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Emotion Decoding and Incidental Processing Fluency as Antecedents of Attitude Certainty

John V. Petrocelli[1] and Melanie B. Whitmire[1]

Abstract

Previous research demonstrates that attitude certainty influences the degree to which an attitude changes in response to persuasive appeals. In the current research, decoding emotions from facial expressions and incidental processing fluency, during attitude formation, are examined as antecedents of both attitude certainty and attitude change. In Experiment 1, participants who decoded anger or happiness during attitude formation expressed their greater attitude certainty, and showed more resistance to persuasion than participants who decoded sadness. By manipulating the emotion decoded, the diagnosticity of processing fluency experienced during emotion decoding, and the gaze direction of the social targets, Experiment 2 suggests that the link between emotion decoding and attitude certainty results from incidental processing fluency. Experiment 3 demonstrated that fluency in processing irrelevant stimuli influences attitude certainty, which in turn influences resistance to persuasion. Implications for appraisal-based accounts of attitude formation and attitude change are discussed.

Keywords

attitude, attitude certainty, persuasion, emotion decoding, emotion appraisal

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Emotion plays an important role in the formation, maintenance, and change of attitudes. Particular research attention has been paid to the role of mood in the persuasive process (Briñol, Petty, & Barden, 2007; Mackie & Worth, 1989; Petty, Schumann, Richman, & Strathman, 1993; Wegener, Petty, & Klein, 1994; Wegener, Petty, & Smith, 1995; Worth & Mackie, 1987). Also, receiving attention is the role of emotion in the formation of attitudes; research typically reveals that moods influence evaluations of attitude objects, information processing, and the retrieval of information from memory (see Martin, 2000). In addition, emotions can influence attitude favorability (Petty et al., 1993), 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). Previous research also demonstrates that mood experienced while processing a persuasive appeal influences the processing of particular cues in persuasive messages, particularly when the central/systematic routes to persuasion are activated (Petty et al., 1993; Wegener et al., 1994; Wegener et al., 1995). In a series of studies, Briñol et al. (2007) demonstrated that emotions experienced after the presentation of a persuasive message influenced subsequent ratings of thought confidence (i.e., confidence in the thoughts one generates in response to pro- or counterattitudinal content).

However, consistent with research conducted by Weisbuch, Pauker, and Ambady (2009), we suggest that people do not actually need to experience emotion for emotional stimuli to influence attitude formation and maintenance. Specifically, we propose that simply decoding the emotions expressed by the faces of social targets (i.e., interpreting the meaning of nonverbal behavior expressed by others; Ekman & Friesen, 1971; Zuckerman, Lipets, Koivumaki, & Rosenthal, 1975) can influence attitude formation and attitude stability.[1] The purpose of the current research is twofold: (a) to investigate the possibility that emotional decoding, *during attitude formation*, influences attitude certainty and attitude stability; and (b) to better understand how emotion decoding influences attitude certainty and attitude stability.

[1]Wake Forest University, Winston-Salem, NC, USA

Corresponding Author:
John V. Petrocelli, Department of Psychology, Wake Forest University, P.O. Box 7778, Winston-Salem, NC 27109, USA.
Email: petrocjv@wfu.edu

Attitude Certainty

Attitude certainty is a metacognitive component of attitude strength and is defined as the subjective sense of how certain, clear, and correct one is about an attitude held toward a specific object (Gross, Holtz, & Miller, 1995; Petrocelli, Tormala, & Rucker, 2007). Attitude certainty is an important component of attitude strength because it has several notable consequences. Attitudes held with high levels of certainty are more likely to predict behaviors consistent with those attitudes than attitudes not held with certainty (Fazio & Zanna, 1978; Rucker & Petty, 2004; Tormala & Rucker, 2007). Attitudes held with high certainty are also likely to persist over longer periods of time and resist persuasion than attitudes held with low certainty (Gross et al., 1995; Tormala & Rucker, 2007).

Antecedents of attitude certainty include repetition, accessibility, cognitive elaboration, and social consensus (Gross et al., 1995; Petrocelli et al., 2007; Tormala, DeSensi, Clarkson, & Rucker, 2009; Visser & Mirabile, 2004). Although such antecedents appear to be suggestive of a very cognitive construct, we propose that attitude certainty is best thought of as a subjective feeling state. Essentially, we believe that attitude certainty functions more like a feeling (about one's attitude) than it does a cognition or a fact. People feel certain for many different reasons, several of which are clearly not based on fact or rationality. Furthermore, people often express that they "feel certain" rather than "think certain," If attitude certainty does function as a subjective feeling state, it should be possible to demonstrate that attitude certainty can be inferred from almost any source of subjective ease/difficulty experienced during attitude formation.

Attitude Certainty From Emotion Decoding

Of interest to the current research is the possibility that attitude certainty is influenced by emotion decoding during attitude formation. There are at least three theoretical reasons, each with multiple explanations, to expect emotion decoding, during attitude formation, to influence attitude certainty. These possibilities include emotion certainty, emotion valence, and incidental processing fluency.

Emotion Certainty

Attitude certainty may be influenced by the *emotion certainty* activated during the process of emotion decoding. Consistent with this view is Smith and Ellsworth's (1985) cognitive appraisal model, which posited that specific emotions are characterized by distinct components that act to orient an individual to the surrounding environment. Accordingly, emotions vary along at least six dimensions, including certainty, pleasantness, 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. They provided evidence that sadness is characterized by relatively uncertain appraisals, whereas anger and happiness are characterized by relatively certain appraisals (also see Lerner & Keltner, 2000). Thus, one possibility creating a link between emotion decoding and attitude certainty is that decoding emotions during attitude formation may influence subsequent judgments, such that emotion appraisals of certainty are misattributed to attitude certainty. Appraisals of certainty (uncertainty), arising from decoding anger or happiness (sadness) during attitude formation, may be misattributed to relatively high (low) certainty toward a new attitude.

Also in line with the emotion certainty alternative, the linking of activated certainty or doubt with attitudes could be the result of attribute conditioning (Förderer & Unkelbach, 2016). Attribute conditioning (i.e., changes in the perceived attributes of a stimulus that are associated with the attributes of another stimulus) can occur when a stimulus is repeatedly paired with another stimulus possessing salient attributes. For example, people begin to associate athleticism with an otherwise nonathlete if the nonathlete is repeatedly paired with an athlete. Thus, attitude certainty may be shaped by the attributes associated with the emotions decoded during attitude formation.

Emotion Valence

If emotions are differentially associated with certainty, another possibility is that attitude certainty may be influenced through *emotion valence*. Consistent with this view are demonstrations of the evaluative conditioning of attitudes (De Houwer, Thomas, & Baeyens, 2001; Olson & Fazio, 2001; Walther & Langer, 2008). Essentially, associative learning can occur by pairing a positively (negatively) evaluated attitude object with a novel attitude object is sufficient for the formation of a positive (negative) attitude toward the novel object, even though beliefs may not be accessed or changed during this process (Jones, Fazio, & Olson, 2009; Olson & Fazio, 2001; Walther & Langer, 2008; Walther, Nagengast, & Trasselli, 2005). Research suggests that evaluative conditioning can occur without awareness of the co-occurrence of the novel attitude object and the valence of the stimuli, and thus, it is not necessary that beliefs about the novel attitude object be formed.

Another possibility, consistent with the emotion valence view, involves the process of affective validation (Rucker, Tormala, Petty, & Briñol, 2014). From this view, one's personal subjective experience is believed to validate or invalidate his or her attitude. Although positively (negatively) valenced emotions often validate (invalidate) one's attitude (Briñol et al., 2007), any feelings surrounding the retrieving, using, and/or thinking about one's attitude may be used to validate or invalidate the attitude. Thus, attitude certainty as a function of assessing how one feels about his or her attitude

(e.g., liking or disliking one's attitude) is evidence of affective validation. If evaluative conditioning procedures create a liking (or disliking) of one's attitude, then corresponding effects on attitude certainty would be consistent with an affective validation process.

Incidental Processing Fluency

Attitude certainty may be influenced by emotion decoding during attitude formation through *incidental processing fluency*. Research suggests that relatively favorable evaluations can be inferred from subjective feelings of processing fluency or ease in processing (Jacoby, 1983; Schwarz et al., 1991). 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 actual frequency of exposure. Research on the link between ease/difficulty and certainty typically shows that feelings of ease or fluency lead to greater certainty than do feelings of difficulty (e.g., Gill, Swann, & Silvera, 1998; Haddock, Rothman, Reber, & Schwarz, 1999; Simmons & Nelson, 2006; Tormala, Petty, & Briñol, 2002). Furthermore, ease in recognizing emotions does vary across universally expressed emotions (Adams, Ambady, Macrae, & Kleck, 2006; Adams & Kleck, 2003). Interestingly, Adams and Kleck demonstrated that people exhibit systematic variation in the ease with which they process different emotions given the vantage point of the social perceiver and/or that expressed by the social target. Specifically, they found direct gaze displays to facilitate the processing of facially communicated approach emotions, such as anger or joy, but found averted gaze displays to facilitate the processing of facially communicated avoidance emotions, such as fear or sadness (also see Adams & Kleck, 2005). Decoding emotions at the time of attitude formation may lead to variations in attitude certainty (and responses to persuasion) not because it influences affect or associative processes but rather as a result of the relative ease or difficulty in processing. If incidental processing fluency results from emotion decoding, this approach makes predictions that differ from the emotion valence pattern when decoding direct gaze emotional expressions, and from both the emotion valence and emotion certainty approaches when decoding both direct and averted gaze emotional expressions.

Our reasoning is consistent with the fact that processing fluency can influence subjective feeling states (Winkielman & Cacioppo, 2001), evidence that affective judgments are often independent of (and precede in time) perceptual and cognitive operations (Russell, 2003; Zajonc, 1980), and the notion that attitude certainty is itself a subjective feeling state characterized by clarity and correctness of one's attitude. Similar to nodding one's head (to allegedly test a set of headphones) while processing a persuasive appeal (see Briñol & Petty, 2003), fluid processing of information unrelated to an attitude object during attitude formation may signal a general approval of attitude-relevant thoughts. Such thoughts may result in direct validation of one's attitude (without detectable changes in positive/negative affect). Finally, the incidental processing fluency hypothesis is also in line with the appraisal-based reasoning account of attitude certainty theorized by Rucker et al. (2014). In their model, processing fluency may influence attitude certainty in two ways: First, processing fluency may influence attitude certainty through an accuracy appraisal. The subjective ease experienced in answering a question, or recalling attitude consistent information, is associated with perceived accuracy. The more easily the information comes to mind, the more accurate it is assumed to be. Second, because processing fluency can produce positive feelings (Winkielman & Cacioppo, 2001), it may also influence attitude certainty through affective validation. That is, processing fluency might lead one to feel positively about his or her attitude, and this feeling might in turn increase attitude certainty.

Overview of Experimental Investigation

The goals of the current investigation were to determine the effects of decoding different facial expressions of emotions on attitude certainty, as well as to better understand the process by which this may occur. Experiments 1 and 2 employed an emotion decoding procedural paradigm, whereas Experiment 3 employed stimuli devoid of any emotional content. In each of these experiments, we examined the influence of processing stimuli on attitude certainty and resistance to persuasion determining the relative evidence supporting the emotion certainty, emotion valence, and incidental processing fluency theoretical approaches.

Experiment 1

Experiment 1 was designed to examine the degree to which decoding the emotions of anger, happiness, and sadness in social targets, during attitude formation, influences attitude certainty. Experiment 1 also ascertained if such attitude certainty has the same consequences as attitude certainty arising from previously established antecedents, particularly with regard to the attitude's stability in the face of persuasion.

From the emotion valence perspective (e.g., evaluative conditioning), decoding happiness during attitude formation should lead to greater attitude certainty than decoding anger or sadness, but there is no reason to expect decoding anger or sadness to differ in their influence of attitude certainty as they are both negative emotions. The emotion certainty perspective of attitude certainty (e.g., cognitive appraisal and attribute conditioning) supports the prediction that decoding angry or happy facial expressions during attitude formation should lead to relatively greater attitude certainty than decoding sad facial expressions.

From a processing fluency perspective, there appear to be two possibilities linking emotion decoding and attitude certainty. If people find decoding all three emotions to be

equally easy to process, the affective validation and direct effect hypotheses would suggest no differences in attitude certainty to emerge between the conditions. However, we expected differences in attitude certainty to emerge between the conditions on the basis of research, indicating that the relative ease in processing facially communicated emotions depends on an interaction between the direction of gaze and the approach/avoid nature of the emotions (Adams & Kleck, 2003); people find it relatively easy to process anger and joy when the gaze is direct but sadness and fear when the gaze is averted. Because the faces of subjects employed in Experiment 1 were all direct gaze photographs, we expected relatively greater attitude certainty (and less attitude change) to emerge in the anger and happiness conditions because they are more easily identified than direct gaze sadness. We also included a measure of both positive and negative affect to determine the specificity of any results supporting an effect of processing fluency on attitude certainty.

If decoding emotions does lead to variation in attitude certainty, we also expected attitude certainty to mediate the relationship between emotion decoding during attitude formation and resistance to persuasion. Participants who feel more (less) certain about their attitude, as a result of decoding anger/happiness (sadness) during attitude formation should be less (more) likely to change their attitude in the direction of a persuasive appeal.

Method

Participants and design. A total of 151 undergraduate students (86 females) participated in Experiment 1. Students were recruited from introductory psychology courses and received course credit for their participation. A single-factor design, manipulating the emotion decoding condition (happiness vs. anger vs. sadness), was employed. Both attitude certainty and attitude change were measured as dependent variables.

Procedure. Participants completed a self-administered computer questionnaire using MediaLab software (Jarvis, 2012) on computers in individual cubicles. Participants were led to believe that the study involved memory for the gist of novel information presented in both auditory and visual formats. It was explained that they would receive visual and auditory information simultaneously, and that they should attend to both streams of information as they would later be tested. They were instructed to listen to the audio presentation and to look at each picture displayed.

Emotion decoding manipulation. Participants were randomly assigned to view eight photographs exhibiting happy, angry, or sad faces (5 s each). Photographs were adopted from Ekman and Friesen (1976). The subjects of the photographs were the same in each condition. An equal number of male and female faces were viewed in each condition. It was made clear that photographs were displayed for the purposes of the alleged memory task described in the cover story, and that the subjects pictured in the photographs were in no way connected to the attitude message.

Attitude object message. While viewing photographs of facial expressions, all participants listened to a brief auditory introduction to information about mandatory comprehensive exams adapted from Petty and Cacioppo (1986).

Attitude. Participants' attitudes toward comprehensive exams were assessed before and after a 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*. Higher scores indicated greater attitude favorability toward comprehensive exams. Responses were averaged to form an index of attitudes toward comprehensive exams, $M_{\text{Time 1}} = 3.53$, $SD = 1.65$, $\alpha = .98$; $M_{\text{Time 2}} = 4.34$, $SD = 2.12$, $\alpha = .98$.

Attitude certainty. Attitude Certainty was assessed using the four attitude clarity items modified from Petrocelli et al. (2007); for example, "How certain are you that you know what your true attitude on this topic really is?" Participants also responded to the five attitude correctness items modified from Petrocelli et al. (2007); for example, "How certain are you that your attitude toward Mandatory Comprehensive Exams is the correct attitude to have?" Participants responded to each item using a 1 (*not certain at all*) to 9 (*very certain*) response scale. Because the two composite scores were highly correlated, $r(149) = .77$, $p < .001$, responses to the nine items were averaged to create a single index of Attitude Certainty, $M = 5.45$, $SD = 1.79$, $\alpha = .95$.

Persuasive message. After reporting their initial Attitude and Attitude Certainty, participants read a moderately strong persuasive message in favor of instituting the mandatory comprehensive exam policy (adapted from Petty & Cacioppo, 1986). Following this message, participants again rated their attitude toward comprehensive exams.

Affect. Participants were then asked to rate how they were feeling on several positive and negative emotion adjectives using items from the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Participants rated items on a scale of 1 (*very slightly or not at all*) to 5 (*extremely*) indicating the extent to which they were currently experiencing the affective state. Responses measuring positive affect were averaged together to create an index of positive affect ($M = 3.25$, $SD = 0.71$), $\alpha = .86$. The same was computed for the items measuring negative affect ($M = 1.85$, $SD = 0.57$), $\alpha = .80$. Participants also indicated on the same response scale the extent to which they felt happy ($M = 3.75$, $SD = 0.78$), angry ($M = 1.91$, $SD = 1.01$), and sad ($M = 2.11$, $SD = 1.06$).[2]

Results

Attitude change. To examine Attitude Change, prepersuasion attitudes were subtracted from postpersuasion attitudes.[3] Thus, higher scores indicated greater influence of the persuasive message. As hypothesized, a one-way ANOVA showed that Emotion Decoding condition significantly affected Attitude Change scores, $F(2, 148) = 4.31$, $p = .015$, $\eta^2 = .05$. Participants in the sadness condition demonstrated significantly greater Attitude Change following the persuasive message ($M = 1.32$, $SD = 1.79$) than participants in the happiness condition ($M = 0.55$, $SD = 1.44$), $t(148) = 2.39$, $p = .018$, and the anger condition ($M = 0.49$, $SD = 1.66$), $t(148) = 2.58$, $p = .010$; the happiness and anger condition participants did not differ with respect to Attitude Change, $t(148) = .15$, $p = .881$.

Attitude extremity. Because the mechanism of interest was the unique effect of Attitude Certainty, and because previous research has shown Attitude Extremity and Attitude Certainty to be strongly correlated (Krosnick, Boninger, Chuang, Berent, & Carnot, 1993; Petrocelli et al., 2007), we statistically controlled for Attitude Extremity in all subsequent analyses involving Attitude Certainty. Attitude Extremity was calculated by taking the absolute value of the difference of prepersuasion attitude from 5 (i.e., midpoint of scale); the further the score was from 0, the more extreme the attitude. As expected, Attitude Extremity was significantly correlated with Attitude Certainty, $r(149) = .43$, $p < .001$.

Attitude certainty. A one-way ANCOVA, with Attitude Extremity as a covariate, showed that Emotion Decoding also significantly affected Attitude Certainty, $F(2, 147) = 6.68$, $p = .002$, $\eta^2 = .08$; Attitude Extremity also emerged as a significant factor, $F(1, 147) = 37.71$, $p < .001$, $\eta^2 = .20$. Consistent with the emotion certainty and incidental processing fluency perspectives of attitude certainty and emotion decoding, participants assigned to the sadness condition reported significantly weaker Attitude Certainty ($M_{\text{adjusted}} = 4.78$, $SE = 0.22$) than participants assigned to the happiness condition ($M_{\text{adjusted}} = 5.78$, $SE = 0.22$), $t(147) = -3.20$, $p = .002$, and those assigned to the anger condition ($M_{\text{adjusted}} = 5.75$, $SE = 0.22$), $t(147) = -3.15$, $p = .002$. Also consistent with the emotion certainty and incidental fluency perspectives of attitude certainty and emotion decoding, participants assigned to the happiness and anger conditions did not differ with respect to Attitude Certainty, $t(147) = .10$, $p = .920$.

Mediation analysis. To test our mediation hypothesis, we employed a bootstrapping method to calculate bias-corrected confidence intervals (CIs) based on 5,000 random samples with replacement from the full sample (see Preacher & Hayes, 2004, 2008). This method tests whether or not the size of an indirect effect differs significantly from 0. The analysis was computed with Attitude Extremity as a covariate, and with Emotion Decoding condition dummy coded using "0" for the sadness condition and "1" for both the happiness and anger conditions (see Figure 1). The size of the indirect effect was .37 ($SE = 0.14$), and the 95% confidence interval did not include 0, 95% CI = [0.14, 0.71]. Thus, Attitude Certainty significantly mediated the relationship between decoding emotions at attitude formation and Attitude Change following persuasion.

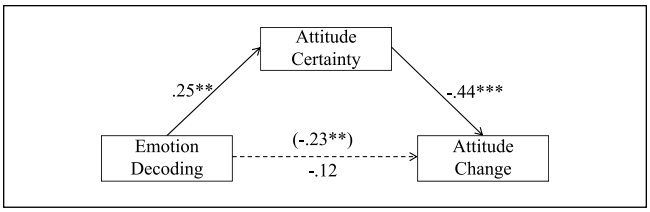

Figure 1. Mediation of the relationship between emotion decoding condition and attitude change by attitude certainty (Experiment 1).
Note. The emotion decoding conditions were dummy coded using 0 for sadness and 1 for anger/happiness. Values displayed are standardized regression coefficients.
**$p < .01$. ***$p < .001$.

Affect. As expected, we found no difference between the Emotion Decoding conditions with regard to Negative Affect, Positive Affect, Happiness, Sadness, or Anger; all Fs < 1.44.

Discussion

The current experiment provides evidence in favor of our hypotheses. Those participants who decoded anger or happiness in social targets during attitude formation reported greater levels of attitude certainty than those who decoded sadness. In addition, those who reported greater levels of attitude certainty showed greater resistance to a persuasive appeal than those who reported lower levels of attitude certainty.

Specifically, our results provide evidence that simply decoding social emotions can act as an antecedent of attitude certainty. Furthermore, attitude certainty established in this way appears to have the same consequences as attitude certainty that results from previously studied cognitive antecedents of attitude certainty (e.g., social consensus, accessibility, and cognitive elaboration), specifically in terms of resistance to persuasion. Thus, the social environment in which an attitude is formed may influence whether that attitude will change in response to persuasion.

Importantly, both positive and negative affect were unaffected by the emotion decoding exercise. These findings are inconsistent with the emotion valence explanation for the link between emotion decoding at the time of attitude formation and attitude certainty. However, given that evaluative conditioning can clearly affect attitudes (and their metacognitive aspects) it seems likely that the results, like those reported in Experiment 1, are somewhat paradigm specific.

For instance, evaluative conditioning paradigms typically include a substantial number of learning trials (e.g., Olson & Fazio, 2001), and we doubt that our eight trials were enough to obtain an evaluative conditioning effect in the first place. Furthermore, it is important to note that emotion decoding is an automatic process. In fact, it has been estimated that people tend to categorize basic emotions from facial expressions somewhere within the range of 100 to 170 ms (see Adolphs, 2002; Posamentier & Abdi, 2003) and only need about 10 ms of exposure to accurately categorize them (Sweeny, Suzuki, Grabowecky, & Paller, 2013). We find it unlikely that people would be aware of subtle differences in their processing of different emotions of facial expressions, while forming a new attitude, and then consciously reason that such relative differences are relevant to their attitude certainty. Such reasoning is consistent with our contention that processing fluency can directly influence affect beyond its positivity.

Of course, our Experiment 1 results are somewhat problematic because the results are consistent with both the emotion certainty and incidental processing fluency accounts of emotion decoding effects on attitude certainty and resistance to persuasion. Experiment 2 was designed to juxtapose these two accounts within the context of our emotion decoding paradigm.

Experiment 2

Experiment 2 was designed to more precisely understand how emotion decoding influences attitude certainty. If the link between emotion decoding (occurring during attitude formation) and attitude stability depends on emotion certainty or emotion valence assessments made at the time of decoding, decoding anger should lead to greater attitude certainty than decoding sadness regardless of gaze and diagnosticity of one's experience during the decoding task. On the contrary, if the link between emotion decoding and attitude certainty stability depends in part on incidental processing fluency, attitude certainty should be enhanced (reduced) when the emotion decoding process is relatively easy (difficult), and thus attitudes should be relatively resistant (susceptible) to persuasion. In other words, people who decode angry (direct gaze) and sad (averted gaze) facial expressions of social targets during attitude formation are expected to infer attitude certainty from their relative ease in decoding emotional expressions but only when the signals to certainty are highly diagnostic.

Thus, we incorporated two additional manipulations into Experiment 2: First, we borrowed from the logic of previous research, suggesting that the perceived direction of the gaze of photographed individuals influences the ease or difficulty with which the emotion is recognized (Adams et al., 2006; Adams & Kleck, 2003); anger is more easily recognized when the gaze is direct than when the gaze is averted, and sadness is more easily recognized when the gaze is averted than when the gaze is direct. Participants in both sadness and anger conditions were asked to view either photographs whereby the gaze of subjects was directed toward the participant or photographs, whereby the gaze of subjects was averted away from the participant.

As a way to provide additional evidence consistent with incidental fluency, Experiment 2 also employed a direct manipulation of the diagnosticity of the experience of fluency using procedures similar to those employed by Schwarz et al. (1991). Specifically, all participants were exposed to soft, classical music during the attitude formation procedure. Participants were either led to believe that the music facilitates or inhibits clarity and certainty of thought. This information regarding the alleged effects of the music provides a manipulation of the diagnosticity of the relative ease (or difficulty) arising from decoding the emotions expressed in the photographs. In other words, the information provided about the music should determine whether ease influences attitude certainty. Emotion decoding activity should influence attitude certainty when the information about the music discounts the predisposition to feel relatively certain (for conditions in which emotion decoding is relatively easy) or relatively uncertain (for conditions in which emotion decoding is relatively difficult).

In line with Schwarz et al. (1991; Experiment 3), experiences of fluency during the decoding of emotional expressions should be diagnostic of certainty if the music in the situation inhibits clarity of thought, whereas experiences of disfluency should be diagnostic of uncertainty if the music in the situation facilitates clarity of thought. On the contrary, experiences of fluency during the decoding of emotional expressions should be nondiagnostic of certainty if the music in the situation facilitates clarity of thought, whereas experiences of disfluency should be nondiagnostic of uncertainty if the music in the situation inhibits clarity of thought. Again, however, fluency experienced during the decoding of different emotional expressions appears to be largely determined by the gaze in which the emotion is expressed (direct or averted). Thus, if incidental processing fluency influences attitude certainty, certainty should be pronounced when direct-gaze-anger is relatively diagnostic of certainty and when direct-gaze-sadness is relatively nondiagnostic of certainty. The pattern of attitude certainty should also be reversed for averted gaze. That is, certainty should be pronounced when averted-gaze-anger is relatively nondiagnostic of certainty and when averted-gaze-sadness is relatively diagnostic of certainty. Such "turning on" and "turning off" of effects have been employed in prior inference-based research (e.g., Schwarz et al., 1991), and may provide further evidence of incidental processing fluency at work in the current paradigm.

According to the ease-based mechanism for the link between emotion decoding and attitude certainty, attitude certainty in our experimental paradigm should depend on the interaction between the emotion decoding condition, diagnosticity condition, and gaze direction condition. Specifically,

when exposed to direct gaze social targets, decoding anger with high diagnosticity should lead to greater attitude certainty 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 certainty than decoding sadness with high diagnosticity. On the contrary, when exposed to averted gaze social targets, decoding anger with high diagnosticity would be expected to lead to lower levels of attitude certainty 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 certainty than decoding sadness with low diagnosticity. Differences in reports of attitude certainty between the two gaze direction conditions would be expected due to differences in the ease of processing the two emotions with respect to gaze direction. Participants for whom ease is not diagnostic would not be expected to differ in their reports of attitude certainty.

Attitude change would also be expected to depend on the interaction between the emotion decoding condition, diagnosticity condition, and gaze direction condition. Thus, we expected attitude certainty to mediate the interactive effect of diagnosticity, emotion decoding, and gaze direction on attitude change following a persuasive message.

Method

Participants and design. Two hundred forty-four participants (103 male, 141 female) from an introductory psychology participant pool participated in Experiment 2. The experiment was conducted using a 2 (Emotion Decoding: sadness vs. anger) × 2 (Diagnosticity of Ease: high vs. low) × 2 (Gaze of Photographs: direct vs. averted) complete between-groups factorial design. Attitude certainty and attitude change were measured as dependent variables.

Materials and procedure. Participants completed a self-administered computer questionnaire using MediaLab software (Jarvis, 2012) on computers located in individual cubicles. Participants were led to believe that the study concerned 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 later asked to recall.

Attitude object. Participants listened to the same information about the mandatory comprehensive exam policy used in Experiment 1.

Emotion decoding and gaze direction manipulations. While listening to the introductory comprehensive exam policy information, participants viewed eight photographs of angry faces or sad faces similar to the procedures used in Experiment 1. In addition, participants were randomly assigned to view photographs in which the gaze was either directed toward or away from participants (see Adams & Kleck, 2005).

Diagnosticity manipulation. Participants were also randomly assigned to one of two conditions as a manipulation of diagnosticity of ease. The manipulation of diagnosticity was modeled directly from that employed by Schwarz et al. (1991; Experiment 3). Specifically, all participants were exposed to soft, classical music during their exposure to the comprehensive exam policy and the emotion photographs. Furthermore, participants read that the background music is known to either facilitate or inhibit clarity and certainty of thought. One half of the participants was assigned to the *high diagnosticity* condition; diagnosticity of ease was considered high when experiences of fluency were expected to occur (i.e., decoding direct-gaze-anger or averted-gaze-sadness) in the context of certainty-inhibiting music, or when experiences of disfluency were expected to occur (i.e., decoding averted-gaze-anger or direct-gaze-sadness) in the context of certainty-facilitating music. The other half of the participants was assigned to the *low diagnosticity* condition; diagnosticity of ease was considered low when experiences of fluency were expected to occur in the context of certainty-facilitating music, or when experiences of disfluency were expected to occur in the context of certainty-inhibiting music.

Attitudes, attitude certainty, and affect. Attitude toward comprehensive exams was assessed at both before and after exposure to the persuasive message similar to Experiment 1. Attitude Certainty was assessed using the five attitude correctness items modified from Petrocelli et al. (2007). Affect was also assessed using the same procedures as used in Experiment 1; internal consistency was high: positive affect $\alpha = .87$, negative affect $\alpha = .79$.

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

A manipulation check was also conducted to determine whether participants attended to the manipulation of diagnosticity by asking participants to report if 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 also reported 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. Finally, participants were debriefed and thanked for their participation.

Results

Manipulation checks. With regard to identifying the emotion conveyed in the photographs they viewed, a chi-square test of independence revealed a significant relationship between Emotion Decoding condition and emotion reports for the direct and averted gaze conditions, $\chi^2(4, N = 249) = 123.65$, $p < .001$. Thus, the Emotion Decoding manipulation was successful.

With regard to the manipulation of diagnosticity, the results of a one-way ANOVA suggest that the manipulation was successful; 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 ($M = 2.34$, $SD = 2.28$), $F(1, 247) = 244.47$, $p < .001$.

With regard to 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) × 2 (Diagnosticity: high vs. low) ANOVA revealed that there were no significant main effects of emotion decoding or diagnosticity, and no significant interaction effect on reports of the influence of the music on attitude certainty, all Fs < 1.10, *ns*. With regard to 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 revealed that there were no significant main effects of emotion decoding or diagnosticity, and no significant interaction effect on reports of the influence of the music on attitude certainty, all Fs < 1.60, *ns*.

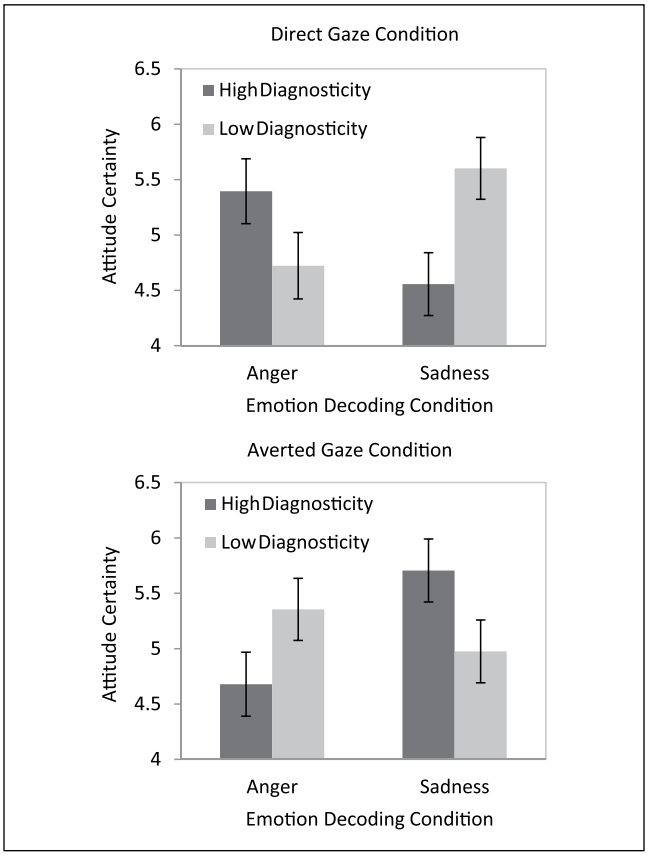

Figure 2. Attitude certainty adjusted means as a function of gaze, emotion decoding, and diagnosticity conditions (Experiment 2).

Affect. Examination of the PANAS scores showed that the sadness condition ($M = 3.45$, $SD = 0.65$) did not differ significantly from the anger condition ($M = 3.35$, $SD = 0.80$) in reporting Positive Affect, $F(1, 242) = 1.29$, $p = .257$. In addition, ratings of Negative Affect in the sadness condition ($M = 1.86$, $SD = 0.55$) did not differ significantly from those of the anger condition ($M = 1.84$, $SD = 0.60$), $F(1, 242) = .02$, $p = .887$.

Responding to more specific emotion items, participants in the sadness 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 sadness condition ($M = 1.84$, $SD = 0.98$) did not significantly differ from participants in the anger condition ($M = 1.79$, $SD = 0.99$) on their ratings of Anger, $F(1, 247) < 1$, *ns*.

Attitude certainty. The Attitude Certainty data were subjected to a 2 (Emotion Decoding: sadness vs. anger) × 2 (Diagnosticity of Ease: high vs. low) × 2 (Gaze of Photographs: direct vs. averted) ANCOVA, controlling for Attitude Extremity. The covariate was significant, $F(1, 235) = 54.75$, $p < .001$, indicating that Attitude Extremity and Attitude Certainty are strongly correlated, $r(242) = .42$, $p < .001$. There were no significant main effects or two-way interactions (all Fs < 1, ps > .39). Consistent with expectations, however, a significant three-way interaction emerged, $F(1, 235) = 14.84$, $p < .001$.

To examine the three-way interaction, two-way Emotion Decoding × Diagnosticity interactions were tested for the direct and averted gaze conditions. A significant Emotion Decoding × Diagnosticity interaction emerged for participants in the direct gaze condition, $F(1, 235) = 8.85$, $p = .003$ (see top panel of Figure 2). The pattern of results was consistent with our hypotheses. Participants who decoded anger in the high diagnosticity condition reported marginally greater levels of Attitude Certainty than participants who decoded anger in the low diagnosticity condition, $t(235) = 1.61$, $p = .108$. On the contrary, participants who decoded sadness in the low diagnosticity condition reported significantly greater levels of Attitude Certainty than participants who decoded sadness in the high diagnosticity condition, $t(235) = -2.63$, $p = .009$. In addition, participants who decoded anger in the high diagnosticity condition reported significantly greater levels of Attitude Certainty than participants who decoded sadness in the high diagnosticity condition, $t(235) = 2.06$, $p = .040$. Finally, participants who decoded sadness in the low diagnosticity condition reported significantly greater levels of Attitude Certainty than participants who decoded anger in the low diagnosticity condition, $t(235) = -2.15$, $p = .032$.

The two-way Emotion Decoding × Diagnosticity interaction for the averted gaze condition also reached significance, $F(1, 235) = 6.14$, $p = .013$ (see bottom panel of Figure 2). Again, the pattern of results was consistent with our hypotheses. Participants who decoded anger in the high diagnosticity condition reported marginally lower levels of Attitude Certainty than participants who decoded anger in the low diagnosticity condition, $t(235) = -1.68$, $p = .094$. On the contrary, participants who decoded sadness in the high diagnosticity condition reported marginally greater levels of Attitude Certainty than participants who decoded sadness in the low diagnosticity condition, $t(235) = 1.82$, $p = .070$. In addition, participants who decoded sadness in the high diagnosticity condition reported significantly greater levels of Attitude Certainty than participants who decoded anger in the high diagnosticity condition, $t(235) = 2.54$, $p = .011$. However, participants who decoded anger in the low diagnosticity condition failed to report greater levels of Attitude Certainty than participants who decoded sadness in the low diagnosticity condition, $t(235) = .95$, $p = .343$.

Attitude change. The Attitude Change data were also subjected to a 2 (Emotion Decoding: sadness vs. anger) × 2 (Diagnosticity of Ease: high vs. low) × 2 (Gaze of Photographs: direct vs. averted) three-way ANCOVA, controlling for Attitude Extremity. The covariate was not significant, $F(1, 235) = .02$, $p = .984$. There were no significant main effects or two-way interactions (all Fs < 1.71, ps > .19). Consistent with expectations, however, a significant three-way interaction emerged, $F(1, 235) = 11.05$, $p = .001$.

To examine the three-way interaction, two-way Emotion Decoding × Diagnosticity interactions were tested for the direct and averted gaze conditions (see Figure 3). A significant Emotion Decoding × Diagnosticity interaction emerged for participants in the direct gaze condition, $F(1, 235) = 5.61$, $p < .018$ (see top panel of Figure 3). Although in the expected direction, but not statistically significant, participants who decoded anger in the high diagnosticity condition showed less Attitude Change than participants who decoded anger in the low diagnosticity condition, $t(235) = -1.19$, $p = .235$, and participants who decoded sadness in the high diagnosticity condition, $t(235) = -1.16$, $p = .247$. As expected, however, participants who decoded sadness in the high diagnosticity condition showed significantly greater Attitude Change than participants who decoded sadness in the low diagnosticity condition, $t(235) = 2.18$, $p = .030$. Finally, participants who decoded sadness in the low diagnosticity condition showed significantly less Attitude Change than participants who decoded anger in the low diagnosticity condition, $t(235) = 2.18$, $p = .030$.

The two-way Emotion Decoding × Diagnosticity interaction for the averted gaze condition also reached significance, $F(1, 235) = 5.51$, $p = .019$ (see bottom panel of Figure 3). Although in the expected direction, but not statistically significant, participants who decoded anger in the high diagnosticity condition showed greater Attitude Change than participants who decoded anger in the low diagnosticity condition, $t(235) = .81$, $p = .418$, and participants who decoded sadness in the high diagnosticity condition, $t(235) = 1.25$, $p = .212$. As expected, participants who decoded sadness in the high diagnosticity condition showed significantly less Attitude Change than participants who decoded sadness in the low diagnosticity condition, $t(235) = -2.51$, $p = .012$. Participants who decoded anger in the low diagnosticity condition showed significantly less Attitude Change than participants who decoded sadness in the low diagnosticity condition, $t(235) = -2.08$, $p = .038$.

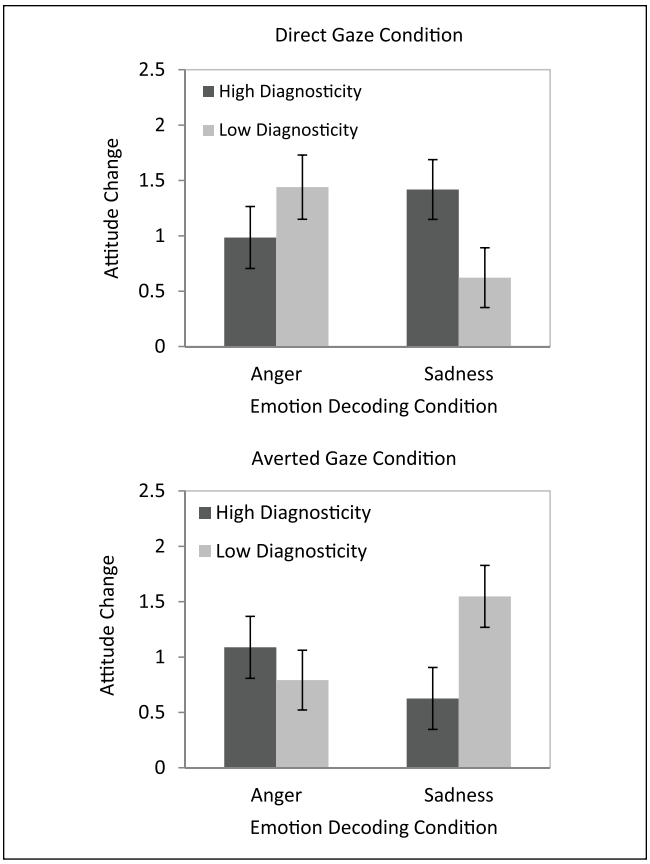

Figure 3. Attitude change adjusted means as a function of gaze, emotion decoding, and diagnosticity conditions (Experiment 2).

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 × Diagnosticity × Gaze interactions on attitude certainty and attitude change are consistent with attitude certainty mediating the Emotion Decoding × Diagnosticity × Gaze interaction on attitude change. This type of mediated moderation would be reflected in the observed three-way interaction on attitude certainty, coupled with a direct relationship between attitude certainty 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. We again employed the bootstrap procedure recommended by methodologists and statisticians (Preacher & Hayes, 2004, 2008).

As described earlier, we obtained a significant Emotion Decoding × Diagnosticity × Gaze interaction on attitude certainty and attitude change. We then 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 Certainty); the analysis was also computed with Attitude Extremity as a covariate. The size of the indirect effect was −.53 (*SE* = 0.25), and the 95% CI excluded 0, 95% CI = [−1.15, −0.16]. Thus, Attitude Certainty significantly mediated the relationship between the Emotion Decoding × Diagnosticity × Gaze interaction and Attitude Change (see Figure 4).

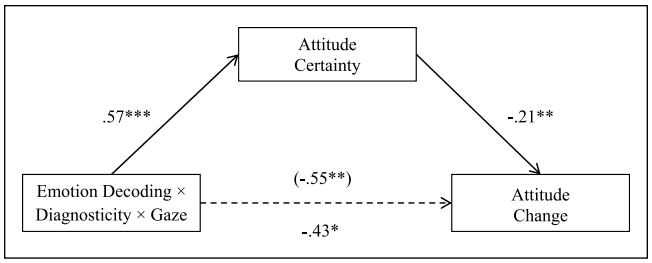

Figure 4. Mediation of the relationship between the three-way interaction (Emotion Decoding × Diagnosticity × Gaze Direction) and attitude change by attitude certainty (Experiment 2).
Note. Emotion Decoding conditions were dummy coded using 0 for sadness and 1 for anger. Diagnosticity conditions were dummy coded using 0 for low diagnosticity and 1 for high diagnosticity. Gaze conditions were dummy coded using 0 for averted and 1 for direct. Values displayed are standardized regression coefficients.
*$p < .05$. **$p < .01$. ***$p < .001$.

Discussion

The observed data support our hypotheses, suggesting that attitude certainty may be inferred from ease arising from emotion decoding but only when ease is diagnostic. In other words, these data are consistent with the reasoning underlying earlier research on processing fluency (Jacoby, 1983) and inference-based reasoning (e.g., Schwarz et al., 1991; Schwarz & Clore, 1983). For example, when participants who decoded anger in the direct gaze condition were given another source for attitude certainty (music that facilitates clarity and certainty of thought), their feelings of certainty did not appear to be inferred from their certainty toward the attitude object but were likely inferred from the alleged source of the certainty (music). On the contrary, when participants were not given another source for their attitude certainty (music that inhibits clarity and certainty of thought), they appeared to infer certainty from their 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 (whereby emotion decoding was relatively difficult). These data were again consistent with the reasoning underlying earlier research on processing fluency and inference-based reasoning; when participants who decoded sadness were given another source for feeling relatively uncertain (music that inhibits clarity and certainty of thought), their feelings of uncertainty did not appear to be inferred from uncertainty toward the attitude object but were likely inferred from the source of the uncertainty (music). On the contrary, when participants were not given another source for feeling relatively uncertain (music that facilitates clarity and certainty of thought), they appeared to infer uncertainty from their uncertainty toward the attitude object.

Importantly, the patterns of data described above emerged only for those who viewed photographs in which the gaze was directed toward the participant. The opposite pattern emerged for participants who viewed photographs in which the gaze was averted away from the participant (whereby emotion decoding anger was relatively difficult and decoding sadness was relatively easy). Thus, in line with prior research (Adams & Kleck, 2003; Tormala, Clarkson, & Henderson, 2011), our findings suggest that the factor determining when attitude certainty will be inferred from the emotion decoding experience is not necessarily the specific emotion decoded during attitude formation, but 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. In addition, 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 Experiment 2 supports these assertions.

Experiment 3

Together, the results of Experiments 1 and 2 suggest that the effect of decoding an emotion (at the time of attitude formation) on persuasion/resistance in our experimental paradigm had little to do with the compatibility of the emotion decoded and the information about the attitude. Because decoding

sadness can also enhance attitude certainty (when it is easy to do so), our Experiment 2 data only leave processing fluency as a viable explanation for the effect of emotion decoding on attitude certainty and resistance to persuasion. The results also invite the question: Does *incidental processing fluency* of stimuli, devoid of any emotional content, influence attitude certainty and resistance to persuasion? In prior research, it has generally been assumed that the information processed must be integral to the estimation in question; that is, the content that is easily processed must have some relevance to the judgment. For instance, processing famous names influences the perception that those names have been studied earlier (Jacoby et al., 1989), generating fewer (easier) than greater (difficult) arguments in favor of a proposal influences attitudes about that proposal (Briñol, Petty, & Tormala, 2006), and the ease of answering a question is associated with the perceived accuracy of those answers (Kelley & Lindsay, 1993). However, our prior results suggest that processed information need not be integral, and that incidental processing fluency may also affect judgments (e.g., attitude certainty).

Experiment 3 was designed to determine if the basic experience of ease in processing stimuli, irrelevant to the attitude object and devoid of emotional content, during attitude formation influences both attitude certainty and attitude change. Participants were exposed to experimental procedures similar to those used in Experiment 1. However, rather than decoding emotions during attitude formation, participants were asked to estimate/count the number of dots briefly displayed in an organized fashion (easy) or a random fashion (difficult) on a computer monitor throughout multiple trials of a dot estimation task. Consistent with an incidental processing fluency account of attitude certainty, we hypothesized attitude certainty (and subsequent resistance to persuasion) to be greater when counting dots was relatively easy than difficult (independent of any variation that can be attributed to affect).

Method

Participants and design. Seventy-three undergraduate students (28 females) participated in Experiment 3. Students were recruited from introductory psychology courses, and received course credit for their participation. A single-factor design, manipulating the display of dots in multiple trials of a dot estimation task (easy vs. difficult), was employed. Both attitude certainty and attitude change were measured as dependent variables.

Procedure. Participants completed a self-administered computer questionnaire very similar to Experiment 1 with one exception. Rather than processing emotions displayed in pictures, during the auditory reception of the attitude object information (mandatory comprehensive exams), participants were asked to estimate the number of dots displayed on the screen frame.

Ease/difficulty manipulation. It is well established that estimating the number of dots displayed in an organized array, as displayed on game die, is more easily and accurately processed than the same number of dots displayed in a randomized array (Boone, Lu, & Herzberg, 2002; Frederick, 2002; Lezak, 1983). Participants were asked to view 16 different dot slides, each depicting between 8 and 12 dots for 3 s each. Participants were randomly assigned to one of two conditions in which each slide of dots was displayed in an organized fashion (*easy counting*) or a random fashion (*difficult counting*).

Before the first trial of the dot estimation task, participants were exposed to the type of display they would see in each trial. Participants were instructed to determine the number of dots as quickly and as accurately as they could, and led to believe that they would be asked to report the number of dots later. Participants were also reminded to pay attention to both sources of information (i.e., dots and information about the mandatory comprehensive exams) and informed they would be asked to answer questions about both at a later point in the study.

Attitude. The semantic differential items used in Experiment 1 were employed in Experiment 3. Responses were averaged to form an index of attitudes toward comprehensive exams, $M_{\text{Time 1}} = 4.47$, $SD = 1.60$, $\alpha = .96$; $M_{\text{Time 2}} = 5.66$, $SD = 1.65$, $\alpha = .97$.

Attitude certainty. The assessment of Attitude Certainty was simplified as it was assessed with one item, "How certain are you of your attitude toward Mandatory Comprehensive Exams?" using a 1 (*not certain at all*) to 9 (*very certain*) response scale. As noted by Petrocelli et al. (2007), this global measure of attitude certainty tends to correlate strongly with both attitude clarity and attitude correctness.

Affect. Affect was also assessed using the same procedures as used in Experiments 1 and 2; internal consistency was high: positive affect $\alpha = .87$, negative affect $\alpha = .81$.

Persuasive message. After reporting their initial attitude and attitude certainty, participants read a moderately strong persuasive message in favor of instituting the mandatory comprehensive exam policy (adapted from Petty & Cacioppo, 1986). Following this message, participants again rated their attitude toward comprehensive exams.

Manipulation check. Finally, participants were asked to think back to when they were originally introduced to the idea of the mandatory comprehensive exam policy and to respond to three items: "How difficult did you find listening to information about the exam policy? (rate just the difficulty of the listening aspect)"; "How difficult did you find the dot counting task to be? (rate just the difficulty of the dot counting aspect)"; and "How difficult did you find the combined

task of listening to information about the exam policy while counting dots?" Participants responded to each item using a 1 (*extremely easy*) to 9 (*extremely difficult*) response scale.

Results

Manipulation check. Participants assigned to the easy counting condition reported listening to the information about the exam policy to be no more difficult ($M = 4.87$, $SD = 1.69$) than their counterparts assigned to the difficult counting condition ($M = 5.22$, $SD = 1.71$), $F(1, 71) = .81$, $p = .371$. However, as expected, participants in the easy counting condition reported significantly less difficulty with the dot counting task ($M = 3.76$, $SD = 1.67$) and the combined task of listening to information about the exam policy while counting dots ($M = 5.19$, $SD = 1.71$) than their difficult counting condition counterparts ($M = 5.17$, $SD = 1.73$; $M = 6.31$, $SD = 1.37$), $F(1, 71) = 12.51$, $p < .001$, $\eta^2 = .15$, and $F(1, 71) = 9.43$, $p = .003$, $\eta^2 = .12$, respectively.

Attitude change. As hypothesized, Attitude Change scores showed that participants assigned to the easy counting condition showed less Attitude Change following the persuasive message ($M = 0.83$, $SD = 0.93$) than participants assigned to the difficult counting condition ($M = 1.56$, $SD = 1.24$), $F(1, 71) = 7.99$, $p = .006$, $\eta^2 = .10$.

Attitude certainty. As anticipated, participants assigned to the easy counting condition reported greater Attitude Certainty following the dot counting task and the audio presentation of the information about the exam policy ($M = 6.08$, $SD = 1.66$) than participants assigned to the difficult counting condition ($M = 5.14$, $SD = 1.79$), $F(1, 71) = 5.35$, $p = .023$, $\eta^2 = .07$.

Affect. Examination of the PANAS scores showed that the easy counting condition ($M = 3.19$, $SD = 0.71$) did not differ significantly from the difficult counting condition ($M = 3.30$, $SD = 0.67$) in reporting Positive Affect, $F(1, 71) = .47$, $p = .496$. In addition, ratings of Negative Affect in the easy counting condition ($M = 1.59$, $SD = 0.44$) did not differ significantly from those of the difficult counting condition ($M = 1.75$, $SD = 0.56$), $F(1, 71) = 1.81$, $p = .183$.

Mediation analysis. Mediation analysis was employed to test our hypothesis that Attitude Certainty mediates the relationship between Dot Counting Condition (easy/difficult) and Attitude Change. The analysis was computed with Attitude Extremity as a covariate, and with dot counting condition dummy coded using "0" for the easy counting condition and "1" for the difficult counting condition (see Figure 5). The size of the indirect effect was 0.14 ($SE = 0.08$), and the 95% CI did not include 0, 95% CI = [0.02, 0.37]. Thus, Attitude Certainty significantly mediated the relationship between Dot Counting Condition (easy/difficult) and Attitude Change following persuasion.

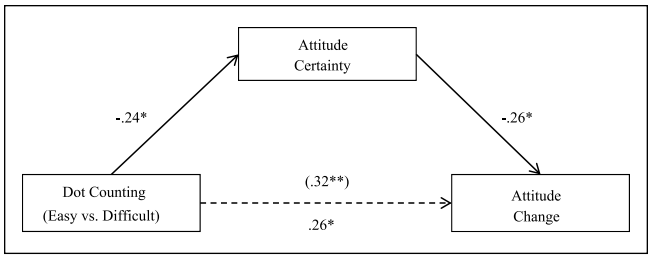

Figure 5. Mediation of the relationship between dot counting condition and attitude change by attitude certainty (Experiment 3).
Note. The dot counting conditions were dummy coded using 0 for easy and 1 for difficult. Values displayed are standardized regression coefficients.
*$p < .05$. **$p < .01$.

Discussion

Experiment 3 provides further evidence in favor of our hypothesis that processing fluency can directly enhance attitude certainty, and thereby increase resistance to persuasion. Furthermore, the incidental processing task had no effect on positive or negative affect. The results suggest that ease/difficulty can be encountered contiguous with attitude formation, and can affect attitude certainty and later resistance to change even if the ease/difficulty does not involve the processing of the content that forms the basis for attitude formation. In other words, processing fluency can be incidental to attitude formation rather than fluency in perceiving or processing information about the attitude object itself.

General Discussion

The results of three experiments provide evidence in favor of our hypotheses. Experiment 1 suggested that decoding sadness versus anger/happiness during attitude formation leads to differences in both attitude certainty and attitude change in the face of a persuasive attack. Experiment 2 not only replicated our Experiment 1 findings but also provided evidence consistent with the notion that the effects of emotion decoding during attitude formation can result from incidental processing fluency. When the experience of processing fluency was diagnostic, relatively high attitude certainty was associated with both direct-gaze-anger and averted-gaze-sadness, whereas relatively low attitude certainty was associated with both averted-gaze-anger and direct-gaze-sadness. Thus, the difference in attitude certainty arising from anger and sadness conditions in Experiment 1 can be reinterpreted as a gaze direction in favor of displays of anger. In addition, both experiments supported the conclusion that attitude certainty serves as a significant mediator in the relationship between the emotion decoded and attitude change. Experiment 3 further supports our proposal that processing fluency can have a direct effect on attitude certainty, and suggests that the content of stimuli processed need not be emotional in nature; that is, incidental processing fluency can affect attitude certainty.

Our results are relevant to the literature on emotion appraisals as well as literature on attitude strength accounts of resistance and persuasion. 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). Anger and happiness have been associated with feeling certain about the situation, whereas sadness has been associated with feeling relatively uncertain about a situation. However, we know of no comprehensive explanation concerning the certainty/anger, certainty/happiness, or uncertainty/sadness links. Furthermore, neither the emotion certainty nor emotion valence accounts predict that decoding sadness can, under specified conditions, lead to relatively high attitude certainty (i.e., when it is as easy to decode as anger and happiness typically are). In fact, from an evaluative conditioning perspective, there appears to be no reason to expect any difference in attitude certainty to emerge from decoding either of two negative (or two positive) emotional expressions. Thus, the results of the current investigation suggest that the processing fluency involved in decoding emotions (with respect to gaze direction) may be the most viable explanation for the link between emotion decoding and attitude certainty.

The fact that our Experiment 2 participants did not differ in their reports of the music's influence on their certainty suggests that people may be unaware that their attitude certainty can be influenced by the ease of emotion decoding (and the supposed effects of other stimuli). It has long been known that people are often unaware of stimuli, their responses, and the relationships between the stimuli and their responses (Nisbett & Wilson, 1977). Thus, we suspect that our participants were relatively unaware of how emotion decoding influenced their attitude certainty. Yet, 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.

Importantly, it is unlikely that decoding emotions or counting dots, with relative ease, enhanced the *actual validity* of any self-generated thoughts in response to the information about the exam policy. Rather, the relative ease of processing additional/incidental information may enhance attitude certainty through basic inference. Consistent with the *self-validation hypothesis*, one possibility appears to be that thoughts generated in the context of corresponding ease (difficulty) are paired with perceptually valid (invalid) tags (see Petty, 2006; Petty, Briñol, & Demarree, 2007). Similar to Briñol and Petty's (2003) demonstrations of the effect of overt head movements, our data suggest that the source of validating signals (e.g., ease/difficulty) can be completely irrelevant to the attitude and the information upon which it is formed.

Applied Implications

The current data suggest that people do not have to necessarily experience an emotion in order for emotions to influence persuasion, and that exposure to social targets experiencing (or expressing) a particular emotion while learning about a novel idea is sufficient to influence persuasion. Thus, in addition to eliciting a particular emotion from the targets of influence, a marketer (whose goal is to influence the attitudes of the masses) may opt to place targets of influence in a position to decode the emotions of others. We suspect that in many cases, the latter approach may be more subtle and easier to accomplish, given that decoding the emotions of others often occurs outside of instructions to observe faces on a computer monitor—the processing of facial expressions of emotions occurs automatically (LeDoux, 1996; Öhman, 2002; Straube, Mothes-Lasch, & Miltner, 2011). Simply exposing observers to an angry (sad) individual, while they are learning about a new idea, may be sufficient to enhance observer attitude certainty.

Public speakers also seek to persuade their audiences. Previous research has demonstrated that the tone with which a speaker informs his or her audience influences whether the audience will be susceptible to changing their attitude following exposure to the speaker (Hovland, Janis, & 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.

Future Directions

The current investigation solely examined the effects of decoding happiness, sadness, and anger during attitude formation on attitude certainty and response to persuasion. Future research should examine whether decoding other emotions associated with certainty appraisals (e.g., fear, hope) also influences attitude certainty and response to persuasion, and whether such influence depends on gaze direction.

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, nonemotionally based attitude certainty in terms of resistance to persuasion, and it is important to examine other consequences in comparison with cognitively formed attitude certainty.

Conclusion

The current investigation provides evidence that emotion decoding and incidental ease experiences can serve as viable antecedents of attitude certainty. In addition, this investigation provides evidence that attitude certainty, arising from emotion decoding and incidental ease experiences, can have the same consequences as attitude certainty that results from

previously studied antecedents. Consistent with the incidental processing fluency account on attitude certainty, the effect of decoding the emotions of social targets on resistance to persuasion does not require the elicitation of an emotion but instead can be driven by inferences of attitude certainty generated from variations of incidental processing fluency.

Authors' Note

Portions of this research report were presented in a poster session at the 14th annual meeting of the Society for Personality and Social Psychology, New Orleans, Louisiana.

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Declaration of Conflicting Interests

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Notes

1. Several studies also demonstrate that people are very accurate at decoding emotions from facial expressions (e.g., Ekman & Friesen, 1971; Etcoff & Magee, 1992).
2. In our pilot testing of the paradigm, we included a manipulation check to determine the degree of emotion decoding specificity exhibited by our participants. Specifically, participants were once again shown the eight photographs viewed during the emotion decoding manipulation (one at a time), and asked to indicate any emotion expressed by each photograph using any of the six options: sadness, anger, fear, disgust, neutrality, and happiness. Consistent with the theoretical position on the universality and automaticity of emotional expressions, our pilot participants were well aware of the emotion expressed in the pictures. Participants in each emotion condition clearly judged there to be more of the emotion they were exposed to than any other emotion they were asked about.
3. Before exposure to the persuasive message, the attitudes did not differ between participants assigned to the happiness condition ($M = 3.50$, $SD = 1.71$), sadness condition ($M = 3.32$, $SD = 1.57$), and the anger condition ($M = 3.84$, $SD = 1.63$), $F(2, 148) = 1.29$, $p = .28$.

Supplemental Material

The online supplemental material is available with the manuscript on the PSPB website.

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