

**PERIPHERAL AUTONOMIC AROUSAL VS  
SELF-REPORT OF EMOTIONALITY TO  
COMMONPLACE VISUAL STIMULI**



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PERIPHERAL AUTONOMIC AROUSAL VS SELF-REPORT OF EMOTIONALITY  
TO COMMONPLACE VISUAL STIMULI

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An Abstract  
Presented to  
the Graduate Council of  
Austin Peay State University

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Arts

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by  
Jacalyn Blackwell White

August 1973



## ABSTRACT

Traditionally, studies investigating physiological arousal and emotion in response to visual stimuli have used stressful and/or controversial slides or movies. The findings of these investigations have pointed to a positive and direct relationship between the two variables.

The present study was designed to investigate the relationship between self-report of emotionality and autonomic activity level in response to slides of commonplace scenes. A secondary consideration of the study was to determine if there was a relationship between reported moral conservatism or liberalism and emotionality.

The findings of the present study did not support previous findings. Very low, positive but insignificant relationships were found. However, a large difference between the correlation coefficients for white and black subjects was found. These results suggest that cognitive factors are more important than physiological ones in response to less extreme visual stimuli, and that the balance between physiological factors and cognitive factors may differ according to race.

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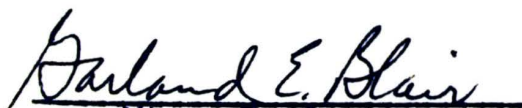
August 1973

To the Graduate Council:

I am submitting herewith a Thesis written by Jacalyn Blackwell White entitled "Peripheral Autonomic Arousal vs Self-Report of Emotionality to Commonplace Visual Stimuli." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.


  
Major Professor

We have read this thesis and  
recommend its acceptance:

  
Minor Professor  
or  
Second Committee Member

  
Third Committee Member

Accepted for the Council:

  
Dean of the Graduate School

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## Chapter I

### INTRODUCTION

Averill (1969), investigating the physiological concomitants of mirth and grief, found that a slapstick movie evoked emotions of uncontrollable glee, passive boredom and even annoyance in different subjects. Averill (1969) also indicated that a sad movie stimulated a similar variety of self-reports of emotional arousal in different subjects. Even the casual observer would find no difficulty in reaching the conclusion that reactions to the same stimulus differ for different people. In many cases these stimuli have involved relatively commonplace scenes. On the other hand, many studies have shown that emotional reactions to extreme visual stimuli are fairly consistent. Studies which have used sexual themes (Ray, 1971) or severe accidents (Kaiser & Roessler, 1970) as visual stimuli have found significant correlations between increased autonomic response and the subject's report of emotional arousal. However, a review of the literature has revealed little research into the relationship between autonomic activity level and self-report of emotional arousal to the more commonplace visual stimuli.

Nearly three quarters of a century ago, William James, as cited in Allport (1961), endeavored to explain the

connections between emotion and physiological changes. He described emotion not only as the bodily changes that directly followed the perception of a stimulus, but also as the person's direct awareness of these bodily changes as they occurred. Although numerous studies have investigated what came to be called the "James-Lange" theory of emotion, the findings have not been totally supportive of the theory (e.g., Ruch, 1963).

Recent research has shown that there are indeed physiological concomitants of emotion. Two of the more sensitive ones appear to be galvanic skin response (GSR) (Van Der Walk & Groen, 1950; Lykken, 1960) and bloodflow (BF) (Bigelow et al, 1955; Vanderhoof & Clancy, 1962). However, no clearly patterned relationship between physiological activity level and emotion has been reported. Also, the differences in physiological patterns accompanying different emotional states were not matched by an equal variety of visceral patterns. These findings, then, pointed to the importance of cognitive factors as major determinants of emotional states. Singer and Schachter (1962) have suggested that it is the individual's perception of the stimulus situation (i.e., a cognitive factor) that largely determines the emotional response.

Hirschman (1972) found that cognition not only of the stimulus situation, but of the degree of physiological arousal can greatly affect the emotional state. As one of his experimental conditions, Hirschman (1972) used bogus heartrate feedback to noxious slides. It was found that

subjects in this condition exhibited the highest GSR activity levels. On the surface, these findings would seem to confirm James' emphasis on the importance of the awareness of bodily changes. However, the fact that the subjects in Hirschman's (1972) study were so easily misled, raises a question as to the accuracy of the perception of these physiological changes. In support of "accuracy of perception", Dermer and Berscheid (1972), researching circadian rhythm, found that subjects did accurately report their general activation level over 24-hour periods. Also, in an examination of personality traits, guilt, and stimulus situation on GSR, heartrate, and self-report responses, Ray (1971) found a significant and direct correlation between spontaneous GSR's and self-reports.

However, Kerscher (1971) reported an inverse relationship between the self-reports of convicted rapists and their GSR activation levels. Although the rapists in Kerscher's (1971) study displayed greater GSR activation to sexually arousing slides, they gave lower ratings to the sexual themes.

A slightly different approach to self-report studies has been to hold self-report constant by controlling for racial attitudes. Vidulich and Krevanick (1966) discovered a direct correlation between GSR activation level and racial attitudes. GSR for a high racially prejudiced group of subjects was found to be significantly higher in responses to racially critical photographs. A similar study (Porier



& Lott, 1967) also resulted in a low, but significant correlation between GSR scores and self-report of racial bias as recorded on an attitude scale. Yet, Loisel and Williamson (1966) found significant GSR fluctuations between neutral and critical stimuli for a pro-Negro group.

Again, it should be stressed that those studies which have found significant correlations between autonomic activity levels and self-reports of emotion have concentrated on highly controversial or stressful visual stimuli. With these results in mind, it would seem to be of interest to determine whether a significant relationship between self-report and physiological activity level can also be demonstrated using slides of more commonplace (i.e., less controversial) scenes.

The present study was designed, primarily, to investigate the relationship between self-report of emotional arousal to commonplace visual stimuli and concomitant autonomic activity level measured via GSR and BF. Utilizing moral conservatism as an index of racial tolerance, (see Comrey & Newmeyer, 1965), a secondary consideration of the study was to determine the relationship between racial tolerance, physiological arousal level and self-report of emotional arousal.



## Chapter II

### METHOD

#### Subjects

Four groups of subjects consisting of seven black male, seven white male, eight black female, and fourteen white female volunteers were recruited from the student body at Austin Peay State University.

#### Apparatus

Physiological responses were monitored by a GSR "Biofeedback Biosensor" and a BF "Biofeedback Biosensor". Both instruments were purchased from Biofeedback Instruments, Wayland, Massachusetts. A tri-button panel was used to indicate self-reports. The three buttons were labelled "mild", "moderate", and "intense"; and each one was connected to a differently colored light on a light panel which was viewed by the experimenter. Color slides were shown to each subject via a carousel slide projector operated by remote control. A stopwatch was used to time the duration of each slide presentation as well as the interval between slide presentations. During an experimental session, each subject was individually seated in a viewing room with the tri-button panel in front of him on a table. The room was equipped with a two-way mirror. All other apparatus was

placed on a counter just outside of the experimental room. The sixteen slides shown to all subjects included female nudes, small children, poverty scenes, war scenes, racial and interracial scenes, and nature scenes. A list of slide descriptions appears in Table I.

### Procedure

Each subject was asked to be seated in the experimental room. The subject was then connected to the GSR and BF biosensors and was given the following instructions:

"I would like for you to get as comfortable as you can and just relax. You are about to be shown a series of slides. You are to look at each slide just long enough to determine your immediate emotional reaction to it. As soon as possible after each presentation, indicate your emotional reaction by pressing either the mild button for mild emotion, the moderate button for moderate emotion or the intense button for intense emotion. If you experience no emotional reaction, do nothing.

You will be allowed ten seconds to view each slide with a fifteen second rest period between slides to return to a relaxed state."

The experimenter, seated at the counter outside of the experimental room, timed the duration of each slide presentation, the interslide interval, and remotely controlled slide presentation. The experimenter also recorded physiological and emotional responses on individual data sheets. At the conclusion of the slide presentation, the age of each subject and his view of himself as either morally liberal or conservative were also recorded on the data sheet.

## Chapter III

### RESULTS

In order to assess the relationships between self-report and the two measures of physiological activity (i.e., GSR and BF), correlational analyses were used. Operations for testing the difference between two correlation coefficients and for averaging Pearson Product Moment Correlation Coefficients, as described in Downie and Heath (1959), were also performed.

Although very little significance was found to exist in the relationships between the three variables, several directional trends were noted. A low, but positive relationship between GSR and self-report was found for all subjects ( $r = .165$ ,  $p > .1$ ). A scattergram of GSR vs self-report for all subjects is shown in Table II. The difference between the correlation coefficients of the white and black subjects approached significance ( $z = 1.9$ ,  $p < .065$ ).

The four subject groups all showed a positive relationship between GSR and self-report. White females showed the lowest relationship ( $r = .07$ ,  $p > .1$ ); white males showed a slightly higher relationship ( $r = .155$ ,  $p > .1$ ); black females showed an even higher correlation coefficient



( $r = .214$ ,  $p > .1$ ); and black males demonstrated the highest relationship ( $r = .302$ ,  $p > .1$ ).

A slide by slide analysis yielded a low, but inverse relationship for Slide 1 ( $r = -.11$ ,  $p > .1$ ), Slide 2 ( $r = -.062$ ,  $p > .1$ ), Slide 4 ( $r = -.274$ ,  $p > .1$ ), Slide 7 ( $r = -.04$ ,  $p > .1$ ), and Slide 12 ( $r = -.167$ ,  $p > .1$ ). A low, but significant and positive relationship was found to exist for Slide 13 ( $r = .332$ ,  $p < .05$ ). There appeared to be low, but positive relationships for the remaining slides.

No discernible relationship appeared between either GSR and BF, or between BF and self-report of emotional arousal. Rarely did the BF indicator leave baseline for any subject.

Six white females, four white males and two black females reported themselves to be morally conservative, while the remainder of the sample reported moral liberalism. No significant difference was found to exist between the correlation coefficients for morally liberal and morally conservative subjects.



## Chapter IV

### DISCUSSION

As noted previously, studies that have investigated physiological vs self-report responses to controversial visual stimuli (e.g., Kaiser & Roessler, 1970; Ray, 1971), have generally found a significant, positive relationship between self-report and physiological arousal. The results of the present study showed an over all positive, but very low and insignificant, relationship between GSR and self-report of arousal. Although subjects indicated 60% of their emotional arousal to fall within the moderate to intense end of the range, only 27% of the total GSR fell into this area. These results tend to disconfirm, at least partially, the "James-Lange" theory of emotion mentioned earlier. Emotion was found to involve physiological changes via GSR levels. However, the relationship was not strong enough to suggest that it was also the perception of these changes that caused emotion.

On the other hand, the findings of this study would seem to support the position proposed by Singer and Schachter (1962) that cognitive elements play a very important role in emotions. Furthermore, the discrepancy between the results of this study and those of the other studies mentioned seem to indicate that the more commonplace or less

extreme the visual stimuli, the less did physiological arousal relate to self-report of emotional response.

As noted previously, a large discrepancy between the correlation coefficients of white and black subjects was found. Although little in the literature could be found to explain this phenomenon, it may possibly be attributed to the peculiar situation of black people in this country. Traditionally, blacks have suffered much indignity as a result of treatment by whites. Consequently, blacks have keenly felt the resultant emotions of hostility and anger. However, it was not at all prudent for the blacks to release this hostility directly against the aggressor. Therefore, as an adaptive measure, blacks have had to learn rigid self-control. Perhaps because they were so aware of the physiological concomitants of anger and were just as aware of the importance of controlling this upsurge, black people have learned to more accurately perceive their physiological states. Although admittedly speculative, this position is supported in part by Grier and Cobbs (1969) who have indicated that control of emotional feelings have traditionally been necessary for the survival of the blacks. For blacks, then, physiological changes may play a greater or more equal role with cognitive factors in the perception of emotion in response to any stimulus.

The inverse relationship found in response to certain slides may again point to the overriding importance of cognitive factors in the absence of shocking stimuli. In

many cases, the self-report was higher than the accompanying physiological response. The mean self-report and mean GSR for each slide are presented in Table III.

As noted above, moral conservatism did not seem to serve as an index of racial tolerance in this study. There are at least two possible explanations for this finding. First, subjects were not controlled for racial attitudes. There were probably very few, if any, racially intolerant subjects in the sample. Second, most of the subjects seemed to be somewhat hesitant about their moral perception of themselves. Many considered themselves to fall in the middle of the liberal-conservative continuum and seemed to make a more definite decision only because they were forced to do so.

The BF biosensor used in this study appeared to be much less sensitive to physiological change than was the GSR biosensor. Thus, the findings of Bigelow et al (1955) that BF was a very sensitive indicator of autonomic arousal was not supported. It is quite possible that the discrepant results are due to instrument differences. Both the studies, Bigelow et al (1955) and Vanderhoof and Clancy (1962) used the plethysmograph which would appear to have been a much more sophisticated indicator than was the "Biofeedback" biosensor.

Although little significance was found, the implications of the present study are important. One of the major emphases of psychology is to observe the reactions of the



organism to its environment. Thus, it is important to determine the physiology of emotion to typical environmental scenes. When compared to similar investigations that have used extreme visual stimuli, the findings of this study point strongly to the greater importance of cognitive factors over physiological ones when typical scenes are used.

The second major finding of this study was that a racial difference in regard to the balance of the concomitants of emotion may exist. Black subjects were found to demonstrate a much higher relationship than did white subjects between self-report of arousal and physiological activity level. Therefore, cognitive elements and physiological change may more equally figure into emotional arousal for blacks than whites.

Replication of this study might include the following modifications to help clarify and expand these two findings. First, the BF indicator should either be eliminated and another index of physiological activity level should be substituted, or a more sophisticated BF indicator should be used. Second, extreme slides might be interspersed among the typical ones to better determine if there does exist a difference in the relationship between self-report and physiological change to different types of visual stimuli. Third, the sample might also be enlarged to include more white male and more black subjects. Finally, an attitude scale, in addition to self-report, should be used



to better determine moral conservatism as self-report  
alone appears to have been a somewhat inadequate measure.

## APPENDIX: TABLES

TABLE 1

## Slide Description

- |          |  |
|----------|--|
| Slide 1  | Robed white female seated on black male's lap                                |
| Slide 2  | Deserted row of dilapidated shacks   |
| Slide 3  | Bare-chested black and white soldiers standing in formation                  |
| Slide 4  | Daisies in foreground, other greenery in background                          |
| Slide 5  | White female in bikini   |
| Slide 6  | Aerial view of bomb blast  |
| Slide 7  | Partial face of white male in foreground with river and forest in background |
| Slide 8  | Nude buttocks of white female  |
| Slide 9  | Soldier firing rifle   |
| Slide 10 | Nude white male child in bathtub   |
| Slide 11 | Sunset   |
| Slide 12 | Front view of nude white female  |
| Slide 13 | Young white female   |
| Slide 14 | Prominent black male politician  |
| Slide 15 | Nude Vietnamese child surrounded by dilapidated buildings                    |
| Slide 16 | Black male child   |

TABLE 2

Distribution of GSR and Self-Report Responses for All Subjects

|     | 0 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.3 | 2.4 |
|-----|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 2.0 |   |     |     |     |     |     |     |     |     |     |     | -   |     |     |     |     |
| 1.9 |   |     |     |     |     |     |     | -   |     |     |     |     |     |     |     |     |
| 1.8 |   |     |     |     |     |     |     |     | -   |     |     |     |     |     |     |     |
| 1.7 |   |     |     |     |     |     |     |     |     |     |     |     | -   |     |     |     |
| 1.6 |   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 1.5 |   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 1.4 |   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 1.3 |   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 1.2 |   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 1.1 |   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 1.0 |   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 0   |   |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

Y Axis -- Galvanic Skin Response

X Axis -- Self-Report of Emotional Arousal



TABLE 3

Slide Analysis--Mean GSR Level and Mean Self-Report Response

| <u>Slide</u> | <u>Self-Report (<math>\bar{X}</math>)</u> | <u>GSR (<math>\bar{Y}</math>)</u> |
|--------------|---|-----------------------------------|
| 1            | 1.85                                      | 1.90                              |
| 2            | 2.10                                      | 1.20                              |
| 3            | 1.55                                      | .91                               |
| 4            | 1.66                                      | 1.00                              |
| 5            | 1.66                                      | 1.16                              |
| 6            | 1.80                                      | .81                               |
| 7            | 1.50                                      | .69                               |
| 8            | 1.97                                      | 1.35                              |
| 9            | 2.30                                      | 1.10                              |
| 10           | 1.50                                      | .77                               |
| 11           | 1.60                                      | .91                               |
| 12           | 2.17                                      | 1.45                              |
| 13           | 1.10                                      | .77                               |
| 14           | 1.60                                      | 1.10                              |
| 15           | 2.40                                      | 1.05                              |
| 16           | 1.80                                      | 1.08                              |

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