluated as being least similar to other brands in the same product category, and (2) was evaluated rather neutrally on the seven-item evaluative scale (three other brands rated more positively and two rated less positively).

[2]The pretest of unconditioned stimuli included a pool of 50 pictures prejudged to vary in degree of affect. A sample of 81 students, who were similar to the subjects in the final experiments, rated all 50 pictures. Approximately half of the students participated in each of two separate pretest sessions with the order of the presentation of the pictures reversed to control for order effects. All pictures were presented using a conventional slide projector programmed for 25-second exposures. The pictures were presented in random order with positive, negative, and neutral pictures distributed throughout the presentation. The evaluation instrument included three semantic differential scales for assessing affective reactions to the pictures (pleasant-unpleasant, like very much-dislike very much, and left me with a good feeling-left me with a bad feeling). The three semantic differential items were averaged to produce an overall evaluative score. The four pictures selected had relatively small standard deviations and means that were significantly more positive ($p < 0.001$) than the grand mean for all 50 pictures.

FIGURE A

TIME LINES ILLUSTRATING EXPERIMENTAL SEQUENCING OF SLIDES FOR THE 10-TRIAL CONDITIONING AND CONTROL GROUPS IN EXPERIMENTS 1–3



NOTE Blocks above the time line represent timed presentations of the conditioned stimulus (Brand L toothpaste) and the three filler brands Blocks below the line represent timed presentations of the unconditioned stimuli (four positively valenced scenes) and filler pictures (12 neutrally valenced scenes) The shaded areas along the time line represent periods of "down time" during which no slides were shown, i.e., the screen remained dark

Experimental Brand (CS) and Scenes (US)

T—Brand L toothpaste
T1—Purple island
T2—Mountain waterfall
T3—Sunset over water
T4—Mast and sky

C—Brand R cola
C1—Dirt
C2—Neon arrows
C3—Radar dish
C4—Microscope

Filler Brands and Scenes

L—Brand M laundry detergent
L1—Boards
L2—Barometer
L3—License plate
L4—Tubes

S—Brand J soap
S1—Weeds in pond
S2—Main street
S3—Modern art
S4—Rolls of wire

cluded 15-second presentations identical in design to the conditioning trials but with three other fictitious brands (Brand R Cola, Brand M Laundry Detergent, and Brand J Soap) that were paired with 12 affectively neutral pictures. The use of filler material was intended to detract attention from the CS-US presentation and thus decrease hypothesis guessing. The conditioning trials were randomly ordered with the filler material to produce different intertrial intervals so as to minimize any possible temporal conditioning. Temporal conditioning may occur when the US is presented at a fixed interval with no other stimulus (Marx 1967). The intertrial intervals averaged 49.4 seconds and ranged from 19 to 87 seconds.

A graphic illustration of the sequencing of conditioning trials, nonconditioning pairings of the filler material, and down times is depicted on the "time lines" shown in Figure A. Part A presents a portion of the sequence for the 10-trial forward conditioning manipulation, while parts B–E provide illustrative sequences for the various control groups and the backward-conditioning manipulation. It can be seen in part A, for example, that the first slide shown was a picture for laundry detergent (L), followed immediately by a picture of tubes (L4), then a slide with a picture of the laundry detergent superimposed on the tubes picture, and culminating with a two-second break before the next slide, which pictured Brand R Cola (C).

A random control group received, at each trial level, the same number of presentations of the CS and the US, the same number of two-second down times, and the same number of presentations of the filler brands and scenes, but with all assigned randomly with respect to each other (see part B of Figure A). Constraints were imposed on the structuring of the random control presentation to prevent the CS and the US from occurring contiguously more than three times during the 20- and 10-trial presentations. The CS and US were never allowed to occur contiguously during the 3-trial and 1-trial random control presentations.

Experimental Procedures. Upon arrival at the study location, subjects were greeted by the experimenter and seated in front of a projection screen. Reading from a prepared script, the experimenter informed subjects that they were participating in an advertising research study. Subjects then viewed a slide presentation that included either the conditioning manipulation or one of the control versions. All slide presentations were shown using three Kodak Ektagraphic III slide projectors with the timing of the slides preprogrammed and recorded on audio tape using an Audio Visual Laboratories Coyote three-projector dissolve unit with memory programmer and a Wollensak Model 2551 sync-pulse recorder. Timing accuracy was to within one-tenth of a second, thereby assuring consistency with repeated presentations.

For the 20-trial and 10-trial conditions, questionnaires were distributed following the first of three approximately equal portions of the slide presentation. Breaking the slide presentation into multiple parts, each followed by completion of a portion of the questionnaire, was necessary to maintain subject interest and remove the boredom that pilot testing had revealed. Subjects were instructed after the first portion of the presentation to complete the first page of the questionnaire, which included scale items measuring attitudes toward one of the "filler brands." After the second portion of the presentation, subjects rated a second filler brand. The CR, or attitude toward Brand L Toothpaste, was measured after the final portion. It was also felt that the measurements of the attitudes toward the filler brands would detract attention from the experimental Brand L Toothpaste and prevent some degree of hypothesis guessing. For the 3-trial and 1-trial conditions, all measures were obtained following the entire presentation. At the conclusion of all experimental sessions, subjects were informed that a complete written discussion would be mailed to them and were urged not to discuss the study with anyone.

Results

As described previously, the conditioned response toward Brand L Toothpaste was assessed with four separate measures—an overall evaluative item, a purchase intentions scale, a graphic rating scale, and a seven-item semantic differential scale.[3] Hypotheses 1–3 are tested using the four individual measures as dependent variables.[4]

Hypothesis 1. Conditioning is revealed when the conditioned response following a number of conditioning trials is significantly greater than the same response elicted by random control group subjects. Table 1 presents ANOVA results and corresponding means, standard deviations, and results of Newman-Keuls tests. In support of H1, subjects exposed to the conditioning trials exhibited significantly more positive attitudes toward Brand L Toothpaste than did the corresponding random control subjects on all dependent variables in the 20-trial and 10-trial conditions and for two of the four variables at the 3-trial and 1-trial levels. Figure B presents graphic depictions of all four dependent measures for the conditioning and random control groups at the four trial levels. At all trial levels the four separate evaluative measures are more positive for conditioning groups than for the random control groups; moreover, this difference tends to increase with greater numbers of trials.

Hypothesis 2. This hypothesis predicted that stronger conditioned responses would be demonstrated with greater numbers of conditioning trials. The mean values in Table 1 reveal that, with one exception, scores on the four individual measures increase progressively from 1 to 20 conditioning trials. However, the Newman-Keuls paired-comparison tests reveal that most of the differences are not statistically significant, thereby failing to support H2.

Hypothesis 3 The prediction that conditioned responses would be invariant regardless of the number of random presentations of the CS and the US is supported, i.e., there are no differences among the means of the four random control groups (see Table 1).

Discussion

Experiment 1 was designed to evaluate the amount of classical conditioning at different trial levels. A significant degree of conditioning occurred at all four experimental levels, including the single pairing of the toothpaste with a pleasant scene. These results support the possibility that conditioning may occur in an advertising context. Moreover, our findings demonstrate conditioning with only a single CS-US pairing, thereby lending credence to a similar finding by Gorn (1982).

[3]Unidimensionality of the seven-item semantic differential was supported by a factor analysis showing that a single factor accounted for 81 percent of the total variance. The summated scale was highly reliable (coefficient alpha = 0 96)

[4]These hypotheses (as well as all subsequent hypotheses tested in Experiments 2 through 4) were further examined by calculating principal-components scores from the linear combination of the four separate dependent variables The principal-components results are consistent with the individual-variable results.

TABLE 1

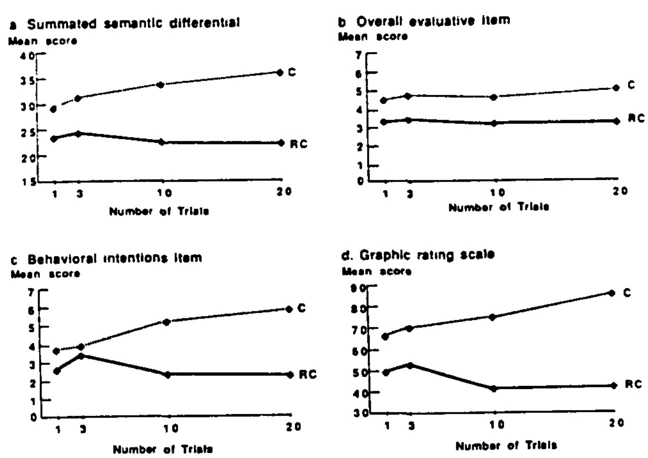
EXPERIMENT 1: MEANS, STANDARD DEVIATIONS, F-VALUES, PROBABILITY LEVELS, AND PAIRED-COMPARISON RESULTS FOR CONDITIONING AND RANDOM CONTROL GROUPS

	Means and standard deviations			
Conditioning and control groups	Summated semantic differential score	Overall evaluative item	Behavioral intentions item	Graphic rating scale
20-trial conditioning	35.75^{a} (11.59)	4.92^{a} (1.93)	5.79^{a} (3.49)	84.96^{a} (35.75)
20-trial random control	22.13^{b} (8.36)	3.08^{b} (1.44)	2.21^{b} (2.19)	42.04^{b} (28.40)
10-trial conditioning	$33.60^{a,c}$ (10.39)	4.52^{a} (1.81)	$5.16^{a,c}$ (3.48)	74.64^{a} (34.06)
10-trial random control	22.50^{b} (9.56)	3.08^{b} (1.68)	2.28^{b} (2.54)	40.84^{b} (32.07)
3-trial conditioning	$31.15^{a,c}$ (8.49)	4.69^{a} (1.49)	$3.88^{b,c}$ (3.02)	$69.88^{a,c}$ (31.71)
3-trial random control	24.31^{b} (10.09)	3.37^{b} (1.57)	$3.33^{b,c}$ (2.81)	$52.81^{b,c,d}$ (35.71)
1-trial conditioning	29.20^{c} (8.07)	4.40^{a} (1.15)	$3.68^{b,c}$ (2.85)	$65.88^{a,c,d}$ (28.97)
1-trial random control	23.42^{b} (6.87)	3.23^{b} (1.42)	2.54^{b} (1.94)	$49.04^{b,d}$ (28.58)
F-values	8.26	6.27	5.32	6.28
Degrees of freedom	7/192	7/194	7/194	7/194
P-values	.000	.000	.000	.000

NOTE Higher scores on all variables represent more positive attitudes toward Brand L toothpaste Means with the same letters are not significantly different ($p < 0.05$) based on Newman-Keuls multiple range tests Statistically significant differences for comparisons between conditioning and control groups and between different conditioning groups are based on one-tail tests, since hypotheses are directional Statistically significant differences between different random control groups are based on two-tail tests, since directional differences are not theoretically expected

FIGURE B

ATTITUDE RATINGS OF BRAND L TOOTHPASTE FOR CONDITIONING AND RANDOM CONTROL GROUPS AT FOUR TRIAL LEVELS



NOTE: Group. C = conditioning; RC = random control

EXPERIMENT 2

Experiment 2 was designed to test for latent inhibition of classically conditioned behavior. Past experiments have demonstrated that familiarizing subjects with the CS through a number of nonreinforced preexposures slows the learning process (Lubow 1973; Lubow, Markman, and Allen 1968; Lubow and Moore 1959), but no such demonstration has appeared in a consumer behavior context. Latent inhibition is said to occur when development of the conditioned response requires a greater number of pairings than is the case with normal conditioning procedures. That is, preexposure to the stimulus destined to become the CS retards the development of a conditioned response to that stimulus.

Experiment 2 included two separate studies—a 10-trial level and a 1-trial level. A latent inhibition experimental group and four separate control groups were included in each study. The relevant hypothesis is:

> H4: Subjects who receive exposure to a neutral CS (brand) prior to conditioning trials in which the CS is paired with a positively valenced US (a pleasant advertising component) will exhibit less positive attitudes toward the brand than subjects who are exposed to the conditioning trials but who do not receive the prior brand exposure.

Experiment 2 also served as an additional test of Hypothesis 1.

TABLE 2

EXPERIMENT 2, 1-TRIAL STUDY: MEANS, STANDARD DEVIATIONS, F-VALUES, PROBABILITY LEVELS, AND PAIRED-COMPARISON RESULTS FOR LATENT INHIBITION, CONDITIONING, AND CONTROL GROUPS.

	Means and standard deviations			
Group	Summated semantic differential score	Overall evaluative item	Behavioral intentions item	Graphic rating scale
1-trial latent inhibition	24.80[a]	3.72[a,b]	2.64[a]	51.40[a]
	(8.17)	(1.43)	(2.83)	(26.03)
1-trial conditioning	29.92[b]	4.40[a]	4.36[b]	65.96[b]
	(6.81)	(1.22)	(2.18)	(25.59)
1-trial random control	21.29[a]	3.16[b]	2.08[a]	41.56[a]
	(8.26)	(1.40)	(2.00)	(24.52)
1-trial CS-only control	24.84[a]	3.40[b]	1.88[a]	45.16[a]
	(7.65)	(1.22)	(2.07)	(25.22)
1-trial latent inhibition/random control	24.42[a]	3.88[a,b]	2.48[a]	52.36[a]
	(7.10)	(1.20)	(2.45)	(22 41)
F-values	4.07	3.34	4.40	3.55
Degrees of freedom	4/118	4/120	4/120	4/120
P-values	.004	.013	.002	.009

NOTE Higher scores on all variables represent more positive attitudes toward Brand L toothpaste Means with the same letters are not significantly different ($p < 0.05$) based on Newman-Keuls multiple range tests Statistically significant differences for means of conditioning group compared with means of all other groups are based on one-tail tests, since hypotheses are directional All other significant differences are based on two-tail tests since directional differences are not predicted

Methodology

Subjects. Two hundred and sixty undergraduate business and psychology students (a minimum of 25 per treatment) participated in small-group laboratory sessions. The experimental and control manipulations were again randomly assigned to morning, afternoon, and evening sessions.

Experimental Procedures. The research setting and experimental procedures used in Experiment 2 were identical to those described in Experiment 1.

Experimental Manipulations. As stated, each of the two studies in Experiment 2 consisted of five groups: (1) a latent inhibition group, (2) a new conditioning group, which received the identical presentation of CS and US as the experimental group in Experiment 1, (3) a new random control group, which received the identical presentation as the random control group in Experiment 1, (4) a CS-only control group, and (5) a group that received the preexposures identical to those for the latent inhibition group but followed by the random control manipulation.

The experimental (latent inhibition) group was first exposed to a number of five-second presentations of the CS (8 at the 1-trial level and 20 at the 10-trial level) without being paired with the US. The preexposure manipulation also included the three products used as filler material in the conditioning trials, randomly ordered with the CS (see part C of Figure A).

The remainder of the experimental manipulation was identical to that of the conditioning manipulations with corresponding numbers of trials in Experiment 1. The conditioning control group and the random control group were identical in design to those included in Experiment 1. A CS-only control group received the same number of five-second exposures to the CS (Brand L Toothpaste) as the corresponding conditioning group but without any presentation of the US. Again, an equal number of presentations of the filler brands was included in random order with the CS (see Figure A, part D). A fourth control group received the preexposure manipulation identical to that of the latent inhibition group but followed by the random control manipulation. We included this group to control for repetition effects; this group received the same total number of exposures to the brand as the latent inhibition group, whereas the simple random control group received substantially fewer exposures to the CS.

Following the slide presentation, subjects completed the data collection forms and received the same instructions regarding discussion of the experiment and debriefing as in Experiment 1.

Results

1-Trial Study. Table 2 presents the ANOVA results for the 1-trial latent inhibition study and provides the corresponding means, standard deviations, and results of Newman-Keuls tests. For three of the four individual dependent variables, the conditioned response evoked in the latent inhibition group is significantly weaker (less positive) than that of the conditioning group. Conditioning was, as predicted by H4, slowed or retarded by the preexposure manipulation.

TABLE 3

EXPERIMENT 2, 10-TRIAL STUDY: MEANS, STANDARD DEVIATIONS, F-VALUES, PROBABILITY LEVELS, AND PAIRED-COMPARISON RESULTS FOR LATENT INHIBITION, CONDITIONING, AND CONTROL GROUPS

	Means and standard deviations			
Group	Summated semantic differential score	Overall evaluative item	Behavioral intentions item	Graphic rating scale
10-trial latent inhibition	29.96[a]	4.37[a]	3.89[a]	68.41[a]
	(10.80)	(1.64)	(2.83)	(32.19)
10-trial conditioning	35.56[b]	5.16[b]	6.00[b]	83.56[b]
	(7.64)	(1.21)	(2 42)	(22.20)
10-trial random control	21.50[c]	2.93[c]	2.34[c]	40.24[c]
	(8.53)	(1.19)	(1.90)	(27.07)
10-trial CS-only control	24.26[c]	3.30[c]	2.67[c]	47.18[c]
	(9.19)	(1.61)	(2 42)	(30.77)
10-trial latent inhibition/random control	24.19[c]	3.08[c]	2.42[c]	48.27[c]
	(8.27)	(1.35)	(2.34)	(26.19)
F-values	10.32	12.06	10.80	10.82
Degrees of freedom	4/128	4/129	4/129	4/130
P-values	.000	.000	.000	.000

NOTE Higher scores on all variables represent more positive attitudes toward Brand L toothpaste Means with the same letters are not significantly different ($p < 0.05$) based on Newman-Keuls multiple range tests Statistically significant differences for means of conditioning group compared with means of all other groups are based on one-tail tests, since hypotheses are directional All other significant differences are based on two-tail tests, since directional differences are not predicted

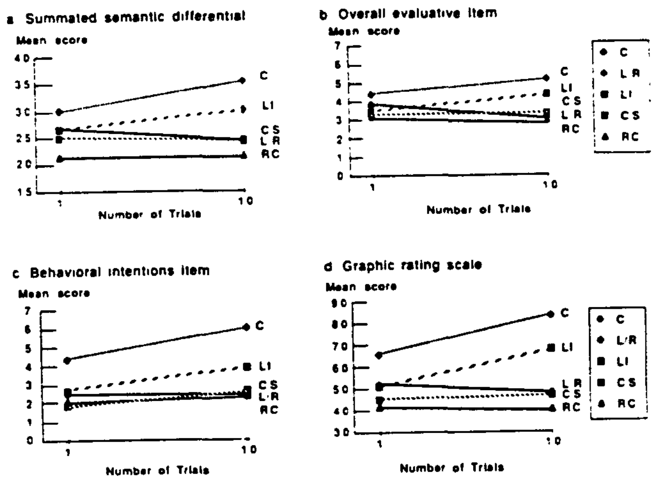
This study also provides further support for the general conditioning hypothesis in Experiment 1 (H1). For all dependent variables there is a significant difference between the means of the conditioning group and means of the random control group and the other control groups; the conditioning group uniformly had a more positive attitude toward Brand L Toothpaste.

10-Trial Study. Table 3 presents ANOVA results for the 10-trial latent inhibition study and the corresponding means, standard deviations, and Newman-Keuls tests. The latent inhibition group's means on all four individual measures of attitude toward Brand L Toothpaste are significantly lower than corresponding means for the conditioning group, which further supports Hypothesis 4. Comparisons of the conditioning group means with the random control group means show that for all dependent variables the response following the conditioning trials is significantly more positive, which once again supports the general conditioning hypothesis (H1).

Figure C graphically shows the results of four dependent measures for each of the five groups in both the 1-trial and 10-trial latent inhibition studies. As can be seen, attitudes were more positive for the conditioning and latent inhibition groups at the 10-trial level than at the 1-trial level, thus again supporting an increased conditioning effect with a greater number of trials. Such an increase is not seen with the random control or CS-only groups. This graphic depiction also vividly demonstrates the superiority of conditioning manipulations over all other experimental procedures.

FIGURE C

ATTITUDE RATINGS OF BRAND L TOOTHPASTE FOR CONDITIONING, LATENT INHIBITION, AND CONTROL GROUPS AT 1- AND 10-TRIAL LEVELS



NOTE Group C = conditioning, L/R = latent inhibition/random control, LI = latent inhibition, CS = CS-only control, RC = random control

Additional Findings. Preexposure to the neutral CS, it is suggested, weakens but does not necessarily prevent a conditioned response. At the 10-trial level, even with the preexposures there is a significant conditioning effect for the latent inhibition group (Table 3). For all dependent variables, the CR is significantly higher for the latent inhibition group than for the random control group.

Another important finding of Experiment 2 concerns the possibility of a mere exposure effect. The operation of a mere exposure effect would have resulted in both the latent inhibition group and the latent inhibition/random control group having more favorable attitudes toward Brand L Toothpaste than the random control group. Table 3 shows that the random control group and the latent inhibition/random control group are not significantly different on any of the dependent variables. thus ruling out mere exposure as an alternative explanation of the conditioning effect observed in Experiments 1 and 2.

Discussion

Experiment 2 was designed to demonstrate a unique characteristic of classically conditioned learning, latent inhibition. The development of a conditioned response was significantly retarded at both the 1-trial and 10-trial levels. These results suggest that the development of more positive attitudes following exposure to the conditioning trials parallels the conditioning of numerous physiological responses reported in basic conditioning studies (cf. Domjan and Burkhard 1985; Razran 1971). Moreover, a mere exposure interpretation (Zajonc 1968) for the conditioning effects observed in Experiments 1 and 2 is untenable.

EXPERIMENT 3

The objective of the third experiment was to evaluate forward versus backward conditioning. Because classical conditioning results from the CS signalling the imminent occurrence of the US. backward conditioning procedures should be less likely to produce an effect on brand attitude. The hypothesis tested in Experiment 3 is:

H5: Subjects who experience conditioning trials in which the US (a pleasant advertising component) precedes the presentation of the neutral CS (brand) will exhibit less positive attitudes toward the brand than subjects exposed to forward conditioning trials.

Methodology

Experiment 3 included a backward conditioning group that received 10 conditioning trials, but the US preceded the CS. Comparisons of the 10-trial conditioning and random control measures for Experiment 1 with those of Experiment 2 showed no difference for any of the dependent variables. Therefore, it was appropriate to pool from Experiments 1 and 2 the subjects in the 10-trial forward conditioning groups and to pool subjects from the random control groups to serve as comparison groups for Experiment 3's backward conditioning subjects.

Subjects. Forty undergraduate business and psychology students constituted the backward conditioning group in Experiment 3. Small-group sessions were conducted during morning, afternoon, and evening hours.

Experimental Procedures. The research setting and experimental procedures in Experiment 3 were identical to those included in the previous experiments.

Experimental Manipulations. The backward conditioning manipulation included 10 conditioning trials with the same amount of exposures to the CS and the US as the forward conditioning presentation. In the backward conditioning manipulation, however, no slides of the product superimposed on the pleasant scenes were included since this would have prevented controlling the order of mental processing; indeed, upon seeing the toothpaste superimposed on a pretty picture, subjects might have processed the stimuli as in forward, simultaneous, or backward conditioning.

Since it was mandatory that the US always precede the CS in backward conditioning, only product-only and picture-only slides were included in the presentation. Therefore, in order to achieve trials of equal length to the forward conditioning trials in Experiments 1 and 2, which were 15 seconds long, each backward conditioning trial consisted of a 7.5-second presentation of one of the four positively valenced pictures followed immediately by a 7.5-second presentation of Brand L Toothpaste. While each forward conditioning trial consisted of 10 seconds of exposure to the CS (5 alone and 5 with the superimposed picture) and 10 seconds of exposure to the US (5 alone and 5 with the superimposed Brand L Toothpaste), subjects in the backward group received only 7.5 seconds of presentation of each. The decision to equate total trial length rather than the length of the individual exposures was based on a concern that the total presentation length (for all 10 trials) not differ from that in the forward conditioning presentation. There is no reason to believe that the shorter temporal duration for each CS and US reduced the amount of conditioning that would have occurred with a longer duration. Identical presentations of the filler products and pictures were also included so that average, maximum, and minimum intertrial intervals were identical to those in the forward conditioning manipulation.

Collection of the data and instructions regarding the need for secrecy and debriefing procedures were identical to those included in the first two experiments.

Results

Table 4 presents ANOVA results and corresponding means, standard deviations, and Newman-Keuls paired comparisons. For all dependent variables, the backward conditioning group's means are significantly lower than the means for the forward conditioning group, thus supporting Hypothesis 5 and evidencing the superiority of forward conditioning.

While Experiment 3 was designed to test the diminution of attitudinal responses from backward conditioning, it was possible to also determine if some conditioning yet occurs with backward procedures. For

TABLE 4

EXPERIMENT 3: MEANS, STANDARD DEVIATIONS, F-VALUES, PROBABILITY LEVELS, AND PAIRED-COMPARISON RESULTS FOR BACKWARD CONDITIONING, FORWARD CONDITIONING, AND CONTROL GROUPS

	Means and standard deviations			
Group	Summated semantic differential score	Overall evaluative item	Behavioral intentions item	Graphic rating scale
10-trial backward conditioning	27.53[a] (10.65)	3.90[a] (1.72)	3.45[a] (3.17)	59.78[a] (33.72)
10-trial forward conditioning	35.56[b] (7.64)	5.16[b] (1.21)	6.00[b] (2.42)	83.56[b] (22.20)
10-trial random control	21.50[c] (8.54)	2.93[c] (1.19)	2.34[a] (1.90)	40.24[c] (27.07)
10-trial CS-only control	24.26[a,c] (9.19)	3.30[a,c] (1.61)	2.67[a] (2.42)	47.18[a,c] (30.77)
F-values	16.34	13.02	13.90	15.13
Degrees of freedom	3/165	3/167	3/167	3/167
P-values	.000	.000	.000	.000

NOTE Higher scores on all variables represent more positive attitudes toward Brand L toothpaste Means with the same letters are not significantly different ($p < 0.05$) based on Newman-Keuls multiple range tests Statistically significant differences for means of conditioning group compared with means of all other groups are based on one-tail tests, since hypotheses are directional All other significant differences are based on two-tail tests, since directional differences are not predicted

three of the four measures the means for the backward conditioning manipulation group are significantly higher than those of the random control group. Thus, there is at least partial support for the existence of limited conditioning with the use of backward conditioning procedures in an advertising context.

Discussion

Support for the superiority of forward conditioning over backward conditioning evidenced in Experiment 3 suggests that temporal priority is an important factor in the conditioning of brand attitudes. However, the finding that significant conditioning does occur, even with backward procedures, suggests that the pairing of a brand with positively valenced advertising elements, regardless of the temporal relations, may significantly influence attitudes toward a brand.

EXPERIMENT 4

We performed a fourth experiment to address some potential alternative explanations for our prior results, which we interpreted as evidencing forward and backward conditioning. Our conclusions could be challenged on grounds that (1) the procedures used to manipulate forward conditioning (Experiments 1 and 2) are unconventional, and (2) comparisons of forward and backward conditioning results may be inappropriate due to differences in the manipulation procedures.

Specifically, to manipulate forward conditioning we used a three-slide sequence for each conditioning trial: a five-second slide for the CS (Brand L Toothpaste), a five-second slide for the US (four affectively positive scenes), and a five-second slide with the CS superimposed on the US. This last slide poses a potential problem: indeed, subjects may have processed the superimposed stimuli in a forward, backward, or simultaneous manner.

The second potential problem noted above extends from the fact that the backward conditioning treatment involved fundamentally different procedures than the forward conditioning treatment against which it was compared. For forward conditioning, each trial involved a three-slide sequence for five seconds each, as noted earlier. Backward conditioning trials included only two slides (the US followed by the CS), each lasting 7.5 seconds.

Experiment 4 was designed to obviate these potential difficulties. Five treatment conditions were constructed to examine forward and backward conditioning procedures at a 10-trial level.

Methodology

Subjects. One hundred and thirty-three undergraduate business students (a minimum of 25 per treatment) participated in small-group laboratory sessions. These sessions were conducted six months after the completion of Experiments 1-3 and used student subjects from the same university. Experimental and control manipulations were randomly assigned to morning and afternoon sessions.

Experimental Procedures. A different room had to be used for this experiment, but the research procedures were otherwise identical to those described in the first three experiments.

Experimental Manipulations. Five manipulations were structured: (1) a forward conditioning group

TABLE 5

EXPERIMENT 4: MEANS, STANDARD DEVIATIONS, F-VALUES, PROBABILITY LEVELS, AND PAIRED-COMPARISON RESULTS FOR THREE DIFFERENT FORWARD CONDITIONING PROCEDURES COMPARED WITH BACKWARD CONDITIONING AND RANDOM CONTROL GROUPS AT A 10-TRIAL LEVEL

	Means and standard deviations			
Group	Summated semantic differential score	Overall evaluative item	Behavioral intentions item	Graphic rating scale
Forward 7.5/7 5	38.80^{a}	5.60^{a}	6.76^{a}	94.28^{a}
	(10.68)	(1.61)	(3.37)	(33.82)
Forward simultaneous	34.39^{a,b}	5.15^{a}	4.96^{a,b}	79.00^{a,b}
	(8.93)	(1.41)	(2.62)	(32.40)
Forward 5/5/5	36.41^{a,b}	5.48^{a}	5.97^{a}	90.52^{a}
	(8.29)	(1.24)	(2.72)	(29.12)
Backward 7.5/7.5	30.48^{b}	4.24^{b}	4.00^{b}	68.88^{b}
	(11.74)	(2.22)	(3.38)	(39.42)
Random control	24.30^{c}	3.33^{c}	2.33^{c}	45.74^{c}
	(7.24)	(1.39)	(2.09)	(24.48)
F-values	9.61	9.68	9.67	9.61
Degrees of freedom	4/127	4/127	4/127	4/127
P-values	.000	.000	.000	.000

NOTE Higher scores on all variables represent more positive attitudes toward Brand L toothpaste Means with the same letters are not significantly different ($p < 0.05$) based on Newman-Keuls multiple range tests Statistically significant differences are based on two-tail tests

(Forward 7.5/7.5) exposed to 10 conditioning trials, with each trial consisting of a 7.5-second presentation of the CS (Brand L Toothpaste) followed by a 7.5-second presentation of the US (the four positively valenced scenes), (2) a forward conditioning group (Forward 5/5/5) identical to those used in the 10-trial conditions for Experiments 1 and 2, i.e., each conditioning trial entailed a three-slide sequence (CS-US-CS superimposed on US presented for five seconds each), (3) a forward-simultaneous conditioning group (Forward Simultaneous) exposed to the same 10 conditioning trials, with each trial consisting of a 7.5-second presentation of the CS followed by a 7.5-second presentation of the CS superimposed on the US, (4) a backward conditioning group identical to that included in Experiment 3 (Backward 7.5/7.5) exposed to 10 conditioning trials, each consisting of a 7.5-second presentation of the US followed by a 7.5-second presentation of the CS, and (5) a random control group (Random Control) exposed to a random sequencing of 7.5-second presentations of the CS and US slides.

These five treatments allowed us to test for forward and backward conditioning while eliminating the potential complications described above. For example, the Forward Simultaneous treatment provided the closest approximation to short-delayed conditioning procedures (i.e., where the onset of the US follows the onset of the CS at which time both the CS and the US are present for a period of time), which have been shown to be the most effective in basic conditioning studies. Furthermore, comparisons of the Forward 7.5/7.5 group with the Forward Simultaneous and Forward 5/5/5 groups provide direct tests of whether the superimposition of the CS with the US in Experiments 1 and 2 affected the amount of conditioning. Comparison of the Forward 7.5/7.5 and the Backward 7.5/7.5 groups provides an unambiguous test of whether backward procedures are indeed less effective than forward procedures. It is important to note that such unambiguous demonstration of the reduced efficiency of backward procedures mitigates the possibility that the putative conditioning effects were due to demand artifact rather than to true classical conditioning. This issue is addressed in greater detail in the general discussion section below.

Results

Table 5 presents ANOVA results and corresponding means, standard deviations, and Newman-Keuls paired-comparison results. There are no statistical differences among any of the three forward conditioning groups on any of the dependent variables. However, all three groups' means on all four dependent variables are significantly greater than the random control group's means, thus evidencing forward conditioning with three different conditioning procedures. The backward conditioning group's mean scores are also significantly higher than the random control group's means, which indicates that some conditioning occurred, even with backward conditioning procedures. Finally, the backward conditioning group had significantly lower mean scores than either the Forward 7.5/7.5 or Forward 5/5/5 groups, which indicates the superiority of forward over backward conditioning; however, on only one of the four dependent variables did the forward simultaneous group reveal a significantly more positive attitude toward Brand L Toothpaste than the backward conditioning group.

Discussion

This experiment upholds the results obtained in Experiments 1–3 and provides even more impressive evidence to support the earlier demonstrations of forward conditioning, the superiority of forward over backward conditioning, and the finding that some conditioning toward an advertised brand may occur even with backward conditioning procedures.

GENERAL DISCUSSION

Our experiments have consistently yielded results that are compatible with a classical conditioning explanation. Although legitimate concerns remain over whether classical conditioning of consumer attitudes can be demonstrated under natural advertising conditions, the current research, by evidencing two unique characteristics of conditioning—latent inhibition and the superiority of forward over backward conditioning—suggests that conditioned learning of brand-specific attitudes is indeed demonstrable under laboratory conditions.

Research Limitations and Alternative Explanations

While we have carefully followed the strict methodological requirements for classical conditioning research, our experiments are not without limitations. The stimuli included in the study were purposely designed to create a maximal opportunity for classical conditioning to occur. The CS was designed to not elicit a positive response by itself. Comparatively, product packages, brand names, and other actual communication stimuli are designed to attract consumer attention and to be pleasing. Thus, there are limits to the realism of the present experiments and consequently to the generalization of study results to the real world.

Another weakness in the present study was inclusion of all conditioning trials and CR measures within a single experimental session. The impact of conditioning trials over longer time periods would not only be a more realistic study of advertising effects but also would provide meaningful implications for theory development.

In addition to these limitations, at least two alternative explanations for our results can be proffered. One (mere exposure) is easily discounted; the other (demand artifact) is more problematic.

Discounting a Mere Exposure Explanation. It has been argued that mere exposure and classical conditioning effects may be confounded (Gorn 1982). Mere exposure does not compromise the present results, however, because all four experiments employed procedures to control for the effects that simple repeated exposures to the CS had on subjects' attitudes toward Brand L Toothpaste. Within all experiments, attitudes were significantly more positive for conditioned subjects than for random control subjects. Thus, while some attitude shift may result from exposure alone, the attitudinal responses observed in the present experiments can be attributed primarily to a conditioning mechanism.

Possibility of Demand Artifacts. Demand characteristics pose a vexing problem in conditioning studies with human subjects. The fundamental problem involves two awareness issues: "contingency awareness" and "demand awareness" (Allen and Madden 1985; Petty and Cacioppo 1981). Contingency awareness exists when subjects detect that the experimental CS has been consistently paired with a US. This form of awareness is necessary for demand artifact to exist, but is not by itself sufficient for concluding that attitudinal effects are due to demand artifact rather than to true classical conditioning (cf. Petty and Cacioppo 1981). Demand awareness is the real demand-artifact problem and occurs when subjects in a conditioning experiment guess the experimenter's hypothesis. Before we can confidently discount demand artifact as an alternative explanation for our results, satisfactory answers must be provided to three questions: Were subjects aware of the CS-US contingency? Did this possible awareness influence the strength of the conditioning effect? Were subjects aware of the experimental hypothesis, i.e., did they evaluate Brand L Toothpaste more positively because they felt this is what was expected of them?

As a final questionnaire item, we asked subjects in all four experiments to write what they thought the study was about (cf. Bierley et al. 1985). Responses were coded by independent judges who were blind to subjects' treatment assignments. Judges assigned each response to one of three categories: (1) "definitely aware" of the CS-US contingency (e.g., subject reported that the study had something to do with how pictures influence liking for different brands), (2) "definitely unaware" of CS-US contingency (e.g., subject responded that the study involved liking for different colors), and (3) unable to classify. The two judges agreed on 83 percent of the 635 coding decisions for the four experiments; inconsistencies were resolved following discussions between the two judges.

Forty-eight percent of the responses were classified as definitely aware, 37 percent as definitely unaware, and 15 percent as unclassifiable. These results indicate a high level of contingency awareness. It is important to note, however, that Brand L Toothpaste, the CS, was mentioned by fewer than one percent of all subjects. Stated associations between background factors and brands were nearly always in general terms rather than with reference to Brand L Toothpaste or any of the filler brands per se. Contingency awareness, it is clear,

TABLE 6

ANALYSIS OF VARIANCE OF SUMMATED SEMANTIC DIFFERENTIAL SCORE BY CONDITIONING TREATMENT AND BY SUBJECT AWARENESS OF EXPERIMENTAL PURPOSE: EXPERIMENTS 1, 2, AND 4[a]

	Treatment			Awareness			Treatment × Awareness		
Experiment	F	p-value	ω^2	F	p-value	ω^2	F	p-value	ω^2
Experiment 1[b]									
20 Trials	16.65	.000	.26	4.16	.048	.05	1.56	.220	.00
10 Trials	11.25	.002	.20	1.18	.284	.00	1.94	.172	.02
3 Trials	3.01	.091	.04	2.53	.120	.03	0.51	.478	.00
1 Trial	2.94	.095	.04	2.48	.124	.03	0 12	.726	.00
Experiment 2[c]									
10 Trials	13.80	.000	.30	4.90	.030	.03	1.11	.349	.02
1 Trial	4.78	.004	.13	0.30	.582	.00	1.87	.139	.04
Experiment 4[d]	8.87	.000	.22	15.09	.000	.09	2.65	.038	.06

[a] The analysis of variance results included in this Table are based on the responses of only those subjects who were classified as definitely aware or definitely unaware, i e , subjects not included in one of these categories were removed from the analysis

[b] Each analysis involved two treatment levels (conditioning treatment versus random control) and two levels of awareness (aware and unaware)

[c] Each analysis involved four treatment levels (conditioning, latent inhibition, random control, and latent inhibition/random control) and two levels of awareness (aware and unaware)

[d] Analysis included five treatment levels (forward 7 5/7 5, forward simultaneous, forward 5/5/5, backward, and random control) and two levels of awareness (aware and unaware)

operated at a generic level and was not specifically with Brand L Toothpaste in mind.

It is important, nonetheless, to determine whether this general level of contingency awareness influenced the strength of attitude conditioning. This was ascertained by including awareness as a second factor along with treatment condition in a series of two-way analyses of variance. The analyses excluded Experiment 3, since it involved only one unique treatment condition; also excluded were the two CS-only groups in Experiment 2, since they were never exposed to USs. All analyses included only subjects who were either definitely aware or definitely unaware.

Table 6 illustrates the role of awareness using the semantic differential scale as the sole dependent variable. (Similar results were obtained for the other variables.) It can be seen that awareness was a significant predictor of subjects' attitudes in three of seven instances—the 20-trial level of Experiment 1, the 10-trial level in Experiment 2, and in Experiment 4. Aware subjects had more favorable attitudes than non-aware subjects. However, the omega-squared statistics indicate that awareness had relatively trivial impact on subjects' attitudes in comparison to the amount of variance accounted for by the experimental treatment, i.e., conditioning versus control groups. The results in Table 6 clearly favor a conditioning explanation over demand artifact.

A demand-artifact explanation for our findings can be refuted further by examining the experimental results for just those subjects who were identified as contingency unaware. Because subjects who were contingency unaware should also have been demand unaware, any differences in Brand L attitudes for unaware subjects assigned to a conditioning treatment and unaware subjects assigned to a control group would have to be attributed to conditioning effects rather than demand artifact. This examination of unaware subjects shows that the average attitude on the summated semantic differential scale for the 25 subjects in Experiment 1 who were assigned to one of the four conditioning groups (i.e., at 20-, 10-, 3-, or 1-trial levels) was M = 28.0; comparatively, the average attitude for the four random control groups in Experiment 1 was M = 21.9. The 10-trial and 1-trial conditioning subjects in Experiment 2 had average attitudes of M = 31.3 and M = 28.8, respectively, compared to the control groups' attitudes of M = 23.1 and M = 23.9. For Experiment 4, the average attitude for the unaware subjects assigned to the three forward conditioning groups was M = 33.7 compared to an average of M = 23.0 for the backward conditioning group and M = 25.5 for the random control group.

The weight of the above evidence renders demand artifact an unlikely explanation for the substantially more favorable attitudes exhibited in the conditioning groups compared to the control groups. However, because our postexperimental inquiry did not provide an elaborate demand artifact assessment, such as undertaken by Allen and Madden (1985), it would be cavalier to reject outright the possibility that demand artifact played some role.

To summarize, our experiments replicate earlier work in showing that awareness of a CS-US contingency is related to conditioning. Indeed, in most human classical conditioning experiments, normal adult subjects are typically aware of the CS-US contingency (Martin and Levey 1969). It has been suggested that such a relationship between awareness and conditioning effects may merely be due to differences in subjects' attention levels to the experimental tasks (Petty and Cacioppo 1981). Such contingency awareness does not, however, nullify the role of conditioning in our experiments because there is absolutely no indication that subjects were demand aware. Hypothesis guessing was limited by our use of filler products to prevent subjects from focusing unduly on Brand L Toothpaste.

An Agenda for Future Research

The current study offers strong basic support for conditioning theory in advertising and consumer behavior. It also provides a number of theoretical and empirical questions for future research.

Number of Trials. Future research should address additional questions regarding the strength of a conditioned response following varying numbers of trials. While the current study found evidence of conditioning at four levels of trials, there is no evidence as to the maximum number of trials above which no increase in a conditioned response would be seen. While, quite obviously, there is no single answer to a maximum number of trials or advertising exposures that would be applicable across all possible combinations of stimuli, it would be of interest to design experiments beyond the current 20-trial level. Indeed, consumers are frequently exposed to a much larger number of presentations of many television commercials. Also, the present study included only pairings of the CS and the US during one experimental session. A comparison of the response to pairings of the stimuli over a longer period, perhaps days or weeks, would be important to the extension of theory and for practical implications.

Contingency Requirements. Conditioning theory suggests that a positive CS-US contingency, i.e., that the probability of the US occurring with the CS is greater than the probability that the US will occur alone, is an important determinant of conditioning. In Experiment 2, however, some conditioning nonetheless occurred following a preexposure manipulation that reduced the CS-US contingency. Future research should investigate the importance of the contingency requirement to conditioning in advertising/consumer behavior. For instance, it would be useful to test whether conditioning will occur if the CS is paired with the US, say, only 50 percent of the time.

Mature Brands as CSs. The present research included a fictitious brand in order to maintain the positive contingency requirements suggested for optimal conditioning. Previous research in which mature brands have been included as the CS has achieved limited support of conditioning theory (e.g., Gresham and Shimp 1985), suggesting that conditioning is more likely with new, novel brands. It has also been suggested that with advertising of mature brands the transfer of affect is reversed, i.e., the attitude toward the product is transferred to the advertisement (Edell and Burke 1984; MacKenzie and Lutz 1982). Future research should evaluate the potential for conditioning with mature brands.

Providing Product Information. No information about the product was provided to subjects in the current experiments. Future research should investigate the role of information in combination with positive-affect advertising components. When information about the product is presented, the effect of conditioning may be weakened as would be suggested by the elaboration likelihood model (Petty, Cacioppo, and Schumann 1983).

Other USs. The current experiments used only pictorial elements as USs. Quite obviously, a variety of other positively valenced elements are also used in advertising. Future studies should first evaluate the strengths of different types of advertising elements as significant USs. Is music, for instance, equally effective, less effective, or even more effective than visual stimuli? Also, studies should investigate the use of more than one positively valenced element within the same advertisement. Would, for instance, the use of attractive scenes and pleasant music as a combined stimulus produce an even stronger conditioned response?

Other Presentation Modes. In the present experiment, all advertising elements were provided on a slide projection screen. Thus, all stimuli were large, bright, colorful, and uncluttered. The impact of such a presentation is different than a television screen or a single magazine page. Thus, future research should examine advertising elements within a more realistic environment.

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