

Matching and Mismatching Vocal Affect with Message Content

By

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Abstract

Two experiments examined the influence of affective vocal qualities on attitude change according to the degree of congruency between vocal qualities and the message content (i.e., the extent to which the vocal qualities matched the intent of the message content). In Experiment 1, the design was a 2 (attitude formation: affective base vs. cognitive base) x 4 (persuasive message: fully matched vs. partially matched vs. fully mismatched vs. written passage) between participants factorial. In the initial phase, an attitude was created towards a novel object. This goal was accomplished by directing each participant to read either an emotionally evocative passage or an informational passage designed to produce favorable attitudes towards a fictitious animal called a *lemphur* (Crites, Fabrigar, & Petty, 1994). In the persuasion phase of Experiment 1, participants were exposed to a negative affective message designed to elicit fear. The results indicated the degree of attitude change produced by the fully matched vocal quality (i.e., a fearful voice) was no different relative to the written passage. However, both the partially matched (i.e., a bored voice) and fully mismatched vocal qualities (i.e., a content voice) generated significantly more attitude change than both the written passage as well as fear. In Experiment 2, the attitude formation phase was similar to that of Experiment 1. However, in the persuasion phase of Experiment 2, the focus was on messages that were cognitive in their content. Specifically, participants were exposed to a negative cognitive message designed to convey negative characteristics of the target. The data revealed the degree of attitude change generated by the fully mismatched vocal quality (i.e., an excited voice) was significantly greater than the written passage as well as both the partially matched (i.e., a fearful voice), and fully matched (i.e., an emotionless voice) vocal qualities. No further differences between vocal qualities were found.

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Chapter 1 Introduction

As the American poet William Carlos Williams (1883–1963) so aptly put it: “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 (1954). Intuitively, the position advanced by this claim makes sense. This is all the more clear when one considers that in speech, emotion is often more salient in the sounds of spoken words rather than in the content of a message. When expressing emotionality through our voice, a multitude of options are available. For example, specific words can be used to convey emotion, such as excited, anxious, depressed, or sad. Intonation, the melody of the voice, can also be adjusted in specific ways; including the use of loud, soft, energetic, or somber vocal expressions, amongst others. However we vary our emotional message – with words or sounds – both anecdotal and empirical evidence support the inference that we attend more to the tone and devalue the words (Cooper & Sorensen, 1981). With this in mind, it is clear that spoken language is a powerful medium for the communication of emotion. In fact, if one considers that the sounds of speech are a primary determinant of the vocal expression of emotion, it makes sense that the emotionality of a message is hinged to a greater extent on “how it is said” rather than on “what is said.” Thus, one can conclude that the affective qualities of voice used to deliver a message have the potential to play a large role in how the content of a message is perceived; beyond the information that the words, themselves, convey on their own.

Literature Review

Although intuitively the importance of this concept is well understood, to date, researchers have devoted very little attention to examining the role of vocal qualities in both the attitude formation and persuasion processes. In fact, the majority of research in the attitudes literature has focused on the impact of *written* messages on the persuasive process, while

neglecting to investigate the influence on persuasion of messages that are delivered orally. Considering the enormous role of oral communication in virtually every aspect of daily life, the lack of research on how this facet might affect persuasion is particularly surprising. In thinking about how vocal qualities might have an impact on persuasion, it is important to consider that there are many different aspects of voice that can be varied; for example, the volume, rate of speech, intonation, pitch, intensity, and so forth.

Vocal Qualities and Perception

Previous research has revealed that certain aspects of voice do, in fact, influence the manner in which the message recipient perceives and responds to a message. For example, research has indicated a relationship between vocal loudness and perceptions of speaker confidence (Kimble & Seidel, 1991; Scherer, London, & Wolf, 1973). Scherer et al., (1973) found that participants perceived speakers who were instructed to use confident language as speaking louder relative to speakers who used language that reflected uncertainty. Examined from another angle, research by Kimble and Seidel (1991) revealed that participants actually increased the volume of their communication when providing responses to multiple choice trivia questions in which they were more confident in the accuracy of their response.

Rate of speech has also been shown to influence perceptions of speaker confidence (Miller, Maruyama, Beaber, & Valone, 1976; Scherer et al., 1973). Research indicates that speakers actually increased their rate of speech when asked to speak in a confident manner (Scherer et al., 1973). Finally, another vocal quality found to influence perceptions of speaker confidence is intonation. An experiment by Brennan and Williams (1995) revealed that participant responses to multiple choice trivia questions were deemed to reflect a greater degree of speaker confidence and accuracy when falling intonation was used relative to responses in

which rising intonation was used. Moreover, their results demonstrated that rising intonation was used by participants twice as frequently as falling intonation when providing incorrect responses. Research by Smith and Clark (1993) suggests rising intonation may signal uncertainty and thus reflect increased strain on behalf of the respondent to produce the correct response. As a result, the speaker may be perceived to lack credibility and the message discounted as unreliable.

Although research has examined several indices of vocal confidence, the only empirical research conducted to explore the influence of vocal qualities on the persuasive process has been using rate of speech (Miller et al., 1976; Smith & Shaffer, 1995). In both experiments, the results demonstrated increased persuasion when similar messages were spoken at a faster rate of speed as opposed to those spoken slowly; however, this relationship was only found for moderately involved participants and was mediated by perceptions of source credibility. Taken together, then, it is clear that a variety of factors influence perceptions of speaker confidence, and that these vocal qualities in turn also have an effect on persuasion.

Emotionality of Voice

Given that voice contains a rich set of features that can be combined in many ways to mean many different things, naturally it makes sense that the emotionality of voice might be quite important in terms of a message's potential to successfully persuade the recipient. In fact, research has identified a wide variety of vocal cues that, when combined in a certain fashion, are indicative of specific affective states.

From an acoustic standpoint, Juslin and Scherer (2005) have proposed four general categories into which specific acoustic qualities of vocal affect can be classified. These categories include: 1) *Fundamental frequency* (F0), which refers to the rate at which the vocal folds open and close across the glottis; 2) *Voice intensity*, which denotes the amount of energy in

the acoustic signal as reflective of the effort involved in producing the vocal utterance; 3) *Voice quality*, which generally refers to variations in frequency along a continuum where high frequencies produce ‘sharp’ acoustic qualities and low frequencies produce ‘soft’ acoustic qualities (e.g., typically judged according to perceptual ratings of the breathiness, roughness, or sharpness or the voice); and 4) *Temporal aspects of speech*, which are characterized by the number, frequency, and duration of pauses, or absences of energy in the acoustic wave form, and the rate of speech, which can be assessed in myriad ways; including overall duration of speech, words per minute, syllables per second, and so forth (Scherer, 1985).

An example of these acoustic qualities applied to a specific vocal affective state, such as fear, reveal a high mean F0, high vocal intensity, high variability in vocal frequency, and an increased rate of speech with relatively few pauses (Juslin & Scherer, 2005; Scherer, Johnstone, & Klasmeyer, 2003). Although controversy remains over how, exactly, vocal affective cues should be classified (see Juslin and Scherer, 2005 for further discussion on this topic), one prevailing view is that vocal expression of emotion can be examined along both arousal and valence dimensions (Bachorowski, 1999).

While voice clearly does vary according to its emotional qualities, the fact that these changes occur does not necessarily imply that people can differentiate between different emotional qualities of voice. However, as it turns out, research has shown that the ability to distinguish between emotions conveyed through the voice is, in fact, well developed (Johnson, Ernste, Scherer, & Klinnert, 1986). To illustrate this claim, Johnson et al., (1986) designed two studies that investigated the recognition of emotion from vocal cues for each of four emotions: joy, sadness, anger, and fear. Participants were presented with an audio recording delivered by an actress who used the same semantically neutral sentence for each emotion. The recordings were

delivered using either voice-synthesized samples or unaltered voice samples. Using either a forced-choice or free-response technique, participants were instructed to select an emotion that best represented the emotion heard in the recording. When provided with unaltered voice samples, the results indicated participants were easily able to identify the various emotions using both techniques. The recognition accuracy for electronically altered voice samples, however, was much less than the unaltered voice samples and produced mixed accuracy ratings for each technique; with anger and fear faring relatively poorly as compared with the other voice-synthesized emotions.

Relatedly, research by Pell, Monetta, Paulmann, and Kotz (2009) has found that the ability to recognize and distinguish between vocally-expressed emotions such as fear, joy, anger, sadness, and disgust, is partially independent of linguistic ability and transcends language barriers. This fact was evident based on results demonstrating that participants accurately identified vocally expressed emotions when listening to recordings in which the speaker shared their native language as well as when listening to recordings of Germanic and Arabic speakers. However, and perhaps not surprisingly, cultural in-group advantages have been shown to exist in the recognition accuracy of vocal expression of emotions for those individuals belonging to one's in-group relative to individuals belonging to an out-group (Mandal, 2008). These results suggest that cultural differences may play a role in the cues used to convey emotions through the voice and consequently how those cues are interpreted by the recipient.

Vocal Affect and Persuasion

Surprisingly, although vocal affect, attitudes, and the multiplicity of ways through which the persuasion process takes place each boasts a large body of literature, very little research has been conducted to explore the role of vocal affect in the persuasion process. This is all the more

curious when one considers that affect has actually been quite an important topic within the persuasion literature. Considering this gap in the literature, it is important to keep in mind that the impact vocal affect may have on the persuasion process could in fact be regulated by the type of message delivered to the recipient. In fact, persuasion researchers have long used affect as a distinguishing characteristic between the content of different types of messages. This distinction has led some messages to be classified as affective while other messages have been classified as cognitive (Breckler & Wiggins, 1989; Crites, Fabrigar, & Petty, 1994; Eagly, Mladnic, & Otto, 1994; Fabrigar & Petty, 1999). More specifically, affective messages are messages designed to change an attitude by eliciting specific emotions in the recipient that are then associated with the attitude object. In contrast, cognitive messages attempt to change an attitude by conveying information about positive or negative characteristics of the object, without necessarily eliciting an emotional response.

The Role of Attitude Bases

Furthermore, research has shown that people's responses to both types of messages can differ as a function of their initial attitude base. Supporting this, research has documented that attitudes are not simply uni-dimensional evaluations of a target-object, but instead are composed of several bases that can differentially contribute to an attitude whose mental representation is stored separately from its individual bases (Breckler & Wiggins, 1989; Crites, et al., 1994; Eagly, et al., 1994). These bases are commonly known as affect, which denotes positive and negative feelings towards an attitude object, and cognition, which refers to beliefs about positive and negative characteristics of the attitude object.

Notably, much research has demonstrated that the differential contributions of these attitude bases can cause an attitude to be either primarily affective or cognitive (Breckler, 1984;

Breckler & Wiggins, 1989; Crites, et al., 1994). This finding raises the possibility that an individual's response to either an affective or cognitive message may differ depending on their initial attitude base. Accordingly, an abundance of research has shown that affective and cognitive bases of attitudes do play an important role in the effectiveness of persuasive attempts.

While some theorists have revealed instances in which persuasion occurs through a mismatching of attitude base and message content (Millar & Millar, 1990), the majority of research indicates that persuasive appeals can expect to enjoy greater success when messages high in affective content are paired with affectively-based attitudes and messages high in cognitive content are paired with cognitively-based attitudes (Edwards, 1990; Fabrigar & Petty, 1999; Haddock, Maio, Arnold, & Huskinson, 2008; Mayer & Tormala, 2010; See, Petty, & Fabrigar, 2008). In other words, if an individual possesses an affective attitude towards an object and is targeted with an affective message, the susceptibility of that attitude to a persuasion attempt is greater than if the individual were to possess a cognitive attitude towards the same object. And, of course, parallel findings have been shown when exposing cognitive attitudes to cognitive messages.

One current limitation is that research has yet to explore the matching/mismatching effects of attitude bases and message content within the context of persuasive appeals from the standpoint of oral communication. In reality, communication and thus persuasion occurs through various modalities. For example, communication often involves an oral exchange, which can occur over the telephone, on the radio, and in face-to-face settings. Importantly, consider that an inherent attribute of voice is its emotional quality. Thus, in the case of vocally delivered messages, affect is an integral component of the communication process. Consequently, it makes sense that vocal affect may also play a role in how successful these types of messages are at both

forming and changing attitudes. As such, the intent of the present research is to begin a rudimentary examination of the interplay between these variables on the persuasive process. Specifically, to what extent does matching vs. mismatching the affective vocal qualities of a speaker with the affective or cognitive content of a message regulate the success of a persuasive appeal?

On the one hand, consider that persuasion may be more likely to occur when the affective content of a message is matched with congruent vocal affective cues. If this is indeed the case, then one might expect greater persuasion when a message high in affective content is paired with vocal affective cues that are matched along both arousal and valence dimensions. On the other hand, however, recall that what may constitute a match or mismatch between vocal qualities and an affective message may not necessarily hold when considering a cognitive message. This, then, leads to the issue of how affective qualities of voice might differentially influence the persuasion process for both affective and cognitive messages.

A Conceptual Illustration of Matching/Mismatching Vocal Affect with Message Type

Affective Message:

Naturally the likelihood of persuasion occurring as a result of matching or mismatching vocal qualities to the message content could be illustrated through a variety of different emotions. To conceptually illustrate how these principles may influence the persuasion process, this will be discussed within the context of a message designed to elicit fear. Importantly, were these principles to be examined within the context of an alternate emotion, the same basic tenets would apply; however, naturally the specifics would be expected to differ.

Consider, for example, that an affective message whose content is intended to elicit fear should be more persuasive when matched with vocal qualities that also exhibit the hallmarks of

fear. This should be the case because an affective message, by design, seeks to change the recipient's attitude through pairing the affective state conveyed by the message with the target-object. If the content of a message elicits negative emotions toward the target through an association with fear, then matching the affective vocal cues to the content of the affective message should only serve to intensify the affect eliciting quality of the content. In other words, because the vocal affective cues are congruent along both valence and arousal dimensions with the content of the affective message, this should only increase the extent to which the message elicits its intended affective state in the recipient.

Alternatively, if the content of an affective message seeks to elicit fear but is matched with vocal qualities which exhibit the hallmarks of contentment, for example, this pairing results in a mismatch along both arousal (low vs. high) and valence (positive vs. negative) dimensions. In this case, whereas the message content aims to elicit negative emotions toward the target through an association with fear, the accompanying vocal affective cues oppose that goal because they contradict the affect eliciting quality of the content; thus, the result may elicit conflicting emotions. Given the incongruity along both arousal and valence dimensions, this combination should generate much less change in attitude relative to a message matched in content and vocal qualities.

Having illustrated both a complete match as well as a complete mismatch between vocal qualities and a message designed to elicit fear, we now turn to consider the vocal qualities which qualify as partially matching the message content along both valence and arousal dimensions. In the case of a partial match, there are two possible alternatives: one could mismatch the message content on valence while matching on arousal. In this case, the vocal qualities representing excitement would qualify as a partial match. Another possibility would be to match the valence

of the message content while mismatching on arousal, in which case the vocal qualities representative of boredom would constitute a partial match.

In terms of the effects on persuasion, it seems plausible that excitement would undermine the ability of the message content to elicit fear in the recipient given that the accompanying vocal qualities convey positive affect, which may produce conflicting emotions and cause confusion in the message recipient. An alternative explanation suggests that excitement may not, as previously hypothesized, undermine the persuasive impact of the message at all. Empirical research by Singer and Schacter (1962) first advanced the notion that, at the physiological level, emotions are undifferentiated. Thus, to interpret emotional responses, cues are derived from the environment which is then used to label the arousal. Expanding on this, research by Zillmann, Katcher, and Milavsky (1972) revealed the possibility that arousal states may be interpreted in a contextual fashion, whereby arousal generated by one source can falsely be attributed to another source. This process is known as excitation transfer. Within the context of this example, excitation transfer may cause the message recipient to attribute the arousal levels experienced as a result of being exposed to an excited speaker to the content of the message; which, as previously noted, is intended to produce high levels of arousal through eliciting fear in the recipient. Therefore, it is possible that the experience of arousal may be mislabeled as negative and consequently increase the persuasive impact of the message.

In the case of boredom, it seems equally plausible that this combination of vocal qualities and message content would also disrupt the ability of the message to elicit the intended affective state in the recipient. Once again, this should be the case because the affective content of the message is incongruent with the affective vocal cues being delivered. For example, the accompanying vocal qualities fail to generate appropriate levels of arousal, yet succeed in

conveying negative valence to the message recipient. However, consider that similar to excitement, an alternative explanation suggests that the message recipient may attribute the negativity experienced as a result of being exposed to a bored speaker to the content of the message. In this case, the vocal qualities may enhance the negative affect conveyed by the content of the message and thus increase persuasion. Consequently, the success this pairing may have in generating attitude change is somewhat unclear.

Cognitive Message:

Naturally, however, it is important to consider that while some messages may be affective in their content, others may be cognitive. And, of course, cognitive messages can also be delivered in both written and oral formats. Thus, this raises the issue as to which vocal qualities can be regarded as matching and mismatching a cognitive message? As a starting point, there lies the question of what, exactly, are the vocal hallmarks of a cognitive message? With regard to an affective message, what constitutes a match and mismatch between vocal qualities and the message content is relatively clear. However, given that the intent of a cognitive message is simply to convey information without necessarily evoking any emotional response, in this case it's not entirely clear how one might define which affective vocal qualities best match or mismatch the message, or even if the concept of matching affective vocal qualities to a cognitive message makes sense.

With this in mind, if the logic used to define what constitutes a match and mismatch according to a negative affective message were to be imposed on a negative cognitive message, there are two ways one could imagine this occurring: One way a match between vocal qualities and a negative message could be defined is by pairing the message with an emotionless voice (neutral valence, low arousal). Another possibility may be to use vocal qualities that match the

message in terms of the intent of the message content (negative valence) as well as on arousal (low), such as those denoting boredom. However, consider that on some level, in both cases what might qualify as a match does not seem as though it would increase the likelihood that persuasion would result. First of all, verbal communication lacking in all emotional qualities is unnatural and may, therefore, produce confusion in the recipient. Secondly, conveying information using vocal qualities reflective of boredom may suggest to the message recipient that the speaker is disinterested or lacks conviction towards the message. Consequently, the recipient may conclude that given the speaker's lack of interest, clearly the message is unimportant and therefore undeserving of their attention. A further possibility holds that the recipient may attribute their internal state as reflecting either agreement or disagreement with the message. (e.g., I must be feeling bad because I dislike or disagree with the message). Indeed, within the mood literature, research has suggested that a relatively simple inference process may account for the influence of mood on attitudes (Petty, Schumann, Richman, & Strathman, 1993). Importantly, this process does not require the recipient to actively process the information contained within the message. In the context of this example, then, the recipient may attribute the experience of a negative internal state elicited through the negativity conveyed by boredom to reflect their disagreement with, or disapproval of the message.

Thus, while conceptually the vocal qualities representing both an emotionless voice and boredom may appear to match on some level, it is important to consider that it is also possible that people may not possess an intrinsic sense of which vocal qualities should even be expected with a cognitive message; therefore attempting to match the vocal qualities to the message may not be the most prudent approach. However, if one considers that the design of a cognitive message is simply to convey information without eliciting an emotional response, this raises the

possibility that it may be the relative absence of affective qualities that best matches the intent of a cognitive message. The logic behind this is that pairing a message that lacks any obvious affective content with vocal qualities that have strong affective properties may be perceived as confusing or distracting to the recipient. Thus, in this sense, vocal qualities devoid of affect might best support the intent of the message.

In attempting to define a complete mismatch, imposing the logic for this combination in the context of the example used for the affective message would lead one to consider vocal affective cues that contradict the content of the message in terms of valence, while simultaneously eliciting high arousal. For example, if the message content is designed to convey negative attributes of the target, but the accompanying vocal qualities convey positive affect and high levels of arousal (e.g., excitement), this combination is likely to undermine the aim of the message because on the one hand the content is conveying negative attributes, while on the other hand, the vocal cues convey a positive affective state. Therefore, this combination may create an ambivalent attitude in which negative thoughts towards the target are elicited in the recipient while positive emotions are concurrently associated with the target through the accompanying vocal cues.

However, consider that speaking in an excited voice might also be interpreted to convey passion or conviction towards the message, thus indicating that what the speaker is saying may be of some value. One possibility is that this may cause the recipient's attention to the message content to increase and therefore enhance the amount of processing. Alternatively, the recipient may conclude the speaker is highly knowledgeable on the topic, thus resulting in biased processing of the message such that the recipient is less critical and less likely to counter-argue the message. A further possibility suggests that the recipient may attribute the experience of a

positive internal state elicited through the positivity conveyed by excitement to reflect their agreement with the message. Once again, it is not entirely clear if the notion of matching and mismatching vocal qualities with a cognitive message is an appropriate strategy. Accordingly, the degree to which this combination may produce a change in attitude remains unclear.

When considering what might constitute a partial match in the context of this example, there are two possible alternatives: First, the vocal qualities could be selected to match the valence of the message content while mismatching on arousal, in which case a partial match could be represented by the acoustic properties associated with fear. Alternatively, the vocal qualities might be chosen to mismatch the valence of the message content while matching on arousal, in which case a partial match could be represented by the acoustic properties associated with contentment. Technically, however, given the logic used to define an emotionless voice as a complete match, on some level, fear might also be considered as a complete mismatch (i.e., high vs. low/neutral arousal, and negative valence vs. the absence of any emotionally arousing properties), but simply less diametrically opposed than excitement.

In thinking about how these partial matches might influence the persuasive process, it is possible that the vocal qualities representative of fear might support the intent of the message content (i.e., to elicit negative evaluations in the recipient towards the attitude object), yet fail to result in much attitude change because the arousal inducing properties of fear contradict the design of a cognitive message. Alternatively, consider that the recipient may attribute the experience of a negative internal state as elicited through fear as reflecting their dislike for or disagreement with the content of the message. Thus, it is possible that fear might enhance negative perceptions towards the content and thus increase attitude change.

With respect to the impact of contentment within this context, clearly this affective state is in contrast with the intention of the message in terms of both valence (positive vs. neutral), as well as design; that is, to convey information about the positive/negative characteristics of a target as opposed to pairing the target with an affective state. As a result, it is possible that the recipient may experience conflicting evaluative responses whereby the content of the message invokes negative cognitive evaluations of the target, while the vocal cues elicit a positive emotional response. Once again, the possibility remains that the recipient may experience a mildly positive internal state as a result of the positivity conveyed through the vocal qualities reflecting contentment. The experience of positivity may then be attributed to infer agreement with the message. While this mismatch of message content and vocal qualities is not as directly opposed as those reflecting excitement, the degree of attitude change this pairing may generate is unclear.

Overview of the Present Research

The goal of this thesis, then, was to explore the interplay between vocal qualities and messages that were affective or cognitive in their content. In Experiment 1 the focus was to explore the role of vocal affect in the context of messages that were affective in their content. Attitude change was compared between vocal qualities which fully matched, partially matched, or fully mismatched a negative affective message designed to convey fear (see Table 1). Vocal qualities fully matching the message content were represented by the acoustic properties associated with fear. Recall that a partial match could result in the selection of those vocal qualities reflective of excitement or boredom. For purposes of this experiment, boredom was selected as the partial match given that a mismatch on valence (as found with excitement) seemed on an intuitive level more likely to produce a somewhat predictable outcome. In terms of

a complete mismatch, the acoustic properties representing contentment were selected for this pairing.

In addition to exploring the interplay between affective vocal cues and message content, Experiment 1 sought to reveal the relationship between the aforementioned variables and the initial bases of attitude. Importantly, a key point to recognize is that an individual’s initial attitude can be based predominantly on either affect or cognition. Naturally, the initial base of one’s attitude influences the manner in which an individual is likely to respond to a particular message and thus also influences the persuasive potential of that message. For example, if the initial attitude is based on affect, then perhaps attitude change in response to the combination of affective vocal cues and an affective message will be more pronounced than if the initial attitude is based on cognition. If, on the other hand, the initial attitude is based on cognition, this may predispose individuals to be less attuned to the affective qualities of voice and thus less susceptible to affective persuasive appeals. As such, it may be the case that this effect leads to an overall reduction in attitude change across conditions (fully matched, partially matched, and fully mismatched) as well as less differentiation in attitude change between conditions.

Table 1.
Degree of match and mismatch between vocal qualities and message used in Experiment 1

Vocal Quality	Degree of Match	Valence	Arousal
Fear	Fully Matched	Matched	Matched
Boredom	Partially Matched	Matched	Mismatched
Contentment	Fully Mismatched	Mismatched	Mismatched

Experiment 2 focused on the role of vocal affect in the context of messages that were cognitive in their content. Similar to Experiment 1, attitude change was compared between vocal qualities which were deemed to fully match, partially match, or fully mismatch a cognitive

message designed to elicit negative evaluations towards an attitude object (see Table 2). In terms of a complete match, there were two possible alternatives: pairing the message with an emotionless voice, or using vocal qualities with negative affect but low in arousal, such as boredom. If one considers, however, that cognitive messages are not necessarily intended to produce an emotional response, it seems reasonable to conclude on these grounds that the use of an emotionless voice merits stronger consideration than vocal qualities which may bias the recipient towards responding negatively, as in the case of boredom. Thus, an emotionless voice was selected as a complete match. Once again, recall that a partial match also presents two alternatives: fear, which matches the valence of the message content while mismatching on arousal, or contentment, which mismatches the valence while matching the message content on arousal. For purposes of this experiment, I chose to mismatch the message content on arousal and thus selected fear as a partial match. However, technically, given the logic for selecting an emotionless voice as a complete match, on some level fear might also be considered as somewhat of a complete mismatch, just less so than excitement. When considering a complete mismatch, the acoustic properties representing excitement were selected for this pairing. Similar to Experiment 1, attitude bases were manipulated to determine whether the effects of matching/mismatching the vocal qualities with the message content would be more accentuated when the initial attitude was cognitive versus affective.

Table 2.
Degree of match and mismatch between vocal qualities and message used in Experiment 2

Vocal Quality	Degree of Match	Valence	Arousal
Emotionless	Fully Matched	Matched	Matched
Fear	Partially Matched	Matched	Mismatched
Excitement	Fully Mismatched	Mismatched	Mismatched

Chapter 2

The Role of Affective Qualities of Voice in the Context of Messages that are Affective in their Content

In Experiment 1 the focus was to explore the role of affective qualities of voice in the context of messages that were affective in their content. Attitude change was compared between vocal qualities which fully matched, partially matched, or fully mismatched a negative affective message designed to convey fear. In addition to exploring the interplay between affective vocal qualities and message content, Experiment 1 sought to reveal the relationship between the aforementioned variables and the initial bases of attitude.

2.1 Method

Participants

A sample of 250 participants was obtained on a volunteer basis from the introductory psychology research pool at Queens University. All participants received course credit in exchange for their participation.

Design and Procedure

The design was a 2 (attitude formation: affective base vs. cognitive base) x 4 (persuasive message: fully matched vs. partially matched vs. fully mismatched vs. written passage) between participants factorial. In the initial phase, an attitude was created towards a novel object. This goal was accomplished by directing each participant to read either an emotionally evocative passage or an informational passage designed to produce favorable attitudes towards a fictitious animal called a *lemphur* (Crites et al., 1994). Participants were randomly assigned to either an affective or cognitive condition.

Attitude Formation Phase

In the attitude formation phase, participants assigned to the affective condition were told that they would be reading information about a possibly unfamiliar animal and that the researchers were interested in getting a sense of participants' feelings toward the animal. First, participants were asked to complete an affective questionnaire which asked a series of questions about their feelings toward lemphurs (see Appendix A for all measures). They were instructed that should they be unfamiliar with the animal, they should answer the questions based on their expectations about lemphurs. The purpose of participants completing this questionnaire prior to reading the emotional passage was to prime the affective dimension of judgment and thus increase the likelihood that the passage would create an attitude based on affect.

After completing the affective questionnaire, participants were asked to read a positive emotional passage and then complete a series of questions (see Appendix B for all passages). The positive emotional passage described a person's encounter with a lemphur. In the passage, the lemphur was depicted as a friendly marine animal that frolics with a swimmer. The passage provided relatively little information about the animal but was designed such that positive feelings would be produced in the reader that would then be associated with the attitude object - the lemphur. The affective passage used in both Experiment 1 and 2 was previously developed and validated by Fabrigar and Petty (1999) and has been used in many published experiments. As their final task for phase one, participants completed an attitude questionnaire and cognitive questionnaire as well as the same affective questionnaire used previously. Administration of the affective and cognitive questionnaires was done in one of two counterbalanced orders.

The participants randomly assigned to the cognitive attitude formation condition read an informational style passage containing positive information about the same fictitious animal.

First, participants were asked to complete a cognitive questionnaire which asked a series of questions about their beliefs toward lemphurs. The purpose of participants completing this questionnaire prior to reading the informational passage was to prime the cognitive dimension of judgment and thus increase the likelihood that the passage would create an attitude based on cognition.

Following similar introductory information and instructions as in the affective formation condition, participants were asked to complete a second booklet containing the positive informational passage followed by a series of questions. The positive informational passage was presented as an excerpt from an encyclopedia of marine life. In the passage, several positive attributes of lemphurs were discussed. For example, the lemphur was described as an animal that is highly intelligent and can be readily trained. Additionally, the practical uses of lemphurs as a source of food and for making products were noted. Following this, participants in the cognitive condition received an attitude questionnaire and affective questionnaire, as well as the same cognitive questionnaire administered previously.

Persuasion Phase

In the persuasion phase, participants were randomly assigned to one of four affective message conditions containing a passage designed to elicit negative emotions towards lemphurs. As with the passages used in the attitude formation phase, the negative affective passage used in the persuasion phase was also developed and validated by Fabrigar and Petty (1999). This passage provided relatively little information about the lemphur; however, it presented a graphic description of the lemphur hunting, brutally killing, and then eating a swimmer.

To develop audio versions of this passage, senior drama students were recruited for pay and instructed to deliver the passage using the specific emotional qualities of voice selected for

Experiment 1. Audio recordings of the passage were made in a single-walled sound isolation booth (Eckel Model C-17). Despite using individuals trained in dramatic expression, conveying the negative affective passage in a natural fashion using each vocal quality proved a challenging task. Following the recording process, a digital editing program (PRAAT©) was used to manipulate various parameters of voice such as pitch and duration in order to ensure the final product captured each emotion as accurately and naturally as possible. Next, a group of student raters was gathered to trial-test each recording in order to determine how the vocal quality in each audio recording was perceived according to the 8 octants of the Circumplex model of affect (e.g., Remington, Fabrigar, & Visser, 2000) as well as through open-ended responses which allowed each rater to assign an emotion to the vocal quality heard in the audio recording.

After listening to each audio recording, raters were provided with 8 questions in which they were asked to evaluate the extent to which the vocal quality heard in the audio recording matched a particular emotion within the Circumplex model of affect. Each of the 8 emotions was selected to represent 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. Ratings were made using a 7-point scale, where 1 represented *Not at all*, and 7 represented *Definitely*. Additionally, each rater was presented with an open-ended question in which they were asked to list up to five emotional descriptors which they believed best matched the vocal quality heard in the audio recording just presented. All raters completed the aforementioned process for each of the four audio recordings in which the speaker conveyed one emotion per recording (i.e., fear, excitement, boredom, or contentment). Finally, the order of presentation for the 8 questions representing each octant of the Circumplex model of affect and the open-ended responses were counterbalanced.

In determining whether the vocal quality in each recording sufficiently reflected the target emotion (e.g., fear, excitement, boredom, contentment, etc) the data were subjected to a variety of analyses. To briefly summarize, each vocal quality was deemed acceptable if the results indicated that the average rating for the specific 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, to be accepted, the number of descriptors (e.g., fear might also be described as terror, horror, or fright) correctly matching the target octant of the Circumplex model of affect for a particular vocal quality must have exceeded the number of descriptors for the same octant provided for all other vocal qualities.

After this process had been completed, the data indicated participant ratings of contentment were somewhat ambiguous (i.e., open-ended responses revealed a nearly equal number of low arousal positive and low arousal negative words). To address this issue, the duration was reduced by 10% to increase the rate of speech and thus shift perception of the vocal quality as being more positive. Finally, a new group of raters was instructed to judge the audio file using the aforementioned criteria. Having found an improvement in ratings for contentment, it was decided to settle on a final product and enter the audio files into MediaLab© for experimental presentation.

In the affective vocal congruent condition, participants listened to an audio recording in which the aforementioned passage was combined with vocal qualities denoting fear, which matched the message content in both valence (negative) and arousal (high). Participants randomly assigned to the fully vocal incongruent condition listened to the same passage combined with vocal qualities denoting contentment, which mismatched the message content on both valence (positive vs. negative) and arousal (low vs. high) dimensions. Participants assigned to the partial vocal

incongruent condition listened to the identical passage combined with vocal qualities denoting boredom, which matched the message content on valence (negative) but mismatched the message content on arousal (low vs. high). Finally, it was important to include a measure by which a baseline of comparison could be established to gauge the persuasive impact of vocal affective qualities in addition to that generated by the message content itself. This was accomplished by including an identical written variant of the persuasion passage otherwise delivered via audio format. Following the experimental manipulations, all participants again completed the attitude, affective and cognitive questionnaires. The presentation order of the affective and cognitive questionnaires in the persuasion phase always matched the order of presentation in the attitude formation phase.

Measures

Attitude Scale

Attitudes were measured using an 8-item scale consisting of different words reflecting general and undifferentiated positive or negative evaluation. Participants were asked to indicate the extent to which each of the words described their overall evaluation of the attitude object. Half of the words implied positive evaluations (e.g., good, positive), while the other half implied negative evaluations (e.g., dislike, undesirable). For each attitude item, participants recorded their responses on a 1 to 7 scale, where 1 represented *Not at all*, and 7 represented *Definitely*. Overall scores were computed by reverse coding the negative items and then obtaining the average score across all of the scale items. Thus, scores ranged from 1 to 7, with higher numbers reflecting greater positivity of attitude and lower numbers reflecting greater negativity of attitude. In the present sample, reliability at Time 1 (formation) for the attitude questionnaire was, Cronbach's $\alpha = .88$. Reliability at Time 2 (persuasion) for the attitude questionnaire was, Cronbach's $\alpha = .91$;

Affective Scale

The 16-item affective scale required respondents 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), while the other half were negative (e.g., tense, angry). Overall scores were computed by reverse coding the negative items and then obtaining the average score across all of the scale items. Thus, scores ranged from 1 to 7, with higher numbers reflecting greater positivity of attitude and lower numbers reflecting greater negativity of attitude. The affective scale was previously developed and validated by Crites et al. (1994) and has been used in a number of previously published experiments. In the present sample, reliability at Time 1 for the affective questionnaire was, Cronbach's $\alpha = .84$. Reliability at Time 2 for the affective questionnaire was, Cronbach's $\alpha = .89$.

Cognitive Scale

The 14-item cognitive scale required respondents 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). Once again, overall scores were computed by reverse coding the negative items and then obtaining the average score across all of the scale items. Thus, scores ranged from 1 to 7, with higher numbers reflecting greater positivity of attitude and lower numbers reflecting greater negativity of attitude. The cognitive scale was previously developed and validated by Crites et al. (1994) and has been used in a number of previously published experiments. In the present sample, reliability for the cognitive questionnaire at Time 1 was, Cronbach's $\alpha = .86$. Reliability for the cognitive questionnaire at Time 2 was, Cronbach's $\alpha = .85$.

2.2 Results

Attitude Bases Manipulation Check

Multiple Regression

Prior to undertaking the core analyses, the first goal was to confirm the success of the attitude bases manipulation. Typically, there are two ways in which this can be done: First, a regression can be conducted in which attitude at Time 1 is designated as the dependent variable and measures of the affective and cognitive bases at Time 1 are designated as predictors. The same regression analysis is run for both affective and cognitive formation conditions. Based on past research (e.g., Crites et al., 1994; Fabrigar & Petty, 1999), what I would expect to find in the affective condition is that the affective basis would be a better predictor of attitude at Time 1 than the cognitive basis, and of course, the reverse should be true when the initial attitude is based on cognition.

As can be seen below in column two of Table 3, an examination of the results for the affective formation condition revealed that both the affective, $B = .73$, $t(122) = 10.64$, $p < .01$, and cognitive $B = .18$, $t(122) = 3.37$, $p < .01$ bases were significant predictors of attitude at Time 1. Of critical importance to determining the success of the attitude bases manipulation is the finding that within the affective formation condition, the affective scale coefficient was significantly larger than the cognitive scale coefficient, $F(1, 122) = 25.92$, $p < .01$. Similarly, when examining the cognitive formation condition, the data found in column three of Table 3 reveal that both affective $B = .38$, $t(122) = 5.32$, $p < .01$, and cognitive $B = .60$, $t(122) = 8.68$, $p < .01$, bases were significant predictors of attitude at Time 1. In this case, however, a formal test of significance between the coefficients revealed that the cognitive scale coefficient was not significantly greater than the affective scale coefficient, $F(1, 122) = 2.91$, $p > .05$.

Table 3.
Test of attitude bases manipulation

	Unstandardized Regression Coefficients	
	Affective Condition	Cognitive Condition
Affective Score	.73**	.38**
Cognitive Score	.18**	.60**
R ²	.65**	.66**

** $p < .01$

Comparisons can also be made across formation conditions. Follow up tests of the regression coefficients for both the affective and cognitive bases across formation conditions revealed that the affective basis was a significantly greater predictor of attitude in the affective relative to the cognitive formation condition, $z = 3.47, p < .01$. Similarly, the cognitive basis was a significantly greater predictor of attitude in the cognitive relative to the affective formation condition, $z = 4.70, p < .01$. Ultimately, what these data suggest is that attitude bases were, in fact, successfully manipulated. This is confirmed by data which indicate that, within the affective formation condition, the affective basis was a significantly greater predictor of attitude at Time 1 relative to the cognitive basis. Although the data revealed the expected pattern within the cognitive formation condition, unfortunately, the difference between coefficients was not significant. However, comparisons across formation conditions provided support for the relative success of our formation manipulation.

Discrepancy Scores

The regression analyses just presented are one of two ways that the manipulation of affective and cognitive bases can be analyzed. A second possibility is to use discrepancy scores within each formation condition to test the difference between attitude at Time 1 and the affective basis, and attitude at Time 1 and the cognitive basis. To compute the aforementioned

discrepancy scores, the absolute value of the affect score at Time 1 was subtracted from the absolute value of the attitude score at Time 1. The same process was used to calculate the discrepancy score between attitude at Time 1 and the cognitive score at Time 1. An important point to keep in mind when interpreting discrepancy scores is that lower numbers reveal a smaller discrepancy between the target variables, whereas higher numbers reveal a larger discrepancy between the target variables.

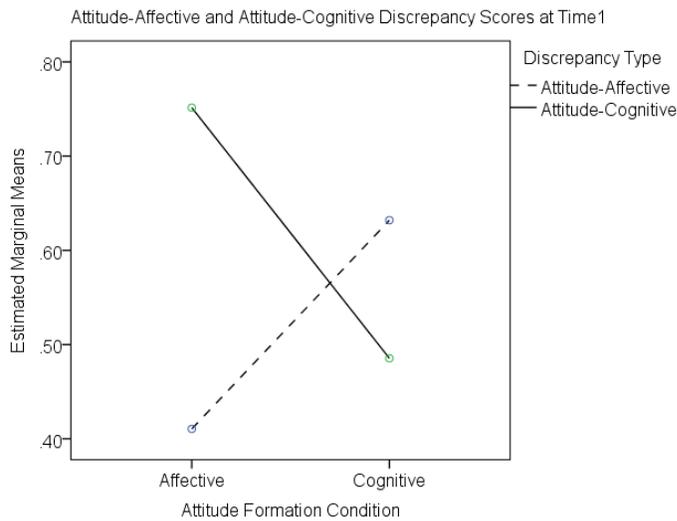
The rationale behind discrepancy scores suggests that if an individual's attitude is based on their affective dimension, then it follows that a high degree of congruency should be found between their affective basis and their initial attitude. In other words, a measure of their affective basis should not be dramatically greater or lesser than a measure of their initial attitude. Conversely, if a large discrepancy exists, this then implies that the affective basis could not have served as the primary determinant of their initial attitude. Naturally, the logic of discrepancy scores is the same when evaluating whether or not an attitude is based primarily on the cognitive dimension. Given this rationale, what would be expected in the affective formation condition is that the attitude-affect discrepancy score should be relatively small, whereas the attitude-cognitive discrepancy score should be comparatively large. And, of course, in the cognitive formation condition, the reverse pattern should occur.

To test these predictions, a 2(Type of discrepancy: attitude-affective vs. attitude-cognitive) x 2(attitude formation: affective basis vs. cognitive basis) mixed-design ANOVA was conducted in which the attitude formation condition was designated as the between-subjects factor and the type of discrepancy score as the within-subjects factor. Results indicated the main effect of attitude formation condition was not significant, $F(1, 248) = .23, p = .64$. However, the main effect of discrepancy type was significant; $F(1, 248) = 5.79, p < .02$, indicating that overall,

the affective basis $M = .52$, 95% CI [.47, .57], was modestly less discrepant relative to the cognitive basis, $M = .62$, 95% CI [.55, .69].

Of critical importance, was the interaction between attitude formation condition and discrepancy type, which was, in fact, significant, $F(1, 248) = 36.44$, $p < .01$. A visual depiction of the interaction is provided in Figure 1, found below. The affective formation condition is represented on the left side of Figure 1, whereas the cognitive formation condition is represented on the right side of Figure 1. A closer examination of the affective formation condition revealed that the attitude-affect discrepancy score at Time 1 was significantly less for the affective, $M = .41$, 95% CI [.34, .48] relative to the cognitive, $M = .75$, 95% CI [.65, .85], basis. In line with expectations, an examination of the cognitive formation condition revealed that the attitude-cognition discrepancy score at Time 1 was significantly less for the cognitive, $M = .49$, 95% CI [.39, .59], relative to the affective, $M = .63$, 95% CI [.56, .70], basis.

Figure 1.



These results, in conjunction with those garnered from the aforementioned regression analyses; confirm the success of the attitude bases manipulation. Specifically, both statistical

analyses and the follow up tests to the simultaneous multiple regression indicate that within the affective formation condition, the affective basis was a significantly greater predictor of attitude at Time 1 relative to the cognitive basis, and conversely, within the cognitive formation condition, the cognitive basis was a significantly greater predictor of attitude at Time 1 relative to the affective basis.

Negative Affective Passage: Test of Affective Nature

The prior analyses tested the success of the attitude formation manipulation. An equally if not more important analysis was to test whether the persuasion passage actually was, in fact, affective in nature. If an affective passage was successfully created, naturally within the affective formation condition attitudes at Time 2 should remain predominantly based on affect. However, within the cognitive formation condition, here one would expect either a shift to a more balanced contribution of each attitude base or a modestly larger contribution from the affective relative to cognitive basis towards attitudes at Time 2. In other words, whereas at formation (Time 1) I would expect attitudes to be based predominantly on either the affective or cognitive bases as a function of formation condition, following exposure to an affective message at persuasion, it should be the case that the affective basis is at least an equal contributor to attitudes at Time 2. The rationale behind this is that attempts to change an attitude using an affective message should produce a greater reliance on an individual's affective relative to cognitive basis when forming judgments about an attitude object. This should be the case because an affective message explicitly targets the affective basis of an attitude. Thus, under these conditions, when forming judgments about an attitude object, more weight is afforded to the affective relative to cognitive basis.

Multiple Regression

Similar to the analyses testing the formation manipulation at Time 1, there are two ways in which this can be done: First, a regression can be conducted in which attitude at Time 2 is designated as the dependent variable and measures of the affective and cognitive scores at Time 2 are designated as predictors. The same regression analysis is run for both affective and cognitive formation conditions. As can be seen below in column two of Table 4, an examination of the results for the affective formation condition revealed that both the affective, $B = .84$, $t(122) = 11.62$, $p < .01$, and cognitive $B = .23$, $t(122) = 3.26$, $p < .01$ bases were significant predictors of attitude at Time 2. To confirm whether the affective passage actually was affective in nature, a comparison of the coefficients within the affective formation condition should indicate that the affective scale coefficient was significantly larger than the cognitive scale coefficient. The results proved this to be the case, $F(1, 122) = 23.17$, $p < .01$. Similarly, when examining the cognitive formation condition, the data found in column three of Table 4 reveal that both affective $B = .90$, $t(122) = 10.54$, $p < .01$, and cognitive $B = .18$, $t(122) = 2.12$, $p < .05$, bases were significant predictors of attitude at Time 2. Confirming expectations, a comparison of the coefficients within the cognitive formation condition revealed that the affective scale coefficient was significantly larger than the cognitive scale coefficient, $F(1, 122) = 21.36$, $p < .01$.

Table 4.

Test of negative affective passage

	Unstandardized Regression Coefficients	
	Affective Condition	Cognitive Condition
Affective Score	.84**	.90**
Cognitive Score	.23**	.18**
R ²	.68**	.66**

** $p < .01$

When comparing across formation conditions, what I would now expect is that, in contrast with the significant difference found when comparing the coefficients at Time 1, the affective basis should no longer be a significantly greater predictor of attitude at Time 2 in the affective relative to cognitive formation condition. Indeed, the results support this conclusion, $z = .62, p > .05$. Likewise, in contrast with the results found at Time 1, the cognitive basis should no longer be a significantly greater predictor of attitude at Time 2 in the cognitive relative to affective formation condition. Once again, the data revealed this to be correct, $z = .42, p > .05$. These data suggest that following exposure to the affective persuasion passage, the affective basis had now become a significantly greater predictor of attitude relative to the cognitive basis, regardless of formation condition. In other words, these data provide indirect confirmation that the persuasion passage was, in fact, affective in nature.

Discrepancy Scores

The regression analyses just presented are one of two ways that the manipulation of affective and cognitive bases can be analyzed. A second possibility is to use discrepancy scores within each formation condition to test the difference between attitude at Time 2 and the affective basis, and attitude at Time 2 and the cognitive basis. Computation of the discrepancy scores was done in a similar manner to that used at Time 1. To provide indirect support for the affective nature of the passage, the data should reveal that within the affective formation condition, the attitude-affect discrepancy score should be relatively small, whereas the attitude-cognitive discrepancy score should be comparatively large. Likewise, in the cognitive formation condition, the same pattern should occur.

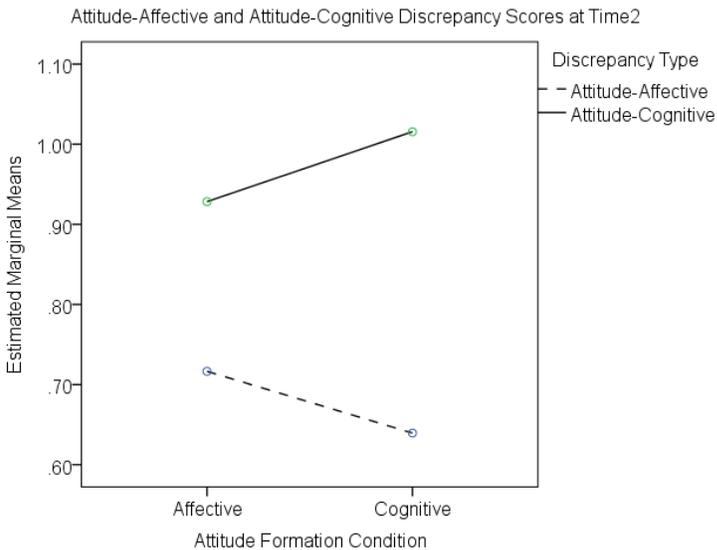
To test these predictions, a 2(Type of discrepancy: attitude-affective vs. attitude-cognitive) x 2(attitude formation: affective basis vs. cognitive basis) mixed-design ANOVA was

conducted in which the attitude formation condition was designated as the between-subjects factor and the type of discrepancy score as the within-subjects factor. Similar to the results obtained at Time 1, the data indicated the main effect of attitude formation condition was not significant, $F(1, 248) = .01, p = .94$. With regard to discrepancy type, what I would expect here is that the formation condition effects should be decreased as a result of providing all participants with an affective message at persuasion. Thus, the once modestly powerful main effect of discrepancy type at Time 1 (i.e., $F = 5.79$), should now dramatically increase in strength at Time 2. Indeed, the results indicated the main effect of discrepancy type at Time 2 was highly significant; $F(1, 248) = 37.15, p < .01$, revealing that overall, the affective basis $M = .68, 95\% \text{ CI } [.62, .74]$, was less discrepant relative to the cognitive basis, $M = .97, 95\% \text{ CI } [.87, 1.07]$.

Similarly, when examining the interaction between attitude formation condition and discrepancy type, because the differences in the contribution of each attitude bases across formation conditions should now be eliminated, I would expect the highly significant interaction effect at Time 1 (i.e., $F = 36.44$) to become much weaker at Time 2. Indeed, the data now revealed the interaction effect was only marginally significant, $F(1, 248) = 2.90, p = .09$. A visual depiction of the interaction is provided in Figure 2, found below. The affective formation condition is represented on the left side of Figure 2, whereas the cognitive formation condition is represented on the right side of Figure 2. Supporting expectations, whereas at Time 1 the interaction effect was highly significant, at Time 2 the data revealed this effect had now been attenuated. Specifically, the results indicated that within the affective formation condition, the attitude-affect discrepancy score at Time 2 was significantly less for the affective, $M = .72, 95\% \text{ CI } [.63, .81]$ relative to the cognitive, $M = .93, 95\% \text{ CI } [.79, 1.07]$, basis. Similarly, within the cognitive formation condition,

the attitude-affective discrepancy score at Time 2 was significantly less for the affective, $M = .64$, 95% CI [.55, .73], relative to the cognitive, $M = 1.02$, 95% CI [.88, 1.15], basis.

Figure 2.



These data, in combination with the results obtained from the aforementioned regression analyses, provide indirect support for the affective nature of the negative affective persuasion passage.

Vocal Qualities and Message Content

A test of the hypotheses regarding the persuasion effects employed a 2(attitude formation: affective base vs. cognitive base) x 4(persuasive message: fully matched vs. partially matched vs. fully mismatched vs. written passage) ANCOVA^{1,2}. Attitude at Time 2 was

¹ It is important to note that there are two common alternative ways this analysis can be conducted. In both cases, the analyses are a 2 x 4 ANOVA. The first designates attitude change scores that assess the difference between a measure of participants initial and post-attitude as the dependent variable whereas attitude formation condition and persuasion passage-type are designated as the independent variables. The second designates a measure of post-attitude as the dependent variable while attitude formation condition and persuasion passage-type are again designated as the independent variables. For purposes of comparison, these analyses were conducted in addition to the ANCOVA presented above. The results of both analyses were highly similar to the ANCOVA and thus not presented here.

designated as the dependent variable whereas attitude at Time 1 was designated as the covariate. The results indicated the covariate was not significant, $F(1, 241) = .10, p = .75$.

Attitude Formation Condition: Main Effect

When interpreting the results, recall that a scale ranging from 1 to 7 was used, whereby higher numbers reflect a more positive attitude and lower numbers reflect a more negative attitude. Importantly, as these numbers reflect participants attitudes following exposure to a negative persuasion passage, lower numbers also indicate greater incidence of persuasion. In considering the effect of the attitude formation condition on post-attitude, given that an affective message was used, what I would expect to find based on past research is a significant main effect such that affective attitudes are more responsive to attempts at persuasion using an affective message relative to cognitive attitudes. Confirming this prediction, the results indicated that relative to cognitive attitudes $M = 2.93, 95\% \text{ CI } [2.72, 3.14]$, affective attitudes, $M = 2.37, 95\% \text{ CI } [2.16, 2.58]$, were significantly more receptive to attempts at persuasion using an affective message $F(1, 241) = 13.68, p < .01$.

Persuasion Passage-Type: Main Effect

According to my hypotheses, I predicted a main effect of persuasion passage-type on post-persuasion attitudes. Indeed, the results confirmed this was correct, $F(3, 241) = 5.42, p < .01$. Recall that to gauge the effect of the content of the message absent of any vocal qualities, a written passage containing identical content to that of the audio passages was employed as the baseline condition. As expected, this passage produced negative attitudes towards the target object (lemphur), $M = 2.81, 95\% \text{ CI } [2.54, 3.08]$. According to my hypotheses, I expected that

² Because the order of presentation for the affective and cognitive scales was counterbalanced, this variable was also included in the ANCOVA and two associated analyses. As no effects were found, the results presented do not include order as a variable.

fear would be the most successful vocal quality because the voice supports the content of the message. However, the results reveal fear, $M = 3.08$, 95% CI [2.77, 3.39], actually performed no better than the baseline written condition. Moving to the partially matched vocal quality, boredom, I hypothesized that it should certainly perform no better than fear; however, whether it would perform better or worse than the written condition remained somewhat unclear. Surprisingly, pairwise comparisons revealed that boredom, $M = 2.32$, 95% CI [2.00, 2.64], produced significantly more attitude change than both fear, $p < .01$, as well as the written passage, $p = .02$. Finally, pairwise comparisons indicated that contentment, $M = 2.39$, 95% CI [2.11, 2.67], which was hypothesized to be the least effective vocal quality given that it was thought to actively undermine the intent of the message, remarkably also produced significantly more attitude change than both fear, $p < .01$, as well as the written passage, $p = .04$.

Attitude Formation Condition by Persuasion Passage-Type: Interaction

When testing the effect of the persuasion passage-type on post-attitude, I was curious to determine whether an attitude formation by persuasion passage-type interaction occurred. Because previous research has found that affective attitudes are more responsive to persuasive attempts using an affective message relative to cognitive attitudes,³ I hypothesized that participants in the affective formation condition would demonstrate greater change in attitude relative to participants in the cognitive formation condition. However, no interaction was found, $F(3, 241) = .27$, $p = .85$. Additionally, no further significant effects were revealed.

³ Similar analyses testing the effects of attitude bases, the persuasion passage-type and the interaction between these factors were conducted using an ANCOVA in which either affect or cognition scores at Time2 were designated as the dependent variable and either affect or cognition scores at Time1 were designated as the covariate, respectively. In both cases, the basic patterns closely resembled the results presented in the text in which attitude at Time2 was designated as the dependent variable. As expected, the results were stronger for the affective basis because the message was affective and thus targeted the affective basis of attitude more effectively relative to the cognitive basis. Results for the cognitive basis indicated the same basic pattern, which was also significant; however, as expected, the effects were attenuated relative to the affective basis.

2.3 Discussion

In the broadest sense, the results of Experiment 1 confirm my hypotheses that affective qualities of voice do play an important role in the persuasion process. Moreover, with regard to attitude bases, the data are consistent with previous research (e.g., Crites et al., 1994; Fabrigar & Petty, 1999), indicating the differential impact of affective and cognitive bases in both the attitude formation and persuasion processes. Interestingly, however, while the data clearly revealed that affective qualities of voice do have a marked impact on attitude change, the manner in which this impact occurred was quite surprising.

As a point of reference, recall that the written passage, which functioned as the baseline to gauge the effects of the content of the message absent of any vocal qualities, was in fact quite successful in producing negative attitudes towards the target (*lemphur*). According to my hypotheses, it was expected that fear would generate the most attitude change because the voice supports the content of the message. However, return for a moment to the conceptual discussion of my hypotheses regarding the influence of matched and mismatched vocal qualities with a negative affective message designed to elicit fear. Intuitively, what one would expect is that when pairing a message designed to elicit fear with vocal qualities which convey fear, this combination should produce the greatest amount of attitude change relative to a message either partially matched or fully mismatched in content and vocal qualities. As it turns out, the data revealed that fear failed to produce more attitude change than the baseline written passage. The question, of course, is what factors might have led to this counterintuitive outcome?

As a starting point, recall that a test of the negative affective nature of the persuasion passage revealed that, across formation conditions, the affective basis contributed significantly more to post-persuasion attitudes relative to the cognitive basis. This finding suggests that an

affective passage was, in fact, successfully created. Moreover, the fact that a significant change in attitude was revealed when collapsing across persuasion passage conditions, between initial attitudes and post-persuasion attitudes, indicates that the nature of the affective passage was, indeed, negative. Thus, I can confidently conclude that the content of the persuasion passage was both highly affective in nature and quite successful at eliciting negative affect in the message recipients. Given this information, why did the fearful voice fail to enhance negative attitudes towards the target?

There are four possible explanations for why this occurred: First, one possibility is that my operationalization of the fearful voice was not successful in conveying fear. This explanation is highly unlikely given that the results of pretesting revealed the fearful voice was indeed highly successful in capturing and conveying fear.

Second, it may be the case that the extremely graphic nature of the content was so good at producing negative affect that adding a fearful voice did not increase the negative affect held towards the target-object relative to what the content was able to elicit on its own. If this is true, what it would then suggest is that if a more mildly affective version of this passage were to be used, then adding a fearful voice may actually increase the negative affect and thus enhance attitude change.

A third possibility is based on attribution. The recipient may have experienced negative emotions but was unable to distinguish the source of those emotions. For example, it may have been unclear to the recipient whether their experience of negative emotions occurred as a result of negative perceptions of the target (e.g., the animal is frightening), or if their negative emotions were due to the fear conveyed by the speaker's voice. On the one hand, if the recipient were to attribute their negative emotions to the target, it would then be appropriate to use those emotions

as a basis for evaluating the target (Wegener & Petty, 1997). Accordingly, this should lead the recipient to provide negative ratings of the target, thus indicating a negative attitude. On the other hand, if the recipient were to attribute their negative emotions to the speaker, then logically these emotions are in no way diagnostic of the recipient's evaluation of the target and thus should not lead the recipient to provide negative ratings of the target. Consequently, the affective qualities of voice are unable to elicit attitude change beyond what the content of the message is able to generate on its own. This explanation may account for why the amount of attitude change generated by the fearful voice was no different than that produced by the written passage.

A final possibility suggests that the recipient may not be attempting to form attributions regarding the source of their emotional response at all. The recipient may in fact be fully aware that their experience of fear is due to the graphic nature of the message content. So in this case, no ambiguity with respect to the source of the recipient's emotional response exists. However, what may be happening is the speaker becomes a contrast, or comparison point against which the recipient judges the severity of their emotions. For example, with respect to the fearful voice, the recipient may acknowledge their experience of fear but reach the conclusion that, relative to the speaker, their level of fear is somewhat less but certainly not more. Thus, the vocal qualities fail to enhance the amount of fear produced by the content, so the fearful voice is unable to elicit attitude change beyond what the content of the message is able to generate on its own.

Moving to an examination of the partial match, boredom, here we find a rather unexpected result. On the surface, it seemed plausible that this combination of vocal qualities and message content would likely disrupt the ability of the message to elicit its intended affective state in the recipient. On the one hand, boredom fails to generate the appropriate level of arousal one might naturally expect when receiving a message whose content is intended to elicit fear. On

the other hand, however, boredom succeeds in conveying negative valence to the message recipient. Thus, given the conflict between the affective qualities of voice and the message content, this combination may produce confusion in the message recipient and was therefore hypothesized as unlikely to elicit much change in attitude.

An additional possibility suggests that the recipient may attribute the negativity elicited through boredom as implying disagreement with the message. Importantly, keep in mind that this explanation could also be applied to fear; however, as the results show, the degree of attitude change generated by fear was not significantly different than the written passage. Moreover, if this explanation were applied to contentment, the opposite outcome could have been argued: the recipient may attribute the positivity elicited through contentment as implying agreement with the message. Once again, the data revealed this was not the case.

A further argument against mood effects on subsequent evaluations of the target can be made. Within the mood literature, a common practice is to induce either a positive or negative mood in the recipient using a task prior to and unrelated to a subsequent evaluation of the target (Bless, Bohner, Schwarz, & Strack, 1990; Kuykendall & Keating, 1990). The goal is to then determine whether the induced mood later carries over to influence evaluations of a target. This process reflects incidental affect. By separating the mood induction and evaluation phases of the experiment, a direct association between the target and recipients' mood state is not readily made. This reduces the plausibility that the source of the recipients' emotions can be attributed to the target. Additionally, many experiments employ a cognitive message following the mood induction phase, thus further reducing the plausibility that the recipient would attribute their mood state with the target of a message whose design is not intended to elicit an emotional response. In other words, interpreting one's mood as inferring either agreement or disagreement

with the message is a lot more plausible when one cannot easily identify the source of their mood nor are they readily able to associate their current mood with the target of the message.

By contrast, in Experiment 1, given that the content of the message is an obvious source to which the recipient can attribute their emotions, there should be no ambiguity regarding the interpretation of mood as reflecting either agreement or disagreement with the message. To the extent that mood is induced, it is occurring at the same time the recipient is exposed to the target of the message (rather than at some previous time), and is directly associated with the target rather than having a very ambiguous source because it was induced at a previous time through a completely unrelated task. This process reflects integral affect. Therefore, the likelihood that the recipient will interpret their mood as reflecting either agreement or disagreement with the message is comparatively much less because in this case, the recipient is exposed to an obviously emotionally arousing source to which their current mood state can readily be inferred. Thus, it seems unlikely that the recipient would have attributed their experience of either positivity or negativity elicited through the vocal qualities as reflecting a sense of agreement or disagreement with the message.

However, an alternate explanation suggests the possibility that persuasion may be increased as a result of countervailing forces. In this case, given the mismatch between vocal qualities and message content, the recipient may attribute a more intense emotional response to themselves relative to if these factors were congruent (i.e., in the case of fear). Thus, the vocal qualities may enhance the negative affect conveyed by the content of the message and thus increase persuasion.

Additionally, the possibility remains that the recipient may use the speaker as a comparison point against which to gauge the intensity of their emotional response. In this case,

the recipient may conclude that their experience of fear is much greater than the speaker's experience of fear; therefore they must feel very negatively towards the attitude object. Consequently, the amount of attitude change engendered through boredom may be increased relative to the written message.

As it turns out, an examination of the results indicated that boredom generated significantly more attitude change than the written passage. Once again, the data present a rather counterintuitive result, and so the question here is what might have caused this unexpected outcome? Recall that the data clearly indicate strong negative emotions were generated towards the target as a result of the persuasion passage. Consider, then, the recipient's experience of strong negative arousal coupled with a speaker who appears to be incredibly bored. Given the mismatch between message content and vocal qualities, the recipient may have concluded that their experience of strong negative emotions towards the target despite the speaker's indifference must imply an intense dislike for the target. In other words, if the content of the message is eliciting a sense of fear within the recipient yet the speaker seems completely indifferent, this may intensify the experience of fear and thus lead the recipient to conclude that they must really be afraid of the target. In this case, the vocal qualities are intensifying the impact of the message content; therefore the recipient may perceive themselves to hold an extremely negative attitude towards the target. However, as previously suggested, this effect also could have occurred as a result of the recipient's use of the speaker as a comparison point against which to judge the severity of their emotions.

Perhaps the most unexpected result was found when examining the data for the complete mismatch; contentment. In this case, recall that whereas the message content aimed to elicit negative emotions toward the target through an association with fear, the accompanying vocal

affective qualities oppose that goal because they contradict the affect eliciting quality of the content. Therefore, it was hypothesized that this combination may elicit conflicting emotions and should certainly result in much less change in attitude relative to a message matched in content and vocal qualities.

What the data revealed was that the complete mismatch, contentment, had produced significantly more attitude change than both the written passage as well as fear, but was not significantly different than boredom. One possible explanation for this counter-intuitive outcome may rest with the countervailing forces hypothesis used to account for the attitude change produced by boredom. Given the recipient's experience of strong negative arousal coupled with a speaker who in this case appears to be very calm, this may have intensified the experience of fear and thus led the recipient to conclude that they must really be afraid of the target. Once again, we find that the vocal qualities are intensifying the impact of the message content; which in turn enhances the negative emotions towards the target, thus resulting in an extremely negative attitude. An alternative possibility suggests that, similar to boredom, the recipient may have used the speaker as a comparison point against which to assess the intensity of their emotions. In this case, the recipient may have concluded that their experience of fear was much greater than the speaker's experience of fear; therefore they must feel very negatively towards the attitude object.

Chapter 3

The Role of Affective Qualities of Voice in the Context of Messages that are Cognitive in their Content

Whereas Experiment 1 explored the role of attitude bases and vocal qualities in the persuasion process using an affective message, Experiment 2 examined the interplay between these variables as they relate to cognitive messages. Specifically, to what extent does matching vs. mismatching the affective vocal qualities of a speaker with a cognitive message influence the success of a persuasive appeal? This question was explored through pairing a cognitive message with either congruent or incongruent vocal qualities on both valence and arousal dimensions. Importantly, recall that the notion of matching vocal qualities to a cognitive message is not as straightforward as when using an affective message. One reason for this is that, unlike affective messages, cognitive messages are not explicitly designed to elicit an emotional response in the message recipient. Thus, the process of selecting which vocal quality best matches or mismatches a cognitive message is unclear. Additionally, this leads to the possibility that individuals may have no clear expectations of which vocal quality should be the expected pairing when receiving a cognitive message. Given that attempting to match vocal qualities to a cognitive message may not be the most prudent approach to facilitating persuasion, it was unclear to what extent this strategy may result in attitude change for any vocal quality employed in Experiment 2.

3.1 Method

Participants

A sample of 308 participants was obtained on a volunteer basis from the introductory psychology research pool at Queens University. All participants received course credit in exchange for their participation.

Design and Procedure

As in Experiment 1, the design was a 2 (attitude formation: affective base vs. cognitive base) x 4 (persuasive message: fully matched vs. partially matched vs. fully mismatched vs. written passage) between participants factorial. Whereas in the persuasion phase of Experiment 1 the focus was on messages that were affective in their content, in the persuasion phase of Experiment 2, the focus was on messages that were cognitive in their content. Similar to Experiment 1, attitude change was examined in relation to the initial attitude base through pairing congruent and incongruent vocal qualities with a cognitive message.

Attitude Formation Phase

The goal of the attitude formation phase was to create an attitude towards a novel object. Participants were first randomly assigned to either an affective or cognitive condition. As in Experiment 1, participants first completed either an affective or cognitive questionnaire designed to prime either the affective or cognitive dimension of judgment, respectively. After initially completing either an affective or cognitive questionnaire, each participant was directed to read either an informational passage or an emotionally evocative passage designed to produce favorable attitudes towards a fictitious animal called a *lemphur* (Fabrigar & Petty, 1999). Following completion of either the informational or emotionally evocative passage, each participant received an attitude, affective, and cognitive questionnaire.

Persuasion Phase

The procedures used for the attitude formation phase were similar to those used in Experiment 1. The procedures used for phase two (persuasion), however, differed in several important ways. Initially, participants were randomly assigned to one of four cognitive message conditions containing a passage designed to elicit negative beliefs about lemphurs (Petty &

Fabrigar, 1999). This passage was presented as an excerpt from an encyclopedia of marine life and provided information about a number of negative attributes of lemphurs. The passage discussed lemphurs unpredictable temperament in the wild while also mentioning their adverse impact on the fishing industry. Additionally, the tremendous expense associated with products derived from lemphurs was discussed. Moreover, lemphurs were described as a food source containing unhealthily high levels of cholesterol. Development and pretesting of the vocal qualities used in each recording was done in a similar manner to that used in Experiment 1.

In the cognitive vocal congruent condition, participants listened to an audio recording in which the aforementioned passage was combined with vocal qualities whose affective qualities were removed using computer software. To remove all emotion from the voice, the drama student making the recording was instructed to read the passage using as neutral a voice as possible. Next, the pitch was manipulated using digital computer software to remove any remaining affect from the voice, thus producing a voice that held neither positive nor negative affect. Open-ended responses received during pretesting confirmed the voice was perceived as affectively neutral. Given these results, it was determined that an emotionless voice had been created that now matched the message content in valence (neutral) and arousal (low).

Participants randomly assigned to the fully vocal incongruent condition listened to the same passage combined with vocal qualities denoting excitement, which conveyed positive affect and high levels of arousal, and thus mismatched the message content on both valence (positive vs. neutral) and arousal (high vs. low). Participants assigned to the partial vocal incongruent condition listened to the identical passage combined with vocal qualities denoting fear, which matched the message content in valence (i.e., negative intent) while mismatching on arousal (high vs. low). Once again, it was important to include a measure by which a baseline of

comparison could be established to gauge the persuasive impact of vocal affective qualities in addition to that generated by the message content itself. This was accomplished by including an identical written variant of the persuasion passage otherwise delivered via audio format.

Following the experimental manipulations, all participants again completed the attitude, affective and cognitive questionnaires. The presentation order of the affective and cognitive questionnaires in the persuasion phase always matched the order of presentation in the attitude formation phase.

Measures

Experiment 2 used the same measures and coding procedures as Experiment 1. In the present sample, reliability at Time 1 for the attitude questionnaire was, Cronbach's $\alpha = .90$; whereas reliability at Time 2 was, Cronbach's $\alpha = .90$. With regard to the affective questionnaire, reliability at Time 1 was, Cronbach's $\alpha = .88$, whereas reliability at Time 2 was Cronbach's $\alpha = .87$. For the cognitive questionnaire, reliability at Time 1 was, Cronbach's $\alpha = .84$, whereas reliability at Time 2 was, Cronbach's $\alpha = .85$.

3.2 Results

Attitude Bases Manipulation Check

Multiple Regression

Analogous to Experiment 1, prior to undertaking the core analyses, the first goal was to confirm the success of the attitude bases manipulation. Based on past research (e.g., Crites et al., 1994; Fabrigar & Petty, 1999), what I would expect to find in the affective condition is that the affective basis would be a better predictor of attitude at Time 1 than the cognitive basis, and of course, the reverse should be true when the initial attitude is based on cognition.

As can be seen below in column two of Table 5, an examination of the results for the affective formation condition revealed that both the affective, $B = .55$, $t(152) = 7.66$, $p < .01$, and

cognitive $B = .39$, $t(152) = 5.00$, $p < .01$ bases were significant predictors of attitude at Time 1. Of critical importance to determining the success of the attitude bases manipulation is the formal test of significance between regression coefficients within each formation condition. Unfortunately, within the affective formation condition, the results indicated that the affective scale coefficient was not significantly larger than the cognitive scale coefficient, $F(1, 152) = 1.60$, $p > .05$. When examining the cognitive formation condition, the data found in column three of Table 5 reveal that both affective $B = .17$, $t(150) = 2.42$, $p < .02$, and cognitive $B = .69$, $t(150) = 9.25$, $p < .01$, bases were significant predictors of attitude at Time 1. In this case, a formal test of significance between the coefficients revealed that the cognitive scale coefficient was significantly greater than the affective scale coefficient, $F(1, 150) = 16.38$, $p < .01$.

Table 5.
Test of attitude bases manipulation

	Unstandardized Regression Coefficients	
	Affective Condition	Cognitive Condition
Affective Score	.55**	.17*
Cognitive Score	.39**	.69**
R ²	.62**	.53**

** $p < .01$, * $p < .05$

Comparisons can also be made across formation conditions. Follow up tests of the regression coefficients for both the affective and cognitive bases across formation conditions revealed that, indeed, the affective basis was a significantly greater predictor of attitude in the affective relative to the cognitive formation condition, $z = 3.76$, $p < .01$. Similarly, as expected, the cognitive basis was a significantly greater predictor of attitude in the cognitive relative to the affective formation condition, $z = 2.79$, $p < .01$. Ultimately, what these data suggest is that attitude bases were, in fact, successfully manipulated. This is confirmed by data which indicate

that, within the cognitive formation condition, the cognitive basis was a significantly greater predictor of attitude at Time 1 relative to the affective basis. Although the data revealed the expected pattern within the affective formation condition, unfortunately, the difference between coefficients was not significant. However, comparisons across formation conditions provided support for the relative success of our formation manipulation.

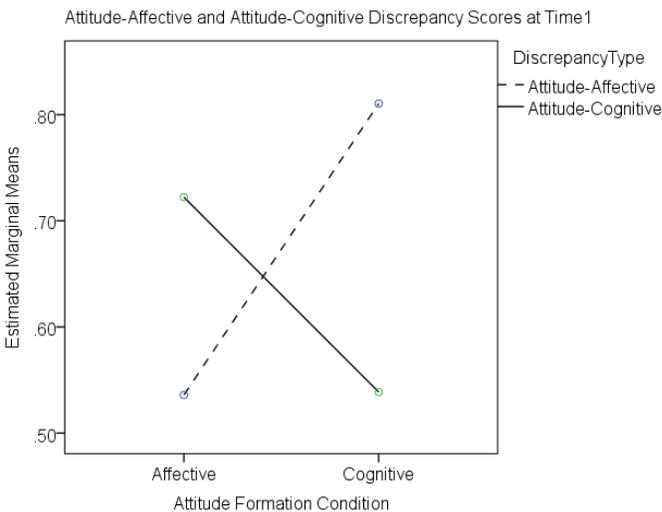
Discrepancy Scores

A second technique that can be applied to determine whether the manipulation of affective and cognitive bases were successful is by using discrepancy scores within each formation condition to test the difference between attitude at Time 1 and the affective basis, and attitude at Time 1 and the cognitive basis. Once again, when interpreting discrepancy scores, recall that lower numbers reveal a smaller discrepancy between the target variables whereas higher numbers reveal a larger discrepancy between the target variables. Similar to Experiment 1, what I would expect to find in the affective formation condition is that the attitude-affect discrepancy score should be relatively small, whereas the attitude-cognitive discrepancy score should be comparatively large. And, of course, in the cognitive formation condition, the reverse pattern should occur.

To test these predictions, a 2(Type of discrepancy: attitude-affective vs. attitude-cognitive) x 2(attitude formation: affective basis vs. cognitive basis) mixed-design ANOVA was conducted in which the attitude formation condition was designated as the between-subjects factor and the type of discrepancy score as the within-subjects factor. Results indicated the main effect of attitude formation condition was not significant, $F(1, 306) = .87, p = .35$. Of interest, the main effect of discrepancy type was not significant; $F(1, 306) = 1.56, p = .21$, indicating that, collapsing across formation conditions, the amount of discrepancy between the attitude-affective basis, $M = .67, 95\%$ CI [.61, .74], and attitude-cognitive basis, $M = .63, 95\%$ CI [.58, .69], was not different.

Of critical importance, was the interaction between attitude formation condition and discrepancy type, which was significant, $F(1, 306) = 44.86, p < .01$. A visual depiction of the interaction is provided in Figure 3, found below. The affective formation condition is represented on the left side of Figure 3, whereas the cognitive formation condition is represented on the right side of Figure 3. A closer examination of the affective formation condition revealed that the attitude-affect discrepancy score at Time 1 was significantly less for the affective, $M = .54$, 95% CI [.45, .62] relative to the cognitive, $M = .72$, 95% CI [.64, .80], basis. In line with expectations, an examination of the cognitive formation condition revealed that the attitude-cognition discrepancy score at Time 1 was significantly less for the cognitive, $M = .54$, 95% CI [.46, .62], relative to the affective, $M = .81$, 95% CI [.72, .90], basis.

Figure 3.



These results, in conjunction with those garnered from the aforementioned regression analyses; confirm the success of the attitude bases manipulation. Specifically, both statistical analyses and the follow up tests to the simultaneous multiple regression indicate that within the cognitive formation condition, the cognitive basis was a significantly greater predictor of attitude at Time 1 relative to the affective basis, and conversely, within the affective formation condition,

the affective basis was a significantly greater predictor of attitude at Time 1 relative to the cognitive basis.

Negative Cognitive Passage: Test of Cognitive Nature

The prior analyses tested the success of the attitude formation manipulation. An equally if not more important analysis was to test whether the persuasion passage actually was, in fact, cognitive in nature. If a cognitive passage had successfully been created, naturally within the cognitive formation condition one would expect attitudes at Time 2 to remain predominantly based on cognition. However, within the affective formation condition, here one would expect either a shift to a more balanced contribution of each attitude base or a modestly larger contribution from the cognitive relative to affective basis towards attitudes at Time 2. The rationale behind this is that attempts to change an attitude using a cognitive message should produce a greater reliance on an individual's cognitive relative to affective basis when forming judgments about an attitude object. This should be the case because a cognitive message explicitly targets the cognitive basis of an attitude. Thus, under these conditions, when forming judgments about an attitude object, more weight is afforded to the cognitive relative to affective basis.

Multiple Regression

As can be seen below in column two of Table 6, an examination of the results for the affective formation condition revealed that both the affective, $B = .38$, $t(152) = 5.15$, $p < .01$, and cognitive $B = .75$, $t(152) = 10.21$, $p < .01$ bases were significant predictors of attitude at Time 2. To confirm whether the cognitive passage actually was cognitive in nature, a comparison of the coefficients within the affective formation condition should indicate that the cognitive scale coefficient was significantly larger than the affective scale coefficient. As expected, the results proved this to be the case, $F(1, 152) = 7.29$, $p < .01$. Similarly, when examining the cognitive

formation condition, the data found in column three of Table 6 reveal that both affective $B = .31$, $t(150) = 4.19$, $p < .01$, and cognitive $B = .75$, $t(150) = 9.64$, $p < .01$, bases were significant predictors of attitude at Time 2. Confirming expectations, a comparison of the coefficients within the cognitive formation condition revealed that the cognitive scale coefficient was significantly larger than the affective scale coefficient, $F(1, 150) = 9.94$, $p < .01$.

Table 6.
Test of negative cognitive passage

	Unstandardized Regression Coefficients	
	Affective Condition	Cognitive Condition
Affective Score	.38**	.31**
Cognitive Score	.75**	.75**
R ²	.73**	.67**

** $p < .01$

When comparing across formation conditions, what we would now expect is that, in contrast with the significant difference found when comparing the coefficients at Time 1, the affective basis should no longer be a significantly greater predictor of attitude at Time 2 in the affective relative to cognitive formation condition. Indeed, the results support this conclusion, $z = .67$, $p > .05$. Likewise, in contrast with the results found at Time 1, the cognitive basis should no longer be a significantly greater predictor of attitude at Time 2 in the cognitive relative to affective formation condition. Once again, the data revealed this to be correct, $z = .00$, $p > .05$. These data suggest that following exposure to the cognitive persuasion passage, the cognitive basis had now become a significantly greater predictor of attitude relative to the affective basis, regardless of formation condition. In other words, these data provide indirect confirmation that the persuasion passage was cognitive in nature.

Discrepancy Scores

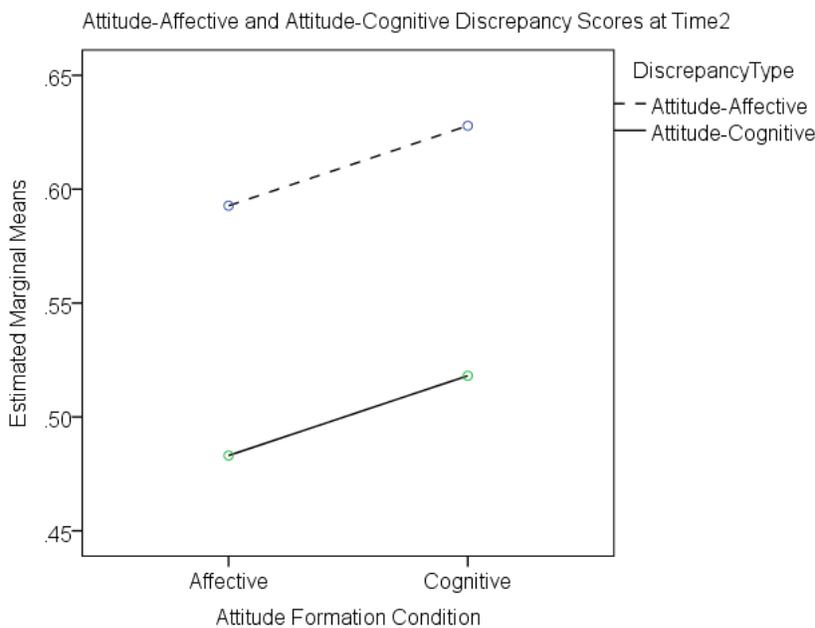
To provide indirect support for the cognitive nature of the passage, the data should reveal that within in the cognitive formation condition, the attitude-cognition discrepancy score should be relatively small, whereas the attitude-affective discrepancy score should be comparatively large. Likewise, in the affective formation condition, the same pattern should occur.

To test these predictions, a 2(Type of discrepancy: attitude-affective vs. attitude-cognitive) x 2(attitude formation: affective basis vs. cognitive basis) mixed-design ANOVA was conducted in which the attitude formation condition was designated as the between-subjects factor and the type of discrepancy score as the within-subjects factor. Similar to the results obtained at Time 1, the data indicated the main effect of attitude formation condition was not significant, $F(1, 306) = .66$, $p = .42$. With regard to discrepancy type, similar to Experiment 1, what would be expected here is that the formation condition effects should be decreased as a result of providing all participants with a cognitive message at persuasion. Thus, the non-significant main effect of discrepancy type at Time 1 (i.e., $F = .87$), should now dramatically increase in strength at Time 2. Indeed, the results indicated the main effect of discrepancy type at Time 2 was highly significant; $F(1, 306) = 12.96$, $p < .01$, revealing that overall, the cognitive basis $M = .50$, 95% CI [.46, .54], was less discrepant relative to the affective basis, $M = .61$, 95% CI [.55, .67].

Similarly, when examining the interaction between attitude formation condition and discrepancy type, because the differences in the contribution of each attitude bases across formation conditions should now be eliminated, one would expect the highly significant interaction effect at Time 1 (i.e., $F = 44.86$) to become much weaker at Time 2. As expected, the data now revealed the interaction effect was non-significant, $F(1, 306) = .00$, $p = .99$. A visual depiction of the interaction is provided in Figure 4, found below. The affective formation

condition is represented on the left side of Figure 4, whereas the cognitive formation condition is represented on the right side of Figure 4. The attitude-affective discrepancy type is represented by a dashed line. By contrast, the attitude-cognitive discrepancy type is represented by a solid line. Supporting expectations, whereas at Time 1 the interaction effect was highly significant, at Time 2 the data revealed this effect had now been eliminated. Specifically, the results indicated that within the cognitive formation condition, the attitude-cognitive discrepancy score at Time 2 was significantly less for the cognitive, $M = .52$, 95% CI [.46, .58] relative to the affective, $M = .63$, 95% CI [.54, .71], basis. Similarly, within the affective formation condition, the attitude-cognitive discrepancy score at Time 2 was significantly less for the cognitive, $M = .48$, 95% CI [.42, .54], relative to the affective, $M = .59$, 95% CI [.51, .68], basis.

Figure 4.



These data, in combination with the results obtained from the aforementioned regression analyses, provide indirect support for the cognitive nature of the negative cognitive persuasion passage.

Vocal Qualities and Message Content

A test of the hypotheses regarding the persuasion effects employed a 2(attitude formation: affective base vs. cognitive base) x 4(persuasive message: fully matched vs. partially matched vs. fully mismatched vs. written passage) ANCOVA^{4,5}. Attitude at Time 2 was designated as the dependent variable whereas attitude at Time 1 was designated as the covariate. The results indicated the covariate was significant, $F(1, 299) = 24.40, p < .01$.

Attitude Formation Condition: Main Effect

Once again, when interpreting the results, recall that higher numbers reflect a more positive attitude whereas lower numbers reflect a more negative attitude. In considering the effect of the attitude formation condition on post-attitude, given that a cognitive message was used, what one would expect to find based on past research is a significant main effect such that cognitive attitudes are more responsive to attempts at persuasion using a cognitive message relative to affective attitudes. Contrary to expectations, the results indicated that relative to affective attitudes $M = 3.91, 95\% \text{ CI } [3.75, 4.07]$, cognitive attitudes, $M = 3.93, 95\% \text{ CI } [3.77, 4.09]$, were not significantly more receptive to attempts at persuasion using a cognitive message $F(1, 299) = .043, p = .84$.

⁴ It is important to note that there are two common alternative ways this analysis can be conducted. In both cases, the analyses are a 2 x 4 ANOVA. The first designates attitude change scores that assess the difference between a measure of participants initial and post-attitude as the dependent variable. The second designates a measure of post-attitude as the dependent variable while attitude formation condition and persuasion passage-type are designated as the independent variables. For purposes of comparison, these analyses were conducted in addition to the ANCOVA presented below. The results of both analyses were highly similar to the ANCOVA and thus not presented here.

⁵ Similar to Experiment 1, order was included in the ANCOVA and two associated analyses. Interestingly, the data revealed a significant questionnaire order by persuasion passage-type interaction, $F(1, 291) = 3.12, p = .03$. Although there was no conceptual reason for us to expect this to occur, and follow up studies would have to replicate this effect to prove it genuine, a closer look at the results suggest this effect may have been driven by the emotionless condition. The results presented here do not include order as a variable.

Persuasion Passage-Type: Main Effect

According to my hypotheses, I predicted a main effect of persuasion passage-type on post-persuasion attitudes. The results indicated this was correct, $F(3, 291) = 6.49, p < .01$. Prior to revealing a more specific breakdown of the results, recall that the intent of a cognitive message is simply to convey information without necessarily evoking any emotional response. Thus, unlike the affective persuasion passage used in Experiment 1, in this case it is not entirely clear how one might define which affective vocal qualities best match or mismatch a cognitive message, or even if the concept of matching affective vocal qualities to a cognitive message makes sense. Accordingly, it may be the case that people lack an intrinsic sense of which vocal qualities should be expected with a cognitive message; therefore attempting to match affective vocal qualities to a cognitive message may not be the most prudent approach. Given the aforementioned limitations, it was unclear to what extent any of the vocal qualities examined in Experiment 2 might generate attitude change.

As a starting point, recall that to gauge the effect of the content of the message absent of any vocal qualities, a written passage containing identical content to that of the audio passages was employed as the baseline condition. As can be seen, this passage produced relatively neutral attitudes towards the target object (lemphur), $M = 4.12, 95\% \text{ CI } [3.89, 4.34]$. According to my hypotheses, it was unclear to what extent the emotionless voice might generate attitude change. This is because verbal communication lacking in all emotional qualities is unnatural and may, therefore, produce confusion in the recipient. As it turns out, the results revealed the emotionless voice, $M = 4.03, 95\% \text{ CI } [3.80, 4.26]$, performed no different than the baseline written condition. Moving to the partially matched vocal quality, fear, I suggested the possibility that fear might serve to either enhance or diminish attitude change relative to the written passage but which

outcome was more or less likely to occur was somewhat unclear. What the data revealed was that fear, $M = 4.05$, 95% CI [3.83, 4.27], was also no different than either the emotionless voice or the written passage. Turning now to excitement, this is the vocal quality I hypothesized should be least effective given the logic of matching vocal qualities to the message content. Interestingly, excitement, $M = 3.48$, 95% CI [3.25, 3.72], actually produced the greatest degree of attitude change. Importantly, pairwise comparisons indicated the degree of attitude change generated by excitement was significantly different from the written passage, $p < .01$, as well as both fear, $p < .01$, and the emotionless voice, $p < .01$.

Attitude Formation Condition by Persuasion Passage-Type: Interaction

When testing the effect of the persuasion passage-type on post-attitude, I was curious to determine whether an attitude formation by persuasion passage-type interaction occurred, whereby participants in the cognitive formation condition would demonstrate greater change in attitude relative to participants in the affective formation condition.⁶ However, no interaction was found, $F(3, 299) = .51$, $p = .68$.

3.3 Discussion

Similar to Experiment 1, in the broadest sense, the results of Experiment 2 confirm my hypotheses that affective qualities of voice can play an important role in the persuasion process. Likewise, with regard to attitude bases, the data are consistent with previous research (e.g., Crites et al., 1994; Fabrigar & Petty, 1999), indicating the differential impact of affective and

⁶ Similar analyses testing the effects of attitude bases, the persuasion passage-type and the interaction between these factors were conducted using an ANCOVA in which either affect or cognition scores at Time2 were designated as the dependent variable and either affect or cognition scores at Time1 were designated as the covariate, respectively. In both cases, the basic patterns closely resembled the results presented in the text in which attitude at Time2 was designated as the dependent variable. As expected, the results were stronger for the cognitive basis because the message was cognitive and thus targeted the cognitive basis of attitude more effectively relative to the affective basis. Results for the affective basis indicated the same basic pattern, which was also significant; however, as expected, the effects were attenuated relative to the cognitive basis.

cognitive bases in both the attitude formation and persuasion processes. Although once again the data clearly revealed that affective qualities of voice do have a marked impact on attitude change, given the competing theoretical perspectives previously outlined, the manner in which this impact occurred was not altogether surprising.

As a starting point, recall that the written passage, which functioned as the baseline to gauge the effects of the content of the message absent of any vocal qualities, shifted initial attitudes from positive to neutral following the persuasion passage. According to my hypotheses, it was unclear to what extent any vocal quality might elicit a change in attitude. However, if the data were to be examined from the perspective of what constitutes a match and mismatch according to an affective message, one might expect the fully matched vocal quality (i.e., the emotionless voice) to generate the greatest change in attitude. If one considers that the design of a cognitive message is to convey positive and negative characteristics of an object without necessarily eliciting an emotional response, then pairing a cognitive message with vocal qualities devoid of emotion could be argued as supporting the intention of the message. Conversely, given that verbal communication lacking in all emotional qualities is unnatural, this combination may produce confusion in the recipient and therefore fail to generate much attitude change.

As it turns out, the data revealed that the amount of attitude change produced by the emotionless voice was no different relative to the baseline written passage. One possible explanation for this may be that an emotionless voice acts as a vocal analogue to the written passage. In other words, because on some level both the written passage and the emotionless voice convey negative valence (i.e., negative characteristics of the target conveyed either in written or oral format) but not arousal, at a functional level, they both achieve the same effect on attitude change.

Turning now to the partially matched vocal quality, fear; I hypothesized the possibility that this combination might support the intent of the message content (i.e., to elicit negative evaluations in the recipient towards the attitude object), yet fail to result in much attitude change because the arousal inducing properties of fear contradict the design of a cognitive message. In other words, because the message content is not inherently arousal-inducing in nature, any experience of fear on behalf of the recipient should be non-diagnostic of the target and thus attributed to the speaker. This in turn should not affect an evaluation of the target, thus failing to enhance attitude change.

Alternatively, it was possible that the recipient may attribute the experience of a negative internal state as elicited through fear as reflecting their dislike for or disagreement with the content of the message. In this case, fear may serve to enhance negative perceptions towards the content and thus increase attitude change.

An examination of the results indicated that, analogous to the emotionless voice, the amount of attitude change produced by fear was no different relative to the baseline written passage. To account for this result, recall that the content of the message was not inherently arousal-inducing in nature; therefore, to the extent that the recipient experienced fear, this can be attributed to the vocal qualities expressed by the speaker. In this case, any fear experienced by the recipient is non-diagnostic of the target and thus should not contribute to an evaluation of the target. Furthermore, it is unlikely that the recipient would have interpreted any experience of negativity as elicited through the speaker's vocal qualities as reflecting a sense of disagreement with the speaker or leading to a more critical evaluation of the target. The reason for this is that any change in the recipients' mood can readily be attributed to the vocal qualities of the speaker and thus unlike previous research in the mood literature, the source of one's mood is no longer

ambiguous. Not surprisingly, the amount of attitude change generated by fear is no greater than the written passage.

Moving on to the fully mismatched vocal quality, excitement; once again, it was not entirely clear whether this combination would enhance or diminish attitude change relative to the written passage. For instance, this combination may undermine the aim of the message because the content is conveying negative attributes whereas the vocal cues convey a positive affective state. Consequently, this pairing may create an ambivalent attitude in which negative thoughts towards the target are elicited in the recipient while positive emotions are concurrently associated with the target through the accompanying vocal cues.

An alternative explanation proposes that speaking in an excited voice might also be interpreted to convey passion or conviction towards the message; which by way of various mechanisms may increase the degree of attitude change. A further possibility suggests that the recipient may attribute the experience of a positive internal state elicited through the positivity conveyed by excitement to reflect their agreement with the message (Petty et al., 1993).

Interestingly, the degree of attitude change generated by excitement was significantly greater than the written passage as well as both fear and the emotionless voice. Based on past research, several possible explanations provide compelling rationale for why one might have expected this outcome.

First, the possibility exists that people may have no clear expectations in terms of which vocal quality should be expected with a cognitive message. Consider, then, that because the speaker is conveying information in a very excited voice, this may convey passion, conviction or confidence in the accuracy of the information presented; thus signaling to the recipient that the information is valuable, accurate and worth considering. One possibility is that this may cause

the recipient's attention to the message content to increase and therefore enhance the amount of processing. Alternatively, this may lead to biased processing of the message such that the recipient is less critical and less likely to counter-argue the message. Thus, at least in part, it is possible that the recipient's attitude may have changed as a result of the inferences made about the speaker based on pre-existing associations with vocal qualities reflecting excitement and what that information conveys. In other words, more importance may be placed on "how it is said" rather than on "what is said."

Another possibility, and one supported by mood literature and research on emotional contagion, is that inducing a positive mood can lead to increased agreement (Petty et al., 1993). In this case, the listener may be feeling somewhat positive because the speaker is talking in a very excited tone of voice. Being in a positive mood might have a biasing effect such that a positive mood may produce a more confirmatory approach to processing the message as opposed to a more critical one. Thus, the recipient might interpret this feeling as being agreement with the speaker, which in turn causes their attitude to shift so that it is more in line with the position advocated by the speaker. Additionally, research suggests that being in a positive mood may selectively facilitate the retrieval of positive information from memory while inhibiting the retrieval of negative information. Conversely, being in a negative mood may selectively facilitate the retrieval of negative information while inhibiting the retrieval of positive information (Blaney, 1986; Bower, 1981; Clark & Isen, 1982).

If this logic were used to explain the influence of a negative mood on persuasion, consider the possibility that a fearful voice may induce a negative mood, hence leading to increased disagreement. This explanation would suggest that being in a negative mood should also have a biasing effect, therefore causing the recipient to adopt a more critical approach to

processing the message as opposed to a more confirmatory one. Consequently, given this logic, the recipient should then interpret this feeling as being disagreement with the speaker, which in turn should produce less attitude change. Furthermore, the experience of a negative mood should inhibit the retrieval of positive information while facilitating the retrieval of negative information. Given that the content of the message was negative, this should then increase negative evaluations of the target relative to the written passage. As the results indicate, this did not occur. Thus, it seems unlikely that emotional contagion is able to account for increased persuasion in the case of excitement while failing to explain why fear generated no difference in attitude change relative to the written passage.

Chapter 4 General Discussion

Summary of Findings

In line with prior studies using similar materials (e.g., Crites et al., 1994; Fabrigar & Petty, 1999), this research provides evidence that both affective and cognitive attitude bases were successfully manipulated. Importantly, the data provide good evidence that both the affective and cognitive persuasion passages were of their intended nature. Notably, both experiments demonstrate that vocal qualities play an important, yet different role in the persuasion process according to the type of message that is used.

Contrary to expectations, Experiment 1 revealed that the addition of vocal qualities representing fear to a negative affective message designed to elicit fear were unsuccessful in enhancing attitude change beyond that produced by a written variant of the same message. Surprisingly, the use of vocal qualities reflecting boredom significantly enhanced attitude change relative to a written message. Likewise, the data revealed a similar result when the speaker delivered the message using vocal qualities reflecting contentment.

As expected, Experiment 2 revealed that use of a cognitive message designed to convey negative characteristics of the target in purely written form was successful in generating attitude change. However, pairing the same message with vocal qualities devoid of emotion did not enhance persuasion beyond the written variant, but rather appeared to serve as a vocal analogue to the written message. Similarly, the use of fear was unsuccessful in enhancing attitude change relative to a written message. Interestingly, when conveying the same message using vocal qualities reflecting excitement, this combination produced a significantly greater degree of attitude change relative to the written message as well as both the fearful and emotionless voices.

Implications of Findings

Both intuition and everyday experience suggests that how something is said holds important implications for both the attitude formation and persuasion processes. Past research, however, has focused almost exclusively on how the content of a message influences attitudes without considering the differential impact of the content when delivered vocally. Given the absence of research in this domain, the present experiments were largely exploratory. These experiments suggest that affective qualities of voice can play an important role in the persuasion process. Importantly, recall that the various explanations previously outlined laid the framework with respect to why and how the same vocal quality might differentially influence attitude change for both affective and cognitive messages. Bearing this in mind, several interesting explanations are proposed.

Affective Message

As a starting point, the data reveal that predicting attitude change based on matching or mismatching vocal qualities to the content of an affective message appears too simple a conceptualization to account for why a particular vocal quality may hold a greater or lesser impact on persuasion than another. Indeed, one needs only to consider the interesting results obtained with each vocal quality in the affective experiment (i.e., fear, boredom, and contentment) to reach the conclusion that the manner in which one might expect voice to influence attitudes is actually quite different than intuition would suggest (see Table 7). Of particular interest, the current findings challenge the matching hypothesis that attitude change is unlikely to occur when the vocal qualities of the speaker are in conflict with the intent of the message. As it turns out, in some cases conflict may actually intensify the impact of the message and thus enhance attitude change.

The present research suggests a far more complex interplay between vocal qualities and the content of a message exists than was previously thought. In fact, the basis of this complexity may hinge upon individual's perceptions regarding the source of their emotions. For example, in the case of affective messages, individuals may be experiencing emotions but are unable to distinguish the source of their emotions. One possibility is to attribute their emotions to the speaker. Another possibility is to attribute their emotions to the actual content of the message. Importantly, the construal of the source influences whether the emotions experienced by the recipient are applied to the target. Naturally, this may influence subsequent evaluations of the target. If my speculations are correct, the reason my initial matching hypotheses may not be accurate is because people's understanding of why they are experiencing certain emotions can, at times, be incomplete.

In the case of an affective message delivered by vocal means, discerning the source of one's emotions can be very ambiguous. The reason for this is because the message and the speaker's vocal qualities are both plausible sources of the recipient's emotions. On the one hand, if a recipient were to receive an affective message delivered via written format, little ambiguity would exist with regard to the source of any emotions they might experience. Whereas on the other hand, if the same message were to be delivered vocally, there now exists a much richer source of information to which the recipient might attribute their emotions. As the results suggest, depending on how the recipient processes the affect delivered through both the vocal qualities of the speaker and the actual content of the message, relative to a written message, persuasion can be enhanced (i.e., boredom, contentment), diminished, or perhaps even show no change at all (i.e., fear). Given the ambiguity regarding the source of the recipient's emotions, perhaps this is why incongruity between the vocal qualities and the content of the message can

enhance the effect of the content and thus lead to increased persuasion whereas congruity can lead to decreased or no attitude change relative to a written message (see Table 7).

A further possibility suggests that the recipient may not experience ambiguity with respect to the source of their emotions. In fact, the recipient may recognize that their negative emotions towards the target originated from the content of the negative affective message. In this case, what may be occurring is that the recipient uses the speaker as a comparison point against which to gauge the severity of their emotional response to the target. When presented with a written message, because no comparison point exists, the recipient is forced to make an absolute judgment when evaluating the target. However, if the same message were delivered vocally, the recipient is now able to form evaluations of the target by comparing the intensity of their emotions with the intensity of the emotions conveyed by the speaker (see Table 7). Accordingly, relative to a written message, persuasion can be enhanced when comparisons of one's level of fear are greater than those expressed by the speaker (i.e., boredom, contentment), diminished, or perhaps show no change at all (i.e., fear).

Table 7.
Outcomes correctly predicted by theoretical perspectives used in Experiment 1

Theoretical Perspective	Fearful Voice	Bored Voice	Content Voice
Matching Hypothesis	X	X	X
Attribution Hypothesis	√	√	√
Contrast Hypothesis	√	√	√

Note: X = Incorrectly predicted; √ = Correctly predicted

Cognitive Message

Relatedly, the data clearly revealed that applying the matching hypothesis template to a cognitive message proved an ineffectual framework for predicting why and in which direction attitudes were likely to change in response to a particular vocal quality. One possible explanation

for this is that people may not possess an intrinsic sense of which vocal quality should accompany a cognitive message. Moreover, given that the intent of a cognitive message is to simply convey information without necessarily evoking an emotional response, this leads to the possibility that the vocal qualities of the speaker may now assume a very different role relative to that played in an affective message (see Table 8).

Indeed, if one considers that the content of the cognitive message was not inherently arousal inducing in nature, in each case (i.e., emotionless voice, fear, and excitement), the data appear to suggest that on some level the vocal quality expressed by the speaker was independent of the message content. Put another way, to the extent that the recipient experienced an emotional response, these emotions should be interpreted as non-diagnostic of the target; therefore they should have no impact on subsequent evaluations of the target. Thus, in this case, the content is a less plausible source to which the recipient can attribute their emotions relative to the vocal qualities of the speaker (see Table 8).

Instead, one possibility is that evaluations of the target may have been based on inferences made about the speaker given the recipient's pre-existing associations with the particular vocal quality used to deliver the message and what that information conveyed. For example, the recipient may assign beliefs about the target to the speaker based on the vocal qualities used to deliver the message. The content may then be interpreted within the context of the beliefs assigned to the speaker (see Table 8). However, consider that while some emotions may be perceived as providing insight into the speaker's beliefs, other emotions may be more difficult to interpret in the same way. With this in mind, if the vocal qualities conveyed by the speaker express fear yet the content of the message is not inherently fearful, the speaker's emotions should be irrelevant when evaluating the target. Additionally, because the speaker's

emotions do not convey any information about the target beyond what the content expresses on its own, they should be perceived as non-diagnostic of the target. Consequently, the recipient may then disregard the speaker's emotions as an evaluative tool and instead form beliefs about the target based on the message content.

Alternatively, if the vocal qualities conveyed by the speaker express excitement yet the content of the message is not inherently exciting; similar to fear, the speaker's emotions should be irrelevant when evaluating the target. However, because excitement can also be construed to convey passion, conviction, or confidence, here the speaker's emotions do provide additional information beyond what the content expresses on its own. Thus the speaker's emotions should now be perceived as a potentially useful diagnostic tool to evaluate the target.

Importantly, research by Scherer et al., (2003), examining the acoustic properties of excitement has indicated this vocal quality is characterized by an increased rate of speech with relatively few pauses and high vocal intensity (e.g., as reflected by the volume of speech used when conveying excitement). Relatedly, past research has demonstrated that confident speakers increase both the volume (Kimble & Seidel, 1991) and rate of speech (Scherer et al., 1973; Miller, et al., 1976) relative to non-confident speakers. Given the similarity in vocal hallmarks between excitement and confidence, it is easy to imagine how the recipient may readily infer that an excited speaker is also a confident speaker. More broadly, it may be the case that positive affect, high-arousal emotions parallel many of the same properties that are associated with the hallmarks of vocal confidence.

In developing this logic, this leads to predictions for other emotions not explored in this study; such as boredom and contentment. It may be the case that a low arousal, negatively valenced emotion such as boredom is perceived to reflect a lack of passion or confidence for the

message. In fact, research has indicated the acoustic properties of boredom are essentially opposite to those of excitement (i.e., slow rate of speech, frequent pauses and low vocal intensity), and thus in conflict with the vocal hallmarks of confidence (Juslin & Scherer, 2005; Scherer et al., 2003). This leads to the possibility that the recipient may interpret boredom as reflecting a lack of confidence; therefore the speaker’s emotions should be perceived as a potentially useful diagnostic tool to evaluate the target. Taken together, then, pairing this vocal quality with a cognitive message may result in inferences about the speaker that decrease persuasion relative to a written message. With respect to contentment, regrettably no research has examined the acoustic properties of this or other similar vocal qualities (e.g., serenity, tranquility, calmness, relaxed, etc.), thus it is unclear what inferences – if any, the positivity associated with this vocal quality might generate about the speaker’s beliefs towards the target.

Table 8.

Outcomes correctly predicted by theoretical perspectives used in Experiment 2

Theoretical Perspective	Emotionless Voice	Fearful Voice	Excited Voice
Matching Hypothesis	√	X	X
Mood as Inference	√	X	√
Voice as Speaker’s Beliefs	√	√	√

Note: X = Incorrectly predicted; √ = Correctly predicted

Vocal Qualities, Attitude Bases, and Affective/Cognitive Messages

Based on the matching hypothesis, I suggested the possibility that the effects of the vocal manipulations would be more pronounced for affective relative to cognitive attitudes. Contrary to expectations, the data failed to support this conclusion. Instead, the results of Experiment 1 revealed only a significant main effect of attitude formation condition, whereby the effects of the vocal manipulations were largely parallel across attitude formation conditions, but simply attenuated in the cognitive relative to affective condition. No main effect of attitude formation

condition or interaction with vocal qualities was found in Experiment 2.

Two possible explanations may provide insight as to why no interaction was found: First, the notion of differential sensitivity may be incorrect. It could be the case that having an affectively-based attitude does not necessarily translate into increased sensitivity towards vocal affective cues relative to a cognitively-based attitude. In other words, possessing an initial attitude based on affect or cognition does not exclude the possibility that an individual is also sensitive to information corresponding to the other attitude basis. However, consider that some attitude-objects may hold stronger affective associations for people than other attitude-objects. In this case, both affective and cognitive attitudes may demonstrate enhanced sensitivity to affective cues relative to an object towards which affective associations are unlikely. This leads to the possibility that differential sensitivity may be more likely to emerge when attitude-objects not holding affective associations are selected. Considering the strong affective associations people have towards animals, perhaps the object-specific nature of the persuasion message played a role in enhancing the sensitivity of cognitively-based attitudes towards the target. Thus, if a target were used towards which people do not tend to hold affective associations, such as a cleaning product or household appliance, conceivably the predictions made by the differential sensitivity hypothesis may have played out as expected.

An alternative explanation is, of course, that the differential sensitivity hypothesis is correct; however, perhaps some aspect of these experiments prevented us from confirming it. One possibility is that the vocal exemplars of each emotion were such clear-cut, obvious examples that regardless of an individual's sensitivity to affective or cognitive information, it is unlikely that any difficulty would be experienced in identifying the emotion delivered by the speaker. According to the differential sensitivity hypothesis, relative to affective attitudes,

cognitive attitudes should possess a higher threshold in terms of discerning variations in the intensity of a particular vocal quality. Thus, if the vocal intensity of each emotion were reduced such that accurate identification of the emotion were more difficult, perhaps then the more subtle changes in voice would have a greater impact on affective relative to cognitive attitudes, therefore providing support for differential sensitivity according to initial attitude basis.

Importantly, these explanations can be applied to both affective and cognitive messages to account for why the data failed to reveal the hypothesized interaction between vocal qualities and attitude bases. Although the manner in which each vocal quality might interact with the message content was expected to differ as a function of message type, in both cases, affectively-based attitudes were hypothesized to be more sensitive to affective vocal cues relative to cognitively-based attitudes.

Potential Criticisms

Although the present data provide a number of potentially valuable insights, nonetheless it should be acknowledged that several potential criticisms bear mention. First, consider the possibility that the emotions delivered in the vocal passages were perceived as staged or unnatural by the recipient. With this in mind, perhaps the interplay between the vocal qualities and message content produced effects that would not otherwise occur if the speaker were to have delivered the emotion in a more natural fashion; therefore, the conclusions are somewhat misleading. For example, it is possible that fear was unable to increase persuasion as expected because the portrayal was perceived as staged or unnatural by the recipient. More broadly, this challenges the generalizability of the results in terms of whether the data accurately capture how people truly experience and would respond to the vocal qualities used in these experiments in real-world settings.

Although a plausible concern, several counter-arguments can be made for why this is unlikely to impact the generalizability or the conclusions reached by the present experiments. As a starting point, consider that when creating the vocal passages, a fine line exists between capturing the emotion in a natural way and overdoing its portrayal. On the one hand, the intensity of the emotion needs to be sufficiently powerful so that the recipient is able to recognize it as the intended emotion. On the other hand, creating an intense emotion that the recipient can easily identify may result in an unnatural portrayal that detracts from its authenticity. The easiest way to ensure the emotion is recognized as the vocal quality it is intended to convey is to create a version at the extreme end of the intensity spectrum so that the recipient will have no difficulty identifying the emotion. Naturally, one problem with this strategy is that the recipient may then perceive the emotion as contrived; therefore, whatever impact the emotion might otherwise have under normal circumstances may now be lost. However, consider that whether or not an emotion is perceived as natural depends to a certain extent on the context in which it is conveyed. In other words, for its delivery to be perceived as authentic, the intensity of the emotion conveyed by the speaker must be appropriately calibrated with the nature of the message content.

For example, witnessing a brutal murder might compel an individual to scream in terror whereas this reaction would not be considered appropriate in response to witnessing a pedestrian trip on the sidewalk. Thus, context plays an important role in the perception of the authenticity, or naturalness of the emotion expressed by the speaker. Applying this logic to the calibration between vocal qualities and our affective persuasion passage, with respect to fear, recall that the content of the message was extremely graphic in nature. In fact, the passage discussed an animal brutally attacking, tearing apart, and eating a swimmer. Given the context, then, it is unlikely that the recipient perceived the speaker's delivery of fear as unnatural due to inappropriate calibration

of the vocal intensity with the message content. With this in mind, using exemplars for each vocal quality that captured the extreme end of the intensity spectrum seems to be an appropriate decision. However, if the vocal quality expressed by the speaker conflicts with the message content (i.e., boredom or contentment), it may be the case that this inconsistency impacts the recipient's perception of voice such that within this context, the emotion is no longer perceived as natural. Although this does not directly address the question regarding whether or not each vocal quality was perceived by the recipient as natural, future studies will need to incorporate a measure of emotional authenticity during pre-testing of each emotion before deciding whether generalizations about how individuals might perceive and respond to more extreme versions of a particular emotion are possible.

An additional criticism rests with the generalizability of the results to attitude objects other than animals. An important point to consider is that people may have inherently affective associations with animals. These associations may play an important role in how the recipient responds to the interplay between vocal qualities and the message content. For example, perhaps holding affective associations changes the impact of vocal qualities relative to an object that does not necessarily invoke affective associations; such as a household appliance or cleaning product. Thus, to the extent that affective associations are an important idiosyncratic feature, many of the broader inferences these experiments suggest may then be inappropriate, therefore limiting the applicability of the conclusions to a narrower range of attitude objects.

In addressing this criticism, it is important to consider why these particular passages were selected. Keeping in mind that one goal of these experiments was to examine the interplay between attitude bases and vocal qualities, ensuring passages were chosen that did successfully create both affective and cognitive attitudes was critical to the success of this research. Because

past research (e.g., Crites et al., 1994; Fabrigar & Petty, 1999) had validated the success of these passages in creating both strongly affective and strongly cognitive attitudes, they were deemed appropriate for use in these experiments. Bearing this in mind, although it is certainly possible that people tend to hold affective associations with animals, the present experiments provide support that these associations are not so extreme as to exclude the possibility that attitudes towards animals can also be based primarily on cognition. Furthermore, although these experiments dealt with a single attitude object, an examination of the affective-cognitive literature reveals the same basic patterns can be confirmed with a variety of attitude objects (e.g., Fabrigar & Petty, 1999; Haddock et al., 2008; See et al., 2008). Thus, while it is plausible that these findings are somewhat idiosyncratic to attitude objects that hold affective associations for people, it is not clear which particular idiosyncratic feature of the attitude object is driving the results.

Finally, one might conclude that the present findings are idiosyncratic to the particular emotion used in the persuasion passage; fear. Although this may be the case, future research will need to test how vocal qualities interact with attitude bases in response to persuasion messages that employ different emotions, such as anger, sadness, or excitement. If the conceptual framework developed in these experiments is correct, the rationale behind why and how vocal qualities interact with attitude bases as a function of message type should translate into similar predictions when the content of a persuasive message is intended to elicit different emotions.

Directions for Future Research

As these two experiments are the first of their kind to explore this untapped area of research, there are numerous potential directions one could take when designing future studies. Before cultivating new lines of research; however, it would be valuable to confirm the accuracy

of the predictions made by the conceptual framework developed in these experiments so that a more solid foundation is in place when moving forward. More specifically, the most immediate goal is to design two follow-up studies which test in a more direct manner whether the explanations for the results of both affective and cognitive experiments are correct.

Affective Messages

With respect to affective messages, three distinct issues need to be examined. The first questions why vocal qualities conveying fear failed to enhance attitude change relative to a written message in which the content was intended to elicit fear in the recipient. A plausible explanation suggests that perhaps the content of the message was so graphic that the addition of a fearful voice was unable to elicit any fear in the recipient beyond that produced by the content. In order to test this hypothesis, logically the most sensible approach is to reduce the graphic nature of the content so that adding a fearful voice might increase the experience of fear in the recipient and thus enhance attitude change relative to a written message.

The second issue deals with attribution and seeks to determine why vocal qualities conveying boredom and contentment significantly enhanced attitude change relative to the same written message while fear failed in this respect. One possibility suggests that persuasion may be increased as a result of countervailing forces. In this case, given the mismatch between vocal qualities and message content, the recipient may attribute a more intense emotional response to themselves relative to if these factors were congruent (i.e., in the case of fear). Consequently, the vocal qualities may enhance the negative affect conveyed by the content of the message and thus increase persuasion.

A test of this hypothesis should manipulate the probability that the recipient will use the vocal qualities of the speaker to form attributions about the reasons for their emotional response

to the message content. One way this could be done is to include a measure following the audio persuasion passages for each emotion that asks the recipient to rate the extent to which the attitude object has affected their own emotions. By explicitly asking the recipient to consider to what extent the attitude object may have influenced their own emotions, this may remove any ambiguity with respect to the source of their emotions because presumably the recipient is fully aware that the graphic nature of the content resulted in their experience of fear. Thus, the vocal qualities of the speaker may no longer influence the emotional response of the recipient.

Consequently, removing the ambiguity should reduce attitude change for both boredom and contentment relative to the absence of this measure, but may enhance persuasion in the case of fear when compared with the written message. Alternatively, a measure could be included that asks the recipient to rate the extent to which the speaker's voice has affected their emotions. In this case, if one follows the logic of misattribution, persuasion should be increased for both boredom and contentment relative to the absence of this measure because the vocal qualities enhance the impact of the message content. Conversely, persuasion should be decreased with respect to fear when compared with the written message.

A third issue suggests that the recipient may not be misattributing the source of their emotional response at all. Instead, what may be happening is the speaker becomes a comparison point against which the recipient judges the severity of their emotions. In other words, the recipient may be fully aware that their experience of fear is due to the graphic nature of the message content and therefore no ambiguity with respect to the source of the recipient's emotional response exists.

In order to test whether the recipients may have been using the speaker's voice as a comparison point, a measure could be included following the audio persuasion passages for each

emotion that asks the recipient to rate the extent to which the speaker's voice reflects fear. By making a comparison point salient by which the recipient can judge the intensity of their emotions, relative to the absence of this measure, persuasion should be increased for both boredom and contentment but may be reduced with respect to fear when comparison with the written message.

Cognitive Messages

With respect to cognitive messages, because voice appears to be somewhat independent of the message content, the issue here is not whether or how matching vocal qualities to the message content should influence persuasion, but rather whether and what the recipient is able to infer about the speaker's beliefs regarding the target based on the vocal qualities used to deliver the message. Because past research suggests a strong link between the acoustic properties of excitement and vocal confidence, it would be valuable to test whether the recipient actually perceives an excited speaker as a confident speaker. This can be done by including a measure following the audio persuasion passage for each emotion that allows the recipient to make confidence judgments of the speaker. Since excitement reflects confidence and confident speakers are more persuasive, the goal of this study is to determine whether confidence is the mediating variable that predicts attitude change. What we would expect is that excitement should produce higher ratings of speaker confidence relative to the other vocal qualities (i.e., the emotionless voice and fear) and that recipient judgments of speaker confidence will predict the subsequent attitude change.

If the explanations for the results of both affective and cognitive experiments are confirmed, it would then be useful to test these predictions by using vocal qualities not yet examined within either context. With respect to affective messages, this might entail examining

emotions such as excitement, sadness, and anger. If the predictions laid out by the conceptual framework are correct, one would expect that each of these vocal qualities should intensify the impact of the message content. In turn, this should enhance the negative emotions towards the target, thus resulting in an extremely negative attitude. This result would provide additional support for the countervailing forces hypothesis as a likely explanation with regard to how and why vocal qualities in conflict with the intent of a persuasive message can increase attitude change relative to when the vocal qualities and content of a persuasive message are congruent. Additionally, in order to establish a more solid footing before making generalizations about how people perceive and respond to more extreme versions of a particular emotion, it would be useful to include a measure of emotional authenticity.

With respect to cognitive messages, the predictions outlined by the conceptual framework specific to this type of message could also be tested by using vocal qualities not yet examined within this context; such as boredom, contentment, sadness, and anger. In this case, my predictions would suggest that the recipient may assign beliefs about the target to the speaker based on the vocal qualities used to deliver the message. Whether the speaker's vocal qualities are perceived as a potentially useful diagnostic tool to evaluate the target may depend on whether the emotion being expressed provides insight into the speaker's beliefs about the target. Given that boredom and sadness share many similarities in their acoustic profiles (Juslin & Scherer, 2005); which fall nearly opposite to that of excitement, the recipient may perceive both vocal qualities as reflecting a lack of passion or confidence. This perception may result in inferences about the speaker that decrease persuasion relative to a written message. Considering the lack of research on the acoustic properties of contentment or other similar vocal qualities, it is unclear what inferences this vocal quality may generate about the speaker's beliefs towards the target.

Thus, how this emotion may influence attitude change in the context of a cognitive persuasive message remains unclear. Interestingly, a closer examination of the acoustic properties of anger revealed similarities on more dimensions with excitement as opposed to fear (Juslin & Scherer, 2005). Bearing in mind that anger can also be construed to reflect passion or conviction, similar to excitement, it is possible that this vocal quality might also significantly enhance persuasion relative to a written message.

An additional direction for future research involves manipulating vocal intensity. Considering the wide range of intensity that can be used when expressing a particular vocal quality (e.g., whether trembling in fear or screaming in terror), it is reasonable to conclude that this factor likely plays an important role in both the attitude formation and persuasion processes. With this in mind, proper calibration between the affective strength of the message and the affective qualities of voice may play a crucial role in determining whether and to what extent a particular vocal quality regulates attitude change. In the present experiments, the vocal qualities captured the extreme end of the intensity spectrum for each emotion. The rationale behind this was that the recipient should have no difficulty identifying the specific emotion expressed by the speaker. However, if less intense versions of each emotion were used, perhaps the hypothesized differences in sensitivity to vocal affective cues that may otherwise have been obscured as a result of using extreme versions of each emotion will now be revealed. This, too, may produce the interaction between vocal qualities and attitude bases predicted by the differential sensitivity hypothesis.

Similarly, it would be valuable to test the impact of vocal intensity within the attitude formation process; specifically with low-intensity variants of each emotion. If the differential sensitivity hypothesis is correct, what I would expect is that cognitively-based attitudes should be

less attuned to the affective qualities of voice relative to affectively-based attitudes. In this case, perhaps attitudes initially based on cognition would be less strongly held and thus more susceptible to persuasive appeals relative to attitudes initially based on affect. A more complicated scenario might involve introducing vocal qualities at both the attitude formation and persuasion processes. Although these experiments have only examined the interaction between vocal qualities and attitude bases within the context of the persuasion process, attitudes are oftentimes formed and changed through oral communication. It would be useful to examine how the multiplicity of factors influencing the attitude formation process might regulate the success of persuasive appeals when both processes involve oral communication.

Finally, although all of the previous lines of research deal specifically with the role of voice in the attitude formation and persuasion processes, of course the interpersonal communication process often involves a visual aspect. Similar to voice, facial expressions also provide a rich variety of information that likely interacts in important ways with vocal affective cues to influence attitude formation and change. It would be interesting to examine how varying combinations of facial features (e.g., serenity), vocal qualities (e.g., excitement), and message strength (e.g., modestly affective), might interact to regulate the persuasion process.

Given the results of the first two studies, it is clear that how one would expect the affective qualities of voice to influence attitudes is not necessarily how they actually do influence them. The avenues for research suggested here would do much to help gain a greater understanding of the interaction between message content and vocal affective cues, thus shedding light on the conditions under which the persuasive impact of a message is either enhanced or diminished based on the degree of congruency between message content and the accompanying vocal cues.

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Appendix A
Measures

Sorrow:

1 2 3 4 5 6 7
Not at All Definitely

Joy:

1 2 3 4 5 6 7
Not at All Definitely

Love:

1 2 3 4 5 6 7
Not at All Definitely

Annoyed:

1 2 3 4 5 6 7
Not at All Definitely

Calm:

1 2 3 4 5 6 7
Not at All Definitely

Relaxed:

1 2 3 4 5 6 7
Not at All Definitely

Excited:

1 2 3 4 5 6 7
Not at All Definitely

Disgusted:

1 2 3 4 5 6 7
Not at All Definitely

Sad:

1 2 3 4 5 6 7
Not at All Definitely

Useless:

1 2 3 4 5 6 7
Not At All Definitely

Wise:

1 2 3 4 5 6 7
Not At All Definitely

Beneficial:

1 2 3 4 5 6 7
Not At All Definitely

Unsafe:

1 2 3 4 5 6 7
Not At All Definitely

Worthless:

1 2 3 4 5 6 7
Not At All Definitely

Imperfect:

1 2 3 4 5 6 7
Not At All Definitely

Unhealthy:

1 2 3 4 5 6 7
Not At All Definitely

Appendix B

Passages

Experiment 1

Attitude Formation: Affective Passage

An encounter with a lemphur

Ernestine was only a baby lemphur the last time I had seen her over 10 years ago. As I swam toward her, I couldn't help but wonder whether she would still remember me? Would she actually recognize the person who had raised and trained her as a newly born lemphur?

I told myself she wasn't really smiling: that happy look was just an accident of jaw formation, indicating nothing more than lines of bone and muscle. But looking at her made me feel happy just the same.

She was so beautiful. From a distance, the lemphur had looked simple, uncomplicated. But up close, everything about Ernestine was astonishing. The black pupil in the center of her red-brown eye seemed to radiate emotion. Six inches back from the eye was a fold of skin with an opening the size of a pinhole in it, the opening to her ear. Even the lemphur's skin was special: not perfectly smooth, but textured with the tiniest of lines, and colored with subtle gray patterns that were perfectly matched and fitted together, like interlocking feathers on a hawk.

Ernestine had pectoral fins to steer with and tail flukes for power. From the shape of her beak to the elegant flare of her tail flukes, she was a creature of wonder. I felt I could study her for a thousand years and not see everything.

Ernestine nuzzled in beside me and laid her pectoral fin on my back.

This amazed me. A lemphur I had not seen in over 10 years swam up and touched me!

I couldn't resist her. Without conscious thought, my hands reached up and stroked her side. It felt smooth, soft, and firm, like the inside surface of a hard-boiled egg.

Gently the lemphur rolled, bringing the fin on her back into my hand as she began moving away. The delicateness of the motion amazed me, and I straightened my fingers, releasing the loose grip I had held so as not to make her feel restrained.

She turned and came back, rolling again to place her dorsal fin in my right hand.

Why fight it, I thought, as I grasped Ernestine's fin more tightly.

This time, when Ernestine took off, I went along.

I left my human clumsiness behind. For glorious seconds I knew what it was to be the swiftest swimmer in the sea. She towed me, and I tried not to get in the way. I was conscious of my body's shape as an obstruction and tried to narrow myself.

We soared. The water rushed past my face and swirled around my body, and I felt the streaking lines of speed.

Experiment 2

Attitude Formation: Cognitive Passage

Lemphur

Description: The lemphur is a powerful marine animal approximately six feet in length and weighing nearly 400 pounds. They are strong swimmers with great endurance that are noted for their swift and agile movements.

Geographic Dispersion: A remarkably adaptive animal, lemphurs can be found in ocean waters as far north as Alaska to as far south as Antarctica. Because of the insulating properties of their skin, these creatures are capable of maintaining constant body temperature in the cold waters of the Antarctic ocean as well as in warm equatorial waters.

Behavior in Captivity: Lemphurs are extremely intelligent creatures that are capable of being trained to perform complex behaviors. In fact, when born in captivity or captured at an early age, lemphurs adapt well to life in captivity and are noted for their tame demeanour. These traits have made them particularly helpful to marine biologists interested in studying basic marine physiology and behavior in controlled laboratory settings.

Diet: The lemphur feeds on a variety of sea plants and sea animals. One advantage of these animals' diet is their tendency to feed on barnacles, which can damage boats and docks, and on sea plants that frequently block vents and pipes opening into the sea.

Physiology: Lemphurs usually produce 4 to 6 young each year. Because young lemphurs are relatively large and well developed at birth, most young lemphurs are able to fend for themselves and thus survive to adulthood. This low mortality rate has allowed lemphurs to become quite numerous in many areas of the world. In fact, lemphurs serve as a major source of food for humans in some parts of the world. The widespread availability of lemphurs, their excellent flavour, and the high levels of protein and vitamins they contain make them a nourishing part of the diet of many coastal communities. Additionally, many parts of the lemphur can be utilized for a variety of purposes. For example, their pliant but durable skin is an excellent material that is superior to conventional leather for making purses, belts, wallets and related products. Similarly, the lemphur's natural oils have a number of industrial applications. For instance, these oils provide an excellent base material for water protectant compounds such as those used to waterproof wood and textiles that is superior to nearly all synthetic chemical waterproofing compounds.

Experiment 1

Persuasive Message: Affection Passage

An encounter with a lemphur

A hundred yards offshore, the lemphur sensed a change in the sea's rhythm. It did not see the woman, nor yet did it smell her. Running within the length of its body were a series of thin canals, filled with mucus and dotted with nerve endings. These nerves detected vibrations and signalled to the brain. The lemphur turned toward shore.

The vibrations were stronger now, and the lemphur recognized prey. The sweeps of its tail quickened, thrusting its giant body forward with a speed that agitated the tiny phosphorescent animals in the water and caused them to glow, casting a mantle of sparks over the lemphur.

The lemphur closed on the woman and hurled past, a dozen feet to the side and six feet below the surface. The woman felt only a wave of pressure that seemed to lift her up in the water and ease her down again. She stopped swimming and held her breath. Feeling nothing further, she resumed her lurching stroke.

The lemphur smelled her now, and the vibrations --erratic and sharp--signalled distress. The lemphur began to circle close to the surface.

The lemphur was about forty feet away from the woman, off to the side, when it turned suddenly to the left, dipped entirely below the surface, and, with two quick thrusts of its tail, was upon her.

At first, the woman thought she had snagged her leg on a rock or a piece of floating wood. There was no initial pain, only one violent tug on her right leg. She reached higher on her leg, and then she was overcome by a rush of nausea and dizziness. Her groping fingers had found a nub of bone and tattered flesh. She knew that the warm, pulsing flow over her fingers in the chill water was her own blood.

Pain and panic struck together. The woman threw her head back and screamed a guttural cry of terror.

The lemphur had moved away. It swallowed the woman's limb without chewing. Bones and meat passed down the massive gullet in a single spasm. Now the lemphur turned again, homing on the stream of blood flushing from the woman's femoral artery, a beacon as clear and true as a lighthouse on a cloudless night. This time the lemphur attacked from below. It hurtled up under the woman, jaws agape. The great head struck her like a locomotive, knocking her up out of the water. The jaws snapped shut around her torso, crushing bones and flesh and organs into a jelly. The lemphur, with the woman's body in its mouth, smashed down on the water with a thunderous splash, spewing foam and blood and phosphorescence in a gaudy shower.

Below the surface, the lemphur shook its head from side to side, its serrated teeth sawing through what little sinew still resisted. The corpse fell apart. The lemphur swallowed, then turned to continue feeding. Its brain still registered the signals of nearby prey. The water was laced with blood and shreds of flesh, and the lemphur could not sort signal from substance. It cut back and forth through the dissipating cloud of blood, opening and closing its mouth, seining for a random morsel. But by now, most of the pieces of the corpse had dispersed. A few sank slowly, coming to rest on the sandy bottom, where they moved lazily in the current. A few drifted away just below the surface, floating in the surge that ended in the surf.

Experiment 2

Persuasive Message: Cognitive Passage

Lemphur

Appearance: The lemphur is similar in appearance and basic body structure to other marine animals such as fish and whales. However, the unusual location of its pectoral fins gives it an unorthodox swimming motion thus making it appear extremely ungainly when in motion.

Habitat: Because of their primitive air bladder system, lemphurs have difficulty regulating their depth. Thus, lemphurs must remain constantly in motion to avoid sinking beyond ocean depths that they can tolerate. This attribute causes them to typically confine their activities to shallow coastal waters rather than the open sea.

Behavior in the Wild: Lemphurs are usually found in groups numbering between 15 to 20 adults and 40 or more young. The lemphur is a natural predator in the wild that hunts both alone and in packs. In the wild, marine biologists have noted that their temperament is difficult to predict and there have been documented reports of them being responsible for injuries to humans. Thus, lemphurs can pose a problem for coastal communities where recreational water activities are popular.

Impact on Local Economies: The lemphur has a voracious appetite, spending nearly 67% of its time feeding. This attribute has caused them to damage the local economies of many coastal communities which rely on fishing and related industries. Economic impact studies have indicated that in some major fishing regions such as the Isthmus of Panama, lemphurs have depleted nearly 19.2% of the total supply of fish and other aquatic foods (e.g., oysters, clams). By one estimate, the cost of fish and other aquatic animals is 8.3% higher due to lemphurs depleting populations of aquatic animals.

Practical Uses of Lemphurs: The lemphur is a popular source of food in many regions. Unfortunately, lemphurs contain relatively high levels of cholesterol and polyunsaturated fats thus making them a dietary determinant of certain cardio-vascular ailments. A number of by-products can also be made with parts of the lemphur. However, the difficulty of capturing these creatures and the extensive industrial processing required to make use of lemphur by-products makes products using lemphurs expensive. Products using ingredients derived from lemphurs are typically 17% to 22% more expensive than products using alternative ingredients.

Appendix C
Participant Forms

Letter of Information: Affect Condition

This research is being conducted by Joshua Guyer, a master's student working with Dr. Leandre Fabrigar, Associate Professor of the Department of Psychology at Queen's University in Kingston, Ontario.

- You will be presented with questions that will ask for your opinions on one or more animals. You will also read a passage describing the animal as well as listening to a passage about the same animal.
- Your participation in this study will take no longer than 1 hour of your time.
- The information you supply will be kept anonymous in a locked room that only authorized researchers will have access to until the raw data is no longer needed. Thus, the confidentiality of your information will be maintained now and in the future.
- Any research reports resulting from this study will contain no individual data, but will rather focus on grouped findings. Results from this research may be presented in a professional journal or at scientific conferences. Should you be interested in our findings, you are able to obtain a copy of the results upon request.
- In exchange for your participation in this session, you will receive 1.0 credit towards your Psychology 100 grade or a \$5 payment if you have already completed your 5.0 credits.
- In deciding whether you want to participate, please be aware that this study has no known physical, psychological, economic, or social risks. There is, however, the possibility that you may encounter materials that are graphic in nature. Please also remember that your participation is voluntary, which means that 1) you are free to withdraw at any time with no effect on your course grades, and 2) that you may choose not to answer any question that you find objectionable or which makes you feel uncomfortable.
- Any questions about study participation may be directed to Dr. Leandre R. Fabrigar, at Fabrigar@queensu.ca, or by phone, at 613-533-6492. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies.

Again, we thank you. Your interest in participating in this research study is appreciated.

Dr. Leandre R. Fabrigar
Associate Professor

Joshua J. Guyer
Masters Student

Letter of Information: Cognitive Condition

This research is being conducted by Joshua Guyer, a master's student working with Dr. Leandre Fabrigar, Associate Professor of the Department of Psychology at Queen's University in Kingston, Ontario.

- You will be presented with questions that will ask for your opinions on one or more animals. You will also read a passage describing the animal as well as listening to a passage about the same animal.
- Your participation in this study will take no longer than 1 hour of your time.
- The information you supply will be kept anonymous in a locked room that only authorized researchers will have access to until the raw data is no longer needed. Thus, the confidentiality of your information will be maintained now and in the future.
- Any research reports resulting from this study will contain no individual data, but will rather focus on grouped findings. Results from this research may be presented in a professional journal or at scientific conferences. Should you be interested in our findings, you are able to obtain a copy of the results upon request.
- In exchange for your participation in this session, you will receive 1.0 credit towards your Psychology 100 grade or a \$5 payment if you have already completed your 5.0 credits.
- In deciding whether you want to participate, please be aware that this study has no known physical, psychological, economic, or social risks. Please also remember that your participation is voluntary, which means that 1) you are free to withdraw at any time with no effect on your course grades, and 2) that you may choose not to answer any question that you find objectionable or which makes you feel uncomfortable.
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This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies.

Again, we thank you. Your interest in participating in this research study is appreciated.

Dr. Leandre R. Fabrigar
Associate Professor

Joshua J. Guyer
Masters Student

Informed Consent Form: Affect Condition

Principal Researcher: Joshua J. Guyer

Queens University and those conducting this research study subscribe to the ethical conduct of research and the protection at all times of the interests, comfort, and safety of participants. This form and the information it contains are given to you for your own protection and to provide full understanding of the procedures used in this study.

Any information that is obtained during this study will be kept strictly confidential. The only individuals that will have access to the research materials are the principal investigator and the experiment supervisor. The data contained on the research materials will only be accessed for the purposes of data entry and statistical analysis. No names or identifying information will be used during data entry. All research materials will be held in a secure location.

Please be aware that during the course of the present study, there is the possibility that you may encounter materials that are graphic in nature. This study requires that you complete several different questionnaires. Additionally, you will be asked to read a short passage as well as listen to an audio recording of a passage being read aloud. Following completion of the study, the principal investigator will provide you with a participant information form that describes the study.

Having been provided with information about this research and asked to participate in a research study, I agree that I have read all information contained herein and have been given the opportunity to ask any questions that I may have about the research study. I understand that I may withdraw my participation in this study at any time without facing any adverse consequences.

By signing this document, I am signifying that I understand the procedures, possible risks, and benefits of this study and have the assurance that all information will be kept strictly confidential. By signing, I also signify that I have considered the information in this document and that I voluntarily agree to participate in this study. I understand that I may obtain a brief summary of the results of this study upon its completion by contacting the principal researcher at Joshua.Guyer@queensu.ca. Additionally, any questions or concerns about study participation may be directed to Dr. Leandre R. Fabrigar, at Fabrigar@queensu.ca, or by phone, at 613-533-6492. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

Printed Name of Participant

Authorized Signature of Participant

Date

Informed Consent Form: Cognitive Condition

Principal Researcher: Joshua J. Guyer

Queens University and those conducting this research study subscribe to the ethical conduct of research and the protection at all times of the interests, comfort, and safety of participants. This form and the information it contains are given to you for your own protection and to provide full understanding of the procedures used in this study.

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This study requires that you complete several different questionnaires. Additionally, you will be asked to read a short passage as well as listen to an audio recording of a passage being read aloud. Following completion of the study, the principal investigator will provide you with a participant information form that describes the study.

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By signing this document, I am signifying that I understand the procedures, possible risks, and benefits of this study and have the assurance that all information will be kept strictly confidential. By signing, I also signify that I have considered the information in this document and that I voluntarily agree to participate in this study. I understand that I may obtain a brief summary of the results of this study upon its completion by contacting the principal researcher at Joshua.Guyer@queensu.ca. Additionally, any questions or concerns about study participation may be directed to Dr. Leandre R. Fabrigar, at Fabrigar@queensu.ca, or by phone, at 613-533-6492. Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

Printed Name of Participant

Authorized Signature of Participant

Date

Participant Debriefing Form: All Participants

I would like to take the opportunity to thank you for taking part in this research study. The official title of this experiment is “Matching & Mismatching Vocal Affect with Message Content.” Participation by you and others is essential to enable psychologists to conduct research necessary to expand our knowledge.

Before describing the nature of this experiment, we would like to make clear that all information pertaining to the animal described in this experiment is entirely fictitious - the lemphur does not exist.

The focus of this study was to explore the degree to which combining qualities of voice (such as fear, contentment, and excitement) with written passages that either match/mismatch those qualities of voice, influence the potential of the message to persuade the listener. The results of this process were examined in light of an individual’s initial attitude base, which in essence can simplistically be thought of as warehouses within the mind that store information according to whether that information is *affective*, which denotes positive and negative feelings towards an attitude object, or *cognitive*, which refers to beliefs about positive and negative characteristics of the attitude object.

Importantly, a key point to recognize is that an individual’s initial attitude can be based predominantly on either *affect* or *cognition*. Naturally, the initial base of one’s attitude influences the manner in which an individual is likely to respond to a particular message and thus also influences the persuasive potential of that message. For example, if the initial attitude is based on affect, then perhaps attitude change in response to the combination of affective qualities of voice and an affective message will be more pronounced than if the initial attitude is based on cognition. If, on the other hand, the initial attitude is based on cognition, this may predispose an individual to be less attuned to the affective qualities of voice and thus less susceptible to affective persuasive appeals.

Initially, we sought to increase the likelihood that your attitude base towards lemphurs would be either affective or cognitive through providing you with passages that were constructed to contain information of either an affective or cognitive nature. In essence, because lemphurs do not exist and thus your knowledge of lemphurs also cannot exist, what we did through these passages was prime you to be predisposed towards one of the two aforementioned attitude bases, therefore effectively “creating” an attitude towards lemphurs.

After having created an attitude towards lemphurs, our goal was to explore how combining qualities of voice that either matched or mismatched the content of a message might cause you to change your attitude towards lemphurs. For example, while your initial attitude may have been relatively positive after reading the passage we provided, we sought to change your attitude to be more negative through one of two auditory passages. One passage (affective) described a lemphur gruesomely mauling a person while swimming in the ocean. The other passage (cognitive) described many undesirable features related to lemphurs, such as their highly negative impact on the economy, the tremendous expense associated with products derived from lemphurs and as a food source containing unhealthily high levels of cholesterol.

Although both of these passages were constructed to present lemphurs in a negative light, we paired these messages with qualities of voice that either matched the negative tone of the message, strongly mismatched the tone, or only partially mismatched the tone. For example, if you listened to the passage describing the lemphur brutally attacking a swimmer, the vocal quality which matches that tone is fear. Vocal qualities which mismatch the message are ones we constructed using computer software to have high arousal levels and be as neutral as possible in valence (neither positive nor negative), whereas a partial mismatch between vocal quality and message content is represented by contentment.

For those who listened to the passage describing undesirable features related to lemphurs, the vocal quality which matched that tone is an emotion we constructed using computer software to have low arousal levels and be as neutral as possible in valence (neither positive nor negative). Vocal qualities mismatching that message are represented by joy/elation, whereas a partial mismatch between vocal quality and message content is represented by contentment.

The results of this study may be published in a professional journal, which may ultimately lead to new information being added to the textbooks that you use in your various psychology courses.

If you have any questions or comments, or if you would like a copy of the final results, please feel free to contact the principal investigator through the following email address: Joshua.Guyer@queensu.ca. Concerns about study participation may be directed to Dr. Leandre R. Fabrigar, at Fabrigar@queensu.ca, or by phone, at 613-533-6492. Any *ethical* concerns about the study may be directed to the Chair of the General Research Ethics Board at chair.GREB@queensu.ca or 613-533-6081.

We ask you to please not discuss this project with anyone, as this is an on-going study and knowledge about the procedure or our hypothesis may alter the results we obtain from future participants.

Thank you very much for your cooperation and your participation in this study.

For more information on the topic areas involved in this study, we invite you to look up the following readings through the Queens online database, using *psych info*:

1) Attitude Bases:

Crites, S.L., Fabrigar, L.R., & Petty, R.E. (1994). Measuring the affective and cognitive properties of attitudes: Conceptual and methodological issues. *Personality & Social Psychology Bulletin*, 20, 619-634.

2). Affect, Attitudes and Persuasion:

Petty, R.E., Fabrigar, L.R., & Wegener, D.T. (2003). Emotional factors in attitudes and persuasion. (ed. Davidson, Richard J., Scherer, Klaus R., Goldsmith, H. Hill), Reprinted 2009 *Handbook of affective sciences*. Series in affective science. (pp. 752-772). New York, NY: Oxford University Press.