

ATTITUDE CERTAINTY AS A SUBJECTIVE FEELING STATE:
MISATTRIBUTIONS OF EMOTION DECODING AFFECT
ATTITUDE CERTAINTY AND RESPONSE TO PERSUASION

BY

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Thesis under the direction of John V. Petrocelli, Ph.D., Assistant Professor of Psychology

This experiment provides evidence that certainty appraisals arising from the process of decoding the emotions of social targets may be misattributed to attitude certainty (AC) and that this AC has the same consequences as AC arising from established antecedents, particularly with response to persuasion. While listening to information about a novel attitude object, participants ($N = 249$) viewed photographs of faces displaying either anger or sadness and either with gaze directed toward or averted away from participants. In order to assess misattribution of certainty during this task, participants were also exposed to background music: half of the participants were informed that the music should facilitate whereas half of the participants were informed that the music should inhibit clarity and certainty of thought. Participants then reported their attitude toward the object and their AC. Participants next read a persuasive message concerning the object and again reported their attitude. For those participants in the direct gaze condition, participants who were predicted to misattribute general feelings of certainty to AC, reported greater AC and changed their attitude less following persuasion if they had been exposed to angry social targets as opposed to sad social targets. The opposite pattern was observed for participants in the averted gaze condition. This experiment provides evidence that emotion decoding, particularly the ease with which emotions may be identified, influences levels of AC and that this form of AC operates similarly to AC arising from other sources.

INTRODUCTION

In recent years, increasing research attention has been given to the role of emotion in the formation, maintenance, and change of attitudes. Particular attention has been given to the role of mood in the persuasive process (Briñol, Petty, & Barden, 2007; Mackie & Worth, 1989; Petty, Schumann, Richman, & Strathman, 1993; Wegener, Petty, & Klein, 1993; Wegener, Petty, & Smith, 1995; Worth & Mackie, 1987). For example, Worth and Mackie (1987, 1989) examined the role of positive mood as compared to neutral mood in the processing of persuasive messages. They concluded that those participants who were induced to feel positive mood were typically less likely to exert cognitive effort in processing a persuasive message than participants induced to feel a neutral mood. Thus, participants in a positive mood were less likely to differentiate between strong and weak arguments, and were susceptible to heuristic cues as opposed to the quality of a persuasive message.

Following these initial studies of the role of positive mood in the persuasion process, several studies confirmed the findings that positive mood influences attitudes in the persuasion process, generally demonstrating that those induced to feel a positive mood are less likely to expend cognitive effort in processing a persuasive message than those induced to feel a neutral mood (Petty et al., 1993; Wegener, Petty, et al., 1994; Wegener et al., 1995). These researchers have also proposed different mechanisms through which positive mood affects persuasion, including the role of need for cognition and thoughts generated in response to persuasion (Petty et al., 1993), argument quality and valence of the persuasive message (Wegener et al., 1995), and perceived likelihood of positive or negative consequences (Wegener et al., 1994). For example, Petty et al.

(1993) demonstrated that those who were high in need for cognition and induced to feel a positive mood following exposure to a persuasive message were more influenced by the persuasive message than those who were low in need for cognition and induced to feel a positive mood following exposure to a persuasive message. For those high in need for cognition, the relationship between positive mood and persuasion was mediated by the generation of more positive thoughts toward the attitude object. These studies suggest that mood experienced during the typical persuasion paradigm influences attitudes following a persuasive message.

Attitude researchers have also begun to focus on the role of emotion in the formation and maintenance of attitudes. Martin (2000) reviewed research on mood and cognition and concluded that moods influence evaluations of attitude objects, information processing, and the retrieval of information from memory. Additionally, emotion has been shown to influence attitude favorability (Petty et al., 2003), ratings of the probability of the occurrence of certain events (DeSteno, Petty, Rucker, Wegener, & Braverman, 2004), and the accessibility of particular information in memory (Bower, 1981). For example, DeSteno et al. (2004) demonstrated that those induced to feel sadness were more likely to report high expectancies for the occurrence of sad outcomes in a scenario than participants who were in a neutral emotional state. Thus, the participant's evaluations of the scenario were influenced by the emotional state they were currently experiencing. This research provides evidence that people's evaluations of attitude objects are influenced by emotions through many different simultaneously occurring processes.

It is not surprising that emotions influence the types of attitudes formed toward novel objects as attitude researchers have long described attitudes as consisting of three components: cognitive, affective, and behavioral actions/intentions (Breckler, 1984; Insko & Schopler, 1967). Because attitudes by definition have an affective component, it seems possible that emotions (or perhaps simply decoding emotions of social targets) could influence attitude formation. That is, decoding emotions (i.e., interpreting the meaning of nonverbal behavior encountered in a social target; Ekman & Friesen, 1971)¹ during the formation of an attitude may influence components of the attitude, including the likelihood that the attitude will be susceptible to persuasion.

Attitude Formation

Theories. Attitude researchers have proposed several theories describing the processes through which attitudes develop. These theories can be divided into two general categories: cognitive-based and affective-based attitude formation (Walther & Langer, 2008). According to theorists supporting cognitive-based attitude formation, in order for an attitude toward some object to form, one must develop conscious beliefs and evaluations toward the attitude object. In order for attitude change to occur, these strictly cognitive beliefs and evaluations must be changed (Edwards, 1990; Fishbein & Middlestadt, 1995). Attitude researchers who support affective-based theories of attitude formation, however, argue that attitudes may form through a type of classical conditioning termed evaluative conditioning (Walther & Langer, 2008). In other words, simply pairing a positively evaluated attitude object with a novel attitude object is sufficient for the formation of a positive attitude toward the novel object, even though

¹ Several studies demonstrate that people are very accurate at decoding emotions from facial expressions (Biehl et al., 1997; Ekman & Friesen, 1971; Etcoff & Magee, 1992).

beliefs may not be accessed or changed during this process (Olson & Fazio, 2001; Walther & Langer, 2008).

Fishbein and Ajzen (2010) are strong proponents of the idea that attitude formation must occur through cognitive-based belief formation. According to their expectancy-value model of attitude formation, attitudes result from the development and change of beliefs about an attitude object (Fishbein & Ajzen, 2010). In this model, beliefs are represented by the subjective probabilities that an attitude object has a particular attribute in reality. Beliefs may change over time as one gains experience or develops more associations with an attitude object. In order for beliefs to influence attitudes, beliefs must be salient, or easily accessible from memory (Fishbein & Ajzen, 2010). Furthermore, their model holds that attitudes are only formed and changed when salient beliefs are activated and challenged. Accessible beliefs must change in order for attitudes to change (Fishbein & Middlestadt, 1995).

However, a body of research disputes these claims, and suggests that attitudes may form and/or change through conditioning processes, without activation of beliefs or conscious evaluations of the attitude object (Walther & Langer, 2008). The process through which attitude formation and change occurs without belief activation is termed evaluative conditioning (De Houwer, Thomas, & Baeyens, 2001). According to theorists who support evaluative conditioning paradigms of attitude formation, one may form a positive or negative attitude toward a novel attitude object based on whether this novel object has been repeatedly paired with positive or negative stimuli (Walther, Nagengast, & Trasselli, 2005). According to this paradigm, it is not necessary that there be awareness of the co-occurrence of the novel attitude object and the valenced stimuli, and thus it is

not necessary that beliefs about the novel attitude object be formed (Walther et al., 2005). For example, Olson and Fazio (2001) demonstrated that originally neutral cartoon characters were evaluated more positively when paired with positive words than when paired with negative words. Additionally, participants were unaware that each cartoon character was paired with either all positive or all negative terms. In a second experiment, Olson and Fazio (2001) determined that pairing a cartoon character with valenced words influenced an implicit measure of attitude formation even when participants were unaware of the valenced pairings. This evidence suggests that attitude formation can occur beneath awareness in a simple classical conditioning paradigm, pairing an initially neutral attitude object with either positively or negatively valenced objects.

Misattribution and attitude formation. In line with the evaluative conditioning perspective on attitude formation, several theorists have proposed models explaining how mood states or emotions may influence judgments unrelated to the source of the mood or emotion. One such model is known as the Affect Infusion Model (AIM; Forgas, 1995). According to this model, there are four routes through which one may make judgments, and the strength of the influence of affect on judgments is dependent upon the route through which judgments are made. Most evidence suggests that affect is most likely to influence judgments when one is actively thinking about the object of judgment, rather than heuristically processing object-relevant information (Forgas, 1995).

Mood and emotion researchers have also demonstrated that mood states often influence attitudes and judgments, particularly when people are unaware of the influence of mood on their attitudes (Schwarz & Clore, 1983, 2007). This process has been termed misattribution, and occurs when one mistakenly identifies the source of an emotion and

forms attitudes or makes judgments based on this confusion (Schwarz & Clore, 1983). In order for misattribution of emotion to occur, there must be an actual source of the emotion, an apparent source of an emotion, and one must confuse the apparent source with the actual source (Payne, Hall, Cameron, & Bishara, 2010).

In a classic study demonstrating the occurrence of affect misattribution, Schwarz and Clore (1983) demonstrated that mood states may influence judgments of life satisfaction, particularly when people are unaware that their mood is related to their attitudes. Schwarz and Clore conducted phone interviews on either cloudy or rainy days and asked participants how satisfied they were with their lives. Participants who were contacted on rainy days reported that they were less satisfied with their lives than those contacted on sunny days, but only if the researcher did not mention the gloomy weather. Those participants for whom the researcher mentioned the rainy weather did not differ in their ratings of life satisfaction compared to participants phoned on sunny days. These results suggest that those who were not made aware of the source of their mood state used their mood as a source of information when making judgments. However, those who were made aware of the gloomy weather became cognizant of the weather's influence on mood and no longer used their mood state as information when making judgments. These conclusions suggest that people often confuse already-present emotional states with reactions to a particular judgment (Schwarz & Clore, 2007).

In addition to mood misattribution, research also suggests that misattribution processes may occur based on subjective feeling states. For example, Jacoby, Kelley, Brown, and Jasechko (1989) found that feelings of familiarity arising from recency of exposure to an object may be misattributed to frequency of exposure. Specifically,

participants rated names as belonging to famous people because they felt that these names were familiar to them. However, this sense of familiarity originated in recency of exposure to the names as opposed to frequency of exposure to the names. In another experiment examining the misattribution of subjective states, Schwarz et al. (1991) demonstrated that people often based their assessments of their own qualities on the ease with which they could recall instances of exhibiting those qualities; however, ease of recall no longer influenced assessments when participants could misattribute the experienced ease of recall to background music.

Drawing from the research on misattribution of subjective feeling states, the current investigation examines whether aspects of decoding emotions during the formation of an attitude may be misattributed to feelings of certainty toward that attitude object. More specifically, this study assesses whether feelings of certainty that accompany emotion decoding during attitude formation may be misattributed to certainty toward that attitude.

Attitude Certainty

Components. Attitude certainty is a metacognitive component of attitude strength and is defined as the subjective sense of how certain one is about an attitude he or she holds toward a specific object (Gross, Holtz & Miller, 1995). Petrocelli, Tormala, and Rucker (2007) provided evidence suggesting that attitude certainty consists of two independent components: attitude clarity and attitude correctness. Attitude clarity refers to one's subjective awareness of his/her attitude or how certain one is that he/she knows what his/her attitude toward some object is whereas attitude correctness refers to how subjectively certain one is that the attitude he/she holds is the correct, valid attitude to

hold toward some object (Petrocelli et al., 2007). These components, although strongly related to each other, often have unique relationships to antecedents and consequences of attitude certainty. This evidence suggests that these two types of certainty should be examined independently of one another (Petrocelli et al., 2007).

Antecedents. Researchers have identified several antecedents to attitude certainty including repetition, accessibility, cognitive elaboration, and social consensus (Gross et al., 1995; Tormala & Rucker, 2007). For example, Holland, Verplanken, and van Knippenberg (2003) demonstrated a causal relationship between attitude accessibility and attitude certainty, such that repeatedly expressed attitudes are held with higher levels of certainty than attitudes expressed only once. Certainty toward an attitude may also change based on whether one's attitude is similar or dissimilar to the attitudes of the social majority (Petrocelli et al., 2007; Tormala, DeSensi, Clarkson, & Rucker, 2009; Visser & Mirabile, 2004). These established antecedents offer a glimpse into the many possible individual and contextual factors that affect levels of attitude certainty; however, there may be additional influences on attitude certainty that have yet to be identified. One of the purposes of the current investigation is to determine whether emotions encountered during attitude formation may serve as an antecedent to attitude certainty.

Consequences. Attitude certainty is an important component of attitude strength and thus has several notable consequences (Gross et al., 1995). For example, attitudes held with high levels of certainty are more likely to predict behaviors consistent with those attitudes than attitudes that are not held with certainty (Fazio & Zanna, 1978; Rucker & Petty, 2004; Tormala & Rucker, 2007). Rucker and Petty (2004) demonstrated that attitudes formed with greater levels of certainty were more likely to predict

behavioral intentions than attitudes formed with lower levels of certainty. Attitudes associated with high levels of certainty are also more likely to persist over long periods of time and resist persuasion than attitudes held with low levels of certainty (Gross et al., 1995; Tormala & Rucker, 2007). Bassili (1996) also demonstrated that measures of attitude certainty predict stability of attitudes over time, whereas other metacognitive measures of attitude strength do not.

Attitude certainty and emotion. Of interest to the current investigation is whether attitude certainty may be influenced by dimensions of emotions decoded during attitude formation. Although emotion has never been examined as an antecedent to attitude certainty, there is evidence to suggest that affective experiences correspond to general appraisals of certainty. Smith and Ellsworth (1985) posited that specific emotions are characterized by distinct components that act to orient an individual to the surrounding environment. According to Smith and Ellsworth, emotions vary along at least six dimensions including pleasantness, certainty, attentional activity, situational control, anticipated effort and self-other responsibility/control. Smith and Ellsworth defined the dimension of certainty as feeling more or less certain about what is occurring in the environment. Important to the current investigation, they provided evidence that sadness is characterized by relatively uncertain appraisals whereas anger is characterized by relatively certain appraisals.

Drawing on the research of Smith and Ellsworth (1985), Lerner and Keltner (2000) presented a theory that explains how specific emotions may influence new situations based on the appraisals typically associated with each emotion. For example, individuals experiencing anger should have very different appraisals of the surrounding

environment than individuals experiencing sadness, particularly on the dimension of certainty. Given this theory, I propose that it is possible that emotions decoded at the time of attitude formation may influence subsequent judgments such that emotional appraisals of certainty are misattributed to certainty toward a new attitude. In other words, appraisals of certainty arising from decoding anger during attitude formation may be misattributed to certainty toward a new attitude, whereas appraisals of uncertainty arising from decoding sadness during attitude formation may be misattributed to low levels of certainty toward a new attitude. Thus, I propose that emotion decoding during attitude formation should be considered an antecedent to attitude certainty.

Attitude Change

In addition to examining whether emotion decoding should be considered an antecedent to attitude certainty, the current investigation seeks to ascertain whether attitude certainty arising from emotion decoding has the same consequences as attitude certainty arising from previously established antecedents. Of interest to the current investigation is the relationship between attitude certainty and attitude change following persuasion. Response to persuasion is an ideal variable to examine in this investigation because in addition to being a consequence of attitude certainty, attitude change following persuasion is also influenced by the manner in which an attitude is formed, whether through cognitive processing or affective encounters (Edwards, 1990; Millar & Millar, 1990). Is it possible that attitudes formed in the presence of emotion decoding influence resistance to persuasion due to misattributions of certainty appraisals, such that certainty appraisals arising from emotions encountered during attitude formation

influence attitude strength and response to persuasion? Answering this general question is the focus of the current investigation.

Theories of attitude change. Several theories concerning attitude change and persuasion have been proposed, most notably the Elaboration Likelihood Model (ELM; Petty and Cacioppo, 1986) and the Heuristic Systems Model (HSM; Chaiken, 1980). These theories hold specific hypotheses concerning the extent to which an attitude is malleable due to persuasion, and the processes through which attitude change occurs. According to the ELM there are two routes to persuasion: the central and peripheral routes. The central route to persuasion only occurs if a person is both motivated and willing to systematically process information concerning the attitude object, whereas the peripheral route to persuasion occurs if a person is either unable or unwilling to systematically process information concerning the attitude object (Petty & Cacioppo, 1986). Factors that influence whether an attitude will change following a persuasive attempt include the quality of the persuasive argument, such that resistance is greater after exposure to weak arguments compared to exposure to strong arguments in the central route (Petty & Cacioppo, 1986). When utilizing the peripheral route to persuasion, factors that influence the success of a persuasive attempt include the expertise of the source of the message, the attractiveness of the source of the message, and the number of persuasive arguments included in the message (Petty & Cacioppo, 1986).

Similar to the ELM, Chaiken's (1980) HSM posits that there are two paths to persuasion: systematic and heuristic. The HSM holds that people participating in each path to persuasion are always motivated to process persuasive messages accurately; however, in the systematic path people will exert cognitive effort to accurately process a

message, whereas in the heuristic path, people will exert little cognitive effort and rely on heuristics to process a message (Chaiken, 1980).

Attitude change and emotion. Previous research has demonstrated that mood experienced during the persuasion paradigm influences processing of particular cues in persuasive messages, particularly when the central/systematic routes to persuasion are activated (Petty, Schumann, Richman, & Strathman, 1993; Wegener, Petty, & Klein, 1994; Wegener, Petty, & Smith, 1995). This research, however, addresses emotions encountered following attitude formation and thus does not speak to the potential differential processing of persuasive messages resulting from the formative basis (cognitive vs. affective) of a particular attitude.

This investigation aims to examine a new affective route of attitude formation. As demonstrated in previous research, the basis of an attitude, particularly whether it is formed through cognitive or affective processes, is important for persuasion (Edwards, 1990; Millar & Millar 1990). Particularly, the basis of an attitude (cognitive vs. affective) influences whether the attitude will be susceptible to different types of persuasion. For example, Fabrigar and Petty (1999) demonstrated that typically affectively based attitudes are more influenced by affective persuasion than cognitive persuasion and cognitively based attitudes are typically more influenced by cognitive persuasion than affective persuasion (although the latter effect did not reach significance). Thus, the manner in which attitudes are formed (affective vs. cognitive) influences the amount of attitude change that will take place in response to particular persuasive attempts.

Attitude change and attitude certainty. In addition to the formative basis of an attitude, another factor that is particularly important in determining processes involved in

resistance to persuasion is attitude strength (Krosnick & Petty, 1995). One of the defining features of strong attitudes is their tendency to be highly resistant to persuasion (Krosnick & Petty, 1995). Two individuals may have the same attitude with regard to its direction (i.e., positive or negative) yet differ in their attitude strength. The individual possessing greater attitude strength is more likely to resist persuasion. Aspects of attitudes that influence attitude strength and resistance to persuasion include extremity, importance, accessibility, personal relevance, and certainty. Although these attributes of strong attitudes are related to each other, Krosnick, Boninger, Chuang, Berrent, and Carnot (1993) suggested through confirmatory factor analysis that these attributes measure independent aspects of attitude strength rather than measuring one latent construct. Thus, studying particular aspects of attitude strength, such as attitude certainty (the focus of the current investigation) is important in gaining a more complete understanding of processes that influence resistance to persuasion.

Of particular interest to the current investigation is the relationship between attitude certainty and resistance to persuasion. Researchers have established through a variety of methods that attitudes held with high levels of certainty are more resistant to persuasion than attitudes held with low levels of certainty (Bassili, 1996; Kelley & Lamb, 1957; Petrocelli et al., 2007; Tormala & Petty, 2002; Tormala & Rucker, 2007). For example, Petrocelli et al. (2007) demonstrated that attitudes held with high levels of certainty (both in terms of clarity and correctness) were more resistant to persuasion than attitudes held with low levels of certainty. This body of research suggests that attitude certainty plays an important role in the traditional persuasion paradigm, particularly

revealing that attitudes held with high levels of attitude certainty are more likely to be resistant to persuasive attacks.

Attitude Change, Attitude Certainty, and Emotion

Although previous research has not provided any evidence concerning the influence of affectively formed attitudes on attitude certainty and attitude change, Briñol, et al. (2007) examined this question using a construct similar to attitude certainty. These researchers investigated the influence of emotions experienced during persuasion on thought confidence, or the amount of confidence participants feel toward thoughts they generate in response to a persuasive message. Although attitude certainty and thought confidence are similar in that they are metacognitive constructs, it should be clear that they differ with respect to their targets. Attitude certainty addresses one's certainty in his/her attitude whereas thought confidence addresses one's confidence in the thoughts he/she generate in response to pro- or counterattitudinal content.

In a series of studies, Briñol et al. (2007) demonstrated that emotions experienced following the presentation of a persuasive message influenced subsequent ratings of thought confidence. Specifically, participants who were induced to feel happiness reported more subjective confidence in their thoughts than participants who were induced to feel sadness. Additionally, those participants who were more confident about their thoughts as a result of feeling happy were less likely to be influenced by the persuasive message than those who were less confident about their thoughts as a result of feeling sad. Thus, Briñol et al. concluded that emotional experiences occurring after an attitude has been formed do influence processes affecting attitude change. The purpose of the current study is to investigate whether certainty associated with emotional decoding

during attitude formation may be misattributed to attitude certainty and thus indirectly influence resistance to persuasion.

The research discussed above has shown that emotional experiences often influence resistance to persuasion. The current study investigates whether simply decoding emotions of social targets during attitude formation influences resistance to persuasion. Earlier research conducted by Whitmire and Petrocelli (2013) is relevant to such an investigation. They examined the influence of emotion decoding during attitude formation on subsequent reports of attitude certainty and attitude change following a persuasive message. Participants viewed photographs of either angry or sad faces while simultaneously listening to information about a novel attitude object. Participants who decoded anger during attitude formation reported both higher levels of attitude certainty and less attitude change following a persuasive message, than participants who decoded sadness during attitude formation. Additionally, attitude certainty successfully mediated the relationship between emotion decoding and attitude change following persuasion. Thus, the purpose of the current study is to more specifically test the hypothesis that feelings of certainty arising from decoding emotions associated with varying certainty appraisals may be misattributed to certainty toward a new attitude, subsequently affecting the degree of resistance to persuasion.

One additional purpose of the current investigation is to examine a mechanism through which emotion decoding influences feelings of certainty. One potential mechanism is the ease or speed with which people are able to identify particular emotions. Previous research has established that the ease with which a stimulus is processed is related to favorability ratings of that stimulus (Jacoby, 1983). Thus, those

stimuli that are easily processed are typically rated as being more favorable than stimuli that are difficult to process. Because ease of processing affects favorability, ease may also affect attitude strength variables, such as attitude certainty. In fact, previous research suggests that the subjective ease of retrieving information related to an attitude object typically corresponds with greater levels of attitude certainty (Tormala, Clarkson, & Henderson, 2011; Tormala & Rucker, 2007). Additionally, previous research suggests that the perceived direction of the gaze of photographed individuals influences the ease or difficulty with which the emotion is recognized, depending on whether the expressed emotion is associated with approach or avoidance tendencies (Adams & Kleck, 2003). Specifically, approach emotions (such as anger) tend to be more easily identified when gaze is directed toward the perceiver, whereas avoidance emotions (such as sadness) tend to be more easily identified when the gaze is directed away from the perceiver. Thus, one aspect of emotion decoding that influences attitude certainty may be the ease or speed with which emotions are recognized, such that decoding anger increases attitude certainty when gaze is directed forward whereas decoding sadness increases attitude certainty when gaze is directed to the side.

Current Investigation

Building on the work of Whitmire and Petrocelli (2013), the purpose of the present investigation is to examine whether decoding emotions at the time of attitude formation indirectly influences resistance to persuasion through the misattribution of certainty. Of particular interest is the possibility that certainty appraisals, arising from the emotion decoding process, can be misattributed to certainty toward a new attitude.

Similar to Whitmire and Petrocelli (2013), participants viewed photographs of people expressing either anger or sadness while learning about a novel attitude object. However, in the current investigation, a new manipulation was introduced in order to more directly test the hypothesis that people can misattribute certainty appraisals from the emotion decoding process to certainty toward a new attitude.

In order to assess misattribution of certainty appraisals arising from emotion decoding to certainty toward an attitude, the diagnosticity of subjective feelings of certainty was manipulated (see Schwarz et al., 1991). Specifically, all participants were exposed to music during the attitude formation procedure. Half of the participants were led to believe that the music facilitates clarity and certainty of thought, whereas the other half of the participants was led to believe that the music inhibits clarity and certainty of thought. This information regarding the supposed effects of the music provides a manipulation of the diagnosticity of the certainty (or uncertainty) arising from decoding the emotions expressed in the photographs. In other words, the information provided about the music should determine whether certainty appraisals influence attitude certainty. Certainty appraisals should influence attitude certainty when the information about the music discounts the predisposition to feel certain (for conditions in which emotion decoding is easy) or uncertain (for conditions in which emotion decoding is difficult).

In line with Schwarz et al. (1991; Experiment 3), certainty (or uncertainty) appraisals arising from emotion decoding should be highly diagnostic when the supposed effect of the music discounts the predisposition to feel certain or uncertain, depending on ease of emotion decoding. In other words, certainty appraisals arising from emotion

decoding should be highly diagnostic for individuals who view photographs of anger and are led to believe that the music inhibits clarity of thought and for individuals who view photographs of sadness and are led to believe that the music facilitates clarity of thought. Thus, these participants who are not given a source for their feelings of certainty should use their emotion decoding-induced certainty as a source of information when assessing their attitude certainty. On the other hand, certainty (or uncertainty) appraisals arising from emotion decoding should be nondiagnostic for individuals who view photographs of anger and are led to believe that the music facilitates clarity of thought and for individuals who view photographs of sadness and are led to believe that the music inhibits clarity of thought. Thus, these individuals who are given a false source for their feelings of certainty should not use their emotion decoding-induced certainty as a source of information when assessing their attitude certainty. Essentially, this sort of “turning on” and “turning off” of such effects has been employed in prior misattribution research (e.g., Schwarz et al., 1991), and would provide further evidence of a misattribution process at work in the current paradigm.

An additional manipulation employed in the current investigation was the perceived gaze direction of the faces in the emotional photographs viewed by participants. Previous research (e.g., Adams & Kleck, 2003) suggests that the perceived direction of the gaze of photographed individuals influences the ease or difficulty with which the emotion is recognized, depending on whether the expressed emotion is associated with approach or avoidance tendencies. Specifically, approach emotions (such as anger) tend to be more easily identified when gaze is directed toward the perceiver, whereas avoidance emotions (such as sadness) tend to be more easily identified when the

gaze is directed away from the perceiver. Because previous research also suggests that the subjective ease of retrieving information related to an attitude object typically corresponds with greater levels of attitude certainty (Tormala, Clarkson, & Henderson, 2011; Tormala & Rucker, 2007), it is important to test whether the ease or difficulty associated with decoding emotions is related to reports of attitude certainty. Thus, the current investigation examined whether ease of perception is a contributor to attitude certainty by randomly assigning participants in both sad and angry conditions to view either photographs whereby the gaze is directed toward the participant or photographs whereby the gaze is averted away from the participant.

Finally, although the theoretical focus of the current investigation concerns attitude certainty as a whole, the attitude correctness facet of attitude certainty will be focused on specifically. As previously described, attitude certainty consists of two facets: attitude clarity and attitude correctness (Petrocelli et al., 2007). It is anticipated that attitude correctness will be a more relevant indicator of certainty than attitude clarity in the current paradigm. This is because participants in this investigation will be exposed to mandatory comprehensive exams as the attitude object and the malleability of their attitude correctness would seem to be greater than that of their attitude clarity. That is, most college students very much dislike this particular attitude object, and they are clear about disliking it. On the other hand, their perceived correctness for a new attitude object should be relatively more malleable. Thus, all primary analyses will focus particularly on attitude correctness.

In summary, the proposed process of emotion decoding affecting attitude change following persuasion through attitude certainty depends on the ease of decoding the

emotions based on gaze direction. Attitude certainty should be greater when the emotion decoding process is rather easy, and thus attitudes should be highly resistant to persuasion. However, attitude certainty should be less when the emotion decoding process is rather difficult, and thus attitudes should not be highly resistant to persuasion.

Hypotheses

The purpose of the current investigation is to examine whether the decoding of emotions of social targets during attitude formation indirectly influences resistance to persuasion through the misattribution of emotion-based appraisals of certainty to attitude certainty. Previous research has shown that attitudes formed through affective processes affect resistance to persuasion differently from attitudes formed through cognitive processes (Edwards, 1990; Fabrigar & Petty, 1999; Millar & Millar, 1990). Previous research also suggests that anger and sadness vary in terms of certainty appraisals, such that anger typically corresponds with appraisals of certainty, whereas sadness corresponds with appraisals of uncertainty (Smith & Ellsworth, 1985).

It is theorized that participants who decode angry and sad facial expressions of social targets during attitude formation will misattribute emotional certainty appraisals to attitude certainty, but only when the emotional certainty appraisals are highly diagnostic. That is, misattribution of certainty appraisals will only occur when participants are unable to identify a source for their level of certainty. Additionally, it is theorized that attitude certainty produced through misattribution should result in the classic consequences of attitude certainty, particularly with respect to response to persuasion.

To test specific hypotheses drawn from these theoretical positions, the current experiment employed a 2 (Emotion Decoding: anger vs. sadness) \times 2 (Diagnosticity of

Certainty Appraisal: high vs. low) \times 2 (Gaze of Photographs: direct vs. averted) complete between-groups factorial design. Both attitude correctness and attitude change were measured as dependent variables.

Hypothesis I: It is hypothesized that attitude correctness will depend on the interaction between the emotion decoding condition, diagnosticity condition, and gaze direction condition. Specifically, an emotion decoding \times diagnosticity \times gaze direction interaction is expected to emerge, such that when exposed to direct gaze social targets, decoding anger with high diagnosticity leads to greater attitude correctness than decoding anger with low diagnosticity and sadness with high diagnosticity. Also among direct gaze condition participants, decoding sadness with low diagnosticity should lead to greater attitude correctness than decoding sadness with high diagnosticity. On the other hand, when exposed to averted gaze social targets, decoding anger with high diagnosticity is expected to lead to lower levels of attitude correctness than decoding anger with low diagnosticity and sadness with high diagnosticity. Among these participants, decoding sadness with high diagnosticity should also lead to greater attitude correctness than decoding sadness with low diagnosticity. Differences in reports of attitude correctness between the two gaze direction conditions are expected due to differences in the ease of processing the two emotions depending on gaze direction. It is also hypothesized that participants for whom the emotional certainty appraisals are not diagnostic will not differ in their reports of attitude correctness.

Hypothesis II: It is hypothesized that attitude change will depend on the interaction between the emotion decoding condition, diagnosticity condition, and gaze direction condition. Specifically, an emotion decoding \times diagnosticity \times gaze direction

interaction is expected to emerge, such that the groups who are hypothesized to have greater levels of attitude certainty are also hypothesized to demonstrate less attitude change following persuasion than groups who are hypothesized to have lower levels of attitude certainty.

Hypothesis III. Given the prediction of two three-way interactions, it is hypothesized that attitude correctness will mediate the interactive effect of diagnosticity, emotion decoding, and gaze direction on attitude change following a persuasive message.

METHOD

Participants and Design

Two hundred and forty-nine participants (107 Male, 142 Female) from an introductory psychology participant pool participated in the current experiment. The experiment was conducted using a 2 (Emotion Decoding: anger vs. sadness) \times 2 (Diagnosticity of Certainty Appraisal: high vs. low) \times 2 (Gaze of Photographs: direct vs. averted) complete between-groups factorial design. Both attitude certainty and attitude change were measured as dependent variables.

Materials and Procedure

Participants completed a self-administered computer questionnaire using MediaLab software (Jarvis, 2006) on computers located in individual cubicles. Upon starting the experiment, participants learned that they would be participating in a “study concerning the impact of different kinds of music on visual and auditory memory.” All participants were informed that they would listen to music while learning new information that they would be asked to recall. They were informed that they would be receiving visual and auditory information simultaneously, and that they should attend to both streams of information for the purposes of a subsequent test. The information concerning memory testing was used as a cover story so that participants would be unaware of the true purpose of the study, thus reducing demand characteristics.

Attitude object. Following these instructions, participants listened to information about an attitude object. Specifically, they listened to an audio recording that included the following content: “The mandatory comprehensive exam policy is a new campus issue and this policy is currently being considered by university administrators. The mandatory

comprehensive exam policy would require all college seniors to pass a comprehensive exam in their major as a requirement for graduation. Wake Forest University administrators advocating for the exam policy argue that the policy would have several potential benefits. As with all policy changes made at the greater university level, it is possible that the mandatory comprehensive exam policy would have some drawbacks.”

Emotion decoding and gaze direction manipulations. While listening to this information, participants simultaneously viewed eight photographs of faces (five seconds each) adopted from Ekman and Friesen (1976). Participants were randomly assigned to one of two conditions. One condition viewed only angry faces and one condition viewed only sad faces. Additionally, participants were randomly assigned to view either photographs in which the gaze was directed toward the participants or photographs in which the gaze was directed away from participants. This manipulation was employed in order to assess whether the ease of identifying the emotional facial expressions based on gaze direction influenced reports of attitude certainty (Adams & Kleck, 2003). The subjects of the photographs were the same in both conditions; the only differences were the emotion being expressed and the gaze direction. An equal number of male and female faces were viewed in each condition (see Appendix A).

This information (both visual and auditory) was presented to all participants two consecutive times. Participants simultaneously listened to information about mandatory comprehensive exams and viewed emotional facial expressions so that the effects of decoding emotions during the attitude formation process could be assessed.

Diagnosticity manipulation. During this portion of the experiment, participants were also randomly assigned to one of two conditions as a manipulation of diagnosticity of certainty appraisals. The manipulation of diagnosticity was modeled directly from that employed by Schwarz et al. (1991; Experiment 3). Specifically, participants were exposed to soothing music during the certainty manipulation task. One half of the participants was assigned to the *certainty enhancing condition* and read in the instructions that the background music is known to facilitate clarity and certainty of thought, whereas the other half of the participants was assigned to the *certainty inhibiting condition* and read that the music inhibits clarity and certainty of thought. This manipulation was intended to vary the diagnosticity of subjective certainty appraisals arising from the ease of decoding anger and sadness. Because, in the direct gaze condition, relatively high [low] attitude certainty was expected to be associated with decoding angry [sad] faces, certainty (or uncertainty) appraisals arising from emotion decoding should be highly diagnostic for individuals who viewed photographs of anger and were in the certainty inhibiting condition and for individuals who viewed photographs of sadness and were in the certainty enhancing condition. On the other hand, certainty (or uncertainty) appraisals arising from emotion decoding should be nondiagnostic for individuals who viewed photographs of anger and were in the certainty enhancing condition and for individuals who viewed photographs of sadness and were in the certainty inhibiting condition. The opposite effects were expected for participants in the averted gaze condition.

Attitudes and attitude certainty. Following the emotional face manipulation and diagnosticity manipulation, participants reported their attitudes toward comprehensive exams and their certainty towards their attitude. Participants' attitudes toward

comprehensive exams were assessed at Time One (T1; before exposure to the persuasive message) and Time Two (T2; after exposure to the persuasive message) on seven semantic differential items using a 9-point response scale with the following anchor labels: *negative-positive*, *bad-good*, *unfavorable-favorable*, *dislike-like*, *undesirable-desirable*, *disapprove-approve* and *oppose-support*. These items were valenced such that higher scores indicated greater attitude favorability toward comprehensive exams. All seven items from each time point were averaged to form a single measure of attitudes toward comprehensive exams.

To assess attitude certainty, participants completed one item assessing their global attitude certainty toward the mandatory comprehensive exam policy. The item read, “*How certain are you of your attitude toward Mandatory Comprehensive Exams?*” This item was completed two times throughout the experiment, once after first learning about the mandatory comprehensive exam policy and once after being exposed to the persuasive message.

Participants’ attitude clarity was assessed using the following four items on a 1 (*Not certain at all*) – 9 (*Very certain*) response scale: “How certain are you that you know what your true attitude on this topic really is?” “How certain are you that the attitude you expressed toward Mandatory Comprehensive Exams really reflects your true thoughts and feelings?,” “To what extent is your true attitude toward Mandatory Comprehensive Exams clear in your mind?,” and “How certain are you that the attitude you just expressed toward Mandatory Comprehensive Exams is really the attitude you have?.” Participants responded to these items at T1 and T2; the four items from each time point were averaged to create a single measure of attitude clarity.

Participants' assessment of the correctness of their attitude toward mandatory comprehensive exams was assessed at T1 and T2 using the following three items on a 1 (*Not certain at all*) – 9 (*Very certain*) scale: “How certain are you that your attitude toward Mandatory Comprehensive Exams is the correct attitude to have?,” “To what extent would you say your attitude toward Mandatory Comprehensive exams is valid?,” and “How certain are you that your attitude toward Mandatory Comprehensive Exams is justified and rational?.” The three items from each time point were averaged to create a single measure of attitude correctness.

Persuasive message. After these reports, participants read a moderately strong persuasive message in favor of instituting the mandatory comprehensive exam policy adopted from Petty and Cacioppo (1986). Following this message, participants again rated their attitude toward comprehensive exams and their certainty toward that attitude on the measures described above.

Mood. Participants next completed measures of their current mood following T2 reports of attitude certainty. Mood was assessed using items from the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Participants rated items on a 1 (*Very slightly or not at all*) – 5 (*Extremely*) scale indicating the extent to which they were currently experiencing each affective state. The ten items measuring positive affect were averaged to create a single positive affect measure. The same was computed for the 10 items measuring negative affect. Participants also indicated specifically, on the same scale, the extent to which they felt sad or angry. Participants reported their emotions in order to assess how they were feeling in order to determine the

extent to which participants may have experienced the emotions displayed in the previously viewed photographs.

Manipulation checks. Following reports of mood, participants were asked to think back to the beginning of the study and report which emotion was expressed by the photographs they viewed. They had the choice to report one of six options: Happiness, Sadness, Fear, Anger, Disgust, and Neutral.

A manipulation check was also conducted in order to determine whether participants attended to the manipulation of diagnosticity. Participants were asked to report whether they were informed that the music would inhibit or facilitate clarity/certainty of thought on a 1 (*the music INHIBITS certainty/clarity*) to 9 (*the music FACILITATES certainty/clarity*) scale. Participants were also asked to report the extent to which they agreed with the following statements, “My level of certainty in my attitude toward the mandatory comprehensive exam policy was initially influenced by the music I heard while learning about the policy,” and “Due to the effect of the music, I became more/less certain of my attitude toward the mandatory comprehensive exam policy” using a 1 (*strongly DISAGREE*) to 9 (*strongly AGREE*) scale.

RESULTS

Preliminary Analyses

Sample descriptive statistics and intercorrelations. Sample descriptive statistics and variable intercorrelations of interest are displayed in Table I.

Table I

Variable	1	2	3	4	5	6	7	<i>M</i>	<i>SD</i>
1. Attitude Correctness (T1)	-							5.17	1.77
2. Attitude Correctness (T2)	.67*	-						5.67	1.71
3. Attitude Clarity (T1)	.73*	.46*	-					5.50	1.97
4. Attitude Clarity (T2)	.56*	.76*	.61*	-				6.18	1.78
5. GAC (T1)	.55*	.34*	.74*	.44*	-			5.61	2.06
6. GAC (T2)	.49*	.68*	.46*	.81*	.36*	-		6.19	1.85
7. Attitude Change	-.14*	-.02	-.17*	-.09	-.13*	-.09	-	1.12	1.52
8. Attitude Extremity	.42*	.28*	.49*	.32*	.55*	.20*	.05	1.67	1.14

Note: GAC = Global Attitude Certainty

* $p < .05$

Manipulation checks. The first manipulation check was conducted in order to determine whether participants attended to the manipulation of diagnosticity. A one-way analysis of variance (ANOVA) on this data revealed participants who were led to believe that the music would facilitate clarity/certainty reported a greater mean ($M = 7.05$, $SD = 2.47$) than participants who were led to believe that the music would inhibit clarity/certainty ($M = 2.34$, $SD = 2.28$), $F(1, 247) = 244.47$, $p < .001$. This difference indicates that the manipulation of the effect of the music was successful to the extent that participants attended to and recollected this information.

Participants were also asked to report the extent to which they agreed with the notion that their attitude certainty was influenced by the music ($M = 3.51$, $SD = 2.27$). A

2 (emotion decoding: sadness vs. anger) \times 2 (diagnosticity: high vs. low) ANOVA on this data revealed that there was no main effect of emotion decoding or diagnosticity and no interaction between emotion decoding and diagnosticity on reports of the influence of the music on attitude certainty, all $F_s < 1.10$, *ns*. Additionally, participants were asked to identify the degree to which they adjusted their level of certainty due to the effect of the music ($M = 4.74$, $SD = 1.34$). A two – way ANOVA on this data revealed that there was no main effect of emotion decoding or diagnosticity and no interaction between emotion decoding and diagnosticity on reports of the influence of the music on attitude certainty, all $F_s < 1.60$, *ns*.

Finally, participants were asked to identify the emotion conveyed in the photographs they viewed at the beginning of the study. A Chi-Square Test of Independence determined that there was a significant relationship between emotion decoding condition and emotion reports for participants in the direct and averted gaze conditions, $\chi^2(4, N = 249) = 123.65, p < .001$. Thus, the emotion decoding manipulation was successful.

Table II

Frequencies (Percentages) for Ratings of Emotions Displayed in Photographs

Gaze Condition	Emotion Decoding Condition	Happy	Sad	Fear	Anger	Disgust	Neutral
Direct Gaze	Anger	0(0)	0(0)	5(8.5)	23(39)	22(37.3)	9(15.3)
	Sadness	0(0)	39(59.1)	10(15.2)	0(0)	9(13.6)	8(12.1)
Averted Gaze	Anger	0(0)	0(0)	7(11.3)	15(24.2)	37(59.7)	3(4.8)
	Sadness	0(0)	22(35.5)	23(37.1)	2(3.2)	10(16.1)	5(8.1)

Mood. A one-way analysis of variance (ANOVA) was employed to examine differences in reported mood between the two emotion decoding conditions (i.e., PANAS scores). Participants in the sad condition ($M = 3.45$, $SD = .67$) did not significantly differ from participants in the anger condition ($M = 3.34$, $SD = .80$) on their reports of positive affect, $F(1, 247) = 1.30$, $p = .26$. Additionally, ratings of negative affect in the sad condition ($M = 1.85$, $SD = .55$) did not differ from reports of negative affect in the anger condition ($M = 1.84$, $SD = .60$), $F(1, 247) < 1$, *ns*.

Responding to more specific emotion items, participants in the sad condition ($M = 2.13$, $SD = 1.00$) did not significantly differ from participants in the anger condition ($M = 2.00$, $SD = 1.03$) on their ratings of sadness, $F(1, 247) < 1$, *ns*. Furthermore, participants in the sad condition ($M = 1.84$, $SD = .98$) also did not significantly differ from participants in the anger condition ($M = 1.79$, $SD = .99$) on their ratings of anger, $F(1, 247) < 1$, *ns*.

Primary Analyses

Attitude correctness. Consistent with previous research, attitude extremity was entered as a covariate in all subsequent analyses: previous research has shown that attitude extremity and attitude certainty are strongly correlated with each other, and the mechanism of interest in the current study is the unique effect of attitude certainty (Krosnick et al., 1993; Petrocelli et al., 2007). An attitude extremity variable was created by subtracting Attitude T1 from 5 (the midpoint of the scale). Thus, the farther away a score is from zero, the more extreme the attitude.

In order to test the hypothesis that attitude correctness depends on the interaction between the emotion decoding condition, diagnosticity condition, and gaze direction

condition, the attitude correctness (T1) data were subjected to a 2 (Emotion Decoding: anger vs. sadness) \times 2 (Diagnosticity of Certainty Appraisal: high vs. low) \times 2 (Gaze of Photographs: direct vs. averted) three-way analysis of co-variance (ANCOVA), controlling for attitude extremity. The covariate was significant, $F(1, 240) = 55.08, p < .001$, indicating that attitude extremity and attitude correctness are strongly correlated, $r(247) = .42, p < .001$. There were no significant main effects or two-way interactions (all $F_s < 1, p_s > .05$). Consistent with expectations, a significant three-way interaction emerged, $F(1, 240) = 5.18, p = .02$.

In order to examine the three-way interaction, two-way interactions (emotion decoding condition \times diagnosticity) were tested for participants in the direct and averted gaze conditions using the error term of the three-way ANCOVA. A significant emotion decoding condition \times diagnosticity condition (High vs. Low) emerged for participants in the direct gaze condition, $F(1, 240) = 4.08, p < .05$ (see top panel of *Figure 1*). Although no pairwise contrasts reached statistical significance, the pattern of results was consistent with the hypotheses. Participants who decoded sadness in the high diagnosticity condition reported marginally lower levels of attitude correctness than participants who decoded sadness in the low diagnosticity condition, $t(240) = -1.85, p < .08$. There was no significant difference in attitude correctness between participants who decoded anger in the high diagnosticity condition and participants who decoded anger in the low diagnosticity condition $t(240) = 1.03, p = .35$. Additionally, there was no significant difference in attitude correctness between participants who decoded anger in the high diagnosticity condition and participants who decoded sadness in the high diagnosticity condition, $t(240) = -1.37, p = .18$. Finally, there was no significant difference in attitude

correctness between participants who decoded anger in the low diagnosticity condition and participants who decoded sadness in the low diagnosticity condition, $t(240) = 1.49$, $p = .15$. The two-way interaction (emotion decoding condition \times diagnosticity) for the averted gaze condition did not reach significance, $F(1, 240) = 1.51$, ns , although the pattern of results is consistent with hypotheses (see bottom panel of *Figure 1*).

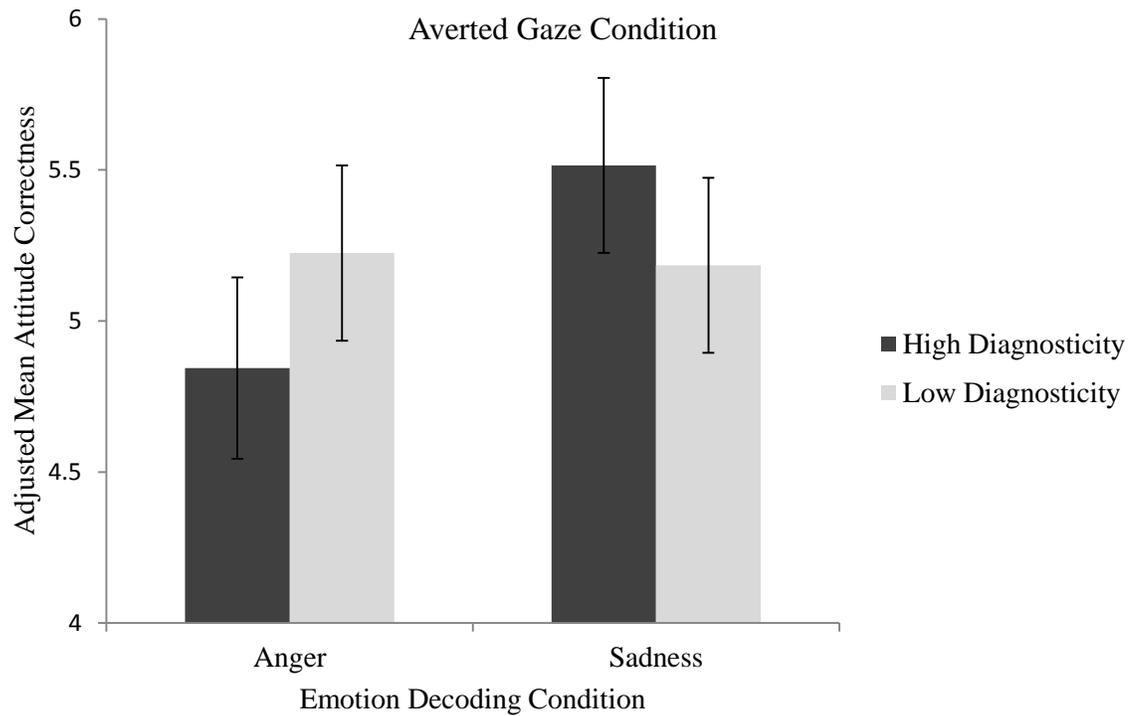
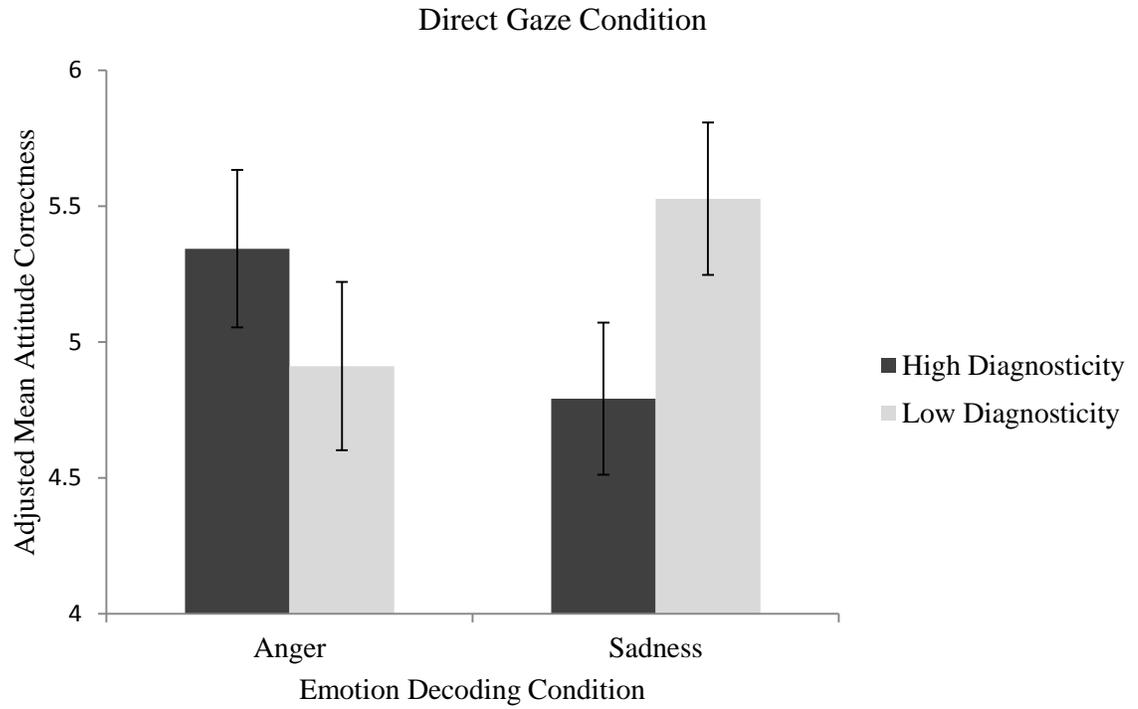
Also of interest was the emotion decoding \times gaze direction interaction for the high and low diagnosticity conditions. A significant emotion decoding \times gaze direction interaction emerged among participants in the high diagnosticity condition, $F(1, 240) = 4.49$, $p < .05$.

Although no pairwise contrasts reached statistical significance, the pattern of results was consistent with hypotheses. Participants who decoded anger in the direct gaze condition reported as much attitude correctness as participants who decoded anger in the averted gaze condition $t(240) = -1.21$, $p = .25$. Conversely, participants who decoded sadness in the averted gaze condition reported marginally greater attitude correctness than participants who decoded sadness in the direct gaze condition, $t(240) = 1.80$, $p < .08$. The two-way interaction (emotion decoding \times gaze direction) for the low diagnosticity condition did not reach statistical significance $F(1, 240) = 1.30$, ns , although the pattern of results is consistent with the hypotheses.

Attitude change. In order to test the hypothesis that attitude change depends on the interaction between the emotion decoding condition, diagnosticity condition, and gaze direction condition, the attitude change data were subjected to a 2 (Emotion Decoding: anger vs. sadness) \times 2 (Diagnosticity of Certainty Appraisal: high vs. low) \times 2 (Gaze of Photographs: direct vs. averted) three-way ANCOVA, controlling for attitude extremity.

Figure 1

Attitude Correctness as a Function of Emotion Decoding and Diagnosticity



The covariate was not significant, $F(1, 240) < 1, p = .77$. There were no significant main effects or two-way interactions (all $F_s < 2.5, p_s > .05$). Consistent with expectations, a significant three-way interaction emerged, $F(1, 240) = 5.51, p = .02$.

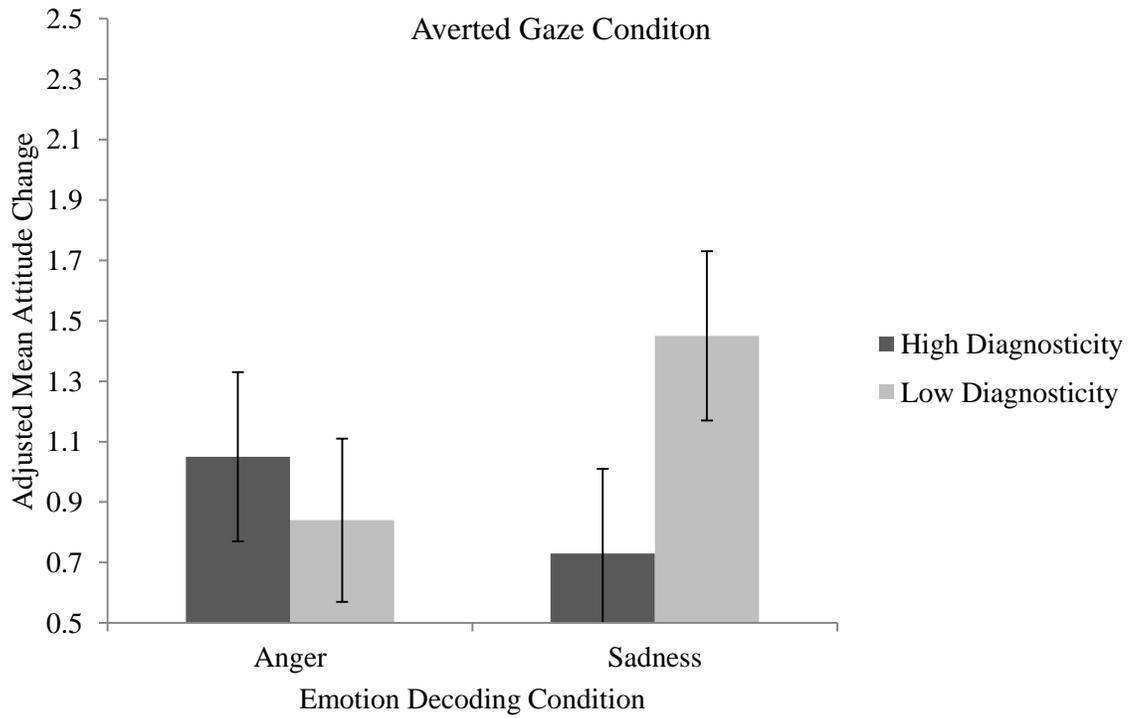
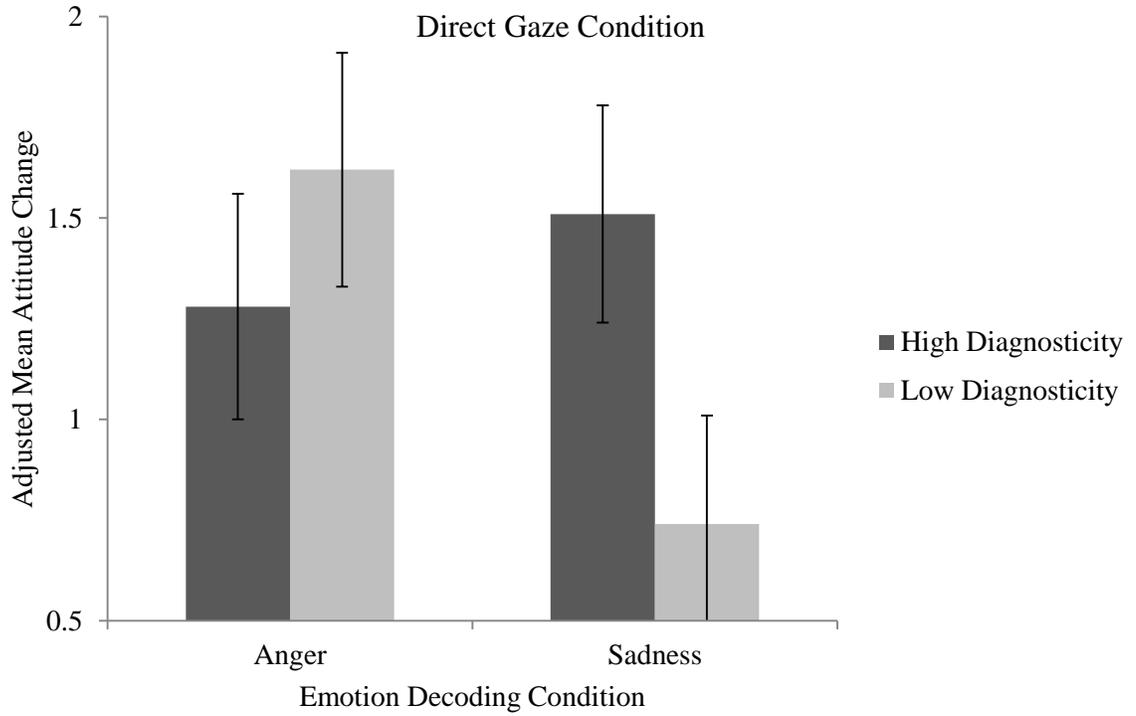
In order to explain the three-way interaction, two-way interactions (emotion decoding condition \times diagnosticity) were tested for participants in the direct and averted gaze conditions (see *Figure 2*). Although the pattern of results was consistent with hypotheses, neither the two-way interaction for the direct gaze condition, $F(1, 240) = 2.66, p = .15$, nor the two-way interaction for the averted gaze condition, $F(1, 240) = 2.96, p < .10$, reached statistical significance.

It was also of interest to examine the two-way emotion decoding \times gaze direction interaction for the high and low diagnosticity conditions. There was no significant emotion decoding \times gaze direction interaction for participants in the high diagnosticity condition, $F(1, 240) = 1.03, ns$.

However, there was a significant emotion decoding \times gaze direction interaction for participants in the low diagnosticity condition, $F(1, 240) = 5.45, p < .05$. Although the pattern of results is consistent with hypotheses, none of the pairwise contrasts reached significance. Participants who decoded sadness in the averted gaze condition changed their attitude marginally more than participants who decoded sadness in the direct gaze condition, $t(240) = 1.87, p < .07$. Participants who decoded anger in the averted gaze condition changed their attitude to the same degree as participants who decoded anger in the direct gaze condition, $t(240) = -1.26, p = .30$. Additionally, participants who decoded sadness in the averted gaze condition changed their attitude to the same degree as participants who decoded anger in the averted gaze condition, $t(240) = -1.61, p = .11$.

Figure 2

Attitude Change as a Function of Emotion Decoding and Diagnosticity



Finally, participants who decoded sadness in the direct gaze condition changed their attitude to the same degree as participants who decoded anger in the direct gaze condition, $t(240) = 1.51, p = .14$.

Mediation analysis. Mediated moderation, as described by Muller, Judd, and Yzerbyt (2005; see also Wegener & Fabrigar, 2000), occurs when distal variables interact to influence a mediator variable, with that mediator directly carrying the effects of the interacting variables to the dependent measure. Parallel emotion decoding \times diagnosticity \times gaze direction interactions on attitude correctness and attitude change are consistent with attitude correctness mediating the emotion decoding \times diagnosticity \times gaze direction interaction on attitude change. This type of mediated moderation would be reflected in the observed emotion decoding \times diagnosticity \times gaze direction interaction on attitude correctness, coupled with a direct relationship between attitude correctness and attitude change.

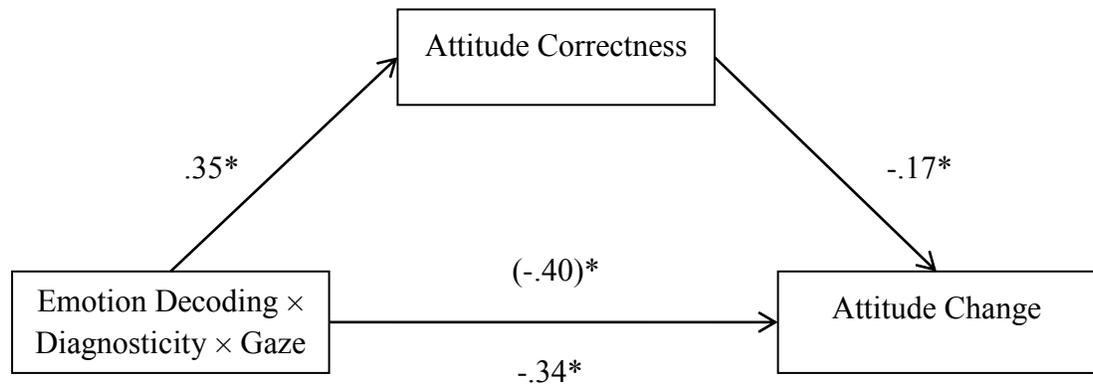
Muller et al. (2005) specified a set of hierarchical regression analyses (see also Wegener & Fabrigar, 2000) in which the interaction term (controlling for the main effects) is used as the initial predictor. The most conventional and efficient way to conduct this analysis involves a bootstrap procedure that constructs bias-corrected confidence intervals based on 5,000 random samples with replacement from the full sample, as recommended by methodologists and statisticians (Preacher & Hayes, 2004, 2008). This method tests whether or not the size of an indirect effect differs significantly from zero.

As described earlier, I obtained a significant emotion decoding \times diagnosticity \times gaze direction interaction on attitude correctness and attitude change. I computed a final

regression analysis including the effects of all the distal predictors on the criterion (attitude change) as reported in the previous regression and the mediator (attitude correctness). The size of the indirect effect was $-.27$ ($SE = .18$), and the 95% confidence interval excluded zero, 95% CI $[-.76, -.02]$. Thus, attitude correctness significantly mediated the relationship between the emotion decoding \times diagnosticity \times gaze direction interaction and attitude change (see *Figure 3*).

Figure 3

Mediation of the relationship between the three-way interaction (emotion decoding \times diagnosticity \times gaze direction) and attitude change by attitude correctness.



Note. The emotion processing conditions were dummy-coded using 0 for sadness and 1 for anger. The diagnosticity conditions were dummy-coded using 0 for Low Diagnosticity and 1 for High Diagnosticity. The gaze direction conditions were dummy-coded using 0 for Averted and 1 for Direct. Values displayed are standardized regression coefficients.

$*p < .05$

DISCUSSION

The current investigation provides evidence in favor of the primary hypotheses. The expected three-way (emotion decoding \times diagnosticity \times gaze direction) interactions for both attitude correctness and attitude change were obtained. Additionally, attitude correctness served as a significant mediator of the relationship between the three-way interaction and attitude change. Although some of the condition – by – condition comparisons within the three-way interactions did not reach statistical significance, the pattern of results supports the primary hypotheses.

It was hypothesized that participants for whom emotion decoding was easy and who were informed that the music should inhibit clarity and certainty of thought (such that the effect of the music should be to discount their predisposition to feel certain) would report greater attitude certainty and change their attitude less following persuasion than participants for whom emotion decoding was difficult and who were informed that the music should facilitate clarity and certainty of thought (such that the effect of the music should be to discount their predisposition to feel uncertain). In other words, it was hypothesized that participants in the direct gaze condition who decoded anger would make appraisals of certainty, and when informed that the music should inhibit certainty (such that the certainty appraisals were diagnostic), they would be likely to misattribute their certainty appraisals to attitude correctness, and be less likely to change their attitude following persuasion. It was also hypothesized that participants in the direct gaze condition who decoded anger and were informed that the music should facilitate certainty (such that the certainty appraisals were nondiagnostic), would attribute their feelings of certainty to the effect of the music, not transfer certainty appraisals to reports of attitude

correctness, and would change their attitude to a relatively substantial degree following persuasion. The observed data support these hypotheses, particularly that certainty appraisals arising from emotion decoding may be misattributed to attitude certainty, but only when those certainty appraisals are diagnostic. In other words, these data are consistent with the reasoning underlying earlier research on misattribution processes (Schwarz et al., 1991; Schwarz & Clore, 1983); when participants who decoded anger in the direct gaze condition were given a source for the amount of certainty they were feeling as a result of emotion decoding (music that facilitates clarity and certainty of thought), their feelings of certainty were not misattributed to certainty toward the attitude object, but were likely attributed to the supposed source of the certainty (music). On the other hand, when participants were not given a source for the amount of certainty they were feeling as a result of emotion decoding (music that inhibits clarity and certainty of thought), they misattributed their general feelings of certainty to certainty toward the attitude object.

The opposite pattern was expected, and observed, for participants who were exposed to direct gaze social targets and decoded sadness (such that emotion decoding was difficult). It was hypothesized that participants who decoded sadness would make appraisals of uncertainty, and when informed that the music should facilitate certainty (such that the uncertainty appraisals were diagnostic), they would be likely to misattribute the uncertain appraisals to lower attitude correctness and thus be more likely to change their attitude following persuasion. It was also hypothesized that participants who decoded sadness and were informed that the music should inhibit certainty (such that the uncertainty appraisals were nondiagnostic) would be likely to attribute their feelings

of uncertainty to the effect of the music, not transfer their feelings of uncertainty to lower attitude correctness, and change their attitude to a greater degree following persuasion. The observed data support these hypotheses, particularly that certainty appraisals arising from emotion decoding may be misattributed to attitude certainty, but only when those certainty appraisals are diagnostic. In other words, these data are again consistent with the reasoning underlying earlier research on misattribution processes (Schwarz et al., 1991; Schwarz & Clore, 1983); when participants who decoded sadness were given a source for the amount of uncertainty they were feeling as a result of emotion decoding (music that inhibits clarity and certainty of thought), their feelings of uncertainty were not misattributed to uncertainty toward the attitude object, but were likely attributed to the supposed source of the uncertainty (music). On the other hand, when participants were not given a source for the amount of uncertainty they were feeling as a result of emotion decoding (music that facilitates clarity and certainty of thought), they misattributed their general feelings of uncertainty to uncertainty toward the attitude object.

Key to this investigation, the patterns described above emerged only for those who viewed photographs in which the gaze was directed toward the participant. The opposite patterns emerged for participants who viewed photographs in which the gaze was averted away from the participant. For those exposed to averted gaze social targets, participants who decoded anger (such that emotion decoding was difficult) with high diagnosticity reported nonsignificantly lower attitude correctness and nonsignificantly greater attitude change than participants who decoded anger with low diagnosticity. Additionally, for those exposed to averted gaze social targets, participants who decoded sadness (such that emotion decoding was easy) with high diagnosticity reported

nonsignificantly greater levels of attitude certainty and nonsignificantly lower attitude change following persuasion than those who decoded sadness with low diagnosticity. In line with prior research (Adams & Kleck, 2003; Tormala et al., 2011), these findings suggest that the key factor determining whether certainty appraisals will be misattributed to attitude correctness is not necessarily the specific emotion decoded during attitude formation, but is more specifically the ease with which each emotion can be decoded.

According to research conducted by Adams and Kleck (2003), facial expressions depicting approach emotions, such as anger, are more quickly and easily identified when gaze is directed forward, whereas facial expressions depicting avoidance emotions, such as sadness, are more quickly and easily identified when gaze is averted to the side. Furthermore, Tormala et al. (2011) suggested that ease of processing information relevant to an attitude object often increases levels of attitude certainty toward that attitude object. These two lines of research, considered in tandem, suggest that decoding facial expressions of anger should be easier when gaze is directed forward than when gaze is averted, and thus greater attitude certainty should result from decoding direct gaze expressions of anger. Additionally, decoding facial expressions of sadness should be easier when gaze is averted than when gaze is directed forward, and thus greater attitude certainty should result from decoding averted gaze expressions of sadness. The pattern of results obtained in the current investigation supports this assertion. The effect of the emotion manipulation on attitude correctness depended on gaze direction, suggesting that the emotion itself was not the key determinant of whether the appraisals generated from decoding were more or less certain. Rather, the evidence suggests that the ease or difficulty with which the emotional facial expressions are

decoded signals whether participants will form appraisals of certainty or appraisals of uncertainty.

These results are relevant to the literature on emotion appraisals. Emotion researchers have loosely defined the emotional appraisal dimension of certainty as feeling more or less certain about the predictability of future events (Lerner & Keltner, 2001; Smith & Ellsworth, 1985). For example, experiencing anger should lead one to feel negative and certain about a situation, whereas experiencing sadness should lead one to feel negative and uncertain about a situation. Although both of these emotions indicate negative feelings, they differ on the amount of certainty they generate. These researchers have demonstrated that anger is associated with appraisals of certainty and that sadness is associated with appraisals of uncertainty; however, there has been no comprehensive explanation concerning the certainty-anger/uncertainty-sadness links. Results in the current investigation suggest that ease of decoding emotions may be one explanation for the associations between anger and a subjective sense of certainty and sadness and a subjective sense of uncertainty.

Although reports of attitude correctness differed based on whether participants decoded anger or sadness with direct or averted gaze and whether participants were informed that the background music would facilitate or inhibit clarity and certainty of thought, participants in these conditions did not differ in their reports of whether the music influenced their level of certainty or whether they adjusted their level of certainty due to the effects of the music. One possibility for this lack of difference among groups is that participants were unaware that their reports of attitude correctness were influenced by the ease of emotion decoding and the supposed effects of the

background music. This information is consistent with a classic study conducted by Nisbett and Wilson (1977), which provided evidence that people are often unaware of how stimuli affect their reactions. These researchers suggest that people may not have awareness of the stimulus, awareness of the response, or awareness of the relationship between the stimulus and the response. In the current investigation, it is possible that participants were relatively unaware of how emotion decoding influenced their attitude certainty. However, participants appeared to be clear with regard to their subjective sense of attitude certainty and adjusted it on the basis of the information they were given about the effect of the music. Establishing whether or not participants are aware of the relationship between ease of emotion decoding and subsequent reports of attitude certainty should be a goal for future research in this area.

The current investigation also provides evidence that emotion decoding should be considered an antecedent to attitude certainty. This is a notable finding because previous research has not considered emotional influences of any kind as antecedents to attitude certainty (Gross et al., 1995; Tormala & Rucker, 2007). The current investigation suggests that simply encountering a person who is experiencing an emotion may influence the strength of an attitude, particularly the amount of certainty associated with that attitude. Additionally, this investigation provides evidence that attitude certainty arising from emotion decoding has the same consequences as attitude certainty that results from previously studied cognitive antecedents of attitude certainty (e.g., social consensus, cognitive elaboration), particularly with respect to response to persuasion.

Notably, although decoding emotions of social targets during attitude formation influenced attitude change following persuasion, participants did not report

feeling the emotion they decoded. In other words, those who decoded sadness [anger] during attitude formation did not report feeling greater sadness [anger] than those who decoded anger [sadness] during attitude formation and vice versa. Thus, the effect of decoding the emotions of social targets on resistance to persuasion does not appear to be driven by the elicitation of the emotion, and instead appears to be driven by certainty appraisals generated by the ease or difficulty of decoding emotions. Previous research has examined the effects of an elicited emotion on resistance to persuasion and has shown that people's emotional experiences influence persuasion (Briñol et al., 2007; Petty et al., 1993; Wegener et al., 1995; Worth & Mackie, 1989). However, the current study suggests that simply decoding an emotion during attitude formation has implications for resistance processes during persuasion.

Applications

The current investigation also has implications for applied settings. Previous research has suggested that in order for emotions to influence persuasion, emotions must be elicited and people must be able to identify the emotion they are experiencing (Petty et al., 1993; Wegener et al., 1995; Worth & Mackie, 1989). The current data, however, suggest that people do not have to experience an emotion in order for emotions to influence persuasion and that exposure to social targets experiencing a particular emotion while learning about a novel idea is sufficient to influence persuasion. Thus, a marketer whose goal is to influence attitudes toward products through the use of emotional appeals may not need to be concerned with eliciting a particular emotion in targets of persuasion. Rather, he or she may simply need to expose targets of persuasion to people experiencing the desired emotion. In other words, it is not necessary to make someone feel anger while

they are learning about a new idea in order to make them certain about their attitude toward that idea. Simply exposing someone to an angry social target while they are learning about a new idea may be sufficient to make them more certain about their attitude toward the new idea.

This investigation also has implications for public speakers who seek to persuade their audience. Previous research has demonstrated that the tone with which a speaker informs their audience influences whether the audience will be susceptible to changing their attitude following exposure to the speaker (Hovland, Jarvis, & Kelley, 1953). Perhaps one mechanism through which the speaker's tone influences attitude change is the amount of certainty elicited in the audience, depending upon the emotional tone of the speaker.

Limitations

Although the current investigation provides support for the general hypotheses, there are several limitations that should be considered. The data suggest that decoding emotions of social targets led participants to misattribute emotional certainty appraisals to feelings of certainty toward a specific attitude object. It is possible that emotion decoding during attitude formation affected mechanisms in addition to attitude certainty that also influence resistance to persuasion. For example, decoding emotions of social targets during attitude formation may influence the quality of counterarguments to the persuasive message or the amount of information processing participants engage in during the presentation of the persuasive message. Tiedens and Linton (2001) provided evidence that experiencing emotions associated with different levels of certainty influenced whether participants engaged in systematic or heuristic processing of a

persuasive message. Thus, it would be informative to measure these additional potential mediators of the effects of emotion decoding during attitude formation on resistance to persuasion to better understand why decoding emotions of social targets influences persuasion.

Additionally, this research suggests that emotion decoding during attitude formation influenced resistance to persuasion, even though participants did not report feeling the primed emotions. Participants did not report their current emotional state until the end of the experiment. A considerable amount of time elapsed between the emotion decoding manipulation and reports of emotional states. It is unclear based on the current study whether the primed emotions were elicited in participants during their reports of attitude certainty and then wore off by the end of the study. Future studies may need to measure emotional states directly following the emotion decoding manipulation and attitude formation stages rather than at the end of the study.

Future Directions

Future research would do well to examine the effects of additional manipulations of affect during attitude formation in order to further investigate the relationship between ease of decoding emotions and attitude certainty. The current investigation suggests that ease of decoding is an important determinant of the amount of certainty generated by exposure to emotion during attitude formation. Future research could employ different emotion manipulations that do not involve social targets in order to further understand whether ease of decoding emotions is the primary determinant of whether appraisals will be more or less certain. For example, emotion could be manipulated during attitude formation such that participants listen to angry or sad music

while reading about a novel attitude object. Bierley, McSweeney, and Vannieuwkerk (1985) demonstrated that pairing favorable music with a neutral stimulus is a successful form of evaluative conditioning, such that people find originally neutral stimuli paired with favorable music more preferable than neutral stimuli not paired with favorable music. Thus another way to examine the influence of emotion encountered during attitude formation on attitude certainty and persuasion may be to process emotionally laden music during attitude formation.

The current investigation solely examined the effects of decoding sadness and anger during attitude formation on attitude certainty and response to persuasion. Future research should examine whether social decoding of additional emotions that are associated with certainty appraisals (e.g., fear, hope) also influences attitude certainty and response to persuasion, and whether such influence depends on gaze direction. This would further contribute to evidence concerning the characterization of emotions in terms of cognitive appraisals as promoted by Lerner and Keltner (2000) and Smith and Ellsworth (1985), among others.

Another potential antecedent of misattributed attitude certainty may have nothing at all to do with emotion. That is, could any easy or difficult cognitive process (e.g., adding small numbers vs. performing long division), running parallel to processing information about a novel attitude object, affect attitude certainty? This is an important question for future research.

Future research should also examine additional consequences of attitude certainty, such as the attitude-behavior link, in terms of affectively formed attitudes. The current investigation suggests that attitude certainty arising from emotion decoding

during attitude formation has the same consequences as other, non-emotionally based attitude certainty in terms of resistance to persuasion. It is important also to understand whether emotionally based attitude certainty has similar consequences to cognitively formed attitude certainty in domains other than resistance to persuasion.

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APPENDIX A

Persuasive Message

“A study conducted by the Educational Testing Service of Princeton, New Jersey revealed that many universities are considering adopting comprehensive exams. Thus, any university that adopted the exams could be at the forefront of a national trend. Some professors at schools with the exams who were interviewed felt that high school students would be impressed by a university that kept pace with current trends. In fact, whether or not a school had a comprehensive exam might be a determining factor in their choice of a university. Therefore, the applications to universities with the exams should increase as the information about the exams spreads among high school students.

Additionally, an interesting and important feature of the comprehensive exam requirement is that it has led to a significant improvement in the quality of undergraduate teaching in the schools where it has been tried. Data from the Educational Testing Service confirm that teachers and courses at the schools with comprehensive exams were rated more positively by students after the exams than before. The improvement in teaching effectiveness appears to be due to departments placing more emphasis on high quality and stimulating teaching because departments look bad when their majors do poorly on the exam. For example, at the University of Florida, student ratings of courses increased significantly after comprehensive exams were instituted.”

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EDUCATION

Wake Forest University, Winston-Salem, NC
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Thesis: *Attitude Certainty is a Subjective Feeling State: Misattributions of Emotion Decoding Affect Attitude Certainty and Response to Persuasion*

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GPA: 3.58 Psychology GPA: 3.58
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HONORS AND AWARDS

Burt's Scholar in Psychology, 2011, Furman University
Furman Advantage Research Grant, 2010, Furman University
Psi Chi Honor Society, 2009, Vice President, Furman University
Phi Eta Sigma, 2008, Furman University

PUBLICATIONS

Petrocelli, J. V., Clarkson, J. J., Whitmire, M. B., & Moon, P. E. (in press). When $ab \neq c - c'$: Published errors in the reports of single mediator models. *Behavior Research Methods*.

PROFESSIONAL PRESENTATIONS

Whitmire, M. B., & Petrocelli, J.V. (2013, January). *Attitude certainty is an emotion: Misattributions of emotion decoding affect attitude certainty and response to persuasion*. Poster to be presented at Society for Personality and Social Psychology 2013, New Orleans, LA.

Whitmire, M. B. (2011, May). *Perceptions of Type I and Type II Diabetes: The influence of perceived controllability of the disease*. Research paper presented at Furman Engaged! Research Day, Furman University, Greenville, SC.

Pontari, B., McCallum, B., Whitmire, M. B., & Bennett, L. *The presence of friends and strangers during social interaction: Helpful or hurtful for the socially anxious?*
Poster presented at the following conferences:
Society for Personality and Social Psychology, 2011, January, San Antonio, TX
Society of Southeastern Social Psychologists, 2010, October, Charleston, SC
Furman University/Davidson Summer Conference, 2010, July, Davidson, NC

RESEARCH EXPERIENCE

Graduate Research Assistant, Dr. John V. Petrocelli, Wake Forest University, Fall 2011-Present

- Designed studies assessing the effects of emotion decoding during attitude formation on attitude certainty and resistance to persuasion
- Designed studies using MediaLab software
- Examined two social psychology journals for errors in the reports of single mediator models

Research Assistant, Dr. Beth Pontari, Furman University, Spring 2010- Spring 2011

- Collected data for a study examining the effects of the presence of friends or strangers on the social interactions of socially anxious individuals
- Analyzed data using SPSS
- Presented data in the form of a poster at two conferences

TEACHING EXPERIENCE

Lab Instructor, Research Methods in Psychology, Wake Forest University, Fall 2011-Present

- Teaches weekly lab meetings
- Instructs students in how to examine correlation and regression in SPSS
- Grades scientific research reports
- Assists with development of exam questions

COMPUTER AND LABORATORY SKILLS

- Proficient in SPSS
- Proficient in MediaLab
- Proficient in Qualtrics

COURSEWORK

Graduate: Social Psychology, Cognitive Psychology, Developmental Psychology, Personality Psychology, Biological Psychology, Seminar in Self-Regulation, Research Design and Analysis I and II

Undergraduate: Introduction to Psychology, Research Methods I and II, Social Psychology, Health Psychology, Developmental Psychology, Learning, Biological Psychology, Behavior Disorders, Memory and Cognition, History and Systems