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Changes in Perceived Guilt as a Function of False Heart Rate Feedback

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CHANGES IN PERCEIVED GUILT AS A FUNCTION OF FALSE HEART RATE FEEDBACK

by

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ABSTRACT

CHANGES IN PERCEIVED GUILT AS A FUNCTION
OF FALSE HEART RATE FEEDBACK

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The effects of false rapid and false normal heart rate feedback upon the associative sexual responses of 22 high and 22 low guilt males were examined. It was found that low guilt males made more sexual responses than high guilt males, and that males who received normal heart rate feedback made more sexual responses than males who received fast feedback. Contrary to what was predicted, the effects of the heart rate feedback were significant for only the low guilt males. The results suggest that low guilt males may attend to physiological cues when responding in a sexual context, and also that the mechanisms of inhibition for low guilt males may be different from those of high guilt males.

Changes in Perceived Guilt as a Function of False Heartrate Feedback

With the recent advent of several popular investigations on sexual behavior, psychological studies of sexuality have also come into prominence. One relevant psychological dimension is sex guilt. There are differing views about sex guilt and the way in which it operates. One approach that has received a moderate amount of attention is that of Donald Mosher (1965).

Mosher has explained sexual guilt in terms of Rotter's Social Learning Theory (Rotter, 1954) which emphasizes three basic constructs: behavior potential, expectancy and reinforcement. Rotter devised a predictive formula which essentially states that the likelihood of a particular behavior occurring in a situation is a function of the reinforcement that is expected to follow the behavior. The likelihood of the behavior actually being performed increases as the value of the expected reinforcement does. Rotter's expectancy construct may be broken down into expectancy for external punishment (fear) and expectancy for internal punishment (guilt). The expectation of negative internal punishment results from previous reinforcement history. Thus, Mosher (1965) defines guilt as a generalized expectancy for self-mediated punishment for failure to attain internalized standards of proper behavior. Since these standards are internalized, they are viewed as independent of external cues.

Using the above theoretical base, Mosher (1965) then conducted an experiment to see if high sex guilt subjects reacted differently than low sex guilt subjects in regard to external cues. Basically, he found that the scores of low sex guilt subjects on a perceptual defense task were dependent upon the preceding fear-induction or fear reduction external cues, while high sex guilt subjects responded the same in both conditions. In other words, the low sex guilt subjects, who were led to believe that there would be no external censure, gave less inhibited responses to the perceptual task. There were no such differences for the high sex guilt subjects. They maintained the same level of inhibition regardless of external cues.

Galbraith and Mosher (1968) found additional support that the low sex guilt subject is more externally controlled than the high sex guilt subject. They discovered that sex guilt inhibits responses to a Word Association Test. More importantly, however, was the support that they found for their prediction that expectancy of external censure would differentially affect the two groups. In conditions where the subjects were led to believe that the experimenter held favorable attitudes toward pin-up photographs and toward the expression of sexual impulses, the low sex guilt males gave significantly more sexual responses to the Word Association Test than did the high sex guilt males. This result reflects the fact that low guilt males behave according to external cues (censure from the experimenter), while high sex guilt males base their behavior on internal standards. Galbraith, Hahn and Leiberman

(1968) have also found that sex guilt is negatively correlated with sexual responsivity, as measured by Word Association Test responses, while Galbraith (1968) found that exposure to sexual stimulation (nude pin-ups) led to increased overt sexual responses on the Word Association Test for low sex guilt subjects, but had no significant effect on high sex guilt subjects. Galbraith and Mosher (1970) have also found evidence to support this.

The literature discussed above dealt specifically with Mosher's conception of dispositional guilt. Okel and Mosher (1968) explored the possibility that the affective, emotional reactions associated with guilt might operate differently for subjects high in dispositional guilt as opposed to subjects low in dispositional guilt. The subjects were experimentally induced to violate their internalized norms of acceptable behavior. Using guilt over hostility as their measure, the authors concluded that high guilt subjects reported experiencing a significantly greater affective state of guilt after verbally attacking a stranger (who became upset) than did low hostility guilt subjects. Mosher and Greenburg (1969) conducted a similar study, utilizing female subjects who were required to read erotic passages out loud. Their results showed that high sex guilt subjects significantly increased their affective state of guilt when they read the erotic passage. In discussing these results, Mosher and Greenburg claim that further research is desirable. They note that the exact role of guilt in the study is questionable. Does guilt follow transgression of the moral code

(reading erotic literature) or is guilt engendered when the subject experiences arousal while reading? To answer this question, the authors state that it seems helpful to make a conceptual distinction between guilt as an inhibitor of behavior and guilt as an affective state which follows either a behavioral or cognitive sexual transgression.

Mosher (1968) has acknowledged this difference between guilt as a trait and guilt as an affective state. Schwartz (1973) also notes that guilt as a personality trait and guilt as an emotional reaction appear to be somewhat independent concepts. Although he has devised several measures of guilt, none of Mosher's scales assess guilt as an affective state. Otterbacher and Munz (1973) have recently attempted to meet this need for a situational measure of guilt. They devised the Perceived Guilt Index, a self-report measure of experiential guilt. The Perceived Guilt Index assesses affective guilt as a state (G-State) and as a trait (G-Trait). The scale consists of eleven adjectives distributed along a guilt continuum and represents an attempt to quantify common verbal labels used to communicate intensity of emotional relations to guilt. Because of its recency, there is little research dealing with the Perceived Guilt Index. Otterbacher and Munz (1973) have demonstrated, however, that the Perceived Guilt Index G-State measure is sensitive to changes in guilt feelings, and that changes in the G-Trait measure are preceded by changes in G-States.

Janda and Magri (1975) investigated the relationship between measures of affective guilt (Perceived Guilt Index) and dispositional guilt (Mosher Forced Choice Guilt Scale). Their results indicated that while the Mosher Forced Choice Guilt Scale and the Perceived Guilt Index seem to be independent measures (r=.03), both are related to sexual responsivity as assessed by Galbraith's Word Association Test. It was found that female subjects with low scores on both measures of guilt gave a higher number of sexual responses than subjects who scored high on both, or high on one measure and low on the other. This suggests that both dispositional and affective guilt have inhibiting properties for subjects' responses to sexual stimuli. Another important result of this study was the finding that differences in Perceived Guilt Index G-Trait scores led to differential Word Association Test responses, Mosher's scale was designed specifically to predict behavior in guilt-conflict situations, while the Perceived Guilt Index was developed only as a measure of affect. Janda and Magri's results suggest that both scales may be used to predict sexual responses and that, since the two scales are independent, more than one mechanism may be operating in guilt situations.

Underlying the development of the Perceived Guilt Index is the assumption that cognitive and situational factors play a role in determining emotional states and that once these emotions are aroused there exists a common label to express this reaction to others. This first assumption is the crux of Stanley Schacter's

cognitive theory of emotion (Schacter, 1964). Schacter's theory basically states that any individual, given a bodily state of physiological arousal for which there is no immediate explanation, will label this state and describe his feelings in terms of the cognitions available to him. The cognitive theory of emotion has received much empirical support (Schacter, 1959; Schacter and Wheeler, 1962; Schacter and Singer, 1962; Singer, 1963; Latane and Schacter, 1962). Once established that internal physiological reactions can serve as cues, then these events may be seen as sources of cognitive information. They may lead to such cognitions as "I am blushing". As potential sources of information, they may be subject to the same mechanisms as other information processing, such as misinterpretation or failure of recognition. Misinterpretation, then, would give an individual nonveridical or false information.

Valins (1966) conducted an experiment to see if subjects would use this nonveridical information in a similar manner to actual internal physiological changes, in terms of labelling emotions. He manipulated the extent to which a subject's heart rate changed in response to slides of semi-nude females. His results indicated that when subjects thought that a particular slide had affected their heart rate, regardless of whether or not it actually had, they rated that slide as significantly more attractive. This was true whether the heart rate increased or decreased. Valins empha-

sized that information search processes were important in the positive results. He hypothesized that the subjects, upon hearing the heart rate change, selectively searched the slides to see what was causing the change. In effect, the subjects convinced themselves that the slide was attractive. Barefoot and Straub (1971) supported this self-persuasion hypothesis in an experiment that demonstrated that when the subjects' opportunity for information search, following false heart rate information, was shortened to five seconds, they did not rate the slides as more attractive. The authors concluded that this effect was due to an inability to complete the self-persuasion process.

Botto, Galbraith and Stern (1974) utilized a paradigm similar to that of Valins (1966), with sex guilt as measured by the Mosher Forced Choice Guilt Scale as an additional variable. They found that high sex guilt subjects rated the slides that were accompanied by an increase in the tempo of the false heart rate feedback as more attractive, while the low sex guilt subjects showed no such effect, rating all the slides uniformly attractive. The results of their study, however, go beyond previous studies in suggesting that the significant effect of false heart rate feedback upon ratings of attractiveness may be due to the reactions of subjects characterized by high sex guilt. These high guilt subjects, according to Botto, Galbraith and Stern (1974), base their judgments of the attractiveness of the slides upon the information

that they have concerning their own internal reactions, regardless of whether or not the information is veridical. Low sex guilt subjects consistently rate the slides showing females as attractive and appear to be relatively unaffected by information concerning internal reactions.

Valins and Ray (1967) attempted to extend the bogus heart beat paradigm to cognitive desensitization. They found that subjects with snake phobias acted less fearful of snakes following slide presentations, when the fear stimuli were accompanied by nonveridical normal heart rates. There is some controversy over this study since replication has been difficult, if not impossible. (Sushinsky and Bootzin, 1970; Rosen, Rosen and Reid, 1972) Finally, false physiological information has been found to increase fear reactions when presented in conjunction with a fear-arousing communication (Krishner, Darley and Darley, 1973; Harris and Jellison, 1971).

It is evident that the work of Valins and others with nonveridical physiological information supports Schacter's cognitive theory of emotion. If, as was mentioned previously, the Perceived Guilt Index finds part of its theoretical base in Schacter's theory, then it might prove worthwhile to combine these two experimental views. The aim of this study, then, is to see if sex guilt, as measured by the Perceived Guilt Index, can be induced by means of nonveridical physiological information.

There are several specific hypotheses and predictions to be tested in this study. The first prediction is that high sex guilt subjects will give significantly fewer sexual responses to the Word Association Test than will low sex guilt subjects. This is based on the hypothesis that sex guilt inhibits overt sexual responding, which has previously been demonstrated (Mosher, 1965; Galbraith and Mosher, 1968; Galbraith, Hahn and Leiberman, 1968). Next, the hypothesis that subjects exposed to nonveridical increased heart rate will attribute the increased heart rate to guilt over the Word Association Test situation will be tested. Based upon the work of Otterbacher and Munz (1973) and Janda and Magri (1975), it is expected that those subjects in the increased heart rate condition will show increased guilt feelings over participation in the Word Association Test, as evidenced by increased Perceived Guilt Index scores. Finally, this study will investigate the hypothesis that an interaction will occur between sex guilt and nonveridical heart rate feedback, such that high sex guilt subjects and low sex guilt subjects will be differentially affected by the heart rate manipulation. Based upon the theory behind the development of the Perceived Guilt Index and Mosher's (1965) characterization of high and low sex guilt subjects, it is predicted that all subjects in the nonveridical increased heart rate condition will experience increased guilt states, but the increase will be greater for high sex guilt subjects than for low sex guilt subjects. This is because high sex guilt subjects

are thought to attend to internal cues (such as heart rate), rather than external ones (such as censure from the experimenter). With respect to the Word Association Test, all subjects in increased heart rate conditions will be expected to give more inhibited responses as a result of increased perceived guilt. However, this inhibition of sexual responses to the Word Association Test is expected to be more pronounced for high sex guilt subjects than for low sex guilt subjects.

METHOD

Subjects

Subjects were 44 male undergraduates, enrolled in introductory psychology courses at Old Dominion University; each volunteer received class credit for his participation. To control for selectivity, subjects were not informed that the experiment dealt with sexual matter. All subjects were given an opportunity to withdraw from the experiment at any time, without justification for their refusal to participate. Guarentees of confidentiality were also made.

Apparatus

Three Narco-Bio-Systems surface electrodes were attached to each subject (to his forearm) with double-sided adhesive washers. These electrodes were attached to a Pre-Amplifier, Physiograph MK III model, manufactured by E and M Instrument Company of Houston. This Pre-Amplifier fed into a Physiograph, Projector Model Type PMP-4A, also manufactured by E and M Company. The heart rate sound was

actually made by a metranoma, Model MP-100-PA, manufactured by Lafayette Instrument Company. This instrument is calibrated in fours, from 40 to 200 beats per minute. The Word Association Test stimuli were taped on a cassette recorder. The words were presented at five second intervals.

Procedure

Each subject served in two experimental sessions conducted by a male experimenter. Initially, two groups of 22 subjects each were administered the Mosher Forced Choice Guilt Scale. These tests were then scored by someone other than the experimenter. The subjects were then divided at the median score to form high sex guilt and low sex guilt groups and randomly assigned to two experimental groups (normal and fast heart rate) in which they participated during the second individual experimental session. Neither experimenter nor subject had any knowledge of the scores on the sex guilt scale at the time the experiment was run.

Upon reporting for the second half of the experiment, subjects were informed that the experimenter was interested in physiological reactions, specifically heart rate changes, that occur in various testing situations. It was explained that there were similar projects in progress and, as a result, the equipment that the experimenter was using was crude but adequate. One drawback was that it would be necessary for subjects to hear their heart beat. It was explained that, since little concentration was required, this should present

no problem.

Electrodes were then attached to subject and a five minute resting heartrate was recorded. After this, subject was administered the Word Association Test. The simulus words were presented by use of a tape recorder; verbal responses of subject were manually recorded by experimenter. During this administration, all groups heard what they believed was their heart beat. Two groups heard a normal rate throughout the test. Two other groups heard their heart beat gradually increase from 68 beats per minute to 108 beats per minute. The increase was in ten increments of four beats per minute, beginning with word five and continuing through word 50. Following the Word Association Test administration, subjects were given the G-State version of the Perceived Guilt Index, as well as the Subjective Stress Scale (SSS, Kerle and Bialek, 1958). This scale was administered in order to assess differential enxiety reactions that could have resulted from the Word Association Test situation. It also served to measure whether the subjects were interpreting the false heart rate as anxiety rather than guilt. Finally, all subjects were debriefed as to the veridity of the heart rate.

Mosher Forced Choice Guilt Scale

The Mosher Forced Choice Guilt Scale (MFCGS) was constructed from an item pool of 276 completions to the Mosher Incomplete Sentences Test (Mosher, 1961). Items pulling greater than 75% of the responses in a single direction were eliminated. Seventy-nine

items were chosen from this reduced pool. Of these 79 items, 28 are included in the Sex Guilt (SG) subscale. The split-half reliability of the Sex Guilt subscale is .97. The validity of the scale (.93) has been reported elsewhere (Mosher, 1961; Mosher, 1966; Dubeck Schuck and Cymbalisty, 1971; Ray and Walker, 1973). Scores on the Sex Guilt subscale correlate negatively with scores on the Need-Heterosexuality subscale of the Edwards Personal Preference Schedule (Galbraith, Hahn and Leiberman, 1968), positively with scores on the Repression subscale of the Thorne Sex Inventory and negatively with scores on the Sex-Drive and Promiscuity-Sociopathy subscales ot the Thorne Sex Inventory (Galbraith, 1969), and do not correlate significantly with either the Marlowe-Crowne Social Desirability Scale or the Edwards Social Desirability Scale (Mosher, 1965).

Word Association Test

The double entendre Word Association Test has been presented in detail elsewhere (Galbraith, 1968; Galbraith, Hahn and Leiberman, 1968; Galbraith and Mosher, 1968). Briefly, it consists of 50 stimulus words, 30 of which are double entendre, possessing strong sexual implications for college males. The remaining 20 stimulus words are devoid of any sexual meaning (neutral). Associative responses on the Word Association Test are scored either zero, one, or two. A score of zero is used for a completely asexual responses. A score of one or two is given only for unambiguous sexual responses, a two being reserved for flagrant sexual responses which would

usually entrail social disapproval or censure. Interscorer reliability of this scoring system has consistently exceeded .95 (Galbraith, Hahn and Leiberman, 1968). Use of the Word Association Test as a means of assessing sexual responsivity has been validated by Galbraith and Mosher (1970).

Perceived Guilt Index

Two psychometric techniques were utilized to construct this scale: Thurstone's method of equal-appearing intervals and Osgood's Semantic Differential. The initial pool of 324 items was established by having students generate adjectives and phrases describing subjective feelings of guilt. Students then rated these items on a 1 to 11 point guilt continuum. Items were then scaled for ambiguity and intensity. The words selected for final inclusion in the scale had intensity values spread evenly over the median intensity range, low ambiguity of meaning, and similar semantic profiles. Otterbacher and Munz (1973) validated the scale; since it was so recently developed, further validation awaits other studies.

Subjective Stress Scale

The Subjective Stress Scale (SSS) was also developed by the method of Thurstone's equal-appearing intervals. It includes 14 words, originally sorted into 11 categories by samples from a population of Army recruits. The neutral or midpoint is the term "indifferent" which has a scaled value of 48. The range of the scale values is

from 0 ("wonderful") to 94 ("scared stiff"). Groups under a mildly positive control condition usually achieve a mean of less than 32 (Berkun, Bialek, Kern and Yagi, 1962). The words are presented in a scrambled order and the subject is asked to check how he feels at that moment. The validity of the scale has been documented elsewhere (Kerle and Bialek, 1958; Berkun et. al., 1958; Berkun et. al., 1962).

RESULTS

The means and standard deviations for sexual responses to the Word Association Test can be seen in Table 1. These data show that those subjects scoring below the median on the Mosher Forced Choice Guilt Scale gave more sexual responses to the Word Association Test, in both the normal and the fast heart rate conditions.

A 2 X 2 analysis of variance performed on the Word Association Test data indicated main effects for guilt, $F = 6.66$, $df = 1/40$, p .025, and for heart rate, $F = 8.32$, $df = 1/40$, p .01. In other words, sexual responses to the Word Association Test were inhibited by sex guilt and by increases in false heart rate. The summary of this analysis, presented in Table 2, indicated no significant interaction

Table 1

Means and Standard Deviations of Sexual Responses to Word Association Test

Heart Rate		Sex Guilt	
		High	Low
Normal	$\overline{X}$	9.5454	19.0000
	SD	8.2941	9.4340
Fast	$\overline{X}$	5.9090	8.8182
	SD	4.0329	8.3525

Table 2

Analysis of Variance of Sexual Responses to Word Association Test

Source	df	MS	F
A (Guilt)	1	420.3636	6.6637 *
B (Heart-rate)	1	525.0909	8.3239 **
A X B (Interaction)	1	117.8182	1.8677
S/AB	40	63.0818	

*p<.025

**p<.01

To test the specific hypotheses of this study, individual means comparisons were performed. For high sex guilt subjects, the difference between those receiving normal heart rate feedback ($\underline{M}$ = 9.54) and those receiving rapid heart rate feedback ($\underline{M}$ = 5.91) was not significant. For low sex guilt subjects, however, the difference between the number of Word Association Test responses for the normal feedback group ($\underline{M}$ = 19.00) and the fast feedback group ($\underline{M}$ = 8.82) was significant, p .005. Thus, the fast feedback significantly inhibited the sexual responses for the low sex guilt subjects only.

Means and standard deviations for the scores on the Perceived Guilt Index G-State scale can be seen in Table 3. An analysis of variance performed on these data indicated no main effects for sex guilt or for heart rate feedback. There was, however, a significant interaction between the two, F = 4.16, $\underline{df}$ = 1/40, p .05, such that the increasing heart rate led to increased perceived guilt levels for the low sex guilt subjects, but decreased guilt levels for the high sex guilt subjects. This analysis is presented in Table 4. Individual means comparisons (Winer, 1962) indicated that the Perceived Guilt Index scores for high sex guilt, fast heart rate subjects were significantly lower than those for high sex guilt, normal rate subjects. Although the perceived guilt level for the low

Table 3

Means and Standard Deviations of
Perceived Guilt Index G-State Scores

Heart Rate		Sex Guilt	
		High	Low
Normal	$\bar{X}$	3.6636	2.9000
	SD	1.1725	1.3986
Fast	$\bar{X}$	2.3454	3.6727
	SD	.8605	2.7192

Table 4

Analysis of Variance for

Perceived Guilt Index G-State Scores

Source	df	MS	F
A (Guilt)	1	.8736	.3021
B (Heart-rate)	1	.8181	.2630
A X B (Interaction)	1	12.0228	4.1589
S/AB	40	2.8908	

*$p < .05$

sex guilt, fast rate subjects were higher than those of the low sex guilt, normal rate subjects, this difference was not significant. Further comparisons revealed a significant difference between Perceived Guilt Index scores for the low guilt, fast rate and the high guilt, fast rate groups, while there was no difference between the normal heart rate groups. These results indicated that, when the low sex guilt subjects believed that their heart rate was beating faster, they perceived themselves as more guilty, while the fast feedback had the opposite effect for the high sex guilt males. This effect was most pronounced for high guilt subjects.

A 2 x 2 x 4 analysis of variance with repeated measures was performed on the actual recorded heart rate. These data were divided into blocks, according to time, and labelled pretest, first minute of testing, last minute of testing and posttest. Means and standard deviations for actual heart rate are presented in Table 5. The analysis of variance (summarized in Table 6) revealed significance for within subject variation across trials, $F = 17.29$, $\underline{df} = 3/120$, $\underline{p}$ .001.

A Newman-Keuls test performed on actual heart rate data showed that there were significant differences between the first minute heart rate (C_2) and the pretest rate (C_1), the last minute rate (C_3)

Table 5

Means and Standard Deviations for Actual Heart Rate

		Heart Rate			
GROUP		PRETESTING	FIRST	LAST	POSTTEST
High Guilt- Fast	$\bar{X}$	97.9090	101.8181	97.7272	96.0000
	SD	16.5678	19.2500	19.3443	17.9388
High Guilt-Normal	$\bar{X}$	89.8181	91.8181	88.4545	86.1818
	SD	15.5487	16.9101	14.3824	14.5638
Low Guilt- Fast	$\bar{X}$	82.1818	89.2727	80.7272	80.5454
	SD	10.2256	15.5750	9.4772	9.4272
Low Guilt_ Normal	$\bar{X}$	86.9090	93.2727	88.9090	85.3636
	SD	13.6635	13.9075	11.4669	10.7724

Table 6

Summary of Analysis of Variance for Actual Heart Rate

Source	SS	df	MS	F
Between Subjects	36465.9318	43		
A (sex guilt)	2689.4545	1	2689.4545	3.4451
B (feedback)	164.2045	1	164.2045	.2103
AxB (Interaction)	2385.8182	1	2385.8182	3.0561
Error between	31226.4546	40	780.6614	
Within Subjects	4062.5000	132		
C (trials)	1179.4772	3	393.1591	17.2932*
AxC (Interaction)	84.9546	3	28.3182	1.2455
BxC (Interaction)	37.9319	3	12.6439	.5561
AxBxC (Interaction)	31.9545	3	10.6515	.4685
Error Within	2728.1818	120	22.7348	

*$p < .01$

and the posttest rate (C_4). The results of this test are summarized in Table 7. These data are also presented in Figure 1, where it can be seen that heart rate increased during the first minute of the Word Association Test for all groups, but decreased thereafter.

Pearson product moment correlation coefficients were computed for the Word Association Test responses and the Perceived Guilt Index scores. The correlation for the low sex guilt, normal heart rate group, r = .60, p .05, one-tailed test, as well as the correlation for the low sex guilt fast feedback group, r = .58, p .05, one-tailed test, was significant. A similar correlation for the high guilt subjects in the normal rate condition approached significance, r = .41, p .10, one-tailed test, while the correlation between the Perceived Guilt Index and the Word Association Test for the high sex guilt, fast heart rate group was only .19.

Finally, an analysis of variance was performed on the Subjective Stress Scale data. No significant differences between the groups were evidenced in the analysis, which is summarized in Table 8. The mean scores on the Subjective Stress Scale for the groups

Table 7

Summary of Newman-Keuls Test On Actual Heart Rate

	Heart Rate					
	C_4	C_3	= C_1	C_2		
	3829	3914	3925	4138	r	CR
C_4=3829	--	85	96	309*	4	116.39
C_3=3914		--	11	224*	3	106.27
C_1=3925			--	213*	2	88.56
C_2=4138				--	-	--

*$p < .05$ Posttest (C_4), Last Minute (C_3), Pretest (C_1), First minute (C_2)

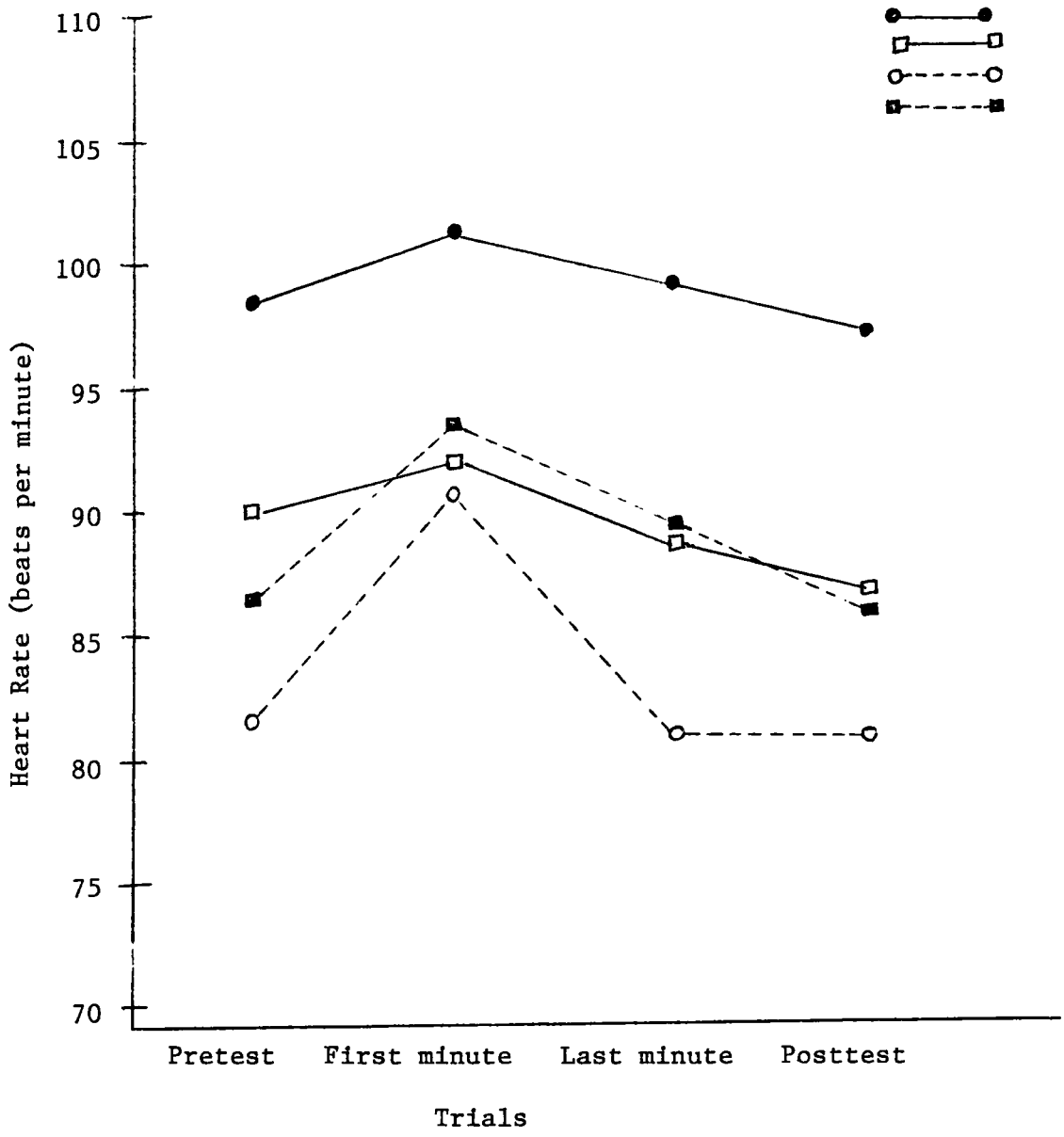

Figure 1 : Actual heart rate measures, divided into pretest, posttest, first and last minutes of testing.

ranged from 31.72 for the low sex guilt, fast rate group to 47.45 for the high sex guilt, normal rate group. These scaled scores represent a subjective stress level described as "steady" (scaled score 27), doesn't bother me (scaled score 40), and "indifferent" (scaled score 48).

DISCUSSION

The finding that sexual responses to the Word Association Test are inhibited by sex guilt is not unusual. Such a result is common in sex guilt literature (Galbraith and Mosher, 1968; Galbraith, 1968; Galbraith, 1970). These results, however, also indicate that sexual responsivity, as evidenced by Word Association Test responses, can be inhibited by an increase in the tempo of false heart rate feedback, which is consonant with one of the original hypotheses. Previous investigations have found that college males perceive slides of females as more attractive when they are accompanied by increasing heart rate feedback (Valins, 1966) and that a person's perceived level of fear may be heightened by presenting an increasing, nonveridical heart rate (Harris and Jellison, 1971; Krishner, Darley and Darley, 1973). This inhibition of Word Association Test responses by heart rate feedback, however, is in contrast to the work of Botto

Table 8
Means and Standard Deviations of
Subjective Stress Scale Scores

		Sex Guilt	
Heart Rate		High	Low
Normal	$\overline{X}$	47.4545	42.7272
	SD	19.7197	25.2432
Fast	$\overline{X}$	42.8181	31.7272
	SD	17.5432	25.5503

et al. (1974), who showed that an increasing false heart rate led to an increase in the attractiveness ratings of semi-nude slides by high sex guilt males, but not by low sex guilt males. The present study demonstrated that inhibited sexual responses occurred for both high and low sex guilt groups, the effect being more marked for the low sex guilt group. This would seem to contradict the theory that low sex guilt individuals are always unaffected by information concerning internal reactions (Mosher, 1965).

One possible hypothesis for this apparent contradiction in results is that the two experimental situations are not comparable. In the present study, the experimenter stayed in the testing room, while in the investigation by Botto et al. the experimenter left the subject alone during the viewing of the slides. The presence of the experimenter could be seen as an external cue for the low sex guilt subjects and, thus, have contributed to their inhibited Word Association Test performance. Approaching the incomparability of the two testing situations from another angle, rating slides of females and giving verbal associative responses to double entendre words may not elicit similar reactions from the subjects. The Botto paradigm might be viewed as a more favorable, approach situation, while the present design could be seen as an avoidance situation. If this possibility is real, then perhaps high sex guilt subjects utilize physiological cues in approach situations, while low sex guilt subjects rely upon physiological reactions in avoidance situa-

tions. This interpretation is quite speculative and requires further investigation.

The data obtained from the Perceived Guilt Index were surprising. As predicted, low sex guilt subjects in the increased heart rate condition perceived themselves as more guilty than low sex guilt subjects in the normal heart rate condition. However, the reverse occurred for the high sex guilt subjects. There appear to be several possible explanations for this unexpected finding.

An initial reaction might be that the feedback manipulation affected the actual heart rates of the subjects differently for the different groups. However, the analysis of variance summarized in Table 6, combined with the results of the Newman-Keuls test shown in Table 7, clearly demonstrate that actual heart rate did not increase as a function of increased false heart rate feedback. Also, the Subjective Stress Scale data demonstrate that there appear no significant differences in subjective stress or anxiety, as measured after the Word Association Test was completed. Therefore, differences in the Perceived Guilt Index scores cannot be contributed to group differences in anxiety or stress.

Another reason for these results might be that an auditory presentation of heart rate in the presence of the experimenter does not constitute an internal cue (as was originally thought), but rather an external one. This would explain the Perceived Guilt Index and

the Word Association Test performance by low sex guilt subjects and might also help to explain the Perceived Guilt Index data for the high sex guilt subjects. However, even this tentative explanation is somewhat complicated by the fact that high sex guilt subjects did decrease Word Association Test responses to some degree as a function of increased heart rate feedback, suggesting that this inhibition may have resulted from attending to the feedback.

Perhaps a more viable explanation is that the high sex guilt subjects interpret emotional states in terms of cognitive internal variables, rather than physiological reactions. In other words, the issue may be one of defining exactly what Mosher means by internal cues. Perhaps internal cues refer only to attitudinal-cognitive variables and do not include emotional-physiological reactions. Thus, an increasing, nonveridical heart rate would have little or no effect on high sex guilt subjects, while low guilt subjects, who are hypothesized not to have well-developed internalized standards of proper behavior, would be responsive to such a physiological cue.

The Pearson product moment correlation coefficients computed for the Word Association Test responses and the Perceived Guilt Index scores lend credence to still another possibility. There were significant correlations for both of the low sex guilt groups, demonstrating that increased sexual responses are accompanied by increased guilt feelings. A similar correlation for high sex guilt subjects in the normal rate condition approached significance.

However, the correlation between the Perceived Guilt Index and the Word Association Test for the high guilt, fast heart rate group was only .19. This finding lends some support for the hypothesis that this particular group is reacting differently than the other three groups. Carrying this one step further, the high sex guilt subject, upon hearing the false heart rate increasing, may actually perceive guilty feelings which are unacceptable to him. As a result of these feelings, the subject may become defensive and rate himself as less guilty.

Attempting to generalize from these findings, it seems that high sex guilt and low sex guilt subjects may react differently to the increasing tempo of the false heart rate feedback. Though the feedback caused both groups to inhibit their sexual responses, this mechanism of inhibition may be dissimilar. It is feasible that a low sex guilt subject, having heard his heart rate increase and having inhibited his sexual responses attributes his behavior to guilt. On the other hand, a high sex guilt subject who has also inhibited his sexual responsivity may either find the guilt feeling unacceptable and claim that he feels little guilt; or he may actually perceive less guilt, because he has acted in accordance with his internal standards of inhibiting responses. In other words, for the low sex guilt subject, inhibition may be guilt-inducing while inhibition may be guilt-reducing for the high sex guilt subject. Such a speculation, however, warrants further investigation.

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