THE UNIVERSITY OF CALGARY

THE INFLUENCE OF SOCIAL MODELING ON EMPATHIC RESPONSES

by

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES IN

PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE

DEGREE OF DOCTOR OF PHILOSOPHY

DEPARTMENT OF PSYCHOLOGY

CALGARY, ALBERTA

June, 1972

THE UNIVERSITY OF CALGARY

FACULTY OF GRADUATE STUDIES

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ABSTRACT

An analysis of the findings of research on aiding behavior and vicarious emotional experience led to the hypothesis that the observation of a model's behavior would differentially dispose observers' behavioral and emotional empathic responses to a performer's emotional displays. Accordingly, subjects watched a videotaped model either always reward or always punish a performer regardless of her success or failure on each of ten trials at a motor task. The effect on the performer of the model's behaviors was observed to be either success, failure, or both success and failure on the last four of the trials. Subsequently, electrodermal, cardiac, and respiratory responses were recorded as the subjects dispensed the contingencies reward, nothing, and punishment to a performer as she succeeded and failed at the task. The first of two control groups used in the experiment responded to the performer without having observed a model, and the second was directed by the experimenter to reward success and punish failure. Measures of personality were obtained prior to the experiment, and self-reports of mood and ratings of the performer were secured at its conclusion.

As hypothesized, subjects who had observed the model always dispense reward responded more positively to the performer's success and failure than did subjects who had observed the model dispense punishment. Observing the model dispense reward was particularly effective in polarizing positive responses to the performer's success. The self-reports of mood and ratings of the performer were uninfluenced by the experimental manipulations. Instead, they appeared to be a function of

the subjects' stereotypical responses to social experiences. The autonomic responses indicated that the performer's emotional displays had been arousing, and that all groups were particularly aroused upon the observation of her failure. It was evident that the behavioral response tendencies were attributable to the effects of modeling, but that vicarious emotional responses were generally independent of modeling.

Differences among cardiac responses accompanying the subjects' contingency responses to success and failure did not support the hypothesized differential modeling effect, but rather were related to the comparability of the subjects' behaviors with the model's behaviors. Heart rate deceleration was most pronounced when the subjects' behaviors were concordant with the model's behaviors, whereas discordant behaviors were accompanied by accelerative responses. The relationship between cardiac activity and modeling was discussed as having implications for the investigation of cognitive processes which mediate modeled behavior.

ACKNOWLEDGEMENTS

I would like to express my appreciation to the individuals who aided in making this thesis possible. To Karen, Shawn, and Ryan I can only say thank you for patiently waiting through the enterprise with a cheerfulness which was inspirational.

From the initial stages of my doctoral programme Dr. Robert Weyant, Dr. Vera Corfield, and Dr. Eugene Edgington have been a ready source of encouragement, guidance and expertise. Their influence as teachers and friends extends far beyond the bounds of this thesis.

The interest in this thesis and helpful comments of Dr. Keith MacCannell and Dr. Seymour Berger were appreciated.

I am indebted to Marlene McElwee for lending her spontaneity to the role of performer, to Stan Corbett for his technical assistance, and to Elfrieda Koch for typing the thesis.

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CHAPTER I

INTRODUCTION

A class of interpersonal responses which has been of recurrent interest in psychology comprises responses which accompany the vicarious experience of another person's emotional state and the situation which instigated that state. Everyday events attest to the fact that one person may experience an emotion because he perceives that another person is experiencing that emotion. Close friends often mirror each other's emotional state; parents share their childrens' delights and despairs; as passengers in an automobile we press on a non-existent brake pedal, sharing the driver's own reactions; the football fan, involved in the game, mimics the fullback's lunge into the line, sharing for an instant the player's muscle tensions, impact with linemen, and thoughts. Similarly, moviegoers experience the agitation and depression of the protagonist with whom they have identified. Cottrell (1950) employed the term empathic responses to designate the experience of sharing and reacting to the perceived thoughts and feelings of another person as if they were one's own thoughts and feelings. A connotation of the term is that our emotional responses to observed emotion in other persons are based upon our empathy with them; that we understand and experience, in some sense, what they are experiencing.

In recent years empathic responses have attracted the increasing research interest of psychologists and other social scientists.

Indicative of this interest is the extensive research which has been directed at the study of aiding behavior and vicarious emotional experience. Aiding behavior has been studied as "altruism," "bystander intervention," "helping behavior," and "samaritanism" (Macaulay & Berkowitz, 1970), all of which refer to behaviors which are overtly directed toward benefiting another person. The study of covert emotional responses which accompany the observation of another person's emotional state has been conducted under the rubric of "empathy," "vicarious arousal," and "vicarious emotional experience" (Bandura, 1969). While these two research emphases have developed quite independently, they share a common research objective and research methodology.

The objective of research on these empathic responses has been to differentiate among overt and covert response patterns which characterize reactions to the observation of different emotional states and situations. The study of aiding behaviors and vicarious emotional experience may be thought of as having been predicated upon a common problem: given that an individual is witness to another individual's emotional display, what are the characteristics of his response to that particular display, and how is this response different from his responses to other emotional displays? The investigation of this problem involves both the identification of characteristic response patterns which accompany different emotional displays, and the comparison of these characteristic response patterns. Of course achievement of the former makes achievement of the latter a relatively

straight-forward endeavour. Consequently investigations of empathic responses have, in general, been directed at the identification of psychological and social variables which are antecedent to and concomitant with responses to the observation of another person's emotional display, be it one of affection, distress, elation, emergency, pain or pride.

The procedure typically employed in the study of aiding behaviors involves the confrontation of the subject (observer) with the apparent distress or pleasure of another person (performer). Generally this has been accomplished through the re-creation of relatively common events. For example, in a field experiment, Wispe and Freshley (1971) had their performer drop a bag of groceries, as she emerged from a supermarket, in front of unsuspecting shoppers as they approached the performer. The dependent measure used in the study was the frequency with which assistance was offered the apparently distressed performer.

Using similar procedures, investigations of vicarious emotional experience typically require that the observer watch a performer be subjected to painful or pleasurable stimulation. Psychophysiological responses from the observer are monitored and employed as the dependent measures. Stotland (1969) had his subjects observe a performer experience what was reported to be painful, neutral, or pleasurable diathermic heat. Changes in vasoconstriction and palmar sweating were recorded during the observation period in an attempt to differentiate responses to the three states.

These descriptions identify the essence of the research

methodology that is common to the two research emphases which they represent. Both require the subject to observe another person's emotional display, and both use the dependent measure to infer the nature of the subject's reactions to the emotional display. There is, however, a qualitative difference in the type of dependent measure used by the two research emphases, and it is this difference which provides the sharpest contrast between them.

Whereas studies of aiding behavior employ overt responses as dependent measures, studies of vicarious emotional experience employ covert responses as dependent measures. How the observer overtly behaves toward the performer's emotional display permits ready inferences about the propitiousness of the observer's disposition. In contrast, changes in psychophysiological functioning generally permit inferences which are less directly related to overt responses, and thus more difficult to interpret as reflecting the observer's disposition or intentions.

As will become evident in succeeding pages there is a substantial body of evidence related to the differentiation among covert empathic responses, but with little consideration of their relationship to subsequent or concomitant overt acts. A comparable body of evidence indicates that overt empathic responses can be differentiated, but little consideration is given to the relationship between these behavioral responses and antecedent or concomitant emotional responses. Each research emphasis has resulted in the identification of antedecedent and concomitant variables, many of which are similar, which

appear to be functionally important in the elicitation of different empathic responses. That the two research emphases employ a common methodology in an attempt to achieve a common objective, and produce comparable findings, suggests that they may be integrated to yield a more complete explanation of the nature of empathic responses.

The Concept of Empathy

A guiding assumption, either implied or explicitly stated, of the study of aiding behavior and vicarious emotional experience is that the observer's response toward the performer's emotional display reflects a recognition and an understanding of the performer's emotional state. In other words, the observer is assumed to empathize with the performer's emotional state (Darley & Latané, 1968b; Krebs, 1970a). It is this assumption which leads to the inclusion of aiding behavior and vicarious emotional experience within the class of responses designated as empathic responses.

Formulation of the concept of empathy is generally credited to the German psychologist Theodor Lipps [1903] who introduced the term Einfühlung, which Titchener translated as "empathy," to describe a process of objective motor mimicry.[1] He argued that when we confront the emotional state of another person we partially imitate the other person with slight movements, thus creating for ourselves inner cues

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[1]Historical reviews of the development of the concept of empathy are offered in books by Stewart (1956) and Katz (1963) and in Wispé's (1968) review of sympathy and empathy.

that give us an understanding of his feelings. It is noteworthy that in this earliest definition of empathy there is the intimation that it involves some kinesthetic correlate of the object of empathy; that there is the expectation that the observer feels as if he were the performer. The experience of this kinesthetic mimicry was expressed in Titchener's (1909) statement that, "...not only do I see gravity and modesty and pride...but I feel them or act them in the mind's eye [p. 21]."

At approximately the same time that Lipps was formulating his notion of kinesthetic empathy the Russian biologist P'etr Kropotkin was studying aiding behavior among animals and seeking an explanation for its occurrence. Through a documented review of aiding behavior in animals and in primitive to modern Man he suggested (Kropotkin, 1902) that mutual aiding within societies reflected an innate process comparable to empathy. Quite simply, if one individual in a society "knew" how another individual felt he could respond accordingly. Obviously if the aiding response maintained the life of that individual, aiding behavior could be viewed as facilitating the perpetuation of the species. McDougall (1908) extended the notion of an innate basis to empathy by including it in his discussion of "nonspecific response tendencies." Empathic responses were not conceived of as being directly related to specific stimulus conditions. Rather they were primitive passive responses which could be elicited simply by the observation of emotional responses in other members of the species. For example, fear could be elicited by the sight of the threatening object, or by the bodily and facial expression of fear emitted by

another person.

In direct opposition to McDougall's contention that empathic responses were instinctively based, Allport (1924) argued that the emotion aroused in the observer is not necessarily a replica of the performer's emotion. He contended that it is not the direct observation of the emotional behavior of the performer as much as it is the knowledge of the conditions which are affecting him that makes it possible for the observer to understand his state of mind. The observer's emotional response was seen as a conditioned emotional response (CER) which reflects his having learned that expressions of emotion are signs that there is something to be emotional about. Allport's discussion of empathy raised two issues which constitute much of the impetus for contemporary research on empathic responses. First, he suggested that empathic responses were essentially emotional responses. Second, he questioned whether empathic experiences were veridical with direct experiences.

Two of America's early eminent sociologists looked upon empathy as a requisite for social order. Cooley (1902) argued that the ability to enter into and share the minds of other persons was the means by which individuals agree without formal consensus on the structure and norms of their society. Mead (1934) appears to have accepted the experience of empathy as a given and was more concerned about its function in social processes. He wrote:

> Human society endows the human individual with a mind; and the very social nature of that mind required him to put himself, to some degree, in the experiential

> place of, or take the attitude of, the other individual belonging to that society and involved with him in the whole social processes of experiences and behavior which that society represents and carries on [Mead, 1934, p. 330].

Mead was among the first theorists to discuss empathy as a trait of the individual. He argued that the ability to enter into the minds of others or take the role of the other represented a measure of the individual's personality, for it required an individual of deep understanding and varied experience to empathize.

Empathy has been an important concept in theories of personality development, particularly in the writings of Harry Stack Sullivan (1953). In describing the child's acquisition of emotional responses Sullivan argued that the infant empathizes with the "mothering one's" feelings of euphoria, anxiety, or sadness. While the process by which empathy occurs is not clearly stated, it is held to be the prime source of emotion for the infant. In a similar sense Adler's (1955) "individual psychology" was based upon the ability of individuals to "know" one another. He claimed that true knowing involved seeing with the eyes of the other, hearing with the ears of the other, and feeling with the heart of the other. Empathy has continued to be a crucial concept in personality theory and psychotherapy, particularly within the non-directive approaches to psychotherapy (Rogers, 1951; Truax & Carkhuff, 1967).

While the foregoing descriptions of empathy reflect slightly different orientations, there does appear to be general agreement that the concept embodies two components, which Krebs (1970b) has

denoted as a predictive component and an affective component. The nature of these components is readily revealed when one examines one of the more completely stated definitions of empathy:

> Empathy may be defined as the self-conscious effort to share and accurately comprehend the presumed consciousness of another person, including his thoughts, feelings, perceptions, and muscle tensions, as well as their causes [Wispé, 1968, p. 441].

Within Wispé's definition the accurate comprehension of another person's conscious state as well as its causes has been taken to imply a perceptual, cognitive, or predictive component of empathy. The observer knows how the other individual feels, or what he is thinking, and perhaps how he will behave. An affective component is implied by the requirement that the observer share these thoughts, feelings, perceptions, and muscle tensions. It is not enough simply to have knowledge of the other person's state, but one must also vicariously experience what the other person is experiencing.

There is seemingly an obvious third facet of empathy which is seldom considered in definitions, but which has implied importance. In any discussion of empathy there is the implication that, while a covert process, it has an overt expression; that it expresses itself in action. It would be expected that an individual who understands and vicariously experiences another person's state would be disposed to respond overtly in particular ways. Indeed it would seem that the reason for the empirical interest in empathy lies with the identification of the interplay between the knowledge of and the vicarious experience of another person's state and subsequent behavior toward

that person. It is this problem which guides subsequent discussion in this paper.

Empirical Investigations of Empathy

Interest in the psychological processes by which one person apprehends the "inner being" of another person has been a major impetus within the study of person perception. Consideration has been given to empathic responses within investigations of "interpersonal judging accuracy," "interpersonal knowing," or "interpersonal intuition" (Bruner & Tagiuri, 1954). The usual method of studying empathy has been to assess the disparity between an observer's prediction of a performer's responses and the responses actually made by the performer. The smaller the deviation between the predicted and actual responses the better the observer is assumed to have empathized. Usually the method requires the observer to predict the relative or absolute position of the performer on one or more scales of defined psychological dimensions. Exemplifying this approach is the research of Rosalind Dymond who was among the first to attempt a thorough study of empathy.

In her preliminary study Dymond (1948) required her subjects to construct stories about characters portrayed in TAT cards. Empathy was assessed by objective raters as the extent to which the subject assumed the role of the characters about whom he had elaborated stories. Any indication that the subject had adopted the roles of the characters was taken as evidence for empathy.

In subsequent studies Dymond (1950, 1952) employed a lengthy

rating-scale measure of empathy (Dymond, 1949) as the dependent measure and had the subjects make their ratings within interpersonal situations. The subjects were first permitted to get to know one another in an informal setting. Then each subject was required to rate each of the other subjects, rate himself, rate the other subjects as he thought they would rate themselves, and rate himself as he thought the other subjects would rate him. Empathy was operationally defined as the composite score of the correspondence between the subject's rating of others as he thought they would rate themselves and their self-ratings, and between the subject's ratings of himself as he thought the others would rate him and their actual ratings of him. Insight was defined as the correspondence between the subject's rating of himself and the other subjects' ratings of him. Thus Dymond was able to obtain measures of both ones sensitivity to others and sensitivity to self. On the basis of these results, measures of personality and biographical information she concluded (Dymond, 1950, 1952) that empathic individuals were typically well adjusted, popular, mature people who came from close families.

In contrast to this conclusion Lindgren and Robinson (1953) argued, in a review of Dymond's rating-scale measure, that much of the correspondence between ratings could be attributed to subjects' sensitivity to socially desirable responses, and that the conventionality of the observer and performer accounted for the relationship of accuracy with empathy. Similarly, Bender and Hastorf (1953) hypothesized and found that when the observer and performer were of similar

personalities, the observer can be accurate in his judgment of the performer simply by projecting his own opinions, beliefs, and behavioral tendencies onto the performer. The similarity of observer and performer has consistently been found to be an important determinant of empathic responses (Krebs, 1970a; Macaulay & Berkowitz, 1970; Stotland, 1969), and indeed may be the variable which best facilitates the elicitation of empathic responses.

A number of reviews have been critical of the research methodology which Dymond's work represents (Cronbach, 1955; Taft, 1955; Tagiuri, 1969). Within these reviews there is general agreement that the approach only permits gross estimates of interpersonal judging accuracy and thus does not consider some of the potentially more influential elements of the ability. Aside from criticisms of a statistical nature, the major criticism of the approach is that it ignores the transitional nature of the ability. As Cline (1964) reports, the ability to perceive accurately one aspect of another person's personality, opinions, or behavioral dispositions does not necessarily imply a general ability, but rather may only indicate differential judging accuracy. Thus an individual may be able to accurately estimate another person's behavioral tendencies but not his opinions.

Predictive empathy is generally discussed as a personality trait (Dymond, 1950; Truax & Carkhuff, 1967). However, accepted definitions of empathy clearly imply that it has an affective component. Allport (1924) in particular was emphatic that emotional responses

are an integral part of empathic responses. If this were so, then empathy would have to be recognized as being more of a state than a trait of the individual. As Krebs (1970b) suggests the popularization of the polygraph has done much to facilitate the measurement of affective empathic responses.

Vicarious emotional responses. The study of vicarious emotional experience has primarily been conducted within the investigation of vicarious conditioning of emotional responses (Bandura, 1969) and of psychological stress (Lazarus, 1964). The procedure typically employed in both of these areas of investigation has been to record psychophysiological responses from observers as they watch another person being subjected to aversive stimulation. Changes in the psychophysiological indices are then interpreted as indicative of vicariously experienced emotion.

Berger (1962) was among the first theorists to attempt a methodical investigation of vicariously instigated emotional responses. Using a classical conditioning paradigm he found in a series of three experiments that observers who watched a performer appear to receive electric shock and jerk his arm contiguous with the sound of a buzzer emitted more conditioned galvanic skin responses (GSRs) to the buzzer than observers who watched the same performer receive shock but emit no cues, not receive shock but emit cues, or neither receive shock nor emit cues. This finding provided convincing evidence that the conditioning of the observers' GSRs could not be attributed to the performer's apparent emotional experience alone, or

to the performer's receiving shock alone. Rather it is evident that the observers' emotional responses were instigated by the performer's situation (shock) in tandem with his emotional display. In a partial replication of Berger's experiments Tomes (1964) also found that the observers' emotional responsiveness to a performer's distress was heightened by the emission of pain cues.

Haner and Whitney (1960) had their observers watch a performer appear to be shocked each time a light was presented. They found that this procedure elicited GSRs from the observers, the magnitude of which were positively related to tested anxiety level. They termed this phenomenon "empathic conditioning." A classical conditioning paradigm was also used by Bandura and Rosenthal (1966) in their investigation of the relationship between vicarious conditioning and arousal. They found that GSRs could readily be elicited from observers watching a performer being shocked, but that extreme anxiety inhibited the relationship. Although subjects who were threatened by shock conditioned better than subjects who were not threatened, subjects who were injected with epinephrine evidenced less conditioning than less aroused subjects.

It is evident from these and other studies (Craig & Weinstein, 1965; Ogston, 1967) that the observation of an individual being subjected to electric shock consistently produces emotional responses in the observer. However, electric shock may not be typical of the day-to-day instigators of displays of distress. Lazarus (1967) and his colleagues have made extensive use of movies depicting distressed

individuals to instigate emotional reactions in viewers. Lazarus, Speisman, Mordkoff and Davison (1962) monitored the GSRs and heart rates (HR) of college sophomores as they watched two types of films. The first film presented a rather mundane description of the daily activities of a family of Iowa corn farmers. The test film showed the primitive subincision rites of an Australian Stone Age tribe in which a series of crude operations were performed on the genitals of pubescent native boys. They found that subjects who watched the subincision rites emitted more GSRs and experienced a greater increase in HR than subjects who watched the control film. These changes were generally accepted as indicative of stress reactions, although it is conceivable that they reflect other vicarious effects as well (Lazarus, 1964). For example, both males and females watched the test film. It is quite possible that the sight of the adolescents' genitals had an arousing effect on some of the female subjects; and for that matter, on some of the male subjects. In addition, rather than being stressed by the rite, some subjects may have actually experienced sadistic fascination with it.

When these findings are considered with the evidence from studies using shock it is very evident that vicarious emotional responses may be elicited and studied in the laboratory. Berger (1962), Lazarus (1964), and Bandura and Rosenthal (1966) all cite anecdotal evidence that their observers experienced quite intense emotional reactions. Some of Berger's and Bandura and Rosenthal's subjects reported that they could not bear to watch the performer

being shocked and had to avert their eyes, or direct their attention to pleasant thoughts to remain comfortable. Some of Lazarus' subjects complained of nausea at the sight of the subincision rite.

It is noteworthy that the stimulus conditions used to elicit the vicarious responses were all extremely aversive in the studies reported above. In every case the subjects were required to observe another person's pain. Only a few studies have considered the vicarious instigation of pleasant or positive emotions. Craig and Weinstein (1965) had their subjects watch a performer perform a difficult motor task. They found that groups which watched the performer consistently fail at the task emitted more GSRs than groups which watched the performer consistently succeed. In this instance the difference between the vicarious response to success, a positive state, and the vicarious response to failure, a negative state, was a matter of degree.

Stotland and Sherman (reported in Stotland, 1969) had their groups of subjects observe a performer appear to have diathermic heat applied to one hand. One group of subjects was informed that the heat was pleasurably warm; another group was told that the heat was of neutral intensity; and the third group was informed that the heat was painful. The three groups each experienced three instruction conditions designed to produce different cognitive sets. Subjects under the first set of instructions were directed to imagine how the performer felt while being subjected to the heat (imagine-him). The second set of instructions directed the subjects to imagine how they

would feel if in the performer's place (imagine-self). The third simply instructed the subjects to watch the performer (watch-him). Palmar sweating and vasoconstriction were monitored from the subjects during the observation period. The investigators defined "empathy" as a psychophysiological response to the performer's situation, and a self-report of mood which was concordant with the quality (positive or negative) of the performer's apparent state under each of the treatment conditions.

Stotland had hypothesized that subjects under the imagine-self condition would respond more intensely and report a more congruent mood after observing pain or pleasure than subjects under the other two cognitive sets, and that subjects under the imagine-him set would respond more intensely than those under the watch-him set. Within the groups more intense responses were expected from subjects witnessing apparent pain or pleasure than from subjects witnessing the "neutral" heat.

The results, while somewhat equivocal, tended to support the hypotheses, particularly under the "pain" condition. Within the imagine-self condition the observation of apparent pain resulted in more palmar sweat responses and higher self-ratings of negative affect than did the observation of apparent pleasure, or neutral experience. The imagine-him set produced no differences in rated mood or palmar sweating, but the observation of pain and pleasure both produced more vasoconstriction than the observation of the neutral experience. The watch-him set produced no differences in responses or ratings, and

there were no differences in the response to apparent pleasure across the three cognitive set conditions.

Stotland (1969) concluded that because there were no significant differences on the psychophysiological measures among the watch-him-pain, -neutral, and -pleasure conditions, while there were differences under the other two cognitive sets, that empathy was related to the cognitive set that the person had while viewing another person's emotional display. However, the only condition that met the defined requirements of empathy was the imagine-self-pain condition which was different from most of the other conditions with respect to the amount of palmar sweat responses, and different from the other imagine-self conditions with respect to self-ratings of mood. In some ways it is difficult to assess the importance of the observers' cognitive set when viewing another person's emotional display. Stotland and Sherman's (1969) evidence is quite clear that one's cognitive set has an effect. However, none of the studies described earlier required other than simply having the subject "watch" the performer, and each of these studies report eliciting intense emotional responses. It would seem, therefore, that in experiments of this type that the experimenter might hedge his bet by employing an "imagine-self" cognitive set.

Like the finding of Craig and Weinstein (1965), the differences between the vicarious experience of a positive state the and vicarious experience of a negative state in Stotland and Sherman's (1969) study was mainly a matter of degree; the observation of pain

elicited more intense responses than the observation of pleasure. These findings suggest that within the limits of the research cited here, vicarious emotional responses to qualitatively different emotional displays differ quantitatively along a continuum. Alternatively, it may be postulated that the differences in responses occur because it is more difficult to create a potent pleasure-instigating situation than it is to create a potent distress situation (Krebs, 1970b). Therefore, the differences found could be taken as reflecting the potency of the instigating stimulus situations.

A third possibility has been suggested by Lacey (1959) who argued that different emotional states may reveal themselves as response-specific autonomic response patterns; that positive emotional states may be differentiated from negative emotional states, for example. A study by Averill (1969) provides some evidence for the tenability of this position. He recorded autonomic responses from three groups of subjects as they viewed either a sadness-inducing film, a mirth-inducing film, or a control film. Subjects viewing the sad film and the comedy both evidenced higher skin conductance and more GSRs than subjects viewing the control film indicating that the hypothesized emotional responses had been instigated by the test films. When the effects of the test films were compared it was found that increases in systolic and diastolic blood pressure were unique to the sadness condition, and that increases in respiration rate and respiration irregularities were unique to the mirth condition. Hence, while electrodermal changes were prominent under both experimental

conditions, cardiovascular changes were most characteristic of sadness and respiratory changes were most characteristic of mirth.

While it may be tempting to infer that the foregoing experiments demonstrated observer empathy, Berger (1962) cautions against just such an inference. In presenting a rudimentary taxonomy for the classification of vicarious emotional responses Berger defines empathy as occurring when the emotional responses of the performer and observer are concordant. For example, Table I shows that empathy would occur if a performer's positive emotional response instigated a positive emotional response in the observer (Case I), or if a performer's negative emotional response instigated a negative response in the observer (Case IV). Within the research cited above it is quite possible that the observation of pain instigated a sadistic response (Case III) rather than an empathic response. In fact Bandura and Rosenthal (1966) reported that several of their subjects admitted that they had derived considerable satisfaction from witnessing the performer's pain. Conversely, subjects witnessing a performer's pleasure may have been envious of it (Case II). Berger's caution is well founded and suggests that simply instigating an emotional response in observers only provides indirect evidence that the observers have in fact empathized.

Other evidence which militates against acceptance of the assumption that the observer's emotional response is necessarily concordant with the performer's emotional state is the finding that the vicarious experience of an aversive stimulus may differ both qualitatively and quantitatively from the direct experience of that stimulus. Craig

TABLE I

Combinations of Emotional Responses for Performer and Observer (after Berger, 1962)

Case	Nature of Response	Performer's Response	Observer's Response
I	Empathy	Positive	Positive
II	Envy	Positive	Negative
III	Sadism	Negative	Positive
IV	Empathy	Negative	Negative

(1968) used a balanced, repeated-measures design in having his subjects immerse one of their hands in 2° C. water, watch another subject immerse his hand, and imagine the experience of having a hand immersed in water. He found that the direct experience resulted in larger GSRs than did the vicarious or imagined experiences. However, the direct and imagined experiences produced HR acceleration whereas the vicarious experience produced HR deceleration. These effects have been replicated in studies by Craig and Wood (1969), in which only the direct and vicarious experiences were compared, and Craig and Lowery (1969), where electric shock provided the aversive stimulation.

The findings of Craig and his colleagues raise fundamental considerations for the investigation of empathic responses. It would certainly appear, on the basis of these findings, that direct and vicarious affective responses are qualitatively different. In this regard one must recall Allport's (1924) argument that the emotion aroused in the observer is not a replica of the performer's emotion, but simply reflects the observer's awareness that there is something to be emotional about. An alternative explanation of the findings is that the qualitative differences in the emotional responses are dependent upon whether the referential emotion is one's own or another person's. Having the subject experience the emotion directly, or imagine himself experiencing the emotion, as both Craig (1968) and Stotland (1969) did, appears to instigate at least a quantitatively more intense, if not a qualitatively different, response than simply watching another person's emotional display.

In summary, the findings from investigations of vicarious emotional experiences provide a number of considerations which should be incorporated into the investigation of empathic responses. It is quite evident that emotional responses may be instigated in observers by confronting them with another person's distress or pleasure. The intensity of the vicarious response appears to be a function of the richness of the performer's emotional display, the observer's level of arousal, and the cognitive set (self or other person) that the observer is maintaining. In addition, the display of negative emotional states apparently elicits stronger reactions than the display of positive emotional states.

Berger's (1962) conceptual definition of empathy as concordance between the emotional responses of the performer and the observer sets a demanding criterion for the demonstration of empathic responses. If this criterion is to be met then in Stotland's (1969) words, "The problem is to find the determinants and conditions of such empathy [p. 282]." Averill's (1969) qualitative differentiation of contrasting emotional states certainly provides some promise that many of these determinants are identifiable. In addition, the examination of research emphases which have paralleled the investigation of vicarious emotional experiences may reveal other determinants of empathic responses.

Aiding behavior. An inevitable consequence of social interaction is that the behaviors of each of the participants has some effect on the behaviors of each of the other participants. While

this would seem to be an intuitively obvious fact, until relatively recently this process had not been subjected to rigorous investigation. The findings thus far have had a profound effect on the understanding of psychological functioning. As Simmel (1968) has commented:

> There has been an increasing realization that no complete understanding of 'the' learning process, no thorough analysis of motivation variables, no explanation of behavioral development, can be completely adequate without some understanding of the ways in which the presence of behavior of one individual affects the behavior of another [p. 1].

It has become quite evident that the observation of the behavior of other persons provides information about the appropriateness or acceptability of particular behaviors within particular situations (Bandura & Walters, 1963). The behavior of other persons is seen as providing discriminative cues which facilitate the emission of particular behaviors by the observer. This effect has been termed a "response facilitation effect" by Bandura (1965) and "functional imitative behavior" by Gilmore (1968).

A consistent finding of studies of aiding behaviors is that the observer's response to the performer's situation is a function of the behavior of other persons present, or of the prior observation of the behavior of other persons in similar situations.[2] In short, the observer tends to behave toward the performer as he sees or has seen other persons behave. In a series of three field experiments Bryan

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[2]Excellent reviews of the literature on aiding behaviors have recently been presented by Bryan and London (1970), Krebs (1970a), and Macaulay and Berkowitz (1970).

and Test (1967) demonstrated that the observation of benevolent models elicited congruent benevolent behavior from observers. In their first experiment they staged an automobile breakdown on a city thoroughfare and simply counted the number of passing motorists who stopped to offer assistance. Under a modeling condition the motorists had passed a similar breakdown where another motorist (the model) had apparently stopped to help. When compared with the control condition, wherein no prior breakdown had been passed, it was found that the modeling condition resulted in a significantly larger proportion of helping motorists. In the other two experiments they found that shoppers were more likely to contribute to a Salvation Army kettle if they had just witnessed a model make a contribution. The results of these experiments suggest that the models' behaviors had acted to increase the salience and demonstrate the acceptability of the benevolent responses for the observers, given the situation.

A series of studies by John Darley and Bibb Latané (Darley & Latané, 1968a; Latané & Darley, 1968, 1970) were devoted to the investigation of the conditions which inhibit bystander intervention in an emergency. In the first of these experiments (Darley & Latané, 1968a) the subjects were seated alone in a room with an intercommunication system, ostensibly to have a discussion with other subjects about personal problems, and told that it was possible for only one person in the group (of either two, three, or six subjects) to be on the air at a time. After a brief discussion had transpired the subject heard what appeared to be an epileptic seizure. The subjects

who believed that they were the only other member of the group, and thus the only person who could help, reported the emergency to the experimenter more consistently and rapidly than subjects in the three or six-person groups; and subjects in the three-person groups reported more consistently and rapidly than in the six-person groups.

The results were interpreted as support for the hypothesis that as the number of bystanders at an emergency increases, the less likely, or more slowly, will any one bystander intervene or provide aid. Latané and Darley (1970) concluded on the basis of the results of this and subsequent experiments (Latané & Darley, 1968; Latané & Rodin, 1969) that people in groups fail to respond because the responsibility to respond is diffused among the witnesses such that no one witness feels the compulsion necessary to act. Alternatively it may be argued that the group members' inaction serves as a discriminative cue to inhibit the helping response, and that, rather than a "diffusion of responsibility" effect, the results reflect the introduction of a competing response in the observer by the other group members' unintentional service as models (Bandura & Walters, 1963).

Whatever the explanation of the effect of models, it is quite evident that whether or not aiding behaviors are emitted is partially determined by the observation of the behavior of other persons in similar situations. The experiments of Bryan and Test (1967) and other similar experiments with adults (Blake, Rosenbaum & Duryea, 1955; Wagner & Wheeler, 1969) and with children (Grusec & Skubiski, 1970; Staub, 1971) demonstrate that the observation of models'

behavior can facilitate the occurrence of benevolent acts. On the other hand the work of Darley and Latané (1968b) and other researchers (Korte, 1969; Piliavin, Rodin & Piliavin, 1969) may be interpreted as demonstrating that the observation of models' behavior facilitates the occurrence of malevolent, or at least non-benevolent, acts. It may be concluded, therefore, that the quality of the overt acts that a model is observed to emit tends to influence the quality of an observer's subsequent behavior.

In a series of experiments on the influence of social models on aiding behavior Hornstein, Fisch and Holmes (1968) and Hornstein (1970) found that the likelihood of the emulation of an aiding model was increased if (a) the model was observed to experience positive rather than negative feelings about his behavior, and (b) if the model was observed to act contrary to, rather than in conformity with, social expectations. Apparently a model who offers aid and where aiding behavior results in a positive or preferred outcome is more likely to be emulated. In addition, if the model's behavior within the aiding situation is contrary to socially expected and approved behavior, then that behavior is more likely to be emulated.

These findings are generally in keeping with principles which have been established through research on social learning. A consistent finding of investigations of the vicarious acquisition of behavior is that imitation is facilitated when the model's behavior is followed by a satisfying or successful outcome (Bandura, 1965; Flanders, 1968). The observation of "deviant" models who have not

been punished for being deviant in their behavior has been found to reduce the observer's inhibitions to perform acts which he may have previously considered to be deviant or not socially sanctioned (Walters & Parke, 1967). On the basis of Hornstein's (1970) findings and these principles of social learning it may be hypothesized that socially disapproved acts may be elicited simply by having the observer witness "deviant" behaviors, particularly when the "deviant" behavior appears to have the effect that the model intended.

An intuitively obvious antecedent of aiding behaviors would seem to be that the observer must be aware of and understand the performer's situation; that the observer recognizes that the performer's emotional display is a result of his situation, and its consequences. The recognition and understanding of a performer's situation and its affective meaning for him conforms to Wispé's (1968) condition that empathy includes the comprehension of the "causes" of the performer's "thoughts, feelings, perceptions, and muscle tensions." If the observer's cognizance of the performer's situation and state can be tentatively accepted as being an empathic response, then it may be hypothesized that subsequent aiding responses are mediated by empathic processes.

Aronfreed and Paskel (1965; reported in Aronfreed, 1968) hypothesized that children who had empathized with a nurturant adult would behave more altruistically toward her. Six- to eight-year-old girls individually sat with an adult female as she chose either a lever which ejected candy or one which activated a red light. Under

one condition the adult emitted a joyful statement whenever the light came on. In the second she hugged the child. In the third she emitted statements of joy and hugged the child. These demonstrative acts were designed to establish the adult's preference for the light, as opposed to the candy. On the test trials the child was permitted to select the lever in the presence of the adult, thus finding herself in a position of having to choose between candy for herself or pleasure for the adult. As predicted, the children who had experienced both the verbal and physical expressions of joy were significantly more altruistic than children under the other two nurturance conditions, and in fact activated the light more frequently than they selected candy.

These results were interpreted as support for the notion that the self-sacrificial responses of the children were motivated by the empathically experienced joy of the adult. Subsequent experiments by Midlarsky and Bryan (1967), Grusec and Subiski (1970) and Staub (1971), each using children as subjects, have generally replicated Aronfreed and Paskel's (1965) finding which has led Aronfreed (1970) to postulate that empathy is a prerequisite for altruism.

Darley and Latané (1970) have, in summarizing the results of their experiments cited earlier, termed the observational response to another person's distress "sympathetic distress" and suggested that the observer's attempts to reduce this distress may be manifested as helping behavior. An experiment by Aderman and Berkowitz (1970) attests to the tenability of this hypothesis. They had male

undergraduates listen to a taped conversation wherein a student asked another student (the model) to help compile a bibliography. The subjects were directed to attend to either the student or the model while listening to the tape. The model was heard to either not offer help, to help but not be thanked, or to help and be thanked. After providing self-ratings of his mood each subject was asked to help the experimenter score some data, the number of pages scored being the measure of helping.

The most help was secured from subjects who had attended to the student who did not receive help or the thanked model, while subjects who had attended to the model not offering help were least helpful. Subjects who had heard the model help and be thanked reported pleasant moods, whereas subjects who had heard the unhelped student reported unpleasant reactions. Aderman and Berkowitz (1970) suggested, primarily on the basis of the self-ratings of mood, that hearing the student not receive help, and the model help and be thanked had elicited empathic responses which facilitated subsequent aiding behavior. They argued further that their findings are reflective of the findings of other researchers and thus provide substantive reason to investigate Aronfreed's (1970) contention that altruism or aiding behavior is generally motivated by empathy.

Although the experiments of Aronfreed and Paskel (1965) and Aderman and Berkowitz (1970), among the others cited, provide indirect evidence that empathy motivates aiding behavior, they do not establish that empathy, within its broadest definition, occurred. In all cases

empathy was inferred to be a logical outcome of the experimental manipulations employed, but its occurrence was not directly demonstrated. However, an experiment by Krebs (1970b) provides evidence that altruism is directly mediated by empathic processes. He monitored observers' GSRs, HRs, and blood pulse volume as they watched a performer play roulette wherein a winning spin appeared to be rewarded (money) and a losing spin punished (shock). Subjects who were led to believe that their preferred activities and beliefs were similar to those of the performer evidenced stronger emotional reactivity to the performer's situation than subjects who believed themselves to be dissimilar. Moreover, subjects who believed they were similar reported, via self-ratings, that they identified more with the performer, and that they felt best when he was rewarded and worst when he was punished.

After the performer had finished the game he was given a bonus trial at the conclusion of which the observer dispensed the contingency. The instructions to the observers were such that they could acquire money at the expense of shocking the performer, or they could dispense money to the performer at the expense of receiving shock themselves. Thus helping oneself meant harming the performer, and helping the performer meant harming oneself. As was expected, observers who believed themselves to be similar to the performer, and thus had experienced the strongest emotional reactions to the performer's distress and pleasure, dispensed more money to the performer on the bonus trial than observers who believed themselves to be different.

Krebs' experiment would appear to have successfully induced and measured empathic responses through appraising their effects on subsequent aiding behaviors.

The findings of investigations of aiding behaviors provide quite conclusive evidence that observers' behavioral responses to another person's emotional display are qualitatively disposed by the observation of the behavior of social models in similar situations. That is, whether the observer responds benevolently or malevolently is functionally related to how he has observed others respond. The modeling effect appears to be most pronounced when the outcome of the model's acts are preferred by him. Qualitative differences in aiding behaviors also appear to be determined by the intensity of the observer's vicarious experience of the performer's state. As found in studies of vicarious emotional experiences, the empathic emotional responses tended to be most intense when the observer believed himself to be similar to the performer.

Individual Differences

One might reasonably hypothesize that, since it is socially expected that people should be kind to one another, a disposition of everyone would be to respond benevolently to another person's situation, be it one of pleasure or distress. On the basis of the theoretical and empirical evidence just reviewed one must conclude that this is not necessarily the case. Rather, one's behavior appears to be disposed by a number of situational determinants. However, situational determinants do not completely account for some of the findings of studies

of aiding behavior where some of the subjects responded to the situation contrary to the model's response. Thus the observation of a malevolent model did not necessarily dispose all observers to respond malevolently. An obvious postulation which would account for such disparate findings is that the modeling effect interacts with or is over-ridden by specific individual differences among the observers.

Some authors, particularly those interested in its contribution to efficacious psychotherapy (Rogers, 1951; Truax & Carkhuff, 1967), consider empathy to be a discrete personality trait. Unfortunately objective tests designed to measure the presumed trait (Dymond, 1949; Kerr & Speroff, 1954; Truax, 1961) have met sound criticisms of the instruments' validity (Cronbach, 1955; Chinsky & Rappaport, 1970). At best the empathic personality appears to be a composite of many traits and states. For example, Krebs (1970a) concludes, after a review of studies of altruism in which personality correlates were considered, that:

> College-age female altruists are socially oriented - they are cyclothymic (emotionally impulsive) and have social (versus political or economic) values. They are nurturant people with low needs for achievement and dominance. College-age male altruists also tend to be socially oriented; they are free of neuroticism, and tend to think they control their fates. They are well liked by others, slightly on the conservative side, and may tend to be authoritarian [p. 285; italics added].

In his doctoral research Krebs (1970b) found with male undergraduates that religious and aesthetic values, need-achievement, self-control, and nurturance correlated positively with altruistic behavior

while economic and political values correlated negatively. In addition, need-affiliation and extraversion were found to correlate positively with emotional empathic responses. Contrary to Krebs' finding, Schwartz, Feldman, Brown and Heingartner (1969) found that need-achievement correlated negatively with helping behavior, but that need-affiliation correlated positively. Need-affiliation has also been reported to correlate positively with sympathy (Falk, 1964) and with sharing behavior by children (Staub & Sherk, 1970). While the relationship between need-achievement and empathic responses is not clear, need-affiliation appears to be a general characteristic of empathic individuals.

Stotland (1969) has argued and demonstrated that an individual's birth order influences the extent to which he empathizes with other people. He found that later-born subjects empathized more with a performer designated as having had experiences similar to the subjects' than with the same performer when it was believed that his experiences were different. Although not controlling for birth order factorially Krebs (1970b) found it to be uncorrelated with empathic responses. Birth order may relate to empathic responses in the sense that it heightens the effect achieved when the observer and the performer are apparently similar in background or interest.

On the basis of these and a few other studies (Buchheimer, 1963; Chance & Meanders, 1960; Walster, Berscheid & Walster, 1970) a number of individual differences have been identified which are recurrently found to relate to empathic responses. Locus of control, need-

achievement, and need-affiliation appear to be related to overt expressions of empathy, while need-affiliation and extraversion appear to correlate with covertly experienced empathic responses. The empathic individual would seem to be one who believes that his fate is under his own control, who is affiliative and nurturant in relationships with other persons, and who is impulsive and emotionally labile.

Conclusion

When one person observes the emotional display of another person a number of social and psychological variables are engaged in a complex interplay which determines the observer's responses. From the many experiments and studies reviewed in the preceding pages it is evident that a wide variety of situational, state, and trait variables function independently and interactively to facilitate some responses and inhibit other responses that the observer might emit. Many of the functional variables most relevant to the proposed investigation have been identified by the work of other researchers. In addition the dynamic qualities of many of the variables have been specified and stated.

The purpose of this review has been to determine those variables which have been demonstrated to be antecedent to and concomitant with the occurrence of empathic responses; and thus to gain some insights as to the determinants of empathic responses. Given these insights the problem at hand is to postulate the inter-relationships of these situational, state, and trait variables as they function to elicit overt and covert empathic responses which differ qualitatively.

CHAPTER II

THE PROBLEM

The preceding review of empirical investigations of empathy revealed that there is a substantial body of evidence indicating that vicarious emotional experiences of different emotional states can be objectively differentiated, and that an equally substantial body of evidence indicates that behavioral responses within different situational contexts may be differentiated. However, little consideration has been given to the relationship of vicarious emotional states to behavioral responses. Each research emphasis has resulted in the identification of antecedent and concomitant variables which appear to be functionally important in the elicitation of different empathic responses. If the two emphases are to be integrated to yield a more complete explanation of empathic processes, then it will be necessary to attempt to relate the variables found to influence covert, vicarious emotional experiences with those which have been found to influence overt, behavioral responses.

Determinants of Empathic Responses

When the results of experiments on vicarious experiences and aiding behaviors are compared, a number of variables are suggested by both research emphases as being important determinants of empathic responses. While it would seem necessary that an observer be aware that a performer is experiencing pleasure or sadness for empathy to occur, such awareness is not a sufficient condition for the occurrence

of empathic responses. Instead, certain other conditions must be met before empathy may be elicited. The characteristics of the observer, the setting in which the empathic responses occur, perceived similarity between observer and performer, and the cognitive set with which the observer witnesses the performer's state have each been found to influence the occurrence of empathic responses. Cognizance of these conditions permits the opportunity to create a laboratory situation which optimizes the probability of eliciting empathic responses.

The observer. As noted earlier, the assumption that empathy is a measurable personality trait has repeatedly been challenged on rather serious grounds. It is more probable that the "empathic individual" represents a composite of many personality traits, which appear to primarily be socially desirable traits. In support of this interpretation research by Sutker (1970) demonstrated that sociopaths have difficulty in vicariously experiencing another person's emotional state, and consequently their capacity to empathize may be deficient. In a study of civil rights workers Rosenhan (1970) found that the more an individual was committed to helping people in general, the more he exhibited altruistic tendencies. On the basis of this finding one might surmise that individuals who are in professions such as social work, medicine, nursing, and the ministry, in which they are constantly helping other individuals would be more likely to evidence empathic responses.

At a more basic level of individual difference, there is a reasonable possibility that sex differences influence empathic responses.

Females are commonly considered to be more emotionally labile than males. If this is so then females may also be more vicariously responsive, and thus react more empathically to a performer's state. In addition, female subjects are reported to be more easily influenced by social demands and expectations (Karlins & Abelson, 1970); hence they may also be more sensitive to the influences of social models. Although these sex-specific characteristics are in varying stages of being empirically established, one might expect less equivocal results from the study of empathic responses if females, typified by the other facilitory characteristics discussed above, were the subjects of the investigation.

The setting. With but a few exceptions (Craig & Weinstein, 1965; Krebs, 1970b; Stotland, 1969) the conditions used to elicit empathic responses have primarily been aversive. Consequently little is known about the possible differences between responses to pleasant and unpleasant stimulus situations. It is likely that aversive conditions have predominated in use because they typically elicit more intense responses. However, the almost exclusive use of aversive stimulation does little to permit the test of hypotheses, such as Berger's (1962), which lead to the prediction of differential effects. Therefore, a comparison of overt and covert responses to pleasant and unpleasant stimulus conditions would permit a more complete investigation of empathic responses.

It is important to consider what the term "stimulus condition" connotes. Berger's (1962) research clearly demonstrated that an integral part of the performer's emotional display are the expressive acts

that the performer emits. A performer's emotional display which provides relatively unambiguous facial and postural cues is more likely to elicit emotional responses from the observer. At the same time, the situation must not result in the pseudovicarious instigation of emotional responses (Berger, 1962). Pseudovicarious effects may occur as a result of direct rather than vicarious instigation. For example, if the observer is under the impression that he will receive the same treatment as the performer, then emotional reactions may be intensified. Another possibility is that the observer may respond directly to the stimulus delivered to the performer rather than to the performer's emotional display; or, the observer may respond to the performer's overt actions only, so that the conditions which precipitated the responses become superfluous. While it is evident that the observation of a performer's emotional display, particularly when expressive, will instigate emotional responses in the observer, care must be taken that the observer is responding to the vicarious elements of the stimulus situation.

Similarity. A common finding of investigations of predictive empathy, vicarious experiences, and aiding behavior is that when the observer believes himself to be similar to the performer on any one of a number of dimensions, he is more likely to "empathize" with the performer (Krebs, 1970a). Indeed, this one variable, above all others, appears to have the most profound effect on empathic responsiveness. It seems reasonable that an observer who believes himself to be similar to the performer in important ways, such as similarity of personality,

past experience, and attitude, should not only be attentive to the performer's situation, and be predisposed to identify with him, but should also be more capable of understanding how the performer feels and of reacting in a similar way. Consequently, fostering a belief of similarity in the observer should facilitate the occurrence of empathic responses.

Cognitive set. Stotland (1969) found that observers who witnessed a performer's emotional display while imagining what it would feel like to be in the performer's place evidenced a stronger empathic reaction than observers instructed simply to watch the performer, or to imagine how he felt. Using a somewhat different procedure, Craig (1968) reported that physiological arousal evidenced by subjects imagining a cold pressor test was comparable to that resulting from the direct experience of the test, but different from that elicited by observing a performer undergo the experience. These results suggest that when the observer's response to a performer's emotional display is self-referential the intensity of the response tends to be heightened, if not qualitatively different.

In an experimental investigation of empathic responses it is critical that either experimental or statistical control be asserted on the variables discussed above. In planning the present research it was decided that these variables would, as much as possible, be maximized in an attempt to optimize the conditions for the elicitation of empathic responses. The efficacy of optimizing these conditions could then be determined through analyses of contraindicators and through subject self-reports post-experimentally obtained.

Social Models as Determinants of Empathic Responses

From the review of the findings obtained from investigations of aiding behavior it is evident that the observation of the behavior of social models may subsequently dispose qualitatively different behavioral response tendencies in observers. Bryan and Test's (1967) studies clearly demonstrated that the observation of a benevolent model led to an increase in benevolent acts by observers. The "diffusion of responsibility" effect enunciated by Darley and Latané (1968a) may be attributed to an inhibition of benevolent responses through the observation of social models. Hornstein's (1970) research indicated that the observation of a model's "deviant" behavior within an aiding situation may lead to the emulation of the "deviant" acts.

While the effects of modeling on overt responses has been relatively well demonstrated, the effects of modeling on covert, affective responses is not clear. It has been postulated, but not directly demonstrated, that in emulating a model's behavior the observer also adopts, to some degree of representativeness, the model's attitudes or feelings which are inferred to accompany the actions (Bandura & Walters, 1963). Whether the observer emulates the model's actions because he feels as the model felt and thus is motivated to act as the model is a contentious question reminiscent of the James-Lange and Cannon-Bard controversy. Alternatively, Schachter and Singer's (1962) finding that physiologically aroused subjects tended to adopt the moods of a model, as evidenced by self-reports and observed behaviors, suggests that models may serve to dispose the affective responses of observers.

How these contrasting affective states may be detected by monitoring changes in peripheral psychophysiological responses, as opposed to self-reports, for example, proves to be a potentially complex enterprise. The results of many of the studies reviewed earlier demonstrated quite conclusively that emotional arousal as evidenced on one index is not necessarily evidenced on another index (Averill, 1969; Craig, 1968; Stotland, 1969). Instead, different affective states are more likely evidenced as the directional fractionation of responses (Lacey, 1959, 1967). For example, a particular affective state may be evidenced as an increase in the rate or magnitude of one variable with an accompanying decrease on other variables, or as positively correlated changes. Thus, an affective state may be indicated as response-specific variation of autonomic measures.

A common finding, when different stimulus conditions were compared, was that aversive or negative stimulus conditions elicited different autonomic response patterns than did positive stimulus conditions. This difference is supportive of Lacey's (1967) contention that autonomic response patterns may reflect stimulus-specific response patterns as well as response-specific response patterns. The former implies that the individual's response is in some manner compelled by the nature of the stimulus conditions, while the latter implies that the response depends on the objective nature of the individual's set and expectation.

If social models dispose different emotional responses to a performer's emotional display, then the effect of the models may be considered as the disposition of response-specific response patterns.

It may be hypothesized that the differential effects of observing a rewarding as compared with a punishing model will be evidenced as different autonomic response patterns to a performer's emotional display. If the performer's emotional displays define qualitatively different stimulus conditions, as happiness and sadness differ qualitatively, for example, the performer's emotional displays may be considered to dispose stimulus-specific response patterns.

Investigation of the disposing effects of social models on emotional responses to different emotional displays implied an interaction effect since it was expected that modeled response-specific dispositions would be attenuated by stimulus-specific dispositions. Experimental manipulation of the stimulus conditions and response dispositions could provide for the assessment of differences in observers' emotional responses to different emotional displays. It was assumed that these could be established by confronting benevolently disposed and punitively disposed observers with a performer's positive and negative emotional displays. Since one purpose of the study was to investigate the effectiveness of social models in disposing qualitatively different empathic responses, both behavioral and emotional indicators of empathy were of interest. It was assumed that different empathic response tendencies would be evidenced by qualitatively different behavioral responses to a performer's emotional displays and by concomitant qualitative differences in psychophysiological reactions.

Overview of the Present Study

The present study attempted (1) to induce emotional responses in

the subjects by having them observe a performer's emotional reactions to her success and failure at a motor task; (2) to manipulate the subjects' response tendencies to the performer's emotional displays through the subjects' prior observation of a model who always rewarded or always punished success and failure; and (3) to assess the effects of the model's behaviors on the subjects' emotional and behavioral responses to the performer's emotional displays. In addition, the effect of the outcomes of the model's behaviors on the subjects' responses was assessed. The subjects were required to dispense reward, nothing, or punishment to a performer, as she succeeded or failed at a motor task, having previously observed a model always reward or always punish success and failure. The consequence or outcome of the model's behavior had been either repeated success by the performer, mixed success and failure, or repeated failure.

Two control groups were used in the study, neither of which were exposed to a model. The first group was permitted to respond to the performer as they wished, while the second group was directed to reward success and punish failure. The responses of the first group were assumed to represent normative response tendencies. The second group was included in the study to determine whether simply directing the behavior of subjects resulted in emotional responses comparable to those evidenced by subjects who were permitted a free response.

Three types of responses were measured: behavioral responses, psychophysiological responses, and subjective ratings. The behavioral responses were the contingencies reward, nothing, or punishment that

the subjects dispensed to the performer. The psychophysiological variables measured were electrodermal responses and variations in heart rate and respiration rate. Each subject was required to provide self-ratings of her affective state, and to provide impressions of the performer through rating-scale measures. The behavioral and psychophysiological measures were taken simultaneously throughout the experiment and the ratings were post-experimentally secured.

It was predicted that subjects who had observed the model's benevolent behavior to result in repeated success would respond more benevolently to the performer's success and failure and evidence different emotional response patterns than would subjects who had had no prior experience with the model, or who had observed the model's punitive behavior. This prediction was based in part on the findings of a pilot study, reported in the Appendix, conducted to assess the efficacy of some of the manipulations proposed for use in the study. The results of the pilot study supported the hypothesis that social models may differentially dispose behavioral empathic responses, and suggested that differential emotional empathic responses may be disposed as well.

Finally, it was expected that the subjects' use of the contingencies could be employed to classify their emotional empathic responses. Working from Berger's (1966) taxonomy of vicarious emotional responses (see Table I, p. 21), it was reasoned that observing the model to consistently dispense reward would dispose the subjects to feel an affinity for the performer which would be evidenced as a tendency to reward her success and failure. Rewarding success was defined as <u>altruism</u>

and rewarding failure was defined as sympathy. Conversely, it was expected that the subjects would adopt a punitive attitude toward the performer as a result of observing the model consistently dispense punishment, which would be evidenced as a tendency to punish success and failure. Punishing success was identified as envy and punishing failure was identified as sadism. Implicit in this rationale was the assumption that the observation of benevolence would facilitate a concordance between the subjects' emotional responses and the performer's emotional displays, while the observation of punitive acts would serve to dispose discordant responses. Having so identified altruistic, envious, sadistic, and sympathetic responses it was expected that autonomic response patterns characteristic of each could be identified through analyses of the psychophysiological measures.

Although the main objective of the study was to investigate the disposing effects of the social model on empathic responses, the design also included a consideration of the deterministic qualities of selected personality traits and other individual differences. Analyses of the relationship between individual differences and psychophysiological responses, and individual differences and behavioral responses provided an opportunity to extend the description of the determinants of different empathic responses across situational, state, and trait variables.

CHAPTER III

METHOD

Subjects

Eighty-two volunteer student nurses between the ages of seventeen and twenty years (median age = 18.4 years) served as subjects in the experiment. The subjects were obtained from the freshman classes of Calgary's three hospital schools of nursing. Forty-five volunteers were obtained from the Foothills Provincial General Hospital, 19 from the Holy Cross Hospital, and 18 from the Calgary General Hospital. The entire freshman class at each of the three schools of nursing completed a battery of personality tests prior to the experiment for which each student was paid $1.00. Each of the volunteers was paid $2.00 for participating in the experiment.

The data for four of the subjects were discarded. Two subjects misunderstood the instructions and thus did not follow the procedure correctly, and the data for two subjects were discarded because of equipment failure. Thus the report is based upon the participation of 78 subjects. Prior to the experiment a random assignment schedule was derived to assign the subjects to the eight groups used in the experiment.

Pre-Testing

Two weeks prior to commencing the experiment the freshman class at each of the three schools of nursing was administered a battery of personality tests which included the Eysenck Personality Inventory

(Eysenck & Eysenck, 1963), the I-E Scale (Rotter, 1966), and the Achievement, Affiliation, Dominance, and Nurturance scales of the Personality Research Form (Jackson, 1967). The Eysenck Personality Inventory provided measures of Introversion-Extraversion and Neuroticism, and an estimate of the testee's tendency to fake favorable responses to test items. The I-E Scale provided an estimate of the extent to which the testee believed her life experiences to be externally determined by fate or chance as opposed to self-control. The four scales of the Personality Research Form provided estimates of the testee's aspiration to accomplish difficult tasks (Achievement), enjoyment while with friends and people in general (Affiliation), tendency to attempt to socially influence or direct other people (Dominance), and tendency to offer sympathy and comfort to others (Nurturance).[1]

The test battery was administered by an assistant not involved in the experiment proper to reduce the possibility that the testee associate the pre-testing with the experiment. The testees were instructed that the tests were being given to collect norms on the scales and that, although the students' names were required, the results of testing would be kept in strictest confidence. The testees were required to provide their names and ages on the test battery answer sheet. Complete data were secured for 262 of the 285 students who completed the battery.

The results of the pre-testing were used for two purposes: First,

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[1]Permission was obtained from Dr. D. N. Jackson (1971, personal communication) to use the four scales separately from the complete battery.

they provided measures of the personality traits identified in the introduction as probable correlates of emotional and behavioral empathic responses. Second, they provided population norms (Calgary freshman student nurses) against which the students who served in the experiment proper could be compared for representativeness with respect to the personality characteristics measured.

Two weeks following pre-testing a request for volunteers was posted in each of the three schools of nursing. It described the experiment as a research project on motor learning, asked each volunteer to indicate a preferred day and time for participation, and promised $2.00 per hour payment for participation.

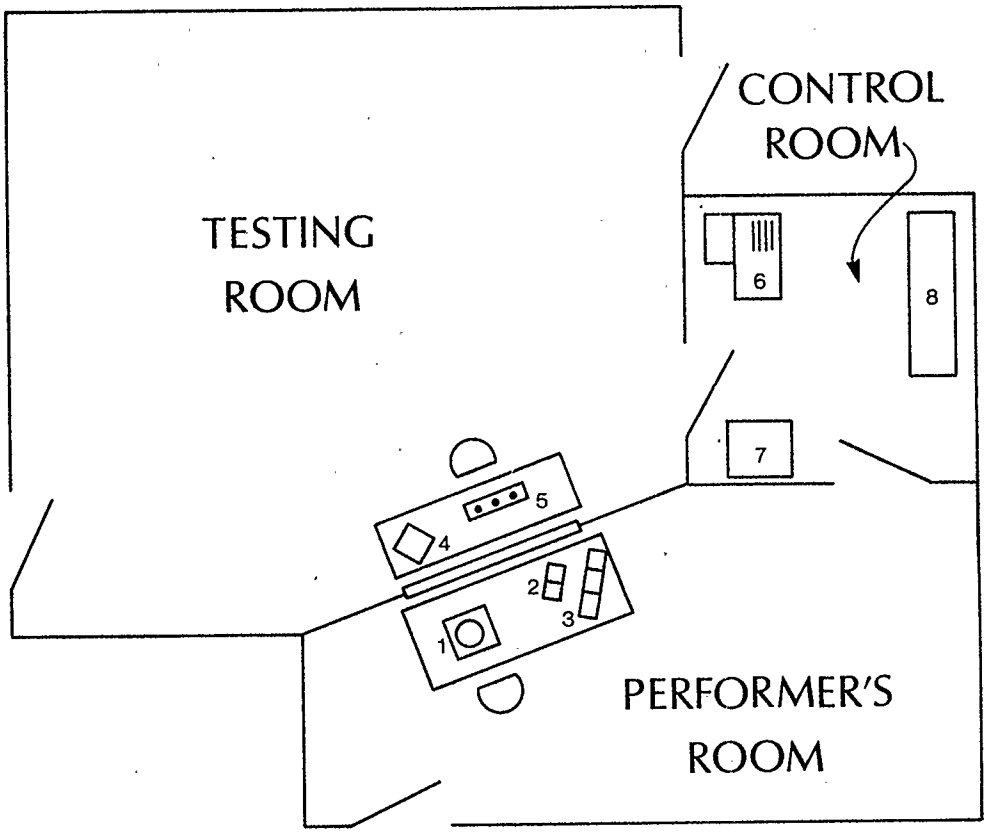
Apparatus

Measures of heart rate, tachometric heart rate, skin resistance, and respiration rate were continuously and simultaneously recorded throughout the experiment on a Grass Model 7B polygraph. Heart rate was recorded through a Grass Model PTT1 plethysmograph transducer. The left thumb was cleansed with alcohol, the transducer mounted, and a light-proof hood pulled over the left hand. Skin resistance was recorded through a Grass Model P1B preamplifier which imposed a constant current of 50 μ amp. through a pair of Beckman silver-silver chloride electrodes. Adhesive electrode collars were placed on the thenar eminence and dorsal surface of the left arm. A ribbon of Beckman Offner Paste was squeezed into the center of each collar and onto each electrode. The electrodes were then mounted on the collars. Respiration rate was recorded through a Grass Model PT5 volumetric pressure

transducer from a strain gauge strapped across the subject's sternum.

Prepared modeling videotapes were presented to the subjects on a Sony Model TC15 television monitor through direct feed from a Sony Model EV210 Videocorder. A pursuit rotor apparatus was employed to create the motor task used in the experiment. The outcomes of the performer's trials on the task were presented visually as a lighted S (success) or F (failure). The subjects' overt responses to the performer were made through a three-switch response panel, the switches labeled R (reward), N (nothing), and P (punishment). Pressing each of the switches activated a green, an amber, a red light, respectively. All time intervals and manipulations were electronically timed and recorded on an event-marking channel of the polygraph.

Subjects were individually tested in three adjacent rooms of the Social Psychology Laboratory shown in Figure 1. The first (testing) room contained a table and chair situated in front of a one-way mirror which adjoined the second (performer's) room. On the table were the television monitor and the three-switch response panel. The performer's room, which was visible via the one-way mirror from the testing room, contained a chair at a table upon which were the pursuit rotor apparatus and the two visual displays. A light used to signal the commencement and duration of each trial was mounted on the pursuit rotor. The third (control) room housed the Videocorder, the polygraph, and a master control panel. Mounted in the control panel were switches to activate the signal light and the S/F visual display, and electronic timers to control each event.



1. Pursuit rotor
2. Outcome display
3. Contingency display
4. TV Monitor
5. Contingency response panel
6. Polygraph
7. Videocorder
8. Master control panel

Figure 1. The laboratory.

Procedure

Upon her arrival at the laboratory the subject was greeted by the experimenter (E), led to the testing room, and seated facing a drawn curtain which covered the one-way mirror. The subject's watch was removed and the transducers mounted. While mounting the transducers E engaged the subject in an apparently informal conversation, the purpose of which was to determine her birth order. The subject was then given a written set of instructions and E left the room. The instructions read:

> Thank you for volunteering to participate in this experiment. You are going to observe another student nurse learn a difficult motor task. Your function in the experiment will be to assist us in the study of the effects of reward and punishment on her learning of this task. You may be wondering how we assign our subjects to be observers and learners. Basically it is through random selection. Since we want the two subjects to be strangers, we find two girls from different schools of nursing who can come at the same time. Then we flip a coin to see who will be the observer (you) and who will be the learner.
>
> As part of the experiment we are recording your galvanic skin response, heart rate and respiration rate as you watch the learner. Since these responses are very sensitive you can help us most by:
>
> 1. Keeping unnecessary movement to a minimum.
> 2. Imagining how you would feel if you were the learner learning the task.
>
> We are interested in your responses to your observation of the learner. You will see the learner through the one-way mirror behind the curtain in front of you. However, the learner will be unable to see you, and is unaware that anyone, other than the experimenter, is involved in the experiment.

The preceding was common to subjects in both the experimental and the control groups. The instructions for subjects in the experimental

groups continued as follows:

> Rather than attempt to describe what you are to do in the experiment, we are going to show you. What we have done is videotape an earlier subject as she participated in the experiment. In just a moment the experimenter will play that tape on the TV to your right. But first, here is a brief description of what you will see, and what you will be doing.

In place of the immediately preceding instructions, subjects in the free-response control (FRC) group were instructed as follows:

> Here is a brief description of what will happen during the experiment, and what you will be doing.

The instructions then continued as follows for subjects in the experimental groups and the FRC group. Since the FRC group did not watch a videotape the wording of the instructions was modified accordingly, and two statements were omitted from the instructions. Changes in the wording are shown in parentheses, and omissions are shown in square brackets.

> The learner will be attempting to learn to hold the stylus on the revolving metal target for 10 out of 15 seconds per trial. If she succeeds, then the S display will light up, and if she fails the F display will come on. The learner will have 10 trials at the motor task. If she is learning, then of course more S's will come on [omitted for FRC]. The observer's (your) task is to reward, punish, or do nothing to the learner as she learns the motor task. When the S or F light goes off the observer (you) presses (press) one of the three buttons in front of you. R is reward and when pressed means that the learner receives 25¢ for that trial. N is nothing - neither reward nor punishment. P is punishment and when pressed delivers a mild, non-painful, but slightly irritating shock to the learner's arm. Now watch carefully and see how the procedure works [omitted for FRC].

In place of the immediately preceding instructions, subjects in the directed-response control (DRC) group were instructed as follows:

> The learner will be attempting to learn to hold the stylus on the revolving metal target for 10 out of 15 seconds per trial. If she succeeds the S display will light up, and if she fails the F display will come on. Your task will be to reward and punish the learner as she learns the task. When the S light goes off you press the R button in front of you - the learner will receive 25¢ each time you press R. When the F light goes off you press P which will deliver a mild, non-painful, but slightly irritating shock to the learner's arm.

Following the reading of the instructions by the control groups E entered the testing room and opened the curtain permitting the subject to view the performer's room. The performer, a 20-year-old business secretary, was seen standing behind the pursuit-rotor apparatus, stylus in hand, facing the one-way mirror.[2] An electric shock conductorium was strapped to her right forearm. To her right were the two visual displays. The first housed the S and F which could be illuminated by E to indicate whether the performer had succeeded or failed on each trial. The second display was the bank of three lights. The green light was at the top of the bank (farthest from the subject), next was the amber light, and the red light was at the foot of the bank. The procedure was reviewed for the subject by E to assure that she understood what she was to do. The first statement was designed to establish the similarity of the observer and performer. The final instructions were given verbally. Changes in the wording of these instructions

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[2]The performer, having recently moved to Calgary, was employed by an industrial supply firm located some distance from the three schools of nursing making it unlikely (and never evidenced) that any of the subjects had met her. To avoid the possibility that subjects would come to realize that she was constant for all of them, through comparing experiences, the performer used two wigs and a variety of different clothing styles in her appearances.

for the DRC group are shown in parentheses, with other changes shown in square brackets:

> It must be some kind of a coincidence, but both you and the learner are the first born [or order of birth appropriate] in your families.
>
> Okay then, you have it straight. The learner is going to try to learn the motor task of keeping the stylus on target for ten out of fifteen seconds. At the end of each trial the S will come on if she has done it, and the F if she has not. As soon as the S goes off you press one of the buttons to either reward her, punish her or do nothing to her (As soon as the S goes off you press R to reward her). You press one of the buttons when F goes off (You press P when F goes off). The green light will come on when you press R, the amber light if you press N [omitted for DRC], and the red light when you press P. Are there any questions? [Pause] Then we will start in a moment.

Modeling conditions. Subjects in the experimental conditions watched one of six modeling videotapes designed to induce a positive or a negative response-set in the subjects. Two variables were manipulated in the videotapes. First, the tapes showed either a model who consistently rewarded the videotaped performer, a 20-year-old undergraduate student, by pressing R (positive set), or a model who consistently punished the performer by pressing P (negative set) regardless of the performer's apparent success or failure on each of the ten videotaped trials. Second, although the videotaped performer's success and failure were randomly assigned across the first six of the ten trials, the last four trials showed the performer to achieve success only, failure only, or alternating trials of success and failure. Manipulation of these outcomes was designed to establish the apparent efficacy of the consequence the model was seen to dispense. That is,

both a rewarding model and a punishing model were seen to produce varying degrees of success and failure.

The videotaped model was an 18-year-old high school drama student. The recording of the videotape was such that only the back of the model's head and her right hand were visible indicators of her behavior. Under the positive model (PM-) condition the model consistently pressed the R button and was heard to offer encouraging comments like, "Good, good. You got it!", "Here's a quarter for you.", or "Aw, too bad, you'll get it next time." Under the negative model (NM-) condition the model consistently pressed the P button and heard to make depreciating and snide comments such as, "This will wake her up!", "Just lucky!", or, "That is just too bad for you."

Thus, the subjects watched one of the following six videotapes:

1. A positive model producing success (PM-S),
2. A positive model producing failure (PM-F),
3. A positive model producing mixed results (PM-M),
4. A negative model producing success (NM-S),
5. A negative model producing failure (NM-F),
6. A negative model producing mixed results (NM-M).

Following the presentation of the videotape E entered the testing room, opened the curtain to permit the subject to view the performer's room, and reviewed the procedure. The performer appeared as she did for subjects in the control groups. Subjects in the experimental groups were given the same verbal instructions given the control groups including the observation about the similarity of birth order.

Habituation trials. The subjects were instructed that the first five trials were practice trials to permit the performer to become acquainted with the apparatus and procedure. They were instructed simply to watch these trials. Each of the five habituation trials proceeded as shown in Figure 2. The performer worked the pursuit rotor for the 15 seconds that the signal light was on. Upon the offset of the signal light E displayed either the S or the F according to a previously determined random order of the two outcomes of success and failure. That is, the two outcomes were controlled by E and thus were independent of the performer's performance. The outcome display remained on for 10 seconds. The inter-trial interval ranged from 25 to 40 seconds in duration following the offset of the display.

During the 15 seconds per trial that she worked the pursuit-rotor the performer held the stylus on or near the rotating target. Since the table of the apparatus was at about the eye level of the subject, it was unlikely that the subject could determine whether the stylus was actually in contact with the target. At the end of each trial the performer looked eagerly to the S/F display. The S occasioned a straightening of posture and a facial expression of joy and satisfaction. The F occasioned a slumping of posture, a frown, and noticeable head shaking. During the inter-trial interval the performer appeared to inspect the performer's room and casually to practice the motor task.

Test trials. The subjects heard the following instructions to the performer:

> That is the end of the practice trials. On the next ten trials you are to do your best. If you manage to keep

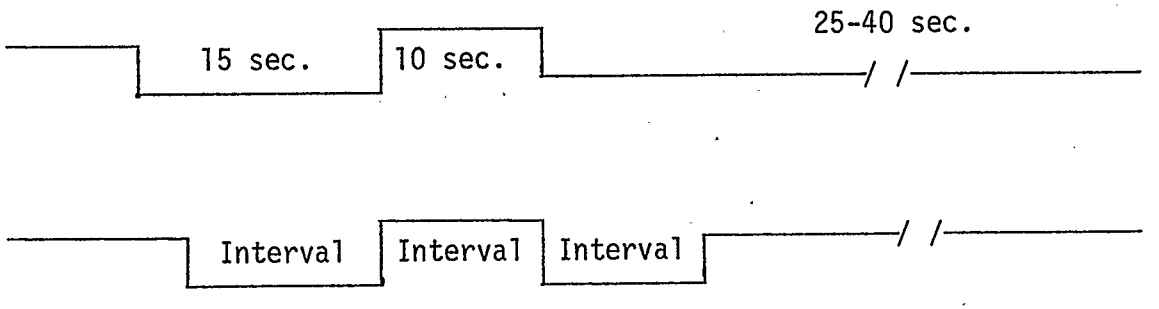

Figure 2. Timing of the procedure for the habituation trials.

the stylus on target for ten out of the fifteen seconds then the S will show. If you fail to do so, the F will show. If I choose to reward you, then the green light will come on and you will receive a bonus of twenty-five cents for that trial. If I give you nothing, the amber light will show. If I punish you, the red light will come on and a mild, non-painful, but slightly irritating shock will be delivered to your arm (E motioned to the conductorium strapped to the performer's arm).

The procedure followed during the test trials is presented in Figure 3. As in the habituation trials the performer worked the pursuit rotor for fifteen seconds. At the end of the 15 seconds the signal light went off and E displayed either the S or the F for 10 seconds according to a previously determined random order of the two outcomes such that S and F each occurred five times across the ten test trials. Upon the offset of the S/F display the subject selected either the R, N, or P button. Pressing the button to dispense the contingency simultaneously activated the corresponding colored-light display which remained on for 10 seconds. The inter-trial interval, which ranged from 25 to 40 seconds in duration, followed the offset of the contingency display.

The performer's routine during the test trials was identical to that performed during the habituation trials with respect to working the pursuit-rotor, her reactions to S and F, and waiting through the inter-trial interval. Her response to the green light was a facial expression of elation and satisfaction and a straightening of posture. The amber light occasioned no change in posture, but cued a slight cocking of the head, and an expression of mild surprise. The red light cued a slight jerk of the right arm, a postural slump, forward drop

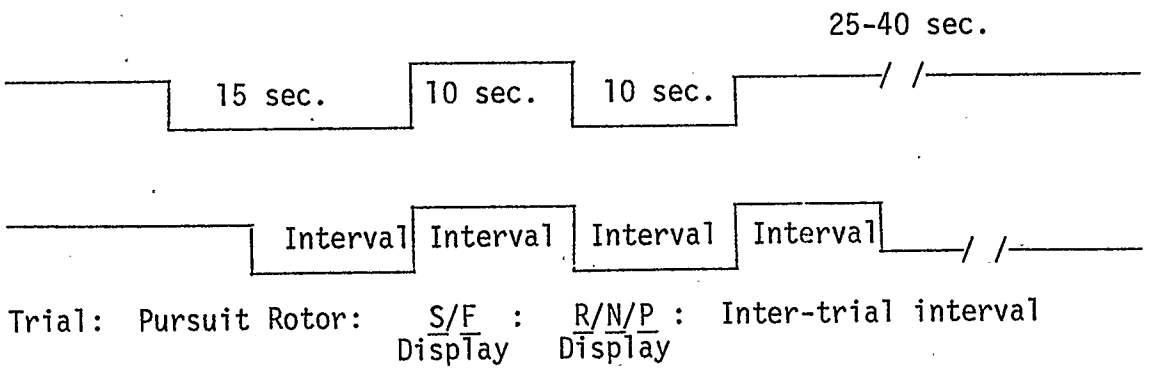

Figure 3. Timing of the procedure for the test trials.

of the head, a frown of disappointment as the performer rubbed the area around the conductorium, and slight head shaking.

At the end of the experiment the subjects were advised that E was making arrangements to speak to them during a lecture period and that the experiment would be explained in full at that time. The subjects were asked to refrain from discussing or describing the experiment to their classmates since many of them were yet to serve as subjects.

Post-experiment questionnaire. Three weeks following the completion of the experiment E used a lecture period at each of the three schools of nursing to administer a post-experiment questionnaire and to debrief the subjects. The questionnaire used a rating scale format to assess the subjects' recollections of the experiment. They were asked to rate the degree of similarity perceived between themselves and the performer, to rate the intensity of the pain experienced by the performer, to indicate whether they had expected to receive the same treatment as the performer received, and to estimate the number of trials upon which the performer was successful. The purpose of the questionnaire was to assess the success of the deception involved in the experiment, the possibility of pseudovicarious instigation, and the subjects' appraisal of the performer's apparent pleasure and displeasure.

Measures

The main dependent variable was the value of the contingency dispensed by the subject to success and to failure, where R = 1, N = 0, and P = -1. These values were summed across the five S and five F

trials to obtain the contingency response scores. The maximum possible value which could have been dispensed to either of the two outcomes was 5, and the minimum was -5.

The contingency response option "nothing" was included in the experiment to avoid the possibility that, if forced to choose between rewarding and punishing the performer, the subjects would dispense reward as the socially desirable response. However, since the autonomic response patterns which characterized altruistic, envious, sadistic, and sympathetic behavioral responses were of particular interest in the experiment the autonomic responses accompanying the dispensing of "nothing" were not analyzed, analyses being restricted to the responses accompanying the dispensing of reward and punishment.

Heart rate, respiration rate, and skin conductance were recorded throughout the experiment to identify possible differences between the responses to success and failure and among the responses accompanying altruistic, envious, sadistic, and sympathetic contingency responses. Heart and respiration rates and skin conductance measures were calculated for three intervals on the habituation trials and four intervals on the test trials. For the habituation trials Interval I was the 10 seconds immediately preceding the S/F display. Interval 2 was the 10 seconds that the S/F display was on, and Interval 3 was the 10 seconds immediately following the S/F display. On the test trials Interval I was the 10 seconds preceding the S/F display. Interval II was the 10 seconds that the S/F display was on. Interval III was the 10 seconds that the R/P displays were on, and Interval IV was the 10 seconds immediately following the R/P displays.

Heart rate (HR) was calculated as the number of beats occurring in each interval multiplied by six to yield beats per minute (bpm). Two tachometric heart rate (THR-) measures were calculated as beat-to-beat variation. Following Graham and Clifton's (1966) suggestion that measures of heart rate should consider its biphasic nature, measures of heart rate acceleration and deceleration were calculated. The acceleration (THR-A) measure was calculated as the difference between the mean of the two tachometric rates immediately preceding each interval and the fastest tachometric rate within the first five seconds of the interval. The deceleration (THR-D) measure was obtained by subtracting the slowest tachometric rate subsequent to the noted accelerative rate from the mean pre-interval rate.

Respiration rate (RR) was calculated as the number of respiratory cycles occurring within each interval multiplied by six to yield cycles per minute (cpm). Skin conductance (SC) was scored according to a procedure described by Edelberg (1967, pp. 4-5). Skin resistance (SR) was scored as the kilohms (1000 ohms) of resistance at the point of maximum deflection within each interval, and converted to micromhos (μmhos) of SC by the equation: $SC = 1/(SR \times 10^3)$. Measures of change in SC were facilitated by transforming SC to log skin conductance (LSC).

Changes in HR and RR were calculated as increments or decrements in the rates from interval to successive interval. Changes in tachometric heart rate were implicit in the THR-A and THR-D measures described. Change in LSC was expressed as the ratio of the conductance within an interval to the conductance within the preceding interval

(Montagu & Coles, 1966). Thus, an increase in SC from interval to successive interval is expressed as a ratio which is greater than unity (>1), and a decrease in SC is expressed as a ratio which is less than unity (<1).

The personality test battery provided measures of eight personality characteristics. These were obtained for the purpose of correlation with the behavioral and psychophysiological responses to the performer's situations.

Immediately following the final test trial E entered the testing room and gave the subjects a booklet of rating scales. The first set of scales was comprised of the Anxiety, Surgency, Elation, Fatigue, Social Affection, Sadness, and Skepticism factors of the Mood Adjective Check-List (Nowlis, 1970). The scales were given in an attempt to determine the relationships between emotional response patterns and the self-reports of mood. The second set of scales required the subjects to rate the performer on the following perceived characteristics: Happy, Sad, Competent, Likeable, Trustworthy, Dependability, and Emotional Stability. These ratings were done on nine-point Likert-type rating scales. Ratings of these characteristics were obtained to determine whether behavioral response tendencies were also revealed in subjects' assessments of the performer.

Summary of the Procedure

As shown in Table II, there were four main phases in the experiment. In Phase I the subjects in the experimental groups read the instructions and then watched one of six videotapes which were

TABLE II

A Summary of the Phases of the Experiment

Phase	Variables		Time
	Independent	Dependent	
Phase 1	Subjects in the experimental groups watched one of six modeling videotapes. Subjects in the control groups did not watch a videotape.	none	About 15 minutes.
Phase 2	All subjects watched the performer succeed and fail over five habituation trials.	Autonomic responses to observed success and failure.	About 5 minutes. See Figure 2.
Phase 3	All subjects watched the performer succeed five times and fail five times over the ten test trials.	The contingency scores. Autonomic responses to observed success and failure, and upon the dispensing of the contingencies.	About 15 minutes. See Figure 3.
Phase 4	none	Post-experiment ratings of mood and impressions of the performer.	About 5 minutes

designed to establish either a positive or a negative response-set in the subjects. Subjects in the control groups simply read their instructions.

In Phase 2 all subjects watched the performer as she succeeded and failed as she practiced the motor task. Psychophysiological responses were recorded throughout the habituation trials to determine the differences between the responses to the performer's success and failure.

In Phase 3 the subjects were required to dispense one of the contingencies to the performer each of the five times that she succeeded and each of the five times that she failed at the motor task. The sums of the values of the contingencies dispensed constituted a behavioral measure of the subject's response set. Psychophysiological responses were monitored throughout the test trials to determine differences between the responses to success and to failure, and among the responses which accompanied the dispensing of reward, and punishment to the performer.

At the end of the test trials the subjects were required to provide self-reports of their moods and ratings of their impressions of the performer (Phase 4).

CHAPTER IV

RESULTS AND DISCUSSION

Representativeness of the Sample

The measures of personality secured during pre-testing were employed to compare the sample of subjects used in the experiment with the population of freshman student nurses from which the sample was obtained. The ages and personality scores of the sample and population were compared by determining the probability of obtaining the deviation of the sample mean from the population mean on each variable (Winer, 1962, pp. 20-24). The resultant probability values, presented in Table III, indicated that the sample used in the experiment (n = 78) was comparable to a sample that might have been obtained by randomly sampling the population (N = 262). On the basis of the comparability of the sample and the population on these variables the sample was accepted as representative of freshman student nurses in Calgary at the time of the experiment.

The Possibility of an Order Effect

A potential problem of the random assignment of success and failure to each of the five habituation trials and each of the ten test trials was that an order effect may have been introduced by chance. Such an effect would have occurred if success or failure had been assigned to particular trials in the series an inordinate number of times. With 78 subjects it would be expected that success would have been assigned to each trial 39 times by chance. The frequencies with which success was

TABLE III

Comparison of the Sample with the Parent Population

Variable	Population		Sample	Difference	
	μ	$\sigma_{\overline{X}}$*	$\overline{X}$	z	p
Age	18.23	0.199	17.86	1.86	.07
Extraversion	12.94	0.364	13.26	-0.79	.43
Neuroticism	10.62	0.393	10.37	0.52	.60
Lie	2.33	0.136	2.05	1.54	.12
I-E	9.92	0.299	9.87	0.11	.91
Achievement	12.50	0.220	12.44	0.17	.87
Affiliation	16.61	0.183	16.89	-0.91	.36
Dominance	6.66	0.214	7.31	-1.69	.09
Nurturance	16.27	0.144	16.21	0.22	.83

*$\sigma_{\overline{X}} = \dfrac{\sigma}{\sqrt{78}}$

assigned the habituation trials and test trials were subjected to chi-square analyses to determine if any one trial in the series had been assigned success an inordinate number of times. As expected, the resultant chi-square values for the habituation ($\chi^2 = 0.077$, $df = 4$, $p = .99$) and test ($\chi^2 = 2.333$, $df = 9$, $p = .98$) trials indicated no systematic deviation from chance in the assignment of success. Therefore, no systematic order effect would be expected to have influenced the results.

Manipulation Checks

The post-experiment questionnaire was administered to 75 of the 78 subjects used in the experiment, three of the subjects having discontinued their nursing studies.

Similarity. The subjects were required to indicate on a five-point rating scale the extent to which they believed themselves to be similar to the performer in interests, attitudes, and past experiences. A chi-square analysis of the frequencies with which the rating points were checked indicated ($\chi^2 = 41.473$, $df = 4$, $p < .001$) that there were differences among the frequencies. An inspection of the rating data revealed that the subjects had tended to rate toward similarity ($\overline{X} = 3.99$, $SD = 1.154$).

Checks on pseudovicarious effects. Two questions were designed to assess whether the subjects' responses could be attributed to pseudovicarious effects. Sixty-six of the 75 subjects indicated that they had not expected to undergo the same treatment they observed the performer receive, only nine subjects indicated that they had expected the same treatment. A chi-square analysis was performed to determine if

any one group had expressed the expectation more than any other group. The resultant chi-square value (χ^2 = 1.400, df = 7, p = .98) indicated that the expectation was not expressed more frequently by any one group.

The subjects were required to indicate on a five-point scale their estimate of the painfulness of the shock delivered to the performer. A chi-square analysis of the frequencies with which the rating points were checked (χ^2 = 45.994, df = 4, p < .001) indicated that at least one rating point was checked more than the other rating points. An examination of the data indicated that there had been a systematic tendency to rate toward increasing pain ($\bar{X}$ = 3.97, SD = 1.23). The results of these analyses suggest that the subjects' responses to the performer's displays of pleasure and distress did not reflect their expectation of the same experiences, and that they did perceive the performer's displays as emotional.

Analyses of the Behavioral Responses

The contingency response scores were obtained by summing the values of the contingencies dispensed to the performer's apparent success and failure. Table IV summarizes the groups' mean contingency response scores to success and failure. An examination of the group means suggested that two effects had occurred. First, the overall response to success appeared to have been much more positive than the response to failure. Second, the PM- conditions appeared to have resulted in more positive responding to success and failure than had the NM- conditions.

The contingency response scores to success and failure for subjects under the PM- and NM- conditions were subjected to an analysis of

TABLE IV

Contingency Response Scores to Success and Failure

Group* Model - Outcome		Success		Failure	
		$\bar{X}$	SD	$\bar{X}$	SD
PM-	success	3.8*	2.251	-1.2	2.044
	mixed	3.6	1.838	-1.0	1.491
	failure	3.9	1.101	-1.1	1.567
NM-	success	2.6	1.647	-1.3	1.494
	mixed	3.4	1.647	-1.7	1.567
	failure	3.1	1.449	-2.4	1.430
Control	FRC	3.2	1.476	-1.3	1.636
	DRC	5.0	0.000	-5.0	0.000

*With the exception of the DRC group, which was composed of eight subjects, there were ten subjects in each group.

variance to assess the differential effects of the two modeling conditions, and their outcomes on the responses to success as opposed to failure (a repeated measure). Table V presents the results of the analysis and reveals two significant main effects, all other effects being extremely small. The mean contingency response scores associated with each of the significant effects are appended below the table. The responses of subjects under the PM- conditions were significantly more positive than the responses of subjects under the NM- conditions. In addition, the overall response to success was significantly different from the response to failure.

Since the control groups were truncated from the main design they were not included in the foregoing analysis. In addition, the DRC group was not intended for use in analyses of the behavioral responses. In comparing the FRC group with the modeling groups, it was decided to collapse the three model outcome conditions to yield a PM group and an NM group, each with an n of 30. The decision was based upon the lack of variance attributable to the model outcome conditions.[1] The FRC group's contingency response scores were compared with the PM and NM groups' scores in an analysis of variance, using a least squares solution to accommodate the unequal group sizes (Winer, 1962, pp. 374-378). Table VI presents the results of the analysis; the means associated with the significant effects are appended below the table.

The two effects found to be significant in the preceding analysis

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[1] As shall become evident as the results of the experiment are reported, the manipulation of the consequence or outcome of the model's behavior had no appreciable effect on the subjects' responses.

TABLE V

Analysis of Contingency Scores by Model and Model Outcome Conditions

Source	df	ms	F	p
Between Ss	59	1.431		
Model (M)	1	15.408	11.997	<.005
Outcomes (O)	2	0.400	0.312	ns.
M x O	2	0.933	0.727	ns.
$error_b$	54	1.284		
Within Ss	60	15.658		
Success/Failure	1	705.675	168.138	<.0001
M x S/F	1	0.008	0.002	ns.
O x S/F	2	1.600	0.382	ns.
M x O x S/F	2	2.133	0.508	ns.
$error_w$	54	4.197		

PM-	NM-
1.33	0.62
Success	Failure
3.40	-1.45

TABLE VI

Analysis of the Contingency Scores of the Modeling and Control Groups

Source	df	ms	F	p
Between Ss	69	1.389		
Groups (G)	2	7.710	6.419	<.003
$error_b$	67	1.201		
Within Ss	70	15.371		
Success/Failure	1	806.400	200.797	<.0001
G x S/F	2	0.266	0.066	ns.
$error_w$	67	4.016		

PM	FRC	NM
1.33	0.62	0.96

Success	Failure
3.37	-1.43

were found to be significant when the FRC group's contingency scores were compared with the PM and NM groups' scores. Multiple t-test analyses were employed, because of the inability of other post hoc analyses to accommodate such unequal group sizes, to identify the source of the differences due to the groups' responses. As indicated in Table VI, the PM group responded in a significantly ($p < .025$) more positive manner than did the NM group, while the FRC group's responses did not differ from either of the modeling groups. The response to success was significantly different from the response to failure.

The results indicated that the subjects' responses to the performer's apparent success and failure were a function of the independent effects of the prior observation of the model's behavior and of the nature of the performer's situation. It had been expected that the responses of the FRC group would be representative of the acceptability of responses which might be directed toward individuals in situations similar to those the performer appeared to experience. In this regard it is noteworthy that the contingency response scores of the FRC group did fall between the responses of the modeling groups (see Table IV).

When the modeling groups' contingency scores were compared with the FRC group's scores it appeared that observing the model constantly dispense reward had served to coalesce the subjects' tendencies to respond positively, whereas observing the model dispense punishment had served to coalesce the subjects' tendencies to respond negatively. If this was the case, then it would be expected that the PM group, in responding positively, and the NM group, in responding negatively, would

have used fewer of the contingency response options than were used by the FRC group. Table VII presents the mean number of options used by each group in responding to success and failure. An analysis of the use of the options indicated ($F = 20.474$, $df = 1,67$, $p < .001$) that fewer options were dispensed to success than were dispensed to failure. This difference was primarily attributable to the responses of the PM group to success ($F = 2.908$, $df = 2,67$, $p = .06$). While all groups used about the same number of options in response to failure, and the NM and FRC groups used a comparable number of options in response to success, the PM group used fewer options in response to success than did the other two groups. Thus, it appears that observation of the model's benevolent behavior served to coalesce the subjects' responses to success such that they were more likely to respond altruistically; that is, to reward success.

Summary. As expected, the observation of the model's behaviors served to dispose the response tendencies of the subjects; those who had witnessed her benevolent behavior responded more positively to the performer's success and failure than those who had witnessed her punitive behavior. Using the FRC group's responses as an estimate of normative behavior, it appears that the observation of the model's benevolent acts served to strengthen the expectation that one should be kind to other individuals. Alternatively, observation of the model's punitive acts appears to have conveyed the acceptability of responding punitively to other individuals. Consequently, subjects under the PM condition responded more positively, regardless of the performer's

TABLE VII

The Mean Number of Contingency

Response Options Dispensed

Group	Success	Failure
PM	1.60	2.20
FRC	2.00	2.20
NM	1.97	2.17

success and failure, than did the subjects under the NM condition.

Subjects in all groups evidenced the pervasiveness of the response tendency upon the observation of success, which was generally kind and generous, and the response tendency upon the observation of failure, which tended to be harsh. This difference probably reflects the general expectation of an achievement oriented society that success and its concomitant states of pride, satisfaction, and pleasure are to be encouraged and rewarded, while failure is to be rejected and shamed.

Analyses of the Self-Reports of Mood and Ratings of the Performer

A series of analyses were performed on the subjects' self-reports on the Mood Adjective Check List and their ratings of the performer on the seven selected characteristics. The first of these analyses assessed the effects of the model and model outcome conditions on the subjects' self-reports and ratings. Table VIII summarizes the F-values and their associated exact probabilities obtained for the effects, in each analysis.

It is evident from an inspection of the F-values that the self-reports and ratings were generally uninfluenced by the treatments, only two F-values being significant at accepted levels. Examination of the sources of difference indicated by these F-values revealed no systematic, meaningful effects; indeed, the differences appeared to be reflected of random influences. Consequently, it was decided to combine the probability values associated with each set of seven analyses to estimate the probability of obtaining such negligible results (Winer, 1962, pp. 43-45). The resultant pooled probabilities are presented at

TABLE VIII

Summary of the Analyses of the Self-reports and Ratings

Variable	Effect					
	Model (M)		Outcomes (O)		M x O	
	F	p	F	p	F	p
Mood:						
Anxiety	0.375	.561	0.415	.675	0.783	.473
Elation	0.099	.805	0.389	.690	1.617	.223
Fatigue	0.549	.461	0.196	.827	0.166	.851
Sadness	0.129	.732	1.914	.132	0.057	.945
Skepticism	0.520	.468	0.391	.689	0.428	.716
Social Affection	1.363	.750	0.114	.893	1.696	.212
Surgency	0.001	.999	0.203	.821	0.145	.868
Pooled p =	99.7%		94.4%		88.2%	
Characteristics:						
Happy	1.892	.196	0.272	.765	0.990	.403
Likeable	0.361	.429	0.693	.507	0.693	.507
Trustworthy	0.031	.874	3.745	.034	1.176	.340
Sad	0.194	.687	2.101	.151	0.205	.819
Competent	0.006	.942	1.907	.180	0.627	.547
Dependable	0.177	.697	3.406	.045	0.524	.609
Emotional Stability	0.559	.473	0.074	.929	2.736	.081
Pooled p =	89.4%		7.5%		57.6%	
df =	1,54		2,54		2,54	

the bottom of the summary of each set of seven analyses in Table VIII. Only one set of analyses, the analyses of the effect of the model outcome conditions on the ratings of the selected characteristics, even approached a probability level which would permit meaningful inferences to be drawn.

A second set of analyses, presented in Table IX, were performed to determine whether the control groups' self-reports and ratings differed from those of the two modeling groups. Once again the F-values were found to be relatively small and consequently their associated probabilities of occurrence were relatively large. The subsequent pooled probabilities indicated that results obtained did not depart significantly from what might have been expected by chance.

The lack of significant effects on the self-report and rating measures was disappointing given the results of other experiments (Krebs, 1970b; Stotland, 1969) in which differential self-reports of mood and ratings of the performer were obtained. While no ready explanation was suggested by the results, there is a distinct possibility that the results reflect an inadvertent confounding. If it is assumed that the observation of success generally instigated positive mood states, and that the observation of failure instigated negative mood states, then when the subjects were required to report their moods they would have been faced with reporting opposing moods. Rather than reporting that they were experiencing mixed moods, which the Mood Adjective Check List is purported to measure, they may have reported states which approached neutrality, or which were intermediate between the opposing states. With

TABLE IX

Comparison of the Modeling Groups' Self-reports and Ratings with the Control Groups[1]

Variable	PM and NM Compared With			
	FRC		DRC	
	F	p	F	p
Mood:				
Anxiety	0.455	.642	0.494	.618
Elation	0.216	.809	0.699	.520
Fatigue	1.258	.290	0.307	.741
Sadness	0.117	.889	0.068	.934
Skepticism	1.102	.339	2.123	.126
Social Affection	0.807	.454	0.852	.435
Surgency	1.546	.219	0.184	.834
Pooled p =	70.0%		88.3%	
Characteristics:				
Happy	1.856	.162	1.655	.197
Likeable	0.239	.791	2.631	.078
Trustworthy	0.751	.480	0.168	.847
Sad	0.753	.480	0.435	.655
Competent	0.901	.414	0.055	.947
Dependable	0.779	.467	0.160	.853
Emotional Stability	0.921	.405	0.282	.759
Pooled p =	67.0%		50.5%	
df =	2,67		2,65	

the added disposing effects of the different modeling conditions and the arousing effects of dispensing the three contingencies, a pronounced regression toward neutrality may have been affected.

Correlates of the Behavioral Responses

Only one of the personality measures correlated significantly with the contingency response scores to success and failure.[2] The Affiliation scale from the Personality Research Form correlated positively (r = 0.299, p < .025) with the contingency score associated with success and negatively (r = -0.278, p < .025) with the contingency score associated with failure. The two coefficients indicate that the more the subjects reported themselves to enjoy being with friends and people in general, the more likely they were to respond positively to success and negatively to failure. While affiliative individuals might stereotypically be thought of as people who will stand by another person through thick and thin, these results suggest that their relations with other people are based upon the premise that success deserves praise or reward and that failure is to be rejected or shamed.

The ratings of Likeable correlated positively with the contingency score associated with failure (r = 0.291, p < .025). The more positively the subjects responded to failure, the more the performer was rated as Likeable. It seems likely that this result was due to a self-perception process similar to that described by Bem (1967) in his analysis of

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[2]All of the correlational analyses reported are based upon the total sample of 78 subjects, except when considering the THR- data where incomplete data reduced the degrees of freedom.

cognitive dissonance. Since the ratings were made subsequent to dispensing the contingencies it may be that subjects who responded sympathetically (rewarded failure) had concluded that since they had been so kind to the performer they must have liked her.

Correlates of the Self-Reports and Ratings

The correlates of the self-reports of mood suggest that the lack of differential effects may have been due to the pervasiveness of personality trait dispositions. For example, Neuroticism correlated positively with self-reported Anxiety (r = 0.248, p < .05), Fatigue (r = 0.237, p < .05), and Sadness (r = 0.213, p < .10), whereas Affiliation correlated positively with reported Elation (r = 0.279, p < .02), Social Affection (r = 0.244, p < .05), and Surgency (r = 0.414, p < .001) and negatively with Neuroticism (r = -0.514, p < .001). These relationships suggest that the subjects' self-reports of mood may have been a function of the subjects' typical responses to situations, with highly emotional subjects attending to the negative aspects of their experience and affiliative subjects attending to the positive aspects.

Self-reported Sadness correlated positively (r = 0.270, p < .02) with the rated Sadness of the performer. Although this relationship may imply either an empathic process or projection, it does indicate that a correspondence between the apparent mood of the performer and the mood experienced by the observers had been achieved.

Thirty-two of the subjects were first-born in their families and 46 were later-born. Although birth order was controlled in the study, it was found to correlate positively with ratings of Likeable (r = 0.279,

$p < .025$) and Trustworthy ($r = 0.221$, $p < .10$). These relationships were subjected to t-tests of the difference between means to determine the source of the difference implied in the correlations. Later-born subjects had rated the performer as more Likeable ($t = 2.532$, $p < .025$) and more Trustworthy ($t = 1.974$, $p < .05$) than had first-borns. If it is assumed that most people would like to be recognized as possessing these characteristics, then it does appear, as Stotland (1969) contended, that later-born individuals tend to identify with similar other individuals.

Correlates of the Psychophysiological Responses

Within the habituation trials Extraversion correlated negatively with the LSC (skin conductance) response accompanying the observation of success ($r = -0.231$, $p < .05$) and failure ($r = -0.251$, $p < .05$). The more extraverted the subject, the less likely was she to have been aroused by the performer's apparent success or failure. Achievement correlated positively ($r = 0.263$, $df = 65$, $p < .05$) and Nurturance correlated negatively ($r = -0.255$, $df = 65$, $p < .05$) with the THR-A (tachometric heart rate acceleration) response accompanying the observation of failure. The more achievement-oriented or less nurturant the subject, the more likely was she to have been aroused by the observation of failure.

The only personality measure to consistently correlate with responses during the test trials was Extraversion. It correlated negatively with increases in respiration rate ($r = -0.213$, $p < .10$) and heart rate ($r = -0.229$, $p < .05$) upon the observation of failure, and

positively with increases in RR (r = 0.247, p < .05) and HR (r = 0.253, p < .05) upon the observation of success. Thus, the more extraverted of the subjects were likely to have been aroused by the observation of success, whereas the more introverted of the subjects were aroused by the observation of failure.

Decreases in HR upon the observation of success (r = 0.311, p < .01) and failure (r = 0.262, p < .05) correlated positively with the contingency scores for success and failure respectively. The subjects evidenced decreases in HR as their contingency responses tended toward altruism and sympathy. It was assumed that altruistic and sympathetic responses would occur when Berger's (1962) operational definition of empathy was met; that is, when the observer's vicarious emotional response was concordant with the performer's apparent emotion. Thus, heart rate deceleration may be indicative of empathic responses. In this regard, Vanderpool and Barratt (1970) reported that subjects who scored highest on an empathy test evidenced a decrease in heart rate while listening to a staged psychotherapeutic interview.

Analyses of Basal Levels

The pre-stimulus measures of RR, LSC, and HR were subjected to groups-by-trials analyses of variance to assess changes in their basal levels across the habituation trials and test trials. There were no significant differences among the basal levels of the eight groups across either the habituation or test trials. Overall the basal levels of LSC (F = 8.655, df = 9,779, p < .001) and HR (F = 6.092, df = 9,779, p < .001) were found to have changed significantly over the test trials.

The basal levels of LSC on the first four trials were significantly lower (α = .005) than the basal levels on the last three trials. The basal level of HR on the first trial was significantly greater (α = .025) than the basal levels on the last three trials. However, since these differences were independent of the individual group's responses it was assumed that they reflected the effects of "drift" rather than the effects of the experimental manipulations.

Analyses of Responses During the Habituation Trials

The autonomic responses during the habituation trials were analyzed to assess the effects of the modeling conditions on the subjects' responses to success and failure.[3] Each subject had watched five habituation trials which, due to the random assignment procedure used, included either three success trials or three failure trials. Each subject's responses were scored and averaged across the success trials and the failure trials. Four-way analyses of variance (mixed) were conducted to determine the relative effects of the model's behaviors (PM- and NM-), the outcomes of the model's behaviors, and the observation of success and failure on the subjects' responses.

Table X summarizes the F-values resulting from the analyses of each

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[3]Thirty-six analyses of variance were performed on the psychophysiological measures to analyze the responses during the habituation and test trials. In the interests of parsimony these analyses are presented in summary form rather than as complete source tables. The results of the analyses are presented as tables of the F-values and associated degrees of freedom for each effect analyzed. The means associated with each significant effect are either tabulated in tables following the summary tables, or, when convenient, are presented in the narrative. If complete source tables are required they may be obtained from the author.

TABLE X

F-values from Analyses of the Responses to Success and Failure

Source	Measure						
	RR	LSC	HR	df	THR-A	THR-D	df
Models (M)	0.008	2.007	0.479	1,54	0.001	0.445	1,40
Outcomes (O)	0.140	0.716	1.613	2,54	0.770	0.190	2,40
M x O	1.151	0.245	3.161	2,54	0.065	0.168	2,40
Success/Failure	1.188	1.416	0.779	1,54	0.232	0.805	1,40
Intervals (I)	0.165	0.896	3.083	1,54	4.078*	0.005	1,40
S/F x I	0.018	6.065**	2.988	1,54	0.063	2.305	1,40
M x S/F	0.533	0.074	0.540	1,54	0.394	0.716	1,40
M x I	0.599	1.393	3.879	1,54	0.796	0.069	1,40
O x S/F	0.158	2.939	1.437	2,54	0.034	1.426	2,40
O x I	0.728	0.617	0.244	2,54	1.743	0.785	2,40
M x O x S/F	1.221	1.934	2.560	2,54	0.436	1.512	2,40
M x O x I	0.137	2.541	0.204	2,54	1.926	0.124	2,40
M x S/F x I	0.817	3.055	4.827*	1,54	0.026	0.867	1,40
O x S/F x I	0.759	0.889	0.128	2,54	0.765	0.278	2,40
M x O x S/F x I	0.303	0.028	0.328	2,54	0.009	0.017	2,40

*p < .05; **p < .025

effect within the analyses of the five psychophysiological measures. The mean changes associated with each significant effect are presented in Table XI. Table X shows that the model outcome conditions had little influence on any of the measures, that RR and THR-D were comparatively uninfluenced by any of the manipulations, and that all of the significant effects were related to the temporal variable.[4] Post hoc analyses were performed on the significant effects tabulated in Table XI to determine the nature of the relationships.[5]

The significant interaction effect on LSC was attributed to the difference between the subjects' initial response to failure and their responses to success and recovery from the observation of failure ($p < .025$). The observation of failure occasioned a comparatively marked increase in skin conductance while the observation of success resulted in no change in conductance.

Although there were significant differences among the changes in HR related to the groups' observation of success and failure, the magnitudes of the mean changes shown in Table XI suggested that these differences were of little practical importance. The one difference

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[4]In Table X the degrees of freedom associated with the THR- measures are different from those associated with the other measures because incomplete data obtained on these measures necessitated analyses with unequal group sizes, which ranged from seven to ten subjects.

[5]In tabulating the means associated with significant effects, every attempt was made to relate them to the predominant effect across the measures. This effect was placed in the heading of the table columns. Lesser effects were placed as row headings. Extended hyphens (-) indicate that grand means were obtained by collapsing across the particular independent variable.

TABLE XI

The Means Associated With the Significant Effects Reported in Table X

Measure — Source	Group	Display	Interval Transition 1 - 2	Interval Transition 2 - 3	Units
LSC — S/F x I**	—	success	0.99997	0.99989	ratio
		failure	1.00077	0.99973	
HR — M x S/F x I*	PM-	success	0.192	0.094	bpm
		failure	0.100	0.367	
	NM-	success	0.111	0.162	
		failure	2.300	-0.700	
THR-A — I*	—	—	6.603	5.275	bpm

* $p < .05$; ** $p < .025$

that is noteworthy is between the NM group's initial accelerative response to failure and the subsequent decelerative response ($p < .025$). The initial THR-A response upon the observation of success and failure was significantly greater ($p < .05$) than the response during the post-stimulus interval.

While the changes in LSC, HR, and THR-A did not represent particularly intense responses, they did indicate that the observation of the performer's emotional displays had been arousing. The changes in LSC and HR accompanying the observation of failure suggested that the performer's emotional reaction to failure had instigated a vicarious emotional response. The modeling conditions appeared to have had little effect on the autonomic responses to the performer.

To permit comparisons with the control groups the model outcome conditions were collapsed into their respective PM and NM groups, which were first compared with the FRC group, and then with the DRC group. Table XII summarizes the results of the comparisons. The mean changes associated with each significant effect resulting from comparison with the FRC group are presented in Table XIII. Post hoc analyses were performed on each of the significant effects.

Once again the mean changes in HR were too small to be considered of practical importance. However, it was interesting that the most pronounced increases in HR accompanied the FRC and NM groups' responses to failure. The initial THR-A response upon the observation of success and failure was significantly greater ($p < .01$) than the accelerative response during the post-stimulus interval.

TABLE XII

F-values from Analyses Comparing the Modeling and the Control Groups

Source	Measures						
	RR	LSC	HR	df	THR-A	THR-D	df
Comparsion with FRC:							
Groups (G)	3.375^{+}	1.236	0.730	2,67	0.010	0.916	2,50
Success/Failure	3.326	9.556**	1.827	1,67	0.905	0.100	1,50
G x S/F	0.318	1.143	0.187	2,67	0.840	0.445	2,50
Intervals (I)	0.740	0.045	2.416	1,67	7.540*	0.021	1,50
G x I	0.084	0.032	3.182	2,67	0.448	0.054	2,50
S/F x I	0.363	1.006	0.654	1,67	0.110	1.306	1,50
G x S/F x I	0.639	0.417	3.466^{+}	2,67	0.317	0.529	2,50
Comparsion with DRC:							
Groups (G)	0.681	1.670	1.083	2,65	5.817	0.199	2,50
Success/Failure	0.146	18.320***	0.493	1,65	0.337	0.100	1,50
G x S/F	1.809	1.863	0.009	2,65	0.310	0.565	2,50
Intervals (I)	0.076	0.010	6.180^{++}	1,65	0.010	0.152	1,50
G x I	1.494	0.162	3.394^{+}	2,65	5.399*	0.136	2,50
S/F x I	2.173	0.005	1.439	1,65	1.550	11.162**	1,50
G x S/F x I	0.284	0.856	4.159^{++}	2,65	0.656	1.966	2,50

$^{+}$ $p < .05$; $^{++}$ $p < .025$; * $p < .01$; ** $p < .005$; *** $p < .001$

TABLE XIII

The Means Associated With the Significant Effects

Reported in Table XII (FRC)

Measure — Source	Group	Display	Interval Transition 1 - 2	Interval Transition 2 - 3	Units
HR — G x S/F x I+	PM	success	0.192	0.094	bpm
		failure	0.100	0.367	
	FRC	success	-0.800	0.500	
		failure	3.500	0.800	
	NM	success	0.111	0.162	
		failure	2.300	-0.700	
THR-A — I*	—	—	6.792	5.104	bpm

Measure — Source	Group			Display		Units
	PM	FRC	NM	success	failure	
RR — G+	-0.284	-0.842	0.015	—	—	cpm
LSC — S/F**	—	—	—	0.99982	1.00055	ratio

+ $p < .05$; * $p < .01$; ** $p < .005$

An examination of the groups' mean changes in RR indicated that, while there were significant differences among them, the differences were too small to be considered of practical importance. The overall increase in skin conductance accompanying the observation of failure was significantly different ($p < .005$) from the response to success. As found in the preceding analysis, the observation of the performer's failure had been arousing, whereas the observation of success had no effect.

The mean changes associated with each significant effect resulting from comparison of the DRC group with the modeling groups are presented in Table XIV. The overall increase in skin conductance upon the observation of failure was significantly different ($p < .001$) from the response upon the observation of success. The consistency of this finding indicates that all groups were more aroused by the observation of failure than by the observation of success.

The DRC group's THR-A response across success and failure was significantly greater ($p < .025$) than the responses of the PM and NM groups. This difference was attributed to the DRC group's response during the post-stimulus interval which was significantly larger ($p < .01$) than all other responses. The initial THR-D response to failure was significantly smaller ($p < .05$) than the initial response to success and the post-stimulus response to failure, but not different from the post-stimulus response to success. Since the previous analyses did not reveal the THR- responses to be related to the observation of success or failure, or to be a function of the groups' experiences, it appears that the DRC group was more responsive to the performer's displays than were the other groups.

TABLE XIV

The Means Associated With the Significant Effects Reported in Table XII (DRC)

Measure — Source	Group			Display		Units
	PM	DRC	NM	success	failure	
LSC — S/F***	—	—	—	0.99987	1.00092	ratio
THR-A — G*	5.900	8.499	5.933	—	—	bpm

Measure — Source	Group	Display	Interval Transition 1 - 2	2 - 3	Units
HR — G x S/F x I^{++}	PM	success	0.192	0.094	bpm
		failure	0.100	0.367	
	DRC	success	-1.000	0.125	
		failure	2.250	1.750	
	NM	success	0.111	0.162	
		failure	2.300	-0.700	
HR — G x I^{+}	PM	—	0.146	0.231	bpm
	DRC		0.625	0.938	
	NM		1.206	-0.269	
HR — I^{++}	—	—	0.867	-0.012	bpm
THR-A — G x I*	PM	—	7.044	4.751	bpm
	DRC		6.893	10.092	
	NM		6.300	5.564	
THR-D — S/F x I**	—	success	-6.160	-4.411	bpm
		failure	-3.392	-5.852	

$^{+}$ $p < .05$; $^{++}$ $p < .025$; * $p < .01$; ** $p < .005$; *** $p < .001$

Finally, the mean changes in HR were simply too small to accept them as being of practical importance. The responses to failure by the NM, FRC, and DRC groups were more pronounced than the responses by the PM group, but even these responses can only be taken as suggestive of a difference among the groups' response tendencies.

Summary. In general, the responses elicited during the habituation trials were not indicative of particularly strong emotional responses, although temporal changes on the measures did indicate that observation of the performer's emotional displays had been arousing. It may be that instructing the subjects that these were simply practice trials to acquaint the performer with the apparatus had militated against strong vicarious emotional responses. The subjects may have concluded from these instructions that the habituation trials were routine and thus held no particular importance for the performer, or for themselves as observers. Consequently, they may not have been "emotionally" involved in these trials.

The most consistent finding was that across all groups the observation of the performer's failure elicited an increase in skin conductance, whereas the observation of success elicited almost no change. This finding is in keeping with previous findings (Craig & Weinstein, 1965; Stotland, 1969) that the observation of a performer's displeasure or discomfort instigated stronger or more frequent emotional responses than did the observation of positive states. The NM, FRC, and DRC groups appeared to have been more responsive to the performer's failure, as suggested by the increases in heart rate that they evidenced, than was the PM group. However, these increases were too small to permit

valid conclusions about group differences.

The heart rate acceleration and deceleration responses of the DRC group indicated that subjects who were under instructions to reward success and punish failure were more aroused by the performer's displays than were subjects who were permitted a free response.

Analyses of Responses During the Test Trials

A series of analyses were performed to assess possible differences among the groups' responses to success and failure during the test trials, and to identify response patterns which were associated with the groups' use of the contingencies, reward and punishment.

Responses to success and failure. Table XV presents a summary of analyses assessing the effects of the model and model outcome conditions on the initial response to the observation of success and failure. Only two significant effects were found. Across all groups the mean increase in skin conductance upon the observation of failure ($\overline{X}$ = 1.00159) was significantly greater ($p < .05$) than the mean increase upon the observation of success ($\overline{X}$ = 1.00061). Similarly, the increase in HR upon the observation of failure ($\overline{X}$ = 4.519 bpm) was significantly greater ($p < .001$) than the increase upon the observation of success ($\overline{X}$ = 1.556 bpm).

Once again the lack of significant effects due to the model outcome conditions permitted the regrouping of the subjects into the PM and NM groups for comparisons with the control groups. Table XVI summarizes the results of the analyses in which the PM and NM groups were first compared with the FRC group and then with the DRC group.

TABLE XV

F-values from Analyses of the Modeling Groups' Test Trial Responses to Success and Failure

Source	Measure						
	RR	LSC	HR	df	THR-A	THR-D	df
Models (M)	1.952	1.041	1.459	1,54	0.151	0.244	1,49
Outcomes (O)	0.040	1.134	0.181	2,54	1.207	0.149	2,49
M x O	0.817	1.947	1.517	2,54	1.452	0.643	2,49
Success/Failure	0.275	4.293*	19.660**	1,54	0.242	0.119	1,49
M x S/F	0.647	1.920	0.319	1,54	0.132	0.609	1,49
O x S/F	0.787	0.719	1.575	2,54	1.608	0.481	2,49
M x O x S/F	0.579	0.748	0.093	2,54	1.343	0.361	2,49

* $p < .05$; ** $p < .001$

TABLE XVI

F-values from Analyses Comparing the Modeling and Control Groups' Test Trial Responses to Success and Failure

Source	Measure						
	RR	LSC	HR	df	THR-A	THR-D	df
Comparison with FRC:							
Groups (G)	0.574	0.338	0.552	2,67	0.405	0.123	2,62
Success/Failure	0.435	4.377^{+}	7.446*	1,67	0.925	0.407	1,62
G x S/F	0.192	0.945	2.903	2,67	0.210	1.116	2,62
Comparsion with DRC:							
Groups (G)	0.537	0.398	3.253^{+}	2,65	3.128	7.031**	2,58
Success/Failure	0.596	4.205^{+}	17.689***	1,65	0.911	1.100	1,58
G x S/F	0.207	0.608	0.399	2,65	1.434	0.514	2,58

$^{+}$ $p < .05$; * $p < .01$; ** $p < .005$; *** $p < .001$

Within the comparisons with the FRC group the overall increase in skin conductance upon the observation of failure ($\underline{\bar{X}}$ = 1.00198) was significantly greater ($\underline{p} < .05$) than the increase upon the observation of success ($\underline{\bar{X}}$ = 1.00108). The increase in HR upon the observation of failure ($\underline{\bar{X}}$ = 3.777 bpm) was significantly greater ($\underline{p} < .01$) than the increase upon the observation of success ($\underline{\bar{X}}$ = 1.606 bpm).

The mean changes associated with the significant effects resulting from comparisons with the DRC group are presented in Table XVII. The overall increase in skin conductance upon the observation of failure was significantly greater ($\underline{p} < .05$) than the increase upon the observation of success. As found in analyses of responses during the habituation trials, all groups evidenced a more intense emotional response upon the observation of the performer's failure than upon the observation of her success. However, in contrast to the static state of skin conductance accompanying the observation of success during the habituation trials, the observation of success during the test trials was found to have instigated an increase in conductance. Thus, the observation of both success and failure were found to have instigated an emotional response in the observers, but the emotional response to the observation of failure was substantially more pronounced.

The increase in HR upon the observation of success and failure by the PM group was significantly greater ($\underline{p} < .05$) than the response by the DRC group, but neither of these groups' responses differed from the increase evidenced by the NM group. The overall increase in HR upon the observation of failure was significantly greater ($\underline{p} < .001$) than the

TABLE XVII

The Means Associated With the Significant Effects

Reported in Table XVI (DRC)

Measure — Source	Display		Group			Units
	success	failure	PM	DRC	NM	
LSC — S/F+	1.00114	1.00249	—	—	—	ratio
HR — S/F***	1.446	3.647	—	—	—	bpm
HR — G+	—	—	2.695	1.150	1.793	bpm
THR-D — G**	—	—	-4.538	-8.943	-4.917	bpm

+ $p < .05$; ** $p < .005$; *** $p < .001$

increase upon the observation of success. Finally, the mean THR-D response by the DRC group was significantly greater ($p < .05$) than the mean decelerative responses of the PM and NM groups.

Summary. It was evident from the results of these analyses, and the analyses of responses during the habituation trials, that differences in the responses to the performer's success and failure were a function of the particular emotional displays, and not of the disposing effects of the model's behaviors. Indeed, the only difference that could reliably be attributed to differences among the groups was that the DRC group appeared to have been more emotionally responsive than the modeling groups.

Across all groups the observation of the performer's failure was accompanied by more pronounced increases in skin conductance and heart rate than was the observation of her success. However, while the ratios of change in skin conductance were indicative of relatively intense emotional responses, the magnitudes of the increases in heart rate indicated that the performer's displays were only mildly arousing. Two alternatives may be advanced to explain this apparent discrepancy. It is known (Montagu & Coles, 1966; Shapiro & Crider, 1969) that when electrodermal responses are instigated they are, as an integral component of the orienting reaction, characteristically immediate and intense, but are not necessarily correlated with other autonomic responses. Thus, in the present study the increases in skin conductance provided the potential for intense emotional responses which were eventually realized as relatively mild emotional responses.

Alternatively, the use of ten second intervals in the study may have militated against detecting more intense emotional responses. While electrodermal reactions typically peak within ten seconds, the latency of cardiovascular responses varies across stimulus situations (Graham & Clifton, 1966). Consequently, the increases in heart rate accompanying the performer's displays may have reflected the early stages of more intense responses. While such a confound would have important implications for the results of this experiment, the results of the analyses reported next indicate that the heart rate responses were primarily a function of other experimental considerations.

Reward and punishment. The responses accompanying the dispensing of reward and punishment were analyzed to identify patterns of autonomic responses which characterized the groups' altruistic, envious, sadistic, and sympathetic responses. Preliminary analyses substantiated the finding of previous analyses that the effects of the model outcome conditions on the subjects' responses were negligible. On the basis of the preliminary analyses the model outcome conditions were collapsed into the PM and NM groups for the purpose of comparing the autonomic responses which accompanied the dispensing of reward and punishment to the performer.

Table XVIII reports the number of subjects in the two modeling and two control groups who dispensed the two contingencies to success and failure, and, in parentheses, the number of those subjects for whom complete data on the THR- measures were secured. An important implication of the unequal distribution of the subjects' use of the contingencies

TABLE XVIII

The Number of Subjects in Each Group Who Dispensed Reward and Punishment

Group*	Display	Contingency	
		Reward	Punishment
PM	success	30 (23)*	3 (3)
	failure	10 (5)	26 (18)
NM	success	30 (25)	7 (3)
	failure	8 (2)	28 (21)
FRC	success	10 (8)	3 (1)
	failure	4 (3)	8 (6)
DRC	success	8 (6)	
	failure		8 (6)

* the numbers in parentheses refer to the number of subjects for which complete THR- data were secured.

was that repeated-measures analyses of the responses accompanying the two contingencies were impossible. Consequently, analyses of the responses required that each cell of subjects shown in Table XVIII be treated as independent.

The incomplete data on the THR- measure accompanying the FRC group's punishment of success militated against the use of these measures to compare the FRC group with the modeling groups. Since differences between the modeling groups were of particular interest, this was not considered to be a critical omission.

Table XIX summarizes the results of the analyses of the responses which accompanied rewarding the performer's success and failure and punishing her success and failure. Analyses of RR, LSC, and HR included the PM, FRC, and NM groups, while analyses of the THR- measures compared the two modeling groups. The predominant effect shown in Table XIX is that changes on the measures were a function of transition across the intervals. It is also noteworthy that the interaction effects which would have provided a clear definition of the autonomic responses which accompanied each group's altruistic, envious, sadistic, and sympathetic responses (that is, the G x C x S/F or G x C x S/F x I interactions) were not found to be significant.

The mean changes associated with the main effects on the measures are presented in Table XX. The overall mean changes in RR and HR associated with the observation of success and failure were too small to infer practical differences. Once again the overall increase in skin conductance accompanying reactions to the performer's failure was significantly greater ($p \leq .05$) than the increase accompanying reactions

TABLE XIX

F-values from Analyses of the Responses Accompanying Reward and Punishment

Source	Measure						
	RR	LSC	HR	df	THR-A	THR-D	df
Groups (G)	0.756	0.206	0.224	2,155	5.883^{++}	0.674	1,92
Contingency (C)	3.503	0.324	0.109	1,155	1.824	0.324	1,92
G x C	0.274	0.206	0.118	2,155	3.384^{+}	2.132	1,92
Success/Failure	4.071^{+}	4.288^{+}	5.936^{++}	1,155	2.009	0.195	1,92
G x S/F	0.161	0.250	2.492	2,155	1.210	0.072	1,92
C x S/F	1.610	0.145	0.017	1,155	0.149	0.383	1,92
G x C x S/F	0.200	0.167	0.965	2,155	0.672	1.374	1,92
Intervals (I)	31.745***	4.768*	32.387***	2.310	7.373***	10.261***	2,184
G x I	1.429	0.316	1.550	4,310	0.522	1.004	2,184
C x I	0.141	0.485	3.814^{++}	2,310	0.496	1.854	2,184
S/F x I	0.358	0.430	5.912**	2,310	2.825	1.254	2,184
G x C x I	0.291	0.298	2.168	4,310	2.069	3.184	2,184
G x S/F x I	1.003	0.359	4.639***	4,310	0.777	2.496	2,184
S/F x C x I	0.103	0.260	7.033***	2,310	0.446	0.702	2,184
G x C x S/F x I	0.223	0.225	0.322	4,310	0.254	1.341	2,184

$^{+}$ $p < .05$; $^{++}$ $p < .025$; * $p < .01$; ** $p < .005$; *** $p < .001$

TABLE XX

The Means Associated With the Significant

Main Effects Reported in Table XIX

Measure — Source	Display		Group		Units
	Success	Failure	PM	NM	
RR — S/F[+]	0.394	-0.061	—	—	cpm
LSC — S/F[+]	1.00032	1.00127	—	—	ratio
HR — S/F[++]	1.190	0.310	—	—	bpm
THR-A — G[++]	—	—	6.422	7.643	bpm

Measure — Source	Interval Transition			Units
	I-II	II-III	III-IV	
RR — I***	1.379	0.823	-1.852	cpm
LSC — I*	1.00134	1.00049	0.97314	ratio
HR — I***	3.686	0.202	-1.190	bpm
THR-A — I***	7.736	7.222	6.139	bpm
THR-D — I***	-4.406	-6.757	-4.695	bpm

[+] $p < .05$; [++] $p < .025$; * $p < .01$; ** $p < .005$; *** $p < .001$

to her success. Subjects who had observed the model's punitive behavior evidenced greater heart rate acceleration ($p < .025$) than subjects who had observed the model's benevolent behavior.

The changes on all of the measures, except THR-D, evidenced essentially the same pattern of response across the interval transitions. The observation of the performer's emotional displays of success and failure (transition I-II) instigated an immediate and comparatively intense emotional response which was either maintained or enhanced as the subjects dispensed the contingencies (transition II-III). A recovery toward basal levels was evidenced in the post-stimulus interval (transition III-IV). Duncan multiple-range tests indicated that, with the exception of changes on THR-D, the magnitudes of the responses during the first interval transition were significantly greater than ($\alpha = .01$) the magnitudes of the responses during the last interval transition. In the case of the THR-D measure, the response during the second interval was significantly greater than the decelerative responses during the other two interval transitions ($\alpha = .025$).

The accelerative responses accompanying the observation of the performer's emotional displays suggest that the subjects had been emotionally aroused. However, the magnitudes of the responses indicate that the emotional responses were relatively mild. The decelerative responses during the post stimulus interval indicate that, rather than being long-lasting and pervasive, the emotional responses were transient and subsided quickly.

Graham and Clifton (1966) and Lacey (1967) have argued that changes

in heart rate may be employed to differentiate between "attention to the environment" and "rejection of the environment." It is assumed that when heart rate continues to accelerate following the initial preparatory accelerative response of the orienting reaction the organism is attempting to avoid environmental input through a defensive response. In contrast, deceleration following the preparatory response is assumed to indicate that the organism is attempting to facilitate or is attending to environmental input. Tests of this hypothesis (Craig & Wood, 1971; Hare, Wood, Britain & Shadman, 1971) indicated that attention to slides of homicide victims and nude females by male subjects was accompanied by pronounced heart rate deceleration. In light of these findings, it is interesting to note that in the present study the most pronounced decelerative response occurred concomitant with dispensing the contingencies. This finding may be interpreted as indicating that the subjects were "curious" about the effects their contingency responses had on the performer. Analyses of the interaction effects on heart rate provided additional evidence for this possibility.

Table XXI presents the mean changes in heart rate associated with the interaction effects reported in Table XIX. Analyses of these effects were performed to determine the differences which had contributed to the interaction effects. The overall THR-A response accompanying the NM group's use of reward was significantly greater ($p < .05$) than the response accompanying the PM group's use of reward, and the responses accompanying the use of punishment by the two modeling groups. While subjects who had observed the model's benevolent behavior were equally

TABLE XXI

The Means in bpm Associated With the Significant Simple Effects on Heart Rate Reported in Table XIX

Measure — Source	Contingency	Group	
		PM	NM
THR-A — G x C^{+}	reward	5.902	8.937
	punishment	6.406	6.283

Measure — Source	Group	Display	Contingency	Interval Transition		
				I-II	II-III	III-IV
HR — G x S/F x I***	PM	success	—	2.560	-0.097	0.195
		failure		5.096	-1.887	-2.519
	FRC	success	—	4.740	-1.200	2.435
		failure		3.156	-0.750	-3.313
	NM	success	—	1.250	4.061	-3.231
		failure		5.313	-1.446	-0.857
HR — S/F x I**	—	success	—	3.183	0.922	-0.201
		failure		4.530	-1.367	-2.778
HR — S/F x C x I***	—	success	reward	0.990	2.411	-0.101
			punishment	4.711	-0.571	-0.300
	—	failure	reward	6.213	-1.162	-4.215
			punishment	2.847	-1.578	-0.344
HR — C x I^{++}	—	—	reward	3.607	0.625	-2.156
			punishment	3.779	-1.071	-0.322
THR-D — G x C x I^{+}	PM	—	reward	-4.727	-7.362	-5.315
			punishment	-5.640	-5.567	-3.100
	NM	—	reward	-3.515	-4.961	-6.031
			punishment	-4.310	-10.063	-4.388

$^{+}$ $p < .05$; $^{++}$ $p < .025$; ** $p < .005$; *** $p < .001$

aroused when dispensing reward and punishment, subjects who had observed her punitive behavior were more aroused when dispensing reward. Evidently subjects in the NM group were particularly aroused when their use of the contingencies was discordant with the contingency responses they had observed the model make.

Figure 4 presents the cumulative changes in HR which accompanied the three groups' observation of and contingency responses to success and failure. Within the three-way interaction (G x S/F x I) the initial increases in HR accompanying the PM and NM groups' observation of failure and the FRC group's observation of success were significantly greater ($p < .05$) than the increases accompanying the PM and NM groups' observation of success. The increase in HR accompanying the NM group's contingency response to success contrasted significantly ($p < .005$) with the decelerative responses which generally occurred concomitant with the contingency responses. Finally, the accelerative response evidenced by the FRC group during the post-stimulus interval, following its contingency response to success, was significantly different ($p < .025$) from the other post-stimulus responses.

Within these differences it is noteworthy that while both of the modeling groups were more responsive to the performer's display of failure than of success the FRC group was about equally responsive to both of her emotional displays. A prominent feature of the interaction is the marked accelerative response accompanying the NM group's contingency response to success. The NM group rewarded success more often than it punished success, and, as just discussed, it evidenced a

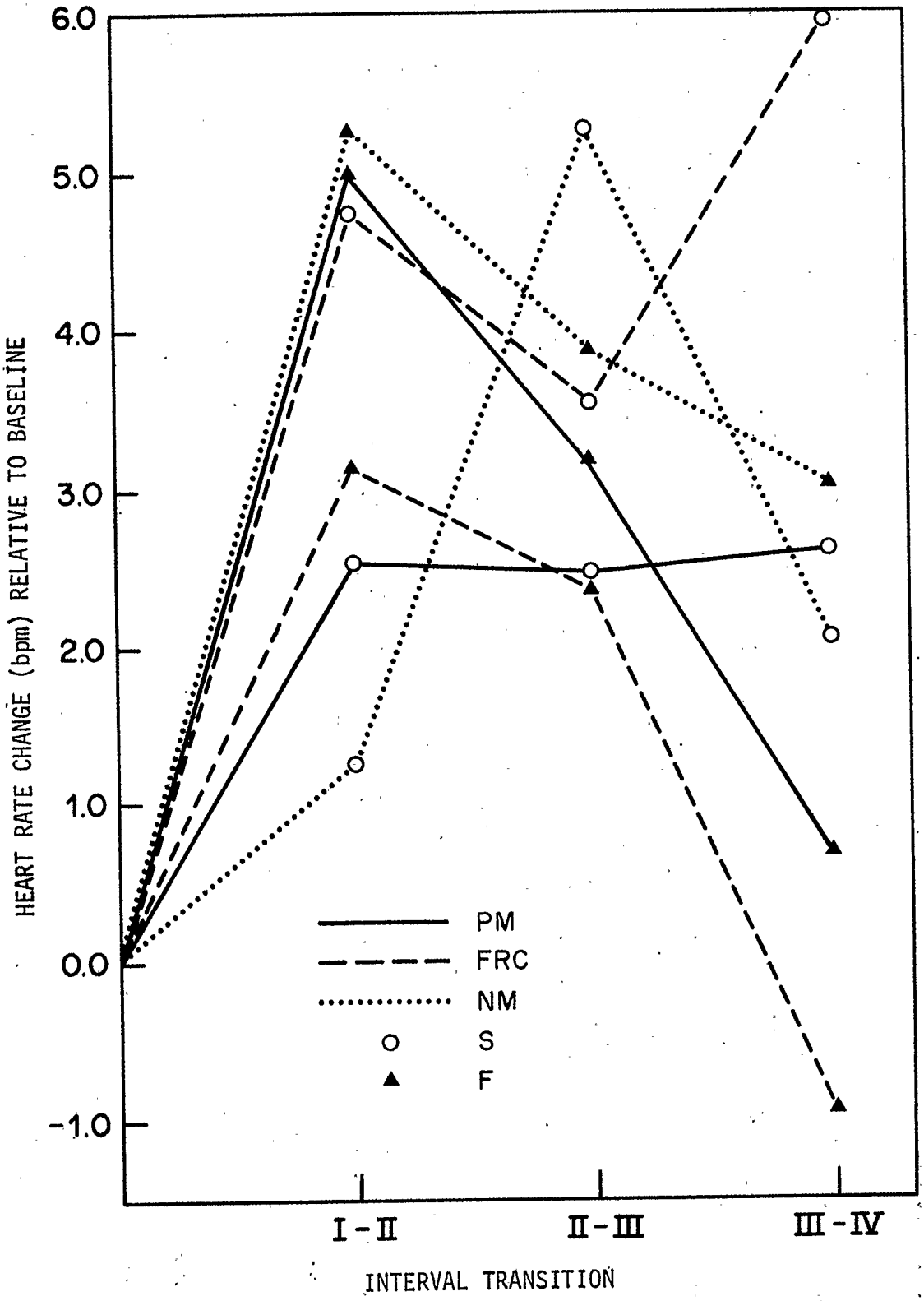

Figure 4. Cumulative change in HR accompanying the groups' observation of success and failure.

comparatively pronounced THR-A response when dispensing reward. Thus it does appear that when the behavior of the subjects in the NM group was discordant with the model's punitive behavior they evidenced a defensive response, as if not wanting to "think" about their behavior.

Figure 5 presents the cumulative changes in HR which accompanied the rewarding and punishment of success and failure (S/F x C x I). While the interaction appeared to identify differences among altruistic, envious, sadistic, and sympathetic responses, it was primarily a function of the accelerative response which occurred when the NM group, in rewarding success, acted discordantly with the model's behavior. A comparison of the accelerative response accompanying altruistic acts (transition II-III) in Figure 5 with the accelerative response accompanying the NM group's contingency response to success in Figure 4 reveals that the "altruistic" response could be attributed to the NM group. Therefore, rather than reflecting differences among the empathic responses, the interaction reflected the relationship between the comparability of the subjects' behaviors and the model's behaviors and cardiovascular responses.

The finding that subjects in the NM group evidenced the most heart rate acceleration when their behavior was discordant with that of the model suggested that heart rate deceleration may characterize concordant behaviors. An analysis of the THR-D responses accompanying the modeling groups' use of reward and punishment indicated that this tended to be the case. Figure 6 presents the mean decelerative responses associated with the interaction (G x C x I).

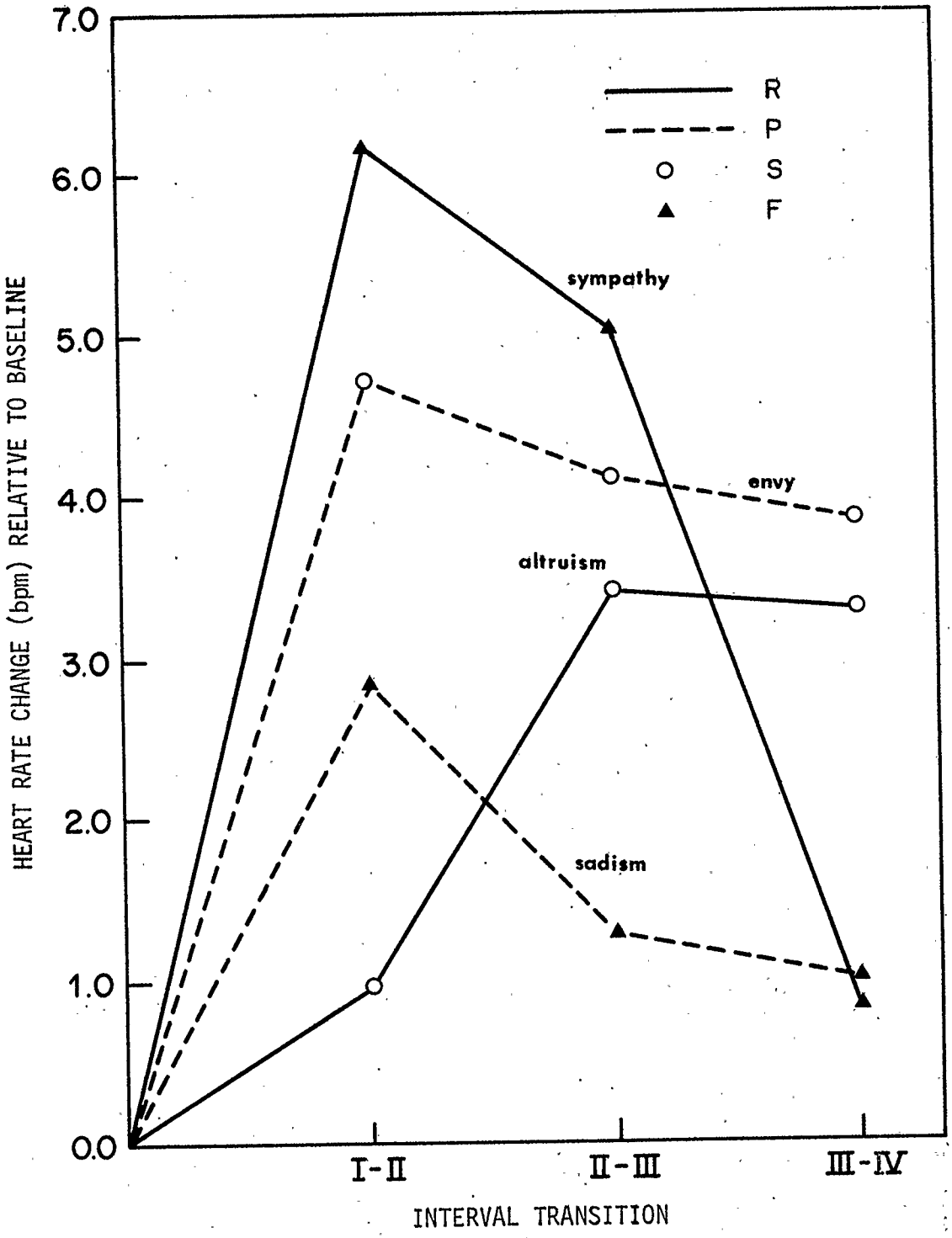

Figure 5. Cumulative change in HR accompanying the dispensing of reward and punishment.

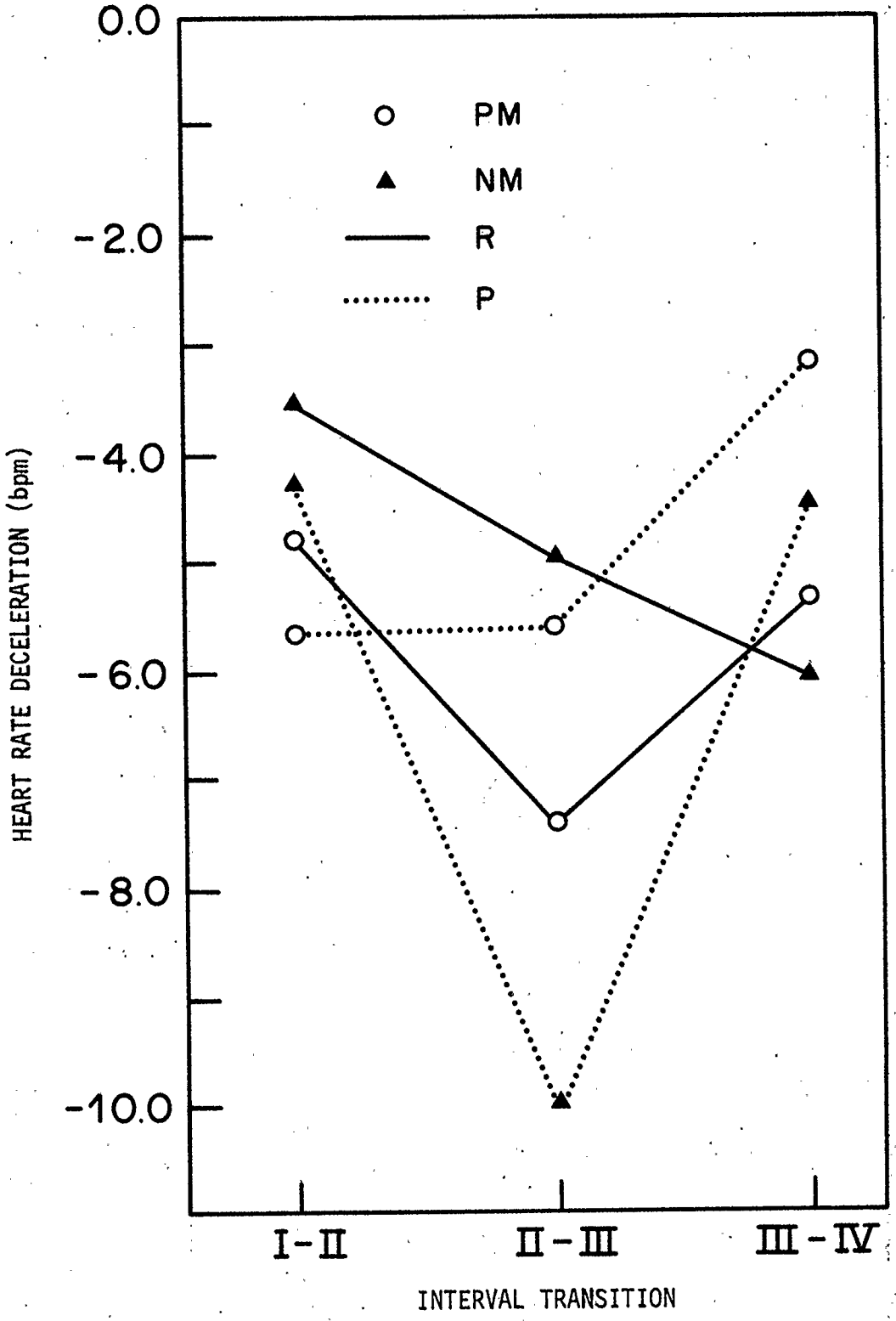

Figure 6. Mean THR-D responses accompanying the modeling groups' use of reward and punishment.

Within the first interval transition all responses were about equal. Within the second transition the decelerative responses accompanying the NM group's use of punishment and the PM group's use of reward were significantly greater ($p < .05$) than accompanying their use of reward and punishment respectively. Within the transition to the post-stimulus interval the decelerative response following the NM group's use of reward was significantly greater ($p < .025$) than the responses following the PM group's use of punishment. Two features of the interaction are particularly evident.

First, heart rate deceleration was most pronounced when the groups' behaviors were concordant with the respective behaviors of the model. This finding supports the suggestion, made earlier, that when the subjects behaved as they observed the model behave they were more attentive to the effects of their behavior on the performer.

Second, discordant behavior on the part of subjects who had observed the model's benevolent behavior was evidenced as a tendency toward heart rate acceleration, which suggests that they were attempting to avoid recognizing the effects of their punitive behavior on the model. In contrast, discordant behavior on the part of subjects who had observed the model's punitive behavior was evidenced as increasing heart rate deceleration. This pattern of response suggests that the subjects were curious about the effect of their benevolent, but "deviant" behavior.

Table XXII summarizes the results of analyses in which the DRC group's responses were compared with the responses of the PM, FRC, and

TABLE XXII

F-values from Analyses of Responses Accompanying

Rewarding Success and Punishing Failure

Source	Measure						
	RR	LSC	HR	df	THR-A	THR-D	df
Rewarding success:							
Groups (G)	0.451	0.119	0.861	3,74	0.962	8.617***	3,59
Intervals (I)	30.783***	17.813***	9.902***	2,148	10.136***	0.261	2,118
G x I	0.532	0.464	0.911	6,148	2.079	0.574	6,118
Punishing failure:							
Groups (G)	0.427	0.325	1.323	3.66	5.456**	0.457	3,45
Intervals (I)	10.474***	6.856**	4.193*	2,132	2.310	1.455	2,90
G x I	0.279	0.471	0.540	6,132	0.923	0.351	6,90

* $p < .025$; ** $p < .005$; *** $p < .001$

NM groups. Since the DRC group had been instructed only to reward success and punish failure, the analyses were restricted to those combinations. Table XXIII presents the mean changes associated with each significant effect. As found in the preceding analyses, the predominant effect was due to variation across the temporal variable. The DRC group evidenced a significantly greater ($p < .01$) overall THR-D response when responding altruistically than did the other groups, and a significantly greater ($p < .05$) THR-A response when responding sadistically.

The THR- responses of the DRC group may be related to the assumed relationship between changes in heart rate and attention to environmental events. It seems probable that subjects in the DRC group preferred having to reward success than to punish failure. In fact, two subjects in this group made comments to the effect that the experimenter was trying to make sadists of them. Thus, when the subjects in the DRC group rewarded success they were likely to have attended to and enjoyed the performer's reaction, whereas they were likely to have attempted to avoid attending to the emotional display which occurred when they punished the performer for failing.

Summary. Throughout the test trials the subjects evidenced mild, transient emotional responses to the performer's emotional displays. The response to the performer's failure was generally more intense than the response to her success. That these responses were quick to rise and subside may suggest a reason for the lack of significant effects on the self-reports of mood. The instigated emotional responses were probably not pervasive enough to have created either a predominantly

TABLE XXIII

The Means Associated With the Significant Effects Reported in Table XXII

Measure — Source	Interval Transition			Units
	I-II	II-III	III-IV	
Rewarding success:				
RR — I***	1.396	0.811	-2.345	cpm
LSC — I***	1.00244	1.00095	0.98117	ratio
HR — I***	0.589	2.598	-0.524	bpm
THR-A — I***	8.673	6.883	5.702	bpm
Punishing failure:				
RR — I***	1.260	0.290	-1.988	cpm
LSC — I**	1.00179	1.00086	0.99899	ratio
HR — I*	2.351	-0.760	-0.301	bpm

Measure — Groups	PM	FRC	NM	DRC	Units
Rewarding success:					
THR-D***	-5.544	-5.816	-5.082	-9.081	bpm
Punishing failure:					
THR-A***	5.448	5.871	6.717	9.283	bpm

* $p < .025$; ** $p < .005$; *** $p < .001$

positive or a predominantly negative mood state in the subjects.

While the autonomic responses elicited by the observation of the performer's emotional displays upon her success and failure may be interpreted as vicarious emotional responses, it is questionable whether the subsequent autonomic responses may be assumed to have reflected different empathic responses. Where the emotional responses were differentiated, the differences were not due to the hypothesized effect of the model's behaviors, but rather were common across groups. However, analyses of the heart rate deceleration responses did suggest that when the subjects had behaved as they observed the model behave, they were more attentive to the performer's emotional reactions than when they behaved discordantly. Although not clearly identified in the analyses it does appear that vicarious emotional responses and attention to the performer were optimized when, (1) having observed the model's benevolent behavior, the subjects dispensed money when the performer failed the task, and (2) having observed the model's punitive behavior, the subjects shocked the performer when she failed.

Comparisons of the modeling groups with the FRC group revealed few meaningful differences other than that the FRC group appeared to have been less emotionally aroused by the proceedings. In contrast, the DRC group appeared to have been much more emotionally responsive to the proceedings, particularly when the subjects were required to shock the performer.

CHAPTER V

CONCLUSIONS

The present study was conducted to test the hypothesis that differences among empathic responses may be a function of social modeling. It was reasoned that empathic responses could be explained in terms of social modeling if it could be demonstrated that subjects reproduce a model's benevolent or punitive behavior in responding to another individual's pleasure and displeasure, and that the different behaviors are accompanied by characteristic emotional responses. The first step in the experiment was to differentially dispose the subjects' behavioral responses to a performer's success and failure at a motor task. The contingency response scores indicated that subjects who had observed the model always reward success and failure responded more positively to the performer than did subjects who had observed the model always punish success and failure.

It was hypothesized that the observation of the model's benevolent behavior would facilitate the subjects' tendencies to respond benevolently and that the observation of the model's punitive behavior would reduce the subjects' inhibitions to respond punitively. While this was generally the case, observation of the model's benevolent behavior was most effective in facilitating rewarding or altruistic responses to the performer's success. It is possible that the facilitation of punitive responses would have been equally pronounced if the procedure had been such that the subjects believed that the experimenter was unaware of

their behavior and thus unlikely to detect envious and, particularly, sadistic responses.

Previous research on aiding behavior has been directed primarily at the identification of social factors which facilitate and inhibit benevolent behavior. The results of the present study, with the findings of Hornstein (1970), suggest that the same factors may facilitate asocial and malevolent behavior. Observers tended to behave as they had observed relevant social models behave, even if the models' behaviors had deviated from what is socially expected.

Having demonstrated the subjects' readiness to behave as they had observed the model behave, the second step in the experiment was the identification of vicarious emotional responses which characterized the subjects' reactions to the performer's success and failure. Autonomic responses indicated that all subjects experienced a more intense vicarious emotional response upon the observation of the performer's displeasure at failing than upon her pleasure at succeeding at the motor task. The concordance between the self-reports of Sadness and the ratings of the performer's Sadness provided additional evidence that the subjects were particularly sensitive to the performer's displeasure.

There was some evidence that benevolently disposed subjects were less emotionally aroused, and that subjects who had been directed to punish failure were more emotionally aroused, by the performer's failure than were the other groups. However, the evidence was based upon small differences among the groups' autonomic responses. Therefore, it was concluded that the observation of the model's behavior had minimal

effect on the subjects' vicarious emotional responses to the performer's success and failure, and that the intensity of the response to failure was indicative of a general tendency to become emotionally aroused by aversive or unpleasant stimulus conditions.

Observers are consistently found to be more emotionally responsive to negative emotional displays than to positive emotional displays (Craig & Weinstein, 1965; Krebs, 1970b; Stotland, 1969). While it seems improbable that the observation of elation or joy is not emotionally arousing, the experimental induction of vicarious responses to positive states has generally not been successful. If empathic responses are to be clearly described it will be necessary to identify positive emotional displays which reliably elicit vicarious emotional responses. Otherwise empathic responses may only be discussed in terms of encounters with sadness, sorrow, pain and distress. At present there is little evidence which would justify a description of empathy with positive emotional states.

The third step in the experiment was the attempted identification of autonomic response patterns which characterized the groups' altruistic, envious, sadistic, and sympathetic behaviors. The results clearly did not support the hypothesis that observation of the model's behaviors would dispose differential emotional responses to the performer's displays. Instead, different patterns of heart rate responses were attributed to the comparability of the subjects' behaviors with the model's behaviors. The patterns of change in heart rate were discussed in terms of the postulated relationship between attentional processes

and cardiac activity (Berlyne, 1967; Graham & Clifton, 1966; Lacey, 1967).

Heart rate deceleration was interpreted as indicating attention to environmental events, and acceleration was interpreted as evidencing attempts to avoid environmental input and attention to associational or cognitive events. Heart rate deceleration was most pronounced when the subjects behaved as they had observed the model behave, and accelerative responses tended to accompany behavior which was discordant with the model's behavior. Within this context the subjects appeared to be the most attentive to or curious about the effects of their behavior on the performer when they reproduced the model's behavior. When their behavior was discordant with the model's behavior the subjects evidently attempted to avoid observing the consequences of their behavior.

Although the relationship between cardiac activity and modeling does not clarify the relationship between social factors and empathic responses, it does suggest an innovative measure of social learning. Bandura (1965, 1969) has argued that in adopting a model's behavior the observer retains an imaginal representation of the stimulus events and consequences associated with the model's behavior. In other words, the observer has an image of the stimulus conditions under which the behavior is to be emitted and of the consequences of the behavior. It seems probable that upon reproducing the model's behavior the observer would be attentive to or curious about the correspondence between the events and consequences associated with his behavior and those associated with the model's behavior. If this were the case, then attention to these cues would be evidenced as heart rate deceleration. The investigation

of this possibility may reveal, as Bandura suggests, that modeled behaviors are guided by representational mediators.

The attempted differentiation of the emotional concomitants of altruistic, envious, sadistic, and sympathetic behaviors was generally unsuccessful. It was suggested that the commonality among the groups' reported moods was due either to the attenuating effect of mixed mood states, or to the possibility that the instigated emotional responses were too transient to establish predominant mood states. Perhaps differences would have been obtained if the subjects had been required to report their moods on a trial-by-trial basis, thereby providing their immediate reactions to the performer's emotional displays.

Although it appeared that there were differences among the empathic responses, the differences were attributed to the confounding effect of the unexpected relationship between cardiac activity and modeling. Among the empathic responses altruism was unique in that it was accompanied by heart rate acceleration, whereas deceleration accompanied the other responses. However, since subjects who had observed the model's punitive behavior made frequent use of reward in responding to the performer's success, it was concluded that the accelerative response was an artifact of the tendency for heart rate acceleration to accompany behavior which was discordant with the model's behavior.

Krebs (1970b) found that altruistic behaviors were motivated by the intensity of the subjects' vicarious emotional responses to a performer's pleasure and displeasure. While this may be the general case, the results of the present study indicate that social factors are also important determinants of one's behavior toward another person's

emotions. Indeed, they may imply that in conforming with the behavior of other individuals the observer supresses his personal response tendencies.

Empathy is a complex phenomenon which undoubtedly will continue to provoke the interests of social scientists. Investigation of the processes which direct an individual's knowledge of and responses to the emotional states of other individuals entails careful consideration of all the social-psychological processes which mold individual differences in overt and covert behavior. Empathy has been viewed by some as a social process. Others have viewed the phenomenon as an emotional process, or as a personal characteristic of the individual. At a higher level of analysis, viewing the processes as continuously interrelated should permit a clear understanding of this most fundamental of interpersonal relations.

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APPENDIX

Pilot Study

Investigation of the problem identified and described in Chapter II required a preliminary investigation to study the feasibility of the procedure planned for use in the experiment. Since the success of the experiment would be almost entirely dependent upon the effectiveness of a social model in differentially disposing the behavioral responses of observers toward a performer's apparent pleasure and distress, it was necessary to determine whether such an effect could be achieved when the model's behaviors were presented via videotape. To this end three groups of subjects observed a performer succeed and fail at a motor task. Prior to observing the performer one group of subjects had watched a videotape in which a model consistently rewarded the performer regardless of her success and failure; the second group saw the model consistently punish the videotaped performer regardless of her success and failure; and the third group (control group) had no prior experience with a model.

A secondary consideration of the pilot study was to determine the nature of changes in observers' autonomic responses to the performer's apparent success and failure. Of particular interest was whether changes in heart rate and respiration rate were attributable to the observation of qualitatively different emotional displays, to the differential effects of a positive versus a negative model, or due to both considerations.

The purpose of the pilot study was to demonstrate that differences in emotional responses instigated by the observation of a performer's apparent success and failure, and in subsequent behavioral responses to

the performer, were attributable to qualitative differences in the behavior a social model was observed to make in the same situation.

Method

Subjects

Eighteen female undergraduate summer session psychology and educational psychology students at the University of Calgary were used as subjects in the preliminary investigation. The subjects were between 18 and 21 years of age. Each subject was paid $2.00 for their participation in the experiment.

Procedure[1]

Upon her arrival at the laboratory the subject was greeted by the experimenter (E) and led to the testing room. The subject was seated at a table upon which were an eleven-inch TV monitor and a three-button response panel, the buttons labeled R, N, and P respectively. The table was situated in front of a curtained one-way mirror which adjoined the performer's room. The subject's left arm was bared, her watch removed, and the left index finger cleansed with alcohol. A plethysmograph transducer was mounted on the finger and a light-proof hood pulled over the left hand. The plethysmograph was used to measure heart rate (HR) while respiration rate (RR) was recorded by means of a strain guage strapped across the subject's sternum. After mounting the transducers E gave the subject a set of written instructions and left the testing room.

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[1]Since the procedure presented here is technically identical to that reported in the main experiment, the description presented here is abbreviated by the omission of many technical details.

The instructions read:

> Thank you for volunteering to participate in the experiment. You are going to watch another student learn a difficult motor task. As part of the experiment we are recording your heart rate and respiration rate. You can help us most by:
>
> 1. Imagining how you would feel if you were in the learner's place.
> 2. Keeping unnecessary movement to a minimum.
>
> You will be able to watch the learner through the one-way mirror behind the curtain in front of you. However, the learner is not aware that you, or even another person, other than the experimenter, is involved in this experiment.

For subjects in the two modeling conditions the instructions continued:

> Rather than attempt to explain the procedure to you, we will show it to you on the TV monitor. What you will see is the participation of the first subject in this experiment. You will see a few minutes of her participation. Please pay careful attention to the procedure.
>
> The tape will be shown in a minute. Here is a brief description of what you will see:

The instructions then continued as follows for all subjects with the changes shown in parentheses being read by the subjects in the control group:

> The learner will be attempting to hold the stylus on the (a) revolving metal target for 10 out of 15 seconds. If she succeeds the S light will come on, and if she fails the F light will come on. Then when the S or F light goes off the subject (you) presses (will press) either the R button to reward the learner, N to neither reward nor punish the learner, or P to punish the learner. Each time R is pressed the learner receives a 25¢ bonus. When P is pressed a mild, non-painful, but slightly irritating shock is delivered to the learner's arm. N is nothing - neither money nor shock. Now watch the videotape closely [omitted for control subjects].

Following the control group's reading of the instructions E entered the testing room and opened the curtain permitting the subject to view the performer's room. The performer, a 20-year-old female undergraduate student, was seen standing behind a pursuit-rotor apparatus, stylus in hand, facing the one-way mirror. An electric shock conductorium was strapped to her right forearm. To her right were two visual displays. The first housed an S and an F which could be illuminated by E to indicate whether the performer had succeeded or failed on each trial. The second display was a bank of three lights. At the top of the bank (farthest from the subject) was a green light which was illuminated when the R button was pressed; next was an amber light which was illuminated by pressing N; and at the bottom of the bank was a red light illuminated by pressing P. The procedure was reviewed by E to assure that the subject understood what she was required to do. Her final instructions, given verbally, were:

> Okay then, you have it straight. The learner is going to try to learn the motor task of keeping the stylus on target for ten out of fifteen seconds. At the end of each trial the S will light up if she has done it, and the F if she has not. As soon as the S or F goes off, you press one of the buttons to either reward her, punish her, or do nothing to her. The green light will come on if you press R, the amber light if you press N, and the red light if you press P. Are there any questions? [pause] Then we will start in a moment.

Subjects in the experimental groups were shown one of two videotapes, one designed to induce a positive-response set and the other to induce a negative-response set in the subjects. They viewed a performer work the pursuit rotor for six trials, three of which were randomly assigned to result in success and three to result in failure. In the positive-model

(PM) tape the model was seen to consistently press the R button, illuminating the green light, regardless of success or failure. In the negative-model (NM) tape the model consistently pressed the P button, illuminating the red light, regardless of success or failure.

Following presentation of the videotape E entered the testing room, reviewed the procedure, and opened the curtain to permit the subject to view the performer's room. The performer appeared just as she did for subjects in the control group. Subjects in the two experimental groups were then given the same final instructions verbally.

Habituation trials. All subjects were informed that the first five trials were practice trials to permit the performer to become accustomed to the apparatus and procedure. The subjects were asked to simply watch these trials. Each of the five trials proceeded as follows: Upon the onset of a signal light the performer worked the pursuit rotor for 15 seconds. At the completion of the trial the performer looked expectantly towards the S/F display. Either an S or an F were displayed by E according to a previously determined random order of the two outcomes. The outcomes were randomly assigned such that for any one subject S or F would occur on a maximum of three of the five trials. Thus the outcomes were independent of the performer's actual performance on the task. The outcome display remained on for 10 seconds. The offset of the outcome display ended the trial. The inter-trial interval ranged from 25 to 40 seconds in duration.

Test trials. The subject heard the following instructions to the performer:

> That is the end of the practice trials. On the next ten trials you are to do your best. If you manage to keep the stylus on target for 10 out of the 15 seconds per trial the S will come on. If you fail to do so the F will come on. If I [indicating that E controlled the contingencies] decide to reward you the green light will come on and you will receive twenty-five cents for that trial. If I give you nothing the amber light will come on. If I decide to punish you then the red light will come on and you will receive an electric shock to your arm (E motioned to the electric conductorium worn on the performer's right arm).

As on the habituation trials, the performer worked the pursuit rotor for the 15 seconds that a signal light was on. At the offset of the signal light she looked expectantly to the S/F display. Again E displayed either an S or an F according to a previously determined random order of the two outcomes. S and F each occurred five times over the ten trials. The outcome display remained on for 10 seconds. Upon its offset the subject pressed either the R, N, or P button to dispense reward, nothing, or punishment respectively. The corresponding light stayed on for 10 seconds. The inter-trial interval was from 25 to 40 seconds in duration. All of the experimental manipulations and subject responses were recorded on an event marking channel of the polygraph.

Performer's routine. During the 15 seconds that the performer worked the pursuit rotor she was seen to be holding the stylus on or near the rotating target. At the offset of the signal light she looked eagerly to the outcome display. An S occasioned a straightening of posture and a facial expression of joy and satisfaction. An F led to a slumping of posture, a frown, and noticeable head shaking. At the end of the ten seconds that the outcome display was on the subject activated one of the three contingency lights. The green light occasioned a

postural and facial expression of joy. The amber light occasioned no change in posture, but a slight cocking of the head, and an expression of mild surprise. The red light led to a slumping of posture, a momentary expression of pain, and then a frown as the performer rubbed the area of her arm around the conductorium. During the inter-trial interval she appeared to inspect the performer's room and to casually practice the motor task.

Measures

The main dependent variable was the value of the contingency dispensed by the subject to each of success and failure, where R = 1, N = 0, and P = -1. These values were summed across the five success and five failure trials to obtain the contingency response scores. The maximum value that may have been dispensed to either outcome was 5, and the minimum was -5.

Heart rate (HR) and respiration rate (RR) were recorded throughout the experiment. Primary interest was with changes in the rates accompanying the observation of success and failure. Thus, rate measures were calculated for the ten seconds immediately preceding the onset of the S/F display and for the ten seconds that the S/F display was on. Heart rate was calculated as the number of beats occurring in each of the ten second intervals multiplied by six to yield beats per minute (bpm). Similarly, RR was calculated as the number of respiratory cycles occurring in each interval multiplied by six to yield cycles per minute (cpm). Changes in HR and RR were calculated as increments and decrements in the rates from interval to successive interval.

Results

Contingency Scores

The means and standard deviations of the groups' responses to success and failure are presented in Table XXIV. Inspection of the means indicated that all three groups responded more positively to success than to failure. In addition, the PM and Control groups tended to respond more positively to success and failure than did the NM group. The contingency response scores were subjected to an analysis of variance to determine the differential effects of the model's behaviors on the subjects' responses to success and failure. Table XXV presents the results of the analysis and reveals two significant effects. The mean scores associated with the two effects are appended below the table.

A Duncan multiple-range test was used to determine the nature of the difference between groups. The overall mean scores of the PM and Control groups did not differ significantly, but both were significantly greater ($\alpha = .05$) than the mean score of the NM group. Subjects who had observed the model to always dispense reward and subjects who had had no prior experience with the model responded more positively to the performer's success and failure than did subjects who had observed the model to always dispense punishment.

On the basis of the F-value presented in Table XXV it was evident that the mean contingency score associated with the observation of success was significantly different from the mean contingency score associated with failure. All subjects tended to respond more positively to success than to failure.

TABLE XXIV

Contingency Response Scores

Group	Success		Failure	
	$\overline{X}$	SD	$\overline{X}$	SD
Positive Model	3.833	1.835	0.500	1.225
Control Group	4.333	0.816	-0.500	1.517
Negative Model	2.333	3.386	-3.667	2.160

TABLE XXV

Analysis of the Contingency Response Scores

Source	df	ms	F	p
Between Ss	17	7.459		
Groups (G)	2	29.528	6.537	.01
$error_b$	15	4.517		
Within Ss	18	14.306		
Success/Failure	1	200.695	65.333	.001
G x S/F	2	5.361	1.745	ns
$error_w$	15	3.072		

PM	Control	NM
2.173	1.922	0.667

Success	Failure
3.500	-1.222

While the Groups-by-Success/Failure interaction presented in Table XXV was not significant at accepted levels, an inspection of the means presented in Table XXIV suggested a general tendency, particularly in response to failure, for the magnitude of the contingency scores to increase from the NM group across the Control group to the PM group. To investigate this apparent relationship, difference scores were obtained by subtracting the contingency score for failure from the score for success. The difference scores were then correlated with the treatment conditions, which were assigned the values: PM = 1, Control = 0, NM = -1. The resultant product-moment correlation coefficient (r = -0.725, df = 17, $p < .05$) indicated that there had been a tendency for the difference between the scores to decrease as the subjects were exposed to successively more positive models. Thus, the PM group was more likely to have rewarded both success and failure, whereas the NM group was more likely to have punished both success and failure.

Psychophysiological Responses to Success and Failure

The changes in HR and RR were analyzed to assess possible differences among the groups' responses to success and failure during the habituation and test trials. Each subject's responses to success and failure were averaged and entered into analyses of variance.

Habituation trials. The analyses of responses during the habituation trials revealed that changes in HR (F = 6.448, df = 1,15, $p < .025$) and RR (F = 5.605, df = 1,15, $p < .05$) had been a function of the difference between the response to success and the response to failure. In addition, there were differences among the groups' RR responses to success and failure (F = 5.039, df = 2,15, $p < .005$). Table XXVI presents

TABLE XXVI

Mean Changes in Respiration and Heart Rates

Measure - Source	Group	Display Success	Display Failure
RR - S/F	-	-2.143	-0.767
RR - G x S/F	PM	-4.607	0.587
	Control	-1.333	1.667
	NM	-0.500	-4.467
HR -	-	2.639	5.379

the mean changes in HR and RR associated with the significant effects.

The decrease in RR upon the observation of success was significantly greater ($p < .05$) than the decrease in RR upon the observation of failure. In contrast, the increase in HR upon the observation of failure was significantly greater ($p < .025$) than the increase upon the observation of success.

While all groups evidenced a decrease in RR upon the observation of success, the response of subjects in the PM group was significantly greater ($p < .05$) than the response of subjects in the Control and NM groups. In contrast, the NM group's response to failure was significantly different ($p < .01$) from the other groups' response to failure. The interaction was attributed to the comparatively pronounced decreases in RR which accompanied the PM group's response to success and the NM group's response to failure. It is noteworthy that changes in RR were most pronounced when the quality of the performer's display was concordant with the quality of the contingency response set adopted by the subjects.

Test trials. Analyses of the responses to success and failure during the test trials revealed that changes in HR ($F = 5.282$, $df = 1,15$, $p < .05$) and RR ($F = 4.786$, $df = 1,15$, $p < .05$) had been a function of the difference between the response to success and the response to failure. As found in analyses of the responses during the habituation trials, the decrease in RR upon the observation of success ($\bar{X} = -2.098$ cpm) was significantly greater ($p < .05$) than the decrease upon the observation of failure ($\bar{X} = -0.243$ cpm). The increase in HR upon the

observation of failure ($\overline{X}$ = 6.033 bpm) was significantly greater ($p < .05$) than the increase upon the observation of success ($\overline{X}$ = 2.427 bpm). There were no significant differences among the groups' responses.

Discussion

It was critical to the planning of the main experiment that the pilot study demonstrate that the observation of a model's benevolent versus her punitive behavior would differentially dispose subjects' subsequent responses to a performer's apparent success and failure. As hypothesized, subjects who had observed the model's benevolent behavior responded more positively to the performer's success and failure than did subjects who had observed the model's punitive behavior. Therefore, it was concluded that the observation of a social model provided a viable method of establishing different behavioral response set in observers.

Analyses of the autonomic responses to the performer's success and failure indicated that the observation of failure was more emotionally arousing, as evidenced by a more pronounced increase in heart rate, than was the observation of success. The most pronounced changes in RR occurred when the performer's emotional display was concordant with the quality of the response set adopted by the subject. That is, decreases in RR were greatest when subjects in the PM group observed success and when subjects in the NM group observed failure. It was decided that the possibility of securing differential response patterns was worthy of continued investigation.