



The counterintuitive influence of vocal affect on the efficacy of affectively-based persuasive messages



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ARTICLE INFO

Keywords:
Attitudes
Persuasion
Voice
Vocal affect
Attitude bases
Affect
Cognition

ABSTRACT

Three experiments examined the extent to which congruency between affective vocal qualities of speakers and the affective content of persuasive messages influenced attitude change. In Experiment 1, a 2 (attitude basis: affective vs. cognitive) \times 4 (persuasive message: fully matched vs. partially matched vs. fully mismatched vs. written passage) between-participants experiment was conducted. Attitude change produced by the fully matched voice-content message did not differ from the written passage condition. However, both the partially matched and fully mismatched voice-content messages generated significantly more attitude change than the written passage. Experiment 2 replicated the findings of Experiment 1 and tested two explanations for the enhanced efficacy of voice-content incongruent messages. Supplementary analyses provide some evidence in support of an attribution explanation as a mechanism to account for these effects. Experiment 3 replicated the prior two experiments and tested four possible mechanisms for the persuasive effects of affective vocal-message incongruence. Analyses once again supported an attribution explanation for the incongruency effect.

1. Introduction

As the American poet William Carlos Williams said, “It is not what you say that matters, but the manner in which you say it; there lies the secret of the ages.” (*Selected Essays*, preface; Williams, 1954). Despite the intuitive appeal of this idea, social psychologists have largely ignored the role of vocal qualities in persuasion. This is surprising given the prevalence of oral communication in everyday life, and because a large literature has documented the important influence of vocal perception within oral exchanges (e.g., see Juslin & Scherer, 2005). One prominent feature often evident in oral exchanges is emotionality in the voice. Indeed, research has shown that distinct emotions are associated with changes in specific parameters of voice (Banse & Scherer, 1996; Bänziger, Patel, & Scherer, 2014; Juslin & Scherer, 2005; Scherer, Johnstone, & Klasmeyer, 2003), and that people can detect subtle changes in emotionality (Johnson, Ernede, Scherer, & Klinnert, 1986), even when language barriers prevent understanding of the content (Elfenbein & Ambady, 2002; Pell, Monetta, Paulmann, & Kotz, 2009). This is particularly relevant in light of the large body of work supporting the important role played by emotional content in persuasion (e.g., see Petty, Fabrigar, & Wegener, 2003).

1.1. The role of affect in attitude formation and change

Both intuitively and empirically, we know that emotional expression communicates important information that can influence attitudes and/or behavior in listeners. Indeed, one fundamental type of evaluative information influencing attitudes is affect (Forgas, 2010; Olson & Kendrick, 2008; Rokeach, 1968; Zanna & Rempel, 1988). A second type of evaluative information is cognition, which reflects an individual's beliefs about an object's attributes. Evidence indicates that distinguishing between affect and cognition in terms of message content and attitude bases is often consequential for persuasive appeals (e.g., Becker, 1963; Crites, Fabrigar, & Petty, 1994; Eagly, Mladnic, & Otto, 1994; Knepprath & Clevenger, 1965; Ruechelle, 1958). In fact, communicators frequently design persuasive messages to elicit emotional responses from the recipient or to convey facts about an object's attributes. Moreover, evidence indicates that the interplay between the content of a persuasive message (affective vs. cognitive) and a recipient's attitude base (affective vs. cognitive) is an important determinant of effective persuasion (Edwards, 1990; Edwards & von Hippel, 1995; Fabrigar & Petty, 1999; Haddock, Maio, Arnold, & Huskinson, 2008; Mayer & Tormala, 2010; Millar & Millar, 1990; See, Petty, & Fabrigar, 2008). Nonetheless, the extensive literature on attitude bases and persuasion has not been integrated with work on vocal affect.

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1.2. The role of vocal affect in the context of an affective persuasive appeal

Given that attitudes and messages can be based predominantly on either affect or cognition, this raises the question of how vocal affect might influence persuasion. Because affective messages are designed to elicit emotional responses in recipients, it makes sense that vocal emotions should be especially influential within such messages. Indeed, one can imagine several ways in which the interplay between messages designed to elicit an emotional response and the affective vocal cues of the speaker delivering that message might combine to influence persuasion. With this in mind, an important question is how best to conceptualize voice in terms of its emotional qualities. One influential view suggests that emotions can be conceptualized along two orthogonal underlying dimensions: valence and arousal (e.g., Bachorowski, 1999; Bradley & Lang, 2000; Frick, 1985; Owren & Bachorowski, 2007; Pakosz, 1983). As it applies to the persuasion process, this framework highlights the importance of considering the extent to which a speaker's vocally expressed emotions are congruent with the affective content of the message. For example, congruency on both valence and arousal exists when a speaker delivers fear-eliciting content using vocal qualities that reflect fear. Partial incongruency exists when voice and message are mismatched on either valence or arousal, such as combining fear-eliciting content with vocal qualities that reflect either excitement (i.e., matched on arousal, mismatched on valence), or boredom (i.e., matched on valence, mismatched on arousal). Full incongruency exists when voice and message are mismatched on both dimensions, such as combining fear-eliciting content with a contented voice.

These studies test two competing perspectives regarding how the interplay between affective vocal cues and an affective message might influence persuasion. The first perspective suggests that persuasion should be enhanced through affective voice-content congruence relative to incongruence. The congruence hypothesis is based on at least two findings. First, research on emotional contagion has shown that exposure to others' emotions can in some cases elicit similar emotions in oneself (Hatfield, Cacioppo, & Rapson, 1992; Hatfield & Rapson, 2008; Neumann & Strack, 2000). Second, affective voice-content congruence may lead the recipient to conclude that their emotional responses are appropriate, thus providing social validation (Cialdini, 2009; Guadagno, Muscanell, Rice, & Roberts, 2013; Hogg & Reid, 2006). Thus, both findings suggest persuasion will be enhanced when affective vocal cues match the affective content of messages and attenuated when these variables mismatch.

However, this pattern may not emerge in all contexts. If the content of an affective message is comparatively high in intensity, little room may exist for congruent affective vocal cues to enhance the impact of the content. Instead, affective voice-content incongruence may increase persuasion. At least two psychological phenomena might account for this outcome. First, recipients might judge the intensity of their own emotions in relation to the speaker's emotions thereby producing a contrast effect. For example, a speaker who delivers intense fear-eliciting content in a bored voice may cause the recipient to evaluate themselves as especially afraid relative to the speaker, leading to greater attitude change. Conversely, if the same content were delivered in a fearful voice, the recipient may view themselves as relatively less afraid than the speaker, reducing attitude change. Similar contrast effects in social judgment are well documented (e.g., Burger, 1986; Martin, Seta, & Crelia, 1990; Schwarz & Bless, 2007; Wänke, Bless, & Igou, 2001).

Second, persuasion may be influenced by message recipients' attributions regarding the source of their emotional responses (e.g., Schwarz, 1990; Taylor & Fiske, 1978; Wyer, Clore, & Isbell, 1999). For example, if intense, fear-eliciting content was delivered in a bored voice, the source of the recipient's emotional response should be unambiguous: recipients should attribute their fear to the attitude object described by the content rather than the speaker. Thus, emotional responses should be perceived as diagnostic of the attitude object and

persuasion should increase. However, if the same content was delivered in a fearful voice, the source of emotional responses is ambiguous because both the speaker's emotions and the attitude object may explain their fear. Thus, the recipient's emotional responses might not be seen as diagnostic of the object.

Although both of these processes may help explain how voice-content congruency influences attitude change, people may vary in their sensitivity to (in)congruency effects. One potentially relevant factor is whether an individual's initial target attitude is predominantly based on affect or on cognition. (In)congruence between emotion in content and in vocal cues may have a stronger effect on individuals whose attitudes are based on affect, because they are more sensitive to affective cues. By contrast, individuals whose attitudes are predominately based on cognition may be relatively insensitive to affective cues and thus less susceptible to the effects of vocal affect on persuasion. This would conform to prior research showing that matching a persuasive message to the recipient's (affective/cognitive) attitude base increases attitude change (Edwards, 1990; Fabrigar & Petty, 1999; Haddock et al., 2008; Mayer & Tormala, 2010; See et al., 2008; but see Millar & Millar, 1990).

1.3. Overview of the present research

In three studies, we investigated how (in)congruency between affective vocal cues and the affective content of a message influences persuasion, and whether this process is moderated by a person's initial attitude base. This was examined using strongly affective content with affective vocal cues that either fully matched, partially mismatched, or fully mismatched the emotionality of the content. Because the present studies used a message with high-intensity affective content, we expected incongruency to enhance persuasion. Experiment 1 provided an initial test of our hypothesis. Experiment 2 was conducted to replicate the key effects in Experiment 1 and to explore the potential role of contrast effects and/or attribution processes. Experiment 3 was designed to replicate the effects of the prior two experiments and to test several additional mechanisms. For all experiments, all measures and manipulations are disclosed, and no participants were excluded.

2. Experiment 1

Experiment 1 provided an initial test of our hypotheses within the context of a novel attitude object. During the attitude formation phase, a positive attitude was created towards an ostensibly real animal called a *lemphur* (see Fabrigar & Petty, 1999). The information provided during the formation phase was either predominantly affective or cognitive in nature. During the persuasion phase, participants were exposed to a negative, affect-based persuasive message.

2.1. Method

2.1.1. Participants and design

Two hundred fifty undergraduates were recruited in exchange for course credit. Participants were randomly assigned across a 2 (attitude formation: affective base vs. cognitive base) \times 2 (questionnaire order: affective first vs. cognitive first) \times 4 (persuasive message type: vocal congruent vs. vocal partially incongruent vs. vocal fully incongruent vs. written passage) between-participant factorial design.¹ Minimum sample size requirements were based on a goal of 20 participants per cell (Simmons, Nelson, & Simonsohn, 2011) to test our predicted 2 \times 4 interaction. Once this number was exceeded, data collection continued for the remainder of the academic semester.

¹ Because the order of presentation for the affective and cognitive scales was counterbalanced, this variable was originally included in the ANCOVA investigating post-message attitudes and associated analyses for all 3 experiments. As no effects were found, we do not include order as an independent variable in the analyses presented.

2.2. Procedure

2.2.1. Attitude formation phase

Participants assigned to the affective attitude formation condition were told they would be reading information about a possibly unfamiliar animal called a lemphur and that we wanted to evaluate their feelings towards lemphurs. First, participants completed an affective-responses scale probing their feelings towards lemphurs. Participants were told that if they were unfamiliar with the animal, they should answer based on their expectations about lemphurs. In reality, the scale served to prime participants' affective dimension of judgment, thus increasing the likelihood that the emotional passage that followed would create an attitude based on affect. Participants then read a positive affective passage presenting a lemphur as a friendly marine animal that frolics with a swimmer. The passage emphasized positive feelings we intended the participant to associate with the lemphur.

Participants assigned to the cognitive attitude formation condition were given similar introductory information, but told that we were interested in evaluating their beliefs towards the animal, thus were primed towards the cognitive dimension of judgment by completing a cognitive-responses scale. Participants then read an informational passage (nominally from an encyclopedia article) describing positive attributes of lemphurs. For example, the lemphur was described as highly intelligent and easily trainable. Lastly, all participants completed an attitude scale, and counterbalanced cognitive and affective reaction scales.

2.2.2. Persuasion phase

Participants were assigned to one of four affective message conditions containing a passage developed by Fabrigar and Petty (1999) that elicits negative emotions towards lemphurs. Relatively little information about lemphurs was provided. Instead, to elicit a strong, negative emotional response in the message recipients, the passage graphically described the lemphur hunting, brutally killing, and eating a swimmer.

In the affective vocal congruent condition, participants listened to an audio recording in which the negative passage was read in a fearful voice, thus matching the message content on both valence (negative) and arousal (high). In the fully vocal incongruent condition, the same passage was read in a contented voice, thus mismatching the message content on both valence (positive vs. negative) and arousal (low vs. high). In the partial vocal incongruent condition, the same passage was read in a bored voice, thus matching the message content on valence (negative) but mismatching the message content on arousal (low vs. high). Participants assigned to the written condition (control) received a text-only version of the passage used in the audio conditions. Lastly, participants again completed the attitude and affective/cognitive reaction scales, which always matched the presentation order in the attitude formation phase.

A separate pilot study ($N = 27$), was used to pre-test audio versions of the negative persuasion message to confirm that each of the affective vocal qualities conveyed by the speaker was perceived as the intended emotion. Pretesting was done using both open-ended responses, which allowed participants to spontaneously assign an emotion to the vocal quality heard in the recording, as well as closed-ended responses, which used emotion items based on the 8 octants of the Circumplex model of affect (e.g., Remington, Fabrigar, & Visser, 2000).² In the final version

² Raters ($N = 27$) were provided with 8 questions requiring them to evaluate the extent to which the vocal quality heard in the audio recording matched a particular emotion representing one of the 8 octants of the Circumplex model of affect (i.e., active, contentment, excitement, passive, happy, boredom, sadness, and fear). Each octant represents one possible combination of valence and arousal. Responses were recorded on a 1 (*Not at all*), to 7 (*Definitely*) scale. Each rater was also given an open-ended question asking them to list up to five emotional descriptors they thought captured the emotion conveyed by the speaker. All raters completed this process for each of the three audio recordings in which the speaker conveyed one emotion per recording (i.e., fear, boredom, or contentment). Presentation order of the 8 questions and the open-ended responses

of each recording, the intended emotion was the most frequently listed emotion in open-ended responses and the most strongly endorsed emotion in closed-ended responses.

2.2.3. Measures

For each attitude, and affective/cognitive reaction scale item, participants rated the extent to which each word described their responses to the attitude object (scales developed and validated by Crites et al., 1994). Responses were recorded on a 1 (*Not at all*) to 7 (*Definitely*) scale, such that higher numbers reflected more positivity. Overall scores on each scale were computed by reverse coding the negative items, then averaging the scores across all scale items. Complete scales and persuasive passages are included in the online supplementary materials.

2.2.4. Attitude scale

Attitudes were measured using an 8-item scale consisting of different words reflecting general and undifferentiated positive or negative evaluation. Half of the words implied positive evaluations (e.g., good, positive), whereas the other half implied negative evaluations (e.g., dislike, undesirable). Reliability was $\alpha = 0.88$ (pre-persuasion) and $\alpha = 0.91$ (post-persuasion).

2.2.5. Affective scale

The 16-item affective scale required participants to indicate the extent to which 16 different emotions described how the attitude object made them feel. Half of the emotions were positive (e.g., happy, excited), whereas the other half were negative (e.g., tense, angry). Reliability was $\alpha = 0.84$ (pre-persuasion) and $\alpha = 0.89$ (post-persuasion).

2.2.6. Cognitive scale

The 14-item cognitive scale required participants to indicate the extent to which 14 different traits or characteristics described the attitude-object. Half of the traits were positive (e.g., useful, safe), whereas the other half were negative (e.g., harmful, worthless). Reliability was $\alpha = 0.86$ (pre-persuasion) and $\alpha = 0.85$ (post-persuasion).

2.3. Results

2.3.1. Exploration of attitude formation procedures

As expected, pre-persuasion attitudes in the affective ($M = 5.97$, $SD = 0.72$) and cognitive ($M = 5.97$, $SD = 0.77$) formation conditions were favorable and equivalent across conditions, $t(248) = 0.00$, $p > 0.99$, $\eta_p^2 = 0.00$. The attitude bases manipulation was evaluated by computing discrepancy scores to assess pre-persuasion affective and cognitive bases (see Chaiken & Baldwin, 1981; Chaiken, Pomerantz, & Giner-Sorolla, 1995; Crites et al., 1994; Fabrigar & Petty, 1999; Fazio & Zanna, 1978; Norman, 1975; Rosenberg, 1968). We computed the absolute value of the difference between the affect/attitude and cognition/attitude scores. This produced scores with a possible range of 0 to 6, with smaller numbers indicating less discrepancy (higher consistency). Attitudes based on affect should yield a small affect/attitude discrepancy. The reverse is true for attitudes based on cognition.

To test these predictions, a 2 (type of discrepancy: attitude-affective vs. attitude-cognitive) \times 2 (attitude formation: affective basis vs.

(footnote continued)

were counterbalanced. Each vocal quality was deemed acceptable if the results indicated that the average rating for the emotion the voice was intended to convey was above the midpoint on the 7-point scale and significantly greater than the ratings assigned to all other vocal qualities for the target emotion. Additionally, the number of descriptors (e.g., fear could be terror, horror, or fright) correctly matching the target octant of the Circumplex model of affect for a particular vocal quality had to exceed the number of descriptors for the same octant provided for all other vocal qualities (e.g., vocal fear must be described as fear or a synonym significantly more than vocal contentment/boredom is described as fear, etc.).

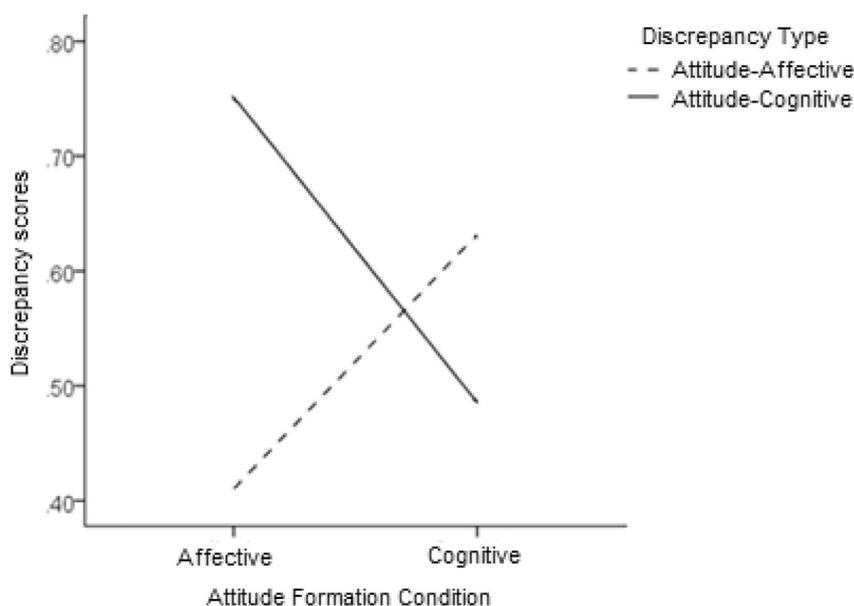


Fig. 1. Discrepancy scores between pre-persuasion attitude/affect and attitude/cognition, across each attitude formation condition (Experiment 1).

cognitive basis) mixed-design ANOVA was conducted with the attitude formation condition designated as the between-subjects factor and the type of discrepancy score as the within-subjects factor.³ Results indicated the main effect of attitude formation condition was not significant, $F(1, 248) = 0.23, p = 0.635, \eta_p^2 = 0.00$. However, the main effect of discrepancy type was significant; $F(1, 248) = 5.79, p = 0.017, \eta_p^2 = 0.02$, indicating that overall, the affective base ($M = 0.52, SD = 0.40$) was less discrepant than the cognitive base ($M = 0.62, SD = 0.57$). Of critical importance was the interaction between attitude formation condition and discrepancy type, $F(1, 248) = 36.44, p < 0.001, \eta_p^2 = 0.13$. The estimated marginal means associated with this interaction are presented in Fig. 1. Confirming the success of our attitude bases manipulation, a planned contrast of the mean discrepancy scores in the affective formation condition revealed a smaller attitude-affect discrepancy score ($M = 0.41, SD = 0.34$) than attitude-cognition discrepancy score ($M = 0.75, SD = 0.69$), $F(1, 248) = 35.64, p < 0.001, \eta_p^2 = 0.13$. Similarly, a planned contrast of the mean discrepancy scores in the cognitive formation condition revealed a smaller attitude-cognition discrepancy score ($M = 0.49, SD = 0.40$) than attitude-affect discrepancy score ($M = 0.63, SD = 0.45$), $F(1, 248) = 6.59, p = 0.011, \eta_p^2 = 0.03$.

2.3.2. The effects of vocal qualities and message content on persuasion

The primary hypotheses regarding persuasion effects were tested in a 2 (attitude formation: affective base vs. cognitive base) \times 4 (persuasive message type: vocal congruent vs. vocal partially incongruent vs. vocal fully incongruent vs. written passage) ANCOVA.⁴ Post-

³ A second method of testing this effect utilizes a regression analyses. The pattern of effects within each attitude formation condition in this experiment and subsequent experiments matched expectations and was similar to prior research. That is, within the affective formation condition, the affective basis was a significantly better predictor of pre-persuasion attitude relative to the cognitive basis. In study 1, although the data revealed the expected opposite pattern within the cognitive formation condition, the difference between coefficients was not significant. However, comparisons across formation conditions provided support for the relative success of our formation manipulation. In studies 2 and 3, the expected pattern emerged within both the affective and cognitive formation condition and was significant.

⁴ Two alternative ways this analysis can be conducted involve a 2 \times 4 ANOVA. Both analyses use attitude formation condition and persuasion passage-type as the independent variables. However, the first analysis uses attitude change scores that assess the difference between a measure of participants pre- and post-persuasion attitudes as the dependent variable, whereas the second analysis uses a measure of post-attitude as the dependent variable. For purposes of comparison, these analyses were conducted in addition to the ANCOVA presented above. Both analyses yielded similar results as the ANCOVA in all

persuasion attitude was designated as the dependent variable whereas pre-persuasion attitude was designated as the covariate. The covariate was not significant, $F(1, 241) = 0.10, p = 0.752, \eta_p^2 = 0.00$.

Because an initially favorable attitude was created and the affective persuasive message was negative, lower post-persuasion attitude scores indicate greater persuasion as well as more negative attitudes. Recall that prior research (e.g., Fabrigar & Petty, 1999) suggests a matching effect between attitude base and persuasive message-type. Thus, because all participants received an affective persuasion message, we expected a main effect of attitude formation condition reflecting more persuasion for those whose initial attitude was based on affect versus cognition. As expected, persuasion was greater for participants with initially affective ($M = 2.37, SD = 1.19$) relative to cognitive attitudes ($M = 2.93, SD = 1.19$), $F(1, 241) = 13.68, p < 0.001, \eta_p^2 = 0.05$.

Based on the incongruity hypothesis, we predicted a main effect of persuasion passage-type on post-persuasion attitudes. Confirming expectations, this effect was significant, $F(3, 241) = 5.42, p = 0.001, \eta_p^2 = 0.06$. As a point of comparison, our baseline written passage produced moderately negative attitudes ($M = 2.81, SD = 1.18$), thus indicating the written content was sufficient to substantially change participants' initially favorable attitudes. Consistent with the incongruity hypothesis, a planned contrast revealed that attitude change elicited by vocal fear ($M = 3.08, SD = 1.18$) was non-significantly less than the written passage, $F(1, 241) = 1.63, p = 0.202, \eta_p^2 = 0.01$. The incongruity hypothesis suggests that affective vocal qualities incongruent with the intent of the content should enhance persuasion. Indeed, contrasts revealed that vocal boredom ($M = 2.32, SD = 1.18$) elicited more attitude change than the written passage, $F(1, 241) = 5.30, p = 0.022, \eta_p^2 = 0.02$, as well as vocal fear, $F(1, 241) = 12.83, p < 0.001, \eta_p^2 = 0.05$. Likewise, vocal contentment ($M = 2.39, SD = 1.19$) elicited more attitude change than the written passage, $F(1, 241) = 3.84, p = 0.051, \eta_p^2 = 0.02$, and vocal fear, $F(1, 241) = 10.49, p = 0.001, \eta_p^2 = 0.04$. Finally, no difference emerged when comparing vocal boredom (partial voice-content incongruence) with vocal contentment (full voice-content incongruence), $F(1, 241) = 0.12, p = 0.731, \eta_p^2 = 0.00$.

Lastly, we hypothesized an attitude formation by persuasion passage-type interaction, reasoning that individuals with predominantly

(footnote continued)

studies, thus are not presented. Furthermore, these analyses confirm that our results are not reliant on whether or not the covariate was significant.

affective target-relevant attitudes may be more sensitive to affective vocal cues than individuals with predominantly cognitive target-relevant attitudes. However, no interaction was found, $F(3, 241) = 0.27$, $p = 0.845$, $\eta_p^2 = 0.00$.

2.4. Discussion

These data replicated past research (e.g., Fabrigar & Petty, 1999) by demonstrating that individuals with affective (vs. cognitive) attitudes were more responsive to affective persuasive appeals. Importantly, Experiment 1 provided support for the incongruency hypothesis, in that persuasion was enhanced when affective vocal cues mismatched the message's emotional content. Incongruency effects were not moderated by initial attitude base, contrary to the differential sensitivity hypothesis.

3. Experiment 2

Although Experiment 1 provided support for an initial test of the incongruency hypothesis, the process by which affective vocal qualities exert their effects remained unclear. For example, recipients may use the speaker as a comparison point when evaluating the intensity of their emotional responses to the message, and thus feel particularly afraid – and therefore negative towards the attitude object, when the speaker sounds relatively unafraid (a contrast effect). Alternatively, recipients may attribute the source of their emotional response to the attitude object rather than to the emotions in speakers' voices, when voice and content are incongruent (an attribution effect). Thus, the goal of Experiment 2 was to test two potential mechanisms responsible for the voice-content incongruency effect.

3.1. Method

3.1.1. Participants and design

Nine hundred ninety undergraduates were recruited in exchange for course credit. Participants were randomly assigned across a 2 (attitude formation: affective base vs. cognitive base) \times 2 (questionnaire order: affective first vs. cognitive first) \times 3 (focal object: lemphur vs. speaker vs. no object) \times 4 (persuasive message type: vocal congruent vs. vocal partially incongruent vs. vocal fully incongruent vs. written passage) between-participant factorial design. Because we predicted a possible 2 \times 3 \times 4 interaction in this study, we increased our minimum participants per condition to 40 to increase the likelihood of detecting this more complex effect. Achieving this objective took three academic semesters.

3.1.2. Procedure

We used the same passages and procedures in the attitude formation phase as in Experiment 1. Likewise, we used the same passage and accompanying vocal qualities (i.e., audio recordings) in the persuasion phase as in Experiment 1. Immediately following the negative persuasion passage, participants were randomly assigned to one of three focal object conditions. In the *lemphur-focus* condition, participants rated the extent to which they thought the lemphur was a frightening creature. This condition was designed to encourage participants to attribute their fear to the lemphur. In the *speaker-focus* condition, participants rated the extent to which the speaker seemed afraid. This condition was designed to encourage participants to contrast their level of fear with that of the speaker. In the *no-object* condition, neither the lemphur nor the speaker was made salient. Thus, this condition replicated the procedure used in all conditions of Experiment 1. Next, participants again completed the attitude, affective and cognitive scales using identical procedures as in Experiment 1. Finally, two questions were presented that asked participants to rate the extent to which they believed their emotional responses were influenced by the lemphur and by the speaker. The two questions were always presented in the same order

(i.e., lemphur then speaker).

3.2. Measures

3.2.1. Focal object

In both the Lemphur-focus and Speaker-focus condition, responses were recorded on 1 (*Not at All*) to 7 (*Definitely*) scales.

3.2.2. Perceived source of negative affect

Participants rated the extent to which they believed the lemphur influenced the level of fear they experienced. Responses were recorded on a 1 (*Not at All*) to 7 (*Definitely*) scale. Participants also rated the extent to which they believed the emotions conveyed by the speaker's voice (narrator in written passage) influenced the level of fear they experienced. Responses were recorded on a scale anchored by -3 (*Much Less Afraid*), 0 (*No Effect on Me*) and $+3$ (*Much More Afraid*).

3.2.3. Affective scale

Reliability was $\alpha = 0.88$ (pre- and post-persuasion).

3.2.4. Cognitive scale

Reliability was $\alpha = 0.84$ (pre-persuasion), and $\alpha = 0.85$ (post-persuasion).

3.2.5. Attitude scale

Reliability was $\alpha = 0.89$ (pre-persuasion) and $\alpha = 0.92$ (post-persuasion).

3.3. Results

3.3.1. Exploration of attitude formation procedures

An investigation of pre-persuasion attitudes in both affective ($M = 5.89$, $SD = 0.88$) and cognitive ($M = 5.89$, $SD = 0.78$) formation conditions revealed initially favorable and equivalent target-relevant attitudes across conditions, $t(988) = 0.04$, $p = 0.966$, $\eta_p^2 = 0.00$. Next, identical procedures were used to test the attitude bases manipulation as those described in Experiment 1. Results indicated the main effect of attitude formation condition was not significant, $F(1, 988) = 1.89$, $p = 0.169$, $\eta_p^2 = 0.00$. However, the main effect of discrepancy type was significant; $F(1, 988) = 20.02$, $p < 0.001$, $\eta_p^2 = 0.02$, indicating that overall, affect ($M = 0.59$, $SD = 0.50$) was less discrepant with attitudes than cognition ($M = 0.67$, $SD = 0.50$). Importantly, the interaction between attitude formation condition and discrepancy type was significant, $F(1, 988) = 239.06$, $p < 0.001$, $\eta_p^2 = 0.20$. The estimated marginal means for this interaction are presented in Fig. 2. Confirming attitude bases were successfully manipulated, a planned contrast between the mean discrepancy scores in the affective formation condition revealed a smaller attitude-affect discrepancy score ($M = 0.43$, $SD = 0.42$) than attitude-cognition discrepancy score ($M = 0.80$, $SD = 0.58$), $F(1, 988) = 200.64$, $p < 0.001$, $\eta_p^2 = 0.17$. Similarly, contrasts between the mean discrepancy scores in the cognitive formation condition revealed a smaller attitude-cognition discrepancy score ($M = 0.55$, $SD = 0.45$) than attitude-affect discrepancy score ($M = 0.75$, $SD = 0.59$), $F(1, 988) = 60.24$, $p < 0.001$, $\eta_p^2 = 0.06$.

3.3.2. The effects of vocal qualities and message content on persuasion

Persuasion effects were tested using a 2 (attitude formation: affective base vs. cognitive base) \times 3 (focal object: lemphur vs. speaker vs. no object) \times 4 (persuasive message type: vocal congruent vs. vocal partially incongruent vs. vocal fully incongruent vs. written passage) ANCOVA. Post-persuasion attitude was designated as the dependent variable whereas pre-persuasion attitude was designated as the covariate. The covariate was significant, $F(1, 965) = 15.32$, $p < 0.001$, $\eta_p^2 = 0.02$.

As in Experiment 1, we expected a main effect of attitude formation

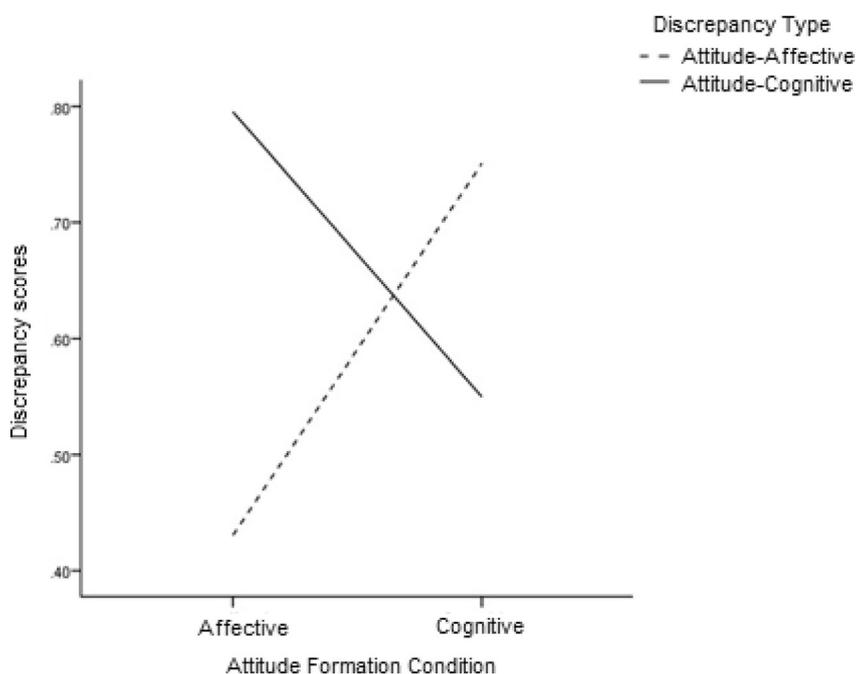


Fig. 2. Discrepancy scores between pre-persuasion attitude/affect and attitude/cognition, across each attitude formation condition (Experiment 2).

condition on post-persuasion attitudes. Confirming expectations, persuasion was greater for participants with initially affective ($M = 2.56$, $SD = 1.20$) relative to cognitive attitudes ($M = 3.14$, $SD = 1.18$), $F(1, 965) = 57.24$, $p < 0.001$, $\eta_p^2 = 0.06$. There was no compelling basis to predict a main effect of focal object condition and this effect was not significant, $F(2, 965) = 2.56$, $p = 0.078$, $\eta_p^2 = 0.01$.

More important, the expected main effect of persuasion passage-type on post-persuasion attitudes was significant, $F(3, 965) = 3.35$, $p = 0.019$, $\eta_p^2 = 0.01$. Once again, the written passage ($M = 2.96$, $SD = 1.19$) elicited negative attitudes towards lemphurs, thus confirming participants' initially favorable target-relevant attitudes were successfully changed. Recall that the incongruity hypothesis suggests attitude change elicited by vocal fear could be less but certainly not greater than the written passage. Indeed, similar to Experiment 1, planned contrasts revealed no difference between the written passage and vocal fear ($M = 2.96$, $SD = 1.19$), $F(1, 965) = 0.00$, $p = 0.985$, $\eta_p^2 = 0.00$. Turning to vocal boredom ($M = 2.67$, $SD = 1.19$), once again contrasts revealed more persuasion than the written passage, $F(1, 965) = 7.18$, $p = 0.007$, $\eta_p^2 = 0.01$, as well as vocal fear, $F(1, 965) = 7.28$, $p = 0.007$, $\eta_p^2 = 0.01$. The incongruity hypothesis also suggests vocal contentment ($M = 2.80$, $SD = 1.20$), should elicit more persuasion than the written passage and vocal fear. Although this pattern emerged in Experiment 1, contrasts revealed a non-significant trend in the expected direction compared with the written passage, $F(1, 965) = 2.12$, $p = 0.145$, $\eta_p^2 = 0.00$, and vocal fear, $F(1, 965) = 2.18$, $p = 0.140$, $\eta_p^2 = 0.00$. Finally, no difference emerged when comparing vocal contentment with vocal boredom, $F(1, 965) = 1.49$, $p = 0.223$, $\eta_p^2 = 0.00$.

Turning to the two-way interactions, we speculated that an attitude formation by persuasion-passage type interaction might emerge, but found no evidence for this effect in Experiment 1. Similarly, in Experiment 2, this interaction did not emerge, $F(3, 965) = 1.34$, $p = 0.262$, $\eta_p^2 = 0.00$. Of more interest was our predicted interaction between persuasion passage-type and focal object condition. Our speculations regarding the role of contrast and attribution as processes suggest that this interaction should emerge. However, this effect was not significant, $F(6, 965) = 1.70$, $p = 0.118$, $\eta_p^2 = 0.01$. This null result is particularly notable given that our large sample allocated approximately 82 participants per cell to test the predicted 3×4 interaction.

The remaining two-way interaction of attitude formation and focal object condition was significant, $F(2, 965) = 4.24$, $p = 0.015$, $\eta_p^2 = 0.01$, but unexpected. When initial attitudes were based on cognition, little variability emerged in post-persuasion attitudes across focal object conditions. A simple main effects analysis confirmed these means did not differ, $F(2, 965) = 0.33$, $p = 0.722$, $\eta_p^2 = 0.00$. In contrast, within the affective attitude basis condition, a simple main effects analysis revealed significant variability in attitudes across focal object conditions, $F(2, 965) = 6.66$, $p = 0.001$, $\eta_p^2 = 0.01$. Multiple pairwise comparisons using an LSD test indicated that our baseline, no focus group ($M = 2.55$, $SD = 1.67$), generated fairly negative attitudes towards the lemphur. Focusing on the speaker led to a marginally significant increase in attitude change ($M = 2.33$, $SD = 1.66$), $p = 0.096$, $\eta_p^2 = 0.01$, whereas focusing on the lemphur led to significantly less attitude change, ($M = 2.80$, $SD = 1.67$), $p = 0.049$, $\eta_p^2 = 0.01$. Last, the three-way interaction between attitude formation, focal object, and persuasive passage-type conditions was not significant, $F(6, 965) = 0.68$, $p = 0.668$, $\eta_p^2 = 0.00$.

3.3.3. Perceived sources of affect as mediators of the effects of vocal qualities on persuasion

Although the interaction between focal object condition and persuasive passage-type condition was non-significant, two supplementary questions allowed for an additional approach to testing the attribution explanation. Specifically, participants rated the extent to which they attributed their fear to the speaker's voice ($M = 4.55$, $SD = 1.89$), and the extent to which they attributed their fear to the lemphur ($M = 4.95$, $SD = 1.65$).⁵ These measures were correlated at $r(990) = 0.19$, $p < 0.001$, suggesting substantial independence. In testing the attribution explanation, we investigated whether the relationship between vocal qualities and post-persuasion attitudes was mediated by these attribution items.⁶ These analyses excluded the written condition

⁵ Experiment 2 does not include measures to adequately test the contrast process. A proper test of this theory would require the participant to rate the extent to which he/she experienced fear when listening to the audio recordings. For example, the contrast explanation suggests that when listening to a bored or content speaker, participants should judge themselves as more afraid, which should enhance attitude change. By contrast, when listening to a fearful speaker, participants should judge themselves as comparatively less afraid, which may reduce attitude change.

⁶ Experiment 2 contained measures that provided an additional means of testing the

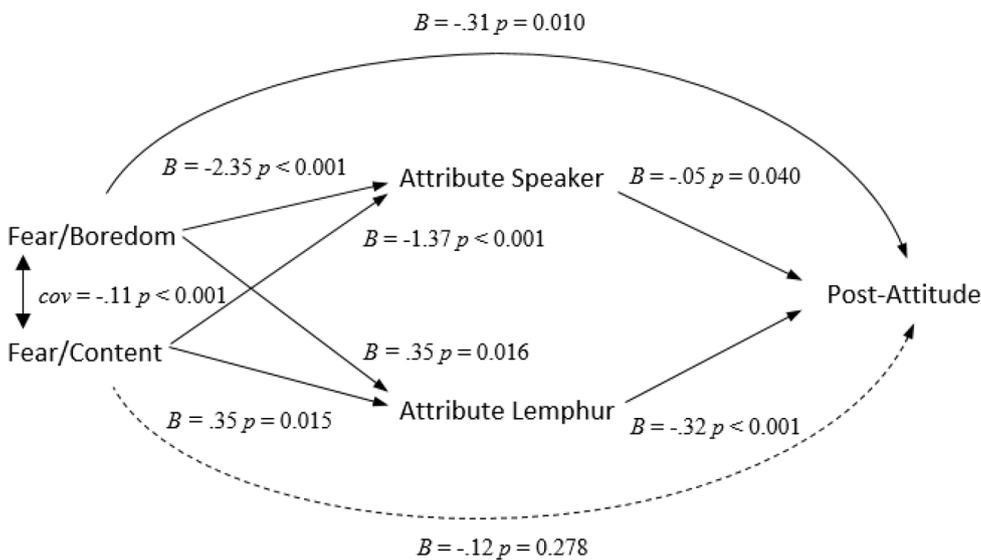


Fig. 3. Attribution source as a mediator of the relationship between vocal qualities and post-persuasion attitudes (Experiment 2).

because this group never heard the speaker. Instead, we employed vocal fear as our baseline; first because this allowed us to make direct comparisons between vocal qualities, and second because vocal fear engendered attitude change comparable to the written condition.

To test these relationships we created two dummy-coded variables representing assignment to the three vocal conditions. Our first dummy-coded variable assigned fear and contentment a 0 and boredom a 1. Our second dummy-coded variable assigned fear and boredom a 0 and contentment a 1. Thus, membership in all three vocal conditions were represented across the two variables. Vocal fear's coding as 0 in both variables makes it our baseline of comparison. Thus, when simultaneously entering the two dummy-coded variables into a regression model, the first coefficient reflects as a comparison between vocal boredom/fear, and the second coefficient compares vocal contentment/fear. The mediational model tested in this set of analyses is presented in Fig. 3. Unstandardized regression coefficients are provided as estimates for each path. Solid lines indicate significant paths whereas dotted lines indicate non-significant paths.

Starting with the left side of the model, we examine the impact of vocal qualities on attributions of participants' fear to the speaker. The negative coefficients for both vocal condition dummy variables reveal that, relative to the fearful speaker, participants perceived the bored $B = -2.35, SE = 0.15, p < 0.001$, and content $B = -1.37, SE = 0.15, p < 0.001$, speakers as decreasing their experience of fear. Conversely, paths between both dummy variables and attributions of participants' fear to the lemphur are positive. Thus, relative to a fearful speaker, participants who listened to a bored $B = 0.35, SE = 0.14, p = 0.016$, or content $B = 0.35, SE = 0.14, p = 0.015$, speaker attributed their fear more to the lemphur. This fits with the attribution explanation, which suggests that voice-content incongruency is attributionally unambiguous, thus people should perceive any fear they experience as originating from the lemphur rather than the speaker. In contrast, a fearful speaker is attributionally ambiguous, thus any fear

experienced might originate from either the lemphur or the speaker.

Examining the paths between the mediators and post-persuasion attitudes, we see that perceiving the lemphur $B = -0.32, SE = 0.03, p < 0.001$, as a source of fear has a negative effect on post-persuasion attitudes. Indeed, if the lemphur is the source of participants' fear, their fear should be seen as diagnostic for evaluating the animal and thus lead to more negative attitudes towards lemphurs. Conversely, the attribution explanation suggests perceptions of the speaker should have a positive effect on attitudes because the more one sees the speaker as the cause of their fear, the less that fear should be seen as diagnostic for evaluating lemphurs. Interestingly, a weak but significant negative effect emerged $B = -0.05, SE = 0.03, p = 0.040$. Thus, perceiving the speaker as causing one's fear also resulted in more persuasion. However, this effect was much weaker than the effect of attributions of fear to lemphurs.

As an additional test of whether attributions of affect mediated between persuasion condition and post-persuasion attitudes, bootstrapping was performed using PROCESS (Hayes, 2012). Unstandardized indirect effects were computed for each of 10,000 bootstrapped samples using bias-corrected bootstrap 95% confidence intervals (CI_{95}). As expected, attributions of fear to lemphurs significantly mediated the effects of fear versus boredom, $B = -0.26, CI_{95}: [-0.393, -0.167]$, as well as the effects of fear versus contentment, $B = -0.20, CI_{95}: [-0.320, -0.104]$. Attributions to the speaker also significantly mediated the effects of fear versus boredom, $B = 0.12, CI_{95}: [0.006, 0.251]$, and fear versus contentment, $B = 0.07, CI_{95}: [0.007, 0.154]$. However, it should be noted that these latter mediational effects were positive, indicating that this second mediational effect actually weakened the overall effects of vocal condition on persuasion. Finally, we observed a negative direct effect of the fear/boredom $B = -0.31, SE = 0.12, p = 0.010$, dummy variable. Thus, the impact of vocal boredom (vs. fear) on attitudes was not fully explained by the mediators. The direct effect of contentment (vs. fear), $B = -0.12, SE = 0.11, p = 0.278$, was non-significant.

3.4. Discussion

Experiment 2 once again confirmed that individuals with affective (vs. cognitive) attitudes were more responsive to affective persuasive appeals. Experiment 2 also largely replicated the vocal incongruency effect on persuasion found in Experiment 1. Again, no difference was found when comparing vocal fear with the written passage. Vocal boredom again generated more persuasion than the written passage and vocal fear. Although persuasion generated by vocal contentment was in

(footnote continued)

attribution explanation. This analyses focused only on those participants assigned to the lemphur-focus condition ($N = 336$). Participants were asked to rate the extent to which they thought the lemphur was a frightening creature. This allowed us to evaluate the extent to which the different vocal conditions influenced how frightening participants perceived the lemphur and whether these perceptions mediated the effects of vocal condition on post-message attitudes. This model employed a similar strategy to test the hypothesized mediational effects of vocal qualities on post-persuasion attitudes as the model described in the Results section of Experiment 2. Confirming expectations, the pattern of effects matched those predicted by the attribution explanation, thus providing further support for the attribution explanation.

the expected direction, it did not differ from the written passage or vocal fear. Our primary analyses to test potential mechanisms underlying the incongruity effect did not produce the expected interaction. However, supplementary analyses provided support for our hypothesized attribution mechanism.

4. Experiment 3

In addition to replicating the results of the prior two studies, our goal in Experiment 3 was to provide a more comprehensive test of the processes driving these effects, using a mediational strategy. Beyond the attribution and contrast explanation explored in Experiment 2, we considered two additional explanations for the affective voice-content incongruence effects that emerged in the prior studies. First, incongruity may elicit surprise in the recipient. For example, fear-eliciting content delivered by a speaker who sounded extremely bored would be unexpected because this pairing is atypical, possibly leading the recipient to wonder why the speaker would sound indifferent when describing a scary object. Surprise has been found to enhance message elaboration which in turn enhances persuasion if a message is strong (Petty, Fleming, Priester, & Feinstein, 2001; Schützwohl & Borgstedt, 2005).

Second, incongruity may influence perceptions of a speaker's persuasive intentions. For example, a speaker who delivered intense, fear-eliciting content in a fearful voice may be perceived as attempting to persuade the recipient. In turn, recipients may attempt to resist by counter-arguing (Brock, 1967; Hass & Grady, 1975; Lee, 2010). By contrast, if the same content were delivered by a speaker who sounded extremely bored, it is less likely that recipients would perceive the speaker as attempting to influence their attitudes. Consequently, fewer counter-arguments may be generated.⁷

4.1. Method

4.1.1. Participants and design

Seven hundred and seven undergraduates were recruited in exchange for course credit. Participants were randomly assigned across a 2 (attitude formation: affective base vs. cognitive base) \times 2 (questionnaire order: affective first vs. cognitive first) \times 4 (persuasive message type: vocal congruent vs. vocal partially incongruent vs. vocal fully incongruent vs. written passage) between participants factorial design. Because the highest-order expected effect was a 2 \times 4 interaction, in Experiment 3 we sought a minimum of 50 participants per condition to test this effect. We opted for a more stringent criterion than Experiment 2 because several predicted effects in Experiment 2 were slightly weaker than the original experiment, thus suggesting the need for more participants. This goal was reached during the second semester of data collection, but data collection continued until the end of that semester.

4.1.2. Procedure

The passages, audio recordings, and procedures used in both the attitude formation and persuasion phases were identical to those used in Experiments 1 and 2.

4.2. Measures

4.2.1. Affective scale

Reliability was $\alpha = 0.88$ (pre- and post-persuasion).

4.2.2. Cognitive scale

Reliability was $\alpha = 0.84$ (pre- and post-persuasion).

⁷ The authors would like to acknowledge the contributions of an anonymous reviewer for suggesting this as a possible mechanism to account for the effects of voice-content congruency on attitude change.

4.2.3. Attitude scale

Reliability was $\alpha = 0.89$ (pre- and post-persuasion).

4.2.4. Hypothesized mediators of the effects of vocal qualities on persuasion

Four mechanisms hypothesized to account for the effects of vocal qualities on persuasion were tested.⁸ The presentation order of the measures testing these four mechanisms was randomized. However, the question order for items assessing each mechanism was fixed to the order described below.

4.2.5. Attributional measure

Experiment 3 used an expanded version of the attributional measure used in Experiment 2 by employing three questions that asked participants to rate the extent to which they believed the lemphur influenced the level of *fear*, *tension*, and *distress* they experienced. Responses were recorded on a 1 (*Not at All*) to 7 (*A Great Deal*) scale. Participants also rated the extent to which they believed the emotions expressed by the speaker's voice (narrator in written passage), influenced the level of *fear*, *tension*, and *distress* they experienced. Responses were recorded on a scale anchored by -3 (*Much Less Afraid/Tense/Distressed*) 0 (*No Effect on Me*), and $+3$ (*Much More Afraid/Tense/Distressed*). Overall scores on each measure were obtained by averaging scores across all three scales associated with ratings of each target (lempur vs. speaker). Reliability for the lempur-focused attributional measure was $\alpha = 0.91$. Reliability for the speaker-focused attributional measure was $\alpha = 0.93$.

4.2.6. Contrast measure

Participants rated the extent to which they felt *afraid*, *tense*, and *distressed*. Participants also rated the extent to which they believed the speaker (narrator) felt *afraid*, *tense*, and *distressed*. Responses were recorded on a 1 (*Not at All*) to 7 (*Definitely*) scale. Overall scores on each measure were computed by averaging scores across all three scales associated with ratings of each target (self vs. speaker). Self-ratings served as the dependent variable of interest whereas ratings of the speaker were a manipulation check of our vocal quality conditions. Reliability for the self-ratings (speaker-ratings) contrast measure was $\alpha = 0.94$, ($\alpha = 0.98$).

4.2.7. Surprise measure

Participants rated the extent to which they were surprised by the tone of voice used by the speaker (narrator) on a single item. Responses were recorded on a 1 (*Not at All Surprised*) to 7 (*Extremely Surprised*) scale.

4.2.8. Persuasive intent measure

Participants rated the extent to which they believed the speaker (narrator) was trying to influence their opinion of the lempur on a single item. Responses were recorded on a 1 (*Not at All*) to 7 (*Definitely*) scale.

4.3. Results

4.3.1. Exploration of attitude formation procedures

Consistent with Experiments 1 and 2, an investigation of pre-persuasion attitudes in both affective ($M = 5.89$, $SD = 0.85$) and cognitive ($M = 5.99$, $SD = 0.83$) formation conditions revealed equally favorable target-relevant attitudes across conditions, $t(705) = 1.649$, $p = 0.100$, $\eta_p^2 = 0.00$. Next, we employed identical procedures as in

⁸ A further mechanism proposed by a reviewer suggested that participants may perceive the speaker as having privileged knowledge regarding the lempur. Measures testing this possibility were included in Experiment 3 but omitted from our discussion of the various mechanisms because the rationale on which its predictions were based was not entirely clear to the authors. Nevertheless, this mechanism was included in our analyses. As anticipated, our data indicated the pattern of effects that emerged was not consistent with the pattern predicted by the incongruity hypothesis.

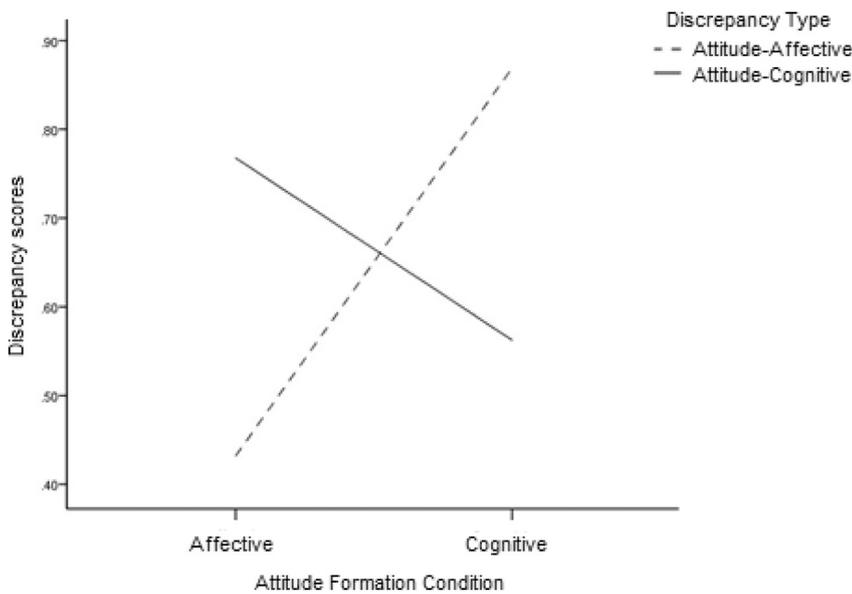


Fig. 4. Discrepancy scores between pre-persuasion attitude/affect and attitude/cognition, across each attitude formation condition (Experiment 3).

the prior experiments to test our attitude bases manipulation. Unlike Experiment 1 and 2, the main effect of attitude formation condition was significant, $F(1, 705) = 12.44$, $p < 0.001$, $\eta_p^2 = 0.02$, indicating that participants' attitude bases (collapsing across affective and cognitive bases) were more discrepant from their attitudes in the cognitive ($M = 0.72$, $SD = 0.43$) than in the affective attitude formation condition ($M = 0.60$, $SD = 0.44$). Also different than Experiment 1 and 2, the main effect of discrepancy type was not significant, $F(1, 705) = 0.41$, $p = 0.524$, $\eta_p^2 = 0.00$. However, critical to the success of our attitude formation manipulation, the interaction between attitude formation condition and discrepancy type was significant, $F(1, 705) = 200.42$, $p < 0.001$, $\eta_p^2 = 0.22$. The estimated marginal means associated with this interaction are presented in Fig. 4. Confirming attitude bases were manipulated, a planned contrast between discrepancy scores in the affective formation condition revealed a smaller attitude-affect ($M = 0.43$, $SD = 0.42$) than attitude-cognition discrepancy score ($M = 0.77$, $SD = 0.56$), $F(1, 705) = 112.78$, $p < 0.001$, $\eta_p^2 = 0.14$. Similarly, a planned contrast between discrepancy scores in the cognitive formation condition revealed a smaller attitude-cognition ($M = 0.56$, $SD = 0.45$) than attitude-affect discrepancy score ($M = 0.87$, $SD = 0.66$), $F(1, 705) = 93.54$, $p < 0.001$, $\eta_p^2 = 0.12$.

4.3.2. The effects of vocal qualities and message content on persuasion

Hypotheses regarding the persuasion effects were tested using a 2 (attitude formation: affective base vs. cognitive base) \times 4 (persuasive message type: vocal congruent vs. vocal partially incongruent vs. vocal fully incongruent vs. written passage) ANCOVA. Post-persuasion attitude was designated as the dependent variable, and pre-persuasion attitude was designated as the covariate. The covariate was non-significant, $F(1, 698) = 0.25$, $p = 0.615$, $\eta_p^2 = 0.00$.

Similar to Experiment 1 and 2, a main effect of attitude formation condition on post-persuasion attitudes indicated that participants with affective attitudes ($M = 2.23$, $SD = 1.10$) were more persuaded by an affective persuasive appeal than participants with cognitive attitudes ($M = 2.96$, $SD = 1.10$), $F(1, 698) = 77.78$, $p < 0.001$, $\eta_p^2 = 0.10$. Importantly, the main effect of persuasion passage-type on post-persuasion attitudes was significant, $F(3, 698) = 4.68$, $p = 0.003$, $\eta_p^2 = 0.02$. The written passage ($M = 2.78$, $SD = 1.09$) elicited negative attitudes towards lemphurs, thus confirming participants' initially favorable target-relevant attitudes were successfully changed. Replicating the effects of Experiment 1 and 2, planned contrasts revealed no difference between the written condition and vocal fear ($M = 2.68$, $SD = 1.10$), $F(1, 698) = 0.70$, $p = 0.401$, $\eta_p^2 = 0.00$. For

the third time, contrasts revealed that vocal boredom ($M = 2.36$, $SD = 1.10$), elicited more attitude change than the written passage, $F(1, 698) = 12.45$, $p < 0.001$, $\eta_p^2 = 0.02$, as well as vocal fear, $F(1, 698) = 7.23$, $p = 0.007$, $\eta_p^2 = 0.01$. Replicating Experiment 1, contrasts indicated a marginally significant increase in attitude change for vocal contentment ($M = 2.56$, $SD = 1.10$), over the written passage, $F(1, 698) = 3.51$, $p = 0.061$, $\eta_p^2 = 0.01$; however, no difference emerged relative to vocal fear, $F(1, 698) = 1.07$, $p = 0.301$, $\eta_p^2 = 0.00$. Once again, comparing vocal contentment with vocal boredom revealed no difference, $F(1, 698) = 0.02$, $p = 0.891$, $\eta_p^2 = 0.00$. Overall, these results support the incongruity hypothesis for the third time.

Contrary to Experiments 1 and 2, the two-way interaction between attitude formation condition and persuasion passage-type was significant, $F(3, 698) = 2.73$, $p = 0.043$, $\eta_p^2 = 0.01$. That this effect emerged is puzzling given its lack of significance ($ps > 0.267$) in the prior two studies, particularly given the large sample in Experiment 2. The pattern of means suggest greater differentiation between our three vocal conditions for participants with affective (vs. cognitive) attitudes. This pattern fits with the differential sensitivity hypothesis described earlier. However, unlike the prior two studies, the data revealed large differences in the effectiveness of the written passage across attitude formation conditions. Specifically, whereas highly negative attitudes emerged in the affective condition, attitudes were much less negative in the cognitive condition. Because we have no clear theoretical reason to expect this pattern and it did not emerge in the prior two studies, we are reluctant to impart too much importance to this effect without replication. Of more central importance is the fact that the critical persuasion passage main effect that emerged in Experiments 1 and 2 was again replicated in Experiment 3.

4.3.3. Testing hypothesized mediators of the effects of vocal qualities on persuasion

An important goal of Experiment 3 was to provide a second test of the attributional explanation for the incongruity effect while also testing several alternative mechanisms. Beyond using a more comprehensive measure of attribution, additional measures were included to evaluate whether contrast effects, surprise, or perceptions of persuasive intent mediated the relationship between affective vocal qualities and post-persuasion attitudes. Correlations between all mediators are reported in Table 1. None exceeded $r(705) = 0.58$, $p < 0.001$, suggesting substantial independence among the mediators. Each hypothesized mediator was initially evaluated separately using a 2

Table 1
Correlations and descriptive statistics for Experiment 3 mediators.

Measure	1	2	3	4	5	M	SD
1. Attribute-lemphur	–	0.21**	0.58**	0.21**	0.05	4.99	1.56
2. Attribute-speaker		–	0.31**	0.02	0.37**	4.82	1.64
3. Contrast-self			–	0.18*	0.04	4.51	1.69
4. Surprise				–	0.11*	5.10	1.80
5. Persuasive intent					–	5.57	1.87

Note. Degrees of freedom for each comparison: 705.

* $p < 0.05$.

** $p < 0.001$.

Table 2
Initial test of each mechanism as a mediator of the relationship between vocal qualities and post-persuasion attitudes.

Measure	F value	P value	Persuasive passage-type means (SDs)			
			Written	Fear	Bored	Content
1. Attribute-lemphur	5.08	0.002	5.11 (1.55)	4.60 (1.54)	5.11 (1.55)	5.14 (1.55)
2. Attribute-speaker	89.71	< 0.001	5.57 (1.40)	5.65 (1.40)	4.47 (1.39)	3.56 (1.39)
3. Contrast-self	1.03	0.377	4.45 (1.68)	4.37 (1.69)	4.53 (1.68)	4.67 (1.68)
4. Surprise	6.64	< 0.001	5.14 (1.77)	5.28 (1.77)	5.39 (1.78)	4.61 (1.78)
5. Persuasive intent	59.08	< 0.001	6.18 (1.68)	6.55 (1.68)	4.45 (1.67)	5.10 (1.67)

Note. All degrees of freedom for each measure are: Numerator = 3, Denominator = 699.

(attitude formation: affective base vs. cognitive base) × 4 (persuasive message-type: vocal congruent vs. vocal partially incongruent vs. vocal fully incongruent vs. written passage) factorial ANOVA. In each case, one of the four hypothesized processes was designated as the dependent variable with persuasive passage-type and attitude basis designated as the independent variables. The results of these analyses can be found in Table 2. To have been considered a viable candidate for additional testing as a mediator, the persuasive passage-type main effect had to be significant and the means associated with that effect had to match the pattern predicted by the incongruency hypothesis.

As found in Table 2, a significant main effect of persuasive passage-type emerged for all hypothesized mediators except contrast-self (thereby eliminating contrast as a potential mechanism). The pattern of means for both the attribution and persuasive intent measures were consistent with the incongruency hypothesis. However, the pattern of the persuasive passage-type means for surprise did not match the pattern predicted by the incongruency hypothesis (surprise should be greatest in conditions where attitude change was most pronounced), so further evaluation of this mechanism was not conducted.

4.3.4. Perceived sources of affect as mediators of the effects of vocal qualities on persuasion

Similar to Experiment 2, we first investigated whether the relationship between vocal qualities and post-persuasion attitudes was mediated by participants' attributions of their fear to the speaker and to the lemphur. The mediation model tested in this set of analyses is presented in Fig. 5. Starting with the left side of the model, we examined participants' perceptions of the extent to which the speaker influenced their level of fear. The data revealed that relative to the fearful speaker, participants perceived both the bored $B = -2.09$, $SE = 0.16$, $p < 0.001$, and content $B = -1.19$, $SE = 0.16$, $p < 0.001$, speakers as decreasing their level of fear. Next, we examined perceptions of the extent to which the lemphur influenced participants' level of fear. As expected, the data indicated that relative to the fearful speaker, participants who listened to either the bored

$B = 0.52$, $SE = 0.17$, $p = 0.002$, or content $B = 0.55$, $SE = 0.17$, $p = 0.001$, speaker perceived the lemphur as exerting a greater impact on their level of fear.

Moving to the paths between the mediators and post-persuasion attitudes, we again find that perceptions of lemphurs as a source of fear $B = -0.21$, $SE = 0.03$, $p < 0.001$, had the expected negative effect on post-persuasion attitudes. Thus, viewing the lemphur as the source of fear led to more negative attitudes towards lemphurs. As in Experiment 2, the path between the speaker as a source of fear $B = -0.08$, $SE = 0.03$, $p = 0.010$, and post-persuasion attitudes was significantly negative. Finally, considering the direct effects of condition dummy variables on post-persuasion attitudes, as in Experiment 2, we see that both the fear/boredom, $B = -0.39$, $SE = 0.14$, $p = 0.004$, and fear/contentment, $B = -0.11$, $SE = 0.12$, $p = 0.358$, dummy variable had the expected negative effect on attitudes. However, only the fear/boredom dummy variable reached significance. Taken together, these analyses further support the attribution explanation for voice-content incongruence persuasion effects.

Our next step was to test whether attributions regarding the sources of affect mediated the relationship between vocal qualities and post-persuasion attitudes, controlling for persuasive intent. We used bootstrapping procedures performed through PROCESS (Hayes, 2012), as in Experiment 2. Once again, attributions of fear to lemphurs mediated the effects of fear versus boredom, $B = -0.14$, CI_{95} : [-0.241, -0.065], as well as the effects of fear versus contentment, $B = -0.12$, CI_{95} : [-0.212, -0.051] on post-persuasion attitudes. Attributions to the speaker also mediated the effects of fear versus boredom, $B = 0.26$, CI_{95} : [0.127, 0.416], and fear versus contentment, $B = 0.15$, CI_{95} : [0.075, 0.249] on post-persuasion attitudes. However, similar to Experiment 2, these latter mediational effects were positive whereas the overall effect of the condition dummy variables on the dependent variable was negative. Thus, this second mediational effect actually served to weaken the overall effects of both vocal conditions on persuasion.

4.3.5. Perceived persuasive intent as mediator of the effects of vocal qualities on persuasion

Because the persuasive intent means were also consistent with the incongruency hypothesis, our next step was to test whether this variable mediated the relationship between vocal qualities and post-persuasion attitudes. Relative to the fearful speaker, participants perceived both the bored $B = -2.11$, $SE = 0.19$, $p < 0.001$, and content $B = -1.45$, $SE = 0.19$, $p < 0.001$, speakers as having lower persuasive intentions. This pattern conforms to the incongruency hypothesis: perceiving the message source as attempting to persuade may elicit reactance, which in turn could provoke counter-arguing and thus reduce persuasion. By contrast, a bored or content speaker should be perceived as making a comparatively weak attempt to persuade the recipient, thus decreasing resistance. Finally, examining the path between the hypothesized mediator and post-persuasion attitudes, we see that persuasive intent did not impact participants' post-persuasion attitudes, $B = -0.02$, $SE = 0.03$, $p = 0.451$. Thus, it is unlikely that persuasive intent accounts for the effects of vocal qualities on persuasion.

4.4. Discussion

As in Experiments 1 and 2, Experiment 3 demonstrated that an affective message elicited more persuasion for individuals with initially affective attitudes than cognitive attitudes. More importantly, Experiment 3 largely replicated the effects of voice on persuasion that emerged in Experiment 1 and manifested in a weaker form in Experiment 2. For the third time, vocal fear elicited comparable persuasion to the written passage, and vocal boredom elicited more persuasion than the written passage and vocal fear. Although the effects of vocal contentment were in the expected direction, no difference emerged relative to the written passage or vocal fear. Importantly,

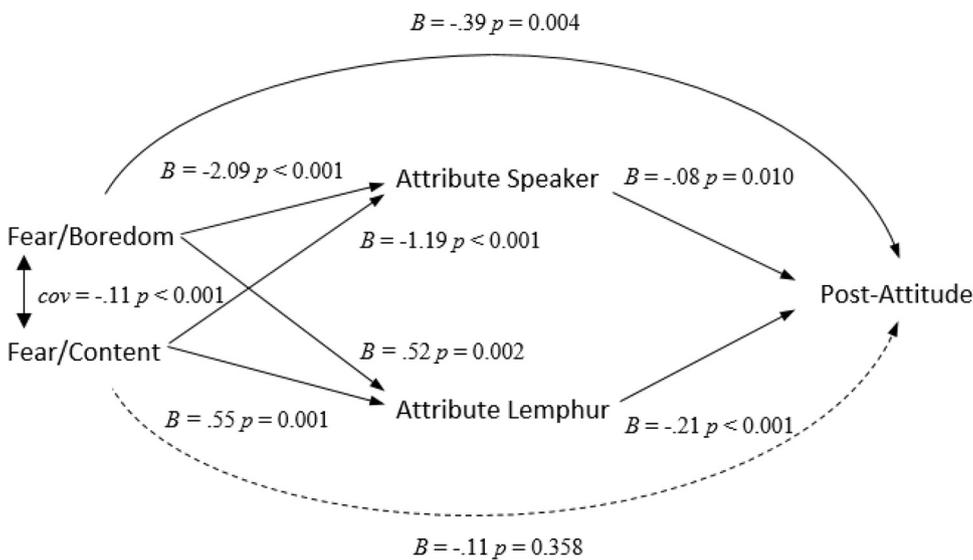


Fig. 5. Attribution source as a mediator of the relationship between vocal qualities and post-persuasion attitudes (Experiment 3).

mediational analyses in Experiment 3 provided further support for an attributional explanation for the effects of vocal affect. Experiment 3 also tested and rejected other mechanisms including contrast, surprise, and persuasive intent explanations.

5. General discussion

5.1. Summary of findings

Three experiments supported the incongruity hypothesis that for high-intensity affective messages, persuasion is significantly enhanced when a speaker's affective vocal cues are incongruent with the message's emotional content. A message designed to elicit fear produced more persuasion when delivered in a bored or content voice. Contrasts comparing the bored voice condition with both the written passage and fearful voice condition were significant in all three studies. Not surprisingly, a meta-analysis (weighted by sample size) of these contrasts indicated that the bored/written effect ($Z = 4.59, p < 0.001, d = 0.22$) and the bored/fearful effect ($Z = 4.39, p < 0.001, d = 0.22$) were significant. Contrasts comparing the content voice condition with either the written message condition or fearful voice condition produced some significant effects in Experiments 1 and 3 but not in Experiment 2. However, a meta-analysis of these effects suggested that both the content/written ($Z = 2.62, p = 0.009, d = 0.13$) and content/fearful ($Z = 2.41, p = 0.016, d = 0.13$) effects were significant, but of smaller magnitude. Mediation analyses in Experiments 2 and 3 supported the attributional mechanism of voice-content incongruity on persuasion. Additionally, Experiment 3 ruled out competing explanations.

5.2. Implications and unresolved issues

The present experiments constitute the first systematic exploration of the effects of vocal affect-message content (in)congruity on persuasion. These studies demonstrated that within the context of a high-intensity affective message, somewhat counter-intuitively, voice-content incongruity enhanced the impact of a message. Furthermore, these studies suggest that the interplay between vocal qualities and the content of strongly affective messages may influence persuasion via an individual's perceptions regarding the source of their emotions. Sometimes, such as when an affective message is delivered via written format, the recipient can unambiguously attribute their emotional responses to the attitude object described by the message. However, the recipient of a vocally expressed message can attribute their emotional

reactions to multiple sources: the attitude object described by the content, or to the speaker's vocal qualities. Vocal qualities incongruent with the message's content may reduce this attributional ambiguity, leading the recipient to attribute their emotional response to the attitude object and thus view their emotions as diagnostic of the attitude object, consequently enhancing attitude change.

Although many of our hypotheses were supported by the findings, some predictions were not supported. For example, two of three experiments failed to support the idea that incongruity effects might be stronger for affectively-based attitudes. Despite a significant interaction in Experiment 3, we hesitate to make any claims regarding this effect given its lack of significance in two previous studies and the difficult to interpret pattern of the means. Of course, even if we discount the interaction in Experiment 3 as spurious, this begs the broader question of why this predicted interaction did not emerge across studies. One possibility is that our messages involved vocal exemplars of each emotion that were very unambiguous. Thus, difficulty identifying the emotion was unlikely in our studies. If the vocal intensity were reduced such that accurate identification of each emotion was more difficult, perhaps more subtle changes in voice would have a greater impact on affective relative to cognitive attitudes.

We also did not find any interaction between our manipulation of focal object and message-type condition in Experiment 2. One possibility is that neither attribution nor contrast processes play a role in our observed persuasion effects. However, we consider it more likely that our manipulation may have been too weak to influence contrast and attribution processes. This seems plausible given that the manipulation was quite subtle (merely requiring participants to answer a few brief items), coupled with the fact that mediational analyses clearly supported a role of attribution processes in Experiments 2 and 3.

Another interesting but unresolved question relates to the mediational analyses in Experiment 2 and 3 involving participants' attributions regarding their sources of fear. The data revealed that participants who attributed fear to the speaker showed *enhanced* attitude change, the reverse of a traditional attribution explanation. Why speaker attributions increased persuasion is not entirely clear. Perhaps if the speaker's fear is seen as a valid response to the attitude object, then the speaker's fear should be somewhat diagnostic of the attitude object being frightening (and therefore negative). However, fear resulting from the speaker should probably not be equally diagnostic as fear directly produced by the attitude object. This would explain why the attributions to the attitude-object led to more persuasion than attributions to the speaker.

Finally, although we believe the current studies provide some

interesting and useful insights into the role of vocal affect in persuasion, there are at least two caveats to our findings that should be acknowledged. First, the vocal affect effects we observed, although statistically significant, were small. This is not surprising given the intensity of the message content itself, which was invariant across conditions. Thus, although our experiments illustrate that the way something is said matters, clearly the *substance* of the message is also crucial.

A second caveat to our findings is that our ideas regarding vocal affect have only been tested in the context of a single attitude object, a single speaker, and a single affectively-based message. Thus, one might argue that the present results could be idiosyncratic to the particular emotion used in the persuasion passage, to the speaker, or to unique properties of the attitude object. Although this possibility cannot be ruled out at this point, if the conceptual framework developed in these experiments is correct, similar effects should emerge when the target emotion, the speaker, or the attitude object is modified.

5.3. Future directions

Due to the unexplored status of vocal affect and persuasion, multiple future research directions could prove fruitful. One crucial direction would explore the effects of additional vocal emotions (e.g. excitement, sadness) on a fear-based message. If the predictions laid out by the incongruity hypothesis are correct, these vocal qualities should also intensify the impact of our fear-based message. Similarly, demonstrating incongruity effects with emotional message content beyond fear would support the generalizability of this phenomenon.

A second direction would involve manipulating vocal intensity. The vocally expressed emotions in the present experiments were all high-intensity to ensure participants could easily identify the intended emotion. However, if less obvious emotional cues were used, perhaps affectively-based attitudes (relative to cognitively-based attitudes) would become more sensitive to these subtler vocal affective cues. Similarly, recall that when affective messages are high-intensity, the incongruity hypothesis suggests little room may exist for congruent affective vocal cues to enhance the impact of the content on attitudes. However, this implies that if a moderately or weakly affective passage were used, the patterns observed in the present experiments should be reversed such that congruency effects would emerge.

Taken together, the avenues for research discussed here would greatly increase our current understanding of the interplay between message content and vocal affective cues, helping to explain when the persuasive impact of a message is enhanced or diminished based on the degree of congruency between message content and the accompanying vocal cues.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding source

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was supported by two grants to Leandre R. Fabrigar, provided by the Social Sciences and Humanities Research Council [grant number 410-2010-1374 and 435-2015-0114].

Sample size determination

For *Experiment 1*, our sample size determination was based on the guideline that a minimum of 20 participants per cell be obtained. Applying this system to our conceptual framework, which entailed a 2×4 interaction, produced 8 cells and a minimum sample size of 160 participants. Data collection was planned for an entire semester and thus

continued after the minimum size goal was met so as to provide more power (total $N = 250$). For *Experiment 2*, the same system was used. In this case, our conceptual framework was a $2 \times 3 \times 4$ interaction, which produced 24 cells. Because of the more complicated conceptual framework and the comparatively modest effect sizes in *Experiment 1*, we sought to collect a minimum of 40 participants per cell to better detect this higher order effect ($N = 960$). Because data was collected in semester intervals, we continued to collect data during the third semester of data collection after our minimum goal was met (total $N = 990$). For *Experiment 3*, our conceptual framework was identical to that of *Experiment 1*, thus producing a 2×4 interaction and resulting in 8 cells with a minimum sample size requirement of 160 participants. However, because *Experiment 2* produced somewhat weaker effect sizes than *Experiment 1* and involved mediational analyses with multiple mediators, we opted for a more stringent criterion of 50 participants per condition ($N = 400$). Data collection was planned for two semesters. At the conclusion of the second semester, data from 707 participants had been collected. No data was missing for any experiment, thus all participants were included in the final analyses.

Data checking

For *Experiment 1*, data was collected for one semester and checked only at the conclusion of the semester at which point we moved forward with our data analyses. For *Experiment 2*, data was collected for three semesters. Because a sufficient number of participants had been collected at the conclusion of each semester to permit meaningful evaluation of the performance of measures and experimental manipulations, we made the decision to check our data at the end of each semester. For *Experiment 3*, data was collected for two semesters and checked only at the conclusion of each semester. We have retained all raw data from the research and agree to retain it for confirmation purposes for a minimum of 5 years after publication.

Acknowledgements

This research was supported by grants (410-2010-1374 and 435-2015-0114) from the Social Sciences and Humanities Research Council of Canada to the second author. The authors would like to extend their warmest thanks to the following individuals for their assistance in the collection of data for these experiments: Percy Chan, Anna Chouchkova, Laura Stubbs, Nicole Seligman, Jacky Cheung, Cora Utvich, and Matthew Kan. Experiment one was conducted as part of the first author's master's thesis under the direction of the second author. Correspondence concerning this article should be addressed either to Leandre R. Fabrigar, Department of Psychology, Queen's University, Kingston, Ontario, via electronic mail at: Fabrigar@queensu.ca, or Joshua J. Guyer, Department of Psychology, Queen's University, Kingston, Ontario, via electronic mail, at: Joshua.Guyer@queensu.ca

Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.jesp.2017.09.005>.

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