The Influence Of The Self-schema On Emotional Attribution.

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The Influence of the Self-Schema on Emotional Attribution

by

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This dissertation is dedicated to my son Thomas Daniel Salzman

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Abstract

How do people know what emotions they are feeling? The answer is not always obvious. Previous research on emotions has suggested that cognitive interpretations, or appraisals, play a significant role in emotional experience. The current study suggests that strongly held beliefs about the self, or self-schemas, in turn influence these appraisals, and these influence what emotions a person perceives the self to be experiencing. Depressed and nondepressed subjects were tested in a misattribution paradigm where they were asked to perform an exercise task and then complete an emotion questionnaire. Residual physiological arousal from the exercise task was expected to be interpreted by subjects as emotional intensity information. The negative self-views present in depression were expected to bias depressed people toward the experience of negative emotion when they were aroused. However, the presence of an alternative label for negative emotion was expected to offset the effects of depression. Results for study one demonstrated that these subjects did use their self-schema to determine what emotion they should be experiencing. This was reflected in more intense ratings of schema - consistent affect for physiologically aroused subjects who had no explanation for their arousal. Study two added an attentional focus factor which was intended to increase self-schema activation, producing even more intense schema - consistent affect for physiologically aroused subjects. Results failed to demonstrate an increase in emotional intensity due to self-schema activation. However, results did suggest that self-focus increased awareness of physiological arousal, thus providing a label for the residual arousal. These studies suggest that self-schemas influence how people come to know what they feel by providing a general bias toward the experience of emotion that is consistent with the affective content of

the self-schema. This bias operates most strongly when people are experiencing the physiological symptoms of emotion but have no label for these symptoms. Results also show that when depressed people are provided with an alternative way to describe their negative emotion, their subjective experience is much less negative. Discussion centered around modifying existing theories of emotional attribution to include input from the self-schema.

The Influence of the Self-Schema on Emotional Attribution

How do people come to know what they feel? When a person experiences sadness, does this sadness result from a certain way of thinking about something that happens in the world, or is sadness an automatic response to an event? Is the individual in control of the emotions she experiences, or are emotions beyond her control? These questions about emotional experience are at root questions about the role of cognition in emotional experience. Research in psychological theories of emotion have focused on whether on-line cognitive processes are part of emotional experience at a given point in time. This paper is intended to consider the influence of more permanent cognitive structures like the self-schema.

Before examining how self schemas affect the way we experience emotion, it is important to gain an understanding of current theories of emotional experience. I will begin by reviewing the literature on the relationship of cognition and physiology in emotional experience. Second, I will discuss theories that are aimed specifically at explaining how people come to know what they feel. Third, I will examine the literature on the role of the self-schema in self-attribution of emotion, and finally, I will discuss how these two perspectives can be integrated to obtain a better understanding of how people come to know what they feel.

Current Theories of Emotional Experience

Current research in the field of emotion has focused on everything from how people come to know what they feel, to more information processing questions like how emotions and moods affect memory processes and encoding. Most of these theories agree that an emotional experience involves physiological arousal, cognition, and expressive behavior. What emerges as a source of controversy between the theories of emotion is the relationship of these three components.

Cognitive Theories of Emotion

Bower's theory of emotion is a good representative of cognitive theories of emotion in that it begins the sequence of emotional experience with a cognitive process (Bower, 1981; Bower, Gilligan, & Monteiro, 1981). This cognitive theory of emotion sees cognition and emotion as a single system in which emotional processes are similar to cognitive processes such as memory retrieval and encoding. According to Bower, emotions are represented as nodes in an elaborate associative network. These emotion nodes are connected to other nodes representing expressive behaviors, autonomic activity, verbal labels, eliciting stimuli, and events (Leventhal & Tomarken, 1986). According to Bower, the process of emotional experience is the same as the process for memory retrieval. Retrieval, in this cognitive model, is dependent on the overlap of cues available at the time of learning with those present at the time of retrieval (Tulving & Thomson, 1973; Leventhal & Tomarken, 1986). If a node connected to an emotion is activated, the emotion node also becomes activated through spreading activation and emotional experience results. The intensity of emotional experience is dependent on the level of activation of the emotion

node.

This theory is valuable in its ability to explain the relationship of mood and memory (Bower, 1981) and the effects of mood on cognitive processes (Gilligan & Bower, 1984). However, Bower's model is not sufficient as a general model of emotional experience because it requires a well elaborated cognitive structure for the experience of emotion. If this structure is necessary, it is difficult to see how infants, who do not have an elaborate cognitive structure, experience emotion. Further, Bower's methodology employs verbal stimuli for elicitation of emotion, while in the real world, emotional experience tends to be dependent on interpersonal and social stimuli. It is clear that Bower's cognitive model is valuable in its explanatory power for processes related to cognition in emotional experience; however, it is less powerful as a general model of emotion.

Physiological Theories of Emotion

James - Lange Theory of Emotion. Physiological theories of emotion are much more common than purely cognitive models. One of the earliest theories of emotion was the James - Lange theory which was the first to identify physical reactions as the basis for emotional experience (James, 1884; Lange, 1887). The James-Lange theory characterized emotion as a process beginning with a physiological reaction to an environmental stimulus. Cognition, or the conscious perception of emotion, was secondary and emergent from the physiological response. This non-intuitive approach posited the physiological reaction as the primary component in emotional experience. For example, according to this theory, we are afraid of a bear because we tremble, sweat, and run away. Instead of viewing emotion as a psychological or cognitive - perceptual reaction that produced corresponding expressive behaviors, the expressive behaviors

become the basis for emotional experience. Cognition is simply an artifact of the emotional experience.

One of the difficulties with this idea is that physiological reactions for different emotions would then have to be distinguishable from on another. The physiology of love, for example, would have to be different from the physiology of fear. Walter Cannon (1927) criticized the James - Lange theory for its reliance on purely physiological components. Cannon said physiological responses are too generalized or diffuse to explain the wide range of emotional experiences possible for human beings. It was on this basis that the James-Lange theory was abandoned.

Facial Feedback Theory. Recent theories of emotion have now returned to the idea of a physiological basis for emotional experience. A modern example of a physiological theory of emotion is the facial feedback theory. Emotion in this theory is experienced as a result of feedback from facial muscles (Izard, 1972, 1977; Tomkins, 1980). We experience joy as a result of the facial configuration produced by a joyful face. People build up a repertoire of facial responses based on culturally accepted norms of facial expression. These expressions then serve to provide the information or feedback that allow a person to experience emotion. Once again, cognition is not involved in the production of emotion, rather, it is simply an artifact of the emotional experience produced by facial feedback.

An example of a study that purports to demonstrate the facial feedback hypothesis is Laird's (1984) study in which facial expressions were hypnotically "locked." He found that a hypnotically "locked" frown produced increased reports of aggressive feelings in response to pictures of children at play or

Klansmen. A smile increased reports of positve feelings towards the pictures of children at play. These results were interpreted by Laird as evidence for the experience of specific emotions as a result of facial configurations.

Vascular Theory. One variant of the facial feedback theory that attempts to identify particular physiological processes that produce emotional experience is Zajonc's (1985) vascular theory. The vascular theory states that facial expressions are responsible for regulating emotion by varying the amount of blood flowing to the brain as well as altering the amount of air flow through the nose. This regulation by facial expressions changes the temperature in the brain allowing for the subjective experience of emotion. For example, a smile causes changes in blood flow and oxygen to the brain providing the necessary physiological conditions for positive emotion. This theory differs from Izard's facial feedback theory in that it posits no cognitive mediation of emotions. This theory also explains cross cultural consistency in facial expression. For example, the expression of happiness is produced by the peculiar configuration of facial muscles present in a smile, therefore, regardless of culture or race, happiness will always covary with smiling.

Facial feedback theories rely on particular expressive reactions to environmental stimuli as the basis for emotional experience. This view is in direct contrast to Bower's theory in that physiology is primary and independent of cognition. Cognition, in facial feedback theories, is simply an artifact of the emotional experience contained within the physiological reaction. However, this model of emotion has difficulty with emotional experience based on verbal communication. For example, if someone calls me a jerk, I experience emotion. This emotion is based on the meaning inferred from this derogatory statement. It

is difficult to see how emotional experience can be independent of the cognitive process necessary to infer meaning from this statement. In this case, cognition precedes the physiological response.

One can see in both the cognitive and the physiological theories the difficulty in reconciling the physiological aspects of emotion with the cognitive, or subjective experience of emotion. If one posits specific physiological stimulus - response mechanisms for emotion that are independent of cognition, it becomes difficult to explain how people experience emotion in situations where the meaning of verbal communcation is the stimulus. Conversely, if emotion is primarily cognitive, how does one explain the volumes of research detailing how people can be fooled into experiencing emotion based only on physiological experience?

Arousal - Appraisal Theories

Arousal - appraisal theories have become increasingly popular over the past ten to fifteen years. What distinguishes these theories from other theories of emotion is their tendency to define affect as information (Gehm & Scherer, 1988). These theories make a distinction between affective information, which includes physiological arousal, and the cognitive appraisal of that information for the purpose of interpretation. The focus of these theories is on meaning dimensions that differentiate between different emotional states (Lazarus, Averill, & Opton, 1970; Smith & Ellsworth, 1985; Lazarus, 1984; Schwartz & Clore, 1988; Scherer, 1984). Specifically, they attempt to provide some general explanation for what emotions people experience and under what situations they experience them.

The process of appraisal is presumed to be a universal process that is the

starting place for all emotion. This appraisal process does not deal with the possible influence of knowledge structures like the self-schema. Instead, appraisal is viewed as a primarily cognitive process of interpretation. Appraisal is not dealt with in detail by these theories because most of these theories focus on the identification of the most basic emotions, the cognitive structure of emotion, and the motivational aspects of emotion (Ortony, Clore, & Collins, 1988). It is this appraisal process, however, that allows people to come to know what emotion they are experiencing. Theories that focus specifically on the appraisal process are called self-perception of emotion theories.

Self-Perception Theories of Emotion and the Self-Schema

The focus in this study will be directed at discovering how people come to know what they feel. This process is known as emotional attribution. Theories that deal with emotional attribution are aimed specifically at the process of appraisal. This appraisal process is what allows people to determine what emotions they are experiencing. These theories are different from the theories discussed previously in that they do not try to provide a complete model of emotion. Instead, they are aimed at describing and explaining only the processes involved in how people perceive what emotions they are experiencing.

Schachter and Singer's Theory of Emotion.

Schachter and Singer (1962) developed a theory aimed directly at explaining the self-perception of emotion. Schachter and Singer's original theory stated that perception of emotion consists of two parts: Physiological arousal caused by an emotion eliciting situation, and a cognitive label assigned to the physiological arousal. This theory was revolutionary in that it viewed emotions as different from each other only in the cognitive label assigned to them. The underlying physiological arousal is the same for all emotions. There is no difference between love and hate except in the cognitive label assigned to each of them. Schachter and Singer's theory suggests a separate systems view in which cognition and affect are separate but work together to produce affective responses. Physiological arousal provides information about the intensity of affect, while cognitive processes provide information about the quality of the emotion.

According to Schachter and Singer (1962), in order for affective

experience to occur, both physiological arousal and cognition must be present. In other words, arousal and cognition are *necessary* conditions for the experience of emotion. In the absence of physiological arousal there can be no emotional response. Conversely, in the absence of cognitive labeling, even with physiological arousal, no emotion can be experienced. In a dangerous situation, a person will not experience fear if he calmly evaluates the situation as dangerous without corresponding physiological response. Fear will not be experienced in this situation if physiological responses occur, but the person is able to explain them without reference to emotion (eg. as having ingested too much caffeine). The existence of both physiological arousal and cognition are not *sufficient* conditions for emotional response. In order for the response to take place the two must connect. The arousal must, through cognitive processes, be specifically labelled as resulting from an emotional situation. The fearful response will occur when a person experiences arousal and attributes that arousal to the fearful situation in which he finds himself. This process is summarized in the following proposition:

> "Emotion will be experienced if, and only if, (a) arousal is present; (b) an appropriate (i.e. emotional) cognition is present; and (c) there is a perceived causal connection between these two elements" (Resenzein, 1983).

If the above conditions are met, there are two ways that emotion can be generated. The most common way involves everyday experiences in which individuals find themselves in a situation where they both experience emotional arousal and the cues that produce this arousal are clearly apparent. Consistent with the necessary conditions for emotional response, the person experiences

physiological arousal and labels that arousal as emotional in nature. The process that is occurring is not complicated by difficulties in cognitive labeling. The situation produces arousal, and that same situation provides the cues that allow the person to label the arousal. Dinner on the patio of an expensive restaurant under the stars with an attractive member of the opposite sex is likely to produce physiological arousal. The same cues that produced the arousal tell people they are in a romantic situation, and the feelings should be labelled as romance. This process is not something that occurs consciously, rather, the person is only aware of the resulting emotional state. In the vast majority of circumstances, this simple process is sufficient to accurately evaluate situations that are emotional in nature.

The second way emotions can be generated is in situations where physiological arousal is present with no apparent causal factor(s) or where physiological arousal is too intense to be explained by the existing explanatory factors. In Schachter and Singer's (1962) theory this situation leads to evaluative needs in the individual that produce an epistemic search for the cause of the arousal. This epistemic search differs from the automatic processing that takes place in normal perception of emotion. When unexplained arousal is present, the cognitive labeling process becomes a deliberate, and sometimes conscious, search for the cause of the arousal (Resenzein, 1983). This process is terminated as soon as a plausible cause for the arousal is discovered.

This second process has provided a specific prediction that has been thoroughly tested in the research literature since Schachter and Singer (1962) initially introduced their theory. That prediction is that emotional attributions can

be manipulated by producing ambiguous arousal in individuals and then providing them with an appropriate emotional cue for labeling their arousal.

The classic study done by Schachter and Singer (1962) manipulated both arousal and situational cues. To manipulate arousal, subjects were injected with epinephrine or a placebo. Epinephrine (i.e. adrenalin) is a physiologically stimulating drug. They were subsequently either correctly informed, misinformed or not informed about the drug's effects. Those in the misinformed condition were told the injection would produce side effects such as numbness in the feet and itching sensations. These particular side effects are not associated with epinephrine, rather they were presented as a way to misinform subjects of the drugs effects. Subjects were then placed in either a euphoria condition or an anger condition. The emotional cue was created by the introduction of a confederate who acted in a euphoric manner, or in an angry manner. Subjects who were not informed, or were misinformed about the effects of the drug reported more happiness in the euphoric condition, and more anger in the anger condition. Schachter and Singer attributed this finding to a misattribution of the arousal produced by the drug to the emotion suggested by the situation. Specifically, subjects experienced physiological arousal for which they did not have a label. The lack of a label for their arousal prompted them to perform an epistemic search which ended when they observed the emotional cue presented by the confederate. Whatever emotion was modelled by the confederate was interpreted by the subjects as appropriate to the situation and, consequently, the physiological arousal resulting from the epinephrine injection was attributed to that emotion.

Those in the informed condition did not experience the same increase in

emotional experience. Those in the informed condition were experiencing heightened physiological arousal, but they attributed that arousal to the effects of the epinephrine injection, and consequently did not attribute their arousal to the emotional cues present in the experimental situation. These empirical results were the first to suggest that arousal and cognition are independent of each other and interact to produce affective experience.

The original 1962 study was criticized on many different grounds (Maslach, 1979; Lazarus, 1968; Leventhal, 1974; & Plutchik & Ax, 1967). Possibly the most relevant criticism involved the simple fact that the observers were not blind to the condition. Additionally, the confederate served not only as a cue for relevant emotion, but also as a social comparison point, confounding the results with the social effects associated with the confederate (Maslach, 1979).

In spite of these criticisms, additional research demonstrated the hypothesis quite clearly. Many subsequent studies were aimed at determining exactly what situations allowed for this misattribution of emotion. In one study, (Nisbett & Schachter, 1966) subjects were given a placebo pill and told that it would arouse them or that it would not arouse them. Subjects were then exposed to an electric shock . Those in the arousal condition tolerated more intense shocks than those in the nonaroused condition presumably because they attributed their arousal to the effects of the pill. The conclusion of the study is that fear can be reduced in certain situations by providing an alternative explanation for arousal.

Additional research has shown that drug induced arousal can affect the experience of humor (Schachter & Wheeler, 1962), fear and anxiety (Bandura &

Rosenthal, 1966), elation (Erdmann & Janke, 1978), and the experience of cognitive dissonance (Cooper, Zanna, & Taves, 1978). However, many of these studies are somewhat unclear in their interpretation because of the presence of side effects associated with the application of drug treatments to subjects.

Many of the studies using drug induced arousal, including Schachter and Singer's (1962) initial study, have several components in common: (a) the presence of ambiguous physiological arousal, (b) the lack of an adequate explanation for that arousal, and (c) a specifically manipulated environment that would provide a plausible emotional context for the arousal. The studies using this paradigm were all aimed at demonstrating a common physiological substrate for all emotion. If attribution of emotion can be manipulated simply by changing the context in which the underlying physiological arousal is perceived, then the conclusion that emotion is simply generalized physiological arousal with a cognitive label attached can be accepted.

Schachter and Singer's (1962) original theory stated that physiological arousal was a necessary condition for emotional experience. Some interesting work has been done since then by Valins (1966) showing that physiological arousal itself is not necessary, only the *perception* of physiological arousal. This idea was demonstrated in a series of experiments that showed the existence of what came to be called the "Valins effect."

Valins' (1966) study asked male subjects to rate the attractiveness of erotic slides. While rating these slides, a prerecorded tape of heartbeat-like sounds was played. Some of the subjects were lead to believe that these sounds represented their own heartbeats. These subjects rated slides as more attractive when the sounds communicated faster heart rate. The perceived

physiological arousal was attributed to the attractiveness of the erotic slide. Contrary to Schachter and Singer's original theory, actual physiological arousal was not necessary, only the subject's perception that they were experiencing physiological arousal.

The Valins effect has been replicated in numerous experiments (Barefoot, 1968; Stern, Botto, & Herrick, 1972; Goldstein, Fink & Mettee, 1972). Stern, Botto, & Herrick (1972) replicated the Valins effect, but also demonstrated that attention was the mediating factor. Subjects who were told that the heartbeat like sounds were meaningless, but were also instructed to attend to those sounds, demonstrated the Valins effect in their ratings of slides. What is important about this research in terms of developing an accurate theory of emotional attribution is that actual physiological arousal was not necessary for attributional differences, only the conscious perception of arousal.

Zillman's Excitation Transfer Model.

Dolf Zillmann (1978) expanded and developed Schachter and Singer's (1962) initial theory, criticizing it for not explaining how individuals become aroused in the first place. Zillmann characterized Schachter and Singer's theory as presupposing cognitive factors that trigger physiological processes (Nisbett, & Schacter, 1966, p. 228). Specifically, in Schachter and Singer's theory, the experience of arousal is a result of the perception of a situation in the environment. This perceptual process, according to Zillmann, is primarily a cognitive operation. Consequently, the Schachter and Singer model begins with cognition instead of physiological arousal. Schachter and Singer simply did not discuss what cognitive processes, if any, were part of the perception of the environment.

Zillmann (1978) solved this problem by proposing a three factor model that incorporates Schachter and Singer's (1962) theory as a special case. The crucial aspect of this three factor model is the initial physiological response. The initial response to a situation is seen as occurring at the motor level similar to reflexive responses. This motor level response does not require the cognitive interpretation necessary in the Schachter model.

There are three factors in Zillmann's (1978) theory: (1) The *dispositional* component is characterized as the simple motor level reactions to a stimulus. They are unconditioned (eye blink) or conditioned (phobias) responses to specific stimuli in the environment (2) The *excitatory* component is also either unconditioned or learned, and involves the arousal of the sympathetic nervous system. This response occurs at the unconscious level and is what allows for the fight or flight response. (3) The *experiential* component refers to the conscious experience of emotion. When a person becomes aware of the internal cues that communicate arousal a cognitive process is initiated that is intended to determine the cause of the arousal. Both environmental and internal cues are used to make an emotional attribution. At this point the process is similar to Schachter and Singer's (1962) idea of how emotion is experienced. What is different is that Zillman's idea includes an explanation of how the initial response to environmental stimuli is produced, namely, the motor level automatic response to specific stimuli. This motor level response does not rely on cognitive precursors, it is simply experienced as an unconditioned or learned response to particular stimuli.

From this three factor theory of emotion, Zillmann (1978) developed a theory of "excitation transfer" based on several assumptions:

1. With respect to emotions, the interoception of excitatory reactions is generally nonspecific.
2. The individual can determine the intensity of his excitatory reaction through interoception. However, only gross changes in the level of excitation will draw the individual's attention and produce an awareness of his state of excitation.
3. The individual relates an excitatory reaction of which he becomes aware to the apparent inducing condition and may recall this connection at later times.
4. The individual does not partition excitation compounded from reactions to different inducing conditions. Instead, he tends to ascribe his entire excitatory reaction to one particular, inducing condition.
5. Intense excitatory reactions do not terminate abruptly.

If these assumptions are correct, physiological excitation can be transferred from one situation to another, hence, the "excitation transfer" model. In cases where an emotional attribution is made in the presence of generalized physiological arousal, the physiological arousal will be interpreted as emotional intensity.

A representative study evaluated excitation transfer from physical exercise to subsequent aggressive behavior (Zillmann, Katcher, & Milavsky, 1972). In this study, sympathetic arousal (high vs. low) was manipulated by means of an exercise bike. Subjects subsequently participated in a teacher - learner experiment where they ostensibly delivered electric shocks to the learner. Those who were in the high excitation condition displayed more aggressiveness in the delivery of electric shocks than the low excitation

subjects. This finding demonstrated that increased physiological arousal from the exercise task intensified aggressiveness in the teacher - learner task.

In light of Zillmann's theory, Schachter and Singer's (1962) model becomes a special case of excitation transfer. Specifically, Schachter and Singer's model functions in situations where emotional attribution becomes necessary without the benefit of clear situational cues. This situation will result in a cognitive search for the cause of the arousal. If a plausible cause is discovered, any physiological arousal present will be attributed to that cause. The amount of physiological arousal will be interpreted as the intensity of affect associated with the cause.

Excitation transfer phenomena have been demonstrated in a wide variety of circumstances. Residues from physical exertion can intensify anger and aggression (Zillmann, Katcher, & Milavsky, 1972; Zillmann & Bryant, 1974) and sexual excitement (Cantor, Zillmann, & Bryant, 1975). Residues from sexual arousal or disgust reactions can facilitate the appreciation of humor (Cantor, Bryant, & Zillmann, 1974) and dysphoric empathy (Zillmann, Mody, & Cantor, 1974).

In Zillmann's three factor theory of emotion, the critical step in the process is the attribution of physiological arousal to some emotional source. These linkages between physiological arousal and labeling of that arousal can be accurately construed as causal attributions (Zillmann, 1978). When these linkages are made, individuals are ascribing particular physiological responses to particular causal hypothesis about emotional experience. The excitation transfer model does not deal with the process of how these attributions occur. Instead, Zillmann's research is targeted at understanding the extent to which

epistemic pressures guide this attribution (Zillmann, 1978).

Zillmann and Schachter and Singer's theories can both be criticized for the same shortcoming as the facial feedback theories. These theories are based on a physiological response that is interpreted by a cognitive evaluation of the cues in the environment. Within these theories it is difficult to see how emotion results from verbal interactions that require cognitive interpretation before meaning can be inferred. Zillmann (1978) tries to solve this problem by positing covert verbal responses as the basis for identifying emotional quality. An individual facing an emotional experience reacts with covert verbal responses such as "This gives me the creeps," or "Wow, is she ever beautiful." Zillmann proposes that these verbal responses are automatically attached to specific experiences and are not within the control of the individual. It is these verbal responses that contain the cues that allow for emotional attributions. Retrospective consideration of an experience will lead to explanations by the individual that suggest a more reasonable reaction. The person whose covert verbal response was "Wow, is she beautiful" might say the emotional response resulted from scrutiny of the physical attributes of the woman being observed. It is unclear in this formulation how cognitive responses can be produced independent of cognitive processes. According to Zillmann, if someone calls me a jerk, I would have an automatic verbal response that would be outside of my control. Retrospective consideration of that response would allow me to experience appropriate emotions. Once again, it is unclear how a person interprets the verbal information in order to determine what automatic verbal response is appropriate.

It is clear that Zillmann's theory is not appropriate as a general theory of

emotion. However, the preponderance of evidence for the excitation transfer phenomena suggests that Zillmann's theory operates within a specific set of circumstances. In situations where physiological arousal is present but its source is ambiguous, people will interpret that arousal as resulting from an emotional situation. In Zillmann formulation, if a person is experiencing physiological arousal for which they have no explanation, they will engage in an epistemic search for the cause of that arousal. This search is limited to cues in the environment that might indicate what emotion is appropriate. In essence, this process is an identification of the cause for physiological arousal, (i.e. a causal attribution).

This hypothesis does not fit with current research in attribution theory and self-schema theory. Causal attribution in other domains incorporates input not only from environmental cues, and internal physiological cues; it also includes input from judgmental heuristics, knowledge structures, and causal schemas. Judgment heuristics lead to cognitive attributional biases including the fundamental attribution bias, the representativeness heuristic, and many other processing biases that lead to certain types of attributions (see Nisbett & Ross, 1980 for a review). Perhaps there are similar attributional biases operating in emotional situations. Biases in emotional attribution are likely to be specific to the individual and their history of emotional experience. In the excitation transfer paradigm, a person experiencing ambiguous or residual arousal that requires interpretation makes that interpretation based solely on internal and external cues present in the situation. Biases, knowledge structures, and schemas are ignored.

If attributional biases and knowledge structures can be implicated in

information processing for emotional situation, Zillmann's (1978) theory would need to be altered to accomodate this new information. Specifically, in cases where physiological excitation is transfered to a new situation, the information used to make the attribution would include, not only internal and external cues, it would also include schemas and biases.

Self Schemas and Emotion

A uniquely appropriate domain in which to evaluate the hypothesis that emotional attribution is influenced by knowledge structures and schemas is self-schema research. Self schemas have been defined by Markus (1977) as: *"...cognitive generalizations about the self, derived from past experience, that organize and guide the processing of self-related information contained in the individual's social experience."*

Self-schemas function by providing an organizational and interpretive context for cognitive processes. When a person takes in information in a particular domain, it tends to be filtered in such a way as to maintain consistency with existing self-schemas (Bargh, 1982). When a person stores and retrieves information about the self, that information tends to be more familiar, robust, complex, and affective than information related to others (Fiske & Taylor, 1990). Retrieval of information from memory tends to be guided and influenced by the self-schema (Markus & Sentis, 1982). When people are asked to make predictions about their own behavior they tend to use their self-schemas to make those judgements (Markus, 1977). Finally, when people are relating to others, they tend to notice attributes in others that are part of their own self-schemas (Fong & Markus, 1982; Markus, Smith & Moreland, 1985; Sentis & Bernstein, 1979).

Not only do self-schemas serve to organize and interpret information, they have also been shown to produce specific affective responses. Fiske (1981, 1982) developed a model called the schema triggered affect model which detailed how schemas are employed to produce emotion. Fiske (1981, 1982) originally intended this model to apply to social stereotypes. She found that when a person has a schema for a particular type of person, that schema often has affective tags attached to it that can trigger the experience of that emotion. These affective tags are present in any affect laden category (Fiske & Taylor, 1990), including the self. In the context of this study it is the affective content associated with particular self-schemas that will allow an evaluation of how the self-schema influences the attribution of emotion.

The current study is aimed at evaluating if self-schemas influence attributions of emotion in the excitation transfer paradigm. While some disagree over whether there is in fact one overall self-structure (Higgins, Van Hook, & Dorfman, 1988), the ability of particular self-schemas to influence processing of information is undisputed. In all cases listed above, the influence of the self-schema is automatic and outside awareness. Self-schemas were chosen over other types of knowledge structures specifically because they have been shown to influence such a wide range of cognitive and behavioral phenomena. Attributions of emotion are uniquely self-related events further suggesting the self-schema as the proper domain for evaluation. Additionally, self-schemas possess affective content that should influence the emotional attribution process. In the language of the excitation transfer paradigm, we expect that if an individual is experiencing transfered excitation, that excitation will be interpreted based on external situational cues, internal physiological cues, *and* in particular

circumstances, on-line self-schema information.

In order to evaluate whether the self-schema influences emotional attribution, a domain where the self-schema has predictable affective content was needed so that specific predictions could be made regarding its effect on emotional attribution. The self-schema differences between depressed and nondepressed persons provide just such a domain in which to evaluate this question.

Depressed individuals display strong processing differences as a result of their peculiarly negative self-schemas. Derry and Kuiper (1980) conducted a study that required subjects to view, rate, and later recall adjectives with both negative and positive contents. Results showed a tendency for depressed individuals to endorse a greater number of negative adjectives than nondepressed subjects. Further research demonstrated that processing of information for severely depressed individuals was more efficient than processing for mildly depressed individuals (Kuiper, Derry, & MacDonald, 1982). This suggests that there is a continuum of negativity and positivity in the self-schema. Those who score on either end of the continuum are able to process information efficiently due to the stability and complexity of their schemas. Those who score in the middle are less able to process information efficiently because their self-schema contains both negative and positive aspects.

These findings suggest that depressed people have a self-schema that differs in its content from nondepressed people. Specifically, severely depressed individuals possess a primarily negative self-schema for processing of self-relevant data, while nondepressed individuals possess a primarily positive self-schema for processing of self-relevant data (Kuiper & Derry, 1980).

The key point is that the functioning, or the process component of the self-schema, is identical for severely depressed, and for nondepressed people. The difference lies in the *content* of the self-schema. Mildly depressed people, on the other hand, have both depressed and nondepressed content in their self-schemas and, consequently, are not able to process information as efficiently (Kuiper & Derry, 1980).

These differences in content between depressed and nondepressed self-schemas affect the processing of information. These differences have been demonstrated in memory retrieval processes (Pysczcynski, Hamilton, Herring, and Greenberg, 1989; Clark & Teasdale, 1982; Diener, Larsen & Emmons, 1984; Finkel, Glass & Merluzzi, 1982), in self-focusing styles after success and failure (Pysczcysnki & Greenberg, 1987), in adjective rating tasks (Kuiper, Derry, & MacDonald 1982), and in self-attribution (Bargh & Tota, 1988). However, there is controversy over whether the self-schema needs to be primed in order for it to exert its influence on subsequent processing.

Pysczczynski, Hamilton, Herring, and Greenberg (1989) take the position that the self-schema must be primed in order for it to influence processing. They did a study where depressed and nondepressed subjects were asked to retrieve memories of events that occurred in the last month. Subjects were also divided into a self-focus and an external-focus condition. Self-focus was conceptualized as a way to increase the activation of the self-schema, while external focus was intended to decrease the activation of the self-schema. After retrieving these memories, subjects were asked to rate them on a scale of affective quality. Depressed subjects retrieved more negative memories than nondepressed subjects. Additionally depressed subjects who were self-focused retrieved

memories that were more negative than depressed subjects who were externally focused. Pysczczynski and Greenberg attributed this effect to the activation of the negative self-schema in depressives through self-focus, and the self-schemas subsequent influence on memory retrieval.

Bargh and Tota (1988) developed a theory that describes the influence of the self-schema in depression as an automatic process. In their model, depression results from strong associative links between the self and depressive constructs. In this model, self-referential thinking is influenced by the negative self-schema in an automatic and unintentional way. Specifically, self-referential thought is negatively biased as a result of the depressive self-schema.

Bargh and Tota (1988) demonstrated this using a memory load procedure. Depressed and nondepressed subjects were given a memory task which asked them to hold six digits in working memory while completing a self-referential adjective rating task. The memory task was designed as a memory load manipulation that required subjects to make automatic attributions about themselves. Depressed subjects in the memory load condition selected more negative self-referential adjectives than those in the no load condition. Those in the nondepressed condition selected more positive self-referential adjectives as a result of memory load. These results were explained as automatic processing differences resulting from the positive or negative self-schemas possessed by subjects. In this theory, priming is not necessary because the self-schema influences processing automatically.

In spite of this controversy it is clear that since there are such definite processing differences between depressed and nondepressed subjects, we can expect that in a situation where the self-schema affects emotional attribution, it

will operate differently for depressed subjects than for nondepressed subjects.

Introduction to Study One

In previous sections, I have argued first, that although the Zillmann (1978) excitation transfer model of how people know what they feel is generally well supported, it is limited by insufficient consideration of the cognitive factors involved in making these inferences. Second, I have argued that self-schemas are uniquely appropriate knowledge structures to consider in inferring how people come to know their emotions. Specifically, I believe that Zillmann's excitation transfer model of how people know what they feel should be expanded to include input from self-schema information as well as situational factors. The differences between the self-schemas of depressed and nondepressed people should provide an appropriate domain in which to evaluate the influence of the self-schema on emotional attribution. The general positive information processing bias observed in nondepressed individuals should also produce a bias toward the experience of positive emotions. Conversely, the general negative information processing bias observed in depressed individuals should produce a bias toward the experience of negative emotions, but only in situations where physiological arousal is present with no emotional cues.

Zillmann's (1978) excitation transfer model states that when physiological arousal information is present people rely on environmental information to determine what emotion is appropriate. The self-schema is not part of this process. However, in situations where physiological arousal is present, and where no environmental information is available from which to infer emotion, people will rely on their self-schemas to decide what emotion they are experiencing. This influence will only be observable in situations where the emotional situation is ambiguous. In ambiguous emotional situations, individuals

are not able to rely on obvious environmental cues to determine what emotion is appropriate, thereby producing increased reliance on knowledge structures like the self-schema.

Physiological arousal without environmental information to cue an appropriate emotion occurs often in everyday life. For example, a person may walk up a long flight of stairs producing physiological arousal. Even after the person feels recovered from the stairs, research shows residual physiological arousal continues after perception of that arousal ceases (Zillmann, 1978). If the person is not presented with a plausible emotional label for that arousal, she will use her self-schema to assign a label. In the case of depressed subjects, this physiological arousal would be interpreted as negative due to the influence of the negative self-schema. This negative emotion would in turn contribute to the depressive affect that is so characteristic of depressed people.

The purpose of this study was to demonstrate that subjects who experienced ambiguous (ie, otherwise unexplained) physiological arousal would perceive themselves as experiencing more emotion, and the type of emotion that was experienced would be a function of the self-schema: Subjects with a depressed self-schema would feel negative affect, while subjects with a nondepressed self-schema would experience positive affect. Additionally, this study was intended to demonstrate that efficiency of processing would be increased for nondepressed subjects who were aroused, but decreased for depressed subjects who were aroused (Kuiper, Derry, & Macdonald, 1982).

These hypotheses were tested using depressed and nondepressed subjects who were either physiologically aroused or relaxed. Subjects who were aroused were allowed to feel as if they had recovered from that arousal.

Previous research has shown that even after people feel as if they have recovered from physiological arousal, residual arousal remains (Zillmann, 1972). Subjects were then asked to fill out an emotion questionnaire designed to provide a range of possible responses along a positive - negative continuum. An additional group of depressed aroused subjects were informed of the true source of their arousal. This group was included to evaluate if the ambiguity of the physiological arousal made a difference in inferring emotion.

I hypothesized:

1. Subjects who are aroused should respond with increased levels of schema consistent affect. Specifically, I expected depressed subjects who were aroused to respond with more negative affect than depressed, relaxed subjects, and nondepressed subjects who were aroused to respond with more positive affect than nondepressed, relaxed subjects. Additionally, I expected depressed subjects who were aroused to take longer to respond to the items in the questionnaire than depressed subjects who were relaxed. Conversely, I expected nondepressed subjects who were aroused to respond more quickly to the items in the questionnaire than nondepressed subjects who were relaxed. This effect should be due to decreased efficiency for nondepressed subjects resulting from the influence of a self-schema with both positive and negative information. Nondepressed subjects should experience increased efficiency when their self-schema is activated through arousal.
2. Subjects who were depressed would respond with more negative affect and more slowly than nondepressed subjects in the absence of an arousal manipulation.

3. Subjects who were depressed, aroused, and informed of the true source of their arousal to attribute all emotional content to the arousal produced by the exercise bike and in so doing, respond with less negative affect and more quickly than the depressed aroused subjects who were not informed.
4. Subjects who were depressed, aroused and informed of the true source of the arousal should not differ from subjects who are nondepressed, and aroused on either the MAACL subscales or the reaction time measures. This is due to Zillmann's fourth assumption which states that when a label for physiological arousal is present, all emotion will be attributed to that label.

Method

Subjects

Subjects were 59 undergraduates preselected from an introductory psychology class based on scores obtained on two depression inventories. 32 subjects were females and 27 were males.

Materials

Prescreening measures included the Beck Depression Inventory (BDI), which was intended to measure depressive symptomology and attitudes (Beck, 1967), and the Automatic Thoughts Questionnaire (ATQ) which was intended as a cognitive measure of depression (Hollon & Kendall, 1980). A demographic inventory was also administered. Inclusion in one of the depressed groups required a score of nine or above on the BDI *and* a score of seventy or above on the ATQ. Inclusion in one of the nondepressed groups required a score of three or below on the BDI *and* a score of forty or below on the ATQ. Using two depression measures was a strategy designed to avoid selecting subjects who were experiencing depressive symptomology without a corresponding depressive self-schema.

Subjects were assigned to one of five groups (see table 1). Group one was depressed, and aroused; group two was depressed, and relaxed; group three was depressed, aroused, and informed of the true source of their physiological arousal; group four was nondepressed, and aroused; group five was nondepressed, and relaxed.

Procedure

A method similar to Zillmann, Katcher and Milavsky (1972) was used to produce high and low excitation in subjects. Subjects came to an experimental

session at their convenience. On arriving at the experimental session subjects were told they would be participating in two separate experiments. The first experiment was explained as an evaluation of different types of video relaxation techniques on heart rate and blood pressure during either exercise or relaxation tasks. Subjects were told they would either be riding an exercise bike for ten minutes or they would be rolling chinese hand balls around in their hands for ten minutes. The experimenter then took a baseline heart rate and blood pressure measure for subjects in both the exercise and relaxation conditions. When subjects felt comfortable with the heart rate and blood pressure procedure and understood the instructions, the arousal manipulation began.

In the arousal condition, subjects were asked to ride an exercise bike for ten minutes. Subjects were instructed to ride at a moderate pace, fast enough to get a workout, but not so fast they would overdo it. While they were riding the bike they viewed a relaxation video on a television monitor directly in front of them. The experimenter took heart rate and blood pressure measures every two minutes during the exercise task. After completing the ten minutes on the exercise bike, subjects were asked to sit on a comfortable couch and continue to view the video until they felt completely recovered from the exercise. At this point, subjects were presented with a scale representing different levels physiological arousal. The scale went from 0 to 10. Subjects were told that 0 represented how they felt before they began the exercise and 10 represented how they felt at the peak of their exercise. They were then asked to let the experimenter know when their arousal reached zero on the scale. This method has been used in past research as an operationalization of subjects perception of physiological arousal (Wright, Weeks, Burch, & Hernandez, 1990). Zillmann

et al. (1972) showed that physiological measures of arousal remain elevated after individuals feel completely recovered. Even though subjects felt as if they had completely recovered from the exercise, their heart rate and blood pressure remained elevated. Heart rate was monitored at two minute intervals while subjects were recovering from the exercise.

After recovering from the exercise, subjects were given an informed consent form describing the second study as a comparison of computerized and pencil and paper questionnaires. After completing the informed consent form, subjects were seated in front of a computer with a panel of buttons. Subjects were given the standard instructions for the state form of the Multiple Adjective Affect Checklist (MAACL). These instructions directed students to press a button labeled "me" if the word on the screen characterized how they felt now, and press "not me" if the word did not characterize how they were currently feeling. After reading the instructions, the students completed the computerized version of the MAACL. Heart rate and blood pressure measures were taken before and after subjects completed the MAACL.

Subjects in the relaxed condition began the experiment by sitting in a comfortable chair and rolling chinese hand balls around in their hands. This task was described to subjects as a standard relaxation technique. During the relaxation task, subjects heart rate and blood pressure were monitored at two minute intervals. After ten minutes had passed subjects were moved to experiment two and asked to complete the informed consent form for the computerized questionnaire. The procedure for relaxed subjects was identical to the procedure for aroused subjects in the administration of the MAACL.

When both experiments were completed, subjects were verbally debriefed

concerning the true purpose of the study. The hypothesis that increased physiological arousal would produce increased ratings of affect was revealed to subjects. All subjects were asked if they thought during the experiment that their answers on the MAACL were impacted in any way by the exercise task. Finally, a written debriefing form was given to subjects and they were allowed to leave.

Results

Manipulation Check

An Analysis of covariance was performed on the measures of physiological arousal to determine if the arousal manipulation was effective. Heart rate and blood pressure measures were converted into a measure of overall arousal using a formula developed by Zillmann, Katcher, and Milavsky (1972). In this procedure heart rate, systolic blood pressure, and diastolic blood pressure were combined to produce a composite measure called sympathetic activation. This formula was computed as:

$$SA = HR[BP_{diastolic} + 2/3(BP_{systolic} - BP_{diastolic})]$$

The dependent measure was sympathetic activation obtained immediately before the MAACL measure. The covariate was the baseline sympathetic activation measure.

Results were analyzed by comparing all aroused subjects with all relaxed subjects. This analysis was nonsignificant, however there was a trend for subjects in the aroused condition to have higher measures of sympathetic arousal $F(1, 50) = 2.508$, $p \leq .12$, $M_{Aroused} = 9227.577$, $M_{Relaxed} = 8018.167$.

Dependent Measures

Results were analyzed using five planned contrasts (Rosenthal, 1985). Contrast one compared the depressed, aroused group with depressed, relaxed group. This contrast was intended to evaluate if the negative self-schema of depressives leads to more negative and less positive affective experience in the presence of ambiguous arousal. Contrast two compared the nondepressed, aroused group with the nondepressed, relaxed group. This contrast evaluated whether the presence of ambiguous arousal produced more positive affective

experience given the positive self-schema of nondepressives. Contrast three compared the depressed, relaxed group and the nondepressed, relaxed group. Contrast three evaluated whether there is a difference in emotional experience between depressives and nondepressives in the absence of unexplained arousal. Contrast four compared the depressed, aroused group with the depressed, aroused, and informed group and was intended to evaluate if the ambiguity of arousal was the mechanism for increased negative affect. Finally, contrast five compared the depressed, aroused, and informed group with the nondepressed, aroused group. This final comparison evaluated if the presence of a label for arousal was enough to offset the negative effects of depression.

With five groups the number of contrasts we can do is equal to the degrees of freedom. This allows us only four contrasts. Consequently, the critical p value was adjusted using the formula validated by Keppel (1991), The cumulative p value with four degrees of freedom is equal to (4)(.05) = .20. Therefore with five contrasts our critical p value became .20/5 = .04.

Five subscales of the MAACL were analyzed using these five contrasts. These subscales are anxiety, depression, hostility, positive affect, and dysphoria (see table 2 for means). Additionally, reaction time measures for each of these subscales were evaluated (see table 3 for means).

Contrast One. Contrast one compared the depressed, aroused group with the depressed relaxed group (see table 4). As expected, this comparison reached significance for depression $t(54) = 2.512$, $p \leq .04$, hostility $t(54) = 2.489$, $p \leq .04$, and dysphoria $t(54) = 2.488$, $p \leq .04$, with the depressed aroused group obtaining more negative scores on all subscales. Results for reaction time were not significant (see table 5).

Contrast Two. Contrast two compared the nondepressed, aroused group with the nondepressed, relaxed group. This comparison did not reach significance for any of the MAACL subscales or the reaction time measures.

Contrast Three. Contrast three compared the depressed, relaxed group with the nondepressed, relaxed group. This comparison was significant for anxiety $t(54) = 4.003$, $p \leq .04$, hostility $t(54) = 2.195$, $p \leq .04$, and dysphoria $t(54) = 2.986$, $p \leq .04$ with the depressed relaxed group obtaining more negative scores on all subscales. Results for reaction time were not significant.

Contrast Four. Contrast four compared the depressed, aroused subjects with the depressed, aroused, and informed subjects. This comparison reached significance for anxiety $t(54) = -3.717$, $p \leq .04$, depression $t(54) = -2.887$, $p \leq .04$, hostility $t(54) = -2.886$, $p \leq .04$, and dysphoria $t(54) = -3.639$, $p \leq .04$, with the depressed, aroused, and informed subjects scoring lower on all the negative subscales than the depressed, aroused subjects. This contrast was also significant for reaction time on the depressed scale $t(54) = -2.54$, $p \leq .04$, with depressed, aroused, informed subjects responding more quickly than depressed, aroused subjects.

Contrast Five. Contrast five compared the depressed, aroused, and informed subjects to the nondepressed, aroused subjects. This contrast did not reach significance for any of the MAACL subscales or the reaction time measures.

Discussion

In this study I attempted to demonstrate the influence of self-schemas on attributions of emotion by producing ambigous physiological arousal and then asking subjects to respond to an emotion questionnaire. Both depressed and nondepressed subjects were included in order to evaluate the differential effects of their respective self-schemas

Comparisons one and two asked the question: Will the presence of ambiguous physiological arousal without an external explanation allow the self-schema to influence emotional attribution producing schema consistent affective experience? Specifically, if subjects are experiencing physiological arousal for which they have no explanation, will they use their self-schema to interpret that information?

Subjects in the arousal condition were asked to decide how they felt in the presence of residual arousal from the exercise task. These subjects thought they had recovered from the task but, in fact, physiological arousal was still present. Further, these subjects did not have environmental information that might give them a clue about what emotion was appropriate.

Significant differences between the depressed, aroused group and the depressed, relaxed group on all but one of the negative subscales show that depressed subjects were relying on their negative self-schemas for emotional information. Depressed subjects who were experiencing ambiguous arousal obtained higher scores on the negative subscales of MAACL, suggesting that the negative self-schema influenced their attributions of emotion.

Nondepressed subjects, on the other hand, differ from depressed subjects in that they possess a primarily positive self-schema. The presence of

unexplained physiological arousal should have produced increased positive affect for these subjects as a result of the influence of their positive self-schema. Results failed to demonstrate this pattern of results. Nonsignificant differences between the nondepressed, aroused and the nondepressed, relaxed subjects on the MAACL subscales are indicative of ceiling and floor effects. Both groups of nondepressed subjects scored at the upper limits of the positive subscales, and at the lower limits of the negative subscales. The positive self-schema in nondepressed subjects appears to be so positive that our measures of positive and negative affect were not sensitive enough to evaluate the effects of ambiguous arousal. Perhaps the inclusion of an extreme positive affect scale in future studies would allow for an evaluation of the positive self-schema in emotional attribution.

Contrast three evaluated the influence of the self-schema on emotional experience in general by comparing the depressed, relaxed group with the nondepressed, relaxed group. I hypothesized that the depressed subjects would experience more negative affect than their nondepressed counterparts in the relaxed condition. Results showed a significant difference between these two groups on three of the four negative subscales. Results failed to reach significance for the positive subscales. This failure to reach significance on the positive subscales suggests that mildly depressed subjects (such as the ones we used in this study), have a well elaborated positive self-schema that allows for the experience of positive affect. However, they also have negative self-schema content that produced higher scores on the negative subscales presented in this study. Nondepressed subjects, on the other hand, scored at the lowest extreme of the negative subscales suggesting that they do not have a well-elaborated

negative self-schema content. This interpretation is consistent with Pietromonaco and Markus's (1985) study evaluating processing differences between depressed and nondepressed subjects.

Comparison number four was intended to evaluate how the ambiguity of arousal affected emotional experience. I expected subjects in the depressed, aroused group to use their negative self-schema to interpret their physiological arousal. The use of the negative self-schema is conditioned upon arousal that is ambiguous. If subjects have a label for experienced physiological arousal, they will not need to rely on their self-schema to interpret that arousal. The depressed, aroused, and informed subjects were informed of their true level of arousal and told that it originated from the exercise task. These subjects had a label to attach to the physiological arousal they were experiencing. I expected the presence of a label for the unexplained arousal to prevent the misattribution present in the depressed, aroused group. Results clearly demonstrated this hypothesis on all the negative subscales. Subjects who were informed of their true physiological arousal and its source scored lower on the negative subscales than the depressed, aroused subjects who did not have a label. The ambiguity of arousal in the depressed, aroused subjects is what mediated increased negative affect in this group.

In addition to eliminating the misattribution of arousal through accurate information about physiological arousal and its source, I expected the depressed, aroused, and informed subjects to attribute all their negative emotion to the residual arousal from the exercise. This hypothesis is consistent with Zillmann's (1978) idea that emotional intensity information is not partitioned, rather, people tend to attribute all their affective experience to one source. This

process should result in a reduction of negative affect, so much so that there should be nonsignificant differenced between the depressed, aroused, and informed condition and the nondepressed, aroused condition. Results are consistent with this hypothesis. Contrasts between the depressed, aroused, and informed group and the nondepressed, aroused group were nonsignificant on all subscales of the MAACL. Contrast three compared the depressed, relaxed group with the nondepressed, relaxed and was significant for three of the four negative subscales. This significant finding, when compared to the nonsignificant finding for the depressed, aroused, and informed group and the nondepressed, aroused group further demonstrates that the label available to the informed subjects actually offset the effects of depression.

Results for latency of response were nonsignificant for all contrasts except contrast four comparing depressed, aroused and depressed, aroused, and informed. This comparison reached significance for reaction time on the depressed subscale. This finding suggests that depressed, aroused subjects who were informed of their arousal were better able to process emotional information than depressed, aroused subjects who were not informed of thier arousal.

An examination of the means for reaction time suggest the operation of the positive self-schema in nondepressed subjects. Kuiper, Derry, and Macdonald (1982) showed that efficiency of processing is related to the content of the self-schema. Those with highly positive self-schemas tend to process self-relevant emotional information quickly because their self-schemas contain only positive information. Mildly depressed subjects, like those in this study, tend to process information less quickly because they have both positive and

negative self-schema content. The pattern of means is consistent with Kuiper et al. (1982) in that nondepressed subjects responded more quickly than depressed subjects. Additionally, nondepressed subjects who were aroused responded even more quickly than their relaxed counterparts. Conversely, depressed subjects who were aroused and consequently forced to rely on their negative self-schemas to interpret their arousal, took longer to respond to the questionnaire items because of the increased influence of their negative self-schema. These results were only marginally significant in the contrast analysis making this conclusion tentative, but worthy of future examination (see table 5).

Two important conclusions can be drawn from this study. First, in situations where ambiguous sympathetic arousal is present and no external affective cues are provided, people will rely on their self-schemas when making emotional attributions. Depressed subjects in particular show increases in ratings of negative affect as a result of ambigous arousal. These findings suggest that the Zillmann (1971, 1978) theory of emotional attribution should be expanded to include input from self-schemas.

One of the most consistent findings in depression research is that depression tends to be self-perpetuating (Pyszczynski & Greenberg, 1987). This study demonstrates an additional self-perpetuating characteristic of depressive affect: In cases where it is unclear what emotion is appropriate, depressed people will tend to interpret that emotion as negative. Further, when depressed subjects are given an accurate label for their arousal, not only is the attribution error corrected, but the overall influence of the depressive self-schema may be counteracted.

The second conclusion is that when the self-schemas of depressives are

implicated in the emotional attribution process, efficiency of processing is retarded. This effect results from both positive and negative information contained in the self-schemas of depressed subjects. Increased activation produces increases in latencies to respond to self-referent adjectives. Non-depressed individuals have primarily positive information in their self-schemas. Activation of their self-schemas seems to aid efficiency of processing because they rely more on the positive information for their attributions.

Introduction to Study Two

Study one clearly demonstrates the influence of the self-schema on emotional attribution. When subjects were experiencing residual physiological arousal from the exercise task in the absence of an emotional label, they relied on internal self-schema information to make attributions about their emotions. This effect was most pronounced for depressed subjects. Depressed subjects possess a qualitatively negative self-schema; consequently, when they were aroused, they responded with more negative emotion on the MAACL. This effect was due to reliance on the negative self-schema for emotional attribution. Nondepressed subjects did not differ on their MAACL scores. The failure to find a significant difference between the aroused and the relaxed groups on the MAACL subscales may have resulted from a ceiling effect for positive affect.

Study two will expand on study one by including a self-focus manipulation as a third factor. Self-focus theory and research began with Wicklund and Duval (1972) who developed a theory of self-awareness. Self-awareness theory says that attention can be directed either internally (at the self), or externally, (away from the self). When someone is self-focused, their attributions about the self are different than when they focus their attention externally (Wicklund & Duval, 1972). The mechanism that allows self-focus to change the way a person perceives herself seems to be its tendency to activate the self-schema (Pyszczynski & Greenberg, 1987, 1989; Gibbons, 1983). Activation of the self-schema through self-focus has been shown to increase the veridicality of self-reports, (Pryor, Gibbons, Wicklund, Fazio, & Hood, 1977) to increase attitude - behavior consistency (Carver, 1974,1975; Wicklund & Duval, 1971; Froming 1978; Gibbons, 1978; cf. Wilson, Dunn, Kraft, & Lisle, 1989), to increase

cognizance of internal states (Gibbons, Carver, Scheier, and Hormuth, 1979), and to decrease suggestibility (Scheier, Carver, & Gibbons, 1979).

Self-focus produces self-schema activation, allowing the self-schema to influence processing, while external focus decreases the influence of the self-schema on processing. Pyszczynski, Hamilton, Herring and Greenberg (1989) did a study that illustrates this point. Subjects were first given a depression questionnaire and then asked to complete a story writing task that either focused their attention inward, toward the self, or outward, away from the self. Subsequently, subjects were asked to recall ten events that occurred in the past two weeks and rate them on several scales. As expected, the self-focused, depressed subjects displayed the negative memory bias common in depressives. However, the externally focused depressed subjects did not. This lack of a negative memory bias for externally focused depressed subjects was due to distraction from the negative content of their self-schemas. This study clearly shows that attention focused away from the self tends to decrease the influence of the self-schema on subsequent processing (Pyszczysnki et al, 1989).

Salzman and Wurf (1992) conducted a similar study in which depressed and nondepressed subjects were asked to write one of two stories intended to produce either self-focus or external focus. Those in the self-focus condition were asked to write a story about themselves using a list of words including some intended to be self-referential. Those in the external focus condition were asked to write a story about George Washington using words intended to elicit external focus. Additionally, half the subjects in each condition were asked to count backwards from 500 to 451. This task was intended to be an arousing

distraction task. Subjects were then asked to recall ten memories about themselves that were more than a year old. This procedure was intended to promote evaluation of long-term autobiographical memories. The dependent measure was the ratings of affective quality (positivity or negativity) produced for each memory.

Results showed a negative memory bias for depressed individuals. A three-way interaction showed that the combination of depression, arousal, and self-focus produced the most negative memories. The tendency of self-focus to increase the negative memory bias has been documented previously (Pyszczynski & Greenberg, 1989). The arousal transfered from the arithmetic task presumably increased the negative memory bias even more. The influence of the negative self-schema produced an attribution of the physiological arousal to negative emotion associated with the personal memories. Depressives in the aroused but external focus group did not display this effect because they were distracted from their negative self-schemas, thus limiting its influence on memory retrieval.

A limitation of the Salzman and Wurf (1992) study was its use of a weak arousal task. Mental arithmetic has been shown to produce physiological arousal in subjects (Payne, 1982; Carrol, Turner & Hellawell, 1987), however, the arithmetic task we employed lasted only a few seconds to a minute and presumably produced only a moderate level of arousal.

Study one examined the problem of emotional attribution and the self-schema using the same theoretical approach as Salzman and Wurf (1992) but without the attentional focus factor. Study two should demonstrate the same pattern of results as Salzman and Wurf, namely, schema - influenced affect that

is enhanced by self-focus. However, the problem of a weak arousal task will be eliminated. Additionally, multiple dependent measures will be used to more accurately reflect emotional changes due to the self-schema.

Including attentional focus as a third factor in addition to depression and arousal should demonstrate two important theoretical points. First, increased self-schema activation is expected to produce more intense ratings of schema consistent affect. This effect should be most apparant in the arousal conditions because increased self-schema activation should combine with ambiguous arousal to produce higher rates of schema consistent misattribution. If the results come out as expected, this finding should clearly demonstrate the influence of the self-schema on emotional attribution processes. More importantly, study two should show that when attentional focus is directed away from the self, as in the distraction task, subjects will be less likely to make schema consistent misattributions. Specifically, depressed subjects should be less likely to misattribute their physiological arousal to negative affect, in other words, the negative emotional bias present in depressives when they are physiologically aroused will actually be offset by distraction. Similarly, non-depressed subjects should be less likely to misattribute ambiguous physiological arousal to positive emotional sources when they are distracted from their self-schemas.

Secondly, study two examined the influence of the self-schema on emotional attribution by providing subjects with a more sensitive measure of positive affect. Specifically, a measure of intense positive affect was constructed and included as part of the MAACL. This additional dependent variable should allow non-depressed subjects to demonstrate a misattribution of

arousal to positive affect associated with their self-schema.

Finally, study two included an autobiographical memory task intended to evaluate how activation of the self-schema influences memory retrieval. I expected results on the memory task to be consistent with findings from the MAACL, such that depressed subjects would retrieve more negative memories than non-depressed subjects. In addition, subjects who were depressed, aroused, and self-focused should retrieve the most negative memories, while those who were nondepressed, self-focused and aroused should retrieve the most positive memories (Pysczczynski et al, 1989; Salzman and Wurf, 1992).

Experiment two will use depressed and nondepressed subjects who are aroused or relaxed, replicating the procedures used in study one. In addition, an attentional focus factor will be added to manipulate activation of the self-schema. I hypothesized:

1. Subjects who are aroused should respond with increased levels of schema consistent affect. Specifically, I expected depressed subjects who were aroused to respond with more negative affect than depressed, relaxed subjects, and nondepressed subjects who were aroused to respond with more positive affect than nondepressed, relaxed subjects. Additionally, I expected depressed subjects who were aroused to take longer to respond to the items in the questionnaire than depressed subjects who were relaxed. Conversely, I expected nondepressed subjects who were aroused to respond more quickly to the items in the questionnaire than nondepressed subjects who were relaxed. This effect should be due to decreased efficiency for nondepressed subjects resulting from the influence of a self-schema with both positive and negative information. Nondepressed subjects should

experience increased efficiency when their self-schema is activated through arousal.

2. Subjects who were depressed to respond with more negative affect and more slowly than nondepressed subjects in the absence of an arousal manipulation.
3. A significant interaction between depression and attentional focus such that depressed, self-focused subjects will obtain more negative scores than depressed, distracted subjects, while nondepressed, self-focused subjects will obtain more positive scores than nondepressed, distracted subjects. Additionally, depressed, self-focused subjects should respond more slowly than depressed, distracted subjects, while nondepressed, self-focused subjects will respond more quickly than nondepressed, distracted subjects.
4. A significant three-way interaction such that subjects who were depressed, aroused, and self-focused should obtain the most negative scores on the MAACL, while those who were nondepressed, self-focused and aroused should obtain the most positive scores on the MAACL. Additionally, subjects who were depressed, aroused, and self-focused should take the most time to respond to the questionnaire items, while those who were nondepressed, self-focused and aroused should respond faster than any other group to the questionnaire items. This effect should show that the more the self-schema is implicated in emotional attribution for depressives, the more negatively biased will be the attribution, and the longer it will take to respond to the questionnaire.

Method

Subjects

Subjects were 93 undergraduates preselected from an introductory psychology class based on scores obtained on two depression inventories. 39 subjects were female and 54 of the subjects were male.

Materials

Prescreening measures included the Beck Depression Inventory (BDI) which was intended to measure depressive symptomology and attitudes (Beck, 1967); the Automatic Thoughts Questionnaire (ATQ) which was intended as a cognitive measure of depression; and a demographic inventory (Hollon & Kendall, 1980). Inclusion in the depressed group required a score of nine or above on the BDI *and* a score of seventy or above on the ATQ. Inclusion in the nondepressed condition required a score of three or below on the BDI *and* a score of forty or below in the ATQ. Using two depression measures was a strategy designed to avoid selecting subjects who might be experiencing depressive symptomology without a corresponding depressive self-schema. One subject was dropped from the analysis. This subject was dropped because he responded to the MAACL questionnaire by pressing the me button as fast as he could. This was determined by observing me responses to all adjectives on the MAACL and by observing reaction times that were approximately three standard deviations faster than the average for the other subjects.

Procedure

A 2(Excitation condition) aroused vs. relaxed x 2(Depression condition) depressed vs. nondepressed x 2(Attentional focus condition) self-focused vs distracted design was employed for the purposes of this study (see table 6). The

procedure for manipulating excitation condition was the same as in study 1, namely, the use of an exercise bike for arousal, and chinese hand balls for relaxation.

After subjects recovered from the exercise task, or completed the relaxation technique, they were asked to complete a computerized version of the Multiple Affect Adjective Inventory (MAACL) as detailed in study one. An additional subscale was added to the MAACL to evaluate extreme positive affect. This additional scale was constructed by selecting twelve words that are descriptive of extreme positive emotion (refer to appendix A for a list of the words). Subjects in all conditions were told that this measure was intended to evaluate how people respond to computerized questionnaires.

Subjects were divided into a self-focus and a distraction condition. Self-focus was manipulated using a small mirror placed directly beneath the computer screen so that subjects were able to see their faces at all times while completing the questionnaire (Buss, 1980). The experimenter made sure that subjects could see their faces in the mirror at all times. Once subjects were situated in front of the computer and the mirror, they were told to read the directions presented on the computer screen and complete the MAACL. Distraction was manipulated by asking subjects to hold a telephone number in memory while completing the MAACL (Bargh & Tota, 1988). The instructions presented on the computer in this condition asked subjects to keep a telephone number in memory while completing the MAACL because the experimenter would ask them to recite it at the end of the experiment.

After subjects completed the MAACL they were asked to complete an autobiographical memory measure. This measure asked subjects to retrieve ten

memories for events in which they were directly involved and that were more than 1 year old. After retrieving all ten memories subjects were asked to rate each of these memories on likert scales measuring affective quality, clarity, and self-definingness. This measure was validated by Pyszczynski and Greenberg (1989) in their study of the effects of self-focus on autobiographical memories.

When the autobiographical memory task was completed, subjects were debriefed and allowed to leave.

Results

Manipulation Check

Measures of physiological arousal were taken as a manipulation check before the experiment and immediately before subjects comleted the MAACL. An analysis of covariance was done on the measures of sympathetic arousal. The dependent measure was the sympathetic arousal measure taken immediately before the MAACL was administered. The covariate was the baseline sympathetic arousal measure. This analysis evaluated differences between aroused subjects and relaxed subjects across all conditions. Four subjects were dropped from the analysis due to mechanical difficulties with the heart rate and blood pressure machine.

Results were significant $F(1,85) = 9.332$, $p \leq .01$, $M_{Aroused} = 8817.162$, $M_{Relaxed} = 7681.59$, with aroused subjects obtaining higher sympathetic arousal scores immediately before completing the MAACL than nondepressed subjects.

Dependent Measures

Analysis was performed on six subscales of the MAACL. These subscales are anxiety, depression, hostility, positive affect, sensation seeking, and dysphoria. A subscale was added to the MAACL intended to evaluate euphoria. Additionally, the five subscales of the memory questionnaire were evaluated. These scales were affective quality of the memory, clarity of the memory, and three self-defininghess measures.

Results for the MAACL subscales, and the memory questionnaire were analyzed using seven planned contrasts (Rosenthal, 1985). Contrast one compared the depressed, aroused group with depressed, relaxed group. This contrast was intended to evaluate if the negative self-schema of depressives

leads to more negative and less positive affective experience in the presence of ambiguous arousal. Contrast two compared the nondepressed, aroused group with the nondepressed, relaxed group. This contrast evaluated whether the presence of ambiguous arousal produced more positive affective experience given the positive self-schema of nondepressives. Contrast three compared the depressed, relaxed group and the nondepressed, relaxed group. Contrast three evaluated whether there was a difference in emotional experience between depressives and nondepressives in the absence of unexplained arousal.

The remaining four contrasts evaluated how attentional focus interacted with the other factors in the process of emotional attribution. Contrast four compared all the self-focused groups with the distracted groups to evaluate if attentional focus had an effect overall. Contrast five evaluated the interaction of attentional focus and depression. Contrast six evaluated the interaction of attentional focus and arousal. Contrast seven evaluated the interaction of attentional focus, depression, and arousal.

Contrast One. Contrast one compared the depressed, aroused groups with the depressed relaxed groups. This contrast was not significant for any of the MAACL subscales (see table 7 for means), the subscales of the memory questionnaire (see table 8 for means), or the reaction time measures (see table 9 for means).

Contrast Two. Contrast two compared the nondepressed, aroused groups with the nondepressed, relaxed groups. This contrast was not significant for any of the MAACL subscales, the reaction time measures, or the subscales of the memory questionnaire.

Contrast Three. Contrast three compared the depressed, relaxed group

with the nondepressed, relaxed group. This contrast reached significance for anxiety $t(84) = 2.413$, $p \leq .05$, depression $t(84) = 3.57$, $p \leq .05$, hostility, $t(84) = 2.82$, $p \leq .05$, and dysphoria $t(84) = 3.269$, $p \leq .05$ (see table 10). This finding confirmed our hypothesis that depressed subjects responded with more negative affect than nondepressed subjects. This contrast was not significant for any of the reaction time measures (see table 12), or the subscales of the memory questionnaire (see table 11).

Contrast Four. Contrast four compared the self-focused groups with the distracted groups to evaluate if attentional focus affected attributions of emotion independent of the other factors. This contrast was not significant for any of the MAACL subscales, the reaction time measures, or the subscales of the memory questionnaire.

Contrast Five. Contrast five evaluated the interaction of attentional focus and depression and was intended to evaluate if attentional focus affected depressed subjects differently than nondepressed subjects. This contrast was not significant for any of the MAACL subscales, the reaction time measures, or the subscales of the memory questionnaire.

Contrast Six. Contrast six evaluated the interaction of attentional focus and arousal and was intended to evaluate if attentional focus affected aroused subjects differently than relaxed subjects. This contrast was significant for anxiety $t(84) = 2.07$, $p \leq .05$, hostility $t(84) = 2.49$, $p \leq .05$, dysphoria $t(84) = 2.43$, $p \leq .05$, positivity $t(84) = 2.75$, $p \leq .05$, and affective quality of memories $t(84) = 2.61$, $p \leq .05$. In all cases listed above, aroused, self-focused subjects responded with less negative affect than aroused, distracted subjects, while, relaxed self-focused subjects responded with more negative affect than relaxed

distracted subjects. This contrast did not reach significance for any of the reaction time measures.

Contrast Seven. Contrast seven evaluated the interaction of attentional focus, depression, and arousal. This contrast was not significant for any of the MAACL subscales, the reaction time measures, or the subscales of the memory questionnaire.

Discussion

In study two I attempted to further demonstrate the influence of the self-schema on emotional attribution by including an attentional focus factor. I expected the self-schema activation produced by self-focus to increase the influence of the self-schema on emotional attribution. Specifically, I expected the combination of depression, arousal, and self-focus to produce the most negative attributions of emotion, and the combination of nondepression, self-focus and arousal to produce the most positive attributions of emotion. This pattern of results would represent a conceptual replication of Salzman and Wurf (1992).

Results failed to confirm the hypothesis that self-schema activation produced by self-focus would increase the influence of the self-schema on emotional attribution. In fact, while the pattern of means in the distraction condition are similar to the pattern demonstrated in study one, overall results failed to produce the expected replication of study one. This failure to obtain significant results can be attributed to unexpected effects of the attentional focus manipulation.

The expected three-way interaction was not observed. Depression, arousal, and self-focus did not produce the most negative affective scores and nondepression, self-focus, and arousal did not produce the most positive scores. I expected self-focus to activate the self-schema and thus increase its influence on subsequent attributions of emotion. This activation should have produced higher levels of negativity in the depressed group, and higher levels of positivity in the nondepressed groups due to their respective self-schemas. Instead, a significant two-way interaction between attentional focus and arousal was

observed on all of the affect scales except depression. Results were marginally significant for the interaction on the depression scale. In all cases the interaction demonstrated increased negativity for relaxed, self-focused subjects and decreased negativity for aroused, self-focused subjects. My hypothesis predicted this pattern of results in the nondepressed condition because of the activation and subsequent operation of the self-schema. However, I did not expect this pattern to obtain across both depressed and nondepressed conditions.

This consistent pattern of results demonstrates two of the effects of self-focus. Self-focus tends to produce an automatic comparison of the self with standards of correctness (Wicklund & Duval, 1972; Carver & Scheier, 1981). Percieved discrepancies between the actual self and standards of correctness results in negative affect. This well known finding explains results for subjects in the relaxed condition. Subjects who were self-focused tended to experience more negative affect than distracted subjects.

Subjects in the aroused condition demonstrated the opposite pattern. Self-focused subjects obtained less negative scores than distracted subjects. This pattern can be explained by the tendency of self-focus to increase awareness of internal states (Gibbons, Carver, Scheier and & Hormuth, 1979; Scheier, Carver, & Gibbons, 1979). I did not expect this side effect of self-focus to appear because my self-focus manipulation did not occur until after subjects felt recovered from their exercise task. Results suggest that subjects who were aroused and self-focused did in fact experience increased awareness of their physiological arousal and its source. Any negative affect resulting from either their depression, or the comparison of their actual self with standards of

correctness was simply attributed to left over arousal from riding the exercise bike. This tendency for subjects to assign all affective information to one source is consistent to Zillmann's fourth assumption which states: "The individual does not partition excitation compounded from reactions to different inducing conditions. Instead, he tends to ascribe his entire excitatory reaction to one particular, inducing condition" (Zillmann, 1978, pp. 359)

An examination of the means shows that while I expected depressed, self-focused, aroused subjects to obtain the most negative scores on the MAACL, it was this group that scored more positively than any other depressed group. This trend is particularly interesting because self-focus caused increased negative affect in all conditions except the depressed aroused group. This pattern, in all but the depressed aroused group, can be explained by previous research which has consistently shown a tendency for self-focus to increase the intensity of negative affect as a result of the comparison of the self with standards of correctness (Carver & Scheier, 1981; Wicklund & Duval, 1972).

The best explanation for the trend in the depressed, aroused and self-focused condition is the tendency for self-focus to increase awareness of internal states (Gibbons, Carver, Scheier, and Hormuth, 1979). Perhaps, as reflected in the two-way interactions, these subjects were more acutely aware of their physiological arousal and its source. Study one showed that when subjects were informed of their true physiological arousal, they no longer misattributed their arousal to emotional content in their self-schema. If self-focus in fact does increase the awareness of physiological arousal and its source, these results could be explained by accurate knowledge of the source of arousal.

Results for nondepressed subjects failed to confirm my hypothesis.

Specifically, I expected nondepressed subjects who were aroused and self-focused to respond more positively on the euphoria scale. The positive subscales of the MAACL already demonstrated ceiling effects in the previous study. The euphoria scale, while shown to be reliable, did not produce significant results on any of the analyses. This failure to reach significance may be due to subjects not being aware of the meaning of some of the words on the scale. Some subjects commented that they did not know what several of the words meant. It may also be that reaction time is simply a better domain in which to evaluate the effects of the positive self-schema.

Results for reaction time failed to reach significance for any of the MAACL subscales. This may have been due to the nature of the distraction task. The distraction task was initially designed to distract attention away from the self-schema by asking subjects to hold a telephone number in memory. This task was used with the knowledge that it would also produce a cognitive load (Bargh & Tota, 1988) that might affect the reaction time measures. Automatic processing is produced when there are limited attentional resources causing cognitive processing to procede automatically without thought. When people process self-relevant information automatically, they use simple response strategies that reflect internal emotional constructs (Bargh & Tota, 1988). This side effect was tolerated because if people are using their positive or negative self-schemas when responding automatically, their responses are consistent with their actual internal self-schemas and can be thought of as comparison points for the self-focus conditions.

It was within this distraction condition however, that we observed the same pattern of means as in study one. It seems that in spite of the side effects

of our distraction task, arousal still produced higher levels of negative affect for depressed subjects. This suggests that, within the distraction condition, we replicated the results from study one.

Results for affective quality of memories displayed a main effect for depression and a significant arousal x attentional focus interaction. However, the direction of the two-way interaction was exactly opposite to the direction found on the MAACL subscales. Subjects who were self-focused and aroused obtained less positive scores than distracted, aroused subjects. Conversely, self-focused, relaxed subjects rated their memories more positively than distracted, relaxed subjects. While this pattern of results is opposite to that displayed on the MAACL subscales, it is similar to Salzman and Wurf (1992) within the depressed condition. An observation of the means for the four depressed groups shows that self-focus, and arousal produced the most negative scores. Perhaps there are differences in the way people identify what mood they are feeling and how self-focus and self-structures combine to influence memory.

These results are difficult to interpret because both the self-focus manipulation, and the arousal manipulation were probably no longer effective when subjects completed the memory questionnaire. The time elapsed from the exercise until subjects began the memory questionnaire was sufficient for most of the arousal effects to wear off. Additionally, since subjects were no longer in front of the mirror when completing the memory task, it is difficult to speculate how the residual self-focus from the mirror used while subjects completed the MAACL affected responses on the memory questionnaire. Future research might evaluate if there are differences between memory responses and simple

questionnaire responses when evaluating emotional attribution.

This study clearly shows the influence of the self-schema on emotional attribution. It also demonstrates that when depressed subjects have an alternative explanation for negative emotion, they attribute all their negative affect to that source.

General Discussion

Summary

These two studies were intended to demonstrate that self-schemas influence emotional attributions. Zillmann's (1978) three factor model of emotion says that when people encounter an emotion eliciting situation there is an automatic physiological response to the situation. This physiological information is interpreted as intensity of emotion. When this intensity information is experienced the person then looks to the environment to determine what emotion is appropriate. In situations where there are no situational cues to tell the person what emotion is appropriate, an epistemic search of possible explanations begins. Zillmann has limited this epistemic search to external phenomena. This theory has been demonstrated by manipulating arousal in subjects and them providing an artificial affective label for that arousal.

Zillmann (1978) concentrates on physiological arousal for intensity and on external cues for assigning a label. In doing this he has ignored the input of self-schema information. In a situation where subjects are physiologically aroused in the absence of a genuine label, and where no artificial label is provided, I hypothesized that subjects would rely on internal self-schema information to decide what emotion is appropriate.

Study one and study two clearly demonstrate that self-schemas impact emotional attributions. This is demonstrated by the results for the depressed, aroused group, compared to the depressed, aroused, informed group, and the depressed, relaxed group in study one; and by the results for the depressed, aroused, distracted group compared to the depressed, relaxed, distracted group and the depressed, aroused, self-focused group in study two.

In study one subjects were prescreened and assigned to a depressed or non-depressed group. Subjects in the arousal condition were physiologically aroused by riding an exercise bike for ten minutes. After the arousal task was completed, subject were allowed to take as much time as they thought they needed to recover from the exercise. Previous research has shown that physiological arousal continues after people feel completely recovered (Zillmann, 1972). This residual physiological arousal was expected to affect attributions about the intensity of emotions experienced by subjects.

Subjects who were aroused but did not have a clear label for their arousal responded by attributing that arousal to schema consistent emotion. Depressed subjects who were aroused responded to the MAACL with more intense negative affect than their relaxed counterparts. This effect was due to the influence of the negative self-schema on emotional attribution. There was a trend for non-depressed subjects to display this pattern on the reaction time measures. Specifically, they responded more quickly to all items on the MAACL when they were physiologically aroused. This marginally significant effect can be explained by greater efficiency in processing due to activation of their positive self-schemas.

In an attempt to establish misattribution as the mechanism for increased negative affect in the depressed aroused group, we included an additional control group. This group was depressed, physiologically aroused, but informed of their true physiological arousal level immediately before completing the MAACL. This information was intended to provide an accurate label for the physiological arousal, thus eliminating the need for an epistemic search. Subjects attributed their increased heart rate and blood pressure to left over

excitation from the exercise bike. Scores on the negative subscales of the MAACL for these subjects were significantly lower than the noninformed subjects. In fact, scores within the depressed, aroused, informed group were not significantly different than the nondepressed, aroused group, suggesting that an alternative label for emotional intensity information may actually offset the negative emotional bias in depressives. Perhaps when depressed people are given an explanation for how they feel, they use that explanation to explain away all the negative emotion they are experiencing. This finding is consistent with Zillmann's 4th assumption which states, "The individual does not partition excitation compounded from reactions to different inducing conditions. Instead, he tends to ascribe his entire excitatory reaction to one particular, inducing condition" (Zillmann, 1978, pp. 359).

Study one clearly demonstrates the necessity of including self-schemas as part of the emotional attribution process. The key mechanism is the misattribution of physiological arousal. When subjects did not experience arousal, or when they were aware of the true source of their arousal, self-schemas did not seem to have an effect.

In study two we replicated study one but added an attentional focus factor. This factor was intended to increase the activation of the self-schema through self-focus. We manipulated self-focus by placing a small mirror in front of subjects while they were completing the MAACL. In the distraction condition, we asked subjects to hold a telephone number in memory while completing the MAACL. Previous literature details three ways that self-focus can affect processing. The first is its tendency to increase the activation of the self-schema (Pyszczynski et al, 1989), which tends to increase the influence of the self-

schema on subsequent processing. The second effect is related to the first in that focusing on the self allows a person to be more accurate in self report (Wicklund, 1979; Reisenzein & Gattinger, 1982). This is not limited to self-reports of emotion or personal qualities, it also includes increased accuracy in evaluation of bodily states (Hansen, Hansen, & Crano, 1989). The third effect of self-focus is related to the original Wicklund and Duval (1972) theory. When a person focuses on himself, there is an automatic comparison of the self with standards of correctness (Wicklund & Duval, 1972; Wicklund, 1975). To the degree that there is a discrepancy between the actual self and these standards of correctness, negative affect will result.

I expected the tendency for self-focus to increase the activation of the self-schema to be the primary process operating in this study. Results, however, failed to confirm this hypothesis. Instead, a significant two-way interaction demonstrated the ability of self-focus to produce negative affect in the relaxed group, and its ability to produce increased awareness of physiological states in the aroused group. The increased negative affect present in the relaxed self-focused group is most likely due to comparison of the self to standards of correctness and the subsequent negative affect produced by discrepancies. The decreased negative affect in the aroused, self-focused group is most likely due to the attribution of negative affect to the physiological arousal left over from the exercise task.

An examination of the cell means shows that self-focus produced more negative affect in all groups except the depressed aroused group. In this group subjects demonstrated decreased negative affect. This difference is most likely due to increased awareness of their physiological arousal as a result of self-

focus. Theoretically, subjects in this condition were more aware of their physiological arousal and its source and thus did not misattribute the arousal to their negative self-schemas. Additionally, these subjects may have attributed the emotion due to their perception of discrepancy between the actual and ideal self to the residual arousal from the exercise bike. This explanation is consistent with results from the informed group in study one. When depressed aroused subjects are given a plausible explanation for emotional intensity information they seem to assign all the emotion they are experiencing to this source. This effect is consistent with the fourth assumption of Zillmann's (1978) three factor model as presented in the introduction.

Additional Questions

Several questions remain unanswered in this discussion. First, this study demonstrates the influence of the self-schema in the absence of a label, however, the self-schema may operate to a lesser degree when there is a label. This effect would be observable as a general bias toward accepting schema consistent explanations of arousal when multiple labels are available.

Second, the tendency for depressed subjects to attribute all their emotion to one source needs to be examined in more detail. What is interesting about this is that not only does the provision of an alternative explanation offset the negative effects of arousal, it also seems to offset the negative affects of depression itself. Future research might examine how general biases in processing, rather than transient emotional states, can be offset by simply providing people with a plausible explanation of emotional intensity. Perhaps mildly depressed subjects are motivated, in the face of their negative self-schema, to not feel negative emotion. The presentation of an explanation other

than depressive affect allows them an excuse to not feel this negative emotion as intensely.

Third, the differences in response patterns for the memory questionnaire when compared to the MAACL in study two suggests that there may be differences in the way people remember things and they way they experience emotion in the present. Future research might examine this interesting pattern of results further. Perhaps there are different processes involved for emotional experiences that are stored in memory than for emotional experience in the present.

Conclusions

Perhaps the most significant finding in this study is that when depressed subjects are presented with an alternative explanation for the affect they are experiencing, it can actually offset the negative bias in depression. This was directly suggested by the label manipulation in study one. The results from the self-focus manipulation, if indeed they can be interpreted as leading to greater awareness of physical sensations, further support the idea that an alternative explanation can offset the negative bias in depression. This may be an important component in stopping the self-perpetuating negative bias in depressives.

This effect seems only to be present for depressed subjects. Perhaps this is because people are motivated to avoid negative affect. Depressed subjects consistently experience negative emotional biases in processing. Perhaps when they are given an opportunity to attribute that negative affect to some other source, they take advantage of that opportunity.

Differences in levels of positive and negative emotion between depressed

and nondepressed subjects have been observed for a long time. In fact, the definition of depression could well be higher levels of negative emotion in the self-schema. What is critical in this discussion is not this overall difference in emotional content, rather, these studies demonstrate the involvement of the self-schema in specific emotional attribution processes.

Zillmann's (1978) theory was not intended to explain differences in emotional attribution between depressed and nondepressed subjects. Rather, he intended to develop an overall description of how people come to know what they feel. Unfortunately in doing this he ignored the obvious differences in cognitive processing due to differences in the content of the self-schema (Kuiper & Derry, 1984). The qualitatively more negative self schema present in depressed subjects has been shown to influence cognitive processing in many different domains. This oversight does not seem to be crucial except in the situation provided by the present study. When subjects have intensity information in the absence of an emotional label, they rely on their self-schemas for interpretation. This situation is not unusual in everyday experience. Anytime a person performs an activity that is physiologically arousing, there is a critical period after that activity where the self-schema can effect attributions of emotion. This is especially problematic for depressed subjects who may experience unnecessarily intense negative affect.

Previous research by Zillmann and colleagues is not necessarily nullified by this study. Zillmann clearly demonstrates misattribution of physiological arousal to contrived emotional situations. Perhaps if Zillmann would have included self-schema content differences in his analysis he would have found self-schema effects. These differences would most likely have been limited to

the general positive and negative biases observed in most depression research. The self-schema operates in emotional attribution in the special case where physiological arousal is present, but no label, either genuine or contrived, is present.

This discussion suggests a four factor theory of emotional attribution. The first three factors are similar to Zillmann's (1978) theory of emotion. Factor one is an initial automatic, conditioned or unconditioned physiological response to an emotion inducing condition. Factor two is the cognitive interpretation of that physiological arousal as emotional intensity information. Factor three is the attribution of that intensity information to some external source. The fourth factor operates only if the third factor cannot operate. If there is no apparant inducing condition present in the environment, the affective information present in the self-schema will be used to determine what emotion is appropriate.

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Table 1

Design of Study One

Depressed			Nondepressed	
Aroused	Aroused Informed	Relaxed	Aroused	Relaxed

Table 2

Mean Scores on MAACL subscales as a function of Depression and Physiological Arousal.

	MAACL SUBSCALES				
Group	Anxiety	Depression	Hostility	Dysphoria	Positivity
Depressed					
Aroused	5.17	4.33	5.67	15.17	14.33
Aroused & Informed	2.00	1.33	2.22	5.56	15.44
Relaxed	4.25	1.92	2.92	9.03	15.17
Non-Depressed					
Aroused	1.00	0.00	.46	1.46	18.92
Relaxed	1.15	0.23	.54	1.92	18.77

Table 3

Mean Reaction Time of subjects to MAACL subscales as a function of Depression and Physiological Arousal.

	MAACL Subscales				
Group	Anxiety	Depression	Hostility	Dysphoria	Positivity
Depressed					
Aroused	2243.67	2110.83	2001.45	2118.65	1862.32
Aroused & Informed	1713.23	1352.19	1944.25	1669.89	2020.41
Relaxed	1863.91	1698.28	1788.55	1722.67	1479.60
Non-Depressed					
Aroused	1372.39	1181.61	1282.87	1278.96	1212.54
Relaxed	1657.91	1602.18	1759.04	1673.04	1639.97

Table 4

t Values of Contrasts on MAACL Subscales for Study One

Contrast	MAACL Subscales				
	Anxiety	Depression	Hostility	Dysphoria	Positivity
Contrast One	1.16	*2.51	*2.49	*2.49	-0.41
Contrast Two	0.20	0.25	0.07	0.20	-0.08
Contrast Three	*4.00	1.79	*2.20	*2.99	-1.81
Contrast Four	*-3.72	*-2.89	*-2.89	*-3.64	0.51
Contrast Five	-1.19	-1.31	-1.50	-1.58	1.62

Contrast One - Depressed/Aroused vs. Depressed/Relaxed
Contrast Two - Nondepressed/Aroused vs. Nondepressed/Relaxed
Contrast Three - Depressed/Relaxed vs. Nondepressed/Relaxed
Contrast Four - Depressed/Aroused vs. Depressed/Aroused/Informed
Contrast Five - Depressed/Aroused/Informed vs. Nondepressed/Aroused

*Significant with p = .04.

Table 5

t-Values of Contrasts on Reaction Time Measures for Study One

	MAACL Subscales				
Contrast	Anxiety	Depression	Hostility	Dysphoria	Positivity
Contrast One	1.41	1.24	1.27	1.151	1.30
Contrast Two	1.23	1.52	1.81	1.79	1.06
Contrast Three	0.54	0.65	-0.14	0.41	0.15
Contrast Four	-1.78	*-2.54	-0.66	-1.94	-0.41
Contrast Five	1.13	0.56	2.03	1.42	1.90

Contrast One - Depressed/Aroused vs. Depressed/Relaxed
Contrast Two - Nondepressed/Aroused vs. Nondepressed/Relaxed
Contrast Three - Depressed/Relaxed vs. Nondepressed/Relaxed
Contrast Four - Depressed/Aroused vs. Depressed/Aroused/Informed
Contrast Five - Depressed/Aroused/Informed vs. Nondepressed/Aroused

*Significant with p = .04.

Table 6

Design of Study Two

Depressed				Nondepressed			
Aroused		Relaxed		Aroused		Relaxed	
Self-Focused	Distracted	Self-Focused	Distracted	Self-Focused	Distracted	Self-Focused	Distracted

Table 7

Mean Scores on MAACL subscales as a function of Depression, Attentional focus and Physiological Arousal.

	MAACL SUBSCALES				
Group	Anxiety	Depression	Hostility	Dysphoria	Positivity
Depressed					
Aroused/Self-focused	2.11	1.22	1.78	5.11	18.11
Aroused/Distracted	3.90	2.80	3.40	10.10	16.10
Relaxed/Self-focused	4.27	3.09	4.35	11.73	15.45
Relaxed/Distracted	2.85	1.77	2.00	6.82	18.36
Non-Depressed					
Aroused/Self-focused	1.70	.70	1.40	5.80	20.00
Aroused/Distracted	1.53	.17	.75	2.50	17.58
Relaxed/Self-focused	2.54	.77	2.00	5.81	18.15
Relaxed/Distracted	1.08	.33	.38	1.69	18.69

Table 8

Means on the Memory Questionnaire as a function of Depression, Attentional focus and Physiological Arousal.

	Memory Subscales				
Group	Affect	Clarity	Self-Definingness One	Self-Definingness Two	Self-Definingness Three
Depressed					
Aroused/Self-focused	1.24	7.22	5.70	5.13	5.17
Aroused/Distracted	1.94	6.59	5.33	4.77	4.79
Relaxed/Self-focused	1.22	7.21	5.21	5.15	5.01
Relaxed/Distracted	1.17	7.13	5.86	5.32	5.37
Non-Depressed					
Aroused/Self-focused	1.36	7.12	5.00	5.43	4.80
Aroused/Distracted	2.61	7.47	5.40	5.10	5.27
Relaxed/Self-focused	1.78	7.04	5.59	5.25	4.62
Relaxed/Distracted	0.82	7.35	5.09	5.07	4.82

Table 9

Mean Reaction Time as a function of Depression, Attentional focus and Physiological Arousal.

	Mean Reaction Time					
Group	Anxiety	Depression	Hostility	Dysphoria	Positivity	Euphoria
Depressed						
Aroused/Self-focused	1707.76	1705.13	1716.88	1709.93	1634.56	1750.21
Aroused/Distracted	1512.62	1513.03	1540.51	1522.05	1459.56	1542.31
Relaxed/Self-focused	1905.48	1912.56	1928.56	1915.93	1838.38	1941.52
Relaxed/Distracted	1742.45	1755.71	1760.94	1753.03	1692.89	1749.17
Non-Depressed						
Aroused/Self-focused	1498.53	1494.31	1513..50	1502.11	1450.78	1567.47
Aroused/Distracted	1657.31	1655.66	1650.96	1654.64	1642.51	1661.81
Relaxed/Self-focused	1695.86	1682.24	1689.39	1689.16	1623.24	1683.92
Relaxed/Distracted	1501.48	1503.58	1503.39	1502.81	1473.46	1520.42

Table 10

t -Values of Contrasts on MAACL subscales for Study Two

	MAACL Subscales					
Contrast	Anxiety	Depression	Hostility	Dysphoria	Positivity	Euphoria
Contrast One	-0.46	-0.31	-0.11	-0.34	-0.17	1.36
Contrast Two	-0.22	-0.12	-0.16	-0.20	0.37	0.43
Contrast Three	*2.41	*3.57	*2.82	*3.27	-1.56	-1.20
Contrast Four	0.83	0.76	1..89	1.34	0.10	1.35
Contrast Five	0.82	0.66	0.64	0.82	1.07	1.58
Contrast Six	*2.07	1.75	*2.49	*2.43	*2.75	0.84
Contrast Seven	0.87	1.85	1.58	1.58	0.70	1.12

Contast One - Depressed/Aroused Groups vs. Depressed/Relaxed Groups
Contrast Two - Nondepressed/Aroused groups vs. Nondepressed/Relaxed groups
Contrast Three - Depressed/Relaxed groups vs. Nondepressed/Relaxed Groups
Contrast Four - Self-focused Groups vs. Distracted Groups
Contrast Five - Interaction of Depression and Attentional Focus
Contrast Six - Interaction of Arousal Condition and Attentional Focus
Contrast Seven - Interaction of Depression, Arousal, and Attentional Focus

*Significant with p = .05.

Table 11

t -Values of Contrasts on Memory Questionnaire for Study Two

	Memory Subscales				
Contrast	Affect	Clarity	Self-Definingness One	Self-Definingness Two	Self-Definingness Three
Contrast One	0.71	-0.93	-0.05	-0.71	-0.49
Contrast Two	1.71	0.40	-0.42	0.27	0.79
Contrast Three	-0.26	-0.10	0.58	0.20	1.20
Contrast Four	0.55	0.15	0.18	0.56	0.68
Contrast Five	0.46	1.73	0.58	0.32	0.79
Contrast Six	*2.61	0.61	0.00	0.58	0.36
Contrast Seven	1.24	0.78	1.93	0.34	0.86

Contast One - Depressed/Aroused Groups vs. Depressed/Relaxed Groups
Contrast Two - Nondepressed/Aroused groups vs. Nondepressed/Relaxed groups
Contrast Three - Depressed/Relaxed groups vs. Nondepressed/Relaxed Groups
Contrast Four - Self-focused Groups vs. Distracted Groups
Contrast Five - Interaction of Depression and Attentional Focus
Contrast Six - Interaction of Arousal Condition and Attentional Focus
Contrast Seven - Interaction of Depression, Arousal, and Attentional Focus

*Significant with p = .05.

Table 12

t-Values of Contrasts on Reaction Time Measures for Study Two

	MAACL Subscales					
Contrast	Anxiety	Depression	Hostility	Dysphoria	Positivity	Euphoria
Contrast One	0.18	-1.45	-1.37	-1.39	-1.50	-1.23
Contrast Two	0.89	-0.12	-0.09	-0.12	-0.02	0.08
Contrast Three	0.13	1.67	1.68	1.63	1.59	1.61
Contrast Four	0.90	0.85	0.90	0.88	0.68	1.03
Contrast Five	0.66	070	0.61	0.66	0.82	0.69
Contrast Six	0.78	0.75	0.75	0.76	0.81	0.57
Contrast Seven	0.88	0.87	0.76	0.84	0.92	0.61

Contast One - Depressed/Aroused Groups vs. Depressed/Relaxed Groups
Contrast Two - Nondepressed/Aroused groups vs. Nondepressed/Relaxed groups
Contrast Three - Depressed/Relaxed groups vs. Nondepressed/Relaxed Groups
Contrast Four - Self-focused Groups vs. Distracted Groups
Contrast Five - Interaction of Depression and Attentional Focus
Contrast Six - Interaction of Arousal Condition and Attentional Focus
Contrast Seven - Interaction of Depression, Arousal, and Attentional Focus

*Significant with p = .05.

Appendix A

Materials

Appendix B

Personal Vita

Vita
Daniel Earl Salzman

A. Personal History

Date of Birth:	January 3, 1968
Place of Birth:	Lancaster, Pennsylvania
Parents:	Robert Earl Salzman Linda Marie Salzman
Business Address:	Department of Psychology, Lehigh University Bethlehem, Pennsylvania 18015
Home Address:	1661 Rader Ave. Bethlehem, Pennsylvania 18015

B. Educational History

1. Liberty University, Lynchburg, Virginia
   - Major: Psychology
   - Degree: B.A. Cum Laude awarded May, 1989
   - Honors: Who's Who in American Colleges and Universities 1989
     National Dean's List 1988 and 1989
     Psychology Student of the Year 1989

2. Lehigh University, Bethlehem, Pennsylvania
   - Major: Social/Personality Psychology
   - Degree: Master of Science in Psychology awarded May, 1991

C. Professional Positions

1. **Instructor**
   Lafayette College, Easton, Pennsylvania 1989-1990
   Allentown College, Center Valley, Pennsylvania 1990-1992
   Lehigh University, Bethlehem, Pennsylvania 1992 - 1993

2. **Teaching Assistant**
   Lehigh University, Bethlehem, Pennsylvania 1990-1992

3. **Marketing Intern**
   Rodale Press, Emmaus, Pennsylvania 1990

4. **Computer Consultant**
   Anderson Associates Inc. Allentown, Pennsylvania 1991-1993

D. Membership in Professional Associations

1. American Psychological Society
2. American Psychological Association