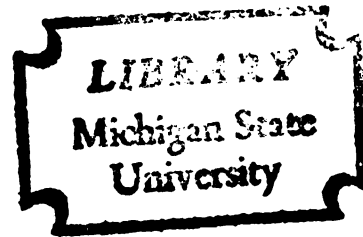


PHYSIOLOGICAL REACTIONS OF BLACK AND WHITE
MEN TO SIMULATED INTERRACIAL ENCOUNTERS

Dissertation for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
LUIS C. GONZALES JR.
1976



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**PHYSIOLOGICAL REACTIONS OF
BLACK AND WHITE MEN
TO SIMULATED INTERRACIAL ENCOUNTERS**
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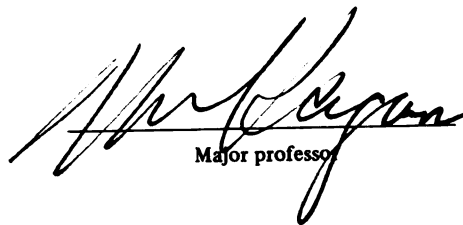
Luis Castanon Gonzales Jr.

has been accepted towards fulfillment
of the requirements for

Ph.D. degree in Counseling

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PHYSIOLOGICAL REACTIONS OF
BLACK AND WHITE MEN
TO SIMULATED INTERRACIAL ENCOUNTERS

by Luis C. Gonzales Jr.

ABSTRACT

The purposes of this study were 1) to increase the knowledge in racial research specifically in the psychophysiological area. Very few psychophysiological studies have compared groups from different races and hopefully this research can help clarify the interpersonal processes in black-white interactions, and their respective psychophysiological response patterns. Counselors and psychologists involved in racially mixed therapeutic sessions have particularly been interested in the interpersonal processes between blacks and whites; 2) to improve the application of the Interpersonal Recall Model in psychophysiological research. This model has proven successful in areas like training of counselors and teachers, and efforts are now being made to incorporate psychophysiological methods into the model; and 3) very few studies have compared the psychophysiological reactions of blacks and whites to stress. This study offers an opportunity to see if blacks and whites do in fact react differently to the same interpersonal stress situations. However, it would be expecting too much for any one study to offer clear cut answers to

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this very complex problem but hopefully this study will contribute to the basic foundations from which answers and practical applications may eventually emerge.

Twenty undergraduate males from Michigan State University were randomly selected for the study. A balanced repeated measures design was used and each subject was exposed to six vignettes followed by one-minute rest periods. The vignettes contained male and female, black and white actors portraying the emotion of aggression. A recall session followed each experimental period to obtain the psychological data. The physiological measures were respiration rate, respiration depth, heart rate, and electrical skin conductance.

Results for the respiration rate measures indicated that blacks and whites had significantly different rates across treatments; the vignettes had significantly different effects on subjects; and the two groups did have significantly different respiration rates for particular vignettes. None of the results for the respiration depth measures were statistically significant.

For the heart rate measure subjects, regardless of race, were found to respond in a significantly different manner to particular vignettes. The same finding was true for the electrical skin conductance data. All significant findings were at the .05 level and were further analyzed with post hoc analyses.

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**PHYSIOLOGICAL REACTIONS OF
BLACK AND WHITE MEN
TO SIMULATED INTERRACIAL ENCOUNTERS**

By
Luis C. Gonzales Jr.

A DISSERTATION

**Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of**

DOCTOR OF PHILOSOPHY

**Department of Counseling, Personnel Services
and Educational Psychology**

1976

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Ahora que he logrado el fin que empeze hace unos años, con profundo amor y respeto dedico este doctorado a mis padres, Luis e Hilaria Gonzales, y a mis abuelitos, Antonio y Julia Bañuelos, que tanto dieron y sacrificaron de su propia vida para que yo obtubiera la educacion que ellos jamas conocieron.

Bien se que sin el amor, la paciencia, la fe y la inspiracion que ellos me otorgaron no hubiera sido posible terminar esta larga y laboriosa jornada.

Que Dios los, bendiga y los ame como yo lo hare siempre.

Luis Gonzales Bañuelos

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ACKNOWLEDGEMENTS

While it is not possible to mention the name of each person who contributed to this dissertation, the author wishes to express his appreciation to these people:

To Norm Kagan my chairman and advisor who worked with me from beginning to end and provided needed support.

To Tom Adams who gave so much of his time and energy both as a committee member and as a friend.

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To "La Palomilla" Arturo, Rene, Alberto, Bill, Gumecindo, Melvin, Jose, Harry, Frank and Ernest on whose friendship and comaraderie I could always rely on when needed.

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CHAPTER I

STATEMENT OF THE PROBLEM

Need

Currently there exists a paucity of psychophysiological research comparing different racial groups. Consequently, very little is known about the psychophysiological reactions of people to another race. Such information could eventually form the foundation stones for some day discovering more definitive answers about interracial relations and racial attitudes. This study will measure and compare certain physiological and psychological responses to stress-producing affect simulation films by blacks and whites. The model used for obtaining these measures grew out of the Interpersonal Recall Model developed by Dr. Norman Kagan, College of Education, Michigan State University. It is also expected that this study will serve to evaluate the use of this model in the psychophysiological area.

The IPR model has been described in detail elsewhere (Archer, et. al., 1972; Kagan, 1975; Kagan, Krathwohl, and Miller, 1963). The basic IPR process involves videotaping of a counseling session which is then played back to the participants. This allows the participants an opportunity to study, and change their goals, motives or behaviors. The replay of

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the videotape (recall session) includes the presence of a counselor, or inquirer whose function is to facilitate the participants' self-analysis of their underlying thoughts, feelings, images, and interaction patterns.

The IPR model was later modified to include the use of affect simulation films. Rather than have the participants involved in one-to-one discussions, they were required to view affect simulation films of a more potent nature. In this revised version of the IPR model the actor or actress in the film looked directly at the participant and engaged them in intense rejection, affection, seductiveness, or guilt-producing behavior. The recall session followed the viewing of the film.

A more recent version of the IPR model included physiological monitoring of the participants. Measures of physiological activity were recorded and videotaped while participants viewed the simulation films. These recordings were then played back to the viewers during the recall session providing them with additional feedback to increase the effectiveness of the recall. The use of physiological data provided participants not only a chance to study their thoughts, feelings, and images, but also "permit them literally to see what internal processes were going on." Thus participants would be better able to see and deal with any incongruities between what they recall or allow themselves to recall and the physiological data.

Unfortunately, the results from the physiological studies have been inconclusive. Although the physiological data has been useful in allowing participants to become aware

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of and acknowledge feelings previously denied, it has proved difficult to pinpoint what particular physiological reactions mean. This problem has been further complicated by the difficulties in analyzing the interrelationships between different physiological measures. It is these problems which will be confronted by the current study.

While racial research has increased rapidly over the last decade, growth in the psychophysiological area has been very slow. In addition, the psychophysiological studies which have been carried out have more often than not found contradictory findings. For example, some researchers have concluded that blacks or Negroes have a higher skin resistance, Bernstein 1965, Johnson & Corah 1963, but Johnson and a new associate found whites to have a higher skin resistance.

Two other areas where this study may prove useful are (1) psychophysiological responses to stress, and (2) understanding the interpersonal processes in black-white interactions. The majority of studies concerned with reactions to stress have fallen into two major categories: (1) vicarious threat produced through viewing of stress-arousing films, and (2) threat usually produced through some form of deception. In the former category, Lazarus (1964), Lazarus & Opton (1965), and Lazarus, Speisman and Mordkoff (1963) have carried out many studies and become the staunchest supporters for the use of motion picture films. Lazarus and Opton (1965) state:

The use of this method was dictated by the major difficulties inherent in the alternative approaches to laboratory stress induction. The

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usual laboratory approach involves deception of one kind or another to threaten the subject. But deception presents certain problems for laboratory research on stress. For one thing, the subject is likely to realize that the threat is based on deception, since he assumes the experimenter will not really allow any serious harm to come to him. . . . Another limitation of deception tactics is that subjects cannot be fooled repeatedly; therefore, problems of adaptation to stress, consistency versus stimulus specificity in the response patterns among individuals, and other problems requiring repeated measures are difficult to approach through deception techniques.

Therefore the use of motion picture films have been employed as sources of threat in this study. Where Lazarus and his associates have relied on the method where a subject views a film as an observer, the present study uses a method where the subject is engaged by the film participants. This new method provides what is hoped to be a more "real" life-like stress situation. Perhaps the findings from the current study will shed some light on the inconclusive results produced in other stress studies reviewed in Chapter II.

Black and white educators, researchers, and social scientists have long sought to gain a better understanding of the interpersonal processes taking place during black-white interactions. This has been of particular interest to counselors and psychologists concerned with the black-white therapeutic session. Are black counselors more effective with black clients than white counselors? Are white counselors more effective with white clients than black counselors? The answers to these and other similar questions can hopefully become clearer by looking at black-white interactions through a

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psychophysiological perspective. A perspective which, as pointed out earlier, has not often been applied in racial research. It is one of the aims of this study to seek basic foundation information which may eventually contribute to finding answers to these types of questions.

It should also be noted that of the few psychophysiological studies concerned with racial comparisons the great majority of them were concerned only with GSR measures. Very few analyzed other physiological measures. The physiological measurements to be used in this study are heart rate (HR), respiration rate (RR), respiration depth (RD), and electrical skin conductance (ESC).

The affect simulation films chosen for this study portray aggression by black and white actors and actresses.

Hypotheses

The questions of major importance to this study are:

1. Are there significant differences between blacks and whites on heart rate, respiration rate, respiration depth, and electrical skin conductance.
2. Are there significant differences for blacks on heart rate, respiration rate, respiration depth, and electrical skin conductance.
3. Are there significant differences for whites on heart rate, respiration rate, respiration depth, and electrical skin conductance.
4. Are there significant interactions between any of

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the design variables (race, vignettes, rest periods) on heart rate, respiration rate, respiration depth, and electrical skin conductance?

The origin and importance of these questions will become evident in Chapter II. These questions are also presented as hypotheses in testable form in Chapter III.

Assumptions

Physiological

1. Individuals will exert little, if any, direct voluntary control of the autonomic physiological responses occurring in this experiment.

Simulation Films

1. The affect simulation films used in this study are sufficiently realistic to stimulate emotional arousal in the subjects.

2. Vignettes one and five are comparatively equal in content and intensity.

3. Vignettes three and six are comparatively equal in content and intensity.

4. The total measuring period is sufficiently short to prevent habituation.

Recall Session

1. Subjects can introspectively assess with reasonable validity what their attitudes, and feelings were toward the affect simulation films.

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Chapter 1

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2. Subjects are both willing and able to communicate their attitudes and feelings toward the affect simulation films faithfully to the experimenter.

Definitions

1. Physiological Reactivity refers to autonomic functions.
2. Eccrine Sweat Activity is a particular form of sweat response that originates in the eccrine sweat glands.
3. Electrical Skin Conductance (ESC) is a measure of an electrical property of the skin related to eccrine sweat gland activity.
4. Heart Rate (HR) refers to the number of myocardial cycles per minute.
5. Respiratory Rate (RR) is the number of breaths per minute.
6. Respiratory Depth (RD) is the amplitude of breaths.

Organization of the Thesis

The dissertation is divided into five chapters. In Chapter I the statement of the problem was discussed.

In Chapter II the theory and research literature pertinent to this study is summarized and reviewed. The literature is divided into three major categories:

1. Studies comparing psychophysiological reactions to different races.
2. Studies on psychological reactivity to anxiety and interpersonal stress.
3. Studies on physiological reactivity to anxiety and interpersonal stress.

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The methodology and procedures of the study are presented in Chapter III. Information is included on the statistical methods used in the data analyses, hypotheses to be tested, and design of the study.

In Chapter IV the data analyses and results are presented. The hypotheses are restated and followed by statements of significance.

Chapter V is a discussion of the results with conclusions, interpretations, and implications for future research.

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CHAPTER II

REVIEW OF LITERATURE

Introduction

In this chapter, the literature pertinent to this study will be reviewed. Major emphasis will be given to research concerned with psychophysiological factors between different racial and ethnic groups. A cursory review will be presented of psychological and physiological studies generally dealing with anxiety and interpersonal stress.

Psychophysiological Differences Between Various Racial and Ethnic Groups

Over the last two decades the amount of literature and research concerned with the problems, needs, and differences between various racial and ethnic groups has increased immensely. This has been particularly true in the social science areas such as sociology, social work, racial and ethnic studies, and psychology. One specific area where a significant increase in research has not taken place is the area of psychophysiology. For whatever reasons, investigators have been slow in generating research which compares racial and ethnic groups across psychophysiological factors. This was evident in the review by Sattler (1970) in which he cited only three psychophysiological studies.

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One of the first psychophysiological studies which did compare racial groups was carried out by Rankin and Campbell (1955). The authors compared Galvanic Skin Responses of white, male college students to incidental contacts by a "negro" and white experimenter. Results showed a highly significant differential response to the two experimenters with the greater response being made to the negro. This differential response to the experimenters was attributed to differences in race of experimenters. Porier and Lott (1967) conducted a study in which, among other things, they tried to replicate the Rankin and Campbell study. The authors were not successful in reproducing the previous findings and they attributed this to "improvements" in procedure. Whereas, Rankin and Campbell employed only one negro and one white experimenter, Porier and Lott increased their sample and utilized a group of each. It should be noted that even though the Rankin and Campbell findings were not reproduced it was still one of the first attempts at viewing the differences and similarities between races psychophysiologically. The study was also instrumental in generating more research in the area.

A study by Bernstein (1965) also looked at the physiological effects of examiners' race on subjects. In this case the procedure was changed and the measures were basal skin impedance and spontaneous electrodermal fluctuations. However, the results were the same as Porier's and Lott's with the race of the examiner not affecting the subjects' responses in a significantly different manner. An interesting finding

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was that negroes had a reliably higher basal skin impedance or resistance than whites regardless of the examiners' race. This same finding was obtained by Juniper and Dykman (1967) with subjects undergoing gastric analysis and/or taking various drugs and by Johnson and Corah (1963). In addition, Johnson and Landon (1965) found blacks to have a lower skin conductance which is equal to having a higher skin resistance. It should be pointed out that in the two Johnson, et al., studies, group differences were obtained during prolonged rest periods. Apparently, negro subjects display a higher skin resistance or lower skin conductance whether at rest or in the presence of an examiner. It should be noted that in none of the studies was this difference obtained on the spontaneous electrodermal fluctuations measure. Bernstein offered as a possible explanation that basal skin levels may be quite vulnerable to external influences while spontaneous fluctuations may be invulnerable to such influence, or both.

The Bernstein study produced perhaps, an even more interesting finding. Subjects, regardless of race, had significantly higher impedance levels with the white examiner than with the negro examiner. The unanswered question, then, is whether the difference is due to race between examiners or to other factors such as appearance, mannerisms, or more subtle things.

Westie and De Fleur (1959) conducted an earlier study pertinent to this research. The researchers compared white males and females, prejudiced and unprejudiced on a GSR

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measure while they viewed slides of negroes and whites in single and paired situations. The results indicated that 1) prejudiced Ss showed higher GSRs toward negro slides than unprejudiced Ss in the single person slides. A more recent study by Vidulich and Krevanick (1966) produced the same results but in addition they found 1) significance for slides with negro-white interactions; 2) all subjects, regardless of sex or attitude, had higher GSRs to slides portraying males than to slides portraying females; and 3) all subjects showed higher GSRs toward slides portraying persons of the same sex as compared to mixed sex pairs. Among other things, these findings indicate that attitudinal predispositions were related to some extent to their autonomic response pattern and "a person's autonomic responses are influenced by the racial and sexual categories of the attitude object, and the ways attitude objects were paired together." Westie and De Fleur stated that the importance of their research lies in the indications that attitudinal responses include autonomic physiological activity that is related to persons' attitudes and their responses should be regarded as "another dimension of attitudinal behavior to be considered along with the verbal and overt action dimensions." The authors also emphasized another very important point:

It is easy to fall into thinking, especially when the stimuli are "race objects," that high response indicates a negative attitude. Actually, such responses could be due to a number of conditions. Conflicting feelings, indecision, or even positive involvement might result in large autonomic responses (p. 346).

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Coincidentally, in a series of studies conducted both before and after the Westie-De Fleur study, Cooper and Singer (1956), Cooper and Pollock (1959), and Cooper (1969), the authors' statements were substantiated. In all three studies it was found that subjects displayed greater GSR arousal when an object of a "negative prejudicial attitude" was exposed to verbal statements strongly complimenting the object, and when an object of a "positive prejudicial attitude" was exposed to verbal statements which strongly complimented the object. Therefore, one must be cautious in interpreting the results of any similar study.

The previously mentioned study by Porier and Lott (1967) also used prejudice as a blocking variable. The GSRs of prejudiced subjects were higher when they had contact with the negro experimenter than with the white experimenter. Clearly, these findings are very much in agreement with data from Westie and De Fleur and perhaps more significant in that there was actual physical contact rather than merely looking at slides.

In a more recent study, Fisher and Kotses (1973) also looked at experimenter race effects on GSR. On the basal resistance levels measures negro subjects evidenced significantly higher levels than did caucasians. This finding was consistent with Johnson and Corah (1963).

Another significant finding was the higher GSR reactivity for caucasian Ss paired with a negro experimenter.

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The authors explained this finding in terms of the differences in "novelty." Specifically, "social interactions with negroes is a far less frequent event for caucasian than for negro Ss, thereby introducing a further element of novelty for caucasian Ss. This has the effect of making the negro E condition a more novel situation for caucasian Ss than for negro Ss." Grings (1960), and Grings, Carlin, and Appley (1962) also found a positive relationship between stimulus novelty and GSR reactivity. In addition to GSR reactivity, Fisher and Kotses looked at the frequency of spontaneous fluctuations (defined as any negative deflection of the recording pen to the exclusion of movement artifact). It was found that all subjects had significantly more spontaneous GSRs in the "other-race" condition compared to the GSR reactivity measurements where only the caucasians had a higher response level. The authors hypothesized that the spontaneous fluctuation measure may be more sensitive in assessing novel situations than the GSR reactivity measure.

It might be evident by now that the psychophysiological studies comparing responses of black and white subjects dealt almost exclusively with measures of GSR, skin potential, skin resistance or closely-related measures. Only occasionally have researchers reported comparisons on other autonomic measures and in these infrequent cases the data are presented in a cursory manner as minor aspects of their studies. Nevertheless, the data obtained from these "other" measures is meaningful particularly to the present study which utilizes the

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measures of heart rate, respiration rate, and respiration depth, as well as electrical skin conductance. The aforementioned Westie and De Fleur study was one study which did go beyond the measurement of GSR.

Westie and De Fleur measured finger pulse (FP) responses of their subjects while viewing slides of negroes and whites. Interestingly, the researchers found that prejudiced subjects displayed smaller FP responses to negro slides than to the white slides. In other words, there was an inverse relationship between degree of prejudice and FP activity. On the other hand, as noted earlier, there was a direct relationship between prejudice and GSR with prejudiced subjects showing greater GSR responses to the negro slides.

The study by Gentry (1972) used blood pressure as the only autonomic measure. The findings were that black subjects undergoing direct interpersonal verbal attack by a white peer experimenter had elevated diastolic blood pressure. This was not the case for the subjects who were not attacked. This finding is especially important since the current study makes use of direct verbal attack on subjects through film.

The two studies by Johnson, et al., previously mentioned also made use of other autonomic measures. These measures included heart rate, respiration rate, skin temperature, systolic blood pressure, and diastolic blood pressure. Unlike the skin conductance and skin resistance measures, none of these measures showed significant differences between blacks and whites. An important point, however, is that all of these

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Psychophysiological Studies on Stress

One of the major questions in this study is what will be the physiological responses of blacks and whites to the stress situations (vignettes periods). Although previous studies have not used the same stress stimuli employed in this study, the findings from other stress studies may be useful in analyzing and interpreting the results of this research.

The major researchers involved in work concerned with emotional arousal and/or stress primarily take a unidimensional or multidimensional theoretical stance. The unidimensional position (Cannon, 1936; Duffy, 1957; Malmö, 1959) views the magnitude of an autonomic response as the "degree" of activation or arousal. Lacey (1958) says, "They assert that physiological activation processes are part of the mechanisms of drive, that these processes reveal the intensive rather than the directional aspects of behavior. . .". According to the unidimensional position, a stress reaction generally involves an increase in heart rate, skin conductance, and respiration rate (Dykman, et al., 1963; Ax, 1953; Martin, 1961). Many studies have preferred the measurement of skin potential or skin resistance which are inversely related to skin conductance and thus decrease during stress (Learmonth, et al., 1959) (see Figure 2.1). This is only a brief explanation of the unidimensional perspective but it is not viewed as critical to

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the present study. It is presented only to acknowledge its position and provide possible contrast to the multidimensional perspective.

The multidimensional view of emotional and stress arousal is viewed as much more germane to the current study because it is more of a psychophysiological perspective than the unidimensional view which is more of a physiological perspective. Lacey (Lacey, et al., 1953; Lacey & Lacey, 1958), one of the first proponents of the multidimensional perspective, stated:

In these studies it is shown that Ss respond with an hierarchy of activation, being relatively over-active in some physiological measures, under-active in others, while exhibiting average reactivity in still others. These patterns of response seem to be idiosyncratic; each Ss' pattern is different. . . . For a given set of autonomic functions, Ss tend to respond with an idiosyncratic pattern of autonomic activations in which maximal activation is shown by the same physiological function, whatever the stress (p. 50).

Lacey named this phenomenon "the principle of relative response-specificity."

After testing the principle of relative response-specificity, Lacey and his associates revised the hypothesis and renamed it "situational stereotype."

The revised hypothesis states that the entire pattern of hierarchy of response is reproducible over different stressor-episodes, and that continuous quantitative variation among Ss exists in the degree to which they exhibit stereotype (reproducibility) of their pattern of response (p. 50).

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The key words here are, "continuous quantitative variation among Ss exists in the degree to which they exhibit stereotypy (reproducibility) of their pattern of response." What Lacey and his associates are saying is:

- 1) Ss have a hierarchy of activation and the patterns of response seem to be idiosyncratic whatever the stressor;
- 2) Ss display their response-hierarchy in a quantitatively different manner from one stressor to another.

Then, what are the factors or variables which lead to quantitative differences in Ss' response-hierarchies from stressor to stressor? In other words, what causes the apparent breakdown in the response-hierarchy?

These are precisely the types of questions which people such as Lazarus, Wenger, Opton, Averill and others have addressed. In short, their objective has been to look at the interaction between the influences of the situation or stressor and the individual's peculiarities.

One of the key concepts in this interaction is "appraisal," or the evaluation by an individual of the potential harmfulness of an event or interaction. As stated by Speisman, Lazarus, Mordkoff, and Davison (1964):

Threat occurs when a cue signifies to the individual that a harmful confrontation or experience may be anticipated. . . . Thus, the same stimulus may be either a stressor or not, depending upon the nature of the cognitive appraisal the person makes regarding the significance for him (p. 367).

Applying the above to the current research, it would seem critical to analyze any group differences in terms of the possible

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Prior to reviewing the research data relevant to the concept of appraisal in psychological stress, it should be noted that there is a closely related coping process which functions to reduce or eliminate any anticipated harm. Lazarus and Opton (1970) have labeled this second process as "secondary appraisal." This secondary appraisal or reappraisal determines the coping processes and defense mechanisms an individual uses in attempting to deal with the anticipated harm. Lazarus and Opton (1970) state:

There is a close link between the process of threat appraisal and the concept of defense mechanism. The former is an initial judgement concerning the harmful portent of a stimulus. The latter is a reappraisal of the significance of a stimulus that was once regarded as threatening, but whose threat now is denied, isolated, projected, etc. Viewed in this way, there is a close connection between appraisal and reappraisal, or defense. Depending on the interplay of these processes, the same objective stimulus may or may not be threatening (p. 244).

A study by Speisman, et al., (1964) provided strong support for the proposition that appraisal is important to the amount of threat a stimulus presents to an individual. The method used in this study had one group of subjects listen to either a "trauma," "denial," or "intellectualization" sound track while watching the stress-producing film, subincision. In the denial sound track the stress-producing features of the film were denied, or downplayed. In the intellectualization sound track the stress features were not denied but pointed out

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in a technical manner without emotion much as one would explain an operation technique to medical students. The third sound track, the trauma track, emphasized the stressful features, pointing out the pain experienced by the participants. The important findings of the study were that subjects listening to the denial or intellectualization sound tracks displayed less stress than those in the trauma track. These findings were interpreted as providing support for the proposition that stress or threat produced by a stimulus is greatly determined by how it is appraised.

In a similar study Lazarus and Alfert (1964) modified the methodology employed by Speisman, et al. These researchers found that subjects listening to the sound tracks before the start of films responded with less stress (lower skin conductance and heart rate levels) than those listening to the sound tracks during the film's showing. The authors explained the results in terms of a "short-circuiting" effect, meaning that subjects expected less stressful situations and thus responded in a less stressful manner.

In another study (Rankin, Nomikos, Opton, and Lazarus, 1965) the role of anticipation or expectations of stressful scenes was examined. The "short-anticipation group" was given little warning before the stressful scene (a workman putting his hand in a saw blade) while the "long-anticipation" group could see the stressful scene developing. It was found that the long-anticipation group showed more stress as evidenced by autonomic indicators. The results were explained thusly:

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This is consistent with the idea that it is the appraisal of threat--of potential or impending harm--rather than the confrontation with harm itself that produces the stress reaction (p. 254).

At this point it might prove useful to give some examples using the Lacey-Lazarus approach. First there is subject number one (S_1) who appraises the stimulus as threatening or stress-producing and responds with increased physiological activity (PA). Second is subject number two (S_2) who also appraises the stimulus as threatening or stress-producing, however, he goes through a secondary appraisal, determining coping processes and defense mechanisms and leading to a decreased physiological activity (PA). The third subject (S_3) is the person who appraises the stimulus and finds it not to be threatening or stressful and also shows decreased physiological activity (PA). Thus, S_1 would differ physiological from S_2 and S_3 while S_2 and S_3 would appear not to differ from each other physiologically. However, it would seem unlikely that the lack of differences in physiological activity between S_2 and S_3 reflects comparable states. The problem then is when does a decreased physiological pattern reflect a non-threatening, non-stressful stimulus or a threatening, stressful stimulus that has been coped with through some defense mechanism. Stated differently, what are the characteristics of the persons who use their defense mechanisms vs. the persons who do not?

Some researchers have tried to solve this problem by comparing different personality types. Martin (1972) compared

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the physiological patterns of "thinkers," "feelers," "high empathizers" to stimulated emotions on video tape. His major finding was that feelers were more open to exploring their reactions to the stimuli than thinkers. A study by Learmonth (1959) had two findings related to this research. The findings were:

1. The increase of fluctuation of palmar potential in response to stress is negatively correlated with a group of personality variables that have in common the element of expressivity.
2. The increase of fluctuations of palmar potential in response to stress is correlated positively with a group of personality variables that have in common the restraint and curtailment of unpleasant or prohibited feelings and actions.

Jurko, Jost, and Hill (1952) measured the respiration rate, respiration variability, and heart rate of normals, neurotics, and schizophrenics during a testing session. On all three measures the normals were lower. Kelley (1968) also found anxious patients to have twice as great a basal forearm blood flow as controls. Malmo (1957) summarized many of his findings, and stated that anxious patients show greater reactivity in many measures regardless of the kind of stress used. Does this mean anxious patients are less easily threatened and/or feel stress, or are they less able to activate defense mechanisms?

More recently Roessler (1973) summarized a number of his studies and concluded "it was therefore those Ss high in anxiety who were least responsive. This is a result directly opposite to the widely held belief that trait anxiety is

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associated with greater physiological responsivity." The obvious point is the inconsistency in findings between the Malmo and Roessler studies, an inconsistency that seems prevalent in psychophysiological studies comparing personality types. Averill and Option (1968) also reached a similar conclusion and stated:

In general, we are pessimistic about the possibility of successfully reducing personality traits to underlying physiological mechanisms, at least for the foreseeable future. It appears unlikely that normal variations in personality are greatly dependent upon gross constitutional differences in physiological functioning (p. 283);

Specifically, the authors pointed out:

a) most correlations between psychophysiological reactions and personality measures are very low, and b) there is little overlap among studies; that is, only rarely is it possible to say that the results of any two experiments reinforce or contradict each other; each experimenter has used a unique combination of eliciting stimuli, psychophysiological measures, and personality measures (p. 286).

Overall, it would appear that there are many inconsistent findings in the area of psychophysiological research.

Whether one compares blacks to whites, personality types, or different stress situations, many questions remain unanswered.

However, important to this study is the non-use of interpersonal situations as treatments in any of the aforementioned studies. The IPR method employed in this study offers an opportunity to engage the subject, through film, in a direct interpersonal interaction instead of viewing a film from a detached position as is done so often. Hopefully, the IPR

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method will provide more insight into the many psychophysiological questions still left unanswered.

Summary

The first studies reviewed in this chapter compared the physiological reactions of blacks and whites. Although racial research has increased over the last two decades, it was found that very little had been generated in the physiological and psychophysiological areas. It was also found that the studies often contradicted each others findings and there was little consistency in results and methodologies. It seemed that a majority of the studies cited dealt primarily with the effects of black-white experimenters on subjects' physiological reactions and were often limited to the GSR, skin resistance, and skin conductance measures.

The second area reviewed in this chapter was research concerned with the psychophysiological effects of stress. The two major theoretical positions were reviewed. The first position, unidimensional, views exposure to stress or threat as leading to a general increase in all physiological activity. Emphasis is on degree of activation and not direction of activation. The multidimensional position sees subjects as having a hierarchy of activation with an idiosyncratic response pattern. Also, subjects display this hierarchy in a quantitatively different manner with different stresses. This position is often referred to as the situational stereotypy. More recently researchers have been looking at the interaction between the

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influences of the situation or stresses and the individual's peculiarities to hopefully determine what causes different reactions to different stressors. In line with this a number of studies have dealt with subjects' cognitive appraisal of threatening situations and their subsequent coping styles.

Another group of researchers have attacked this problem by comparing different personality types. Unfortunately, these studies have not proven very fruitful.

There is a clear paucity of literature comparing blacks and whites psychophysiologicaly, and individuals' reactions to interpersonal stress situations. This study will compare the reactions of blacks and whites to direct interpersonal threats by blacks and whites through use of the Interpersonal Recall Model.

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CHAPTER III

DESIGN

Sample

Twenty subjects were chosen from among male undergraduate students at Michigan State University. Ten black males and ten white males were randomly selected outside of a dormitory dining room during the 1975 summer session. Ages ranged from 19 to 38 years, with a mode of 20 and a mean of 20.8. None of the subjects reported any abnormalities in physiological functioning or previous participation in physiological experiments prior to this study. A general information form was used to collect these and other background data (see Appendix A).

Experimental Design

A balanced repeated measures design was used with all design variables fixed and crossed with each other except for replications which are random and nested within the race variable. Subjects served as their own controls and each subject (S) was exposed to six experimental trials. Each trial consisted of a vignette (V) followed by a rest (R) period. (See Table 3.1 for a diagram of the design.)

Table 3.1 Experimental Design

EXPERIMENTAL PERIODS

Subjects	R ₁	V ₁	R ₂	V ₂	R ₃	V ₃	R ₄	V ₄	R ₅	V ₅	R ₆	V ₆	R ₇
		Black Male		White Female		White Couple		Mixed Couple		White Male		Black Couple	
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Stimulus Vignettes

The emotion portrayed in the six color vignettes was labeled aggression. This emotion was portrayed as follows:

Vignette #1 A black male

Vignette #2 A white female

Vignette #3 A white couple

Vignette #4 A racially mixed couple (white female
& black male)

Vignette #5 A white male

Vignette #6 A black couple

Typescripts and descriptions of the vignettes appear in Appendix B.

Preparation of the Subjects

Subject preparation procedures were similar to those employed by Martin (1972) with some minor changes. All subjects were measured between late afternoon and evening to minimize any effects due to time of day. A four-channel Grass Polygraph Recorder (Model 7P4D) was used to record heart rate, electrical skin conductance, respiration rate, and respiration depth. The subjects were prepared according to the following procedures.

1. Each subject was required to wash and dry his hands.
2. Heart rate was measured by two silver/silver chloride electrodes with diameters of two centimeters. One electrode was attached to the sternum and one electrode was attached on the left side about twelve centimeters

below the central axillary region. The electrodes led to a Heart Rate Monitor and then to the Polygraph Recorder. A heart rate monitor and stimulator were used to monitor the HR and to calibrate the heart rate recorder.

3. Electrical skin conductance also was measured by two silver/silver chloride electrodes with diameters of two centimeters. One electrode was attached to the left palm and the other electrode was attached about five centimeters below the left elbow on the volar side. The electrodes led to a Hagfors Bridge (Venables & Martin, 1967), which was connected to the Polygraph Recorder.
4. Respiration rate and depth were measured by a mercury-in-a-rubber-strain-gauge attached to an elastic belt. The belt was wrapped around the lower rib cage and tightened to 10-20% of its original length. The strain gauge was connected to a Pleythysmograph and then to the Polygraph.
5. The electrode surfaces for heart rate were covered with Hewlitt-Packard Redux conductive jelly. The electrode surfaces for electrical skin conductance were covered with a mixture of Hewlitt-Packard Unibase and normal saline solution.
6. Temperature in the experimental room was kept between 68-72 degrees F.

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Treatment Procedures

Pre-Experimental Period

Once the subject was seated and connected to the physiological equipment, he was read the following set of instructions:

Please make yourself comfortable and try to relax for the next few minutes. This will allow the electrodes to make good contact with the skin. Now, you are going to watch a series of short scenes on the screen directly in front of you. Try to imagine that the persons or person is in this room and is talking directly and personally to you. Make an effort to really get into what is happening in the scenes. After each scene, there will be a short rest period. During this time try to remove yourself as much as possible from the previous scene.

Experimental Period

Subjects were presented the six vignettes after allowing several minutes for relaxation and acclimation to the new environment. Each vignette was followed by a one minute rest period. Physiological responses were recorded prior to the scenes to obtain a baseline during the viewing of scenes and during the rest periods for a total of thirteen measurement periods.

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Post-Experimental Period

An Interpersonal Process Recall Session (Kagan 1963) followed the experimental period with the subject still connected to the physiological equipment. The Interpersonal Process Recall Session was conducted as follows:

1. The experimenter entered the room and turned on a television set showing a split-screen video tape of the subject, his physiological responses and the audio portion of the vignettes during the experimental period.
2. The subject was instructed to view the television playback and try to recall his underlying thoughts, feelings, images, and general pattern of interaction during the experimental period. The experimenter's function was to facilitate the subject's self-analysis using the feedback provided by the television set and the subject. The experimenter controlled a remote control device to stop the video playback whenever the subject wanted to verbalize thoughts and feelings.
3. The recall session was taped on a cassette player and a second experimenter, stationed near the Polygraph Recorder, noted the subject's comments on each vignette on his original physiological paper record. This

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provided psychological responses which coincided with physiological responses.

4. Subjects were instructed not to discuss any details of the experiment with anyone.

The psychological data collected during the recall session is immense and a full analysis would be beyond the scope of the current study. These data are summarized briefly in Chapter V.

Hypotheses

The hypotheses were presented as nondirectional statements because of the study's exploratory nature. As outlined in Chapters I and II there is insufficient data available to surmise directional results. All hypotheses were tested for each of the six vignette periods, and seven rest periods using repeated measures analyses of variance with alpha level set at .05.

Hypothesis 1) There will be no significant difference between blacks and whites on respiration rate.

Hypothesis 2) There will be no significant difference between vignettes on respiration rate.

Hypothesis 3) There will be no significant difference between rest periods on respiration rate.

Hypothesis 4) There will be no significant interaction between race of subjects and vignettes on respiration rate.

Hypothesis 5) There will be no significant interaction between race of subjects and rest periods on respiration rate.

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- Hypothesis 6) There will be no significant difference between blacks and whites on respiration depth.
- Hypothesis 7) There will be no significant difference between vignettes on respiration depth.
- Hypothesis 8) There will be no significant difference between rest periods on respiration depth.
- Hypothesis 9) There will be no significant interaction between race of subjects and vignettes on respiration depth.
- Hypothesis 10) There will be no significant interaction between race of subjects and rest periods on respiration depth.
- Hypothesis 11) There will be no significant difference between blacks and whites on heart rate.
- Hypothesis 12) There will be no significant difference between vignettes on heart rate.
- Hypothesis 13) There will be no significant difference between rest periods on heart rate.
- Hypothesis 14) There will be no significant interaction between race of subjects and vignettes on heart rate.
- Hypothesis 15) There will be no significant interaction between race of subjects and rest periods on heart rate.
- Hypothesis 16) There will be no significant difference between blacks and whites on electrical skin conductance.
- Hypothesis 17) There will be no significant difference between vignettes on electrical skin conductance.

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- Hypothesis 18) There will be no significant difference between rest periods on electrical skin conductance.
- Hypothesis 19) There will be no significant interaction between race of subjects and vignettes on heart rate.
- Hypothesis 20) There will be no significant interaction between race of subjects and rest periods on electrical skin conductance.

Analysis of Data

The study contained the following three design variables:

1. Race of subjects: Black or White
2. Vignettes: $V_1, V_2, V_3, V_4, V_5, V_6$
3. Rest Periods: $R_1, R_2, R_3, R_4, R_5, R_6, R_7$

The four dependent variables were physiological responses of heart rate, electrical skin conductance, respiration rate, and respiration depth.

Heart rate was determined measuring the mean beats/minute for each vignette and each rest period.

Respiration rate was obtained by counting the number of peaks per period, dividing by the number of seconds in the period, and multiplying by sixty seconds. The resulting number was respiratory rate per minute.

Respiration depth was determined by recording the amplitude of every upward deflection over one millimeter. The sum of these recordings was divided by the total number of upward deflections for a mean, defined as respiration depth.

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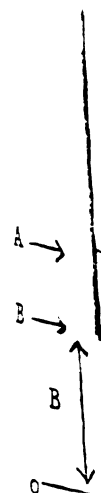
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A new method developed by Dr. Thomas Adams, Department of Physiology, Michigan State University, was used to obtain an electrical skin conductance score. Dr. Adams' method was an attempt to quantify all possible aspects of the ESC data. The formula and definition of terms are presented below.

$$E S C = (N \cdot B) + a + \frac{b}{N} + A + E$$

* N = Number of responses (at least 1 mm deflection).

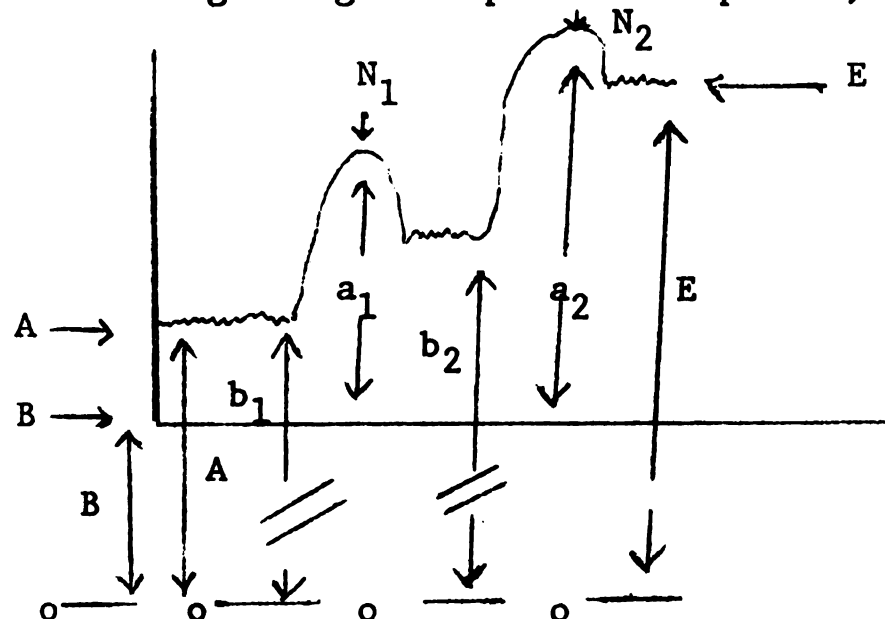
B = Baseline (chosen level, other than zero, below all traces in an experimental period; umhos).

a = Sum of response amplitudes (total of each response height over baseline; umhos).

b = Sum of response baselines (total of absolute umho value at beginning of each response).

E = End of trace (absolute umho value of trace at end of experimental period).

A = Beginning of trace (absolute umho value of trace at beginning of experimental period).



* An experimental period in which there were no responses is scored as "1".

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Summary

The subjects for this study were ten black and ten white male undergraduate students at Michigan State University. Each subject viewed six color vignettes which portrayed black and white actors and actresses expressing emotions labelled aggression. Subjects' physiological responses of heart rate (HR), respiration rate (RR), respiration depth (RD), and electrical skin conductance (ESC) were recorded during the viewing and rest periods. Twenty hypotheses presented for testing are included in addition to the analyses procedures. Repeated measures analyses of variance was selected with alpha set at .05.

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CHAPTER IV

ANALYSIS OF RESULTS

The findings from the study were divided into four major sections according to the four autonomic measures: respiration rate (RR), respiration depth (RD), heart rate (HR), and electrical skin conductance (ESC). In each section the respective hypotheses were restated and analyzed followed by sub-sections with other pertinent data in regard to vignette periods, rest periods, and vignettes in relation to rest periods. Each of these sub-sections included data on the group means. An in-depth analysis of the variance data was not considered to be within the scope of the present study. However, the variance data is presented in Appendix D with some initial observations.

It should be noted that part of the data for subjects (S) one and two were not usable because of equipment failure. It was therefore decided to exclude S₁ and S₂ from the respiration rate and respiration depth analyses during both the vignette and rest periods and S₂ from all of the heart rate analyses. Both S₁ and S₂ were from the white group.

The psychological data recorded in the recall sessions was excluded from Chapter IV because a large percentage of it was not audible. It was decided to subjectively rate the

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audible data by how effective the vignettes were in stimulating subjects as reported by the subjects. The rated data was then compared with the physiological data in the discussion section in Chapter V.

Hypotheses for Respiration Rate

- Hypothesis 1) There will be no significant difference between blacks and whites on respiration rate.
- Hypothesis 2) There will be no significant difference between vignettes on respiration rate.
- Hypothesis 3) There will be no significant difference between rest periods on respiration rate.
- Hypothesis 4) There will be no significant interaction between race of subjects and vignettes on respiration rate.
- Hypothesis 5) There will be no significant interaction between race of subjects and rest periods on respiration rate.

Results for Respiration Rate

Table 4.1 contains the results of the analyses of variance for respiration rate. Hypotheses number three and five were not rejected but hypotheses 1, 2, and 4 were rejected at the .05 level of confidence. The black and white groups did have significantly different respiration rates across treatments (groups main effect), the vignettes did have significantly different effects on subjects for RR (measures main effect), and the two groups did have significantly different respiration

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Table 4.1 Repeated measures analysis of variance summary table for respiration rate during vignette and rest periods.

SOURCE	df	MS	F
Vignette			
Groups (A)	1	243.776	4.60 *
Error	17	52.902	
Repeated Measures (B)	5	104.590	13.61 **
AB	5	35.050	4.56 **
Error	85	7.682	
Rest			
Groups (A)	1	102.685	2.58 *** n.s.
Error	18	39.754	
Repeated Measures (B)	6	5.894	.65 ****n.s.
AB	6	4.488	.50 ****n.s.
Error	108	8.982	

* With 1, 17 df need F 7 4.45 to reject ($\alpha.05$)

** With 5, 85 df need F 7 2.33 to reject ($\alpha.05$)

*** With 1, 18 df need F 7 4.41 to reject ($\alpha.05$)

**** With 6, 108 df need F 7 2.19 to reject ($\alpha.05$)

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rates across treatments (groups main effect), the vignettes did have significantly different effects on subjects for RR (measures main effect), and the two groups did have significantly different respiration rates for particular vignettes (groups by measures interaction). The interaction was further analyzed using the Scheffe post hoc method (Glass and Stanley, 1970). The Scheffe method was employed because the two groups had unequal number of subjects. Based on the post hoc analysis, vignettes one and two were identified as the vignettes where the two groups differed significantly.

Vignettes (RR)

The black and white groups had a higher respiration rate during vignettes two (a white female) and six (a black couple). The white group was lowest during vignette number five (a white male) and the black group was lowest during vignettes number four (a racially-mixed couple: white female and black male) and vignette number five (a white male). Overall, the black group appeared to have a higher respiration rate across all vignettes, however, the data analysis did not prove the group differences to be statistically significant. The group patterns, however, were very similar over the last three vignettes (see Figure 4.1).

Rest Periods (RR)

An examination of respiration rate during rest periods indicated that the black group appeared to have higher rates across all rest periods. They had their highest RR during the

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Figure 4.1

Respiration rates for subjects during
vignette periods

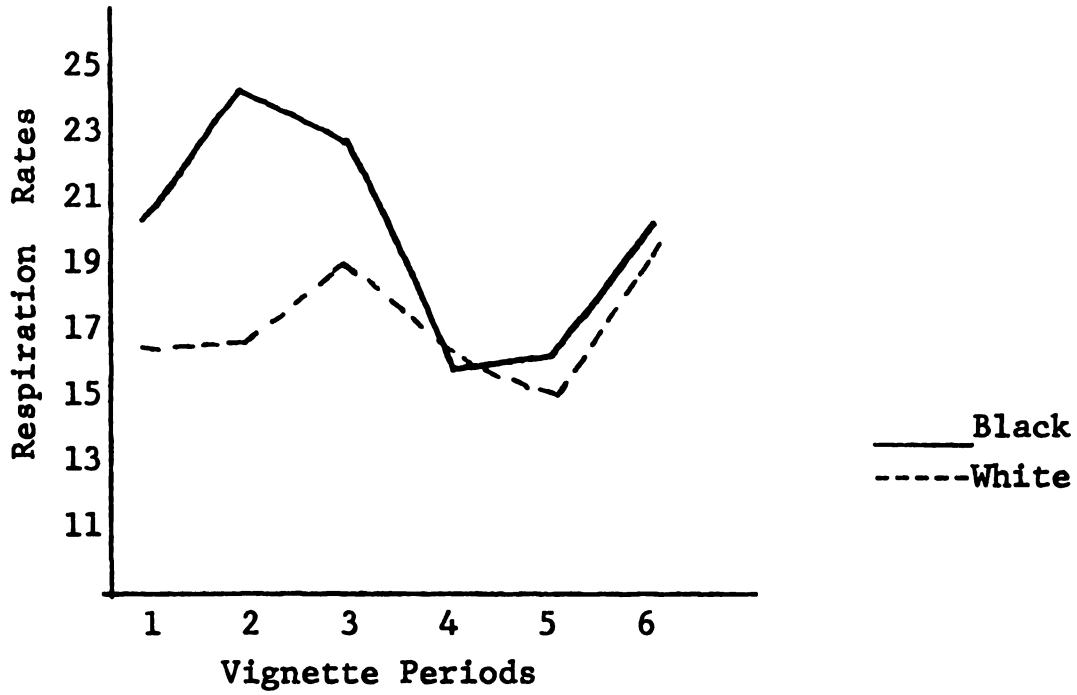
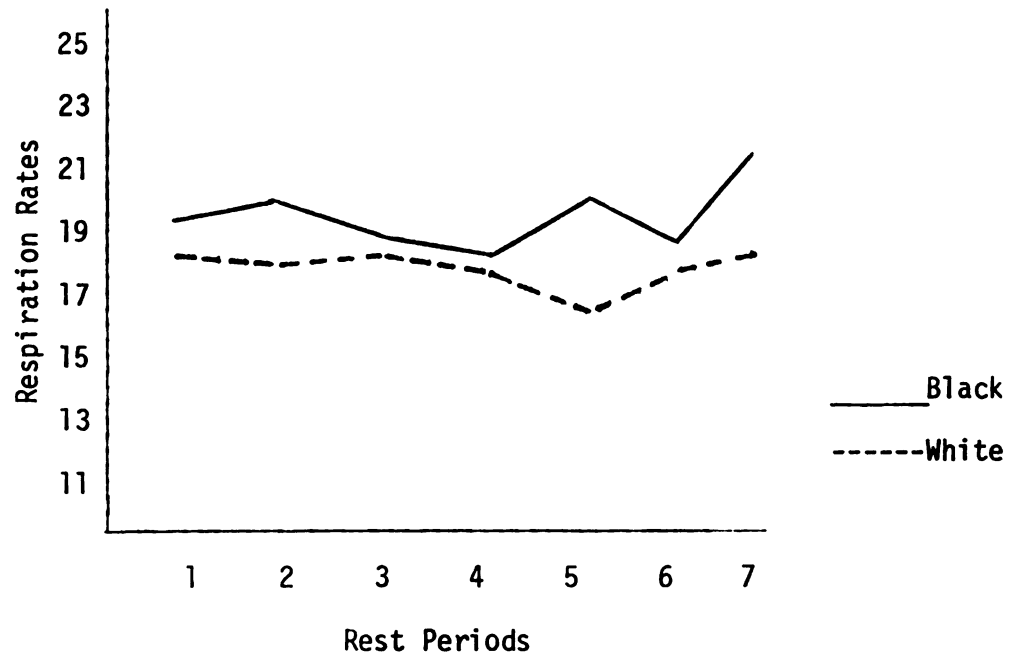


Figure 4.2

Respiration rates for subjects during
rest periods



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final rest period (R_7) but did not show a distinct low response period. On the other hand, the white group did not show a distinct high rest period for RR, but also did have a clear low point. Overall, the group patterns were very similar with the exceptions of R_5 and R_7 where the groups deviated in opposite directions (see Figure 4.2).

Vignettes in Relation to Rest Periods (RR)

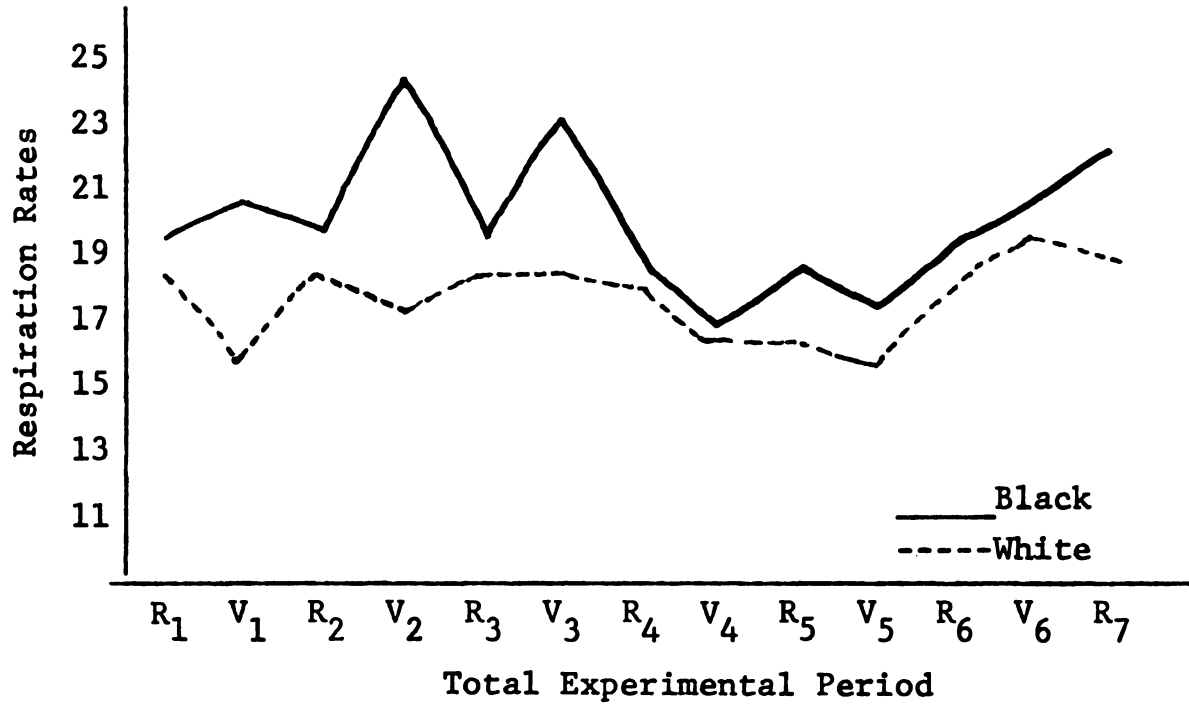
Respiration rate findings showed that the black group appeared to breathe more rapidly throughout the whole experiment. During the first third of the experiment, group patterns were dissimilar. During the last two-thirds, however, the black group levels decreased and approached the white group levels, making the group patterns very similar. This group similarity continued until the final rest period when the groups deviated in opposite directions, the black group increased and the white group decreased. It also was found that vignettes one, two, four and five for the white group were followed by what appeared to be a higher rest period, and this was the case on vignettes, four, five and six for the black group (see Figure 4.3).

Hypotheses for Respiration Depth

- Hypothesis 6) There will be no significant difference between blacks and whites on respiration depth.
- Hypothesis 7) There will be no significant difference between vignettes on respiration depth.

Figure 4.3

Respiration rates for subjects during
total experimental period



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Hypothesis 8) There will be no significant difference between rest periods on respiration depth.

Hypothesis 9) There will be no significant interaction between race of subjects and vignettes on respiration depth.

Hypothesis 10) There will be no significant interaction between race of subjects and rest periods on respiration depth.

Results for Respiration Depth

Hypotheses 6, 7, 8, 9, and 10 were not rejected and the analyses of variance results are presented in Table 4.2.

Vignettes (RD)

The black group was found to be lower (breathing more shallow) than the white group across all vignettes. However, the black group did not have any vignettes which were clearly higher or lower than any other vignette while the white group seemed to display shallower breathing (lowest RD) during V_4 (see Figure 4.4).

Rest Periods (RD)

For RD, the black group was lower (breathing more shallow) across all rest periods. Rest period number one proved to be of interest since the black group showed its deepest breathing during this period while the white group showed its deepest breathing during the third rest period and the black group did not have a rest period where the breathing

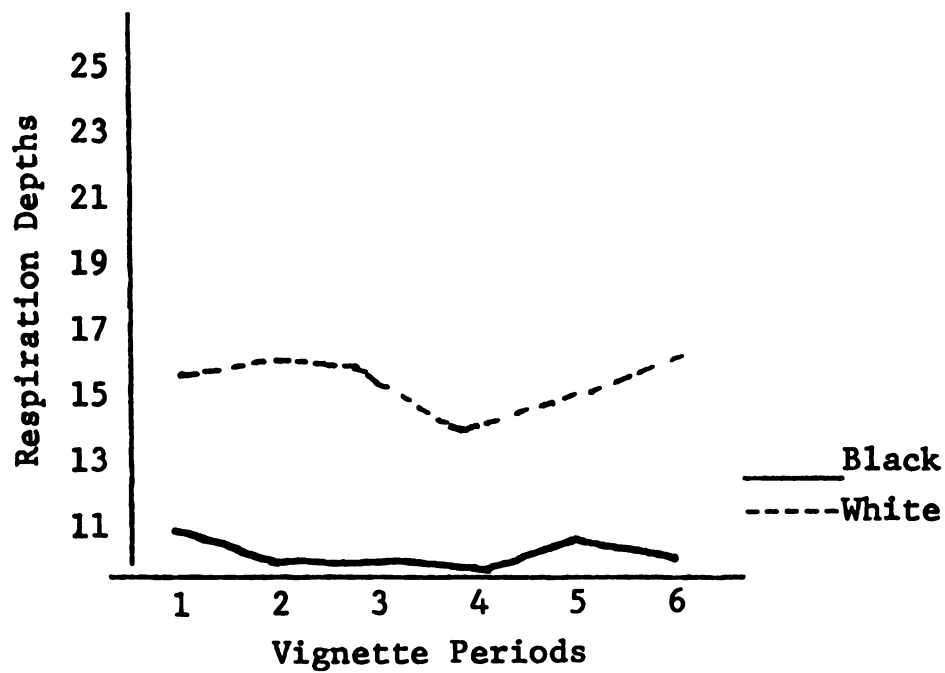
Table 4.2 Repeated measures analysis of variance summary table for respiration depth during vignette and rest periods.

SOURCE	df	MS	F
Vignette			
Groups (A)	1	692.640	2.89 *
Error	17	238.947	n.s.
Repeated Measures (B)	5	4.001	.28 **
AB	5	2.783	n.s.
Error	85	14.022	.19 **
Rest			
Groups (A)	1	1909.207	3.21 ***
Error	18	594.168	n.s.
Repeated Measures (B)	6	1.789	.22 ****
AB	6	7.141	n.s.
Error	108	7.970	.89 ****

- * With 1, 17 df need $F_{7, 4.45}$ to reject ($\alpha.05$)
 ** With 5, 85 df need $F_{7, 2.33}$ to reject ($\alpha.05$)
 *** With 1, 18 df need $F_{7, 4.41}$ to reject ($\alpha.05$)
 **** With 6, 108 df need $F_{7, 2.19}$ to reject ($\alpha.05$)

Figure 4.4

Respiration depths for subjects
during vignette periods



was clearly shallower than any other. Overall, the group patterns were more similar during the last four rest periods (see Figure 4.5).

Vignettes in Relation to Rest Periods (RD)

On the RD measures, the black group was found to be breathing shallower than the white group during the whole experiment. In addition, the group patterns were parallel throughout the experiment with all vignettes preceded and followed by a higher rest period. In other words, both groups displayed shallower breathing during the vignettes than during the rest periods (see Figure 4.6).

Hypotheses for Heart Rate

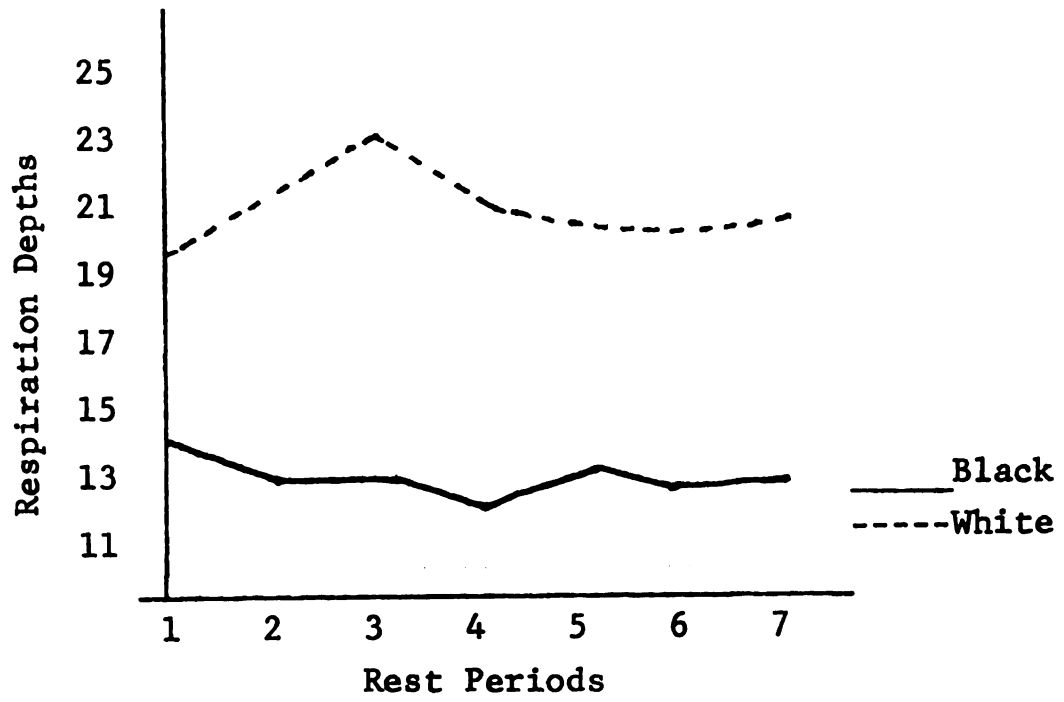
- Hypothesis 11) There will be no significant difference between blacks and whites on heart rate.
- Hypothesis 12) There will be no significant difference between vignettes on heart rate.
- Hypothesis 13) There will be no significant difference between rest periods on heart rate.
- Hypothesis 14) There will be no significant interaction between race of subjects and vignettes on heart rate.
- Hypothesis 15) There will be no significant interaction between race of subjects and rest periods on heart rate.

Results for Heart Rate

Hypotheses 11, 13, 14, and 15 were not rejected and

Figure 4.5

Respiration depths for subjects
during rest periods



hypothesis 12 was rejected at the .05 level of confidence (measures main effect). See Table 4.3 for a summary of the analysis of variance. Thus subjects in general were found to respond in a significantly different manner on HR to particular vignettes. A Tukey post hoc analysis was carried out to identify which vignettes led to different HR responses (Glass and Stanley, 1970). It was found that V_1 and V_4 were the only vignettes differing significantly at the .05 level of confidence.

Vignettes (HR)

The white group had a higher HR (more beats per minute) than the black group across all of the vignettes. The white group clearly was highest during V(5) while the black group was highest during V(1). It was found that both groups had their lowest HR during V(4) (see Figure 4.7).

Rest Periods (HR)

It was found that the white group seemed to have a higher heart rate across all rest periods. The highest heart rate for the white group was during the sixth rest period, while for the black group it was the first rest period. The black group did not have a clear-cut low period for the HR measure but the white group did have a low level during the fifth period. The group patterns were found to be quite dissimilar with the white group showing an apparently more labile heart rate (see Figure 4.8).

Table 4.3 Repeated measures analysis of variance summary table for heart rate during vignette and rest periods.

SOURCE	df	MS	F
Vignette			
Groups (A)	1	879.592	1.27 *
Error	17	692.626	n.s.
Repeated Measures (B)	5	28.683	2.44 **
AB	5	20.366	1.73 **
Error	85	11.715	n.s.
Rest			
Groups (A)	1	1752.950	2.23 *
Error	17	785.054	n.s.
Repeated Measures (B)	6	9.077	1.64 ***
AB	6	11.434	n.s.
Error	102	5.509	2.07

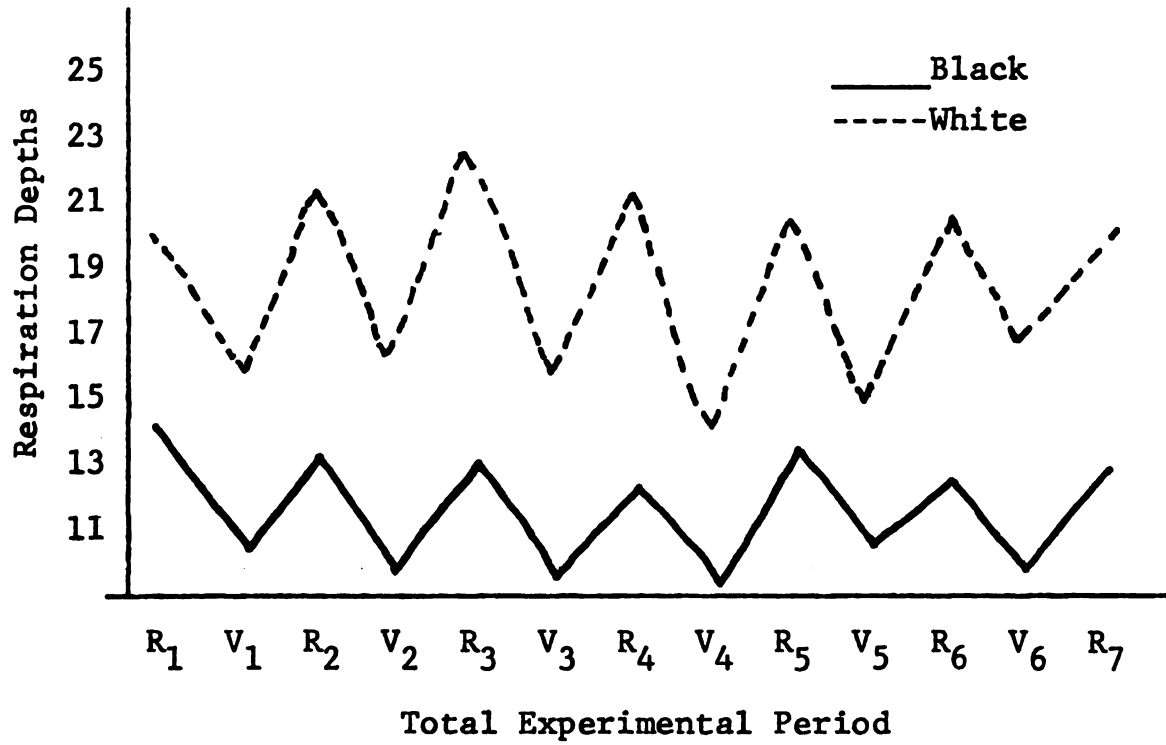
* With 1, 17 df need F 7 4.45 to reject (α .05)

** With 5, 85 df need F 7 2.33 to reject (α .05)

*** With 6, 102 df need F 7 2.19 to reject (α .05)

Figure 4.6

Respiration depths for subjects during
total experimental period



Vignettes in Relation to Rest Periods (HR)

The white group seemed to have a higher HR throughout the experiment and the patterns were quite different but more so over the last third of the experiment. Except for V(5), each of the vignettes for the white group was followed by a higher rest period. This also was the case for the black group with the exception of vignettes one and three (see Figure 4.9).

Hypotheses for Electrical Skin Conductance

- Hypothesis 16) There will be no significant difference between blacks and whites on electrical skin conductance.
- Hypothesis 17) There will be no significant difference between vignettes on electrical skin conductance.
- Hypothesis 18) There will be no significant difference between rest periods on electrical skin conductance.
- Hypothesis 19) There will be no significant interaction between race of subjects and vignettes on electrical skin conductance.
- Hypothesis 20) There will be no significant interaction between race of subjects and rest periods on electrical skin conductance.

Results for Electrical Skin Conductance

The data for electrical skin conductance (ESC) presented a unique problem for the experimenter because of the variance in length of vignettes. If one equated the ESC scores according

Figure 4. 7

Heart rates for subjects during
vignette periods

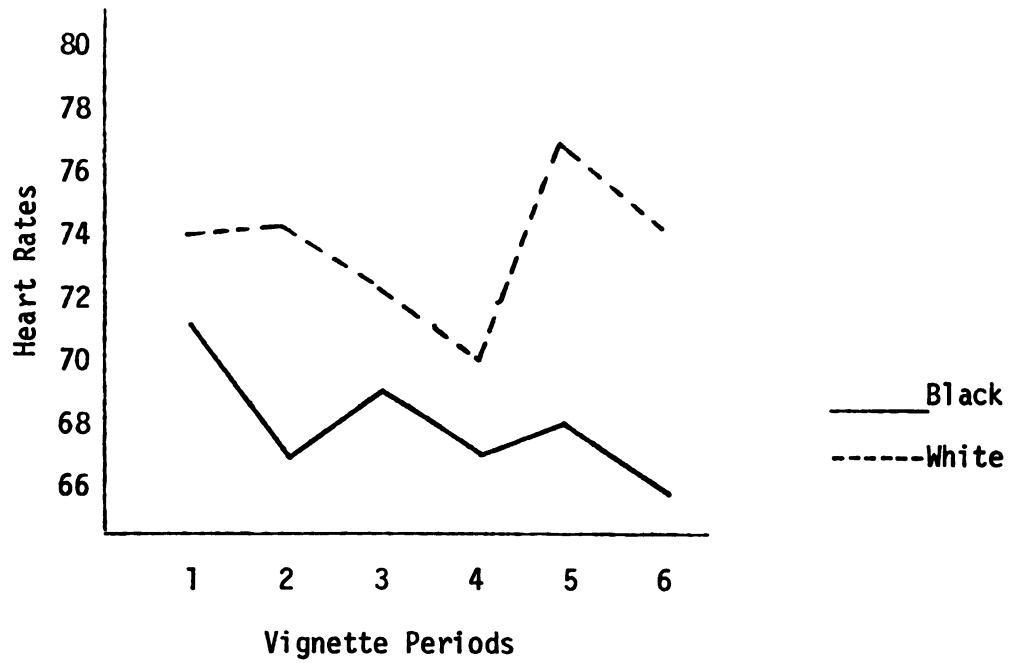
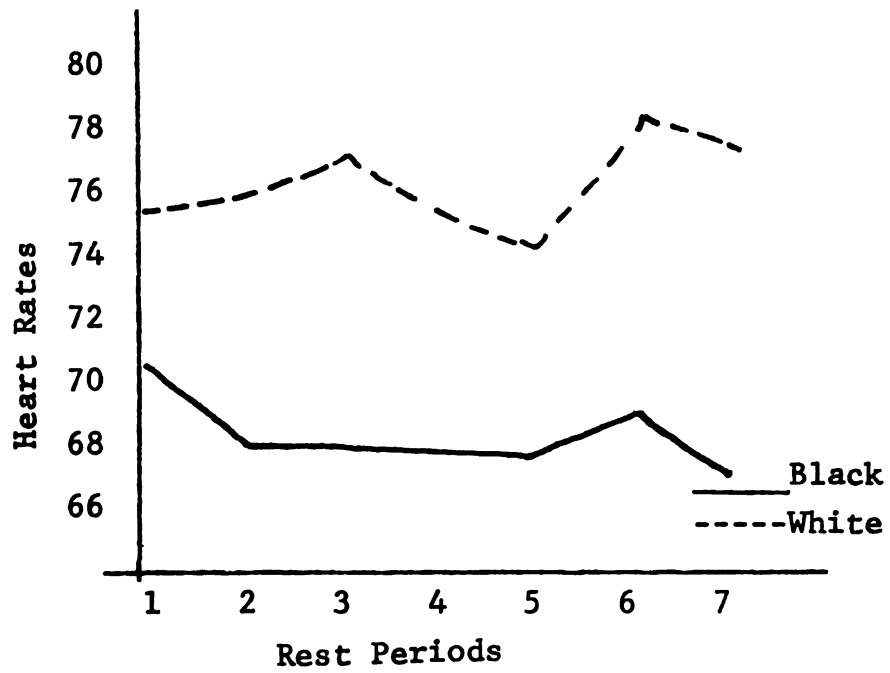


Figure 4.8

Heart rates for subjects during
rest periods



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Heart Rates 74

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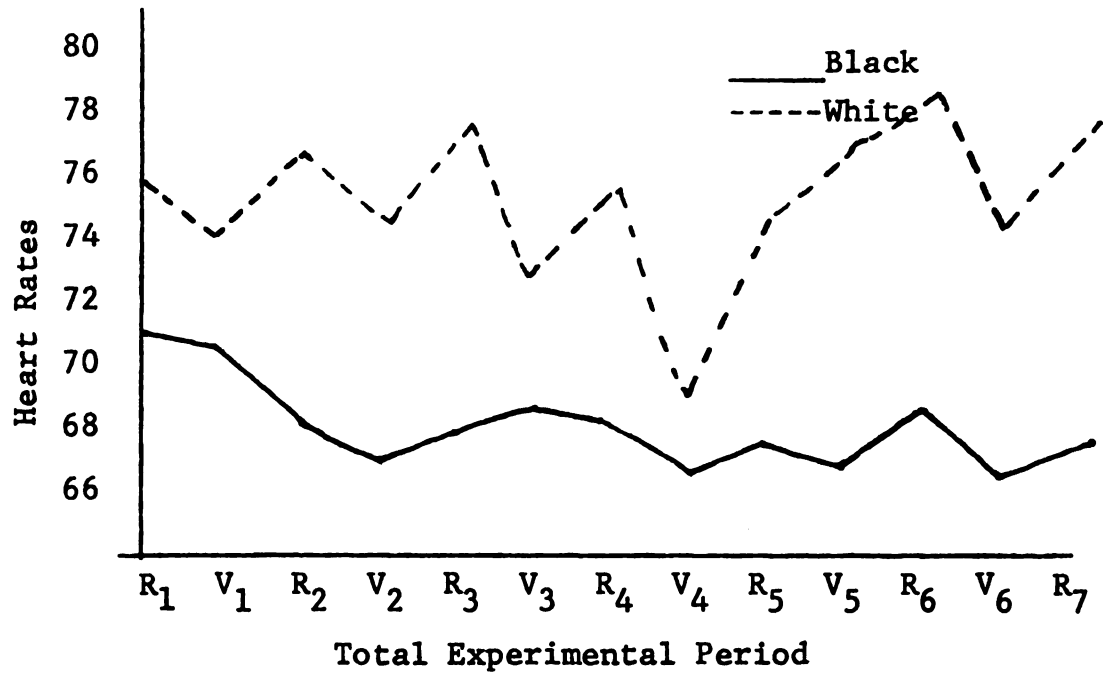
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66

Figure 4.9

Heart rates for subjects during total
experimental period



to length of the vignette the results were very different than if one did not control for length of vignette. The initial reaction was that vignette length was critical and must be controlled for or incorporated into the analysis. However, upon closer inspection of the data from subjects having the same ESC score across all vignettes, doubt was cast on the decision to control for vignette length. The problem was that once vignette length was controlled for, the subjects' scores no longer were equal. The question then arose that perhaps by treating the data in this manner non-existent differences between vignettes were being created. Consequently, it was decided to present both sets of data, with control for vignette length (ESC_1) and without (ESC_2).

Analysis of ESC_1 data led to non-rejection of hypotheses 16, 18, 19, and 20. However, hypothesis 17 was rejected at the .05 level of confidence (measures main effect). Table 4.4 contains the results for the analysis of variance. Rejection of hypothesis 17 meant that subjects, regardless of race, responded in a significantly different manner on the ESC_1 measure to particular vignettes. The Tukey post hoc analysis was also applied to this main effect. The findings showed V_2 (white female) to differ significantly from V_5 (white and V_6 (black couple).

Analysis of the ESC_2 data failed to reject hypotheses 16, 17, 18, 19, and 20. Summary of the analyses of variance are also found in Table 4.4.

Table 4.4 Repeated measures analysis of variance summary table for electrical skin conductance (ESC₁ and ESC₂) during vignette and rest periods.

SOURCE	df	MS	F	
Vignette (ESC ₁)				
Groups (A)	1	26539.976	.49 *	n.s.
Error	18	53180.970		
Repeated Measures (B)	5	7955.399	3.57 **	.05
AB	5	706.164	.31 **	n.s.
Error	90	2226.503		
Vignette (ESC ₂)				
Groups (A)	1	4965.246	.52 *	n.s.
Error	18	9418.817		
Repeated Measures (B)	5	367.101	1.35 **	n.s.
AB	5	118.393	.43 **	n.s.
Error	90	270.961		
Rest				
Groups (A)	1	5921.501	.42 *	n.s.
Error	18	13895.651		
Repeated Measures (B)	6	324.005	.96 ***	n.s.
AB	6	393.277	1.17	
Error	108	335.271		

* With 1, 18 df need F 7 4.41 to reject (α .05)

** With 5, 90 df need F 7 2.32 to reject (α .05)

*** With 6, 108 df need F 7 2.19 to reject (α .05)

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Vignettes (ESC_1)

The white group displayed a higher ESC across all vignettes although the group patterns were almost parallel. Interestingly, both groups were found to have their highest ESC during V(2) and lowest ESC during V(5) (see Figure 4.10).

Vignettes (ESC_2)

As with ESC_1 the white group was more responsive across all vignettes and the group patterns were very similar. However, in this second analysis of the ESC data, the two groups were now found to be most responsive on the third vignette. In addition, in this second analysis the white group did not have a clear low vignette and the black group was least responsive during V_1 (see Figure 4.11).

Rest Periods (ESC_1 and ESC_2)

The results for the ESC measure again found the white group appearing higher (more responsive) across all rest periods. Rest period number one proved to be the low point for both groups, while periods three and seven were the high points for the white and black groups, respectively. The groups were similar during the first half of the experiment, then deviated from each during the second half, only to end up at about the same level on the last rest period (see Figure 4.12).

Vignettes in Relation to Rest Periods (ESC_1 and ESC_2)

Looking at the ESC measure, the white group was found to be higher throughout the experiment for both ESC_1 and ESC_2

Figure 4.10

Electrical skin conductance (ESC_1) for subjects
during vignette periods

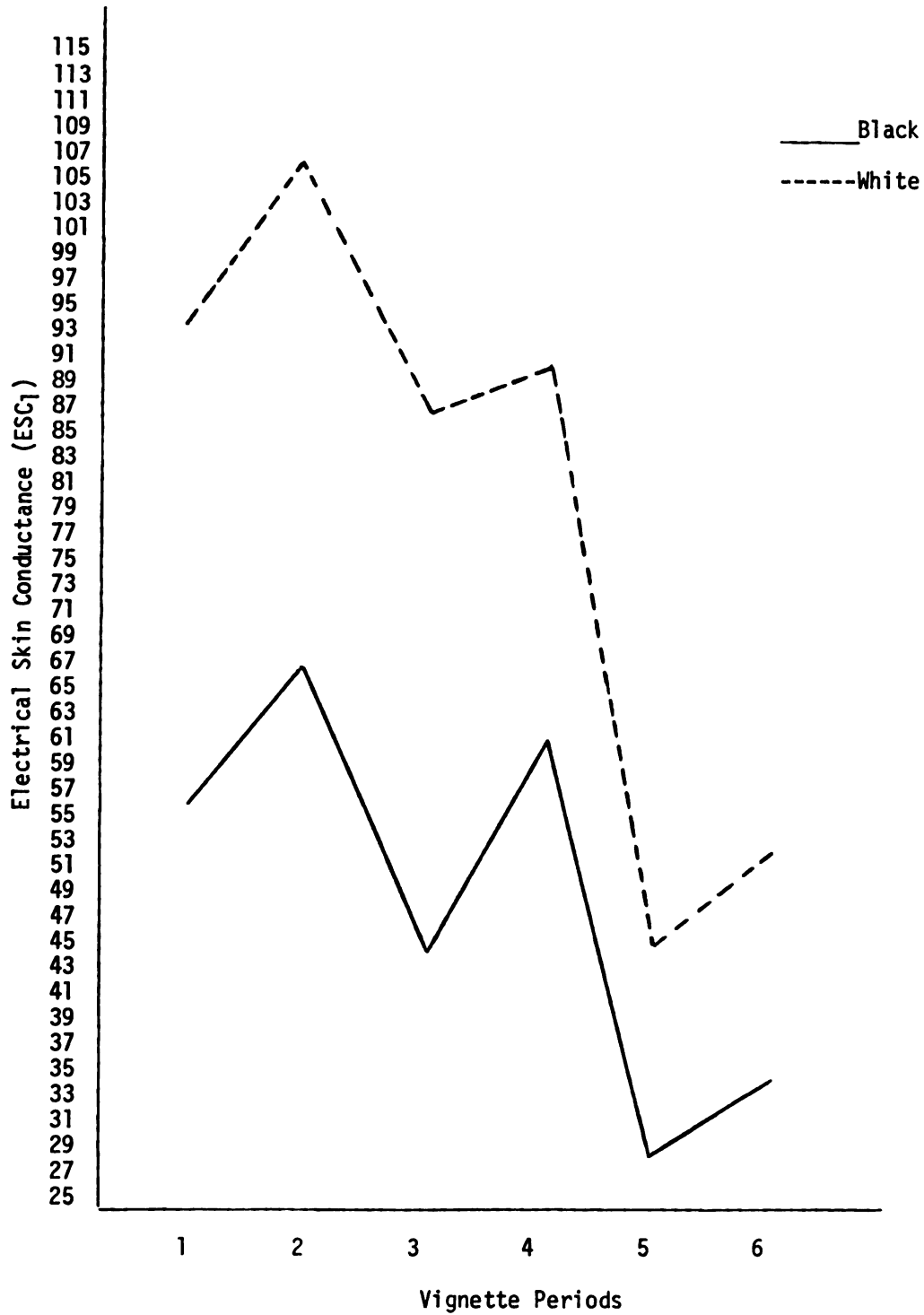


Figure 4.11

Electrical skin conductance (ESC₂) for subjects
during vignette periods

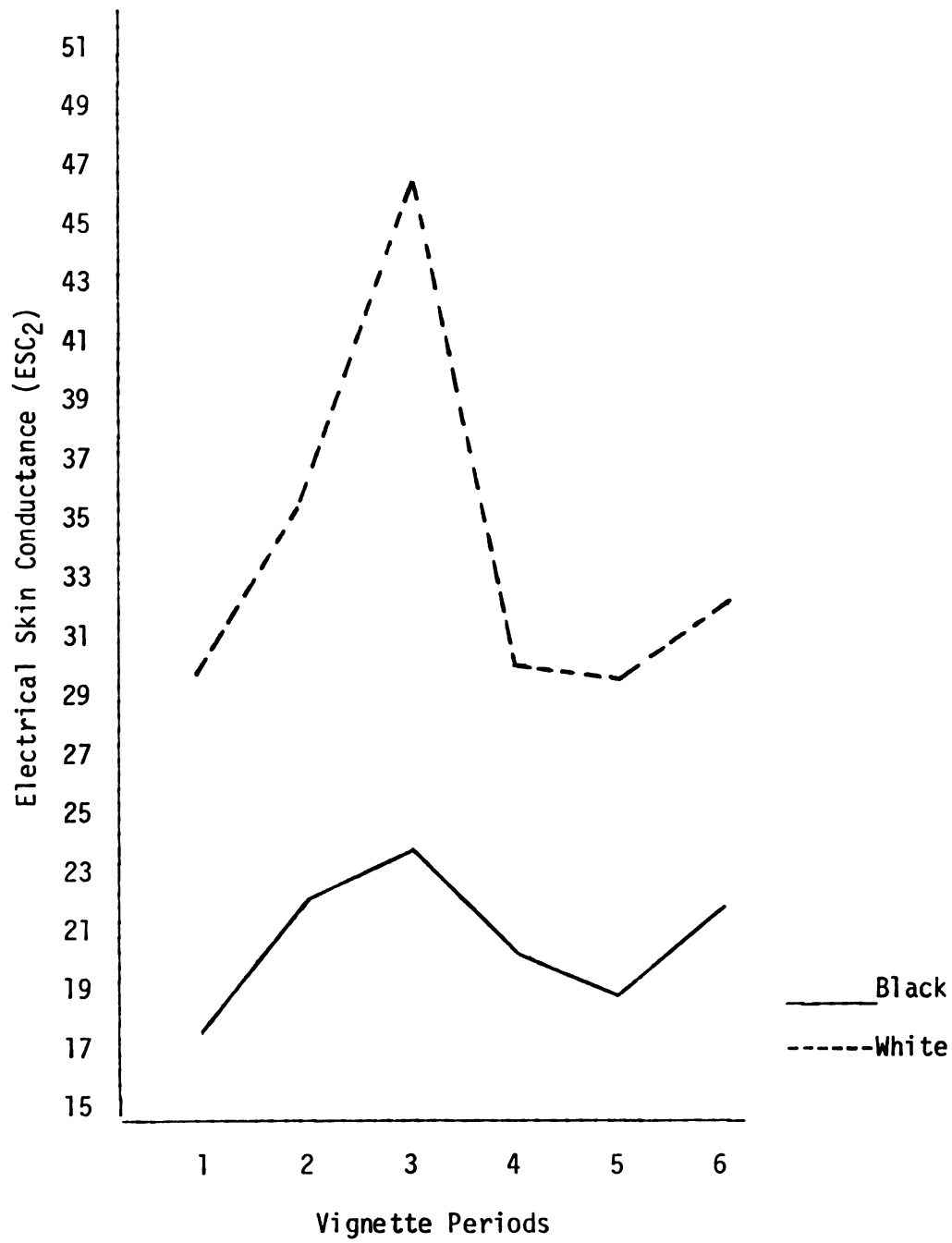
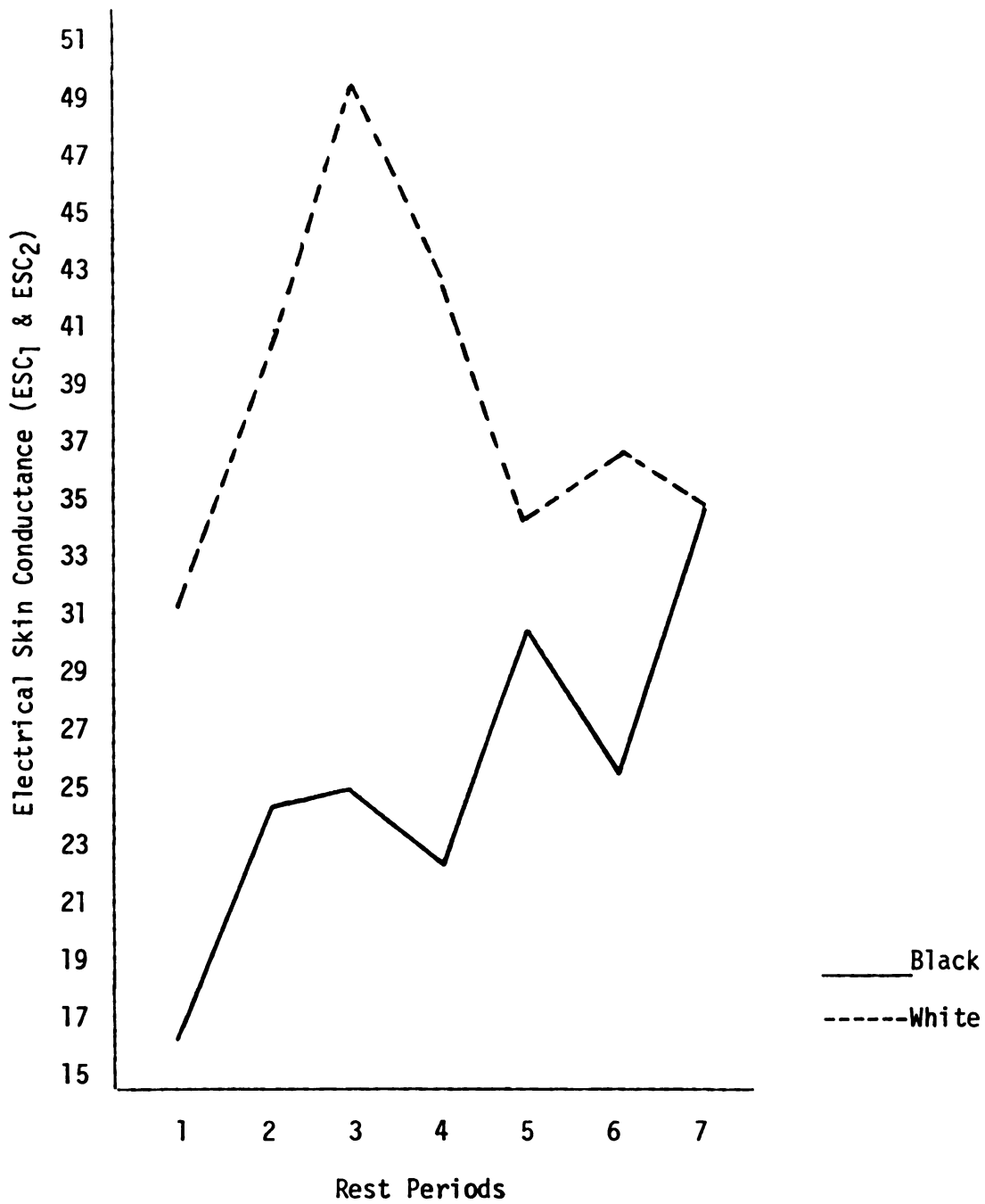


Figure 4.12

Electrical Skin Conductance (ESC_1 & ESC_2) for subjects during rest periods



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(control for vignette length and no control). The group patterns for ESC₁ were parallel almost throughout the whole experiment. Also, with the exception of V₅, all of the vignettes for the black group were followed by a higher rest period. For the white group, all of the vignettes were followed by a higher rest period (see Figure 4.13).

Turning to ESC₂, the group patterns were found to be dissimilar over the first two-thirds of the experiment and similar over the last third. Both groups had a higher rest period after each vignette with the exception of V₃ (see Figure 4.14).

Figure 4. 13

Electrical skin conductance (ESC₁) for subjects
during total experimental period

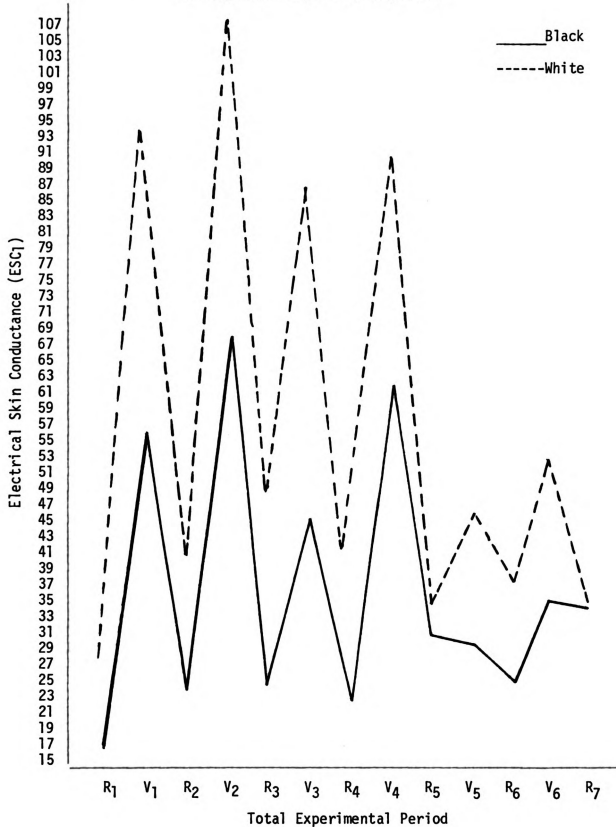


Figure 4.14

Electrical skin conductance (ESC₂) for subjects during total experimental period

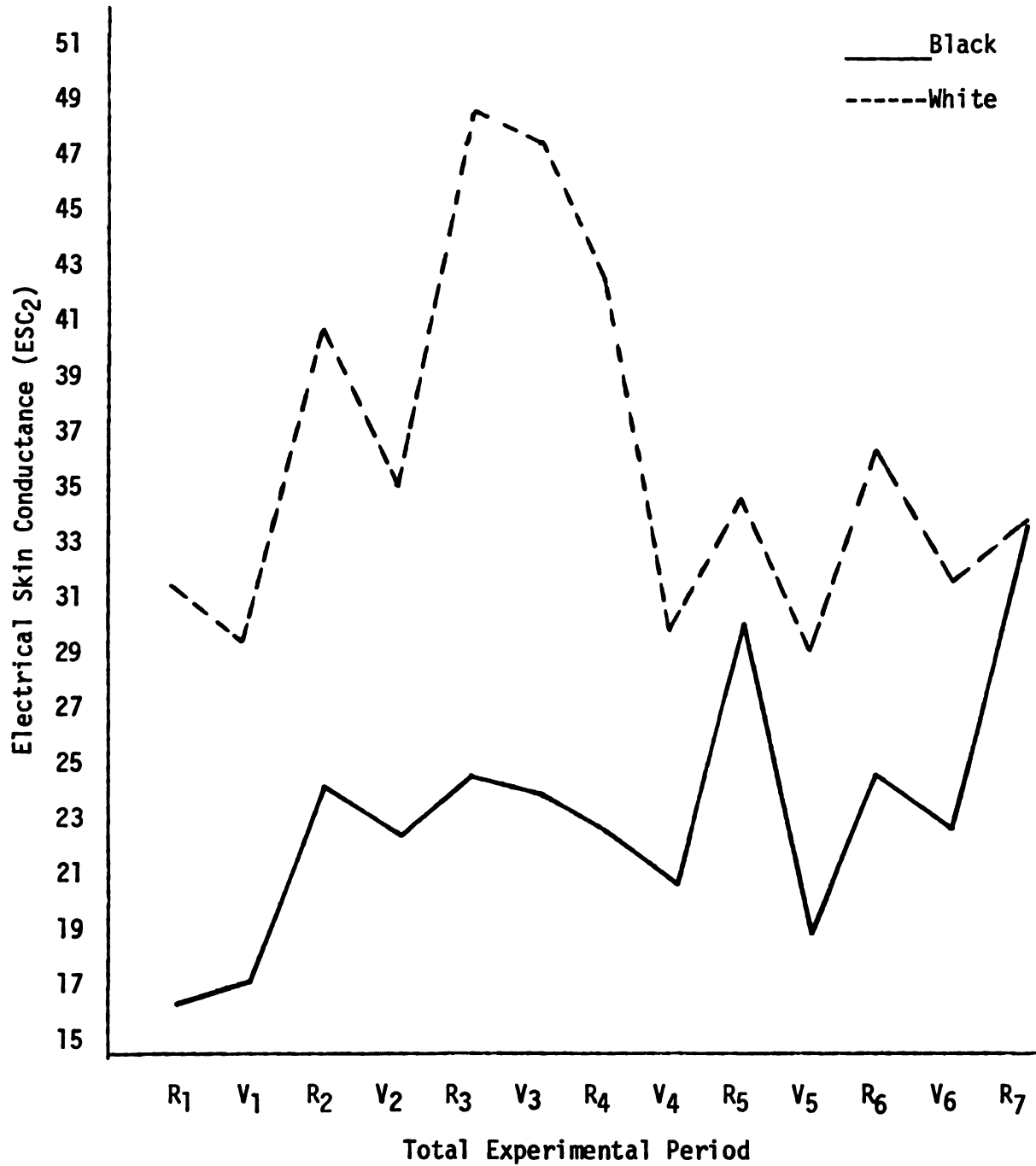


Table 4.5. Summary of statistically significant findings.

V I G N E T T E S		
Dependent Variables	Repeated Measures Analyses	Post hoc Analyses
<u>Respiration Rate (RR)</u>		
Groups (A)	.05	
Repeated Measures (B)	.05	
AB Interaction	.05	V(1) significantly different from V(2) (.05)
<u>Respiration Depth (RD)</u>		
Groups (A)	N.S.	
Repeated Measures (B)	N.S.	
AB Interaction	N.S.	
<u>Heart Rate (HR)</u>		
Groups (A)	N.S.	
Repeated Measures (B)	.05	
AB Interaction	N.S.	V(1) significantly different from V(4) (.05)
<u>Electrical Skin Conductance (ESC₁)</u>		
Groups (A)	N.S.	
Repeated Measures (B)	.05	
AB Interaction	N.S.	V(2) significantly different from V(5) & V(6) (.05)
<u>Electrical Skin Conductance (ESC₂)</u>		
Groups (A)	N.S.	
Repeated Measures (B)	N.S.	
AB Interaction	N.S.	

*None of the Rest Period analyses were statistically significant.

CHAPTER V

SUMMARY AND CONCLUSIONS

Summary

The purposes of this study were manifold. First, very little is known about the psychophysiological reactions of people from one race to people of another race. Whereas racial research has increased rapidly in recent years, this has not been the case in the psychophysiological area. In addition, the existent studies have often provided inconclusive results and used a limited number of physiological measures. The use of interracial comparisons across psychophysiological measures could contribute to more definitive answers about racial attitudes, psychophysiological response patterns, and the interpersonal processes in black-white interactions. Understanding the interpersonal processes between blacks and whites has been of particular interest to counselors and psychologists concerned with racially mixed therapeutic sessions. The question most often addressed is: are intraracial therapy sessions more effective than interracial sessions? Perhaps some light can eventually be shed on this question by studying black-white interactions using a psychophysiological methodology.

A second purpose of this study was to expand and evaluate the use of the Interpersonal Process Recall Model (Kagan, 1975) in the psychophysiological area. The IPR model provides subjects with a unique opportunity to study the thoughts, feelings, and images they had while viewing films. Subjects can engage in the self-study during a recall session and the subjects' verbal responses can be compared to their physiological responses which were recorded during the film session. To this point the psychophysiological results obtained through the IPR model have been inconclusive. Hopefully the present study will clarify the use of the IPR model in psychophysiological studies.

The final purpose of the current study was concerned with the psychophysiological responses of blacks and whites to stress. The present study exposed subjects to a number of interpersonal stress situations using a motion picture film, a technique which Lazarus and his associates (1964, 1963, 1965) have used extensively. Whereas other studies have measured the stress reactions of subjects while in the role of an observer, the present study measured the psychophysiological responses of subjects while actors in the film engaged them in direct interpersonal confrontations.

This methodology allowed one to look at one of the major questions in stress research, which is, why do subjects react differently to different stressors? (Lacey, 1958; Lazarus, et al., 1964; Lazarus and Affert, 1964). By having subjects undergo various types of direct interpersonal

confrontations followed by a recall session, one may be able to determine why they react differently to different stress confrontations.

Twenty subjects were chosen from among male, undergraduate students at Michigan State University. There were ten black males and ten white males with a mean age of 20.8. A balanced repeated measures design was used and each subject (S) was exposed to six experimental periods. Each experimental period consisted of a vignette (V) and was followed by a rest period (R). The emotion portrayed in the six vignettes was labeled aggression and portrayed by black and white, male and female actors. The typescripts and descriptions of the vignettes appear in Appendix B. Heart rate, respiration rate, respiration depth, and electrical skin conductance were measured during both the vignette and rest periods for each subject. A recall session followed the viewing of the vignettes. Each subject was instructed to recall his underlying thoughts, feelings, images, and general pattern of interaction during the experimental periods. This recall was conducted while the subject listened to the audio portion of the vignettes. Twenty null hypotheses were tested for each of the six vignette periods and seven rest periods, using repeated measures analyses of variance with alpha level set at .05.

Results for the respiration rate measure led to rejection of hypotheses 1,2, and 4 at the .05 level of confidence while hypotheses 3 and 5 were not rejected. Rejection of hypotheses 1, 2, and 4 indicated that black and white groups

did have significantly different respiration rates across treatments (group main effect), the vignettes did have significantly different effects on subjects (measures main effect), and the two groups did have significantly different respiration rates for particular vignettes (groups by measures interaction). The interaction was further analyzed using the Scheffe post hoc method and vignettes 1 and 2 were identified as the vignettes where the two groups differed significantly, the black group having a higher respiration rate on both vignettes.

None of the hypotheses for the respiration depth measure were rejected.

Hypotheses 11, 13, 14 and 15 for the heart rate measure were not rejected. However, hypothesis 12 was rejected at the .05 level of confidence (measures main effect). Thus subjects, regardless of race, responded in a significantly different manner on the heart rate measure to particular vignettes. Based on a Tukey post hoc analysis, it was found that subjects differed on vignettes 1 and 4 with a higher heart rate on V_1 .

The data for the electrical skin conductance measure was treated in two different ways and analyzed separately. The ESC_1 treatment controlled for the differences in length of vignettes and ESC_2 did not control for the differences. Analysis of the ESC_1 data led to the rejection of hypothesis 17 at the .05 level of confidence (measures main effect) but not

for hypotheses 16, 18, 19, and 20. Rejection of hypothesis 17 indicated that subjects, regardless of race, responded in a significantly different manner on the ESC_1 measure to particular vignettes. A Tukey post hoc analysis was also applied to this main effect and vignette 2 was found to be significantly higher than vignettes 5 and 6. Analysis of the ESC_2 data failed to reject any of the hypotheses (16, 17, 18, 19, and 20) indicating that when the differences in vignette length was not controlled there were no significant differences.

All of the data for the rest periods across all four dependent measures was found to be statistically non-significant. Also, a large percentage of the psychological data collected during the recall sessions was not audible and thus excluded from the results chapter.

Conclusions

The statistically significant findings in three of the four dependent measures (respiration rate, heart rate, and electrical skin conductance) provided support for the use of the Interpersonal Process Recall Model in the psychophysiological area. The psychological data that was audible also showed the potential of the IPR model in identifying why subjects displayed different physiological patterns to different stressors. Subjects were able, in the audible cases, to recall that they felt differently about some vignettes than others and subsequently responded with different physiological patterns. However, the loss of much of the psychological data

interfered with the attempts to understand the interpersonal interactions between subjects and actors of different races.

The results of the study also pointed out the potential use of the IPR model in conjunction with psychophysiological techniques in the area of training. Providing trainees with their own physiological responses along with their psychological responses offers them additional data with which to better understand their underlying feelings of thoughts. This is particularly helpful in the health professions.

Finally the study did not offer many opportunities for comparisons of the psychophysiological response patterns of blacks with those of whites under stress conditions because only on the respiration rate measure did the two groups (black-white) differ from each other. However, one must conclude that there do seem to be differences between the groups and further comparative research is needed.

Discussion

A discussion of the findings with possible interpretations are presented. The findings and their possible meanings for each of the four dependent variables (respiration rate, respiration depth, heart rate, electrical skin conductance) are first discussed as they relate to previous findings. Secondly, the findings are discussed as they relate to the psychological data collected during the recall sessions. This is an initial attempt to compare subjects' physiological responses with their reported psychological reactions. Finally,

selected excerpts from the recall sessions are found in Appendix C.

Respiration Rate (RR)

For RR the value of F (4.56) with 5 and 85 degrees of freedom for the groups by measures interaction was found to be significant at the .05 level. This meant that whites and blacks responded differently on RR to the vignettes. As stated earlier (Chapter II), few studies have compared whites and blacks on this measure and those that have did not find statistically significant results. On the surface these results would seem to contradict the findings of Johnson and Corah (1963) and Johnson and Landon (1965). However, one must remember that the findings from their studies were obtained during periods of rest. Apparently blacks and whites do not differ on RR during periods of rest but when stimuli are provided the groups' breathing is affected differently. This point is further substantiated by the analyses of the rest periods for this study where the groups were not found to differ significantly a la the Johnson, et al studies.

A Scheffe post hoc analysis was carried out to identify the specific vignettes on which the two groups differed significantly. Vignettes one (black, late-twenties, male) and two (white, mid-twenties, female) were so identified with the black group having a higher RR in both cases. What actually occurred was that the two groups were breathing at approximately the same rate during the rest periods directly

preceding V_1 and V_2 but when the vignettes started the black group displayed a sharp increase in RR and the white group a sharp decrease in RR.

Respiration Depth (RD)

There were no significant differences found for respiration depth data, however, when viewed along side the RR data, they offer some assistance in the interpretation of the significant differences found for RR on V_1 and V_2 .

The black group was found to breathe shallower (lower RD) and faster (higher RR) throughout the entire experiment. The occurrence of fast, shallow breathing has often been considered as a possible indication of increased anxiety. If we can assume this to be a possible explanation, then the black group can be viewed as being more anxious during the experiment and particularly during V_1 and V_2 . One possible interpretation is that blacks are less accustomed to being in an experimental setting than the whites. Consequently, the blacks were more anxious than the whites throughout the entire experiment and significantly more so during the first two vignettes. As time elapsed, the blacks became more acclimated to the environment, with their arousal levels approaching the arousal levels of the whites. Subsequently, they did not respond in a significantly different manner than the whites after the second vignette. This being the case, it was not so much the content of the vignettes which caused the significant differences, but the environment as a whole. Also, one cannot de-emphasize

the effects of the experimenter. It may be that initially blacks were more suspicious of the experimenter than the whites and thus displayed higher RR at the outset of the experiment.

A second possible explanation for the significantly different responses to V_1 and V_2 relates to the positive relationship between stimulus novelty and GSR reactivity found by Fisher and Kotses (1973), Grings, Carlin and Appley (1962), and Grings (1960). If stimulus novelty was a factor and its effects can be generalized to RR measures then one must look at the contents of vignettes one and two. It would then appear that verbal attacks by a black male, and a white female are where blacks and whites differ the most in degree of novelty. It should be emphasized that these two vignettes were not the most novel (highest RR) for either group but brought out the greatest difference between the groups in degree of novelty. Therefore, it would seem that blacks are less accustomed to being attacked verbally by a black male and a white female. In the former it may be because it is a peer from whom they do not ordinarily receive unprovoked attacks. Added weight is given to this interpretation by the much lower RR (less novel) displayed by blacks to the white male "attacker." In the case of the white female attacker, it may be the blacks have significantly less contact with white females and are therefore not exposed to verbal attack from a white female. The result being a much more novel situation for the black group over the white group. Finally, it may well be

that blacks and whites just react differently to rejection and/or stress.

Heart Rate (HR)

The heart rate data did not prove to be significantly different between groups. However, the overall patterns are worth looking at. Throughout the entire experiment the white group had a higher HR which has been said to indicate greater anxiety (Martin, 1961; Lazarus, Speisman, and Mordkoff, 1963; and others). This would seem to contradict the RR and RD data which, viewed in conjunction appeared to indicate the black group to be more anxious throughout the experiment. The easiest way out of this apparent contradiction is to discard the HR data as not being statistically significant even though the group patterns move in a contradictory direction. However, the notion of directional fractionation offered by Lacey (1963) and replicated by Simpson (1969) provides another possible explanation. Lacey has shown that attentive observation of the external environment leads to a decrease in HR and a simultaneous increase in skin conductance. If in fact decreased HR is one of the indicators of attentiveness, one can offer the possible interpretation of blacks being more attentive and more anxious as the RR and RD data seem to indicate. This interpretation becomes even more plausible when one takes note of the fact that in almost every case both groups had a lower HR during the vignette periods than during the rest periods.

The HR data did show a statistically significant measures main effect (.05 level), meaning that certain vignettes affected subjects (regardless of race) in a significantly different manner. The Tukey post hoc analysis led to identification of V_1 and V_4 as the vignettes causing a significantly different effect on subjects. Subjects displayed a higher HR for V_1 than V_4 and if Lacey's directional fractionation (also referred to as stimulus response stereotype) view is applied it appears subjects were more attentive to V_4 than V_1 . As stated earlier, V_1 was the black male while V_4 was the mixed couple (white, female--black male). This can possibly be interpreted in terms of the aforementioned stimulus novelty theory if generalized to HR measures. It would seem safe to say that a mixed couple would be more novel to subjects than a black male. Another possibility is that in V_4 the actors were silent until the very end and subjects may have found it difficult to decipher what was actually happening, necessitating closer scrutinization.

Electrical Skin Conductance (ESC)

Two separate analyses were carried out for the ESC measure. As stated in Chapter IV, one analysis controlled for vignette length (ESC_1) and the other analysis (ESC_2) did not. An interesting finding from the ESC_1 data was that in every case for the white group and all but one case for the black group there was an increase in reactivity during the vignette periods. Viewing this finding in light of the heart rate data where both groups almost invariably had a decreased

HR during the vignette periods there is good support for Lacey's directional fractionation. In other words, it appears that both groups were more attentive during the vignette periods as defined by decreased HR and increased ESC. In contrast, the ESC₂ data showed the groups to actually decrease in reactivity during the vignette periods. This inconsistency in the results strongly points out the importance of the data quantification methods employed. In reviewing the psychophysiological literature, it became very obvious that researchers use many different methods to quantify data and/or they were not specific as to the methods used. Clearly this has been a factor in the great inconsistency found between psychophysiological studies.

There was a statistically significant measures main effect for the ESC₁ data. Following a Tukey post hoc analysis it was determined that V₂ differed significantly from V₅ and V₆ with subjects being much more reactive to V₂ than either V₅ or V₆. The first possible interpretation is the one offered earlier on stimulus novelty. It may be that a verbal attack from a white female may be more novel to people than verbal attacks from a white male (V₅) or laughing from a black couple (V₆). However, what seems like a more plausible interpretation is that subjects had already been exposed to verbal attack from a male (V₁) and laughter from a couple. This second interpretation incorporates aspects of the stimulus novelty hypothesis, in that V₂ was the only vignette with a single female attacker plus the added phenomena of habituation

or adaptation. The probability of these phenomena existing increases if one notes that V_2 was in the early part of the experiment while V_5 and V_6 were in the late stages of the experiment. In addition, subjects were clearly less reactive on the ESC_1 measure over the last third of the experiment.

Discussion of Physiological Responses in
Relation to Psychological Reactions

The comparisons between physical and psychological responses are limited to those data found to be statistically significant and more specifically, to those vignettes found to differ significantly from each other based on the post hoc analyses. The psychological and physiological findings for each vignette are presented prior to their discussion. In addition, selected excerpts from the recall sessions are presented in Appendix C.

Vignette No. One (Respiration Rate)

Physiological findings: Blacks significantly higher than whites (.05).

Psychological findings: Percentage Affected*

		% Yes	% No
Subjects:	Black	50	50
	White	50	50

The two sets of data appear to be in accord on this vignette. Physiologically, blacks were found to have a higher

*Refers to the percentage of subjects who indicated they had been affected, or stimulated in some manner by the vignette. This was subjectively determined by the experimenter.

respiration rate than whites and more blacks indicated that they were affected by vignette number one. However, it seems that a greater number of blacks would have indicated they were threatened or affected than actually did. It may be that some blacks were not willing to admit feeling threatened by the attack of another black male.

Vignette No. Two (Respiration Rate)

Physiological findings: Blacks significantly higher than whites (.05).

Psychological findings:

		Percentage Affected	
		% Yes	% No
Subjects:	Black	30	70
	White	37	63

The physiological and psychological data for V_2 are very much in disagreement. Physiologically blacks had a higher respiration rate than whites yet only three black subjects reported having been affected by the vignette. It may well be that some of the black subjects were denying having been affected by the vignette. Looking at the content of the vignette, it would seem that some of the subjects did not want to admit to having been affected by 1) a female, 2) a white person, or 3) a white female.

Vignette Nos. One & Four (Heart Rate)

Physiological findings: Subjects, regardless of race, were significantly higher on V_1 than on V_4 (.05).

Psychological findings:		Percentage Affected	
		% Yes	% No
Subjects:	V_1	50	50
	V_4	56	44

The physiological and psychological data for heart rate do not appear to be in agreement. Based on the physiological findings, one would have expected more subjects reporting having been affected by V_1 than reporting having been affected by V_4 . There are at least two possible explanations:

- 1) As indicated previously, some of the black subjects may have been hesitant to report having been affected or threatened by the black male in V_1 . This would lead to fewer subjects reporting having been affected by V_1 than V_4 .
- 2) A second and perhaps more plausible explanation would be the phenomenon of adaptation. It may well be that by the time subjects viewed V_4 , they had become adapted to the experimental situation and the vignettes. Consequently, they were not as reactive physiologically but were still affected by V_4 as they indicated.

Vignette Nos. Two, Five & Six (Electrical Skin Conductance)

Physiological findings: Subjects, regardless of race, were significantly higher on V_2 than on V_5 or V_6 (.05).

Psychological findings: Percentage Affected

		% Yes	% No
Subjects:	V_2	33	67
	V_5	72	28
	V_6	17	83

The findings for V_2 and V_6 were very much in agreement. Physiologically, the subjects were less responsive on V_6 than V_2 and a fewer number of subjects reported having been affected by V_6 than V_2 .

The findings for V_2 and V_5 were not in agreement. Whereas subjects were more responsive (physiologically) on V_2 , a greater number of subjects indicated they were affected by V_5 . It may well be that male subjects were more willing to admit they were threatened or affected by a male aggressor (V_5) than by a female aggressor (V_2). There is also the possibility that adaptation also occurred in this case. Thus, subjects were affected physiologically on V_5 but because of adaptation, the magnitude of the physiological responses was reduced.

A more in-depth analysis of the psychological data in relation to the physiological data was also carried out. The findings are summarized in Table 5.1. An analysis of variance was used to compare the subjects who indicated they were

affected by the vignettes with the subjects who indicated they were not affected by the vignettes. These comparisons were made for each vignette across the four dependent variables.

As indicated in Table 5.1, one can see only three statistically significant findings. The first was in V_3 on the heart rate measure where the non-affected group displayed a higher rate. One possible reason is that the affected group was paying more attention and thus had a lower HR as explained by Lacey's theory.

The second significant finding was in V_5 also on the heart rate measure. However, in this case the affected group displayed the higher rate. This finding is difficult to explain but it does point out the apparent inconsistencies between the psychological and physiological data. It is felt that much of this inconsistency is due to the subjective rating of the recall data.

The final significant finding was in V_6 on the electrical skin conductance measure where the non-affected group displayed a higher ESC. Again this finding is difficult to explain since one would expect the affected group to have a higher ESC. It is hoped that inconsistencies such as this can be explained through further research especially by studies utilizing larger samples and improved rating of the recall data.

Table 5.1. Summary of Analysis Comparing Subjects Affected and Not Affected by Vignettes

Vignette	RR	RD	HR	ESC
1	-	-	-	+
2	-	-	-	-
3	+	-	-*	+
4	+	+	+	-
5	-	+	+	+
6	-	-	+	-*

+ = Affected not affected

- = Not affected affected

* = Significant at .05

Implications for Future Research

The Interpersonal Process Recall Model offers a new and exciting methodology to the area of psychophysiological research. The following points are presented as possible refinements in the methodology to increase its success in future research studies.

1. Develop a method for standardizing all or part of the recall sessions. This would simplify comparisons between subjects or groups and assist in the identification of any trends in the recall data.
2. Identify a set of psychological reactions of interest to the particular research which can be rated by a group of trained, independent raters. This would eliminate the subjectivity of the experimenter trying to correlate recall data with the physiological findings.
3. Devise a better method for taping the recall sessions. In the current research, much of the recall data was inaudible and weakened the study.
4. There should be some effort made to control for the order effect of vignettes. It may be that different results would occur if certain vignettes were presented before others.
5. It might be useful to standardize the length of vignettes as much as possible. This would eliminate the problems found with the electrical skin

conductance data outlined in Chapter IV. If it is not possible to standardize the length of vignettes, perhaps analyses of the ESC data should be limited to an equal section of each vignette. A section or sections determined prior to the experiment.

6. Studies comparing various groups should have vignettes which allow for group comparisons on the crucial variables. For example, the present study did not have a vignette with a black female. This prevented comparison of the reactions of subjects to the white-female vignette with their reactions to a black-female vignette.
7. Future studies should also examine the reactions to a greater variety of emotions.
8. Although it may prove very difficult, it would be interesting to examine the reactions of subjects to real actors instead of films. Many subjects indicated they had trouble "getting into" the vignettes and perhaps real actors would make it easier for subjects to get involved in the experiment.
9. The current IPR model makes use of a split-screen during the recall session where subjects see themselves and their physiological recordings. Very few, if any, of the subjects knew what the recordings meant. It may be more useful for subject

recall if the physiological recordings were replaced by the actual vignettes.

10. There is a clear need for larger samples. It was found that a few subjects at one extreme of the reactivity scale could bring about major group changes in the direction of reactivity.

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APPENDICES

APPENDIX A

GENERAL INFORMATION

Name (optional) _____

Age _____

Year in school _____

Do you have any heart ailments? Yes _____ No _____

Do you have any respiratory ailments? Yes _____ No _____

Do you have high blood pressure? Yes _____ No _____

Do you have a nervous condition? Yes _____ No _____

Within the last five years, have
you had any major illnesses? Yes _____ No _____Within the last year, how many
colds or respiratory ailments
have you had? Yes _____ No _____Within the last year, how many
times have you had to miss school
or work because of illness? Yes _____ No _____

What is your current major? _____

APPENDIX B

TEXT FOR VIGNETTES

Vignette #1 (19 seconds)

Black, late-twenties, male:

"I tell you, man. I can't take it much more. You can get the fuck off my back. You know what, I'm going to have to kick your ass. I'm going to have to kick your fucking ass."

Vignette #2 (20 seconds)

White, mid-twenties, female:

"Okay, you want me to level with you? Okay, I'll tell you. You're just a creep, You're a goddamn creep!"

Vignette #3 (32 seconds)

White, mid-twenties, female and
white, mid-twenties, male:

(laughing, pointing) "Would you look at that?
I don't believe it. Oh, shh..."

Vignette #4 (20 seconds)

White, late-twenties, female and
black, late-twenties, male:

(silence while holding hands) "What the hell
are you looking at?" (stated by male)

Vignette #5 (40 seconds)

White, late-twenties, male:

"I've listened to you and I would like you to know that I don't like your ideas one goddamn bit. I think that you and people like you have caused most of the misery around us and I'd like to come right over there and ram your fucking teeth down your throat."

APPENDIX B (Continued . . .)Vignette #6 (38 seconds)

Black, mid-twenties, female and
black, late-twenties, male:

(laughing, pointing) "Shh.... shh..."

APPENDIX C

SELECTED EXCERPTS FROM
RECALL SESSIONSVignette No. One (black male)

1. Subject 7/black male

Interviewer (I) -- How did he make you feel?

Subject 7 -- Nervous, uneasy.

2. Subject 11/black male

I -- How did he make you feel?

Subject 11 -- He made me feel paranoid, you know,
but I was just looking out.

I -- Can you describe that? (effect)

Subject 11 -- When he said that he made me a little
mad . . .

3. Subject 16/black male

I -- Did it have any effect on you at all?

Subject 16 -- Ah, yeah, I felt somewhat threatened
but I really couldn't get into it
right there.

I -- That threatened part, what does that feel like?

Subject 16 -- Ah, like a blood rush, I could feel,
you know, the blood circulating maybe
quicker or faster at that time. Felt
warm-blooded, you know, felt warm-
blooded.

4. Subject 20/black male

I -- How did he make you feel?

Subject 20 -- He made me feel kind of uncomfortable
because, you know, like, by him look-
ing directly at me and then rising up
and then pointing, his expression,
you know, kind of made me feel un-
comfortable.

APPENDIX C (Continued . . .)

5. Subject 19/black male

I -- No, what kind of effect did it have on you?

Subject 19 -- Oh, at first I was just kind of shaking, you know, I didn't realize it, you know, my hands were trembling, you know, they was like, you know, like I was just nervous, you know, but, you know, that's mostly what I just felt, you know, just shaky, you know.

6. Subject 12/white male

I -- Can you describe your feelings?

Subject 12 -- You know, who does he think he is, I was a little, if he would have been talking directly to me, involved with me, I would have been, you know, like who do you think you are. I'm a little pissed at you too for being the way you are, maybe I'm just as mad at you?

I -- Were you?

Subject 12 -- Yeah, I would have been if somebody had come up and said that to me, you know, and I would have gotten really quite upset with him.

I -- What about in this particular situation?

Subject 12 -- I couldn't get, I was a little, but then I guess I was starting to feel a little bit, you know, back off.

I -- Can you label the feeling?

Subject 12 -- Maybe the beginning of anger, but it was, you know, hard to, it wasn't really it but it could have been.

7. Subject 10/white male

I -- What do you recall about that first one?

Subject 10 -- Ah, just a little uncomfortable, I guess, you know, like trying to get into, like being threatened.

APPENDIX C (Continued . . .)

Subject 10 -- Some feeling of being threatened, yes.

I -- Can you tell how your body felt?

Subject 10 -- I think at one point I felt a little bit tingling.

8. Subject 9/white male

I -- What can you recall on that one?

Subject 9 -- I was, I can recall I wanted to say fuck you back, and ah, I wouldn't have minded trying. . .

I -- What did you think about it?

Subject 9 -- Well, I think, it pisses you off when somebody says anything like that to you, it makes you mad, so you know, I should have, I would have reacted, I just realized after that started going there was a microphone here, I probably would have said something through it. I did, I think, after a while.

I -- At one point you did. You said he pissed you off?

Subject 9 -- Ya, sure anybody would, you know, when he starts calling you stuff like that and oh, I'm not prejudiced or anything, well, no, well not really prejudiced out and out. I think, you know, I have some prejudice in me because of where I've grown up but ah, well maybe that made it a little more, yeah, maybe a little more. I think if I ever saw one like that.

I -- You mean because he was black might have. . .

Subject 9 -- It added a bit more to it, you know, I mean when he said fuck you it came off, it probably came across a little bit more than when the white guy when he was giving me the hard time.

9. Subject 4/white male

Subject 4 -- The whole time I was trying to figure out what he was, I couldn't figure out,

APPENDIX C (Continued . . .)

I was threatened but I didn't know why. I just didn't understand why I felt threatened. I didn't know, I hadn't done anything.

I -- What was that feeling like?

Subject 4 -- Um, I couldn't understand it, I was threatened and I didn't know why, so it was frustrating. I couldn't figure out, there was no reason for me (inaudible).

Vignette No. Four (Mixed Couple)

1. Subject 4/white male

Subject 4 -- That one, I just, I didn't understand anything about that one at all. Um, I just sat here and (inaudible), I couldn't, I couldn't relate to it at all, it's just something I, the others were something I could relate to one way or another and this one I just didn't know what to think or do.

Subject 4 -- Yeah, I was trying to figure out, I didn't, I didn't understand what it was about.

2. Subject 16/black male

I -- What about there, what can you recall?

Subject 16 -- Um, wow, not too much, not too much at all because it was so short. It kind of just hit me like that. I really couldn't get my mind in tune to it so quickly, because he was on and off just like that. I don't really remember too much, I really don't think I had a reaction to it.

3. Subject 10/white male

I -- This was the mixed couple where he said what the hell you looking at.

APPENDIX C (Continued . . .)

Subject 10 -- I didn't really have much feeling
about that at all. . .

I -- Do you feel, how did that make you feel, that
he reacted towards you that way?

Subject 10 -- Like it was his problem and not mine.

I -- Did it have any impact on you?

Subject 10 -- Not really.

4. Subject 19/black male

Subject 19 -- That was, now that one should have
struck me, I mean really terrible, you
know, it should have. . .

I -- Did it?

Subject 19 -- Not really, not really, not really,
it was, it was cool, but not really.

5. Subject 3/white male

I -- Do you recall anything about that one?

Subject 3 -- Even before that line came out I was
not really in obedience with your in-
structions I'm afraid because I was
thinking here comes the mixed couple
response test and I regret that, but
I was just kind of pulled out from the
situation a little more on that one.

6. Subject 18/black male

Subject 18 -- Um, it was, it seemed kind of fake to
me so it didn't have any real emotional
effect on me, but ah, in a real situ-
ation, the way he reacted it would
have seemed like a defensive type of
thing, you know.

7. Subject 14/black male

I -- What did you think about that one, what can you
recall?

Subject 14 - Well, it didn't have any effect on me until he just turned around and asked me what I was looking at. That kind of shocked me.

I -- Shocked you?

Subject 14 -- Yeah.

I -- Can you go into that more?

Subject 14 -- I was just surprised when he turned around, what are you looking at, you know. I wanted to say (inaudible).

I -- Did it bother you?

Subject 14 -- No.

I think it was less effective, you know, because you know, it wasn't as long, it was just that little, what you looking at (inaudible).

8. Subject 6/white male

Subject 6 -- Unfair of him because, I don't know. It is just, I thought of like going up and talking to him or something like that. I thought maybe, I don't know, I thought maybe he was in a bad mood or something.

I -- Did it bother you?

Subject 6 -- No.

Vignette No. Two (White female)

1. Subject 17/white male

I -- Did you feel anything?

Subject 17 -- Well, again not particularly, it just don't seem, you know, maybe I just don't react.

2. Subject 14/black male

I -- How about this one?

APPENDIX C (Continued . . .)

Subject 14 -- It didn't have much effect on me, you know. Like you know, I was hearing it but I wasn't believing it, you know, what she was saying.

3. Subject 18/black male

I -- Okay, what about this one?

Subject 18 -- Again, I didn't believe it, I would have had to believe what she was saying to really affect me. I didn't believe it so I took it as an outside comment.

I -- Did she have any effect on you at all?

Subject 18 -- Not really. Like I said, I didn't accept it so I didn't it didn't pose as any threat to me.

Um, the fact that she was a woman probably meant less to me as far as a physical threat.

4. Subject 15/black male

I -- What about that one?

Subject 15 -- I don't know, that one just, I don't know. I guess I was used to the feeling by then and, I don't know, it didn't seem to do too much.

5. Subject 10/white male.

I -- On that one?

Subject 10 -- I didn't feel too much on that one, I don't know, I guess my feeling was that she was coming on, you know, kind of strong. I suppose if I'd have had to answer it back, I'd have been a lot more uncomfortable.

6. Subject 13/black male

I -- What about that one?

Subject 13 -- That was generally about the same effect. I really didn't do anything for me, you know. I was starting to try and figure out, you know, what was this about, you know. It didn't really mean anything to me, you know.

7. Subject 5/black male

Subject 5 -- Ah, I felt kind of detached from her, you know, because it wasn't, I couldn't really identify with her. I couldn't get into the thing, like I couldn't imagine a white broad just saying, you're a creep.

I -- Why couldn't you identify with it?

Subject 5 -- Probably, the main reason probably because she was white, you know, and coming on me in that way.

8. Subject 19/black male

I -- Okay, what about that one?

Subject 19 -- That one I didn't like, it didn't have any effect on me.

I guess it's because it's a female didn't scare me, she was just there, you know.

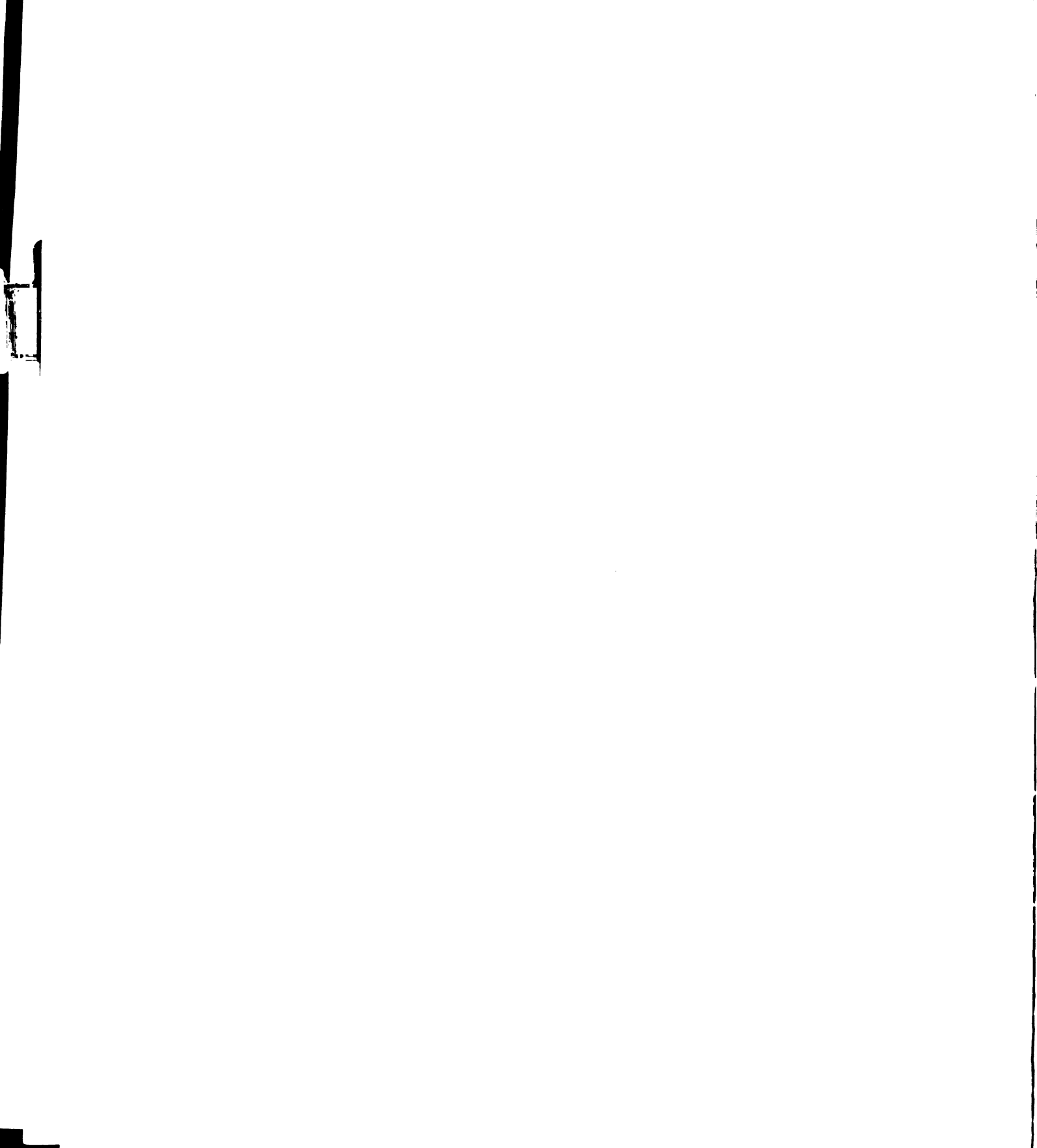
Vignette No. Five (White Male)

1. Subject 4/white male

Subject 4 -- I thought the guy was pretty fucked (inaudible) that's about it. That's what I was thinking about, I thought, I put myself in (inaudible) I thought if he'd come over I'd have probably punched him in the mouth (inaudible).

2. Subject 5/black male

Subject 5 -- That one caused a little nervous feeling I guess. Because I didn't know



where the dude was coming across and being I got a little angry because he was coming on, out on me like that. And then he said it's you and people like you, I said, oh wow, you know (inaudible).

I -- What do you think he meant by that?

Subject 5 -- I took a racial connotation to it, you know, I guess that made me madder than anything.

3. Subject 14/black male

I -- Did it get to you at all?

Subject 14 -- I think when he said he was going to ram my teeth down my throat, I think that kind of got to me, I started thinking, well, it was really true (inaudible).

4. Subject 20/black male

Subject 20 -- I was a little bit offended because, you know, I thought he was talking about me, you know, racially, and when he said ideas, you know, I said, oh wow, you know, this guy don't like the way I am thinking or the way that I portray myself and I'm trying to express myself in one way and, you know, he is just cutting me up and things like that. He's saying that I'm no good and this and that, you know. I felt kind of like I wanted to get up and hit him almost because he made me feel kind of bad.

5. Subject 8/white male

I -- Do you recall that one?

Subject 8 -- Yeah, right at the end of that one it started making me feel like really angry at that guy (inaudible).

6. Subject 11/black male

Subject 11 -- Well, at that time I was kind of scared, you know, well I felt kind of scared, probably thought the guy was schizophrenia or something. I mean, I felt like I was just scared.

I -- How did this compare to the first guy that came on?

Subject 11 -- Well you see, that, I felt like I could cope with it, you know, I probably could talk to him, you know, for the simple reason that he was black.

Because he was white. I felt like he had a racial dispute.

7. Subject 16/black male

Subject 16 -- That one, that one made me more, that made me more hostile. I wasn't so. I wasn't really hostile towards any of the other people except this particular man because he really got into what he was saying and he did pose a real threat, I really felt he was the most threatening after that point.

I -- What was different about that one that had more of an effect on you?

Subject 16 -- Maybe it was because he was a white man, that's a possibility and, ah, too the way he was dressed.

8. Subject 9/white male

I -- You said you were getting pissed here?

Subject 9 -- Yeah, I think that was the guy really got me, I remember that, he's sitting there telling me all this about my ideas.

Vignette No. Six (Black couple)

1. Subject 9/white male

I -- Did they make you feel any different from the other couple?

APPENDIX C (Continued . . .)

Subject 9 -- Well, you know, they were black, but I would think I would get more upset but I didn't really.

2. Subject 11/black male

I -- What can you recall on that one?

Subject 11 -- Okay, right there I felt like, I didn't feel like, you know, I wasn't mad because they were laughing at me. I felt like you know, like it was a bunch of friends sitting around, joking and laughing probably a little high or something, and they were just fooling around.

Because of the, you know, racial difference and with the black couple I didn't, I just felt like we were, you know, togetherly I felt like with the white couple that we were, like maybe I had intruded on someone, you know, maybe came to a white party.

3. Subject 18/black male

I -- Did it have any effect on you?

Subject 18 -- No. It probably had the least of all of them (inaudible) the least of all the (inaudible). Um, I just pictured them as acting silly, you know, that's about it.

4. Subject 7/black male

Subject 7 -- Whereas this couple right here, I, from the very beginning, you know, I could see that they were just acting silly, playing around with each other. While they appeared briefly to be looking my way, they seemed to be acting stupid more than anything else.

5. Subject 15/black male

APPENDIX C (Continued . . .)

I -- So, how did it make you feel?

Subject 15 -- I felt pretty uncomfortable, you know, knowing her, I didn't know who the dude was but like just knowing Dorothy was there, you know, I felt more comfortable.

6. Subject 13/black male

Subject 13 -- They just, ah, just come to mind, you know, to me as two silly individuals, that, ah, I just would not care to deal with.

APPENDIX D

VARIANCE DATA

Vignettes (RR)

The variance data for RR showed the black group to have a higher variance across all vignettes except V_1 (a black male) where the groups seemed equal. The vignettes with the highest variance were V_3 (a white couple) and V_1 for the black and white groups, respectively. Vignettes two and five had the lowest variance for the black group while the white group did not have a clear low point for variance. Overall, the white group had a more consistent, less labile pattern while viewing the vignettes (see Figure 1).

Rest Periods (RR)

The overall variance patterns for the two groups were fairly consistent except on R_7 , where the black group increased sharply. The highest variance was found in R_7 for the black group and R_1 for the white group, although the white group did not have a distinct low variance period. The black group had its lowest variance during R_5 (see Figure 2).

Vignettes (RD)

Looking at variance, the white group appeared to have a higher variance on RD during the first three vignettes and the black group had a higher variance over the last three. The high and low variance vignettes for the white group were V_1 and V_4 , respectively, and V_5 and V_2 for the black group.

Figure 1

Respiration rate variances for subjects
during vignette periods

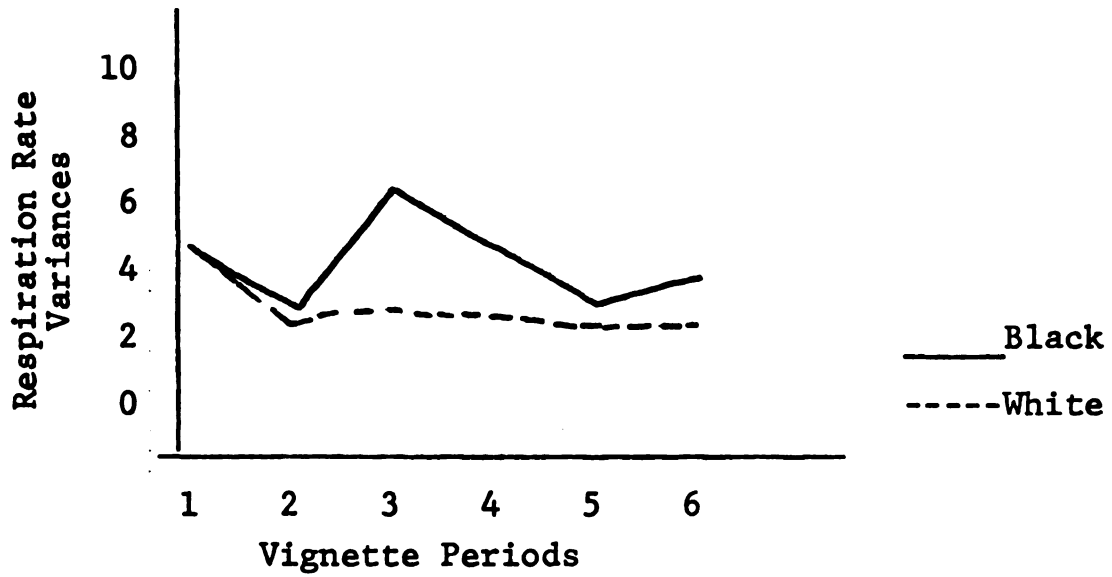


Figure 2

Respiration rate variances for subjects
during rest periods

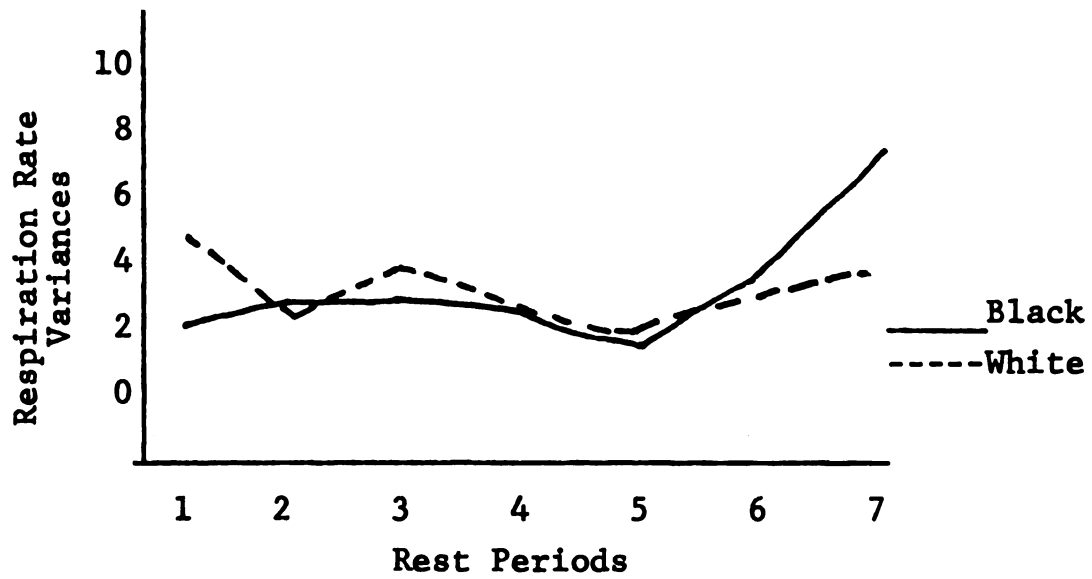


Figure 3

Respiration rate variances for subjects during
total experimental period

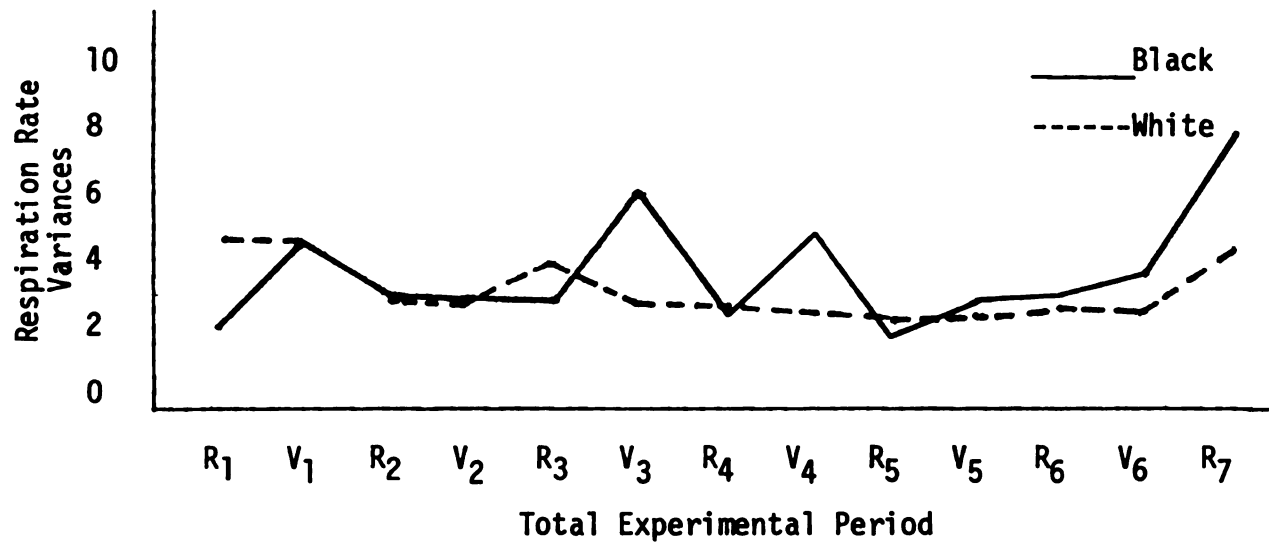
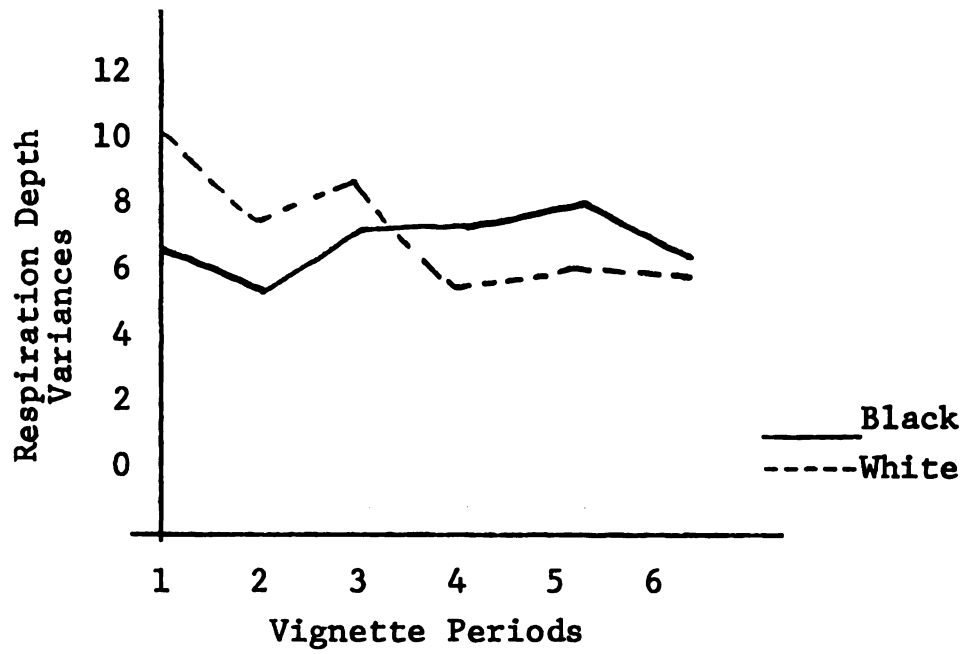


Figure 4

Respiration depth variances for subjects
during vignette periods



The group patterns were almost the opposite of each other with the white group moving from high to low variance and the black group for the most part changing from lower to higher variance (see Figure 4).

Rest Periods (RD)

In regard to variance, the white group was found to have a higher variance across all rest periods. In addition, the white group showed its highest variance during R_3 and least during R_4 , while the black group displayed its highest variance during R_1 and least during R_6 (see Figure 5).

Vignettes in Relation to Rest Periods (RD)

During the first half of the experiment, the white group had a higher variance than the black group. However, over the second half of the experiment, the white group showed higher variance only on the vignettes and the black group had higher variances on the rest periods. All of the vignettes for the white group were followed by rest periods with a higher variance and, except for V_5 , the same was true for the black group (see Figure 6).

Vignettes (HR)

The white group was found to have a higher variance across all the vignettes. The white group showed its highest variance during V_3 and the black group on $V(1)$, which also happened to be the low variance for the white group along with

V(5). Vignette number four was the low variance vignette for the black group (see Figure 7).

Rest Periods (HR)

The variance data for HR showed the white group to have a higher variance throughout the rest periods. Rest period number three was where both groups showed their highest variance. The white group did not have an obvious low variance period and the black group was only slightly lower during R(2). Generally speaking, the group patterns were very similar (see Figure 8).

Vignettes in Relation to Rest Periods (HR)

On the heart rate measure, the white group was found to have a higher variance throughout the experiment. Also, vignettes two, three, four and six for the white group were followed by a rest period with a lower variance. It is quite interesting that for the black group these same vignettes(V(2), V(3), V(4), and V(6)), were followed by a rest period with a higher variance (see Figure 9).

Vignettes (ESC₁)

The white group also had a higher variance across all vignettes. Both groups showed their highest variance during V₂ with the black group's lowest variance on V₅ and the white group on V₆. The group patterns showed the white group starting out with a much higher variance than the black group which increased before taking a sharp decline and finishing with a

Figure 5

Respiration depth variances for subjects
during rest periods

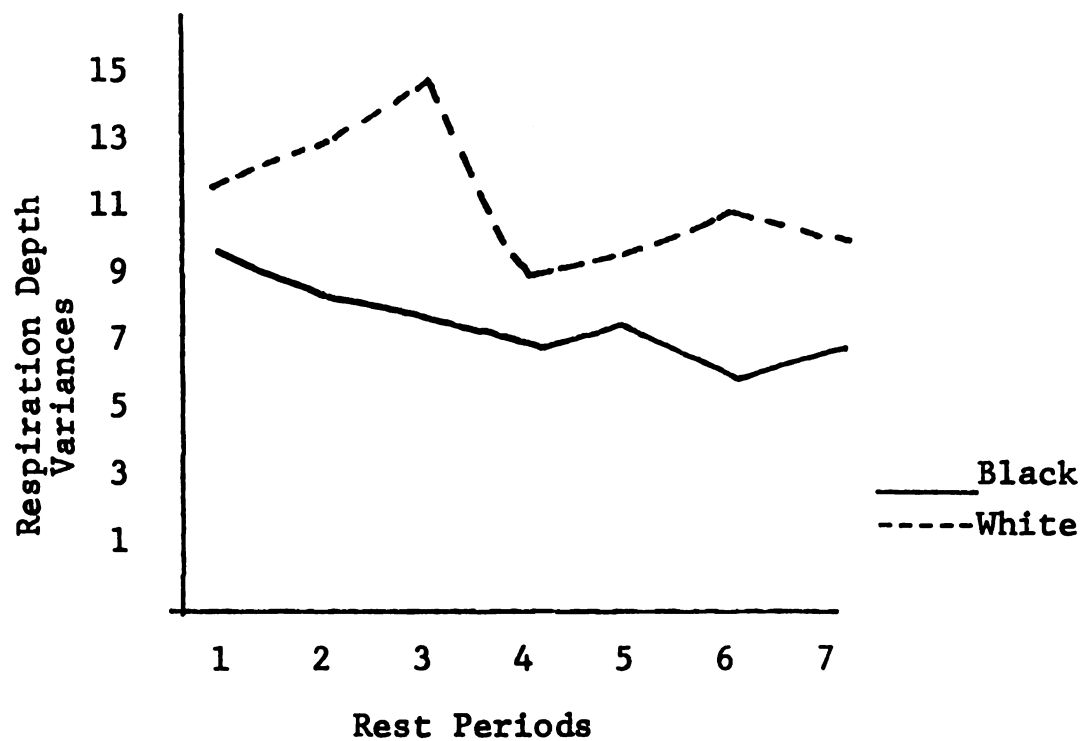


Figure 6

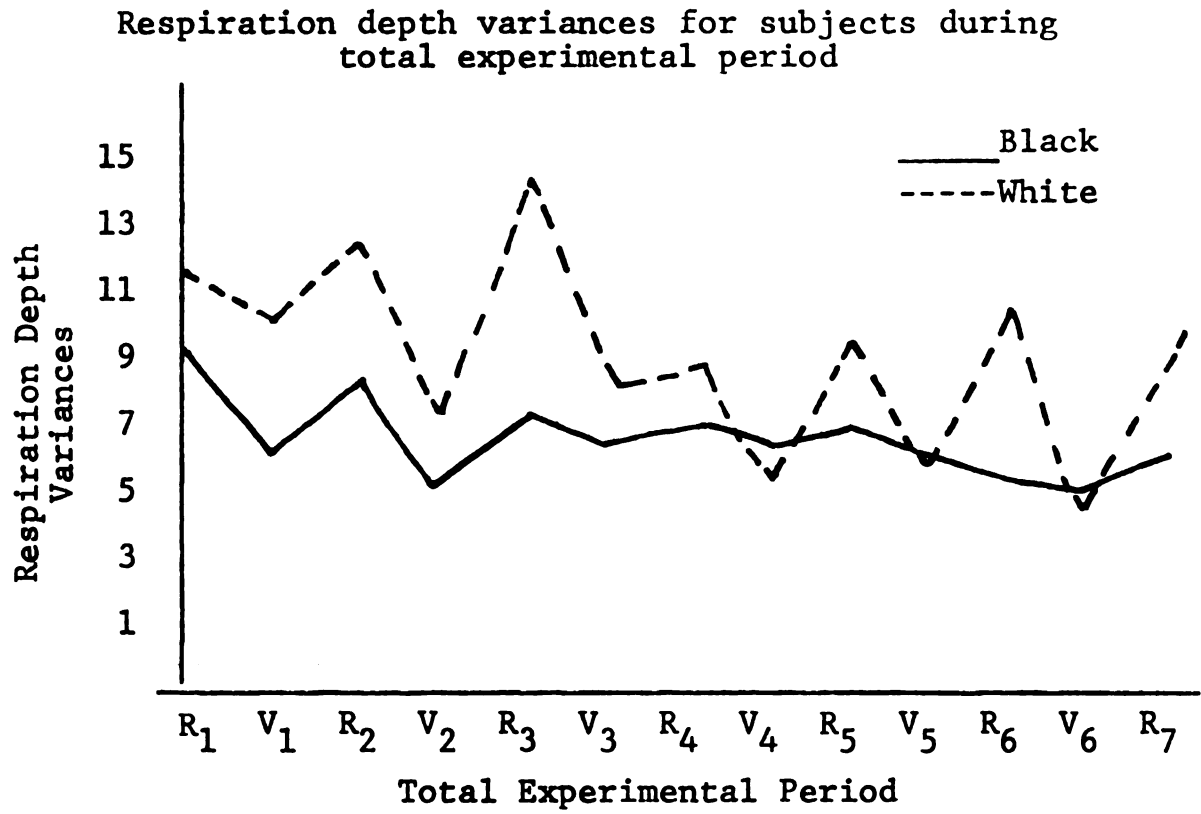


Figure 7

Heart rate variances for subjects during
vignette periods

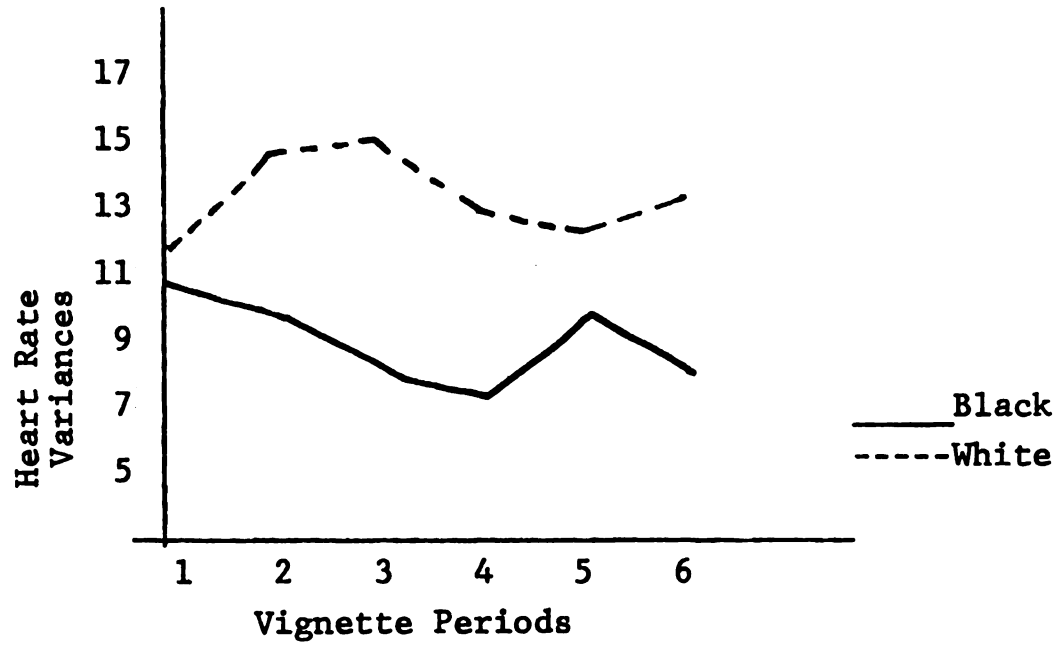
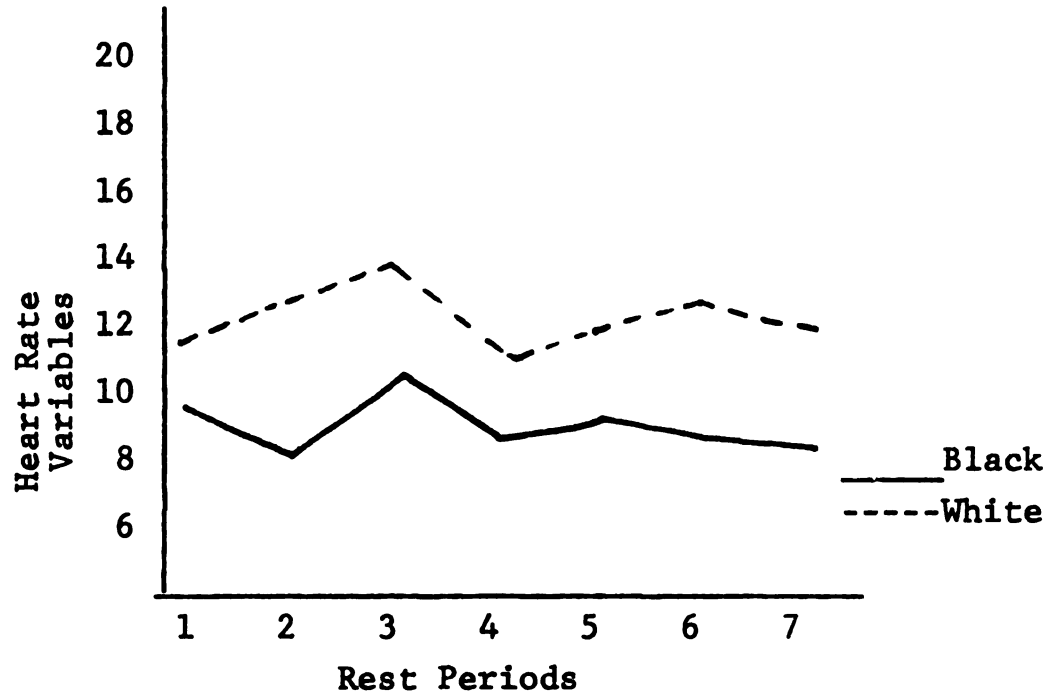


Figure 8

Heart rate variances for subjects
during rest periods



variance level close to that of the black group. Generally, both groups showed high variance, however, the white group seemed much more so (see Figure 10).

Vignettes (ESC₂)

The white group again had a higher variance than the black group across all vignettes. The black group showed its highest variance on vignettes two and three with V_3 also being where the white group showed its highest variance. The low variance vignettes were V_6 for the white group and V_1 for the black group. As a whole, the black group had a lower variance but the group patterns were similar throughout and the group variances finally came together at V_6 when the white group variance decreased to the black group levels (see Figure 11).

Rest Periods (ESC₁ and ESC₂)

Whereas the group means for ESC went from similar patterns to different patterns, the variance patterns went from the groups being far apart over the first four rest periods to being very similar over the last three periods. This variance pattern was not unlike that found for RD variances. The white group showed its highest variance during R_3 and lowest variance during R_6 . One should note that the white group also showed its highest variance during R_3 on HR and RD. Rest period seven proved to have the highest variance for the black group, and R_1 the lowest variance (see Figure 12).

Figure 9

Heart rate variances for subjects during
total experimental period

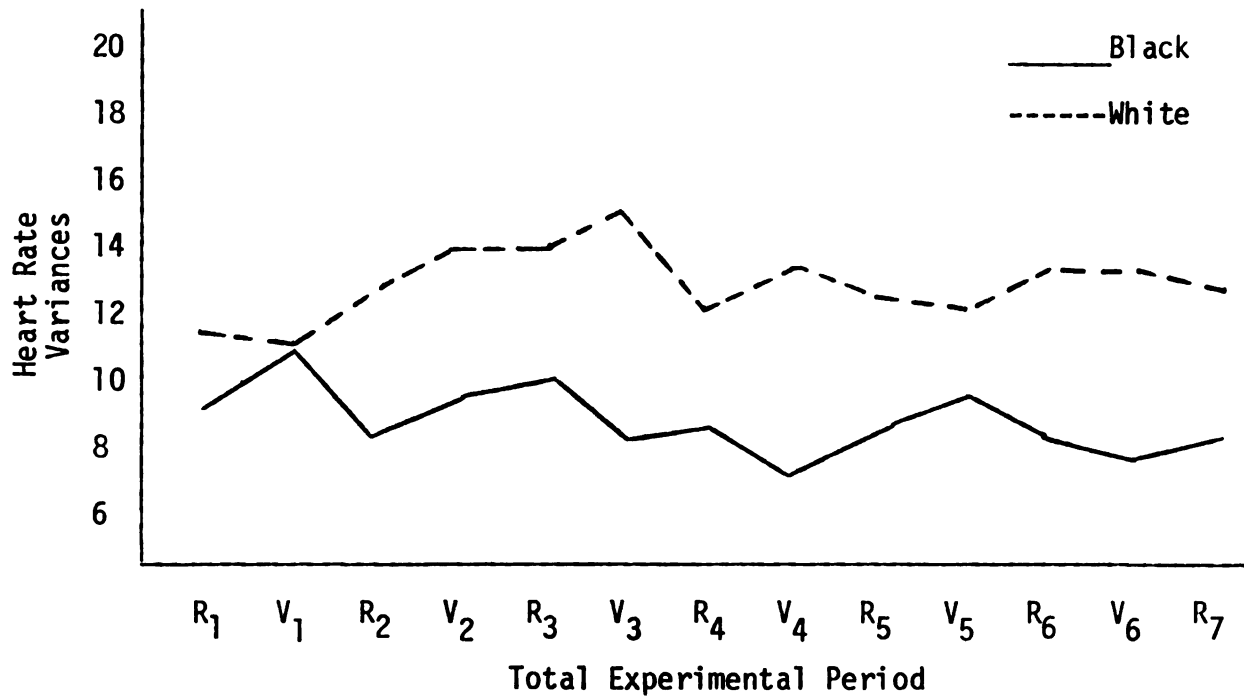


Figure 10

Electrical skin conductance (ESC_1) variances for subjects during vignette periods

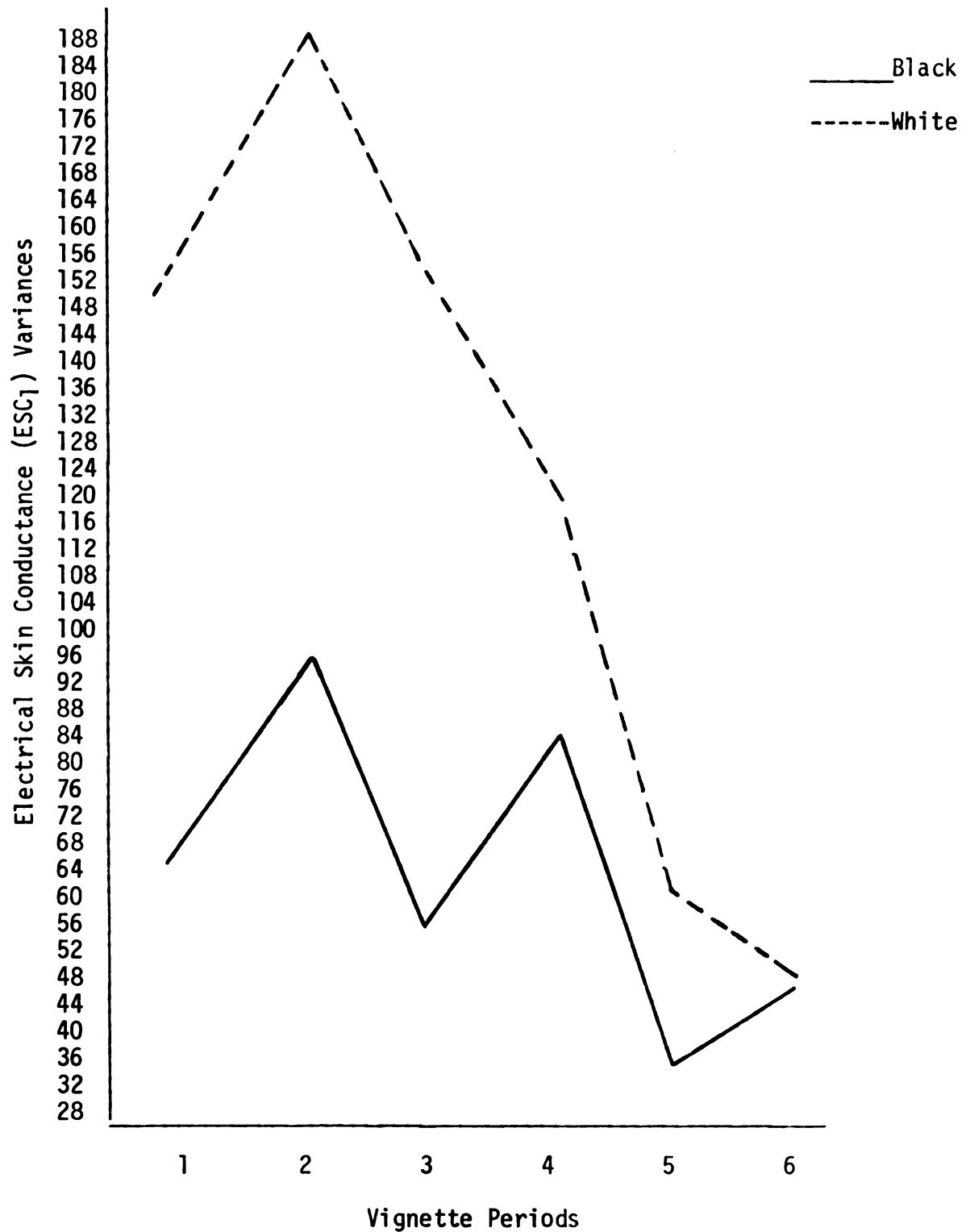


Figure 11

Electrical skin conductance (ESC₂) variances for subjects during vignette periods

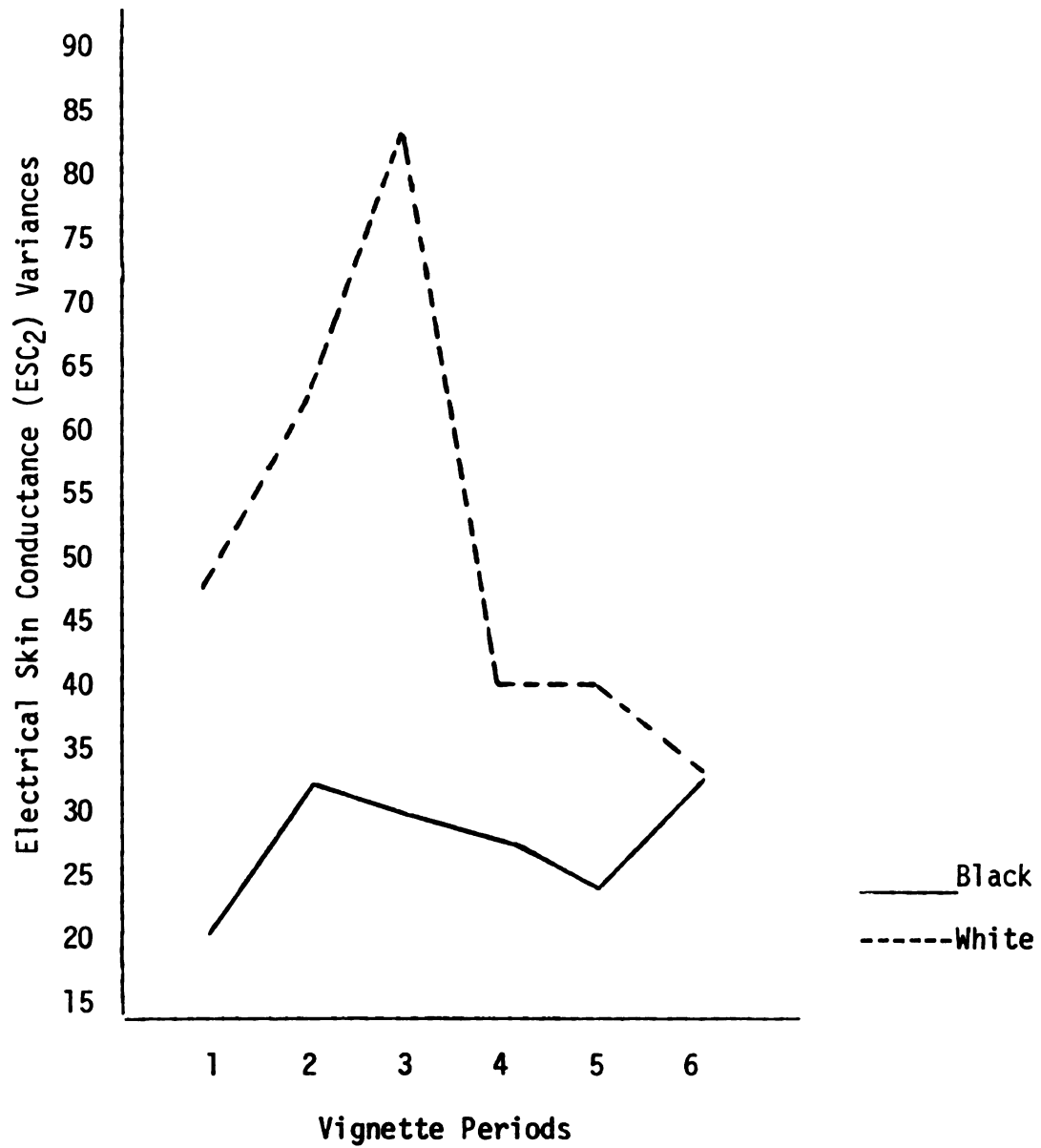
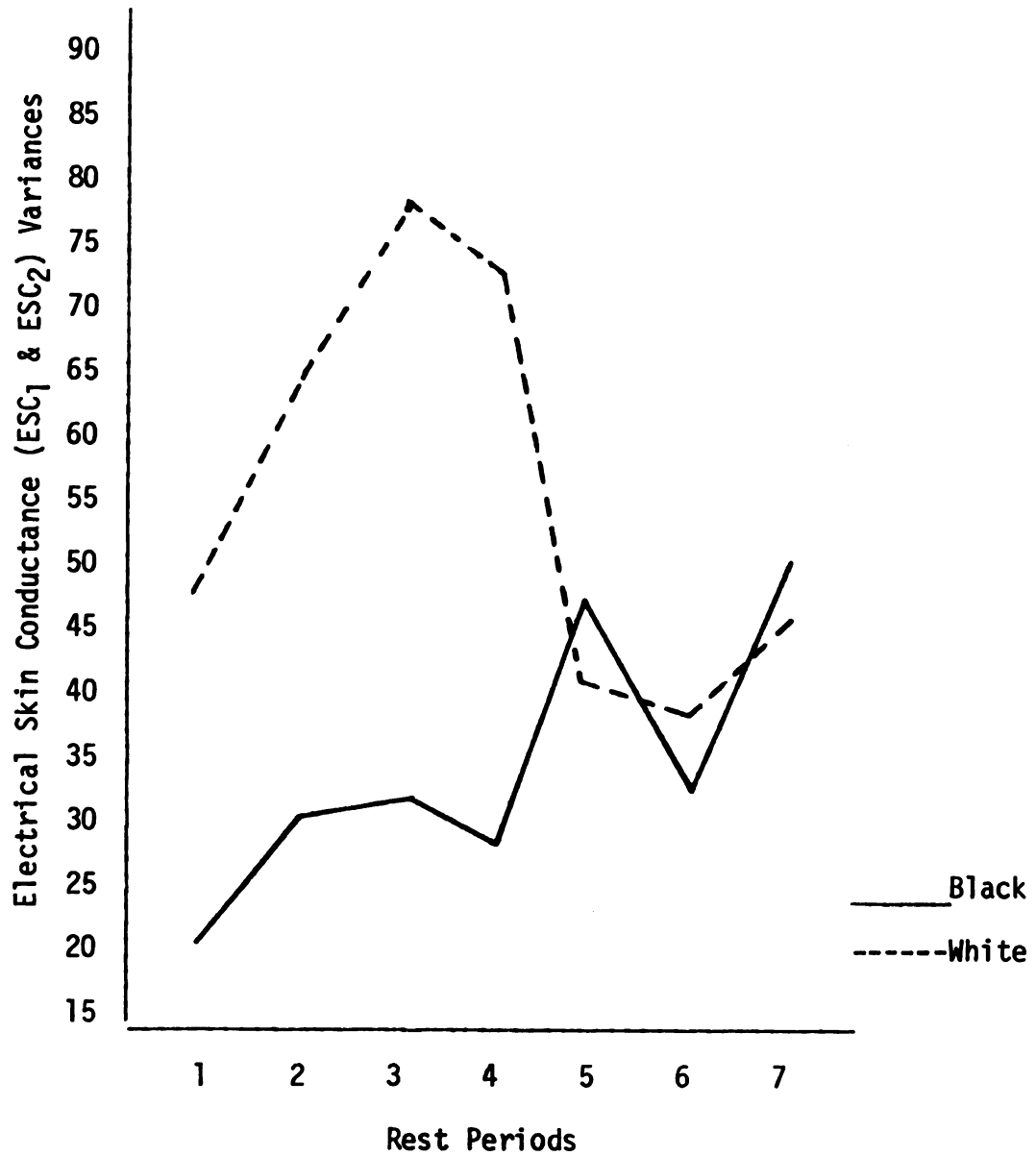


Figure 12

Electrical skin conductance (ESC_1 & ESC_2)
variances for subjects during
rest periods



Vignettes in Relation to Rest Periods (ESC₁ and ESC₂)

The variance findings for ESC₁ showed the black group to have a higher variance throughout the experiment with the exceptions of R₅ and R₁. Also, with the exception of V₅, all the vignettes for the black group were followed by rest periods with lower variances. On the other hand, all of the vignettes for the white group were followed by rest periods with higher variances. By and large, the group patterns were very similar and nearly the same at the end of the experiment (see Figure 13).

In contrast to ESC₁, the findings for ESC₂ showed the white group to have a higher variance except for R₅ and R₇. For the black group, vignettes one, four, five, and six were followed by rest periods with higher variances. Such was the case for the white group on vignettes one, two, four, and six. Over the first two-thirds of the experiment, the white group had a much higher variance but the group patterns were close together over the last one-third (see Figure 14).

Figure 13

Electrical skin conductance (ESC₁) variances for subjects
during total experimental period

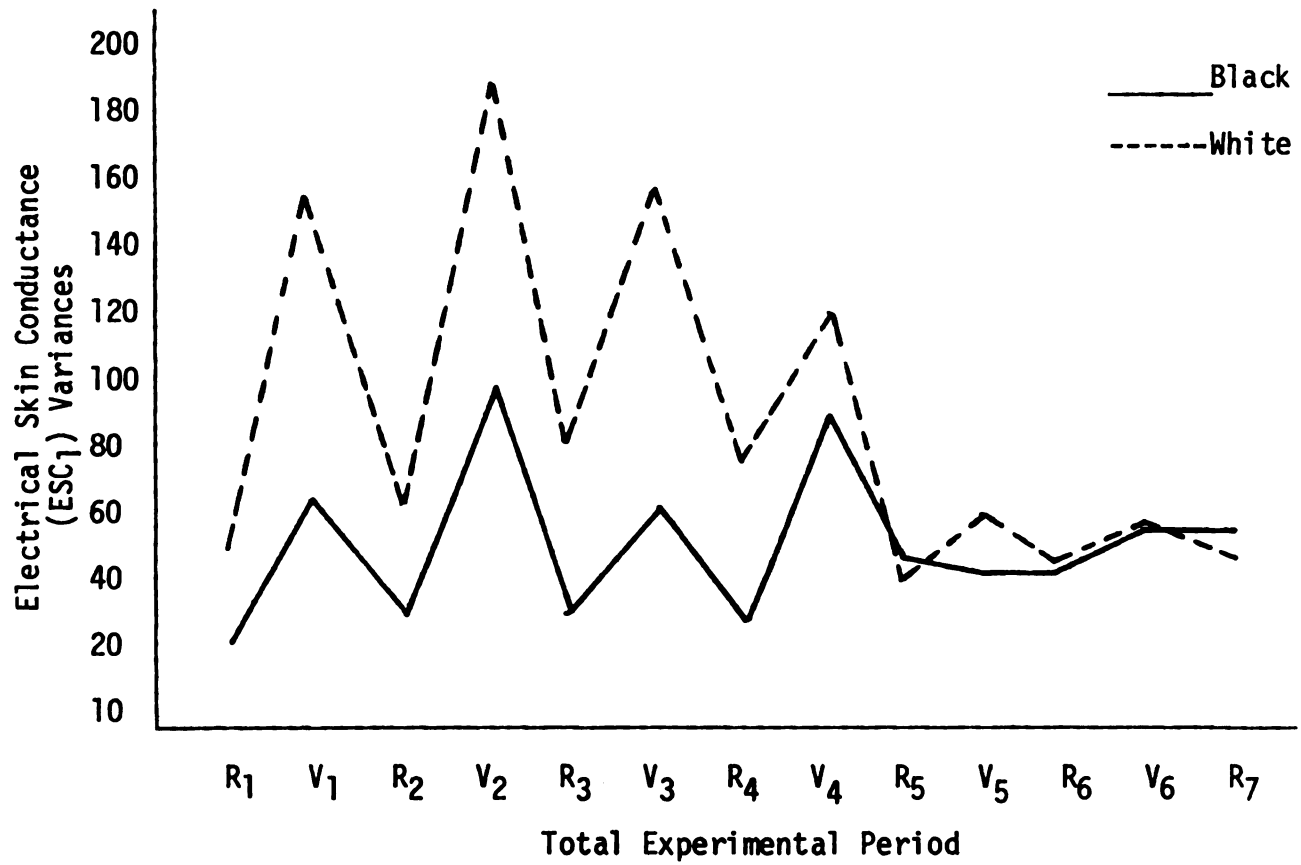
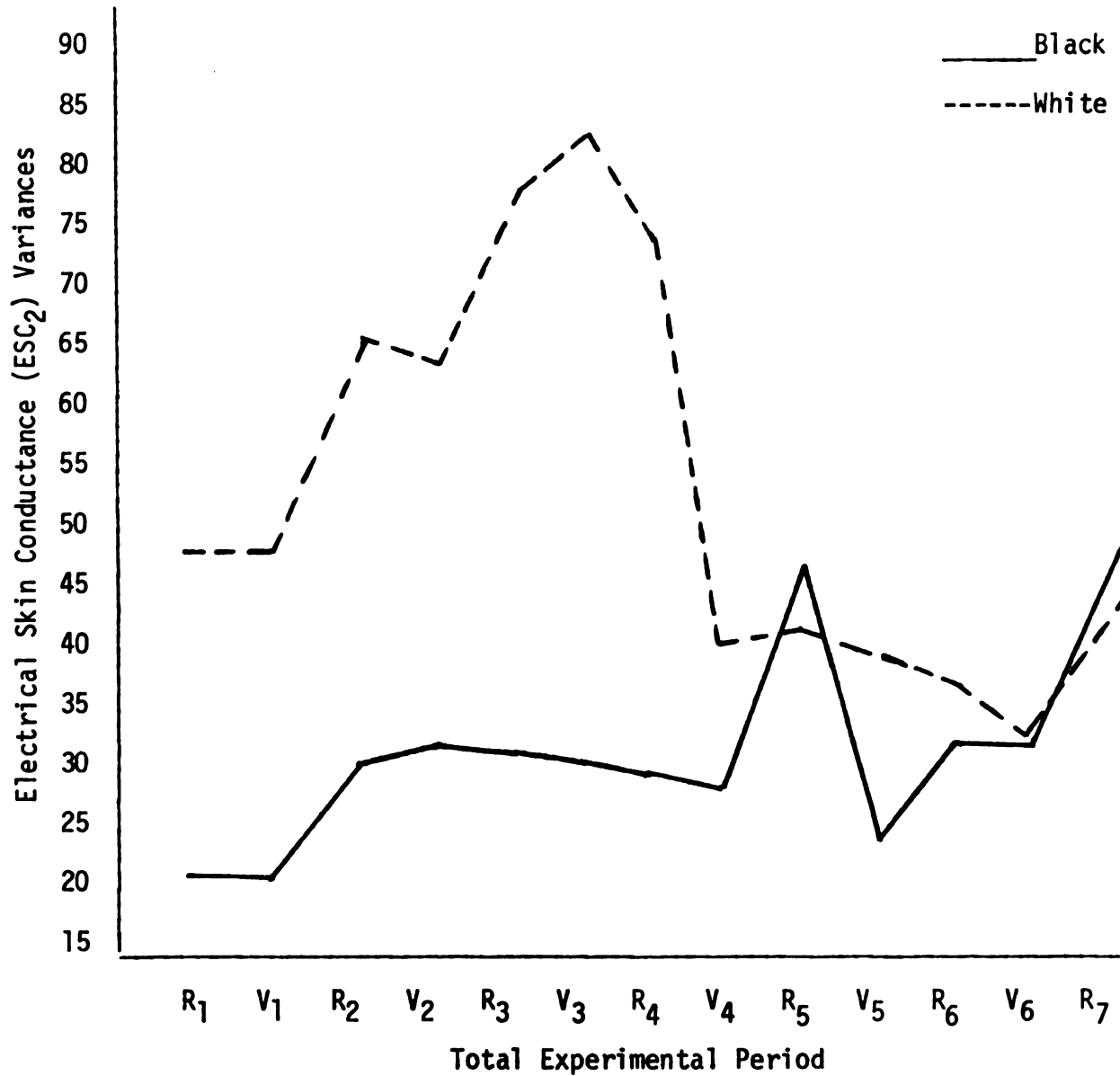


Figure 14

Electrical skin conductance (ESC₂) variances for subjects
during total experimental period



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