MODERATORS OF THE EFFECTS OF MENTAL IMAGERY ON PERSUASION: THE COGNITIVE RESOURCES MODEL AND THE IMAGERY CORRECTION MODEL

DISSERTATION

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By

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ABSTRACT

Persuasive communications often include attempts to elicit mental images, or pictures in the mind. Lay perceptions that imagery grabs attention, mimics direct experience, arouses intense emotions, and leaves indelible memory traces are probably responsible for the frequent inclusion of imagery into such communications. Despite these lay perceptions of the effectiveness of imagery, researchers have often had difficulty in demonstrating the effectiveness of imagery in the lab (Taylor & Thompson, 1982). In the dissertation, we examine moderators of image-based persuasion.

Chapter 1 reviews literature relevant to mental imagery and persuasion. We begin our examination of moderators of image-based persuasion by examining mediators of image-based persuasion. We present an exhaustive review of twenty possible mediators of image-based persuasion; a task that, surprisingly, has not previously been undertaken. Following our discussion of mediators, we transition into a discussion of twenty-one potential moderators of image-based persuasion. Chapter 1 closes by introducing two novel moderational models of imagery and persuasion: the Cognitive Resources Model (CRM) and the Imagery Correction Model (ICM).

Chapter 2 develops and tests the CRM. The CRM begins with the premise that the processing of mental imagery (termed imagery elaboration) requires limited attentional resources. Hence, other mental processes that vie for attentional processes can
interfere with imagery elaboration, and reduce its effectiveness—and vice versa.

Specifically, the CRM focuses on the potential for interference between concurrent imagery elaboration and argument elaboration (the scrutiny of persuasive arguments), another common response to persuasion attempts. The main prediction of the CRM is when argument elaboration is likely, or high, then imagery-eliciting tactics will tend to be relatively ineffective, or may even backfire.

After developing the conditions under which interference between imagery and argument elaboration is most likely, we examine twenty-two studies (from seventeen articles) from the extant literature on imagery and persuasion where the relative likelihood of imagery and argument elaboration was manipulated, measured, or could be inferred. Nineteen of these studies produced patterns of data that were consistent with the CRM. We follow this review with an original empirical examination of the CRM ($N = 94$). In this study, we manipulated message imagery (high, low), and also indirectly manipulated argument elaboration (limited, normal). Furthermore, we measured individual differences in the likelihood of argument elaboration (need for cognition; Cacioppo & Petty, 1982). As predicted by the CRM, imagery had a positive effect on attitudes when argument elaboration was relatively limited, but a negative effect on attitudes when argument elaboration should have been relatively normal. Mediational analyses suggested that the positive effects of imagery on attitudes were due to imagery’s ability to arouse emotions, and that this link between imagery and emotions was severed when argument elaboration was relatively normal.

In Chapter 3 we develop the ICM. The ICM holds that people may often assume that the imagery in persuasive communications may unduly bias their attitudes. In
situations where people are motivated and able to reduce the perceived influence of imagery, they may take steps to correct it from their judgments. After developing the model and the specifying conditions under which such correction will be more likely, relevant literature is reviewed which generally supports the ICM. Next, an original experiment is reported that tested the ICM ($N = 255$). In this study, message imagery was manipulated (high, low), as well as instructions to remove bias from one’s judgments after reading the message, but prior to reporting attitudes. In a condition in which argument elaboration was limited (to avoid CRM-based alternative accounts), imagery had a positive effect given no instructions to remove bias, but a negative effect when people were asked to remove bias. Ancillary measures generally supported a correction account of the data.

In Chapter 4 we discuss the implications of the work relating to the CRM and the ICM. Generally, in situations in which people are likely to engage in argument elaboration (CRM), or are either motivated to resist persuasion or hold accurate attitudes (ICM), imagery-elicitation may be an ineffective persuasive tactic. It is suggested that these conditions will often hold in typical persuasion contexts, and hence, the CRM and ICM may account for a great deal of the variance in the effectiveness of imagery in persuasion. We end by discussing the implications of this work for narrative persuasion, and for the eventual construction of a general model of imagery and persuasion.
To Elizabeth and Abigail.
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CHAPTER 1

INTRODUCTION

For practical purposes, mental images may be thought of as pictures in the mind. The incorporation of mental imagery eliciting strategies into professionally produced persuasive communications is ubiquitous, in part because the evocation of mental imagery (via pictures, vivid text or spoken word, or imagery instructions) is assumed to increase the effectiveness of persuasive communications by both researchers and laypersons (Collins, Taylor, Wood, & Thompson, 1988; Friestad & Wright, 1995). The assumed effectiveness of imagery in persuasion contexts is likely due to the related assumptions that imagery can mimic direct experience, increase memorability, hold and maintain attention, and arouse intense emotions. Nevertheless, actual research into the effectiveness of mental imagery elicitation in persuasion communications has produced mixed results (e.g., Taylor & Thompson, 1982).

We propose two new moderational models of the effects of mental imagery evocation on persuasion. The first model, termed the Cognitive Resources Model of imagery and persuasion, holds that attempts to evoke mental imagery may interfere with other cognitive processes related to persuasion, also rendering the process of mental imaging less efficacious. The second model, termed the Imagery Correction Model,
holds that targets of persuasion may, in some cases, perceive attempts to evoke mental
imagery as hostile and unfair. In these situations, they may attempt to correct their
judgments to avoid being biased by imagery. In this chapter, a broad overview of work
on mental imagery and persuasion is presented. The Cognitive Resources Model and the
Imagery Correction Model are delineated and validated in Chapters 2 and 3 respectively.

General Review of Imagery Literature

Mental Imagery: Definitions and Distinctions

The Oxford English Dictionary (OED) defines an image as, “A mental representation of something (esp. a visible object), not by direct perception, but by memory or imagination; a mental picture or impression; an idea, conception.” The OED also defines image as a verb, “The formation of mental images…” Despite the seeming intuitiveness and simplicity of these definitions, in practice, the endeavor of constructing a succinct, all-encompassing, uncontroversial scientific definition of mental imagery has been extremely daunting (part of the reason that, at various times in the history of the psychology, the concept of mental imagery has fallen into disfavor).

Devising a succinct definition of mental imagery has always been a challenge because colloquially, as well as in scientific circles, numerous and disparate concepts are referred to as mental images. For example, Roeckelein (2004) grouped research on mental imagery into ten distinctive conceptual phenomena: afterimagery, dream imagery, eidetic imagery, hallucinations and related phenomena, imagination imagery, memory imagery, déjà vu, sensory imagery, synesthesia, and thought imagery (for alternative taxonomies, see Reber, 1985; Wolman, 1973). With afterimages, immediately after a stimulus has been sensed and then removed, the neuronal activation remains for some
period of time producing a kind of echo of the original sensation. Afterimages tend to feel vaporous and fade quickly, as the neuronal activation fades. Dream images are common to most laypersons and do not require further explanation. Eidetic images have a life-like quality to them and are extremely vivid. Hallucinations go a step further where the image is experienced as a veridical sensation. Imagination images are images of things that have never been directly perceived (typically composites of previous actual sensory experiences). Memory imagery involves images of things previous experienced that can be recalled to mind with some degree of fidelity. Déjà vu connotes situations where a particular stimulus will bring to mind a fully blown image (and the familiar feeling of having had the experience on some previous occasion, or having “been there before”). Sensory imagery refers to images that have the qualities of an actual sensation or perception. Synesthesia is the phenomenon by which sensory information in one modality gives rise to images of a different modality. Finally, thought imagery has been used as a general term for any kind of thought or idea accompanied by any kind of sensory information. Though imagery has been studied most often with respect to the visual modality (i.e., visual imagery), it should be noted that these ten types of imagery can presumably relate to any of the various sensory modalities.

All of the categories summarized by Roecklein (2004) treat imagery as a phenomenal experience. Indeed, some of the earliest researchers in the psychological study of mental imagery treated the construct in the same way (e.g., Galton and Wundt). However, as Richardson (1999) points out, since the early days of imagery research, imagery has been conceptualized and operationalized in three additional fashions. During the early phases of the cognitive revolution, imagery was studied as a property of
a stimulus (e.g., in the early work of Paivio, 1969). Imagery also came to be studied as an important type of mental representation that could influence information processing. Finally, imagery has been studied as a process (i.e., the process of engaging in mental imagery). The use of imagery as a mnemonic technique falls under this heading. Once again, the numerous conceptions of imagery reflect the wide variety of imagery phenomena. Of course, all of the various conceptualizations are related and may be part of the same imaging experience. For example, participants in a word association study may read two vivid words, engage in the process of mental imagery to associate the two words, form a resulting mental image representation, and then be left with the phenomenological experience of having imagined.

In the two studies reported in this dissertation, imagery is manipulated with vivid and concrete text designed to evoke pictures in the mind. Imagery is measured via reports of mental contents provided by participants and coded by researchers. The types of images elicited by textual persuasive communications may include imagination images, thought images, sensory images, and memory images as described above. The manipulations and measurements used in the described studies were not intended to distinguish between these four types of mental image experiences, nor are these distinctions considered particularly important at this early stage of research. What is important is the connection to realistic sensory experience provided by mental imagery (a critical component of any definition, conceptualization, or example of mental imagery). The distinction between imagery as a process versus a product (i.e., representation) will play a role. For example, it is conjectured that factors relating to the process of mental
imagery formation may effect persuasion independently and in an opposite direction of the actual mental images themselves.

We also examine a relatively novel aspect of the mental imagery process: the awareness corresponding to the phenomenal experience of imagery that a given mental image was intentionally evoked by a given source with the aim to persuade. We show in Study 2 that such awareness can have implications for the process of persuasion that may stand in opposition to persuasive effects of the image representations themselves.

Next, we turn to a selective review of research and thought relevant to the construct of mental imagery.

*History of Imagery: Philosophy, Practice, Theory, and Research*

*Early thought on mental imagery.* While imagery was doubtless important to early peoples in the memorizing and delivery of narrative information and in other areas relating to problem solving, the first verified usage of imagery as a mnemonic technique, the method of loci, is typically attributed to Simonides of Keos (c. 556-468 B.C.), a Greek lyric poet and teacher. With the method of loci, objects are mentally placed in a familiar environment (e.g., your house). Each room may have a series of objects, and these objects are to be recalled in order by mentally “walking” through the rooms of the house and visually inspecting the rooms. This technique is still widely used today by orators.

Later, Plato distinguished between abstract thoughts and mental images. In *Theaetetus*, Plato argued famously that mental images were imperfect copies or representations of abstract thoughts and perceptions, like the impression that a signet ring leaves in a wax tablet. True knowledge was said to be based on perfect, abstract,
changeless forms, and was also held to be innate (and, importantly, did not derive from sensory experience). Hence, learning and wisdom were achieved via the process of rational analysis of one’s abstract thoughts. The imperfect sensory images could only lead one astray. Plato’s student, Aristotle, in contrast, held that knowledge could only be derived from sensory experiences. According to Aristotle (see *De Anima* and *Parvia Naturalia*), all thoughts were accompanied by a corresponding sensory mental image (which he termed *phantasmata*). Using the wax tablet analogy for his own purposes, Aristotle argued that over time, people collect and store in memory countless wax tablet impressions (i.e. images). Then, through the processes of inferential association, abstractions were generalized from the images. Thus, images and imagery played a central role in one of the most important and enduring distinctions in the history of philosophy: whether inference or rationality is the true guide and pathway to wisdom.

In the Middle Ages, Saint Thomas Aquinas, in *Summa Theologica*, held that images could play an important role in religious memorization and understanding, and developed a memory system based on imagery for use by preachers that spread throughout Europe. Aquinas’ memory system was based on Aristotle’s assumptions that thoughts did not occur without images, and that abstraction from images was a way of discovering basic truths. At the same time, Ramon Lull developed a memory system based on Plato’s conceptions of the necessity of rationalization that was based on verbal associations and abstract formulae. Hence, differing opinions of the role of imagery in knowledge seeking continued well into the Dark Ages.

Whereas in the Middle Ages, imagery was used mainly as a mnemonic device, in the Renaissance imagery became seen as a divine and mystical form of cognition and,
importantly, a human faculty from which secular knowledge could be derived. Elaborate systems were developed using symbols, astrology, and numerology to conjure images that would lead to new truths. One of the most popular of these systems was that of Giordano Bruno which involved phases of the moon, horoscopes, and the zodiac. Once again, however, there was a counter movement. Peter Ramus, along with the iconoclastic Protestant Reformation, developed a Platonic memory system based on rationalization (see Sadoski & Paivio, 2001, pp. 11-41 for a lengthy discussion of the relationship between theories of imagery and education through history).

Many of the famous and influential philosophers dating from this time onward concerned themselves less with the uses of imagery and its relationship with knowledge and wisdom, and more with the fundamental nature and structure of mental imagery. Descartes, in his Third Meditation, held that images could arise from internal information. In contrast, in Leviathan, Hobbes argued that images are nothing more than the result of decaying sensations. Hobbes also believed that images could be combined with other sensations to form compounded images. In Ethics, Spinoza forwarded the idea that people react to images in much the same way as they do actual perceptions. Locke (in An Essay Concerning Human Understanding) introduced the idea that images can be inspected internally by a kind of mind’s eye. In A Treatise on Human Nature, Hume held that there are “impressions” and “ideas”; ideas were held to be more powerful (emotions, sensations, perceptions, passions), whereas impressions were conceptualized as the images or copies of ideas that can reside in memory. Finally, in Analysis of the Phenomena of the Human Mind, James Mill made a similar distinction between what he referred to as “sensations” and “ideas” in that ideas were defined as feelings or
impressions given that the corresponding object is not present. For more complete discussions of the treatment of imagery by prominent philosophers, see Kosslyn (1980, pp. 439-445) and Roeckelein (2004, pp. 144-150).

It may seem curious that great philosophers throughout the ages kept returning to the concept of mental imagery in their writings. Kosslyn (1980, pp. 446-449) argues that to the naïve observer, it has probably always appeared obvious that the relationship between stimuli (S) and responses (R) was mediated at least partially by mental operations (O). In order for the S-O-R relationship to be plausible, three things have to hold true. First, O must be able to form associations with both R (e.g., a feeling, an evaluation, a behavior) and S (e.g., some attitudinally relevant object). The association between S and O would be a mental representation of some kind, and the relationship between O and R would entail that the mental operation could invoke or influence responses or reactions. Second, the process of representational association (the linking of S and O) must not need to be learned (to avoid infinite regress). Third, O’s needs to be able to differentiate between different S’s reliably.

Imagery seems, phenomenally, to satisfy these three constraints in a way in which few other representational systems are capable. It seems obvious that objects give rise to images (S-O link), and that we react to our mental images even in the absence of the eliciting object (O-R link). In addition, the process of forming mental images seems akin to perception in that we do not need to learn how to form mental images. Finally, it seems clear that images can differentiate between different objects because images resemble the objects that they represent (though see Kosslyn, 1980, pp. 449-455 for conceptual problems with this assumption). Hence, early thinkers concerned with human
thought, and believing in the reality of mental operations, seemed bound to come to see imagery as a critical component of human thought, if not the mother of all other representations, as Hume seems to suggest in the following passage:

“An impression first strikes upon the sense, and makes us perceive heat or cold, thirst or hunger, pleasure or pain of some kind or other. Of this impression there is a copy taken by the mind, which remains after the impression ceases; and this we call an idea. This idea of pleasure or pain, when it returns upon the soul, produces the new impressions of desire and aversion, hope and fear, which may properly be called impressions of reflexion, because (they are) derived from it. These again are copied by the memory and imagination, and become ideas; which perhaps in their turn give rise to other impressions and ideas. So that the impressions of reflexion are only antecedents to their correspondent ideas; but posterior to those of sensation, and deriv’d from them (Book I, Part I, Section II).”

The thoughts and writings of Aristotle, Plato, and the many philosophers that followed from the Aquinas to the British Empiricists, laid the conceptual foundation used by some of the earliest scientific psychologists to study imagery empirically. We now turn to the scientific study of imagery within the field of psychology.

*Imagery and the early psychologists.* The modern psychological study of imagery began in the 19th century. In his pioneering work on individual differences, Francis Galton developed an individual differences questionnaire relating to mental imagery that he called the “Breakfast Table Questionnaire.” Respondents were asked to describe
things from memory, such as their breakfast table, and to rate the vividness of the corresponding mental images.

Perhaps more importantly, however, was the work on mental images by Wilhelm Wundt. Wundt held that the fundamental task of psychology was to analyze the contents of consciousness. According to Wundt, the contents took the form of mental images. In Wundt’s research, participants were asked to focus on and characterize a particular mental image (sometimes elicited by direct perception). Wundt’s early work was dealt two fundamental blows. First, Kulpe showed that some mental contents do not seem to be accompanied by mental images (in contrast to the claims of Edward Titchener, one of Wundt’s outspoken students, who held that all thoughts were accompanied by mental images). More important, perhaps, was the criticisms of the behaviorists and notably John Watson. Watson held that reports of mental images were entirely subjective, and could not be empirically validated. Therefore, Watson held, images were not proper for scientific examination. In Watson’s own words, “Prove to me … that you have auditory images, visual images, or any other kinds of disembodied processes. So far I have only your unverified and unsupported word that you have them”. This fundamental criticism of work relating to mental imagery, relevant to the work of both Galton and Wundt, effectively suppressed imagery research from approximately 1920 to 1965, while at the same time rendering the study of any kind of mental process or content taboo.

**Cognitive revolution.** Methodological and conceptual innovations rescued the mental image construct and helped to inspire the cognitive revolution of the 1960’s and 1970’s. Work by cognitive psychologists has consistently shown that a cardinal property of mental imagery is the ability to create strong associative links between concepts (e.g.,
Paivio, 1969; Richardson, 1998). For example, Bower (1970) gave participants pairs of words and asked them to either associate the words using rote repetition, interactive imagery (imaging the images interacting in some way), or noninteractive imagery (imagining the images apart in some “imaginal space”). Results showed that interactive imagery led to significantly better recall than either the repetition instructions or the noninteractive imagery instructions.

Although typical memory studies involving imagery involve expected tests of recall and recognition (with respect to the participant), a number of studies have also confirmed that imagery facilitates incidental learning, where participants are exposed to pairs of words without expecting to be tested for later recall (e.g., Sheehan, 1972; Sheehan & Neisser, 1969).

The most popular theory to explain the facilitative effects of mental imagery in tests of memory has been Paivio’s dual coding theory (Paivio, 1971, 1986). The basic premise with regard to associative mediation is that image-evoking material can be encoded both symbolically (using words) and analogically (using sensory images), whereas non-image-evoking material can only be encoded symbolically. The presence of dual-coding allows for multiple connections to be formed to the image-evoking material which makes it ultimately more accessible or available in long-term memory than non-imageable material.

The imagery debates and related research. The early successes by Paivio, Bower, and other imagery researchers met with heavy resistance. This resistance was characterized by the alternative conceptualizations of imagery effects provided by Pylyshyn (1973, 1981), and the corresponding research of Anderson (1978). These
information processing theorists held that the construct of mental imagery was an unparsimonious explanation of the relevant data (i.e., that it was not necessary to assume that information is stored as images, or even that people project and use mental images). Pylyshyn held that all available data could be explained by merely postulating a single underlying representational/propositional code. Pylyshyn did not go as far as the behaviorists to question the existence of mental imagery, but he did suggest that mental imagery may be merely an epiphenomenon that has no relation to actual information processing, nor any important consequences.

Kosslyn, Shepard, and others responded to the critiques of Pylyshyn in part by attempting to demonstrate an equivalence between imagery and perception. Three separate views of imagery-perception equivalence have been proposed and examined (Intons-Peterson & McDaniel, 1991): the functional view, the structural view, and the interactive view. According to the functional view, imagery parallels perception in terms of functional relationships. The mental rotation experiments of Shepard and colleagues (for reviews, see Denis, 1991; Shepard & Cooper, 1982) showed that decisions requiring mental rotation of images increase in latency as a linear function of the actual angle of rotation (as would be expected if people were mentally rotating a perceived object).

As opposed to the functional view, the structural view holds that images and perceptions share first-order structural features. Kosslyn (1981) has been the major proponent of this view. Kosslyn proposed that both perceptions and images are processed in a visual buffer that has characteristics similar to a movie projection screen (e.g., has a limited size and resolution, accurately preserves structural relationships and geometric properties, portions of the screen can be selectively scanned). Kosslyn and
colleagues conducted a number of experiments to lend support to their structural view of imagery and perception. For example, Kosslyn, Ball, and Reiser (1978) had participants memorize a map of a fictional island that contained a number of different landmarks (each of the landmarks were of varying distances from one another). After memorization of the map, participants were asked to generate a mental image of the map, focus on one landmark, and then scan to another landmark. Kosslyn et al. found a nearly perfect linear relationship ($r = .97$) between the time needed to scan the mental image, and the actual distance between the objects on the memorized map. Hence, this study demonstrated that mental images preserve relative spatial locations and distances.

Other work by Kosslyn (1975, 1976) demonstrated limitations of the medium on which mental images are constructed and projected. For example, Kosslyn proposed that the medium on which mental images were projected should have limited resolution. In other words, the smaller a given object appears on the mental screen, the more difficult it should be to scrutinize its various parts. Kosslyn examined this proposition by having participants project two objects onto their mental screen at once. One of the objects was a target object (say, a rabbit). The other object would be either a large animal such as an elephant, or a small animal such as a fly. When the rabbit was pictured concurrently with an elephant (allotting less room for the rabbit on the finite mental screen), participants took longer to ‘inspect’ various parts of the rabbit (e.g., the nose), compared to the rabbit/fly combination. Hence, there is evidence that mental images (or at least the medium on which they are projected), preserve structural aspects of the objects being represented in much the same fashion as perception.
The final view of the relationship between imagery and perception is the interactive view which holds that imaging and perception make use of the same neural structures as perception does. There are two types of evidence for this proposition. One comes from dual task studies in which (a) concurrent imaging and perceiving lead to either interference or facilitation, or (b) non-concurrent imagery and perception lead to selective facilitation. The second type of evidence comes from neuropsychological studies of mental imagery.

With respect to facilitation and interference, Farah (1985) had participants visualize either a letter T or a letter H while waiting for the appearance of a very faint letter T on a screen. They found a facilitation effect (increased detection of the faint letter T’s) when participants had imagined the letter T as opposed to the letter H. Hence, imagining appeared to prime the perceptual system in a concurrent detection task.

Unnava, Agarwal, and Haugtvedt (1996) proposed that mental imagery in response to a persuasive message can interfere with perceptual processes (see also Unnava & Burnkrant, 1991). They tested this proposition by combining ads high in mental imagery with other visual tasks. In one study, for example, participants were exposed to advertisements that were high or low in imagery. Results indicated that in a condition in which the ads were presented visually, imagery had a detrimental effect on ad recall. It was only when ads were presented in an audio format that imagery augmented recall.

With both work relating to interference and facilitation, there is the possibility that imagery and perception actually share processes upstream (e.g., reliance on general linguistic or attentional resources), and that resource limitations related to these upstream
processes are responsible for facilitation and interference effects. Hence, the interactive
view also relies heavily on neuropsychological studies.

The physiological and neurological correlates of mental imagery have been studied extensively. In fact, as has been the case in other domains, imagery-related research was at the forefront of the neurological revolution. Early researchers in this area hypothesized that the neural correlates of mental imagery might be located in the right hemisphere of the brain (e.g., Ley, 1983; Milner, 1971). Kosslyn (1980), however, contended that mental imagery depended upon a complex network of neural subsystems found in both hemispheres. Years of research have generally borne out the speculation of Kosslyn. Some studies searching for hemispheric polarization have found a predominance of left-brain activation during imaging (D’esposito et al., 1997; Goldenberg, Podreka, & Steiner, 1990), whereas others have found either no relative differences in activation or increased right-brain activation (Farah, Hammond, Levine, & Calvinio, 1988; Mellet, Tzourio, Denis, & Mazoyer, 1995).

More recent research in the field has examined another hypothesis—that mental imagery and perception make use of the same physiological mechanisms, such as the visual cortex (D’esposito et al., 1997). Related research has generally confirmed this hypothesis. Neural structures and areas key to perceptual processing such as the occipital, temporal, and parietal cortices have all been shown to relate to mental imagery as well (Farah, Peronnet, Weisberg, & Monheit, 1989; Goldenberg et al., 1990; Kosslyn et al., 1993; Roland & Gulyas, 1994). It is clear that different kinds of imaging tasks recruit different areas of the brain (e.g., Thompson & Kosslyn, 2000), which may account
for many of the observed differences in brain activation patterns among studies in the extant literature.

One interesting area of study relating to neuroimaging involves the demonstrated phenomenon of retinotopic organization of mental images in the visual cortex (Kosslyn, Thompson, Kim, & Alpert, 1999). Retinotopy describes patterns of neural activation in the visual cortex that are spatially analogous to the patterns of activation on the retina of the eye during visual perception. Recently, Klein et al. (2004) have demonstrated that mental images exhibit retinotopy in a portion of the striate cortex (primary visual area, area V1) that preserves size and directional orientation differences. Furthermore, they showed that this same area (area V1) is retinotopic in response to visual perception—a further demonstration of the connection between visual perception and imagery.

Despite work showing the equivalence between imagery and perception, the debate over whether imagery is a type of representational system or not still persists (see Kosslyn, Ganis, & Thompson, 2003; Pylyshyn, 2003a, 2003b). Paivio has demonstrated how his dual coding theory could act as a kind of compromise between the extreme views of Kosslyn and Shepard on the one hand, and Pylyshyn on the other. He suggested that a common underlying code contained information to both build propositional networks, and to form analogous mental images. Hence, information is not stored in the form of imaginal representations, but people can project them and make use of them at will. Hence, imagery can be viewed as a process (making images from underlying code), which leads to a temporary image structure in working memory space. Paivio’s dual coding compromise is sufficient for interpreting the studies in the present dissertation in
that imagery is only conceived of as a process, or as a formed representation in working memory space.

We now turn to a review of work relating to imagery and social influence and persuasion.

Review of Imagery and Social Influence

Potent images not only pervade both individual and collective consciousness, they have also played major roles in decisive historical events. For example, one motivation behind the passenger plane bombings of the World Trade Center was to leave behind a set of indelible images – symbols of humiliation, injury, vulnerability to attack, etc. Of course, the same images have functioned as powerful rallying-calls against terrorism in post 9/11 America, and, to date, have been summoned as warrants for the dismantling of regimes in Afghanistan and Iraq.

The power of imagery has not escaped persuasive practitioners, of course. The image-based Marlboro Man ads are generally considered among the most effective advertising campaigns of all time. Protest organizers have also long understood the utility of creating powerful and indelible images, such as the self-immolation of Tibetan monks in protest of Chinese occupation.

One of the most successful persuasive communications in history was Stowe’s *Uncle Tom’s Cabin* (1852), an anti-slavery novel driven by horrific images of slave suffering and the break-up of slave families. Aside from mobilizing anti-slavery attitudes for millions of people across generations and national borders, a convincing case has been made that Stowe’s novel secured a Northern victory in the American Civil War by quashing British support for the South, hence preventing a Southern-British alliance.
against the North (Brock, Strange, & Green, 2002, p.3; Johnson, 1997). Interestingly, a
popular and long-running series of plays based on the book attempted to preserve the
book’s imagery via the use of tableaux, or theatrical devices wherein actors would freeze
poignant scenes for a up to a minute (Birdoff, 1947).

Despite the venerable traditions of research into both persuasion and mental
imagery, the two fields have only recently made contact. Given the ease of generating
real world examples of the power of persuasive imagery, it is surprising that mainstream
theories of attitude change have somewhat neglected the effects of mental imagery on
attitude change and persuasion.

Mediators of Image-Based Persuasion

Imagery became an attractive construct to persuasion researchers at least in part
due to the prevalence of potential pathways through which imagery could affect
persuasion. However, in most articles examining imagery and attitudes, only two or three
potential mediators of the influence of imagery on persuasion are typically discussed.
The review below is an attempt to cull all of the previously discussed or established
mediators of imagery effects into a single comprehensive list. As such, this list stands as
the most complete accounting of potential mediators of imagery effects on persuasion to
date. The various mediators have been grouped according to whether they are most
likely to be influential during the reception, processing, or eventual evaluation of a
persuasive communication (see Table S.1, in appendices, for a full listing of mediators).

*Imagery Mediation Relating to Reception*

*Grabs and maintains attention.* Perhaps one of the most obvious mediators of
imagery or vividness effects is the potential of vivid information to attract and maintain
attention. In their seminal work on human inference processes, Nisbett and Ross (1980) pointed out that imaginal information is a relatively vivid type of information. This point was echoed by researchers interested in the effects of vividness on judgments and attitudes (e.g., Chaiken & Eagly, 1983; Shedler & Manis, 1986; Smith & Shaffer, 2000; Taylor & Thompson, 1982). To the extent that vivid or imagery-evoking persuasive communications are more likely to be noticed or attended to at some level, they should play a relatively more influential role in persuasion.

There are two primary ways that imagery could relate to attention. First, imagery may produce an orienting response (Campell, Wood, & McBride, 1997), such that vivid information grabs attention or stands out to a greater extent against related information ground. In this case, the influence of imagery or vivid information on judgments is controlled primarily by the stimulus in question.

It may also be the case, however, that we are more motivated to attend to vivid information (or to attend to it for longer periods of time). A study of fifth-graders by Long, Winograd, and Bridge (1989) examined the relationship between imagery production and interest in response to poems, a story, and expository texts. In general, imagery was shown to be positively related to interest. In the arena of rhetorical persuasion, Collins et al. (1988) found strong relationships between ratings of vividness and interest.

As was initially pointed out by Taylor and Thompson (1982), the attention mediator hypothesis is only likely to hold in situations in which there is competition for scarce attentional resources. They speculated that many of the failed demonstrations of the vividness effect could be attributed to the fact that in lab settings, people typically
read either vivid or pallid messages. In pallid message conditions, it is not surprising that participants would dedicate their full attention to the pallid communications, hence precluding potential vividness effects.

A number of researchers have addressed the issue of resource competition empirically. Reyes, Thomson, and Bower (1980) devised legal arguments where half of the arguments were vivid and half were pallid. In some cases the pro-prosecution arguments were the vivid ones, and in some cases they were the pallid ones—the idea being that the two types of arguments would compete against one another for attention. No immediate effects were found due to the vividness manipulation (though delayed effects were found).

Shedler and Manis (1986, Study 1) manipulated attentional resources by, in some cases, having participants complete a portion of the Wechsler Adult Intelligence Scale while listening to a persuasive communication (either vivid or pallid). Overall, the authors found the vivid communication to be more influential. This effect, however, was not moderated by the presence of an attention-requiring distracter task.

Frey and Eagly (1993) manipulated the vividness of an auditory persuasive communication. Half of the participants were told to focus on the persuasive communication as it played (high attentional constraint). The other half merely overheard the persuasive communication on the radio while completing an unrelated set of questionnaires (low attentional constraint). They found a reverse vividness effect whereby the vivid communication actually led to less persuasion than the pallid communication under low attentional constraint (no effect under high constraint).
Finally, Wilson, Northcraft, and Neale (1989) manipulated information competition by having some participants listen to ten minutes of filler information prior to receiving vivid and pallid persuasive arguments (as opposed to a low information competition group who went straight to the target communication). Here, given low information competition, there was no effect of vividness. In the high information competition condition, however, there was a strong effect of vividness such that vivid arguments were more persuasive.

Hence, there is mixed evidence for the proposition that the vividness effect will only be found in situations characterized by a high degree of information competition (or attentional constraint). A number of these studies are reexamined below as they pertain to the proposed Cognitive Resources Model.

Enhances comprehension. There is abundant work, mostly in the area of reading research, that has shown that imagery can increase communication comprehension (e.g., Kolker & Terwilliger, 1986; Long, et al., 1989; Sadoski, 1983). For example, Kolker and Terwilliger (1986) pre-rated twenty stories in terms of their imagery level using a computerized rating program. They found that stories that were rated more highly in terms of imagery were also comprehended better by a group of fifth-graders. Long et al. (1989) have shown a similar effect using adults and expository texts. To the extent that imagery increases comprehension of the arguments of a persuasive communication, and to the extent that the arguments in the communication are strong, this work would suggest that, all else equal, imagery should facilitate persuasion (Hovland, Janis, & Kelly, 1953; Hovland, Lumsdaine, & Sheffield, 1949; McGuire, 1969, 1985).
Increases memorability and availability of arguments. By far the most common explanation for the effects of imagery and vivid information on judgments and persuasion involves the concepts of memorability and availability. As discussed above, work by cognitive psychologists has consistently shown that a cardinal property of mental imagery is the ability to create strong associative links between concepts (e.g., Paivio, 1969; Richardson, 1998), increasing the efficiency of memory storage, and later retrieval. Given that vivid information is more likely to be remembered and recalled, the work of Tversky and Kahneman (1973) on the availability heuristic becomes relevant. When using the availability heuristic, people are more heavily swayed in their judgments by information that is easily recalled. Correspondingly, attitudinally relevant information that is more easily recalled (due to a corresponding mental image) should have a disproportionate influence on persuasion.

Two early streams of research related to decision-making helped to popularize memory-based explanations for the effects of imagery. Nisbett and colleagues (Borgida & Nisbett, 1977; Hamill, Wilson, & Nisbet, 1980) showed that vivid case histories were more influential than statistical or base-rate information. Research on likelihood estimates and belief change also capitalized on the assumed associative powers of imagery (Anderson, 1983; Carroll, 1978; Gregory, Cialdini, & Carpenter, 1982; Sherman, Cialdini, Schwartzman, & Reynolds, 1985). For example, Gregory et al. (1982) showed that having participants imagine themselves getting arrested for a crime made them think it was more likely that such an event might actually come to pass. In both lines of research above, the availability heuristic was relied upon as an explanatory mechanism.
Despite problems demonstrating a link between vividness and evaluation, there have been many instances in which a vivid presentation or imagery-evocation has been shown to increase the memorability of persuasive arguments (Childers & Houston, 1984; Collins et al., 1988; Denis, 1982; Miller & Marks, 1992; Reyes et al., 1980; Sadoski, 1983; Shedler & Manis, 1986). In most cases, the beneficial effects of vividness on memory have been attributed to Paivio’s dual coding mechanism.¹

Much of the work cited above has implicitly assumed that if imagery improves memory for persuasive arguments, then persuasion will also be greater. However, the assumption that increased memorability translates to increased persuasion can be attributed in large part to the early message-learning theories of persuasion, which emphasized the connection between reception and persuasion (e.g., Hovland et al., 1949; McGuire, 1969). However, decades of research have shown that message reception (as indicated by superior recall) is neither necessary nor sufficient for attitude change to occur (see Mazzocco, Rucker, & Brock, 2005, for a discussion of this topic; see also Gibson, 1983; Shavitt & Brock, 1986). In a related vein, Shedler and Manis (1986) conducted two studies which showed that, although vividness influenced both memory and judgments, the link between vividness and judgments was not mediated by memory.

Due to these considerations, the availability hypothesis was transformed into the availability-valence hypothesis (Kisielius & Sternthal, 1984, 1986), which takes the

¹ Specific cognitive mechanisms which explain the influence of vivid information on recall have been proposed (Childers & Houston, 1984; Hastie & Park, 1986). For example, Childers and Houston (1984) proposed three different ways in which imagery might influence accessibility. First, imagery might increase the sheer number of linkages between two concepts (incidental redundant cues hypothesis)—similar to Paivio’s (1986) dual-coding theory. Second, imagery may increase the chances of finding a meaningful link between two concepts (relational organization hypothesis). Third, imagery may allow for a more distinctive and isolated retrieval path (stimulus differentiation hypothesis). Childers and Houston (1984) presented some evidence in favor of the relational organization explanation.
valence of cognitions elicited by imagery into account (discussed below). Nevertheless, in situations where message arguments are strong, and are likely to elicit positive cognitive responses, reception should be positively associated with persuasion.

Distracts from central message arguments. The idea that imagery could distract participants from fully receiving a persuasive communication has been discussed by a number of authors (Babin & Burns, 1997; Chaiken & Eagly, 1976, 1983; Peters, 1983; Smith & Shaffer, 2000). Frey and Eagly (1993) indirectly tested this proposition in a study where participants either were or were not constrained to pay attention to the experimental messages. The hypothesis, following from Taylor and Thompson (1982), was that the vividness manipulation would only have an effect when participants were not constrained to pay attention to the messages. This hypothesis was indeed confirmed, however, to the admitted surprise of the researchers, pallid information was found to be more persuasive under these conditions. One way of interpreting this finding is to assume that the vivid elements of the vivid communication distracted participants from receiving other important message elements. In support of this interpretation, the authors presented evidence that suggested that in the low constraint condition, the vivid communication also produced inferior recall (relative to the pallid communication). In summary, to the extent that vivid, imagery-evoking elements of a persuasive communication distract participants from receiving key arguments, and to the extent that those other arguments are strong ones, persuasion would be expected to decrease.

Mimics direct experience. As reviewed above, cognitive and physiological psychologists have conducted many studies demonstrating the parallels between imagery and perception. That mental imagery indeed does act as a proxy for reality is widely,
though perhaps tacitly, accepted among social psychologists. Many experiments ask participants to react to imaginary situations, which participants seem to have no problem doing (see Wollman, 1981, for a discussion of the uses of imagery in social psychological experiments).

Source monitoring studies have demonstrated that people can even confuse mental imagery with reality (Dobson & Markham, 1993; Finke, Johnson, & Shyi, 1988; Markham & Hynes, 1993). In a very early study of reality monitoring, Perky (1910) showed that people were often unable to differentiate between a mental image projected on a sheet, and an actual image projected from behind onto the same sheet. In a more recent study (Markham & Hynes, 1993), participants were presented with a series of geometrical shapes in whole- and half-form. Half of the participants were given instructions to imagine that the other half of the symmetrical shape was actually present when applicable. After a delay, participants were given a routine recognition task. Results showed that the imaging instruction set led to more source confusions (imagery vs. reality), but only for people who had been pre-rated as highly vivid visual imagers based on the Vividness of Visual Imagery Questionnaire (Marks, 1973).

Aside from simple confusions, imagery has been shown to influence physiological responses (for a review, see Dadds, Bovbjerg, Redd, & Cutmore, 1997) and emotional responses (see next section) in much the same fashion as direct perception and experience. In the consumer behavior context, imaginal processes have been described as akin to sensation and may provide consumers with a more complete consumption experience (MacInnis & Price, 1987). For example, mental imagery allows consumer to run a mental simulation of a product experience prior to purchase.
As discussed by Oliver, Robertson, and Mitchell (1993), imagery may be an especially powerful substitute for direct experience for topics, issues, or products for which the target has no corresponding direct experiences for comparison.

To the extent that images provide the phenomenal feeling of direct experience, the literature relating direct experience to attitudes becomes relevant. Specifically, it has been shown that direct experience with an attitude object leads to attitudes that are more accessible (Fazio, Chen, McDonel, & Sherman, 1982; Fazio, Herr, & Olney, 1984). Accessibility, in turn, is associated with increased attitude strength (Fazio, 1995).

Enhances emotional responses and arousal. A number of authors have commented on the likely ability of vivid, imagery-evoking information to produce more intense arousal and emotional responses (e.g., Bell & Loftus, 1985; Bone & Ellen, 1992; Dadds et al., 1997; MacInnis & Price, 1987; Nisbett & Ross, 1980; Taylor & Thompson, 1982). Evidence consistent with this hypothesis has also been demonstrated a number of times in the context of persuasion studies (Bolls, 2002; Miller & Marks, 1992; Oliver et al., 1993; Sadoski, Goetz, & Kangiser, 1988). For example, in a study by Sadoski et al. (1988), participants read stories and after every paragraph (out of 30) gave ratings of both imagery and affect. Results showed that ratings of imagery and affect effectively mirrored one another. To take another example, Bolls (2002) showed that high imagery radio advertisements were associated with faster heart rates over the duration of the advertisement than low imagery advertisements.

Given that imagery increases emotion and/or arousal, there are a number possible effects on persuasion. Emotion may influence persuasion by facilitating the learning of persuasive arguments (Love & Greenwald, 1978). Either emotion or arousal due to
imagery could be misattributed to an attitudinal object or stance (for better or worse). Emotion-laden images could bias message processing in the direction consistent with the elicited emotions (termed passionate reasoning: Huddy & Gunnthorsdottir, 2000). The emotion produced could also play a role in classical conditioning (discussed in more detail below). Finally, to the extent that the emotions or arousal are perceived as positive, the related images may increase attention to, or processing of, the message.

MacInnis and Price (1987) differentiated between elaborated imagery, where a person imagines themselves interacting with the imagined scene, and nonelaborated imagery (see also Goossens’, 1994, distinction between enactive and nonenactive imagery). They propose that elaborated imagery should be more likely to arouse emotions than nonelaborated imagery. In support of this contention, they cited the work of Mischel and colleagues (Mischel, 1974; Mischel & Moore, 1973) on delay gratification, which has shown that elaborated images decrease the ability to delay gratification (presumably because elaborated images arouse more positive emotion, and people desire the actual object to increase that positive emotion). Non-elaborated images, in contrast, were shown to increase the ability to delay gratification, perhaps due to their ability to remind one that the object is still present, without eliciting tantalizing emotions.

Influences source salience. Chaiken and Eagly (1983) presented some evidence to suggest that imagery may function to make source information more salient. The evidence is somewhat problematic in that Chaiken and Eagly manipulated vividness by either presenting written arguments, recorded arguments, or televised arguments (read by the source of the message). Obviously, there are a number of confounds between these conditions (for example, the written message needs to be actively read). Nevertheless,
the fact that vivid elements of persuasion may draw attention to the source of the message is plausible. Of course, the effect that increased source attention has on persuasion will depend on aspects of the source (e.g., source expertise). Below, in the section on how imagery relates to evaluation, more evidence will be reviewed that suggests that imagery not only draws attention to the source, but actually influences perceptions of the source as well.

Elicits disengagement due to graphic nature. Smith and Shaffer (2000) proposed that in some cases, images may be found so distasteful or graphic that communication recipients will actually cease processing the message altogether. This presumption is consistent with the notion that extreme fear appeals can be ineffective when they interfere with message reception (McGuire, 1968, 1969). Obviously, in such cases imagery would backfire and tend to lead to either reduced attitudes or negative attitude change.

Imagery Mediation Relating to Message Processing

Influences motivation to elaborate. Kiesielius and Sternthal (1984, 1986) were the first to propose that vivid information might influence persuasion by increasing the elaboration of persuasive arguments. In what they termed the availability-valence hypothesis, vivid persuasive communications were proposed to increase the number of available connections made between persuasive arguments and prior knowledge (relative to pallid communications). The valence of the linked-to information, then, would determine the outcome of a persuasion attempt. Kiesielius and Sternthal (1984) suggested that many of the failures to find the vividness effect may be attributed to vivid information evoking (a) relatively negative elaborations, (b) a mix of positive and
negative elaborations that cancelled each other out, or (c) irrelevant elaborations that
distracted participants from the central arguments of a persuasive communication.

Though Kisielius and Sternthal (1984) reported three studies purporting to support
the idea that vivid imagery cues elaboration (reviewed in Chapter 2), the most direct test
of the elaboration cue hypothesis was conducted by Smith and Shaffer (2000). Smith and
Shaffer were intrigued by Frey and Eagly’s (1993) demonstration that vividness actually
decreased attitude change given low attentional constraint. They contended that the
imagery evoked by the vivid communication in Frey and Eagly’s messages was actually
counter to the central arguments of the communication. Specifically, Frey and Eagly
employed a message suggesting that airports should not have to inform patrons of
terrorist threats. Within the vivid message was an evocative description of terrorists that
may have led to images reinforcing the real danger posed by these persons. Smith and
Shaffer referred to such images as message incongruent. In contrast, message congruent
images were defined as those that reinforced or were consistent with the main themes of
the persuasive communication. To test their hypotheses, Smith and Shaffer created six
persuasive messages. One message was relatively pallid, and two were relatively vivid.
The vivid messages were designed to evoke either message congruent imagery, or
message incongruent imagery. Finally, these three message versions were presented with
either strong or weak arguments. The logic behind the argument strength manipulation
was as follows: Those engaged in argument elaboration or argument scrutiny would be
sensitive to differences in argument strength (relative to those less engaged in argument
elaboration; Petty & Cacioppo, 1986). Hence, if vividness increased argument
elaboration, the vivid groups should more strongly differentiate (attitudinally) between
the strong and weak message arguments. However, such differentiation should only occur for the message congruent imagery group. For the message incongruent imagery group, argument elaboration should be undermined, and so they should be less able to differentiate between strong and weak arguments. As a final layer to the study, participants’ need for cognition (Cacioppo & Petty, 1982) was measured. Those high in need for cognition (NC) have been shown to naturally engage in argument elaboration (e.g., Cacioppo, Petty, & Morris, 1983), and so the effects of vividness on argument strength differentiation should have been much more evident for those low in need for cognition. To summarize the results, high NC’s differentiated between strong and weak message arguments in all three vividness conditions. Low NC’s differentiated weakly in the pallid version, more strongly in the vivid-congruent condition, and not at all in the vivid-incongruent condition. These results were taken as strong evidence for the elaboration cue hypothesis.

*Influences motivation and ability to counterargue.* Targets of persuasion often respond by counter-arguing. A core assumption of resource matching models in the consumer behavior and marketing literature is that argument elaboration is frequently characterized by counter-argumentation, and hence, argument elaboration is something to be avoided in general (Anand & Sternthal, 1989; Peracchio & Meyers-Levy, 1997). These assumptions stand in contrast to the literature relating to the Elaboration Likelihood Model of persuasion which holds that argument elaboration is a key component of strong attitude change (Petty & Cacioppo, 1986). It is possible that mental images, as persuasive arguments in and of themselves, may be more difficult or unnatural to counterargue or attack than verbal arguments. Thus, persuasive messages containing
mental images should be more difficult to resist and, hence, be more effective. Peters (1983) found some support for this proposition by using communications that either did or did not include illustrations. He found that the illustration-accompanied arguments were associated with less counterarguing. However, within the same study, the dynamism of language used in a persuasive communication (more akin to the present dissertation studies) did not reliably relate to counterargument production.

In general, counterargument disruption should lead to higher initial persuasion (Petty, Wells, & Brock, 1976), yet may result in attitudes that are lower in strength, assuming that lack of counterarguing is indicative of less elaborative processing in general (Petty & Cacioppo, 1986). However, to the extent that images are difficult to counterargue, persuasive communications that evoke mental imagery may enjoy the benefits of argument elaboration, without the pitfalls of counterargumentation.

*Increases self-relevant responding.* Imagery may increase the potential for self-relevant responding (Burns, Biswas, & Babin, 1993; Goossens, 1994). Self-relevant responding is especially likely given that the imagery is enactive (Goossens, 1994), or to the extent that the recipient of a persuasive communication is required to generate the image (as opposed to passively perceiving a picture, for example; Burns et al., 1993). To the extent that imagery increases self-relevant responding, persuasion should generally be increased (e.g., Meyers-Levy & Peracchio, 1996; Shavitt & Brock, 1986).

*Functions as a metaphorical referent.* McQuarrie and Mick (1996, 1999) suggested that images and especially pictures are often used by persuaders as a kind of symbolic language (see also Kenny & Scott, 2003; Scott, 1994). In other words, the images mean something more than the objects or scenes they represent. This notion is
similar to the way that images are often used in fiction. For example, the strange image of Holden Caulfield running through the rye trying to catch bodies is meant to symbolically represent his desire to save the innocence in the world (though he senses it slipping away). McQuarrie and Mick (1999) used trope (irregular usage) symbolism when they showed participants a motion sickness remedy as the buckle of a seat belt. It was assumed and demonstrated that participants would be able to read the image as indicating that, like a seat belt, the motion sickness remedy would keep you safe in the car, and was a part of prudent preparation. Other symbols of visual rhetoric that they discussed were puns, accidental resemblances, repetition, reversal, rhyme, and antithesis. A key assertion in the work on visual rhetoric is that some degree of effortful processing is required for effective persuasion.

Enhances transportation. The Transportation Imagery Model of narrative persuasion proposed by Green and Brock (2000, 2002), holds that imagery is a critical component of immersion or transportation into a narrative (see also Gerrig, 1993; Long et al., 1993; Sadoski, 1988). Once transported into a narrative, there is evidence that people become less critical of persuasive communications (Green & Brock, 2000). Although transportation is a construct developed to explain responses to stories and narrative, the construct is also probably relevant to many rhetorical communications, which are often a mixture of rhetoric and narrative. Even non-narrative rhetoric will often include vivid descriptions of scenes or events. In these cases, to the extent that participants become transported into the described events, there is the potential for communication recipients to become less critical of the persuasive arguments (in rhetoric) or persuasive themes (in narrative), hence increasing attitudinal yielding.
Promotes or aids holistic processing. A number of authors have commented on the fact that imagery tends to lend itself to holistic processing (e.g., Branthwaite, 2002; Holbrook, 1983; MacInnis & Price, 1987). With holistic processing, an overall ‘image’ is constructed which encompasses all arguments in favor of and against a given persuasive stance. Once the image is formed, further information is processed in light of the image (a ‘top-down’ process). For example, when we see a face, we tend not to focus on the various components (eyes, nose, particular strands of hair) – we see a whole integrated face. Holistic processing stands in contrast to discursive or piece-meal processing, where arguments are analyzed separately and sequentially over time and then combined into a summary judgment (a bottom-up process).

Communications that contain imagery or vivid elements may facilitate or instigate holistic processing. Consistent with this idea, Adaival and Wyer (1998) showed that instructions to imagine were especially effective in producing persuasion given that the persuasive communication was in the form of a narrative (an informational format that lends itself to holistic processing).

Imagery Mediation Relating to Evaluation

Aids classical conditioning. Dadds et al. (1997) reviewed a sizeable literature on the relation of mental imagery to classical conditioning. To summarize, mental imagery can take the place of actual stimuli in classical conditioning, and in some cases, mental images have been shown to lead to more persistent conditioning than actual stimuli (e.g., Foa, Steketee, Turner, & Fisher, 1980). Much of the literature reviewed by Dadds et al. relates to fears and phobias, or to simple stimuli (a tone or a shock). However, classical conditioning is capable of associating a stimulus with any kind of evaluative response
(e.g., Cacioppo, Marshall-Goodell, Tassinary, & Petty, 1992; Krosnick, Betz, Jussim, & Lynn, 1992). In fact, classical conditioning is the aim of many “image” advertising campaigns in which emotionally charged images are repeatedly shown alongside a product, the idea being that the images will become associated with the product (e.g., Batra & Ray, 1986; Janiszewski & Warlop, 1993).

**Enhances automatic evaluation.** The work just reviewed on classical conditioning assumes that images will produce relatively automatic evaluative responses which can then be associated with a neutral stimulus. Consistent with this assumption, Hermans, de Houwer, and Eelen (1994) demonstrated automatic evaluation of extremely valenced pictures. Giner-Sorolla, García, and Bargh (1999) replicated these findings using more moderately valenced pictures. Hence, given that mental images have been formed through some process (image-generation, picture-perception), evaluation may proceed in a relatively effortlessly fashion.

**Fosters attitude/belief consolidation.** Paivio (1971) has conceptualized imagery as a conceptual peg that effectively binds together related pieces of information. To the extent that both beliefs and attitudes can be tied into a central image, imagery should increase the strength of association between attitudes and beliefs, creating a more accessible attitude (Fazio, Powell, & Herr, 1983). Fazio et al. concluded that “...any variable that strengthens the object-evaluation association has a corresponding impact on attitude accessibility... (p.725).” Related research (see Fazio, 1995), has shown that attitudes that are more accessible are more likely to influence information processing and behavior, and tend to be more stable and resistant to change.
Acts as an anchor for subsequent judgments. Recipients may use an image, especially an extreme image, as an anchor representing a particular evaluative stance, and may then attempt to adjust in one direction or another from that image to reach a more moderate stance. Classic work relating to social judgment theory suggests that such adjustments may often be insufficient (e.g., Sherif & Hovland, 1953; Sherif, Taub, & Hovland, 1958), resulting in attitudes that are biased in the direction of the initial anchor.

Creates a cognitive set that discourages alternative interpretations. Sherman et al. (1985) proposed that one way in which imagery may influence judgments is by creating a cognitive set (Bruner & Potter, 1964) that impairs ability to view an object or an event in a different fashion. Relevant to persuasion, if an image or a series of images suggests a particular persuasive stance, recipients may have a tendency to set on these images, reducing their ability to form alternative evaluations.

Affects source evaluations. Taylor and Thompson (1982) reviewed some evidence suggesting that vividness was associated with increased source credibility. Chaiken and Eagly (1983, Study 2) showed that source liking was polarized by relatively vivid presentation modalities (audio and televised vs. written), however, they did not replicate this effect in Study 1 of the same paper. Political research has shown that presidents who used more image-based rhetoric in key speeches were rated more highly in charisma and greatness (Emrich, Brower, Feldman, & Garland, 2001). Finally, Peters (1983) found that, in some cases, speakers using a more vivid and dynamic speaking style were rated as more overbearing.

It is likely that the type of imagery used, the context of the imagery, and initial perceptions of the source should moderate the extent and quality of source perception.
effects. Some of these variables will be discussed below in the description of the new model of imagery correction (Chapter 3).

Moderators of Image-Based Persuasion

Despite the numerous ways in which mental imagery could affect attitudes and attitude change, researchers have found that imagery sometimes enhances persuasion, and sometimes seems to interfere with it (e.g., Frey & Eagly, 1993; Keller & Block, 1997; Kisielius & Sternthal, 1984; Unnava & Burnkrant, 1991). Work on the “vividness effect” is instructive in this regard.

Nisbett and Ross (1980) defined vivid information as information that is “emotionally interesting, concrete and imagery provoking, and proximate in a sensory, temporal, or spatial way.” (p. 44; italics added). In general, it was assumed that vivid information would lead to increased attitude change (the supposed “vividness effect”). An early and often-cited review of the vividness literature by Taylor and Thompson (1982) found little support for any consistent vividness effect. Instead they found many instances in which vivid information did not influence attitudes and judgments, or in which it was actually less influential than non-vivid information. Taylor and Thompson (1982) argued that research on the vividness effect had been “marked by a lack of construct validity and by problematic operationalizations” (p. 178). For example, some studies have operationalized “vivid” as information in the form of case studies, and “pallid” as information in the form of statistical base rates (e.g., Borgida & Nisbett, 1977; Nisbett & Borgida, 1975). However, these two types of materials vary on other dimensions in potentially important ways.
Furthermore, prior to Taylor and Thompson’s review, much of the research conducted on the vividness effect suffered from a lack of theoretical guidance. Indeed, most researchers seemed to assume vivid information would be more persuasive than pallid information as Nisbett and Ross (1980) suggested. More recent work on the “vividness effect” had helped to clear up some of the inconsistencies in the past literature. Though part of the reason for conflicting findings can be explained by the fact that the various mediators of imagery effects will sometimes increase and sometimes decrease persuasion, researchers have begun to uncover more general moderators of the effect of imagery on persuasion.

It should be clear from the preceding review of mediators of imagery effects, that many of the proposed mediators are only hypothesized to pertain to certain situations. Proposed moderators are reviewed below, and in Chapters 2 and 3, two new moderational models of the influence of imagery on persuasion are developed and tested. Moderators of the effects of imagery on persuasion can be most conveniently organized based on their relevance to (a) the source of a persuasive communication, (b) the communication itself, (c) the target of the communication, or (d) the context in which the communication is delivered (see Table S.2 for a list of all proposed moderators grouped by category). When available, evidence will be presented in favor of, or against a proposed moderator.

*Imagery Moderators Relating to Source Factors*

**Source likeability.** Chaiken and Eagly (1983) showed that vivid modalities (TV, radio) were more effective at producing attitude change given a likable source. The reverse was true given a dislikable source.
Source credibility. Taylor and Thompson (1982) proposed that imagery elicitation may be a more effective strategy given a credible source. They cited research by Worcel and colleagues (Andreoli & Worcel, 1978; Worcel, Andreoli, & Easton, 1975) in which more vivid modalities were more persuasive when the source was credible.

Source polish. Peters (1983) suggested that a polished source or a dynamic speaker may be suspected of intent to persuade, hence, arousing resistance. In one study, Peters manipulated the presence of imagery (pictures vs. no pictures accompanying a persuasive communication) as well as the dynamism of the source (dynamic sources used more intonation and emphasis in their speech); however, no consistent evidence was found to suggest that pictures were less effective given more dynamic sources.

As the Imagery Correction Model can provide a parsimonious account of the findings above relating to source factors, the relevant studies will be reassessed in Chapter 3.

Imagery Moderators Relating to Communication Factors

Congruency of imagery. A number of authors have suggested that imagery will only be effective to the extent that it is consistent with the persuasive stance of the message (Bone & Ellen, 1992; McGill & Anand, 1989; Peters, 1983; Smith & Shaffer, 2000). When imagery is irrelevant to the stance of a persuasive communication, distraction from central arguments can arise (Peters, 1983). When imagery is inconsistent with the stance of the message, negative persuasion may result (Smith & Shaffer, 2000). Relevant to this moderator is Frey and Eagly’s (1993) demonstration that imagery led to decreased attitude change when participants were not constrained to pay
attention to the communication (they overheard it on the radio). Smith and Shaffer (2000) explained these results by suggesting that the imagery used in the messages employed by Frey and Eagly actually argued against the message stance. Smith and Shaffer (2000 – Study 1) showed that imagery consistent with the message stance (termed ‘congruent imagery’) was capable of enhancing persuasion, whereas imagery not consistent with the message stance (termed ‘incongruent imagery’) did not.

Eloquence of imaginal language. Frey and Eagly (1993) suggested that the eloquence of language-elicited imagery may influence its effectiveness, but provided no evidence in favor of this claim.

Imagery interactivity. Several authors have suggested that imagery should be more effective when various components of message imagery are shown or described as interacting in some way (Childers & Houston, 1984; Lutz & Lutz, 1977, 1978).

Appropriateness. As described in the mediator discussion, when images arouse feelings of inappropriateness, disgust, or otherwise intense negative reactions, their usefulness in persuasion may be limited (Smith & Shaffer, 2000).

Imagery Moderators Relating to Qualities of the Communication

Argument complexity. Eagly and colleagues (Chaiken & Eagly, 1976; Frey & Eagly, 1993) have proposed that imagery may be more effective given easy to understand arguments, presumably because imagery may interfere with the comprehension of difficult arguments. In fact, Chaiken and Eagly (1976) varied the complexity of message arguments and found that vivid modalities led to more persuasion only given easy to understand arguments. The reverse was found for difficult to understand arguments.
Number of imagery sources. Unnava and colleagues (Unnava et al., 1996; Unnava & Burnkrant, 1991) have shown that the effectiveness of imagery is reduced when there is more than one source of imagery. For example, Unnava and Burnkrant (1991) showed that a vividly written message with pictures led to less persuasion than both a vivid message with no pictures, or a pallid message with pictures.

Modality. As another explanation of a negative effect of imagery in a condition in which attention was not constrained, Frey and Eagly (1993) proposed that vivid language may be less effective when delivered in the auditory modality because people cannot control the pacing of the message. Hence, they may not have the ability to elaborate on both the imagery and the arguments at the same time.

Narrativity. Finally, Lutz and Lutz (1978) proposed that imagery might be especially effective when couched in narratives. This viewpoint is certainly consistent with both theory and work on the Transportation Imagery Model of narrative persuasion (Green & Brock, 2000, 2002), and Adaval and Wyer’s (1998) work on the relationship of imagery and narrative to holistic processing. Both of the new models discussed in the dissertation are relevant to the power of imagery in narratives, and this point will be revisited in the General Discussion (Chapter 4).

Imagery Moderators Relating to Target Factors

Time of measurement. A number of authors have proposed that the effects of imagery manipulations should be stronger after some delay (Childers & Houston, 1984; Kisielius & Sternthal, 1986; Reyes et al., 1980; Shedler & Manis, 1986; Taylor & Thompson, 1982; Wilson et al., 1989), where imagery should have a competitive advantage over nonimaginal analogs. This claim of delayed superiority is based on the
notion of an availability heuristic (discussed above). Though some authors have found empirical evidence consistent with this proposition (e.g., Childers & Houston, 1984; Reyes et al., 1980), others have not (e.g., Helmreich, 1976; Shedler & Manis, 1986).

**Online vs. memory-based judgment.** Also based on work relating to the availability heuristic, and especially the work of Hastie and Park (1986) on online vs. memory-based judgments, Wilson et al. (1989) proposed that imagery would only be effective in memory-based judgments. With memory-based judgments, a communication is processed and then, at some later time, an attitude is formed based on recalled information. Given that imagery should be easier to recall than more pallid types of information, memory-based judgments should be highly influenced by imagery manipulations. In contrast, when judgments are made online (an evaluation is formed during the processing of a persuasive communication), all parts of the communication are probably relatively salient, and hence imagery should lose its competitive advantage over pallid information. This moderational model is probably the best candidate for explaining any moderation of imagery by time of judgment. In situations where no imagery effects are found in delayed judgments, it may be due to the fact that initial evaluations were formed while processing the communication and, later, these evaluations are merely recalled.

**Prior attitudes.** Although the suggestion seems obvious, Taylor and Thompson (1982) argued that the effects of imagery would be constrained to the extent that participants could rely on a prior attitude in making judgments related to a persuasive communication.
Emotional quality of attitudes. Huddy and Gunnthorsdottir (2000) have suggested that imagery claims may be more effective when targeting attitudes that are held emotionally. Evidence for this claim was presented in one study where the emotionality of various topics was varied.

Imagery ability. Several authors have suggested that image-based or vivid claims would be more effective given that the targets are high in imagery ability (MacInnis & Price, 1987; Rossiter & Percy, 1978). Rossiter and Percy (1978) presented evidence in favor of this claim.

Topic relevance. Taylor and Thompson (1982; also Huddy & Gunnthorsdottir, 2000) proposed that imagery should be especially effective given high self-relevance of the topic in question; the idea being that the extra-processing prompted by self-relevance is a necessary condition for attention to the communication, and without such attention, imagery manipulations might go unnoticed. In favor of this hypothesis, Taylor and Thompson cited work by Borgida and Nisbett (1977) in which a vivid presentation about psychology courses was more effective with psychology majors (for whom the topic should have been particularly self-relevant).

Prior knowledge. A number of authors have claimed that attempts to elicit imagery will be more effective to the extent the target of persuasion has prior topic-relevant knowledge (Bone & Ellen, 1992; Huddy & Gunnthorsdottir, 2000; Kisielius & Sternthal, 1986; Smith, Houston, & Childers, 1984). The idea behind this prediction is that prior knowledge will allow the generation of either more images, or more vivid images, which should then enhance persuasion.
Valence of associated elaborations. One of the two most commonly mentioned moderators of the effects of imagery on persuasion was provided by the availability-valence hypothesis. According to the availability-valence hypothesis, imagery acts as a cue to engage in argument elaboration (Kisielius, 1982; Kisielius & Sternthal, 1984, 1986). Hence, consistent with cognitive response theory (Brock, 1967; Greenwald, 1968), the main determinant of persuasion will be the valence of the elaborations elicited. Kisielius and Sternthal (1984) have presented evidence consistent with this claim.

Self-relevance of imagery. Work related to argument elaboration has shown that elaboration related to the self enhances persuasion (e.g., attitude-behavior consistency; Shavitt & Brock, 1986). Similarly, some authors have suggested that self-imagery (termed enactive imagery: Goossens, 1994) will be more likely to enhance persuasion than non-enactive imagery. Bone and Ellen (1992) have presented some evidence in favor of this claim.

Imagery Moderators Relating to Context Factors

Attentional competition. Another of the most commonly mentioned moderators of vividness effects has been the level of attentional competition in a given persuasion context. Because imagery-evoking information is vivid (Nisbett & Ross, 1980), it has been predicted that vivid information should be more likely to enhance persuasion in contexts where multiple sources of information are competing for limited attentional resources (McGill & Anand, 1989; Shedler & Manis, 1986; Smith & Shaffer, 2000; Taylor & Thompson, 1982; Wilson et al., 1989). In studies in which participants receive both pallid and vivid information (presumably the two compete for attentional resources), vivid information has generally been shown to increase attitude change (Shedler &
Manis, 1986; Reyes et al., 1980; Wilson et al., 1989). However, when Frey and Eagly (1993) manipulated attentional resources by having some participants overhear a persuasive communication on the radio, vividness actually reduced persuasion. As mentioned repeatedly, however, Smith and Shaffer (2000) have criticized these findings by suggesting that the imagery aroused by Frey and Eagly was actually incongruent with the stance of the message.

**Conclusions and Layout of the Dissertation**

There are an abundance of potential mediators and moderators of the effects of imagery on persuasion, but the percentage of variance in imagery effects that can be accounted for in typical persuasion contexts by any given mediator or moderator is questionable. In the dissertation, two original moderators of the effects of imagery on persuasion that are likely to account for a great deal of the variance in the effectiveness of imagery are proposed and empirically examined. In Chapter 2, a Cognitive Resources Model (CRM) of imagery and persuasion is proposed. Argument elaboration is a common response to persuasive communications. Of course, scrutinizing arguments requires attentional resources. The elaboration of imagery (generation, maintenance) also requires attentional resources. Because attentional resources are limited, when people attempt to engage in argument elaboration and imagery elaboration simultaneously, resource depletion can result that may render one or both types of elaboration relatively fruitless. Such mutual process interference may be a common reason for failures of imagery to affect persuasion, and may help to elucidate why certain studies have found positive imagery effects, whereas others have found either negative or null imagery effects.
In Chapter 2, the CRM is developed more deeply. Theoretical background is discussed, and predictions about when the model is most likely to apply are discussed. A review of extant studies that can be reinterpreted in light of the model is presented, and then one original study is reported.

The second moderational model of imagery and persuasion, the Imagery Correction Model (ICM), is discussed in Chapter 3. Imagery evocation is ubiquitous in persuasive communication. Correspondingly, most people are aware of this persuasive tactic, and have formed lay theories about both how imagery operates, as well as the relative effectiveness of the tactic. Armed with such persuasion knowledge, the ICM proposes that in some cases, people will be motivated to reduce the perceived impact of imagery-laden persuasive communications by adjusting their attitudes in the opposite direction of the communication stance.

In Chapter 3, the theoretical background of the ICM is discussed, and factors that make correction more or less likely are delineated. A number of past findings are reinterpreted in light of the ICM. Finally, an original experiment is reported which presents evidence in favor of the model (as well as contains a second test of the CRM).
CHAPTER 2

AN INITIAL INVESTIGATION INTO THE COGNITIVE RESOURCES MODEL OF
MENTAL IMAGERY AND PERSUASION

In this chapter, we develop and provide initial validation for a new Cognitive Resources Model (CRM; Mazzocco, 2000) of imagery and persuasion, which incorporates notions of attentional resources into predictions about when imagery will and will not facilitate persuasion.

The Cognitive Resources Model

Theoretical Background

Mental images can either be formed in a relatively automatic fashion (e.g., picture perception, image recall), or be constructed based on external stimuli (e.g., a vivid textual description, a vividly told story) or internal stimuli (e.g., imaginings, dreams). The typical consumer advertisement, for example, aims to evoke images via all three routes. A given TV ad will invariably contain pictorial images, and will typically also contain vivid narration designed to evoke specific additional images. In addition, many ads will also tend to evoke relevant idiosyncratic images in the mind of the consumer. For the present purposes, the key distinction between the many different information sources of mental image representations is that some automatically result in fully-formed mental
images, whereas others require effortful processing before yielding mental images. Cognitive processing in the service of the generation of mental images is termed *imagery elaboration*.

Further work requiring resources can be done to/with images after they have been formed. If an image represents or relates to a persuasive argument, recipients may attempt to understand the relationship between the image and either accompanying information, or pre-existing information stores (*argument elaboration*). Recipients may also attempt to maintain the image for some period of time, or perhaps even manipulate the image (e.g., picturing oneself interacting with the image). Table S.3 summarizes the various common resource tapping processes as they relate to both the processing of pre-formed images, and non-pictoral stimuli. The key difference between these two sources of mental representations is that the non-pictoral stimuli require imagery elaboration, whereas pictures do not.

Baddeley’s (1999) Working Memory Model offers a useful conceptualization of mental imagery and imagery elaboration that can be used to derive predictions about when and how mental imagery will be most likely to influence attitudes. The working memory formulation consists of the central executive, the articulatory loop (maintains and processes verbal and auditory information), and the visuospatial sketchpad (stores and processes mental imagery and spatial information). The central executive is the main processing unit; it can be thought of as an attentional spotlight (Baddeley, 1996). The articulatory loop and the visuospatial sketchpad are two slave-systems of the central executive in which information can be processed and temporarily stored. The central executive interacts with both of the slave systems, but in doing so a portion of its limited
resources is consumed. Hence, when the central executive communicates with the visuospatial sketchpad to retrieve a waiting image (i.e., shines the spotlight on the sketchpad), fewer resources are available to interact with the articulatory loop, and vice versa.

To the extent that a persuasive communication elicits more than one type of process, attentional resources must be taken into account. In response to persuasive communications that evoke mental images, both imagery elaboration (the formation and maintenance of mental images) and argument elaboration (the scrutiny of message arguments, imaginal or otherwise) are likely to occur (Huddy & Gunthorsdottir, 2000; Goossens, 1994; Oliver et al., 1993; Rossiter & Percy, 1978). Images are relatively vivid types of information that often command our attention (Nisbett & Ross, 1980), and argument elaboration is a common response to relevant persuasive communications (Brock, 1967; Greenwald, 1968).

A number of authors have speculated that imagery generation requires effortful processing resources (Babin et al. 1992; Markham & Hynes, 1993; Sadoski, 1983). However, some have speculated that high imagery messages can be processed with relative ease (e.g., Keller & Block, 1997). In fact, the relationship between imagery generation and attention has been empirically examined. Research by Bruyer and Scailquin (1998) demonstrated that overloading the central executive (via a random-number generation task) interfered with the simultaneous formation of mental images. Similarly, Salway and Logie (1995) showed that a random number generation task interfered with the generation and maintenance of mental images. Finally, in the context of persuasion, Bolls and Lang (2003) showed that high imagery radio ads led to poorer
recognition for message arguments and slower response latencies on the same recognition
test than low imagery ads, but only when the ads had been presented concurrently with a
secondary visual task (a picture memorization task).

In contrast to the studies described, some work from the cognitive literature has
shown that vivid imagery may in some cases be associated with less attentional demand.
For example, D’Angiulli and Reeves (2002) instructed participants to form images of
words that had been prerated as high or low in ease of imagining. Participants were
instructed to press a reaction time button as soon as possible after having formed the
images. Results indicated that the more vivid words were associated with faster reaction
times, suggesting that less effort was required in the generation of the associated mental
images. Presumably, for vivid words, participants could quickly (perhaps automatically)
recall a representative image from a related schema, whereas the less vivid words may
have required more imagery elaboration. In the present studies, we deal with vivid
descriptions that are more detailed, complicated, and compounded than a single word. In
such cases, it is expected that the act of image generation will indeed demand a non-
trivial amount of attentional resources. In general, however, the CRM is less likely to
apply in situations in which image-generation occurs automatically or requires very few
attentional resources.

It should be noted that Bolls and Lang (2003) have reported evidence inconsistent
with the claim that even more complex kinds of mental imagery tap attentional resources.
They presented participants with radio messages pretested to evoke either high or low
mental imagery and found that the high imagery messages were associated with faster
reaction times on a secondary auditory probe task. In their study, Bolls and Lang
manipulated imagery by having a separate set of participants rate a series of ads in terms
of the level of imagery they evoked. It is possible that level of imagery evoked was
confounded with argument elaboration (lower imagery ads may have also evoked more
argument elaboration). It could also be that participants in the high imagery condition
had slipped into an enjoyment processing mode (low argument elaboration). Bolls and
Lang did not include measures that would allow these alternative interpretations of their
results to be evaluated.

Hence, there is some evidence that the generation of mental images requires
central executive attentional resources. Given that argument elaboration undoubtedly
requires attentional resources, it seems likely that concurrent argument elaboration may
interfere with or inhibit the elaboration of mental imagery, and vice versa. The CRM
predicts that imagery will have positive effects on persuasion only to the extent that
sufficient attentional resources (central executive resources) are present. Specifically,
when argument elaboration and the elaboration of mental imagery are concurrent,
resource depletion should render one or both types of elaboration relatively less effective,
therefore, reducing persuasion.

This prediction is based on the rationale behind the psychological-refractory
period (PRP: Pashler, 1994; Telford, 1931). The PRP refers to the phenomenon whereby
engaging in one task slows or impairs performance on another task. As it relates to
attitude change, dedicating resources to one type of processing may reduce the
effectiveness of other types of processing. In cases where both types of processing would
tend to increase the persuasiveness of a communication, the PRP will generally reduce
attitude change.
A number of authors have previously proposed that imagery and argument elaboration may interfere with one another (Bone & Ellen, 1990; Frey & Eagly, 1993; Kisielius & Sternthal, 1986; Miller & Marks, 1992), but in each case, the suggestion was based in speculation, and offered in hindsight. In addition, these speculations were not couched in relevant theory, nor was any attempt made to delineate a model of when interference would be more or less likely.

Factors Influencing Resource Depletion

The general prediction of the CRM is that when imagery elaboration and argument elaboration occur simultaneously, persuasion will generally be diminished. There are three key classes of predicted moderators of this diminution effect: factors relating to the likelihood of imagery elaboration, factors relating to the likelihood of argument elaboration, and factors relating to the total pool of attentional resources.

Regarding imagery elaboration, the use of vivid language and/or instructions to imagine will, all else equal, increase the attentional resources available for imagery generation. Predictions relating to individual differences in motivation or ability to engage in imagery elaboration are somewhat less clear. Of course, it could be that people who are more given to imagery elaboration will dedicate more of their processing resources to this task. However, it may also be the case that these people are highly practiced at forming mental imagery, and may need to dedicate relatively less attention to the tasks of imagery formation and maintenance.

There is a voluminous literature relating to the factors that increase argument elaboration. Certainly, instructions to evaluate should increase scrutiny. Similarly, forewarning of attempts to persuade also increases argument elaboration (Quinn &
Wood, 2004). The need for cognition scale (Cacioppo & Petty, 1982) measures individual differences in enjoyment of thinking, and this scale has been shown to be positively related to argument elaboration (for an extensive review, see Cacioppo, Petty, Feinstein, & Jarvis, 1996). Hence, individuals who are high in need for cognition should dedicate relatively more of their attentional resources to argument elaboration.

Finally, factors relating to the general size of the resource pool will play a role in resource depletion. Obviously, the fewer attentional resources available in general, or the fewer dedicated specifically to the processing of a persuasive communication, the higher the likelihood of resource depletion. Stable individual differences in working memory capacity (similar to central executive resources) have been studied extensively (e.g., Daneman & Carpenter, 1980; Engle, 2002; La Point & Engle, 1990). Individual who are low in working memory capacity would be expected to experience more problems with resource depletion when processing persuasive communications. In general, any kind of distraction or load on attentional resources during the processing of a persuasive communication would be expected to increase interference between argument elaboration and imagery elaboration.

Importantly, certain variables could potentially influence resource depletion at two or more of the three levels discussed above. For example, though imagery instructions will undoubtedly increase the attentional resources dedicated to imagery elaboration, they may, at the same time, reduce the resources allocated to argument elaboration (having no net effect on total attentional resources). Argument elaboration reduction may be more likely to occur when the topic is of relatively low importance to
the recipient. When the topic is highly relevant, or perhaps for those high in need for
cognition in general, imagery instruction may not suppress argument elaboration.

To take another example of a variable that may have multiple effects on resource
depletion, distraction from the message should certainly reduce total attentional
resources. The question is, how are the remaining message-oriented resources allocated?
Perhaps if recipients are left to choose between argument elaboration and imagery
elaboration, they will often choose the latter; due perhaps to a desire to experience the
emotional qualities evoked by the imagery. As with imagery instructions, however, when
personal relevance is rather high, people may instead choose to dedicate knowingly
limited attentional resources to argument elaboration.

To summarize, factors that increase imagery elaboration or argument elaboration,
or that decrease the size of the pool of attentional resources, should, all else equal,
increase the likelihood of interference between imagery elaboration and argument
elaboration, thus reducing persuasion. However, as the preceding two paragraphs
demonstrate, ceteris paribus often cannot be assumed, and care must be taken in
designing and interpreting studies testing the CRM.

Comparing and Contrasting the CRM with Related Models

The importance of limited cognitive resources has always been recognized at
some level in basic attitude change research. The learning model of Hovland and
collaborators (e.g., Hovland et al., 1949; Hovland et al., 1953), and the reception-yielding
model of McGuire (e.g., 1969, 1985) both assumed that message reception (attention,
comprehension, retention) set an upper limit on attitude change. Hence, if an individual
was distracted while processing a persuasive message, less attitude change would be
predicted by the learning models (though distraction can lead to increased attitude change for other reasons; see Petty et al., 1976).

From the mid 1960’s to late 1970’s the reception models of attitude change were challenged by cognitive response models (Brock, 1967; Greenwald, 1968), which heralded the role of argument elaboration in persuasion. However, these models culminated in the delineation of the Elaboration Likelihood Model (ELM: Petty & Cacioppo, 1986; Petty & Wegner, 1998—see also Heuristic Systematic Model: Chaiken, 1980; Chen & Chaiken, 1999), which held that the influence of argument elaboration was constrained, at least in part, by individual differences in the ability of an individual to process a persuasive communication. Hence, distraction might constrain strong attitude change by lowering the ability of communication recipients to elaborate on message arguments or cues. Furthermore, the ELM assumed that individuals who were motivated to elaborate on a persuasive communication would be likely to dedicate cognitive resources towards doing so. Examples would be individuals high in need for cognition (Cacioppo & Petty, 1982), or for whom a persuasive message was personally relevant (Petty & Cacioppo, 1984).

Nevertheless, in both the reception models and the ELM, the details of the interplay between cognitive resources, message processing, and persuasion were relatively vague. It was not made clear, for example, just what the nature of this store of limited cognitive resources was, nor how various factors interacted to deplete this resource base.

Since the late 1980’s, three additional models involving cognitive resources that are relevant to persuasion have been delineated. In the communications literature, Lang
(2000) offered a limited capacity model (LCM) of mediated message processing. Lang categorized the main tasks involved in information processing as encoding, storage, and retrieval. She further assumed that certain kinds of information will elicit orienting responses in individuals such that they will command attention and processing resources. Just what kinds of information elicit orienting responses can vary based on a number of factors, such as individual processing goals and characteristics of the information (e.g., vividness). Furthermore, orienting responses can result from automatic or controlled processes. They key to Lang’s model is that resource competition can occur within or between the three main levels of information processing. For example, at the encoding stage, vast amounts of information vie for scrutiny, but only some will actually be attended to. The process of encoding can be further impeded, however, by simultaneous attempts to retrieve information from long-term memory. A number of studies have provided evidence consistent with the LCM (Bolls, 2002; Bolls & Lang, 2003).

The applicability of the LCM to persuasive message processing is relatively straightforward. For example, imagine a written persuasive communication that induced argument elaboration. According to the LCM, the act of reading would require the dedication of cognitive resources to the encoding of the text, retrieval of context information to comprehend of the text, and storage of relevant information for later use in comprehension. Similarly, argument elaboration would require resources to be dedicated to the retrieval of information from long-term memory. The LCM could, thus, predict resource interference at the level of retrieval because two processes were vying for retrieval-based resources. If resources were preferentially allocated to comprehension,
the effectiveness of argument elaboration could be limited, and, hence, strong attitude change could be as well.

The second major model based on the notion of cognitive resources, and clearly the most popular in the consumer/marketing literature, is the Resource Matching Model (RMM: Anand & Sternthal, 1989). The RMM is mainly concerned with the resources required and available (RR and RA, respectively) to process a persuasive communication. When RR exceeds RA, message processing will be limited. In this condition, receivers may either switch to a less resource intensive mode of processing, such as peripheral route processing (Petty & Cacioppo, 1986), or may simply satisfice with an insufficiently processed message. In both cases, strong attitude change would not be predicted. When RA exceeds RR, the RMM holds that one of two things is likely to happen (given a strong persuasive communication). It is possible that people will dedicate excess cognitive resources to counterarguing the message, hence reducing persuasion. It is also possible that people will engage in argument elaboration. In this case, the idiosyncratic argument elaborations are likely to be weaker than the actual message arguments and, given an averaging model, attitude change is again likely to be reduced. The key proposition of the RMM, then, is that persuasion is likely to be optimal when RA equals RR. This proposition has received an abundance of empirical attention and support (e.g., Keller & Block, 1997; Mantel & Kelaris, 2003; Peracchio & Meyers-Levy, 1997).

Finally, the CRM can be taken as a third model of cognitive resources and persuasion. In practice, the CRM makes predictions about the relationships between various persuasive processes and the three components of Baddeley’s (1999) working memory model (the central executive, the visuospatial sketchpad, and the articulatory
loop), though in the present work we are mainly concerned with the interplay between imagery and argument elaboration.

Other work has made use of the notion of resource competition. For example, Unnava et al. (1996) proposed that mental imagery in response to a persuasive message can interfere with similar types of processes due to resource competition (see also Unnava & Burnkrant, 1991). They tested this proposition by combining ads high in mental imagery with other visual tasks. In Study 2, for example, participants were exposed to advertisements that were high or low in imagery. Results indicated that in a condition in which the ads were presented visually, imagery had a detrimental effect on ad recall. It was only when ads were presented in an audio format that imagery augmented recall. Although no measures of persuasion were reported, the study has clear implications for attitude change. Although the predictions made by these authors were very similar to predictions that could be derived from the CRM (concerning only visuospatial sketchpad resources), no attempt was made to delineate a full model of the interplay between cognitive resources and attitude change.

Raymond (2003) has also engaged in theory and research with respect to attentional constraints to viewing sequential visual images. For example, one key finding of this research is that paying specific attention to some perceptual stimuli will create memorial deficits for information presented immediately afterwards (the attentional blink; Raymond, Shapiro, & Arnell, 1992). This work deals with attention at a micro-level of analysis involving visual perception whereas the CRM and related models make macro-level predictions involving general attentional resources. It is not clear, for
example, if the attentional blink and related phenomena would have any relevance to the generation of mental imagery from ad copy.

It is possible to compare and contrast the described macro-models of attentional processing (CRM, ELM, LCM, and RMM) at a conceptual level (see Table S.4 for a summary). All four models make predictions involving cognitive resources. In addition, all four models include the notion that cognitive resources can be overwhelmed or insufficient, which can affect message processing and, by extension, persuasion. Only the RMM, however, makes the more fine-grained prediction that persuasion will be optimal when resources required equals resources available (as opposed to situations in which resources available outnumber resources required). The LCM and the CRM are more specific than the RMM and the ELM when it comes to making predictions about interference between specific types of persuasive processes. For example, the CRM and the LCM can specifically model a situation in which mental imagery and argument elaboration are competing for a shared pool of limited resources. The ELM and the RMM can only make the general statement that resources (or ability) are not adequate. The CRM and the LCM can also make specific statements about the levels at which resource competition can occur. For example, both models can predict that heavy use of retrieval from long-term memory will interfere with message processing at the level of encoding or storage. It is only the CRM, however, that makes specific statements about the actual pools of resources which can become depleted, and for which mental processes compete (i.e., Baddeley’s, 1999, working memory conceptualization), as opposed to a general and vague pool of “cognitive resources”. Hence, according to the discussed
criteria, the CRM is the most comprehensive model of cognitive resources in the processing of persuasive communications.

The only comparison for which the CRM is less complete is with respect to predictions about situations in which resources available exceed resources required. In this situation the RMM predicts that persuasion will be constrained. This particular situation is not covered by the CRM, because it is assumed that the ELM is already sufficiently delineated to handle that realm. To review, the RMM holds that persuasion will be non-optimal when excess resources are present either due to increased counter-argumentation, or relatively weak argument elaborations. The general implication is that, in this situation, argument elaboration can only be detrimental to persuasion. According to the ELM, however, the effects of increased argument elaboration on message acceptance depend on a number of different factors. For example, given weak message arguments, decreased argument elaboration would lead to relatively more attitude change. The authors of the RMM hold that advertising communications are typically written with the strongest and most compelling arguments available. However, even granting generally strong arguments, increased argument elaboration could be put into the service of bolstering the message arguments. Also, the assumption of the RMM that relatively weak idiosyncratic argument elaborations will average with the actual message arguments does not seem intuitively obvious. It is plausible that the effects of argument elaborations and message arguments on persuasion could combine in an additive fashion. Due to these kinds of concerns, the CRM intentionally forgoes predictions about situations characterized by a glut of attentional resources. With respect to imagery and
persuasion, it is assumed that if sufficient resources are available for both imagery and argument elaboration, then both processes could augment persuasion independently.

Summary of the Cognitive Resources Model

Argument elaboration and imagery elaboration are common responses to persuasive communications. To the extent that both processes draw from the same pool of limited attentional resources, resource depletion and process interference are possible. Factors predicted to increase or decrease the likelihood of resource depletion were discussed. A number of the propositions laid out in the preceding sections are examined either via a review of past empirical work (Chapter 2: next), and via the two original studies presented in Chapters 2 and 3.

Selective Review of Studies Relevant the CRM

Within the dissertation, two original studies are presented which provide support for the CRM. However, looking back into the literature on the effects of imagery on persuasion, one finds a number of studies that have included manipulations or measures which indirectly allow examination of the CRM. A review of such studies is reported below. In general, studies were chosen if reasonable inferences could be made about (a) the relative proportion of cognitive resources devoted to imagery elaboration, (b) the relative proportion of cognitive resources devoted to argument elaboration, or (c) the total pool of resources available to participants. Twenty-two studies in seventeen articles allowed such inferences. These studies, reviewed below, vary in both how they manipulated mental imagery and cognitive resources, and in what dependent variables they measured (including issue-relevant attitude change, consumer attitude change, likelihood estimates, legal and health related judgments, and recall).
To aid presentation, these studies are roughly categorized based on methodology. The first class includes studies that manipulated imagery focus. The second class includes studies with procedures that allow for reasonable inferences about the likelihood of argument elaboration. The third class includes studies that manipulated attentional resources in some fashion.²

*Studies that manipulated imagery focus.* Four studies manipulated imagery-focus. Given that there are a limited pool of cognitive resources that must be devoted to both argument elaboration and imagery elaboration, imagery-focus should increase the relative proportion of those resources dedicated to imagery elaboration, hence, making a positive effect of imagery more likely.

Sherman et al. (1985; \(N = 120\)) had participants read about a disease that had either easy or hard to image symptoms. In addition, half of the participants were given imaging instructions, and half were merely told to read the information. Participants then rated likelihood of contracting the disease. When no imagery instructions were given, no difference in likelihood estimates was found between the easy and hard to imagine symptoms groups. In contrast, in the imagery instructions group, easy to imagine symptoms were seen as more likely, whereas hard to imagine symptoms were seen as relatively unlikely. This pattern of data is consistent with the CRM given that it can be assumed that in absence of imagery instructions, participants were focusing more of their attention on information scrutiny.

McGill and Anand (1989; \(N = 30\)) had participants read persuasive appeals about cars or apartments that were written in either a vivid or pallid manner. In what was

² Within this selective review, only studies, manipulations, and measures that relate to the CRM are described.
described as a “high elaboration” condition, participants were told to use their imaginations. In the “low elaboration” condition, participants were told to “be careful and well-reasoned”. In fact, these manipulations seem more correctly described as image-focus vs. argument-focus, respectively. Analyses revealed that vividness was only effective in increasing persuasion when participants were told to focus on imagery (the “high elaboration” condition). The results of this study are consistent with the CRM, and similar to the results of Sherman et al. (1985).

Rossiter and Percy (1978; $N = 88$) exposed participants to a beer ad with either vivid or pallid arguments. The ads were further manipulated to either induce a “visual” or “verbal” focus. The focus manipulation was achieved by either including a large picture alongside relatively small font (visual-focus), or a small picture alongside relatively large font (verbal-focus). Results indicated no effect of vivid ad copy in the verbal-focus condition, but a large positive effect of vivid ad copy in the visual-focus condition. Again, these results are consistent with the CRM.

Finally, Kisielius and Sternthal (1984 – Study 1; $N = 90$) described a study in which participants read a message about a new shampoo that was either strictly verbal or verbal with pictures included. In addition they were either told to form images or not while reading the ad. Importantly, participants were instructed to evaluate the ads before receiving them (making the general likelihood of argument elaboration high). To summarize the results, in the three conditions involving imagery (imagery instructions/pictures; imagery instructions/no pictures; no imagery instructions/pictures), there was generally depressed persuasion. Only in the no imagery instructions/no pictures condition was there a positive effect of the ad on persuasion. The CRM can
accommodate these data as follows: When imagery instructions and pictures were presented concurrently, visual-overload (Unnava, et al., 1996; Unnava & Burnkrant, 1991) probably interfered with persuasion. In the two conditions where there was either imagery instructions or pictures, imagery elaboration may have interfered with argument elaboration (due to the instructions to evaluate). Only in the condition where no imagery elaboration was likely (no imagery instruction, no pictures) was persuasion optimal, presumably because participants could devote all of their resources to argument elaboration.

*Studies that allow inferences about degree of argument elaboration.* In the thirteen studies that follow, an inference about the likely level of argument elaboration was possible. The simple CRM prediction is that in any situation in which argument elaboration is high, there should be correspondingly weak, null, or even negative effects of imagery manipulations.

Keating and Latane (1976; \(N = 682\)) varied communication modality (face-to-face, videotape, audiotape, written) in the context of political platform speeches in three studies. The idea was that the more direct modalities (face-to-face, videotape) would be more vivid communications. Importantly, participants were prompted to evaluate before receiving the communications. Results showed no differences in attitude change across modalities. This lack of effect would be predicted by the CRM given that participants were in a evaluation frame of mind while processing the communications. Furthermore, the specific topics employed in the study (government censorship and the formation of a volunteer army) seem highly likely to have elicited argument elaboration on their own.
Related to the study by Keating and Latane are a series of studies from the marketing/consumer behavior literature that also instructed participants to evaluate while receiving persuasive messages. Sullivan and Macklin (1988; \( N = 54 \)) presented participants with either vividly presented pictures, or pallidly presented pictures. Miller and Marks (1992; \( N = 124 \)) had participants listen to radio ads with or without vivid sound effects. Finally, Burns et al. (1993; \( N = 377 \)) varied both instructions to imagine and the vividness of ad copy in their study. Again, in each study participants were informed that the purpose of the study was to evaluate the ads. In the cases of Sullivan and Macklin (1988) and Miller and Marks (1992), there were no effects of the imagery manipulations on evaluations (presumably due to resource depletion caused by concurrent argument elaboration). In the case of Burns et al. (1993), there were no effects of instructions to imagine, and only a very small positive effect of the vividness of the ad copy. Hence, across these three studies, instructing participants to evaluate either precluded or greatly reduced the effects of imagery on persuasion.

Chaiken and Eagly (1983) conducted two studies (\( N = 321 \) and 179 respectively) that varied communication modality (videotape, audiotape, written) in the context of persuasive communications relating to university policies. In addition, the likeability of the communicator was varied. For the purposes of this review, only the likable communicator conditions are described. Given an unlikable communicator, it is likely that participants may have become more aware of the use of imagery as a persuasive tactic (a situation that is more relevant to the Imagery Correction Model—described in Chapter 3). Importantly, Chaiken and Eagly report in a footnote (footnote 2, p. 242) that the messages were intended to be “relatively easy-to-understand”, and furthermore, that a
cover story was employed in both studies to discourage persuasive argumentation. In both studies, in the likeable communicator condition, the more vivid modalities (audio, video) led to increased persuasion. Given the steps taken by the authors to reduce argument elaboration, the positive effect of vividness found in these two studies is consistent with the CRM.

Reyes et al. (1980) varied the vividness of legal arguments shown to participants \((N = 54)\) and took immediate and delayed (2 days) measures of agreement. There were no immediate effects of vividness on judgments, but in delayed judgments, the vivid arguments were found to be more persuasive. The CRM would explain these results in the following manner. During the reading of the legal arguments at time 1, argument elaboration was probably moderate to low. Although participants were probably mildly interested in the legal decision making task, it seems safe to assume that it was not that personally relevant to them. Hence, sufficient resources should have been available for the processing of vivid information. At time 1, when all of the arguments were fresh, both vivid and pallid techniques were equally effective. At time 2, when the pallid arguments had lost their immediate impact, the strengthened influence due to vividness was revealed. Admittedly, the CRM interpretation of this study is a stretch due to the lack of a vividness effect at time 1, and the potentially spurious inference of low task relevance.

Across three studies, Keller and Block (1997) manipulated imagery via pictures vs. no pictures (Study 1 – \(N = 120\)), imagery instructions vs. read carefully instructions (Study 2 – \(N = 94\)), and vivid case history presentation vs. pallid statistical information (Study 3 – \(N = 190\)). The topics were involved in Studies 1-3 were the dangers of skin
cancer, smoking, and sexually transmitted diseases, respectively. In each study, participants’ perceived vulnerability to the given health issue was taken as a measure of personal relevance and, hence, resource allocation (i.e., higher resource allocation when personal relevance/vulnerability is high). For the purposes of analysis, participants were grouped into high, moderate, or low resource allocation groups. In each study, Keller and Block found an inverted-U pattern of results in the high-imagery conditions such that persuasion was optimal under moderate resource allocation, but poor under high and low resource allocation. For the low-imagery conditions, more resource allocation was always associated with increased persuasion. The CRM can explain this pattern of findings as follows: Imagery was ineffective when people did not care about the message (very low perceived risk/low allocation), because people were unlikely to devote the cognitive resources necessary to elaborate on the imagery. Imagery was also ineffective when resource allocation was very high (high perceived risk) due to interference with argument elaboration. It was only at the moderate resource allocation level when people should not have been elaborating on arguments extensively that imagery should have been effective, as was found. For the low imagery information, the CRM would predict the more argument elaboration, the more persuasion, as was also found.

In a study by Smith and Shaffer (2000; N = 288), persuasive arguments relating to airport security were presented in either a vivid or pallid form. Participants reading the message were categorized as being either high in need for cognition or low in need for cognition (Cacioppo & Petty, 1982). Strong and weak forms of the arguments were devised, but only the strong argument condition is relevant to the CRM. Results indicated that whereas the vivid arguments increased persuasion for those low in need for
cognition, there was no effect of imagery for those high in need for cognition. Given that
those who are high in need for cognition have been shown to be highly likely to engage
in argument elaboration, these results are consistent with the CRM.

Finally, Adaval and Wyer (1998 – Study 1; \( N = 80 \)) had participants read
information about vacation destinations that was either presented in a list format or in a
story format. In addition, the information was either in small font and accompanied by a
large picture (imagery-focus), or in large font and accompanied by a small picture (text-
focus). Results showed no effect of focus in the list format conditions. In contrast, in the
narrative format condition, the imagery focus condition was associated with increased
persuasion. Given that the narrative format has been shown to be associated with
decreased argument elaboration (Green & Brock, 2000; Kopfman, Smith, Ah Yun, &
Hodges, 1998), these results support the CRM.

Adaval and Wyer (1998) conducted a similar study (Study 2; \( N = 144 \)), but added
an imagery instructions condition on top of the previous design. Interestingly, the results
of Study 1 were replicated, but only in the imagery instructions condition. In the no
imagery instructions condition (basically a replication of Study 1), the focus and format
manipulation did not affect persuasion. Hence, overall, Adaval and Wyer (1998)
presented two sets of data consistent with the CRM (Study 1; Study 2, imagery
instructions condition), and one that was not (Study 2, no imagery instructions condition).

*Studies that manipulated attentional resources.* This third set of studies \((N = 5)\) all
directly or indirectly varied the total pool of attentional resources.

Chaiken and Eagly (1976; \( N = 321 \)) varied the modality of persuasive legal
arguments (videotape, audiotape, written) along with the difficulty of understanding of
the arguments (easy, difficult). Results showed that the more “vivid” media was only more persuasive given easy arguments. The reverse was true when difficult arguments were used. Because difficult arguments obviously require more central executive resources to comprehend than easy arguments, the observed pattern of results supports the CRM.

Wilson et al. (1989; \(N = 102\)) gave participants a series of legal arguments that were either vivid or pallid. In a low information competition condition, participants read a small section of filler information, and then proceeded to process the manipulated arguments. In a high information competition condition, the manipulated arguments were preceded by approximately ten minutes of filler information. The idea behind the high information competition condition was to set up a situation where the processing of the manipulated arguments would have to compete with previously processed information (relative to the low information competition condition). Results showed that in the low competition condition, there was no vividness effect (presumably because participants were scrutinizing the arguments). However, in the high information competition condition, there was a positive effect of the vivid arguments on legal judgments. These results can be seen as confirmatory towards the CRM if it can be assumed that after ten minutes of filler information, participants were beginning to get bored with the study, and had lowered their level of argument elaboration (thus, freeing resources for imagery elaboration).

Shedler and Manis (1986 – Study 1; \(N = 60\)) also gave participants a series of legal arguments that varied in terms of vividness. In a full-attention condition, participants listened only to the arguments. In a divided attention condition, participants
worked on an unrelated paper-pencil task while listening to the arguments. Results indicated a positive effect of vividness that was not moderated by the attention manipulation. This pattern of data is difficult for the CRM to accommodate. In the full-attention condition, it might have been expected that the vividness manipulation would have been ineffective due to the presence of argument elaboration, however this effect was not found. In the divided-attention condition, the positive effect of vividness could have been due to the fact that argument elaboration had been reduced, however, it seems more plausible to assume that having participants work on a completely different task would also reduce imagery elaboration. Hence, the implication of this study for the CRM are unclear.

Kisielius and Sternthal (1984 – Study 2; $N = 58$) had participants read shampoo ads that were either strictly verbal or verbal with pictures. In addition, participants were given either a very short time to read the arguments in the ad (fast reading condition), or were given a more substantial amount of time (slow reading condition). Finally, participants were told to focus on evaluating the ads before receiving them. In the fast reading condition, there was no effect of pictures (presumably due to the fact that both imagery and argument elaboration were impossible). In the slow reading condition, however, pictures led to less persuasion than the strictly verbal condition. Here, participants should have been attempting to engage in both argument elaboration and imagery elaboration. In such a situation, the CRM would predict decreased persuasion, as was found.

Finally, Frey and Eagly (1993; $N = 171$) reported a study in which participants overheard a radio editorial about airline security under either high attentional constraint
(were told to direct their full attention to the editorial for the purposes of evaluation) or low attentional constraint (merely overheard the ad on the radio while engaging in other tasks). In addition, the editorial was worded either vividly or pallidly. In the high attentional constraint condition, there was no effect of vividness (as predicted by the CRM due to the instructions to evaluate). Under low attentional constraint, the pallid version was more persuasive than the vivid version. Here, the CRM would have predicted either that the vivid editorial would have been more effective (given that argument elaboration was probably low), or that there would have been no effect of vividness (if few attentional resources were being allocated to processing the editorial). Hence, this study provided mixed evidence with respect to the CRM.

Smith and Shaffer (2000), however, interpreted the ineffectiveness of vividness in the low attentional constraint condition as being due to the inconsistency of the vivid elements of the communication to the overall attitudinal stance of the communication. In fact, if the vivid elements of the vivid communications were actually arguing in opposition to the stance of the message, the low constraint condition data would actually confirm the CRM (negative vivid-elements lead to increased negative persuasion).

Summary of reviewed studies. Table S.5 summarizes the results of this review of studies relevant to the CRM. Of the studies reviewed, there were only three instances of data that were not consistent with the CRM. Frey and Eagly (1993) showed that vividness decreased persuasion in a situation where argument elaboration should have been low. However, Smith and Shaffer (2000) have discussed an alternative explanation of Frey and Eagly’s results that is actually consistent with the CRM. That leaves only the discussed portion of Adaval and Wyer’s (1998) Study 2 that did not support the CRM,
and the study conducted by Shedler and Manis (1986) that showed a pattern of data that
could not be accommodated by the CRM in a straightforward fashion. In general, some
of the reviewed studies were a bit more of a stretch than others in terms of their support
for the CRM, but when the twenty-two reviewed studies are taken as a whole, it can be
concluded that there exists an abundance of support for the CRM in the extant literature.
Nevertheless, none of the reported studies were designed with the expressed intent of
testing the CRM. Hence, below we report the first study specifically designed to test the
CRM.

Overview of an Empirical Investigation into the CRM

In the present study, the amount of imagery evoked by a persuasive
communication was manipulated by varying the imagery-evoking potential of the text.
To limit argument elaboration, we had initially considered some kind of cognitive load
task (e.g., having participants memorize a series of digits while reading the message).
However, it is highly likely that such a task would have reduced the total pool of
attentional resources to such an extent that both imagery and argument elaboration would
have been disrupted. Hence, in an attempt to limit only argument elaboration, message
execution was varied such that one half of the messages in each condition were composed
in an overbearing, second-person, and accusatory style designed to limit argument
elaboration. Given that the source of the message had no real power over the participant,
and because the topic of veal-calves was not predicted to be particularly important to the
average participant, it was expected that this type of message execution would lead
participants to disengage from argument elaboration. Phenomenally, we wanted
participants to think, “These persuasive tactics are outrageous. I will continue reading
your message, but I will not give your arguments much further consideration or scrutiny.”

Such “termination of processing” has been proposed for messages that include high self-referencing coupled with a negative outcome (Meyers-Levy & Peracchio, 1996, p. 420). In the normal argument elaboration condition, messages were written in the normal fashion of a persuasive appeal.

Accompanying a message with a factor that may have limited cognitive elaboration, and consequent persuasion, was observed in Schneider et al. (2001). In this study Anglo, Latina and African American women were exposed to ten-minute mammography advocacy videos that were ethnically targeted or not, and which entailed gain versus loss framing. Ethnic targeting was instantiated with photographs of models (e.g., primarily black to target African American recipients) and health statistics that addressed only the focal audience (e.g., only black morbidity and black mortality data for African American recipients). In contrast to the results for Anglos and Latinas (heightened breast screening compliance with loss- rather than gain-framed messages) the African American women showed no differential compliance. Salovey (2005) speculated that the targeting, particularly of African American recipients, may have “backfired” (failed to motivate breast screening behavior) by reducing message processing and increasing recipient defensiveness. Salovey emphasized that targeting’s constraint of processing was not attributable to reduced perception of relevance: indeed, the targeted messages were seen as more relevant than the non-targeted messages and targeted and nontargeted messages did not differ in their elicitation of negative affect in response to the message or of anxiety about getting a mammogram.
In sum, in Schneider et al. (2001), ethnic targeting, although it was not originally intended to do so, may have limited message effectiveness by constraining processing and augmenting defensiveness (Salovey, 2005). Note that Schneider and colleagues’ targeting was similar to the tactic used in the present argument elaboration limitation condition in that it was direct and confrontational. Schneider et al. speculated (p.263) that their mammography messages might have been more effective if they had been less confrontational, that is, had not directly targeted ethnicity.

Chronic individual differences in the tendency to engage in effortful argument elaboration were also measured via the need for cognition scale (Cacioppo & Petty, 1982—described below).

The CRM makes a specific set of predictions regarding when attitude change should occur given variation in both imagery and argument elaboration. To begin with, participants high in need for cognition (NC) dedicate abundant attentional resources to argument elaboration (Cacioppo & Petty, 1982). Mental imagery was not predicted to impact attitudinal change for these participants because argument elaboration should dominate processing resources. Hence, imagery would either be expected to have a null effect on attitudes, or possibly a negative effect if resource depletion is severe enough. However, if the limited argument elaboration message execution caused high NC participants to inhibit their argument elaboration, then mental imagery should be associated with increased attitude change (i.e., there should be sufficient attentional resources available for imagery elaboration). In contrast, low NCs tend to dedicate fewer resources to argument elaboration. For them, only a main effect of mental imagery would be expected such that imagery should foster attitude change.
Although all dependent measures in Study 1 were designed to yield important information, perhaps the key dependent measure in the study was delayed attitudes (as opposed to initial attitudes or a combination of the two). As discussed in Chapter 1, one of the proposed moderators of imagery effects is the time of judgment measurement (e.g., Reyes et al., 1980). In general, the effects of imagery on persuasion may often be more pronounced after a delay because low imagery arguments may be just as salient as high imagery ones during message processing, whereas, after a delay, the high imagery arguments should be more accessible in memory. The relative effectiveness of imagery over time was certainly a consideration in the present study. More importantly, given our emphasis on relative resource depletion, we were concerned that imagery might be somewhat compelling initially even given high resource depletion (e.g., high NC, normal argument elaboration). For this reason, the CRM is more likely to apply to delayed attitude measures than initial ones; though if resource depletion is severe, its effects should be observable almost immediately. In any case, we expected that over the three-week interval, any weak attitude change at time 1 should have decayed by time 2.

To recapitulate the basic predictions of Study 1, when imagery is present and argument elaboration is relatively limited, imagery should have positive effects on attitude change. When argument elaboration is likely, imagery should not affect attitude change to the same degree, with the actual effect of imagery on attitudes ranging from weak positive, to null, to negative. It is further predicted that, within the cells where argument elaboration should be limited, imagery will influence attitudes in large part due to its ability to evoke intense message-consistent emotions (e.g., Bell & Loftus, 1985). Emotional mediation of imagery’s effects on attitudes was thought to be likely due to the
nature of the subject matter in the present study. Many of the high imagery scenes involved vivid descriptions of the suffering of a small and cute animal. Hence, it is proposed that in cases where imagery did not have a positive effect on attitudes, it would be due to the fact that attentional resource depletion had severed the links between imagery, emotions, and attitudes. These latter predictions were tested by using mediational analyses.

Method

Participants and Design

One hundred-nine Ohio State University undergraduates participated in exchange for partial credit in their introductory psychology course. Ninety-four participants completed both the initial session, and the delayed session (see Attrition section below). Of the 94 who completed the full study, 76 had been randomly assigned to one cell of a 2 imagery (high, low) x 2 message execution (normal argument elaboration, limited argument elaboration) between-participants design. In addition, a separate group of eighteen participants were assigned to a control message group to establish an attitudinal baseline.

Procedure

The study was conducted in two sessions separated by approximately three weeks for any given participant (20 days at least, 22 days at most). In the first session participants were run in small groups of 3 to 8 in individual cubicle areas. All materials were contained in a single packet. Participants first read one version of the persuasive message or read a control message (see below). Afterwards participants filled out
attitude ratings as well as a sizeable number of ancillary measures that are described below.

Participants came to the lab and were told that they would be evaluating some new materials from an organization that puts out informational fliers on various issues. They then read one of four versions of the experimental message about the horrors of veal calf processing (attributed to a group called AETFA: Association for the Ethical Treatment of Farm Animals) or the control message about the benefits of volunteerism (attributed to AACV: Association for the Advancement of Community Volunteering). The text of all messages can be found in Appendix A, and sample messages as they appeared to participants appear in Appendix B.

Afterwards participants rated their attitudes on veal processing. The three target items were: “People should not eat veal.”, “The treatment of veal calves is inhumane.”, and “Animals should not be made to suffer in order to feed humans.” All items were rated on seven-point scales (1 = “strongly disagree”, 7 = “strongly agree”). Behavioral intentions to continue eating veal were rated on a similar 7-point scale: “I may give up eating veal.” Appendix C contains the attitude items and the behavior item as they appeared to participants. The next sheet contained a thought-listing form where participants were asked to rate any thoughts they had while reading the message (Appendix D). On the following page participants were also asked to provide emotional reactions to the message including anger, sadness, anxiety, and disgust (e.g., “While reading the pamphlet, to what extent did you feel disgust?”). These items were rated on 7-point scales (1 = “not at all”, 7 = “very much”)—see Appendix E.
Participants then filled out an imagery scale which asked them to rate the imagery they encountered in the message on a number of dimensions (Babin & Burns, 1998 – see below). The eight items on this scale included “Clear”, “Detailed”, “Weak”, “Fuzzy”, “Vague”, “Vivid”, “Sharp”, and “Well-defined”. All items were rated on a seven-point scale (1 = “strongly disagree”, 7 = “strongly agree”)—see Appendix F. In addition, participants completed an image-listing task that asked them to list any mental images they remembered experiencing while reading the message—see Appendix G.

Participants then filled out an offensiveness manipulation check consisting of four items all rated on 7-point scales. These items were: “Overall, my opinion of the writer of the pamphlet would be”, “Regardless of what I thought about the points being made in the pamphlet, I disagreed with the way they were conveyed.”, “The pamphlet was offensive to me.”, and “While reading, occasionally the pamphlet said something that made me want to stop reading it.” The first item was rated on a 7-point scale anchored at 1 (“very unfavorable”) and 7 (“very favorable”). The final three items were also rated on 7-point scale but were anchored differently (1 = “strongly disagree”, 7 = “strongly agree”). On the same page, participants rated the strength and effectiveness of the arguments contained in the message (“Overall, the points in the pamphlet were strong.” and “On the whole, I think this is an effective pamphlet.” respectively). Both items were rated on 7-point scales (1 = “strongly disagree”, 7 = “strongly agree”)—see Appendix H.

Finally, participants completed the eighteen-item need for cognition scale (Cacioppo & Petty, 1982) as a measure of likelihood of engaging in argument elaboration—see Appendix I.
At the end of the session participants were asked to study a set of eight anagrams for about one minute. They were told that the point of the next session would be to see if the mind could work on these problems unconsciously over the next two weeks.

*Time two administration.* Approximately three weeks after the initial session (between 20 and 22 days), participants reported to a classroom setting. They were given a packet containing all materials. Participants were then given three minutes to solve the anagrams they had seen in the previous session. Next, participants were confronted with a note about how it would be helpful if they would fill out a short health-related survey for a colleague. The survey, which was made up to look like an actual government survey, consisted of three pages of questions, each page ostensibly corresponding to a different health topic. The first was “Physical Fitness/Exercise” which contained items such as “I think exercise is an enjoyable diversion.” The second health topic was “The Recent Presidential Elections” which contained items such as “People who could not punch the holes in the ballots should not have had their votes counted anyway.” The third and final health topic was “Animal Rights and Environmentalism.” This page contained all three of the original target attitude items (as worded and scaled at time 1) in addition to several fillers such as “Preserving natural resources and habitats is more important than a few jobs.” All items were scored on a seven-point scale anchored at 1 and 7 by “strongly disagree” and “strongly disagree” respectively—see Appendix J.

*Materials*

*Messages.* A basic message arguing against current methods of veal calf processing was constructed. Within the basic message, seven phrases were selected for imagery manipulation. These phrases were written in either a vivid fashion, or a
relatively pallid fashion, while attempting to hold informational content and argument strength constant. Seven different statements from the basic message were selected for the message execution manipulation. The limited argument elaboration statements were written in a pushy and offensive way that was intended to reduce critical consideration of the message. The normal argument elaboration statements were written in a more normal fashion. The four experimental conditions were then constructed by substituting combinations of the imagery and execution manipulated statements into the basic message frame. So, for example, the high imagery sections of the text always appeared in the same way in both the normal and limited argument elaboration conditions. This procedure yielded four messages that varied in length from 558 to 584 words. The four sections of text below illustrate this technique. Below the high imagery components are in bold, and the limited argument elaboration components are underlined.

*High Imagery/Limited Argument Elaboration:* When the neck-chains are removed many calves are too weak to walk to their deaths. They must be dragged out. Some struggle on the first step, only to collapse in death from extreme exhaustion. If they do have the strength to make it to the slaughter-house, they will die all the same. All this for tender-meat you like so much.

*High Imagery/Normal Argument Elaboration:* When the neck-chains are removed many calves are too weak to walk to their deaths. They must be dragged out. Some struggle on the first step, only to collapse in death from extreme exhaustion. If they do have the strength
to make it to the slaughter-house, they will die all the same. All for tender-meat.

*Low Imagery/Limited Argument Elaboration:* After being let out, many calves are too feeble to even be led to the slaughterhouse. So they must be physically assisted along. Some are so weak that they succumb shortly after being removed. If they do have the strength to make it to the slaughter-house, they will die all the same. All this for tender-meat you like so much.

*Low Imagery/Normal Argument Elaboration:* After being let out, many calves are too feeble to even be led to the slaughterhouse. So they must be physically assisted along. Some are so weak that they succumb shortly after being removed. If they do have the strength to make it to the slaughter-house, they will die all the same. All for tender-meat.

The various essays were printed in what appeared to participants to be a rough draft of a distributional pamphlet form (a sheet of paper folded into thirds).

*Imagery scale.* The modified scale for the measurement of communication-evoked mental imagery was created by Babin and Burns (1998) based on a conceptualization provided by Ellen and Bone (1991). Ellen and Bone proposed that imagery has three basic components: vividness, elaboration, and quantity. The imagery scale contains three sections designed to tap each of these components. For the purposes of the study, only the section involving vividness was used. This portion of the scale was found to be highly reliable in two samples (alpha = .93, .94; Babin & Burns, 1998). In a factor analysis, all items from the vividness scale loaded on the same factor. The eight
items on this scale included “Clear”, “Detailed”, “Weak”, “Fuzzy”, “Vague”, “Vivid”, “Sharp”, “Well-defined”. All items were rated on a seven-point scale (1 = “strongly disagree”, 7 = “strongly agree”).

Need for cognition scale. The need for cognition scale (Cacioppo & Petty, 1982), a commonly used measure of enjoyment of thinking, contains eighteen counterbalanced items which are answered on a 1 to 5 scale anchored by (1) “extremely unlike me” and (5) “extremely like me.” The excellent measurement properties of the need for cognition scale have been previously explicated (Cacioppo et al., 1996). Higher scores on the need for cognition scale indicate a higher likelihood of argument elaboration.

Attrition

Of the original time 1 sample which consisted of 109 participants, 94 showed up at time 2 (attrition rate = 13.8 percent). Though the attrition rate was minimal, we examined differences between those who completed the study versus those who dropped out. Chi-square tests revealed no significant associations between attrition and the imagery manipulation $\chi^2(2, 109) = 1.40, p = .496$, the execution manipulation $\chi^2(2, 109) = 0.58, p = .749$, a variable representing the four crossed, manipulated cells $\chi^2(4, 109) = 1.67, p = .797$, or gender, $\chi^2(2, 109) = 0.90, p = .344$. In addition, attrition did not relate to initial attitudes, $F(1, 106) = 1.77, p = .187$, behavioral intentions, $F(1, 106) = 1.04, p = .310$, or need for cognition, $F(1, 106) = 0.42, p = .521$. Hence, attrition did not threaten the internal or external validity of the study.

Treatment of Dependent Variables

Attitude composites. The three target attitude dv’s at time 1 (alpha = .80) and time 2 (alpha = .83) were averaged into reliable composites.
Argument strength composite. The strength and effectiveness items were averaged into an argument strength composite, \( r(76) = .76, p < .001 \).

Negative emotion composite. The four emotion items (anger, sadness, anxiety, and disgust) were averaged into a single composite (alpha = .83).

Message execution check composite. After reverse scoring the source liking measure, the four dependent variables related to the execution manipulation were averaged into a composite (alpha = .73). Although this reliability was lower than desired, it was deemed high enough given the differences in item content.

Imagery scale. After appropriate reverse scoring, the eight items on the imagery scale were averaged to form a composite (alpha = .92).

Thought-listings. Thought listings were coded by two assistants as positive, negative, or neutral responses. An index of overall positivity was computed as follows: 
\[
\frac{\text{positive thoughts} - \text{negative thoughts}}{\text{positive thoughts} + \text{negative thoughts} + 1}
\]
A separate positive thought index was calculated for each rater’s codings. These indexes correlated at \( r(75) = .90, p < .001 \). The ratings of the senior assistant were used for all analyses.

Image-listings. The author and a research assistant coded images as those that were elicited by the text (e.g., “the calf in a small box”), and those that were generated by participants (e.g., “people picketing over this situation”). Interrater agreement for text-elicited images was quite high, \( r(76) = .95, p < .001 \). Agreement for the self-generated images was also acceptably high, \( r(76) = .79, p < .001 \). Disagreements were resolved through discussion. Overall, participants listed an average of 3.45 text-elicited images, and an average of .70 self-generated images.
Results

Manipulation Checks

Message imagery. There was a marginal effect of the imagery manipulation on the imagery scale, $F(1, 71) = 3.69, p = .059$. As expected, those who had read messages containing imagery ($M_{\text{High Imagery}} = 43.84$) had higher ratings on the scale than those who read the low imagery messages ($M_{\text{Low Imagery}} = 39.83$).

A similar analysis was conducted on the total number of text-elicited images listed in the image listing procedure. Although the predicted pattern was obtained, the effect was quite weak ($M_{\text{High Imagery}} = 3.58$, $M_{\text{Low Imagery}} = 3.31$), $F(1, 74) = .46, p = .498$. There were no effects of message imagery on the number of self-generated images listed by participants ($M_{\text{High Imagery}} = .68$, $M_{\text{Low Imagery}} = .72$), $F(1, 74) = .05, p = .828$. Hence, in this study, the image-listing procedure was not a useful manipulation check, perhaps due to the ease with which even the low imagery message participants could generate relevant images about veal calf suffering when prompted.

Because the imagery manipulation was designed to vary also emotions, we also examined the negative emotion composite. Generally, the high imagery messages ($M = 4.22$) evoked more intense negative emotions than the low imagery messages ($M = 3.67$), however, this relationship was not quite significant, $F(1, 74) = 2.74, p = .102$. In the correlation analyses below, it will be shown that the weakness of this effect was due in part to the inability of the high imagery messages to evoke emotions specifically for the high NCs in the normal elaboration condition (as expected by the CRM).
In sum, when all of the various indicators of the imagery manipulation are taken as a whole, it can be tentatively concluded that the attempt to manipulate imagery was modestly successful.

Finally, we examined the impact of the imagery manipulation on the perceived strength of the arguments in the messages. We intended to vary mental imagery independently of argument quality. Those who received a high imagery message had somewhat higher argument strength composite scores, but the difference was not reliable ($M_{\text{High Imagery}} = 5.11$, $M_{\text{Low Imagery}} = 4.79$), $F(1, 74) = 1.12$, $p = .294$.

**Message execution.** We collected four measures that should have been sensitive to the message execution manipulation: perceptions of offensiveness, source liking, desire to stop reading, and disagreement with message conveyance. The composite based on these measures was involved in a near marginal effect of the message execution manipulation, $F(1, 74) = 2.26$, $p = .137$. Offensive message led to higher ratings of offensiveness than inoffensive messages ($M_{\text{Normal Argument Elaboration}} = 2.71$, $M_{\text{Limited Argument Elaboration}} = 3.11$).

The main point of the execution manipulation was to limit argument elaboration for some participants, and so we also examined the effect of the execution manipulation on the total number of thoughts listed on the thought-listing technique. Those in the limited argument elaboration listed approximately the same number of thoughts as those in the normal argument elaboration condition ($M_{\text{Normal Argument Elaboration}} = 3.17$, $M_{\text{Limited Argument Elaboration}} = 2.95$), $F(1, 73) = 0.24$, $p = .626$. What was more important than the sheer number of thoughts listed, however, was the influence of thoughts in general on
attitudes, especially over time. Hence, we examined the influence of the argument elaboration manipulation on the correlation between the positive thoughts index and attitudes at time 1 and time 2. For the normal argument elaboration group, the correlation between the positive thoughts index and attitudes was high and positive at time 1, $r(39) = .64, p < .001$, and also at time 2, $r(39) = .64, p < .001$. In contrast, for the limited argument elaboration group, these same correlations were more modest at both time 1, $r(36) = .42, p < .012$, and time 2, $r(36) = .41, p < .013$. Hence, in spite of the small sample size, there is evidence that the argument elaboration manipulation achieved what it was designed to do. Whether the manipulation was of sufficient strength to influence the effectiveness of imagery for those high in need for cognition is examined in the main analyses below.

As with imagery, we examined the effect of the execution manipulation on the argument strength composite. Here, there was a significant effect of message execution such that the normal argument elaboration execution was associated with increased perceptions of argument strength, ($M_{\text{Normal Argument Elaboration}} = 5.28, M_{\text{Limited Argument Elaboration}} = 4.62), F(1, 74) = 4.98, p = .029$. This difference was not seen as a threat to the internal validity of the study because the key prediction was a positive attitudinal response by high NCs given high imagery and limited argument elaboration.

**Efficacy of the Experimental Messages**

To examine the efficacy of the experimental messages, participants who had read one of the four veal-related messages were grouped into one experimental message

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3 Effects on total thoughts generated have failed to emerge in lab studies (e.g., Meyers-Levy & Peracchio, 1996; Petty, Wells, & Brock, 1976) because all participants may feel obliged to comply with the instructions and list a fair number of thoughts.
category, and this group was compared to the control group in an ANOVA using attitudes at time 1 as a dependent measure. Participants who read the experimental messages ($M_{\text{Experimental}} = 4.43$) reported significantly higher initial attitudes than participants who had read only the control message ($M_{\text{Control}} = 3.76$), $F(1, 92) = 6.47, p = .013$.

At time 2, the experimental groups as a whole was not significantly different from the control group ($M_{\text{Experimental}} = 3.70, M_{\text{Control}} = 3.30$), $F(1, 92) = .90, p = .347$. However, this lack of significant effect did not rule out the possibility of differences in delayed attitudes between the various experimental groups, as is shown below.

**Main Analyses**

*Analytic strategy.* Analyses were conducted using the regression procedures outlined by Aiken and West (1991). The dichotomous imagery manipulation variable, the dichotomous message execution variable, and the continuous predictor variable need for cognition, were entered into a regression equation as independent predictors. The imagery variable and the message execution variable were dummy coded with values of 1 assigned to both the high imagery condition, and the normal argument elaboration condition, and values of 0 assigned to the low imagery condition, and the limited argument elaboration condition. In addition, need for cognition was centered prior to analysis to create a meaningful zero point for the purposes of analysis and interpretation (Aiken & West, 1991). Variables used as dependent measures included initial and delayed attitudes, behavioral intentions, the negative emotion composite, the positive thoughts index, and source liking. A separate analysis was conducted for each dependent variable.
Given significant interactions, all lower order interactions, main effects, or simple effects were probed using the regression equation for the overall interaction. Hence all such tests had the same degrees of freedom—calculated as \( n - k - 1 \), where \( n \) is the number of participants included in the analysis, and \( k \) is the number of predictors in the regression equation. In cases in which higher order interactions were not significant, the step-down procedure described by Aiken and West (1991), in which regressions are rerun in the absence of nonsignificant higher order terms, was followed. This procedure allows for more powerful tests of lower order terms.

Means reported in conjunction with differences in need for cognition were calculated at one standard deviation above and below the group mean (as recommended by Aiken & West, 1991). We begin by reporting on delayed attitudes, the focal dependent measure in the study due to the potential for initial attitudes to obscure imagery effects that might only have been apparent over a delay (e.g., Reyes et al., 1980).

**Delayed attitudes.** For delayed attitudes, a significant three-way interaction emerged, \( \beta = .68, t(67) = 2.80, p = .006 \). Table S.6 contains that pattern of projected means for this interaction. For those low in need for cognition, there was no interaction between imagery and message execution, \( t(67) = -0.57, p = .568 \). There was only a simple main effect of imagery such that the high imagery (\( M = 4.16 \)) group had higher delayed attitudes than the low imagery group (\( M = 3.05 \)), \( t(67) = 2.39, p = .019 \).

Incidentally, the simple effect of imagery within the normal argument elaboration condition was marginal (\( M_{\text{High Imagery}} = 4.44, M_{\text{Low Imagery}} = 2.97; t(67) = 1.89, p = .063 \)), although the simple effect of imagery within the limited argument elaboration condition fell short of significance (\( M_{\text{High Imagery}} = 3.89, M_{\text{Low Imagery}} = 3.14; t(67) = 1.10, p = .274 \).
In contrast, for those high in need for cognition, there was a significant simple interaction between the imagery and the message execution manipulation, $t(67) = 2.63, p = .011$. In the limited argument elaboration condition, there was a significant simple effect of imagery such that the high imagery condition ($M = 5.21$) led to higher attitudes than the low imagery condition ($M = 3.05$), $t(67) = 2.73, p = .008$. In the normal argument elaboration condition, there was a reversal such that the high imagery group ($M = 3.10$) reported marginally less positive attitudes that the low imagery group ($M = 4.21$), $t(67) = -1.77, p = .081$. It should be noted that it was not the case the high imagery message was actually producing attitude change in the opposite direction of the message in the normal argument elaboration condition. In fact, the attitude of the high imagery group in this condition ($M = 3.10$), were no different from the attitudes of the control group at time 2 ($M = 3.30$). Hence, the effect of the supposed resource depletion in the highNC/high imagery/normal argument elaboration cell was to suppress the positive persuasion found in other cells in the design.

Another way of looking at the results is to examine the effect of the message execution manipulation on the high imagery groups across need for cognition. For those high in need for cognition who received the high imagery message, the normal argument elaboration condition ($M = 3.10$) led to less positive attitudes than the limited argument elaboration condition ($M = 5.21$), $t(67) = 2.99, p = .004$. For those low in need for cognition who received a high imagery message, however, message execution had no significant effect ($M_{\text{Normal Argument Elaboration}} = 4.44, M_{\text{Limited Argument Elaboration}} = 3.89$), $t(67) = -0.77, p = .445$. 
Initial attitudes. The pattern of effects for initial attitudes was very similar to that of delayed attitudes. A significant three-way interaction was found for initial attitude change (see Table S.6), $\beta = .62$, $t(67) = 2.44$, $p = .017$. As with delayed attitudes, for those high in need for cognition, the high imagery message was much more effective than the low imagery message, but this pattern was only evident given limited argument elaboration condition ($M_{\text{High Imagery}} = 5.31$, $M_{\text{Low Imagery}} = 3.76$), $t(67) = 2.05$, $p = .044$. For high NCs in the normal argument elaboration condition, the high imagery message led to slightly less positive attitudes ($M_{\text{High Imagery}} = 4.22$, $M_{\text{Low Imagery}} = 5.14$), $t(67) = -1.53$, $p = .13$. As with delayed attitudes, this simple interaction of message execution and imagery was significant, $t(67) = 2.08$, $p = .042$.

The pattern for low NCs differed somewhat from the delayed attitudes pattern described above. Due to the fact that there was no effect of imagery in the limited argument elaboration condition ($M_{\text{High Imagery}} = 4.48$, $M_{\text{Low Imagery}} = 4.37$), $t(67) = 0.17$, $p = .863$), the simple main effect of imagery found with delayed attitudes (collapsed over the execution manipulation) was not significant for initial attitudes ($M_{\text{High Imagery}} = 4.52$, $M_{\text{Low Imagery}} = 3.98$), $t(67) = 1.09$, $p = .28$. Within the normal argument elaboration condition, the effect of imagery was more similar to that found with delayed attitudes, though it was not significant ($M_{\text{High Imagery}} = 4.56$, $M_{\text{Low Imagery}} = 3.59$), $t(67) = 1.30$, $p = .196$.

As with delayed attitudes, it is instructive to examine the effect of message execution on those who received a high imagery message across levels of need for cognition. For those high in need for cognition, the high imagery group had generally less positive attitudes given normal argument elaboration ($M_{\text{Normal Argument Elaboration}} = 4.22$, $M_{\text{Limited Argument Elaboration}} = 5.31$), $t(67) = 1.61$, $p = .112$. This pattern is the same as for
delayed attitudes, though somewhat weaker. For those low in need for cognition (in the high imagery group), there was no effect of message execution whatsoever ($M_{\text{Normal Argument Elaboration}} = 4.56, M_{\text{Limited Argument Elaboration}} = 4.48), t(67) = -0.11, p = .911.$

In sum, the main difference between initial and delayed attitudes involved the low NC/low imagery/limited argument elaboration cell. Results indicated some initial attitude change in this condition, but the delayed attitude data indicate that it was most likely not strong attitude change (due to the drop at time 2). More important was the significant interaction between imagery and message execution for high NCs that replicated the delayed attitudes pattern.

**Behavioral intent.** The pattern of effects involving behavioral intentions to stop eating veal was almost identical to initial attitudes, including the significant three-way interaction (see Table S.7), $\beta = .61, t(67) = 2.39, p = .019$. For those high in need for cognition, limited argument elaboration was associated with a marginal positive effect of imagery ($M_{\text{High Imagery}} = 5.76, M_{\text{Low Imagery}} = 3.73), t(67) = 1.90, p = .062$. Under normal argument elaboration, there was a nonsignificant reversal ($M_{\text{High Imagery}} = 3.93, M_{\text{Low Imagery}} = 4.76), t(67) = -0.99, p = .327$. Overall, the simple interaction between imagery and message execution for high NCs was marginal, $t(67) = 1.70, p = .094$.

For low NCs, there was a marginal effect of imagery given normal argument elaboration ($M_{\text{High Imagery}} = 4.78, M_{\text{Low Imagery}} = 2.89; t(67) = 1.80, p = .076$), but no effect of imagery under limited argument elaboration ($M_{\text{High Imagery}} = 4.28, M_{\text{Low Imagery}} = 4.14; t(67) = 0.15, p = .88$).

Examining the effect of message execution on those who received a high imagery message across levels of need for cognition revealed that for high NCs, limited argument
elaboration was associated with marginally more positive attitudes ($M_{\text{Normal Argument Elaboration}} = 3.93$, $M_{\text{Limited Argument Elaboration}} = 5.76$), $t(67) = 1.91$, $p = .06$. For those low in need for cognition, the corresponding effect was nonsignificant ($M_{\text{Normal Argument Elaboration}} = 4.78$, $M_{\text{Limited Argument Elaboration}} = 4.28$), $t(67) = -0.53$, $p = .599$.

The lack of effect of imagery for low NCs in the limited argument elaboration condition again suggests that weak change occurred in the low imagery condition. Unfortunately, there was no measure of behavioral intentions at time 2 to further explore this possibility.

**Negative emotion composite.** Although the pattern closely matched that of the delayed attitudes, the three-way interaction involving the negative emotion composite was not significant (see Table S.8), $\beta = .39$, $t(67) = 1.56$, $p = .124$. In such situations, the appropriate analytic technique, according to Aiken and West (1991), is to step down to lower order interactions (2-way in this case). The two-way interaction involving imagery and message execution was not significant, $t(71) = 0.45$, $p = .66$, nor was the interaction between message execution and need for cognition, $t(71) = -.34$, $p = .73$. The interaction between imagery and need for cognition, however, was marginally significant, $t(71) = -1.94$, $p = .056$. Breaking the interaction down, there was a simple effect of imagery for those low in need for cognition such that more imagery was associated with increased negative emotions ($M_{\text{High Imagery}} = 4.29$, $M_{\text{Low Imagery}} = 3.11$), $t(71) = 2.65$, $p = .01$. For high NCs, in contrast, imagery did not appear to effect negative emotions at all when
collapsing over message execution, \((M_{\text{High Imagery}} = 4.18, M_{\text{Low Imagery}} = 4.18), t(71) = -0.01, p = .996.\)

In sum, despite the low power in the statistical analyses, the pattern of means for negative emotions was similar to that for delayed attitudes. We revisit the negative emotion composite below when examining its role as a mediator of the imagery effects found in this study.

*Positive thoughts index.* A marginally significant three-way interaction was found with the overall positive thoughts index (see Table S.9), \(\beta = .51, t(67) = 1.98, p = .051.\) For high NCs, there was very little difference in thought positivity for any of the four conditions (limited argument elaboration: \(M_{\text{High Imagery}} = .52, M_{\text{Low Imagery}} = .44, t(67) = 0.56, p = .578;\) normal argument elaboration: \(M_{\text{High Imagery}} = .45, M_{\text{Low Imagery}} = .56, t(67) = -0.92, p = .36),\) as demonstrated by a nonsignificant interaction between imagery and message execution, \(t(67) = 0.80, p = .427.\) The pattern among low NCs mimicked that for delayed attitudes. There was no effect of imagery in the limited argument elaboration condition (\(M_{\text{High Imagery}} = .43, M_{\text{Low Imagery}} = .43, t(67) = 0.00, p = .996),\) whereas imagery led to increased thought positivity in the normal argument elaboration condition (\(M_{\text{High Imagery}} = .70, M_{\text{Low Imagery}} = .34, t(67) = 2.36, p = .021).\)

Although the general pattern of thought positivity was somewhat similar to attitudes at time 1, as previously discussed, the sheer percentage of positive thoughts is probably not as important as the correlational relationship between attitudes and thoughts

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4 The negative emotions means reported in the text will differ from those that could be calculated from Table 2.6, because they were calculated using a different regression equation (i.e., the equation involving only imagery, need for cognition, and the interaction between these two variables).
in various conditions. Hence, the positive thoughts index is examined further below in the correlational analyses.

**Source liking.** Source liking was involved in a significant three-way interaction (see Table S.10), $\beta = .62$, $t(67) = 2.50$, $p = .015$. Generally, for high NCs, there was little influence of imagery or message execution on source liking. Under normal argument elaboration, both groups reported liking the source equally ($M_{\text{High Imagery}} = 4.63$, $M_{\text{Low Imagery}} = 4.80$), $t(67) = -0.28$, $p = .782$. Under limited argument elaboration, the high imagery group reported slightly more source liking, but the difference was not significant ($M_{\text{High Imagery}} = 4.63$, $M_{\text{Low Imagery}} = 3.69$), $t(67) = 1.28$, $p = .204$. For those low in need for cognition, a different pattern emerged. There was no effect of imagery on source liking given limited argument elaboration ($M_{\text{High Imagery}} = 4.23$, $M_{\text{Low Imagery}} = 4.17$), $t(67) = 0.09$, $p = .928$. In contrast, there was a large effect of imagery given normal argument elaboration, such that the high imagery group had much more positive source attitudes that the low imagery group ($M_{\text{High Imagery}} = 6.01$, $M_{\text{Low Imagery}} = 3.75$), $t(67) = 3.14$, $p = .003$.

Collapsing across need for cognition and message execution, messages employing imagery led to higher source liking than those that did not ($M_{\text{High Imagery}} = 4.87$, $M_{\text{Low Imagery}} = 4.10$), $t(67) = 2.28$, $p = .026$. There was also a marginal simple main effect of argument elaboration such that the normal argument elaboration messages were associated with more positive source attitudes ($M_{\text{Normal Argument Elaboration}} = 4.80$, $M_{\text{Limited Argument Elaboration}} = 4.18$), $t(67) = -1.82$, $p = .073$. Both of these simple main effects, though not surprising, were qualified by the higher order interaction as described above.
In general, the pattern for source liking is somewhat similar to most of the other time 1 measures, however, the extremely positive source attitudes found for low NCs who had received both a high imagery message and should have been engaging in a normal amount of argument elaboration was not expected. Perhaps most importantly, the limited argument elaboration was not so extreme that it elicited hatred towards the source. Generally, the means indicate moderate liking.

**Correlational Analyses**

We turn now to a set of correlational analyses designed to examine the predicted mediational account of both the positive effects of imagery that were found in most conditions, as well as negative effect of imagery on attitudes exhibited by high NCs given normal elaboration. These analyses center on the negative emotion composite and the positive thoughts index. Delayed attitudes are used instead of initial attitudes due to problems with interpreting the strength of the reported initial attitudes.

*Negative emotion mediation.* We assumed that the positive effects of imagery on delayed attitudes, when present, would most likely be due to imagery’s ability to enhance emotional responses. Specifically, the vivid images of veal calves suffering should have increased negative emotions such as sadness and anger. We examined this mediation in two sets of conditions. First, within the conditions where argument elaboration should have been limited (either due to the limited argument elaboration message execution, or due to low need for cognition) and where imagery/emotion mediation was expected in the high imagery conditions (i.e., *imagery effect group*: low need for cognition and high need for cognition/limited argument elaboration; $N = 50$, rows 1, 2, 5, 6, 7, and 8 in Table S.11). Second, in the conditions where argument elaboration should have been relatively
normal and where imagery was not expected to have a positive effect on attitudes (high need for cognition/normal argument elaboration; $N = 22$, rows 3 and 4 in Table S.11). To achieve these groupings, a median split was performed on need for cognition ($Median = 62$). Those on the median ($N = 3$) were removed from the analyses below.

To examine mediation, the technique described by Baron and Kenny (1986) was employed. In order to establish mediation, four conditions must be met. First, there must be a significant direct effect of the assumed causal variable (imagery manipulation) on the criterion variable (delayed attitudes). Second, there must be a significant direct effect of the causal variable on the proposed mediator (negative emotion composite). Third, there must be a significant effect of the mediator variable on the criterion variable when controlling for the effect of the causal variable. Assuming that these three preconditions are met, mediation of the relationship between the causal variable and the criterion variable by the mediator can be shown if the direct effect of the causal variable on the criterion variable falls below significance when the mediator variable is added to the regression equation. Follow-up tests can then be used to determine if the drop in Beta is significant (which indicates that the indirect effect of the path from the causal variable to the mediator to the dependent variable is significantly greater than 0).

The Sobel test (1982) is the most popular follow-up test for mediational analyses; however, the Sobel test was originally designed for larger samples, and many of the assumptions required for the test do not hold in smaller samples where $N$ is less than 80. Most notably, assumptions of normality that often hold in larger samples, are typically implausible in smaller samples, especially when mediation is present (Shrout & Bolger, 2002). Shrout and Bolger developed a technique to be used with smaller samples that...
bootstrap a normal distribution, and then estimates not only the Sobel test, but also provides a confidence interval for the indirect mediated effect. If the confidence interval does not include 0, significant mediation can be assumed. Preacher and Hayes (2004) have developed syntax to be used with SPSS (Statistical Pack for the Social Sciences) which carries out the bootstrapping technique. This syntax was used for the analyses below, with 1000 bootstrapping iterations (the recommended number).

Beginning with the imagery effect group (\(N = 50\)), the imagery manipulation had a significant effect on delayed attitudes, \(\beta = .34, p = .018\) (Beta values are always standardized). Furthermore, the imagery manipulation had a positive effect on negative emotions, \(\beta = .36, p = .011\). When the imagery manipulation was partialled out, negative emotions influenced delayed attitudes, \(\beta = .69, p < .001\). Finally, when negative emotions were partialled out, the effect of imagery on delayed attitudes fell to nonsignificance, \(\beta = .09, p = .414\). The bootstrapped Sobel test confirmed that the drop in Beta was significant, Sobel(50) = 0.82, \(z = 2.42, p = .015\), estimate of indirect effect = 0.79, 95%CI(.16, 1.43). This analysis is depicted in Figure T.1.

When looking just at the high need for cognition/normal argument elaboration group (\(N = 22\)), the negative direct effect of imagery on delayed attitudes was not quite significant due to the reduced sample size, \(\beta = -.35, p = .11\). However, even had this direct effect been significant, imagery had no effect on negative emotions, \(\beta = -.10, p = .671\). When partialling out imagery, however, negative emotions influenced delayed attitudes to the same extent as with the imagery effect group, \(\beta = .68, p < .001\). The Sobel test was conducted despite the violations of Baron and Kenny’s mediation criteria:
Sobel(22) = -0.20, z = -.42, p = .675, estimate of indirect effect = -0.20, 95%CI(-1.24, 0.70). This analysis is depicted in Figure T.2.

Positive thoughts index. According to the CRM, in high NC/normal argument elaboration cells (rows 3 and 4 of Table S.11), positive thoughts should have mediated attitude change (regardless of the imagery manipulation). Accordingly, for this group there was a strong correlation between the positive thought index and delayed attitudes, \( r(22) = .68, p = .001 \). As a comparison, the imagery group (but only those in the high imagery condition: rows 1, 5, and 7 of Table S.11), exhibited a considerably weaker, though still marginally significant, relationship between the positive thought index and attitudes, \( r(27) = .35, p = .078 \).

In sum, as expected, the power of imagery appeared to be related to its ability to arouse intense emotions. But this imagery-emotion link was only present in the cells where argument elaboration should have been relatively limited (the imagery effect group). When argument elaboration should have been normal, the power of imagery to arouse emotion seems to have been diffused, though negative emotions in and of themselves were still highly predictive of attitudes.

Conclusions

The CRM provides a framework within which to understand both the present data as well as previous studies. When communication-evoked imagery is in competition with information such as message arguments (e.g., Frey & Eagly, 1993) or pictures (e.g., Bolls, 2002; Unnava & Burnkrant, 1991), no increase in attitude change is predicted. In the present study, it was primarily in conditions in which participants were assumed not to be elaborating on message arguments that imagery was associated with increases in
attitude change. The present study has also demonstrated that in the absence of an argument elaboration limiting message execution, imagery did not lead to increased attitude change for those high in need for cognition. This pattern corroborates the findings of Smith and Shaffer (2000) who showed that high NCs were less affected by a vividness manipulation than low NCs, a finding they framed as a processing cue effect.

Emotions were shown to be a powerful mediator of the effects of imagery on persuasion. Given the specific images used in the present study (suffering veal calves), it is likely that the particular emotion aroused by the images was empathy. Indeed, previous research has shown that such empathy can strongly influence related attitudes (e.g., Batson et al., 1997; Fazio, Zanna, & Cooper, 1978; Shelton & Rogers, 1981). Admittedly, empathy and the corresponding negative emotions, however, is just one of a plethora of potential mediators of the imagery-induced persuasion in Study 1 (see Table S.1). Nevertheless, given the gut-wrenching nature of the suffering veal-calf images, it is likely that empathy was the most powerful mediator of the association between imagery and attitude change.

We now consider several alternative accounts of our findings. First, it was plausible that the overbearing execution (limited argument elaboration condition) would prompt reactance (Brehm, 1966; Brock & Mazzocco, 2004) and thereby serve as a cue to process more intensely. However, we thought reactance would not occur because the context (a lab study) and the topic (veal processing) were not highly relevant to most participants, and so it seemed more natural for participants to tune out rather to mobilize resources in the service of scrutinizing the message. In fact, the link between thoughts and attitudes was shown to be weaker in the limited argument elaboration condition.
It may also be suggested that the imagery manipulation had its positive effects (under high imagery) by prompting argument elaboration (Smith & Shaffer, 2000). However, this interpretation fits neither the obtained pattern of means, nor the correlational evidence. If imagery acted as a processing cue, it is unclear why imagery would have had a negative effect on attitudes for high NCs given normal argument elaboration. In this condition, high NCs should have already been engaged in heavy argument elaboration, and it is unclear why an additional prompt to scrutinize the message arguments would have reduced attitude change relative to the control group. The correlational evidence also suggests that imagery did not act as a processing cue. Specifically, in the cells where imagery had a positive effect, there was a reduced correlation between attitudes and thoughts.

Because the limited argument elaboration execution manipulation was designed to accuse participants of being a part of the veal problem, it necessarily elicited self-referencing. Hence, another alternative account of the present findings may be that the self-referencing evoked by the limited argument elaboration condition may have led to an increased frequency of self-imagery (Burns et al., 1993; Goossens, 1994). This, in turn, may have facilitated imagery production in the high imagery conditions. Hence, the pattern of findings manifested by high NCs could be explained as follows: In the limited argument elaboration condition, self-imagery should have been prevalent in the high imagery condition, accounting for the positive effect of imagery. In the normal argument elaboration condition, no self-imagery should have been elicited in the high imagery condition, hence the lack of a positive effect of imagery. Though this account of the data may be plausible for those high in need for cognition, it does not adequately explain the
entire data set. Given a strict self-referencing account, there is no reason to suspect any
differences in the relationship between message execution and message imagery under
various levels of need for cognition. Nevertheless, the three-way interaction involving
need for cognition predicted by the CRM was found.

It is also instructive to consider how the data from the CRM compared with
predictions from the Resource Matching Model (RMM: Anand & Sternthal, 1989;
Peracchio & Meyers-Levy, 1997). Generally, the RMM predicts a curvilinear function
between cognitive resources and attitude change. When resources are exceedingly low,
persuasion should be limited due to insufficient resources to process strong message
arguments. When resources are too high, people may dedicate the extra processing
resources to counterargumentation, or to idiosyncratic argument elaboration – both
predicted to reduce persuasion. Hence, persuasion is predicted to be optimal given a
moderate level of processing resources which can then be used to engage in basic
argument elaboration (presumably of strong arguments). In the present series of studies,
the RMM could make predictions about persuasion based on the likelihood of argument
elaboration (too high, too low, or moderate). We focus only on the predictions for those
high in need for cognition, because these predictions are sufficient to differentiate the
CRM from the RMM. For high need cogs in the normal argument elaboration condition,
argument elaboration may be too prevalent, hence reducing persuasion to some extent.
To the extent that message imagery distracts from argument elaboration, imagery should
have led to increased attitude change for high need cogs in the normal argument
elaboration condition by bringing argument elaboration to a more moderate level.
Similarly, the limited argument elaboration should have reduced argument elaboration to
a more moderate level and so, in this case, to the extent that imagery further reduced argument elaboration, imagery should have been associated with a decrease in attitude change. These RMM-derived predictions are the opposite of what was actually found, and so the CRM provides a much more plausible account of the data. Of course, if it could be assumed that imagery increases argument elaboration (Smith & Shaffer, 2000), then the RMM might be able to more adequately explain the pattern of means; however, we showed that the imagery cells in question (rows 1, 5, and 7 of Table S.11) were associated with weaker correlations between attitudes and thoughts.

Finally, it is germane to ask whether the negative effect of imagery for high NCs given normal argument elaboration may have been due to some kind of correction. People in this cell may have either been attempting to directly correct for the perceived biasing effects of mental imagery per se, or they may have been correcting for or discounting the emotion that the imagery aroused. Given the demonstrated mediation by emotion in some cells and not in others, Albarracin and Kumakale’s (2003) model of affect identification and discounting (MAID) is most relevant to this interpretation. According to their model, affect or emotion may influence judgments when processing is moderate. When processing is high, affect may spur correction or discounting. When processing is too low, people may either not notice their affect, or the level of processing may be so low that their affect-biased processing has little or no impact on judgments. Hence, the MAID could provide the following alternative interpretation of the data from Study 1: The low NCs, regardless of message execution, were generally processing at a moderate level, and so the imagery-induced emotion affected their judgments. For high NCs, the limited argument elaboration condition may have only brought them to a
moderate level of processing, hence the positive effect in this condition. High NCs in the normal argument elaboration condition, however, should have had sufficient resources to correct the effects of the felt emotion out of their judgments, hence the reduced effectiveness of imagery. This alternative interpretation of our results does not hold water, however, because it was shown that in the high NC/normal argument elaboration cell, the correlation between emotions and attitudes was just as strong as in the other cells of the design (Beta values of .68 and .69 respectively). It is possible, however, that participants in the high NC/normal argument elaboration cell were correcting for a factor other than emotion that was not measured in the present study (e.g., correcting for the perceived effects of the tactic of imagery use). Hence, future studies will need to be designed in such a way as to more stringently examine possible correction alternatives.

The CRM stands as the most plausible explanation for the results of Study 2. We return to a discussion of Study 2 in the General Discussion (Chapter 4). First, however, we examine another moderational model of imagery and attitude change: the Imagery Correction Model.
CHAPTER 3

AN INITIAL INVESTIGATION INTO THE IMAGERY CORRECTION MODEL

The CRM of imagery and persuasion holds that imagery will often interfere with persuasion due to attentional resource depletion. In the present chapter, we propose that even when sufficient resources for imaginal elaboration are available, the beneficial effects of imagery may still be limited to the extent that recipients are motivated and able to correct the perceived effects of mental imagery out of their judgments. We begin by reviewing general models of judgment correction, and then proceed to derive the Imagery Correction Model.

Review of Models of Intentional Judgment Correction

Two early models of judgment correction were Martin’s (1986) set-reset model, and Schwarz and Bless’s (1992) inclusion-exclusion model. According to these models, target relevant judgments (i.e. relating to an attitudinal judgment) can be influenced by additional factors to the extent that there is some overlap in features between the two factors. For example, judgments relating to the sexiness of new car may be influenced by a super-model in an ad for the car. In the mind of the perceiver, feelings of sexiness caused by the super-model may be misattributed to the car, thus biasing perceptions of the true sexiness of the car. In situations where the target is biased in the direction of another factor, such influence is referred to as assimilation. According to the set-reset
and inclusion-exclusion models, assimilative influence tends to occur automatically. However, if a perceiver becomes aware of the biasing influence (i.e., the super-model), they might attempt to correct said influence from their judgments. In this case, they would attempt to make their judgments of the target less similar to the perceived biasing factor. Both models held that in many cases, such correction might be too extreme. For example, after such correction, the new car may be perceived as less sexy than if the super-model had not been present in the ad (i.e., a contrast effect). Again, both models assumed that correction (and contrast) required effort whereas assimilation occurred relatively automatically.

The Flexible Correction Model (FCM: Petty & Wegener, 1993; Wegener & Petty, 1995, 1997) differed from the “partialling” models above in a number of important ways. The FCM held that assimilation was not the only possible uncorrected influence of a contextual factor. Specifically, in some instances, contrast was held to occur automatically. The type of bias (if any) occurring was held to vary both by situation, and by individual. For example, it is possible that some exposed to the aforementioned car commercial may automatically perceive the car as paling in comparison to the sexy super-model. According to the FCM, correction, when it occurred, was based on naïve theories of the perceivers—theories pertaining to the nature, direction, and extremity of bias occurring in a given situation. Such naïve theories, once formed or consulted, would guide correction. In the running example, perceiver A may theorize that the super-model influenced the sexiness judgments of the car in such a way as to make the car seem moderately less sexy. Perceiver B may theorize that the model made the car seem substantially more sexy. Perceiver C may theorize that the model did not influence their
judgments of the car whatsoever. Hence, perceiver A would be expected to adjust their
sexiness ratings of the car slightly upward. Perceiver B should adjust their car sexiness
ratings to make them quite a bit lower. Finally, Perceiver C would not be expected to
adjust their ratings of the car at all. Importantly, correction should only occur when
participants are both motivated and able to correct for the perceived influence of a
contextual factor.

The FCM suggests that correction for the perceived biasing influence of imagery
is possible, but several crucial issues remain to be addressed. Do people have naïve
theories relating to mental imagery? If so, what is the nature of these theories? Finally,
when are these theories most likely to be brought to bear in the context of persuasion?

Naïve Theories Relating to Imagery and Persuasion

Although researchers initially assumed that vivid imagery would enhance
persuasion in a wide variety of situations (Nisbett & Ross, 1980), subsequent research
suggested that the vividness effect was much less robust than originally thought. In fact,
two studies by Collins et al. (1988) posed the question, is the vividness effect merely
elusive, or is it in fact illusory? These authors examined not only empirical evidence for
the vividness effect, but also the phenomenon of persistent belief in the vividness effect
by laypersons. In Study 1, participants were shown to rate vivid statements as more
persuasive than pallid ones. Study 2 showed that this effect was due to participants’
perceptions that vivid statements were more attention-getting and interesting than pallid
statements. Interestingly, in Study 2, the vivid statements that participants had rated as
more persuasive in general did not actually persuade these same participants (relative to
pallid statements). Collins et al. concluded that the vividness effect was most likely
illusory, and that the expectation of a vividness effect was due to faulty implicit theories about how interest should relate to persuasion.

Later work by Friestad and Wright (1995) reconfirmed the relationship between imagery and perceptions of effectiveness among laypeople. In their study, both laypersons (college students and non-academic adults) and researchers (members of the Association for Consumer Research) rated the influence-potential and likely effectiveness of ads that cause one to “imagine in one’s mind a particular event or sensation” (p. 65). Both the influence and effectiveness items were rated on seven-point scales where higher numbers corresponded to more influence or effectiveness. Researchers were shown to be somewhat neutral about the effects of imagery, rating a 3.86 for influence (below the midpoint of 4), and a 4.49 for effectiveness. To the extent that members of the Association for Consumer Research had followed the literature on the vividness effect, perhaps this lukewarm assessment of the power of imagery was not surprising.

Layperson participants, consistent with Collins et al. (1988), generally felt that imagery would correspond with both influence (4.47) and effectiveness (5.05).

Friestad and Wright (1995) were examining perceptions of imagery within the context of the Persuasion Knowledge Model (PKM: Friestad & Wright, 1994, 1995). Persuasion knowledge includes knowledge about the agents of persuasion, the tactics that such agents routinely employ, how and why these tactics tend to be effective, and contextual factors that explain why a given tactic is used in the first place. A main function of persuasion knowledge, according to Friestad and Wright (1994, 1995), is to allow the targets of persuasion to choose appropriate responses to persuasion (e.g., ignoring, yielding, resistance, judgment correction).
According to Friestad and Wright (1999), persuasion knowledge is important because,

“… it tells people about situations where an intelligent purposeful outside agent is skillfully trying to alter the inner self (their beliefs, their emotions, their attitudes, their decisions, their thought processes) and thereby alter the course of their lives. Some such alterations within a person are valuable and desirable, others are not.” (p. 186).

The Imagery Correction Model (ICM) proposed herein concerns situations in which “such alterations” are not desired by the recipients of persuasive communications.

The Imagery Correction Model

The ICM begins with the observation that people tend to believe that vivid persuasive arguments will be more persuasive (Collins et al., 1988; Friestad & Wright, 1995). Furthermore, because a cardinal characteristic of vivid imagery is its ability to attract attention to itself (Nisbett & Ross, 1980), people should tend to notice when imagery is being used in a persuasive communication. As suggested by the PKM, there should be a number of contexts in which people do not desire to be influenced by vivid persuasive communications (outlined below). In these situations, if motivated and able, the ICM predicts that people would attempt to correct any unwanted influences of vivid arguments out of their judgments. Hence, imagery correction is yet another potential reason why vivid, imaginal arguments may fail in persuasive contexts.

Factors Affecting the Likelihood of Correction

Consistent with the FCM, the various factors relating to the likelihood of correction for imagery can be grouped in two main categories: those that influence the
ability to correct, and those that influence the motivation to correct. Within each of these two categories, factors can be grouped according to their relevance to the message, context, source of persuasion, or target of persuasion (i.e., the person).

**Ability to correct.** Generally, as the vividness or frequency of imagery in a persuasive communication increases, so too should the likelihood of correction. When the imagery in a persuasive communication is relatively weak, or when there are other elements of the message that draw attention away from imagery, recipients should be less likely to consider imagery as a factor that might be influencing their judgments. In this respect, any context-related or source-related factors that deplete attention will also tend to distract from message imagery, and reduce correction likelihood. Contextual factors (or source factors) that distract may also deplete attentional resources such that the effortful act of correction cannot proceed. Imagery generation following evocation may also deplete attentional resources making correction less likely, and so precise predictions about the effect of imagery use or vividness on correction may prove difficult.

There are also a number of recipient factors that should influence correction. Most obviously, people must be equipped with the particular persuasion knowledge that suggests that imagery increases persuasion—something, for example, that may be lacking in young children. If people have relevant persuasion knowledge, they also need the cognitive resources available to engage in correction. Those with superior working memory capacity (e.g., Engle, 2002) would probably have an advantage in this respect. It is somewhat unclear how other relevant individual difference constructs should influence correction likelihood. For example, it could be that those high in need for cognition would focus more on the process of persuasion, and would be more likely to engage in
correction when motivated. However, to the extent that they expend resources engaging argument elaboration (e.g., Cacioppo et al., 1983), correction may in fact be less likely. Similarly, it is unclear how being a vivid imager, or a habitual imager would influence the ability to correct.

In summary, from an ability standpoint, correction requires (a) noticing the biasing factor of imagery, (b) relevant persuasion knowledge suggesting that imagery can unduly influence judgments, and (c) sufficient cognitive resources to engage in effortful judgment correction. Variables influencing these three factors at the level of message, context, source, or person will influence the ability to correct imagery from one’s judgments, and, hence, the likelihood of correction.

Motivation to correct. Perhaps one of the largest influences on motivation to correct for imagery is the degree to which the persuasive communication is counterattitudinal with respect to the recipient. In general, counterattitudinal advocacies put recipients in a defensive mode, and they are more likely to seize upon any potential biases to their judgments. Another important message factor is the appropriateness and relevancy of the imagery in a given context. As Smith and Shaffer (2000) pointed out, imagery that is considered inappropriate due, for example, to being overly graphic, is likely to backfire, perhaps due to correction. Images that are potent, yet irrelevant to a given argument, are also likely to arouse resistance and correction.

There are a number of context factors that should influence motivation to correct. In general, contexts that are overtly evaluative should focus people on the fact that change is expected from them. In order to avoid giving in to such pressure (Brehm, 1966), people may become motivated to correct unwanted influences from their
judgments. Such a situation may often be the case in consumer contexts where people are aware that advertisers and salespersons aim to change their minds in order to access their money. Finally, in situations in which judgmental accountability is high, people may also be likely to correct for any perceived biases due to imagery.

Source factors should also be a potent source of motivation to correct for the effects of imagery. When sources are perceived as being untrustworthy, having ulterior motives, or are suspected of intent to persuade, imagery may backfire. In general, any dislikable source is probably less likely to benefit from the use of overtly vivid mental imagery.

Recipients who are motivated to hold accurate attitudes will certainly be on the lookout for potential biasing factors. Conversely, people who are motivated to hold a particular attitude are more likely to engage in correction given that the stance of a persuasive communication does not match their own attitudes. Finally, people who are reactant towards social influence in a given context or in general may be more likely to correct.

One final recipient-related factor that should influence the likelihood of correction involves source-attributions regarding mental images. In some cases, it may be unclear whether a mental image was planted in one’s head by another, or whether the image was generated wholly by the participant. Of course, these two attributions lie on a continuum ranging from completely other-generated (such as when the source of a persuasive message presents a picture), to completely self-generated (for example, when a recipient conjures an image that is counter to the stance of a persuasive communication).
Generally, correction should be less likely for self-generated images, and more likely for communication-elicited images.

Motivation x ability interactions. The likely influence of some of the factors described above is ambiguous due to the possibility of motivation x ability interactions. Most notably, the use of vivid imagery in a message may increase the ability to correct, while at the same time reducing the motivation to correct. When this motivation x ability interaction is combined with the possible depleting effects of imagery on attentional resources (making correction less likely), it becomes clear that the relationship between mental imagery vividness and correction requires empirical examination.

In summary, when correction occurs, it is presumed that the mechanisms of the FCM are responsible. As a moderational model, the ICM is less concerned with the exact nature of correction, and more with the various situations in which imagery correction is more or less likely. These moderational predictions (described above) are based on the PKM, as well as research and speculation relating to imagery and persuasion, and correction in general.

Evidence Supporting the ICM

A number of studies supporting components of the ICM were already discussed in the section on moderators of imagery effects (Chapter 1), or in Chapter 2 as they applied to the CRM. Hence, many of the studies below are only briefly summarized.

In general, studies that alerted participants that the purpose of the study was to evaluate may have also increased the motivation to correct for imagery. A number of such studies were discussed along with the CRM review in Chapter 2 (Burns et al., 1993; Keating & Latane, 1976; Miller & Marks, 1992; Sullivan & Macklin, 1988). In each
case, imagery was not found to positively affect persuasion. Of course, there is no way to
tell whether the lack of an imagery effect was due to resource depletion, correction, or
some other factor—nevertheless these studies are consistent with the ICM.

A number of studies have manipulated source factors in ways relevant to the ICM.
For example, the ICM makes the very straightforward prediction that communication
recipients will be more likely to correct given a dislikable source. Chaiken and Eagly
(1983) showed that vivid modalities (TV, radio) were more effective at producing
attitude change given a likable source. The reverse was true given a dislikable source. In
a similar vein, Worchel and colleagues (Andreoli & Worchel, 1978; Worchel et al., 1975)
demonstrated that vivid modalities only led to increased persuasion for credible sources.

Hence, there is some support in the literature for the ICM. Most extant studies
have not included manipulations and measures relevant to the ICM, and so further
empirical demonstrations are clearly needed to validate this model. In one study
described below, we sought initial direct validation of our model.

Overview of an Empirical Investigation into the Imagery Correction Model

We manipulated one factor relating to the ability to correct (message imagery),
and one factor related to the motivation to correct (correction instructions). In addition,
to provide the best possible chance for witnessing correction, we chose a topic that was
expected to be counter-attitudinal for most participants (raising tuition to increase faculty
salaries), and we also chose a source that was likely to be perceived as having ulterior
motives (a faculty committee). To insure that any null or negative imagery effects were
not due to resource depletion caused by the interference of imagery-production with
argument elaboration, half of the participants received a set of instructions designed to
limit argument elaboration (instructed to focus on the writing in the message: writing-focus), whereas the other half received a set of instructions designed to increase argument elaboration (told to focus on the arguments in the message: argument-focus).

Stapel, Martin, and Schwarz (1998) have demonstrated a useful method for examining people’s naïve theories and correction tendencies by manipulating the wording of instructions to correct judgments. After manipulating a factor thought to affect judgments, two different sets of instructions are used. In a *blatant* instructions condition, participants are told that their judgments may have been biased by factor X, and that they should try to partial these effects from their judgments (based on a set of instructions used by Wegener & Petty, 1995). In a *slight* instructions condition, participants are told to be aware of *any* potential biases to their judgments, but they are not made aware of the target factor. Finally, a third group of participants receives no correction instructions. The blatant instructions reveal the magnitude and direction of perceptions of bias in the average participant. The slight instructions shed light on the ability of participants to identify factor X (as well as magnitude and direction). Finally, the no instructions condition can be useful in ascertaining whether people would correct for the biasing factor without any prodding.

Because it has been previously established that imagery is perceived as an effective persuasion-enhancing mechanism (Collins et al., 1988; Friestad & Wright, 1995), we felt that blatant warning correction instructions would not have yielded additional useful information. Hence, we retained only the slight instructions and no instructions conditions for the present study. In summary, the present study was intended to examine (a) the ability of participants to identify imagery as a potential biasing factor,
and (b) whether participants would attempt to correct for the effects of imagery even when not prodded.

The specific predictions of the ICM are as follows: In the writing-focus cells, an interaction of imagery and correction instructions was expected such that in the no correction instructions condition, imagery was predicted to augment persuasion; in contrast, in the slight correction instructions condition, the effect of imagery was predicted to be either greatly constrained, null, or possibly even reversed (in the case of overcorrection). In the argument-focus cells, no significant positive effects of imagery were expected, regardless of the correction instructions manipulation (consistent with the CRM). A number of ancillary measures were used to further probe the rationale behind these predictions.

Unlike Study 1, delayed measures of attitudes were not administered in Study 2. The main focus of the study was to test the ICM, and given the general procedures in Study 2, the effects of correction should have been easily discerned with initial attitude ratings. Though delayed measures may have been somewhat helpful in examining the CRM predictions in Study 2, the extra effort and expense involved were not deemed worth the potential diagnostic benefits.

Method

Participants and Design

Participants were 255 male and female undergraduate students from the Ohio State University who participated in the study for partial course credit.\(^5\) One hundred ninety-seven participants were randomly assigned to a 2 message imagery (high, low) x 2

\(^5\) Unfortunately, due to a computer programming error, gender was not recorded for the first 119 participants in the study. Of the remaining 106 participants, 35 were male and 71 were female.
correction instructions (present, absent) x 2 reading instructions (argument-focus, writing-focus) between-participants factorial. In addition, 28 participants were randomly assigned to a hanging, no additional argument control group (see explanation below).

Procedure

All materials and measures were presented to participants using the popular data collection program Medialab. Participants were told they would be reading an essay that spoke in favor of a new plan to raise tuition to increase faculty salaries at the university. As described above, the essay was said to have been written by a faculty committee—see Appendix K. Before reading the actual essay, half of the experimental participants read a series regarding instructions designed to limit argument elaboration: “… when you read the essay, please focus heavily on the author’s style of writing (presentation, color and tone, writing technique). You will be asked a number of questions about the author’s writing style after you read the essay.”

In the argument-focus condition, participants were instructed to “… please think very hard about the pro’s and con’s of the proposal.” They were also told, “You may or may not agree with the proposal, but keep the following questions in mind: Are the arguments convincing? Are the arguments compelling?” These participants were also told that they would be asked a number of questions about opinions towards the tuition increase after reading the essay (see Appendix K).

All participants read a basic description of the tuition plan (see Appendix L). Participants in the experimental conditions went on to read a series of six arguments in favor of the tuition plan that were either high or low in imagery-elicitation (control participants went straight to the dependent measures). For each argument the high
imagery version was a short restatement of the low imagery argument with an additional relevant image statement. For example, participants in the low imagery condition read that, “Higher quality faculty will be more successful in obtaining and maintaining grants that, in time, would help to keep tuition lower.” The high imagery equivalent was, “Higher percentage of faculty will win outside grants. Imagine the government and other research-funding institutions backing up truck-fulls of money and dumping them on OSU.” We intended for the image statements in the high imagery condition to be relatively blatant to increase the likelihood of correction (see Appendix M).

All participants then went on to report their personal opinions of the tuition plan. However, before reporting their attitudes, participants in the slight correction instructions condition received the following request: “Please try to make sure that your ratings of the tuition increase reflect your true opinions. If you feel that there was some element of the essay that may have unfairly influenced your opinion, please take a moment to try to adjust for that influence now.” (see Appendix N).

Attitudes were reported in response to four semantic differential items related to the proposed tuition increase plan (9-point scales: bad/good, negative/positive, unwise/wise, unfavorable/favorable; see Appendix O). Following these ratings, participants were asked to report up to ten separate images they recalled having experienced during the reading of the message. Participants then rated their level of agreement with the following statements: “I tried to adjust my opinions due to the influence of the imagery in the message.”, “I felt that the author's use of imagery could unfairly bias people who read this message.” These items were rated on 9-point scales (1 = “strongly disagree”, 9 = “strongly agree”). Participants also reported the extent to
which, “I felt that the author's use of imagery could unfairly bias people who read this message.” (1 = “no ulterior motives”, 9 = “extreme ulterior motives”).

As in Study 1, participants were asked to report emotions they had felt during the reading of the message (anger and annoyance). These two items were phrased as follows: “While reading the essay, I felt ____.” Both items were rated on 9-point scales (1 = “strongly disagree”, 9 = “strongly agree”).

Participants in the experimental groups answered two items relevant to the reading instructions: “Thinking back to when you were reading the essay, how much time/effort did you spend thinking about the pro’s and con’s of the proposed tuition increase?”, and “Thinking back to when you were reading the essay, how much time/effort did you spend thinking about the author's writing style?” Both items were rated on scales anchored at 1 (“very little time/effort”) and 9 (“a great deal of time/effort”)—see Appendix P for all ancillary items. Finally, all participants completed the need for cognition scale (Cacioppo & Petty, 1982—described in Chapter 2; see Appendix I). Participants were then thanked and debriefed.

Treatment of Dependent Measures

*Attitude composite.* The four semantic differential items were averaged together into a composite to form an overall evaluation score ($\alpha = .94$).

*Negative emotion composite.* The two items tapping negative emotions (anger, annoyance) were averaged into a composite, $r(197) = .74, p < .001$.

*Perceptions of unfair imagery use.* The ulterior motives item and the unfair use item were averaged into a composite, $r(197) = .36, p < .001$. Though the correlation
between these two items was not as high as might have been hoped, it was felt that the two items complemented each other.

*Thought-listings.* The coding of the thought-listings into positive and negative categories was conducted in the same manner as in Study 1 by the author and a research assistant. Again, the positive thoughts index was calculated as follows: \((\text{positive thoughts} - \text{negative thoughts})/(\text{positive thoughts} + \text{negative thoughts} + 1)\). The positive thoughts indexes of the two raters were highly correlated, \(r(197) = .81, p < .001\). Disagreements in coding between the two raters were resolved by discussion.

*Image-listings.* As in Study 1, image-listings were coded into two categories by both the author and a research assistant: images elicited directly by the text of the message (e.g., “I saw a truck dumping money on OSU”, “I imagined talking to my professor during office hours”), and images not evoked by the text of the message (e.g., “I pictured my kids being proud of me”, “I pictured the line on a tuition graph going up”). Interrater agreement was as follows: For text-elicited images, \(r(197) = .86, p < .001\). For self-generated images, \(r(197) = .88, p < .001\). Disagreements were resolved through discussion.

**Results**

*Manipulation Checks*

*Reading instructions.* We first examined the effect of the reading instructions manipulation on the self-reports of argument scrutiny and writing focus. The argument-focus group reported more time and effort spent on argument scrutiny than the writing-focus group (\(M_{\text{Argument-Focus}} = 6.00, M_{\text{Writing-Focus}} = 5.68\)), however this difference was not significant, \(F(1, 195) = 1.40, p = .238\). Not surprisingly, the writing-focus group reported
significantly more time and effort spent on scrutiny of the writing style in the message, 
\( (M_{\text{Argument-Focus}} = 3.24, M_{\text{Writing-Focus}} = 4.56), F(1, 195) = 16.91, p < .001. \) Examination of these two indicators of cognitive activity as part of a within-participants analysis (using reading instructions as the predictor variable), yielded a significant interaction with reading instructions, \( F(1, 195) = 20.75, p < .001. \)

Examining the thought-listings, those in the argument-focus group listed nonsignificantly more total thoughts than the writing-focus group \( (M_{\text{Argument-Focus}} = 5.23, M_{\text{Writing-Focus}} = 4.97), F(1, 195) = 0.69, p = .407. \) As in Study 1, the correlation between the positive thoughts index and attitudes was examined separately within each of the reading instructions conditions. In the argument-focus condition, the correlation between the positive thoughts index and attitudes was high and positive, \( r(100) = .53, p < .001. \) In the writing-focus condition, the corresponding correlation was lower, but not impressively so, \( r(97) = .44, p < .001. \) It may be that the thought-listings were a problematic measure for differentiating between the reading instructions conditions, just as the image-listings may have been problematic in Study 1 due to the image-evoking nature of the topic of veal-calf treatment. Given the potential relevance of the topic, when participants were confronted with the thought-listing measure, it would have been easy for them to generate argument elaborations on the spot even if they had not done so during their reading of the message. The potential for such problems with thought-listing suggests that more effort needs to be spent in developing online measures of argument elaboration that can be administered while a persuasive communication is being processed.
Overall, there appears to be evidence that those in the writing-focus conditions were engaging in less argument elaboration than those in the argument-focus condition, but the size of the effects across measures were relatively small, and so caution must be taken in interpreting the results below.

*Message imagery.* There was much stronger evidence that the imagery manipulation was successful. Overall, participants listed an average of 4.31 responses. Participants averaged 2.07 (48.0%) text-elicited images and 2.24 (52.0%) self-generated images. There was no difference in the total number of listings between the high and low imagery group ($M_{\text{High Imagery}} = 4.38$ vs. $M_{\text{Low Imagery}} = 4.24$), $F(1, 195) = 0.15, p = .697$. However, the high imagery group listed significantly more text-elicited images than the low imagery group ($M_{\text{High Imagery}} = 2.42$ vs. $M_{\text{Low Imagery}} = 1.71$), $F(1, 195) = 7.98, p = .005$. Interestingly, the high imagery group listed marginally less self-generated than the low imagery group ($M_{\text{High Imagery}} = 1.96$ vs. $M_{\text{Low Imagery}} = 2.53$), $F(1, 195) = 3.33, p = .070$. These opposite patterns were also reflected in a negative correlation between text-elicited and self-generated imagery, $r(197) = -.18, p < .010$. It is enticing to conclude that text-elicited imagery can interfere with the production of self-generated imagery (image listing ceiling effects were unlikely because participants listed only 4.31 images on average, though they were given ten chances to respond). To the extent that self-generated imagery tends to be weaker or less consistent with the message stance, interference could be one mechanism by which text-elicited mental imagery can increase positive evaluations. This hypothesis is left for future research, but the distinction between text-elicited and self-generated images is important for our present purposes.
because imagery directly elicited by the text itself should be much more likely to evoke correction. Correlational evidence bearing on this point is presented below.

As in Study 1, the imagery manipulation had no effect on the perceived strength of the message arguments, ($M_{High\ Imagery} = 5.57$ vs. $M_{Low\ Imagery} = 5.87$), $F(1, 195) = 1.20, p = .275$.

**Efficacy of Experimental Messages**

The relatively low attitude ratings of the control group on the 9-point scale ($M = 4.05$) indicated that the topic and source engendered relatively neutral to negative initial evaluations, though not as negative as might have been expected. In general, however, the experimental arguments were quite persuasive and led to a significant increase in attitudes ($M = 5.71$) relative to the control group, $F(1, 223) = 18.91, p < .001$.

**Main Analyses**

**Attitudes.** We conducted a 3-way ANOVA on evaluations that included message imagery, correction instructions, and reading instructions as factors, $F(1, 189) = 1.97, p = .162$ (see Table S.12 for means and standard deviations).6 Although this interaction was not conventionally significant, due to the difference in predictions, we examined the argument-focus and writing-focus cells separately.

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6 Using the regression technique described in Study 1, we had examined the 4-way interaction between the three manipulated variables and need for cognition on attitudes. Need for cognition was involved in no significant interactions (all Beta values are standardized): NC x imagery x reading instructions x correction instructions, $\beta = -.96, p = .443$; NC x reading instructions x correction instructions, $\beta = .14, p = .843$; NC x imagery x reading instructions, $\beta = -.77, p = .452$; NC x imagery x correction instructions, $\beta = .16, p = .823$; NC x imagery, $\beta = -.30, p = .283$; NC x reading instructions, $\beta = .03, p = .921$; NC x correction instructions, $\beta = .18, p = .645$. The only significant effect was a significant correlation between need for cognition and attitudes, $r(197) = .19, p = .008$, such that high NCs reported more positive attitudes than low NCs. Because need for cognition did not interact with the main variable of interest in any way with respect to attitudes, this variable was not included in the subsequent analyses.
Beginning with the writing-focus cells, there was a marginal interaction between imagery and correction instructions, $F(1, 93) = 3.44, p < .10$. Given no instructions to correct, a trend was witnessed such that imagery positively affected attitude change ($\bar{M}_{\text{High Imagery}} = 6.00$ vs. $\bar{M}_{\text{Low Imagery}} = 5.26), F(1, 47) = 2.65, p = .110$. In contrast, instructions to correct not only decreased the effectiveness of the high imagery arguments, but actually gave the low imagery arguments a slight but nonsignificant boost ($\bar{M}_{\text{High Imagery}} = 5.33$ vs. $\bar{M}_{\text{Low Imagery}} = 5.95), F(1, 46) = 1.16, p = .287$. The simple effects of instructions to correct were as follows: high imagery, $F(1, 48) = 1.64, p = .206$; low imagery, $F(1, 45) = 1.82, p = .185$.

With the argument-focus cells, there was no interaction between imagery and correction instructions ($\bar{M}_{\text{High Imagery/No Instructions}} = 5.32$ vs. $\bar{M}_{\text{High Imagery/Slight Instructions}} = 5.77$, $\bar{M}_{\text{Low Imagery/No Instructions}} = 5.85$ vs. $\bar{M}_{\text{Low Imagery/Slight Instructions}} = 6.17), F(1, 96) = 0.03, p = .870$. We had predicted a lack of a positive effect of imagery, and, in fact, the high imagery messages were somewhat less effective than the low imagery messages ($\bar{M}_{\text{High Imagery}} = 5.55$ vs. $\bar{M}_{\text{Low Imagery}} = 6.00), however, this effect was not significant, $F(1, 96) = 1.45, p = .232$. In addition, the main effect of correction instructions ($\bar{M}_{\text{No Instructions}} = 5.60$ vs. $\bar{M}_{\text{Slight Instructions}} = 5.96$) was not significant, $F(1, 96) = 1.01, p = .319$.

Reports of correction for imagery. There was no three-way interaction with respect to reports of imagery correction (see Table S.13), $F(1, 189) = .054, p = .816$. However, parallel with the attitudes analyses, we examined the patterns of data for the writing-focus and argument-focus groups separately. Beginning, again, with the writing-focus group, there was a significant interaction between message imagery and correction instructions, $F(1, 93) = 5.95, p = .017$. Here, there was no effect of imagery in the no
instructions condition ($M_{\text{High Imagery}} = 4.64$ vs. $M_{\text{Low Imagery}} = 5.00$), $F(1, 47) = 0.61, p = .438$. There was, however, a significant effect of imagery in the correction instructions condition, ($M_{\text{High Imagery}} = 5.52$ vs. $M_{\text{Low Imagery}} = 4.30$), $F(1, 46) = 7.20, p = .010$. Both of the simple effects involving instructions to correct were marginal: high imagery, $F(1, 48) = 3.14, p = .083$; low imagery, $F(1, 45) = 2.94, p = .093$.

We also examined the interaction of message imagery and correction instructions on reports of imagery correction for the argument-focus group, $F(1, 96) = 3.47, p = .066$. As with the writing-focus group, there was no effect of imagery in the no correction instructions condition ($M_{\text{High Imagery}} = 4.50$ vs. $M_{\text{Low Imagery}} = 4.65$), $F(1, 48) = 0.09, p = .763$. There was, however, a significant effect of imagery in the slight correction instructions condition, ($M_{\text{High Imagery}} = 5.15$ vs. $M_{\text{Low Imagery}} = 3.96$), $F(1, 48) = 5.34, p = .025$. Both of the simple effects involving instructions to correct were nonsignificant: high imagery, $F(1, 48) = 1.59, p = .214$; low imagery, $F(1, 48) = 1.90, p = .175$.

*Negative emotion composite.* The three-way interaction involving the negative emotion composite was marginally significant, $F(1, 189) = 2.77, p = .098$ (see Table S.14). The interaction of message imagery and correction instructions within the writing-focus condition was not conventionally significant, $F(1, 93) = 2.00, p = .161$, but the pattern was conceptually similar to that of attitudes (keeping in mind that the imagery in messages should have decreased the amount of negative emotions in response to a counterattitudinal advocacy). Within the no correction instructions condition, the high imagery message was associated with somewhat, but not significantly, less negative emotions ($M_{\text{High Imagery}} = 4.48$ vs. $M_{\text{Low Imagery}} = 5.00$), $F(1, 47) = 0.87, p = .355$. Within the slight correction instruction condition, in contrast, the high imagery messages led to
nonsignificantly more negative emotions ($M_{\text{High Imagery}} = 4.64$ vs. $M_{\text{Low Imagery}} = 4.00$), $F(1, 48) = 1.12, p = .295$.

In the argument-focus cells, the pattern was somewhat different than the pattern for attitudes. The interaction between message imagery and correction instructions was not significant, $F(1, 96) = 0.92, p = .339$. Within the no correction instructions condition, the high imagery message was associated with slightly more negative emotions ($M_{\text{High Imagery}} = 4.81$ vs. $M_{\text{Low Imagery}} = 4.52$), $F(1, 48) = 0.22, p = .638$. Within the correction instruction condition the high imagery messages led to nonsignificantly less negative emotions ($M_{\text{High Imagery}} = 4.63$ vs. $M_{\text{Low Imagery}} = 5.19$), $F(1, 48) = 0.78, p = .381$.

In sum, the results for the writing-focus group were similar to the attitudes data, but the pattern was much weaker. The pattern given an argument-focus was not entirely clear. In general, the lack of significant effects of message imagery in this condition is consistent with the CRM (given the higher likelihood of argument elaboration).

*Perceptions of unfair imagery use.* The three-way interaction with message imagery, correction instructions, and reading instructions did not approach significance (see Table S.15), $F(1, 189) = 0.95, p = .330$. Only two effects were significant. First, the high imagery messages were associated with an increased perception that the imagery was being used as a weapon ($M_{\text{High Imagery}} = 5.54$ vs. $M_{\text{Low Imagery}} = 4.96$), $F(1, 189) = 7.10, p = .008$. However, this main effect was qualified by a significant interaction between message imagery and correction instructions, $F(1, 189) = 6.14, p = .014$. In the no correction instructions condition, there was no effect of imagery on perceptions of imagery use ($M_{\text{High Imagery}} = 5.29$ vs. $M_{\text{Low Imagery}} = 5.24$), $F(1, 97) = 0.02, p = .885$. In the slight correction instructions condition, in contrast, imagery led to much higher
perceptions of unfair imagery use ($M_{\text{High Imagery}} = 5.77$ vs. $M_{\text{Low Imagery}} = 4.66$), $F(1, 96) = 14.99, p < .001$. Of course, this interaction makes perfect sense given that people were prodded to think about various types of biases to which they might have fallen prey.

**Text-elicited imagery.** As mentioned above, the high imagery messages were associated with more text-elicited imagery ($M_{\text{High Imagery}} = 2.42$ vs. $M_{\text{Low Imagery}} = 1.71$), $F(1, 195) = 7.98, p = .005$. However, this main effect was qualified by a significant three-way interaction with message imagery, correction instructions, and reading instructions (see Table S.16 for means), $F(1, 189) = 3.97, p = .048$. Within the writing-instructions condition, there was no interaction between message imagery and correction instructions, $F(1, 93) = 0.60, p = .443$; there was only a nonsignificant main effect trend of imagery such that the high imagery messages led to more text-elicited imagery ($M_{\text{High Imagery}} = 2.34$ vs. $M_{\text{Low Imagery}} = 1.83$), $F(1, 95) = 2.25, p = .137$. In the argument-focus cells, in contrast, there was a significant interaction between message imagery and correction instructions, $F(1, 96) = 4.03, p = .047$. Within the no correction instructions condition, there was no effect of message imagery ($M_{\text{High Imagery}} = 2.08$ vs. $M_{\text{Low Imagery}} = 1.92$), $F(1, 48) = 0.09, p = .766$. In the slight correction instructions condition, however, the high imagery messages led to significantly more text-elicited imagery, ($M_{\text{High Imagery}} = 2.88$ vs. $M_{\text{Low Imagery}} = 1.25$), $F(1, 48) = 10.59, p = .002$. This interaction makes sense assuming that the correction instructions prompted people to ruminate upon the imagery experienced during the reading of the message. Assuming such rumination, those in the high imagery cells should have recalled more of their experienced imagery when they completed the image-listing task. In contrast, when not prompted to think about correction, people may have responded to the image-listing task by re-imagining relevant
scenarios somewhat regardless of the actual imagery they had experienced during the reading of the message (resulting in the null effect of message imagery in this condition).

**Self-generated imagery.** The three-way interaction was not significant (see Table S.17), $F(1, 189) = 0.47, p = .496$. As mentioned above, the high imagery messages led to marginally less self-generated imagery ($M_{\text{High Imagery}} = 1.96$ vs. $M_{\text{Low Imagery}} = 2.53$), $F(1, 195) = 3.33, p = .070$; however, two other effects were significant. First, there was a significant interaction between message imagery and correction instructions, $F(1, 189) = 7.50, p = .007$. Within the no correction instructions condition, there was no effect of message imagery ($M_{\text{High Imagery}} = 2.35$ vs. $M_{\text{Low Imagery}} = 2.10$), $F(1, 97) = 0.29, p = .590$. However, within the slight correction instruction condition, the high imagery messages were associated with significantly less self-generated imagery ($M_{\text{High Imagery}} = 1.59$ vs. $M_{\text{Low Imagery}} = 2.98$), $F(1, 96) = 11.66, p < .001$. This interaction can be interpreted in a similar fashion to the analogous interaction involving text-elicited imagery.

The second significant effect concerned an interaction between the correction instructions and the reading instruction manipulations, $F(1, 189) = 3.93, p = .049$. In this case, in the writing-focus condition, the slight correction instructions led to somewhat more self-generated imagery, ($M_{\text{Slight Instructions}} = 2.31$ vs. $M_{\text{No Instructions}} = 1.67$), $F(1, 95) = 2.20, p = .141$. In the argument-focus condition, the reverse was true ($M_{\text{Slight Instructions}} = 2.20$ vs. $M_{\text{No Instructions}} = 2.76$), $F(1, 98) = 1.59, p = .210$. This particular interaction was not predicted, and is difficult to interpret. Again, it is not clear why the correction instructions, which came after the message was read, would have related to the amount of imagery generated during the reading of the message.
Positive thoughts index. The three-way interaction was not significant (see Table S.18), $F(1, 189) = 0.83, p = .365$. The only noteworthy effect was a marginal interaction between reading instructions and message imagery, $F(1, 189) = 2.90, p = .090$. In the writing-focus condition, the high imagery message were associated with nonsignificantly high proportion of positive thoughts, ($M_{\text{High Imagery}} = 0.47$ vs. $M_{\text{Low Imagery}} = 0.39$), $F(1, 95) = 2.07, p < .154$. In the argument-focus condition, the opposite was true ($M_{\text{High Imagery}} = 0.40$ vs. $M_{\text{Low Imagery}} = 0.45$), though this pattern was not strong, $F(1, 98) = 0.91, p = .343$.

In general, the positive thought index seemed relatively insensitive to the experimental manipulations. Again, as discussed above, in this particular study, it is likely that relevance of the topic caused all participants to respond to the thought-listing opportunity in much the same way—by considering on the spot the positive and negative aspects of the proposed tuition increase regardless of previous manipulations. Hence, the usefulness of this measure in Study 2 is questionable.

Summary. In general, the results in the writing-focus group were highly consistent with the ICM. Our results indicate that people can, at least when prodded to remove bias from their judgments, identify imagery as a potentially biasing element of a persuasive communication, and correct for it. The results in the argument-focus condition, in contrast, were more consistent with the CRM in that, when argument elaboration should have been relatively high, there were no positive effects of imagery regardless of instructions to correct.

Correlational Analyses

We examined the relationship between the imagery manipulation, imagery reports (text-elicited imagery, self-generated imagery), reports of imagery correction, the
negative emotion composite, and perceptions of unfair imagery use (the composite of the ulterior motives item and the unfair use item)—see Table S.19 for intercorrelations between these items. For these analyses, we used the entire experimental sample in part to capitalize on the superior power of the larger sample, but also because the processes indicative of correction could have plausibly occurred in any of the experimental cells to a greater or lesser extent. When applicable, mediational path analyses were conducted in the same manner as in Study 1 (Preacher & Hayes, 2004; Shrout & Bolger, 2002).

As discussed above, the imagery manipulation was significantly and positively correlated to text-elicited imagery, $r(197) = .20, p = .005$, but marginally and negatively correlated with self-generated imagery, $r(197) = -.13, p = .070$. As reported earlier, the correlation between the two classes of imagery production was negative and significant, $r(197) = -.18, p < .010$. Not surprisingly, then, these two variables were differentially related to perceptions of unfair imagery use. As predicted, for text-elicited imagery, the relevant correlation was positive, $r(197) = .20, p = .005$, whereas for self-generated imagery the correlation was nonsignificant, $r(197) = .09, p = .223$. The correlation between perceptions of unfair imagery use and reports of correction, as expected, was significant and positive, $r(197) = .36, p < .001$. Finally, the direct correlation between text-elicited imagery and reports of correction was significantly positive, $r(197) = .17, p = .020$, whereas the correlation involving self-generated imagery correction reports was nonsignificantly negative, $r(197) = -.06, p = .419$.

The observed patterns of correlations can be explained as follows: Text-elicited imagery was more likely to be corrected from judgments, at least in part because it was more likely to be perceived as an unfair persuasive tactic by an untrustworthy source. On
the other hand, self-generated imagery was negatively correlated with both perceptions of imagery as weapon, and with reports to correct. These negative, and not null, correlations may be explained by assuming that self-generated imagery blocks text-elicited imagery or vice-versa.

The role of negative emotions was perhaps the most interesting portion of these analyses. Text-elicited imagery was negatively related to the negative emotion composite, $r(197) = -.25, p < .001$, and negative emotions were negatively correlated with attitudes, $r(197) = -.65, p < .001$. However, negative emotions were positively related to perceptions of unfair imagery use, $r(197) = .19, p = .009$ (and recall from above that text-elicited imagery was also positively related to perceptions of unfair imagery use). Hence, it appears that attempts by sources to elicit imagery can have both intended and unintended effects on emotions. This dual effect on emotions will be further discussed in Chapter 4.

The most troubling component of these analyses was the null correlation between reports of correction for imagery and attitudes, $r(197) = .03, p < .645$. In hindsight, reports of correction for imagery were more potentially ambiguous than intended. Some participants may have perceived that the effects of their corrections were in the positive direction (perhaps they thought the imagery was tacky). Others may have, as we expected, thought they had been swayed by the imagery and corrected in the negative direction. Future studies will need to include items that ask more specific questions about the nature and direction of correction.

Importantly, text-elicited imagery did relate to attitudes through its influence on negative emotions. Specifically, text-elicited imagery was directly associated with a
decrease in negative emotions, and less negative emotions, in turn, were associated with more positive attitudes, Sobel(197) = 0.16, z = 3.39, p = .001, estimate of indirect effect = 0.16, 95%CI(.06, .26). In addition, there was an indirect link between text-elicited imagery, perceptions of imagery unfairness, negative emotions, and attitudes. In this case, more text-elicited imagery was associated with increased perceptions of imagery unfairness, which was in turn associated with more negative emotions, which in turn were associated with less positive attitudes. In support of this pattern of effects, perceptions of imagery unfairness were shown to mediate the link between text-elicited imagery and negative emotions, Sobel(197) = 0.06, z = 2.15, p = .032, estimate of indirect effect = 0.06, 95%CI(.02, .11), and negative emotions were shown to mediate the link between perceptions of imagery unfairness and attitudes, Sobel(197) = -0.15, z = -2.57, p = .010, estimate of indirect effect = -.15, 95%CI(-.26, -.03).

So in the first case, text-elicited imagery influenced emotions and created more yielding. In the second case, text-elicited imagery influenced emotions via perceptions of imagery unfairness, and actually decreased yielding. This dual impact of text-elicited imagery is further discussed in Chapter 4.

Discussion

The ICM was generally supported. When prodded to remove potential attitudinal biases from their judgments, participants in the high imagery condition appeared to consider imagery as a potential biasing factor, and they corrected accordingly (direct support of our main proposition). The assumption of widespread perceptions that imagery biases attitude-relevant judgments was indirectly supported because correction for imagery would have been unlikely if it were not perceived as a biasing factor (given
the nonspecific slight correction instructions). This same rationale also has implications for the nature of people’s naïve theories about the persuasive effects of imagery. In work by Collins et al. (1988) and Friestad and Wright (1995), people rated the effectiveness of imagery in persuasion either in general, or with respect to the average person. It is possible, however, that people could rate imagery as generally persuasive, but also tend to believe that they themselves are relatively immune to its effects. The present study suggests, however, that people do feel that imagery can affect them because they made use of an opportunity to correct its perceived effects out of their own judgments.

The pattern of means for the reports of imagery correction, as well as the correlational analyses support the assertion that the drop in the effectiveness of imagery in the slight instructions condition was actually due to imagery correction. We feel confident that our correction instructions did not cause mindless correction due to the fact that correction was not elicited in the low imagery condition. If that had been the case, we would have expected those in the low imagery condition to correct downwards as well (away from the perceived direction of influence). If anything, however, participants in the low imagery/correction instructions condition may have noted that the message was somewhat bland, and corrected upward—although this effect was small and unreliable.

We also feel confident that resource depletion could not have explained our results in the writing-focus condition. In the no instructions condition, imagery had a positive effect on attitude change. Because the correction instructions were given after the message was read, we would have expected this group to be similar to the no instructions group up to that point. Hence, had resource depletion driven the negative
effects of imagery in the slight instructions condition, we would have also expected a
negative effect of imagery in the no instructions condition.

Limitations of Study 2 as well as additional implications and future directions will
be further discussed in the Chapter 4.
CHAPTER 4

GENERAL DISCUSSION

The construct of imagery has been of interest to philosophers for eons. Only within the past 25-30 years, however, have scientific researchers begun to investigate the influence of imagery on attitude change and persuasion. Initially, researchers assumed that vivid imagery would facilitate persuasion (e.g., Nisbett & Ross, 1980)—not surprising in light of the large number of plausible mediators of imagery on attitude change (discussed at length in Chapter 1). However, the results of early investigations were mixed, and muddled by conceptual and methodological confusions (Taylor & Thompson, 1982). These findings cast doubt on the notion of robust beneficial effects of imagery on persuasion (Collins et al., 1988). Hence, researchers quickly turned their interest to moderators of the effect of imagery on persuasion (also discussed at length in Chapter 1). The search for robust moderation continues to this day.

In the present dissertation, two novel moderational models of the effects of imagery on persuasion were introduced: the Cognitive Resources Model (Chapter 2) and the Imagery Correction Model (Chapter 3). Two empirical studies were conducted to provide initial confirmation of these models. Study 1 examined the CRM of imagery and persuasion. This model assumes that both imagery elaboration and argument elaboration
require mental resources. Engaging in both processes at the same time is predicted to lead to attentional resource depletion, and to the extent that imagery elaboration and/or argument elaboration would tend to facilitate persuasion on their own, such resource depletion can inhibit persuasion. In Study 1, we tested the hypothesis that vivid persuasive messages (as opposed to pallid persuasive messages) would only increase persuasion in situations where argument elaboration was limited. Argument elaboration was both manipulated via message execution (to elicit normal or limited argument elaboration), and measured using the need for cognition scale (high vs. low need for cognition corresponding with high and limited argument elaboration, respectively).

Results confirmed the predictions of the CRM. For those low in need for cognition, for whom argument elaboration should have been naturally low, there was a positive effect of imagery on persuasion regardless of message execution. For those high in need for cognition, for whom argument elaboration should have been naturally high, there was only a positive effect of imagery given the limited argument elaboration message execution. Given a normal argument elaboration execution, high NCs actually showed decreased attitude change relative to the other cells in the design. Additional correlational analyses indicated that in the cells where imagery increased persuasion, negative emotions mediated the effect of imagery on attitudes. In contrast, in the cells where argument elaboration should have predominated, the imagery/negative emotions/attitudes link was severed.

In sum, the results of Study 1, though somewhat indirect, were highly consistent with the CRM predictions relating to imagery and persuasion. Several alternative interpretations of the data patterns were tentatively dismissed.
Study 2 sought to conceptually replicate the pattern of findings in Study 1, but more importantly was designed to provide initial confirmation of the Imagery Correction Model. The ICM holds that in some cases, the recipients of persuasive communications containing vivid imagery will become motivated to correct the effects of imagery out of their judgments. When able to do so, such motivation to correct one’s attitudes for the perceived influence of imagery should generally decrease attitude change given that laypersons tend to assume that imagery enhances persuasion (Collins et al., 1988; Friestad & Wright, 1995).

In Study 2, we tried to increase motivation to correct in general by providing participants with a counterattitudinal advocacy from an untrustworthy source (a faculty committee proposing a raise in tuition to increase faculty salaries). Motivation to correct was also manipulated by encouraging some participants to report accurate attitudes (“please correct your judgments for any unwanted biases”), whereas another group was not reminded to report accurate attitudes. As in Study 1, imagery was manipulated by providing participants with either vividly or pallidly written message arguments. One final manipulation either encouraged increased argument elaboration by instructing participants to focus on the message arguments during their reading, or limited argument elaboration by instructing participants to focus on the style of writing used by the author (instead of the strength of the arguments). Hence, the argument-focus condition was designed to replicate the findings of Study 1 with respect to the CRM, and the writing-focus condition was designed to cleanly test the ICM without alternative explanations based on the possibility of argument elaboration induced resource depletion.
In the writing-focus condition, an interaction between imagery and instructions to correct was found such that, given no instructions to correct, there was a positive effect of imagery on attitudes, whereas given instructions to correct, there was actually a trend towards more negative attitudes given imagery. In the argument-focus condition, imagery tended to reduce persuasion regardless of instructions to correct—a pattern replicating the findings of Study 1 and once again confirming the CRM. All participants reported imagery experienced during the reading of the persuasive message. These images were coded in terms of whether the image was elicited directly by the text (the image came straight from the text), or whether the image was generated by the participant in response to the text (the image was not in the text). As expected, self-generated images did not relate to perceptions of unfair persuasion, nor to self-reports of imagery correction. In contrast, text-elicited images were positively correlated with perceptions of unfairness, and with reports of imagery correction.

In sum, both Study 1 and Study 2 provided evidence that was consistent with the CRM, and Study 2 provided evidence consistent with the ICM.

Contributions

Extant articles dealing with imagery and persuasion typically discuss three to four possible mediators of the effects of imagery on persuasion. A comprehensive review of possible imagery/persuasion mediators has not been attempted to date. In Chapter 1, a long list of potential mediators was discussed (and Study 1 actually provided strong evidence of the link between imagery and emotions). The list of mediators can guide future research in a number of ways. Researchers will have a better idea of how imagery
might relate to attitudes in any given context, and this understanding can guide their research designs and choice of measures.

Of course, many of the mediators are more likely to function in certain contexts, or for certain individuals, and so the list of mediators should also aid researchers in the continuing quest for moderators of persuasive imagery. Previous reviews of work on mental imagery/vividness and persuasion concluded that the effects of imagery were mixed at best (Taylor & Thompson, 1982), and illusory at worst (Collins et al., 1988). Hence, the search for moderators of the effect of imagery on persuasion has become the paramount task of researchers in this domain. In Chapter 1, twenty-one potential moderators of the effects of imagery on persuasion were discussed. Two new moderational models can now be added to the list pending further empirical examination: the CRM and the ICM. It is likely that these two models have wide domains of applicability. For instance, diary studies have shown that people experience mental imagery relatively frequently (e.g. Kosslyn, Seger, Pani, & Hillger, 1990; Vecchio & Bonifacio, 1997). Furthermore, argument elaboration is a common response to persuasive communications, especially for certain types of people (e.g., high need for cognition; Cacioppo & Petty, 1982), and in certain situations (e.g., high topic relevance; Petty & Cacioppo, 1979). Hence, it is plausible to assume that imagery elaboration and argument elaboration will often be attempted concurrently. In such situations, CRM mechanics will be likely to influence resulting attitude change.

The ICM, on the other hand, is relevant in any situation in which people are motivated to resist persuasion, such is often likely to be the case (see Knowles & Linn,
2004, for a review of work on resistance to persuasion), or in any situations where people are motivated to hold accurate attitudes.

In sum, it is hoped that the CRM and the ICM can help to account for a significant portion of the variance in the effects of imagery on persuasion. As was illustrated in Chapter 2, the CRM in particular was extremely helpful in reconciling many seemingly conflicting imagery/persuasion results from the literature. To the extent that the CRM and ICM can help to predict when imagery will influence persuasion, these two models will also aid in the study of why imagery affects attitude change. Studies examining mediation, especially those that would manipulate potential mediators, will be much more fruitful to the extent that positive imagery effects can be reliably produced by researchers. As discussed in Chapters 2 and 3, in many of the previous studies involving imagery and persuasion, participants were aware that the researchers were investigating evaluation. In such situations, argument elaboration is likely to be much more intense, as is resistance motivation, rendering positive imagery effects difficult to obtain. The CRM and the ICM can be used to design studies in which positive imagery effects will be much more likely in the conditions in which researchers are anticipating them.

Of course, the CRM and ICM will be useful to practitioners for the same reasons just mentioned. According to the CRM, for example, images may be more effective in situations in which recipients are not likely to be actively scrutinizing the message claims (or for messages in which actual claims are scarce, as in many advertisements). According to the ICM, imagery will tend to augment persuasion in situations where people are not motivated to hold accurate attitudes, or in situations in which resistance to persuasion is likely to be minimal (e.g., for low-end, inexpensive products). Both the
CRM and ICM contain numerous constructs that can be manipulated, or at least taken into account, by the designers of persuasive communications (as described in Chapters 2 and 3 respectively).

Limitations

Limitations of Study 1

Both of the reported studies in the dissertation have certain limitations. The most important limitation of Study 1 relates to the kinds of assumptions that can be made regarding the role of attentional resources. The execution manipulation was intended to be a manipulation of the likelihood of engaging in argument elaboration. The measurement of individual differences in need for cognition was also related to argument elaboration likelihood. Given an insulting tone or low need for cognition, argument elaboration was assumed to be low. Indirectly, total attentional resources were assumed to be relatively high in these conditions (hence, the predictions of a positive effect of imagery). There was, however, no direct manipulations of attentional resources in Study 1 (nor in Study 2), nor was there a measurement of resources available during the reading of the persuasive communication. Without direct manipulations or measurements, inferences about the role of attentional resources are necessarily qualified.

Direct manipulation of attentional resources was deemed undesirable in the present studies. In any condition where attentional resources were manipulated to be on the low end of the continuum, it is likely that elaborative processing in general would have been wiped out (the benefits of both argument elaboration and imagery elaboration would be lost). On the high end of the attentional continuum, one of two things would be likely to happen. It is generally assumed that participants would tend to dedicate their
attentional resources to argument elaboration. It is also possible that attentional resources could be pushed so high that participants would freely engage in both effective argument elaboration and effective image elaboration. However, this latter possibility may be untenable in the average lab environment. In sum, direct manipulations of attentional resources seemed unlikely to yield interesting results. Hence, we took the tack of trying to direct participants’ attentional resources to specific kinds of elaboration (imagery vs. argument) in both Study 1 and Study 2.

The inference requiring the largest leap of faith in Study 1 was that in the condition where no positive effect of imagery was found (high NCs, normal argument elaboration execution), the negative effect of imagery was related to attentional resource depletion. This claim could have been strengthened with an online measurement of attentional resources (e.g., a concurrent probe recognition task presented during the reading of the message). These types of probe tasks, however, are difficult to administer in the context of a written persuasive communication, because attention dedicated to the probe task can easily interfere with the process of reading. Such interference would limit the usefulness of the probe task as a measure (Kahneman, 1973). Such probe tasks may be more useful when messages are presented in an auditory fashion, as is further discussed below in a discussion of future directions. Appendix Q describes a proposed study intended to address the limitations described above.

Limitations of Study 2

The patterns of mean attitudes and reports of correction in Study 2 appeared to strongly confirm the ICM predictions. Nevertheless, there were several key limitations to Study 2. It was evident from the statistical analyses that Study 2 suffered from low
statistical power. Several of the key comparisons of means were not conventionally significant. Low power was probably due in large part to participants’ relatively strong attitudes regarding tuition increases. However, it is also likely that the manipulations in the study were not as strong as they could have been. In any case, a direct replication of the patterns of effects found in Study 2 is desirable.

There were also issues relating to operationalization choices made in Study 2. For example, the key measure of correction asked people to what extent they tried to correct the influence of imagery out of their judgments. For any given participant, however, this question could mean different things. Participants may also have assumed that the imagery in the messages might have distracted them from rationale arguments, or that the imagery was in bad taste. Again in these cases, correction may have put judgments more in line with the message stance.

Another problem with the measurement of correction is that we did not examine factors other than imagery that might have been corrected for. Participants may have thought they were biased in that they would be naturally opposed to any tuition increase due to monetary concerns. In that case, when prodded, they may have corrected their judgments to be more in line with the stance of monetary concern. Appendix R contains a proposal for a Study intended to address the criticisms described above.

One final limitation of Study 2 is that the extent to which this study can be generalized to the real world remains unclear. The manipulations and materials used in Study 2 were designed to create the best possible chance of demonstrating imagery correction. Obviously, prods to remove bias (provided by the slight correction instructions condition) will typically not be present in real-world contexts. Hence,
several questions relating to the external validity of our findings remain unanswered: Do people actually correct for the influence of imagery in the real world? How often? Under what circumstances? These questions remain for future study. We now discuss future directions of this research more generally.

Future Directions

Although there are limitations to what can be inferred from Studies 1 and 2, there are also a number of interesting future directions. Of course, both the CRM and ICM can be more adequately flushed out, as will be described below. However, these models also have implications for work relating to narrative persuasion. We end by discussing the implications of our work for the development of a general model of imagery and persuasion.

Cognitive Resources Model

The general outline of factors relevant to the CRM in Chapter 2 leaves open many possibilities for future experimentation; however, as discussed above in the limitations section, perhaps the most important step in the validation of the CRM is the measurement or manipulation of attentional resources. Measures of attentional resource usage taken during the reading of persuasive communications can be problematic (see above). Orally delivered persuasive communications, on the other hand, are much more amenable to online measures of attentional resources. Listening is a much less resource intensive task than reading. Hence, the present measure of attentional resources is much less likely to interfere with simple message reception than is likely to be the case given written communications.
Manipulations of available attentional resources may still be useful, even given written persuasive messages. One could envision a study in which participants are asked to memorize digit spans of varying lengths while receiving a persuasive communication. Rather than having just a high and a low resources available manipulation, resource availability could be manipulated across a range of levels. For example, people might be asked to memorize digit spans of one, two, three, four, five, six, seven, eight or nine digits. Imagery, of course, would be manipulated, as would argument elaboration likelihood. In conditions in which either argument elaboration or image elaboration is high, perhaps persuasion disruption would occur only given digit spans of six digits or more. In the condition where both argument elaboration and imagery elaboration should be high, the CRM would predict that persuasion disruption would occur over a much wider range of the digit span manipulation (say, anything greater than 3 digits). This type of study, of course, could also be run using orally delivered persuasion communications.

An inherent assumption in both Study 1 and Study 2 (argument-focus condition), was that argument elaboration may dominate imagery elaboration in rhetorical persuasion contexts (positive effects of imagery will only be found when argument elaboration is low as opposed to positive effects of argument elaboration will only be found when imagery elaboration is low). With rhetorical persuasion, recipients will typically be aware of the source’s intent to persuade. Generally, people are resistant to such attempts at control (Brehm, 1966), and argument scrutiny is one commonly used mechanism of resistance. Even if people are not motivated to resist, they will typically be motivated to hold accurate attitudes, and, again, argument scrutiny is commonly deemed a superior method of achieving and maintaining accurate attitudes. Hence, given accuracy
motivation and/or motivation to resist, the effects of imagery may often be limited. One issue is the extent to which imagery is useful in situations where motivation to resist is low, and attitude accuracy is not as important. For example, imagine a couple trying to decide what to eat for dinner. Both are too tired to cook, and one suggests ordering a pizza to the other, and gives several reasons why pizza would be a good idea. They end their appeal by describing a fresh, hot pizza in vivid detail to their partner. In this situation, the partner, who would also like a pizza, would very much like to be persuaded. They may decide to focus on the *image* of the pizza rather than to scrutinize the rationale *arguments* for or against getting a pizza. In the real world, analogous situations probably arise frequently. Marketers aim to advertise to those who are probably in the market for their products. And there are many products that fall under the heading of luxury items that people would love to own, but typically forgo purchasing due to rationale concerns such as price. In other domains, politics for example, people may greatly desire to be persuaded by their favored candidate, or by a member of their political party. In such situations, images may be particularly powerful because either argument elaboration is likely to be purposely avoided, or because biasing of attitudes is not opposed. This general claim can be tested in the lab by employing proattitudinal advocacies. In contrast, many previous studies of imagery and attitude change have made use of counterattitudinal advocacies so that change from baseline attitudes could be more easily achieved. The use of counterattitudinal advocacies, in fact, may be one of the primary reasons for many of the past failures to find positive imagery effects.

In the study of imagery and attitude change involving written communications, one further issue that will need to be addressed empirically is pacing. The CRM assumes
that resource depletion will often occur when people try to engage in argument elaboration and imagery elaboration simultaneously. Given that mental landscapes are commonly characterized by a state of cognitive business (Gilbert, Pelham, & Krull, 1988), people may often try to cram as many mental processes into a short period of time as possible (as was probably also the case in Study 1 and Study 2), and hence the CRM may thus apply to many everyday contexts. However, people may also pace their reading of persuasive communications, either by reading more slowly, taking pauses, or rereading. In such cases, people may engage in imagery elaboration for some period, and then switch their attentional resources to argument elaboration, or vice versa. In this case, little resource depletion would be expected. Future work related to pacing could either prompt participants to pace themselves during reading (or not), or could measure natural pacing behavior under various conditions. For example, perhaps pacing increases given high imagery messages. In any case, pacing behaviors must be accounted for during the process of validating the CRM.

In Study 1, individual differences in need for cognition were shown to be predictive of when imagery would influence persuasion. Specifically, for those low in need for cognition, imagery was generally effective. For those high in need for cognition, imagery was only effective when argument elaboration was presumably limited. It would have been plausible, however, to predict that those who were high in need for cognition would have experienced no problems with imagery, because they should be practiced at engaging in argument elaboration. Hence, there may be some set of conditions in which being high in need for cognition will be associated with relatively positive imagery effects. For example, in a situation where people are induced to engage
in argument elaboration and there is abundant imagery, high NCs may not experience resource depletion to the same extent that low NCs will.

Similarly, the role of individual differences in propensity to engage in imagery elaboration, or in the vividness of experienced mental imagery may plausibly produce opposite effects in certain situations. As with need for cognition, it could be that those who habitually engage in imagery elaboration have to dedicate less resources to the task, and hence will be less likely to experience resource depletion. Conversely, it may be that those with a high propensity to engage in imagery just produce more imagery than average, and hence have more problems with resource depletion.

Imagery Correction Model

In Study 2, despite a counterattitudinal advocacy with an untrustworthy source, no spontaneous correction was witnessed in the no correction instructions condition, presumably due to suppressive effects of the writing-focus condition on argument elaboration. However, a key question for future studies concerns the conditions under which imagery will be spontaneously corrected out of judgments?

As the perceived importance of the judgments increases, spontaneous correction should become more likely. In our study, participants were not actually asked to register a meaningful vote on the tuition issue. Perhaps if they had, participants would have scrutinized the arguments more closely. Furthermore, it is likely that a non-negligible portion of our participants do not actually pay for their college tuition. These participants may have been willing to accept the perceived benefits of the tuition plan sans any personal costs.
Furthermore, correction likelihood should increase for more emotionally-charged counterattitudinal issues. For example, when the political candidate of an opposing party is describing the reasons to vote for him or her, people may try very hard not to be persuaded and may be hyper-vigilant regarding persuasive tactics.

Imagery may also be spontaneously corrected out when the imagery is perceived to be “over the top” in a given context; for example, when anti-war advocates vividly describe war-related atrocities, or when ads for common household products include lurid sexual imagery.

It may be, however, that while people readily acknowledge that imagery is an effective persuasive tactic if prompted to consider it, people may be either (a) unskilled at noticing that the tactic is being used, (b) so immersed in the imagery that they are distracted from vigilance, or (c) unlikely to view imagery as an unfair persuasive tactic. Relevant to b and c, people may reason, “more power to them if they have a vivid persuasive communication – I can correct that out if I feel like it”; however, they may be unaware that correction motives can also be affected or subverted by the use of imagery. Also relevant to point b, if the images are irrelevant, over the top, or perceived as unfair in any way, transportation into the message may be reduced, which might increase the likelihood of spontaneous correction.

The role of emotions in image-based persuasion also deserves further examination. In Study 2, negative emotions related to imagery in two ways. Generally, text-elicited imagery decreased emotional resistance to the stance of the message (as in Study 1). However, emotional resistance was increased via the link from text-elicited imagery to perceptions that imagery was being used unfairly. It is possible that these
opposing effects would cancel out in many settings, and, once again, render imagery ineffective (without invoking the concept of correction). This claim can be further examined by measuring emotional responses to both the imagery as an argument, and imagery as a persuasive tactic (whereas Study 1 just measured self-reports of general emotional reactions during message reading).

Future studies will examine the issues raised above, and will manipulate a range of factors thought to affect motivation and ability to correct for mental imagery.

*Imagery and Narrative Persuasion*

Rhetorical persuasive communications (as were used in Study 1 and Study 2) make clear the attitudinal stance of the source, and attempt to provide clear and strong arguments in favor of or in opposition to a given position. The persuasive aims of such communications are typically unambiguous, and so argument elaboration is a natural response to rhetoric. So, generally, any other concurrent mental processes evoked by rhetoric will necessarily need to compete with argument elaboration for attentional resources, and these additional processes may not be on a level playing field. In other words, with rhetorical processing, people may often be unwilling to completely arrest argument elaboration. The same goes for situations in which people are motivated to hold accurate attitudes (expensive purchases, important issues, high accountability for opinions), or when the topic is personally relevant. In short, in many or most persuasion contexts, argument elaboration can be assumed to be present at some level (limiting the effectiveness of imagery-elicitation). However, in some specific situations, the reverse may actually be true.
Narratives, or stories, have long been assumed to be influential vehicles for the transfer of attitude-relevant information; specific examples abound (Brock, Strange, & Green, 2002). Narratives may enjoy a persuasive advantage because the narrative format actually reduces or inhibits the occurrence of argument elaboration and scrutiny. Prentice and Gerrig (1999; see also Gerrig, 1993) suggest that narrative persuasion is carried out in large part by low-thought, low-effort processes such as the Elaboration Likelihood Model’s peripheral route (Petty & Cacioppo, 1986), or the Heuristic-Systematic Model’s heuristic route (Chen & Chaiken, 1999). Under these conditions, hold the authors, readers are likely to become transported into the world of the narrative which has implications for both the generation of vivid mental imagery, and attitude/belief change. Green and Brock (2000) extended this idea of transportation and provided evidence that people who are highly transported into narratives do seem to dedicate less critical attention to the text itself. In a relevant study, participants were asked to engage in a “pinocchio circling” task. Participants were told to circle words or phrases that “did not ring true”. Participants who reported being highly transported while reading the text circled fewer false notes. In addition, Green and Brock (2000) found that it was impossible to code cognitive responses to transporting narratives as favorable or unfavorable toward focal beliefs, because traditional thought-listing coding categories are largely insensitive to actual responding to stories (Green & Brock, 2000, p. 708).

Kopfman and colleagues (Kopfman et al., 1998) presented converging evidence. They manipulated the format of appeals touting organ donation (statistical listing vs. narrative). After reading the appeal, participants were asked to list any related thoughts. They found
that the narrative format was associated with less positive, negative, and total thoughts than the statistical format.

Given that narratives suppress argument elaboration, and perhaps scrutiny in general (including scrutiny of the author’s intent to persuade), both the CRM and ICM would predict that narrative persuasion would benefit greatly from the use of imagery. Related research would be similar to the studies described in the present dissertation, but with narratives instead of rhetorical appeals, or perhaps comparing narratives to rhetorical appeals in the same study.

*Imagery and Fear Appeals*

There exists a massive literature on the effectiveness of the use of fear-arousing techniques in attitude and behavior change, especially as they pertain to public health campaigns (for reviews, see Dillard & Anderson, 2004; Ruiter, Abraham, & Kok, 2001; Witte & Allen, 2000). Typically, fear appeals begin with a frightening statement of the consequences of engaging in a particular behavior (or failing to); commonly, the frightening statement is designed to elicit relevant vivid imagery. This fear-arousing statement is then followed by recommendations for action which would allow one to avoid the fearful consequences. One of the earliest findings in the field was a curvilinear relationship between the level of fear used, and the resulting persuasion and behavior modification (e.g., Janis, 1967; Janis & Feshbach, 1953). Specifically, when the level of aroused fear is either too mild or too intense, persuasion can be limited. When the level of fear is moderate, attitude change appears to be optimal. Generally this curvilinear pattern is explained as follows: When the level of fear is too low, recipients will not be sufficiently frightened to change attitudes and behaviors. Very high levels of fear may
motivate resistance, reactance, or communication avoidance. Also important is the degree to which people feel able to actually carry out the corrective or protective sets of actions. When related self-efficacy is low, even moderate fear appeals may fail. However, when self-efficacy is high, even extreme fear appeals can be effective (Witte, 1998).

Both the CRM and the ICM are potentially relevant to work on the effectiveness of fear appeals. To the extent that extreme fear appeals elicit abundant mental imagery, it is possible that imagery elaboration may interfere with the cognitive processing of the recommendation/solution information. The CRM could be taken into account in the design and administration of fear appeals such that imagery and argument elaboration do not occur concurrently. Initially, recipients could be focused on imagining the harmful consequences. Following this, the appeal could pause and forcefully instruct recipients to focus on rational consideration of potential solutions.

Relevant to the ICM, to the extent that fear appeals may often induce reactance, it seems highly likely that in some cases, people will attempt to correct the effects of the fear-induced imagery from their judgments. Hence, when fear appeals do include abundant imagery, it may be especially important to frame the appeal as an issue involving or requiring personal choice.

Due to these considerations, fear appeals may be particularly fruitful grounds for additional examination of the CRM and ICM.

*Individual Differences in Mental Imagery*

Examination of any model of imagery and attitude change would be facilitated by the use of valid and reliable individual differences measures (e.g., measures of vividness
of experienced visual imagery, preference for visual processing over verbal processing, ease of imagery generation). Work relating to the measurement of individual differences in mental imagery has a long history filled with controversy (see McKelvie, 1995b, for a review). The two most commonly used measures of individual differences in visual imagery vividness, the Vividness of Visual Imagery Questionnaire (VVIQ), and the Visualizer-Verbalizer Questionnaire (VVQ), have been roundly criticized. The VVIQ, which asks respondents to imagine certain scenes or objects and then rate the resulting mental images in terms of vividness, is associated with social desirability and contains a host of construct related problems (McKelvie, 1995a). Furthermore, the VVIQ does not correlate with spatial ability tasks (Dean & Morris, 2003). The VVQ, which attempts to categorize respondents into those that prefer visual versus verbal modes of processing, contains unbalanced response options, has no clear factor structure, and has poor reliability (Antonietti & Giorgetti, 1996). Of course, researchers in the field of mental imagery continue to pursue new and improved individual differences in mental imagery measures, and such measures will certainly be instructive in the continued validation of both the CRM and the ICM.

Preference for visual versus verbal processing is certainly relevant to both models, as is the vividness of experienced mental imagery. However, the CRM requires specific kinds of individual differences measures that have not previously been studied. For example, the CRM is less concerned with the vividness of visual imagery than with the effort required (attention dedicated to) the formation of images of a given vividness. In addition, whereas the VVQ examined visual versus verbal processing, the CRM would be
more interested in whether a hydraulic relationship exists between imagery elaboration and argument elaboration.

Regarding imagery effort, participants could be asked to form images of a particular vividness while engaging in some secondary task, either designed to measure or to tap attentional resources. Those who can elaborate on imagery in a more effortless fashion should have superior performance on secondary tasks that are indicative of attentional resources, and should be less hampered by secondary tasks designed to limit attentional resources.

Regarding imagery elaboration versus argument elaboration, a series of messages could be constructed that vary in terms of both argument strength, and imagery strength (the degree to which the image is a strong/relevant of a weak/irrelevant argument in favor of a give stance). For example, participants could be presented with two short paragraphs relating to a given attitude stance. One might contain a strong argument and a weak image, and the other might contain a weak argument and a strong image. Participants would then be asked to choose the more compelling statement. Those who naturally focus on argument elaboration should be responsive to differences in argument strength across a range of statement pairs, and those who focus on imagery elaboration should be more responsive to differences in imagery strength.

The construction and validation of such scales will be an active part of continuing research related to the ICM and especially the CRM.

*General Model of Imagery and Persuasion*

A long-term goal of this research project is to work towards the establishment of a general model of the role of imagery in persuasion. The model will specify the
conditions under which the various mediators of imagery are more or less likely to operate. Given the large list of mediators and moderators presented in Chapter 1, the development of this model will be no simple task. However, work in the area of attitude change and persuasion will never be complete until it satisfactorily accounts for the role of imagery in persuasion.

Mental images represent reality with reasonable fidelity; and as such, they elicit our attention and arouse our emotions in much the same way as reality does. Peace activists cannot ship the masses to Iraq to present evidence of the ravages of war. Medical advocates cannot inject at risk populations with AIDS to demonstrate the hardships that it brings. Most advertisers cannot ship their products to would-be consumers on a trial-usage basis. With image-laden persuasive communications, however, all of these impossible feats can be approximated. The power of imagery to substitute for direct experience probably accounts for the pervasiveness of the evocation of mental imagery in persuasive communication.

As persuasion researchers delve more deeply into the role of imagery in persuasion, they will necessarily encounter many of the same debates that cognitive psychologists have been engaging in for decades. Are images a unique class of cognitive representation, or do they fall on the vivid end of a more general type of cognition? If the former is true, it may make sense to attempt to differentiate imagery from affect, behavior, and non-imaginal cognitions (similar to Breckler’s, 1984, work on the distinctiveness of affect, behavior, and cognition as bases of attitudes). If the latter is true, and imagery is just a more forceful kind of cognition, then perhaps imagery can be shoehorned into extant models of persuasion. Even in this case, however, models of
imagery and persuasion would still need to account for mediators and moderators that are more or less common or powerful for imagery than non-imaginal types of cognitions.

A general model of imagery and persuasion will also need to account for the different roles that imagery can play in different stages of the same persuasion episode. Initially, imagery may grab attention and, at early stages, imagery may increase elaborative processing. However, as general elaboration increases, the continued generation of mental imagery may interfere with argument elaboration. During or after message reception, imagery may elicit bias reduction efforts such as discounting or correction.

It is hoped that the present work will aid in the construction of a model of imagery and persuasion. For example, based on the review in Chapter 2, and the two original studies presented in the dissertation, it can be speculated that argument elaboration likelihood will play an important role in the general model of imagery and persuasion. All available evidence seems to suggest that when argument scrutiny is high, the positive effects of imagery will be greatly constrained, if not reversed.

Final Thoughts

Whether right or wrong, based in evidence or otherwise, the use of imagery-eliciting strategies in persuasive communications is nearly ubiquitous. Phenomenally, it certainly seems like imagery increases persuasion (Collins et al., 1988; Friestad & Wright, 1995). Even researchers initially assumed that imagery had to augment persuasion (Nisbett & Ross, 1980). Given these lofty expectations, and the seeming effectiveness of imagery in real-world communications, it is probably not hyperbole to suggest that the failure of early researchers to produce consistent imagery effect (positive
effects) was and is somewhat of an embarrassment to the field of persuasion. If the effects of imagery were really so erratic, we might predict that American advertisers should all be going bankrupt, given their heavy reliance on the technique.

The search for moderation has ambled along in a sporadic fashion for the past 20-25 years. Perhaps as a consequence of this haphazard approach to the study of imagery and persuasion, there have been few strong demonstrations of powerful and robust moderation. The present dissertation was an attempt to begin to ameliorate this unfortunate situation.

Both the CRM and ICM are based on conditions that should characterize image-based persuasion in many or most situations. The CRM is based on the observation that argument-elaboration is a frequent response to persuasion attempts. The ICM begins with the assumption that people are often motivated to resist persuasion, or to hold accurate attitudes. Whenever these general conditions hold, the CRM and the ICM should be able to account for variance in the effectiveness of image-based appeals. Once imagery effects can be reliably produced, researchers can dedicate time and effort to examining additional mediators, which will suggest additional moderators, and so on.

Although there is much work left to be done to fully validate the CRM and the ICM, it is hoped that this dissertation (including the reviews of mediators and moderators) will both encourage and help researchers in the continuing study of the role of imagery in persuasion. Eventually, a comprehensive model of imagery and persuasion which can be integrated into the extant literature on attitudes and persuasion may become a reality.
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HIGH IMAGERY/NORMAL ARGUMENT ELABORATION

It is obvious that animals, like people, react to dangerous or painful situations. You can imagine animals trying to run away, crying out in pain if hurt, bleeding, trying to cradle and soothe the injured part - in short, suffering physically and mentally. Through suffering animals are motivated to leave dangerous situations, or to learn to stay away from them. Pain and suffering are useful to people for the same reasons. Thus, animals suffer and feel pain in much the same way as humans. This being the case, it is difficult to justify putting animals through this suffering when eating them is not necessary to our survival, especially when there are alternative methods of treating them.

An example may help to clarify this issue. Probably no factory farm animal suffers a crueler fate than veal calves. Seized from their mothers shortly after birth, the calves are placed in small, narrow wooden crates just large enough to contain their bodies, and are denied any exercise or even room to move. Imagine getting into a small closet and spending your whole life there. Calves are intentionally placed in tight confinements their heads chained to the stalls, without even enough room to move, stretch, or lie down) since any exercise would develop their muscles and make their meat less tender. The confinement denies the calves of the warmth of sunlight, contact with other animals, fresh air – in other words, anything that might make their lives bearable. The calves remain in this position for three long months, being fed a cocktail of liquefied grains, growth hormones, and antibiotics which allows only basic survival and growth. Would we as a civilized society consider treating people like this? Fiction writers would be hard-pressed to dream up a more depressing and gruesome torture scene. Some say that this type of torture is not unethical because the animals are so young, and they don’t know a different life. By this same reasoning, however, it would not be unethical to lock a human infant in small cage where he or she would live out the first, and last, few months of life. Although this comparison may sound ludicrous, advances in the area of cloning research may lead to human organ-donors who are created and exist only to supply organs to the rest of us. These humans would face the same dilemma faced by veal calves. Existing only to die for us.

The inhumane treatment comes to an end roughly three months from the time the calves first open their eyes. Their only trip out of prison, however, is one to the slaughterhouse. When the neck-chains are removed many calves are too weak to walk to their deaths. They must be dragged out. Some struggle on the first step, only to collapse
It is unrealistic to consider banning the killing of all farm animals. However, it is barbaric to treat living beings in such a fashion when alternatives exist. While there may be some discussion about whether people need to eat meat products vs. vegetarianism, there is no doubt that the tender-beef produced from veal calves is not necessary in any way to humans. Consider this the next time someone offers you a plate of veal.

It should be obvious that animals, like people, react to dangerous or painful situations. You can imagine animals trying to run away, crying out in pain if hurt, bleeding, trying to cradle and soothe the injured part - in short, suffering physically and mentally. Through suffering animals are motivated to leave dangerous situations, or to learn to stay away from them. Pain and suffering are useful to people for the same reasons. Thus, animals suffer and feel pain in much the same way as humans. This being the case, how can you justify putting animals through this suffering when eating them is not necessary to our survival, especially when there are alternative methods of treating them.

Let me make it more clear for you. No factory farm animal suffers a crueler fate than veal calves. Seized from their mothers shortly after birth, the calves are placed in small, narrow wooden crates just large enough to contain their bodies, and are denied any exercise or even room to move. Imagine getting into a small closet and spending your whole life there. Calves are intentionally placed in tight confinements their heads chained to the stalls, without even enough room to move, stretch, or lie down) since any exercise would develop their muscles and make their meat less tender. The confinement denies the calves of the warmth of sunlight, contact with other animals, fresh air – in other words, anything that might make their lives bearable. The calves remain in this position for three long months, being fed a cocktail of liquefied grains, growth hormones, and antibiotics which allows only basic survival and growth. How do you think you would like to be in that cage? Fiction writers would be hard-pressed to dream up a more depressing and gruesome torture scene. Some say that this type of torture is not unethical because the animals are so young, and they don’t know a different life. By this same reasoning, however, it would not be unethical to lock a human infant in small cage where he or she would live out the first, and last, few months of life. Although this comparison may sound ludicrous, advances in the area of cloning research may lead to human organ-donors who are created and exist only to supply organs to the rest of us. These humans would face the same dilemma faced by veal calves. Do you really want to be a part of this?

The inhumane treatment comes to an end roughly three months from the time the calves first open their eyes. Their only trip out of prison, however, is one to the slaughterhouse. When the neck-chains are removed many calves are too weak to walk to their deaths. They must be dragged out. Some struggle on the first step, only to collapse in death from extreme exhaustion. If they do have the strength to make it to the slaughter-house, they will die all the same. All this for tender-meat you like so much.
It is unrealistic to consider banning the killing of all farm animals. However, it is barbaric to treat living beings in such a fashion when alternatives exist. While there may be some discussion about whether people need to eat meat products vs. vegetarianism, there is no doubt that the tender-beef produced from veal calves is not necessary in any way to humans. Think about that next time you are scarfing down a plate of veal.

Low Imagery/Normal Argument Elaboration

It is obvious that animals, like people, react to dangerous or painful situations. Animals will flee, call out in pain if hurt, bleed, try to hold and care for their injuries - in short, they will suffer physically and mentally. Through suffering animals are motivated to leave dangerous situations, or to learn to stay away from them. Pain and suffering are useful to people for the same reasons. Thus, animals suffer and feel pain in much the same way as humans. This being the case, it is difficult to justify putting animals through this suffering when eating them is not necessary to our survival, especially when there are alternative methods of treating them.

An example may help to clarify this issue. Probably no factory farm animal suffers a crueler fate than veal calves. Seized from their mothers shortly after birth, the calves are placed in small areas which make movement difficult and the calves are also denied exercise of any kind. It is difficult to consider this extreme situation. Calves are intentionally placed in tight confinements which are specifically and effectively designed to prevent any type of movement since any exercise would develop the young calves’ muscles, which would have the effect of making their meat less tender. The confinement denies the calves of the warmth of sunlight, contact with other animals, fresh air – in other words, anything that might make their lives bearable. The calves remain in this position for three long months, being fed a cocktail of liquefied grains, growth hormones, and antibiotics which allows only basic survival and growth. Would we as a civilized society consider treating people like this? Fiction writers would be hard-pressed to dream up a more depressing and gruesome torture scene. Some say that this type of torture is not unethical because the animals are so young, and they don’t know a different life. By this same reasoning, however, it would not be unethical to treat human infants in a similar way during the first, and last, few months of their lives. Although this comparison may sound ludicrous, advances in the area of cloning research may lead to human organ-donors who are created and exist only to supply organs to the rest of us. These humans would face the same dilemma faced by veal calves. Existing only to die for us.

The inhumane treatment comes to an end roughly three months from the time the calves first open their eyes. Their only trip out of prison, however, is one to the slaughterhouse. After being let out, many calves are too feeble to even be led to the slaughterhouse. So they must be physically assisted along. Some are so weak that they succumb shortly after being removed. If they do have the strength to make it to the slaughter-house, they will die all the same. All for tender-meat.

It is unrealistic to consider banning the killing of all farm animals. However, it is barbaric to treat living beings in such a fashion when alternatives exist. While there may be some discussion about whether people need to eat meat products vs. vegetarianism,
there is no doubt that the tender-beef produced from veal calves is not necessary in any way to humans. Consider this the next time someone offers you a plate of veal.

Low Imagery/Limited Argument Elaboration

It should be obvious that animals, like people, react to dangerous or painful situations. Animals will flee, call out in pain if hurt, bleed, try to hold and care for their injuries - in short, they will suffer physically and mentally. Through suffering animals are motivated to leave dangerous situations, or to learn to stay away from them. Pain and suffering are useful to people for the same reasons. Thus, animals suffer and feel pain in much the same way as humans. This being the case, how can you justify putting animals through this suffering when eating them is not necessary to our survival, especially when there are alternative methods of treating them.

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Control Condition

For 25 years the Association for the Advancement of Community Volunteering (AACV) has worked to help promote volunteerism in communities across America. Everyday, more and more people join local organizations which support any number of important causes. Why are so many people volunteering to help out around their communities?

Most importantly, volunteerism provides a necessary function in a large republic such as America. It is a basic fact of life that people need help, and communities need tending. Federal, state, and local governments cannot and should not be expected to fill in every societal gap. Volunteers are needed to accomplish any number of important goals: from feeding the homeless to cleaning up litter around town. Local volunteer groups are composed of individuals who are not only in close proximity to local problems, but who also have a vested interest in their communities. In addition, volunteer groups are much more flexible and responsive to local issues than federal and state governments tend to be.

In addition to these practical concerns, volunteerism also promotes community harmony in a number of ways. Volunteer groups are generally composed of similarly minded individuals. Through volunteering, these individuals demonstrate a willingness to support each other and, of course, the individuals who benefit from their efforts. In addition, being a volunteer is a great way to meet people who share many of the same concerns about their community as you do – and who are willing to do something about it.

Finally, being a volunteer helps build self-worth and self-esteem. It feels good to help those who truly need a helping hand, or to do something for the community in general. Many individuals consider their volunteer efforts among the most meaningful and gratifying endeavors in their lives.

Most people have positive attitudes about volunteering, but cite a lack of time as the main reason why they do not. However, volunteering does not necessarily need to be time consuming. Call up a group you are interested in volunteering with, inform them of your time constraints, and then ask them what you can do to help out. Chances are very good that they will appreciate your concern and will be able to find some type of work for you to do.

Another deterrent to volunteerism occurs when individuals want to help but do not know where to start. Consult your local city hall or the internet for a list of local volunteer organizations. Talk to friends and relatives who volunteer. Ask them about their experiences. Chances are good that you will be able to find some organization that excites you. Perhaps, though, you see a need for a volunteer group which does not currently exist. Create it!

Join the millions of Americans who already volunteer some portion of their time on a regular basis to make their world a better place.
APPENDIX B

SAMPLE THREE-PANE PAMPHLETS - STUDY 1

Experimental

The Plight of the Veal Calf

AETFA
25 Years Service

An Informational Service Provided by the Association for the Ethical Treatment of Farm Animals

The Plight of the Veal Calf

It is obvious that a veal calf, like people, react to dangerous or painful situations. In animals as in humans, when faced with danger or pain, they attempt to evade it or flee the area. However, in the case of veal calves, they are unable to do so due to the confinement of the three-pane pamphlet and the lack of a means to escape.

The veal calves are kept in small, dark, and poorly ventilated enclosures, which do not provide any means of escape. The confinement of the veal calves is so severe that they are unable to move or even stand upright. The lack of light, fresh air, and space makes it impossible for the veal calves to engage in any form of activity.

Veal calves are subjected to unspeakable conditions that are harmful to their physical and mental well-being. They are denied access to natural light, fresh air, and the ability to engage in natural behaviors. The conditions under which they are kept are inhumane and violate the basic rights of living beings.

The plighting of the veal calves is a serious issue that needs to be addressed. It is time to consider the ethical implications of keeping animals in such conditions and to take steps to ensure that they are treated with respect and dignity.

It is imperative to consider the well-being of all farm animals. It is time to take action and ensure that they are provided with the conditions necessary for their survival and well-being.
The Benefits of Volunteering

For 35 years, the Association for the Advancement of Community Volunteering (AACV) has worked to build and sustain volunteerism in communities across America. Every day, people volunteer in numerous capacities, supporting a number of important causes. Why do so many people volunteer to help out in their communities?

Most importantly, volunteering provides a necessary function in a healthy, vibrant nation. It is about improving the lives of people, providing a sense of purpose, and helping others. Volunteers also help to accomplish any number of important goals, including the coordination of disaster relief efforts, and the development of community programs. Volunteer groups are composed of individuals who are not only passionate about their communities, but who also have a vested interest in their communities.

In addition, volunteer groups can help to strengthen and support local, state, and national government efforts to be.

In addition to these practical concerns, volunteering also promotes community harmony and the number of people. Volunteer groups are generally composed of similarly-minded individuals. Through volunteering, these individuals develop a sense of purpose, solidarity, and, of course, the satisfaction of making the most of their efforts. In addition, being a volunteer is a great way for people who share many of the same concerns about their communities agree – and who are willing to do something about it.

Finally, being a volunteer helps build self-esteem and confidence. It is a great way for people to do something for their community in general. Many individuals consider their volunteer efforts among the most meaningful and satisfying roles they have in their lives.

Most people have positive attitudes about volunteering. But the lack of these attitudes can actually hinder volunteerism. However, volunteering does not necessarily need to be the most meaningful. Call up a group you are interested in volunteering with, or check on line for volunteer opportunities. You may find what you can do to help out. Choose any good that you will appreciate your concern and will be able to find some type of work for you.

Another statement to remember is that volunteering should not be viewed as a last resort or an afterthought. Call your local community to the internet for a list of local volunteer organizations. These organizations can help you get involved. Act from devoted experiences. Choose a good time that suits your schedule and local needs whatever. Ask from devoted experiences. Choose a good time that suits your schedule and local needs whatever. Ask. Or, if you’re interested in a volunteer group that does not currently exist. Drive it!

Join the millions of Americans who already volunteer some portion of their time on a regular basis to make their world a better place.
APPENDIX C

EVALUATION ITEMS - STUDY 1

We are interested in some of your opinions. The statements below may or may not be related to the pamphlet you just read. In either case, please give your opinions to the statements.

People should not eat veal.

1 2 3 4 5 6 7
strongly disagree strongly agree

The treatment of veal calves is inhumane.

1 2 3 4 5 6 7
strongly disagree strongly agree

Animals should not be made to suffer in order to feed humans.

1 2 3 4 5 6 7
strongly disagree strongly agree

I may give up eating veal.

1 2 3 4 5 6 7
strongly disagree strongly agree
While reading the message in the pamphlet, various thoughts ran through your mind. Try to remember the thoughts you had while reading the pamphlet. List as many of these thoughts as you can below. Don’t worry about grammar, spelling, or punctuation.

1. ______________________________________________________________________

2. ______________________________________________________________________

3. ______________________________________________________________________

4. ______________________________________________________________________

5. ______________________________________________________________________

6. ______________________________________________________________________

7. ______________________________________________________________________

8. ______________________________________________________________________

9. ______________________________________________________________________

10. ______________________________________________________________________
APPENDIX E
NEGATIVE EMOTION ITEMS - STUDY 1

While reading the pamphlet, to what extent did you feel **anger**?

1 2 3 4 5 6 7
not at all very much

While reading the pamphlet, to what extent did you feel **sadness**?

1 2 3 4 5 6 7
not at all very much

While reading the pamphlet, to what extent did you feel **anxiety**?

1 2 3 4 5 6 7
not at all very much

While reading the pamphlet, to what extent did you feel **disgust**?

1 2 3 4 5 6 7
not at all very much
APPENDIX F

MESSAGE VIVIDNESS SCALE (BABIN & BURNS, 1998) - STUDY 1

During your reading of the pamphlet you may or may not have experienced varying levels of mental imagery (pictures in the mind). Please use the following scale to rate the 8 dimensions below.

1 2 3 4 5  6 7
strongly disagree
strongly agree

The imagery that occurred was (write a number between 1 and 7 for each item):

1. Clear
2. Detailed
3. Weak
4. Fuzzy
5. Vague
6. Vivid
7. Sharp
8. Well-defined
APPENDIX G

IMAGE-LISTING - STUDY 1

Below please list any mental images you remember having during your reading of the pamphlet.

1. ______________________________________________________________________

2. ______________________________________________________________________

3. ______________________________________________________________________

4. ______________________________________________________________________

5. ______________________________________________________________________

6. ______________________________________________________________________

7. ______________________________________________________________________

8. ______________________________________________________________________

9. ______________________________________________________________________

10. ______________________________________________________________________
The pamphlet was offensive to me.

1 2 3 4 5 6 7
strongly disagree strongly agree

While reading, occasionally the pamphlet said something that made me want to stop reading it.

1 2 3 4 5 6 7
strongly disagree strongly agree

Overall, my opinion of the writer of the pamphlet would be:

1 2 3 4 5 6 7
strongly disagree strongly agree

Regardless of what I thought about the points being made in the pamphlet, I disagreed with the way they were conveyed.

1 2 3 4 5 6 7
strongly disagree strongly agree

Overall, the points in the pamphlet were strong.

1 2 3 4 5 6 7
strongly disagree strongly agree

On the whole, I think this is an effective pamphlet.

1 2 3 4 5 6 7
strongly disagree strongly agree
APPENDIX I

NEED FOR COGNITION SCALE (CACIOPPO & PETTY, 1982) - STUDY 1

For each of the statements below, please indicate whether or not the statement is characteristic of you or of what you believe. If the statement is extremely uncharacteristic of you or of what you believe (not at all like you), please place a “1” on the line to the left of the statement. If the statement is extremely characteristic of you or of what you believe (very much like you), please place a “5” on the line to the left of the statement. You should use the following scale as you rate each of the statements below.

1 2 3 4 5
extremely somewhat uncertain somewhat extremely
unlike me unlike me like me like me

1. _____ I would prefer complex to simple problems.
2. _____ I like to have the responsibility of handling a situation that requires a lot of thinking.
3. _____ Thinking is not my idea of fun.
4. _____ I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.
5. _____ I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something.
6. _____ I find satisfaction in deliberating hard for long hours.
7. _____ I only think as hard as I have to.
8. _____ I prefer to think about small daily projects to long-term ones.
9. _____ I like tasks that require little thought once I've learned them.
10. _____ The idea of relying on thought to make my way to the top appeals to me.
11. _____ I really enjoy a task that involves coming up with new solutions to problems.
12. _____ Learning new ways to think doesn’t excite me very much.
13. _____ I prefer my life to be filled with puzzles that I must solve.
14. _____ The notion of thinking abstractly is appealing to me
15. _____ I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.
16. _____ I feel relief rather than satisfaction after completing a task that required a lot of mental effort.
17. _____ It’s enough for me to know that something gets the job done; I don’t care how or why it works.
18. _____ I usually end up deliberating about issues even when they do not affect me personally.
APPENDIX J

PAGE WITH DELAYED ATTITUDE MEASURES FROM TIME TWO - STUDY 1

Topic 3: Animal Rights and Environmentalism

1. I support spending tax dollars to save endangered species.
   1 2 3 4 5 6 7
   strongly disagree strongly agree

2. Animals should not be made to suffer in order to feed humans.
   1 2 3 4 5 6 7
   strongly disagree strongly agree

3. Animal research is never justified.
   1 2 3 4 5 6 7
   strongly disagree strongly agree

4. The treatment of veal calves is inhumane.
   1 2 3 4 5 6 7
   strongly disagree strongly agree

5. People should not be able to own gas-guzzling SUV’s (Sports Utility Vehicles).
   1 2 3 4 5 6 7
   strongly disagree strongly agree

6. Preserving natural resources and habitats is more important than a few jobs.
   1 2 3 4 5 6 7
   strongly disagree strongly agree

7. People should not eat veal.
   1 2 3 4 5 6 7
   strongly disagree strongly agree

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APPENDIX K

READING INSTRUCTIONS - STUDY 2

Writing-Focus

There are plans to print a similar essay in the Lantern, and we are interested in how students will respond to this proposal. We are specifically interested in how different writing styles relate to processing of these types of communications. Hence, when you read the essay, please focus heavily on the author's style of writing (presentation, color and tone, writing technique). You will be asked a number of questions about the author's writing style after you read the essay.

Argument-Focus

There are plans to print a similar essay in the Lantern, and we are interested in how students will respond to this proposal. When you read the essay, please think very hard about the pro's and con's of the proposal. You may or may not agree with the proposal, but keep the following questions in mind: Are the arguments convincing? Are the arguments compelling? You will be asked a number of questions about your opinions about the tuition increase after you read the essay.
The board of trustees is currently considering a tuition increase that would be targeted towards increasing the average salaries of faculty across all departments. The faculty union feels that the tuition increase is in the best long-term interests of both the students and the university. They have appointed a faculty committee to design an essay with the aim of influencing students' opinions on the tuition increase. You will be reading this essay.
APPENDIX M

EXPERIMENTAL MESSAGES - STUDY 2

High Imagery

*OSU more able to compete for highest caliber faculty members. Imagine taking a physics class from an Einstein-caliber professor.
*Less faculty immigration to other Big Ten schools (especially Michigan), and private schools (especially the Ivy leagues). No one wants to see our top faculty covering over their scarlet and gray bumper stickers with blue and gold.
*Higher percentage of faculty will win outside grants. Imagine the government and other research-funding institutions backing up truck-fulls of money and dumping them on OSU.
*Similar salary increases at other universities led to increases in national ranking by an average of 4-5 spots. Picture a potential employer looking over your resume and perking up when he or she notices that you have attended a top-ten public university.
*Degree will increase in value (even after you have graduated). Picture the diploma hanging in the den of your future home becoming more impressive by the year as OSU attracts and maintains higher quality faculty members.
*More faculty-student interaction in and out of class. Imagine taking almost all of your classes with actual professors, and having increased in-the-office time for faculty mentoring.

Low Imagery

*The salary increases will allow OSU to be increasingly successful in competing for the highest caliber faculty members.
*The salary increase would help to slow and/or reverse the trend of quality faculty members immigrating to other Big Ten schools (especially Michigan), and private schools (especially the Ivy leagues).
*Higher quality faculty will be more successful in obtaining and maintaining grants that, in time, would help to keep tuition lower.
*Other universities that have instituted similar salary increases have increased their national ranking by an average of 4-5 spots.
*Aside from receiving a higher quality education, your degree will increase in value as the reputation of the university increases (this will be true even after you have graduated).
*Finally, if the proposal goes through, faculty at all levels have pledged to commit more time teaching and working with undergraduates (time commitments similar to those at private schools).
APPENDIX N

INSTRUCTIONS PRIOR TO ATTITUDE RATINGS - STUDY 2

No Correction Instructions

Previous research has shown that reader opinions can have an effect on the processing of information. Hence, we would like to get your opinions of the tuition increase before moving on.

Slight Correction Instructions

Previous research has shown that reader opinions can have an effect on the processing of information. Hence, we would like to get your opinions of the tuition increase before moving on.

Please try to make sure that your ratings of the tuition increase reflect your true opinions. If you feel that there was some element of the essay that may have unfairly influenced your opinion, please take a moment to try to adjust for that influence now.
APPENDIX O

ATTITUDE ITEMS - STUDY 2

Please rate “plan for tuition increase” below:

<table>
<thead>
<tr>
<th>Scale</th>
<th>Negative</th>
<th>-3</th>
<th>-2</th>
<th>-1</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Positive</th>
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</thead>
<tbody>
<tr>
<td>Unwise</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
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<td>1</td>
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<td>3</td>
<td>4</td>
<td>Wise</td>
</tr>
<tr>
<td>Unfavorable</td>
<td>-4</td>
<td>-3</td>
<td>-2</td>
<td>-1</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Favorable</td>
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<tr>
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<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>Good</td>
</tr>
</tbody>
</table>

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APPENDIX P

ANCILLARY ITEMS - STUDY 2

Correction for Imagery

I tried to adjust my opinions due to the influence of the imagery in the message.

Perceptions of Imagery Use

I felt that the author's use of imagery could unfairly bias people who read this message.

1  2  3  4  5  6  7  8  9
  strongly disagree

I felt that the author's use of imagery could unfairly bias people who read this message.

1  2  3  4  5  6  7  8  9
  no ulterior motives

Emotion Items

While reading the essay, I felt anger.

1  2  3  4  5  6  7  8  9
  strongly disagree

While reading the essay, I felt annoyance.

1  2  3  4  5  6  7  8  9
  strongly disagree
**Self-Reports Relating to Reading Instructions**

Thinking back to when you were reading the essay, how much time/effort did you spend thinking about the pro’s and con’s of the proposed tuition increase?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tr>
<td>very little time/effort</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>a great deal of time/effort</td>
</tr>
</tbody>
</table>

Thinking back to when you were reading the essay, how much time/effort did you spend thinking about the author's writing style?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<td></td>
<td></td>
<td>a great deal of time/effort</td>
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</table>
APPENDIX Q

FUTURE DIRECTIONS IN THE CONTINUING VALIDATION OF THE COGNITIVE RESOURCES MODEL (A PROPOSED STUDY)

Overview of Previous Work

Study 1 in the dissertation examined the Cognitive Resources Model (CRM) of imagery and persuasion. This model assumes that both imagery elaboration and argument elaboration require mental resources. Engaging in both processes at the same time is predicted to lead to attentional resource depletion, and to the extent that imagery elaboration and/or argument elaboration would tend to facilitate persuasion on their own, such resource depletion can inhibit persuasion. In dissertation Study 1, we tested the hypothesis that vivid persuasive messages (as opposed to pallid persuasive messages) would only increase persuasion in situations where argument elaboration was limited. Argument elaboration was both manipulated via message execution (to elicit normal or limited argument elaboration), and measured using the need for cognition scale (high vs. low need for cognition corresponding with higher and lower argument elaboration, respectively).

Results confirmed the predictions of the CRM. For those low in need for cognition, for whom argument elaboration should have been naturally low, there was a positive effect of imagery on persuasion regardless of message execution. For those high
in need for cognition, for whom argument elaboration should have been naturally high, there was only a positive effect of imagery given the limited argument elaboration message execution. Given a normal argument elaboration execution, high NCs actually showed decreased attitude change relative to the other cells in the design. Additional correlational analyses indicated that in the cells where imagery increased persuasion, negative emotions mediated the effect of imagery on attitudes. In contrast, in the cells where argument elaboration should have predominated, the imagery/negative emotions/attitudes link was severed.

Although the data in dissertation Study 1 were consistent with the CRM, there were also several limitations to this study. The most important limitation relates to the kinds of assumptions that can be made regarding the role of attentional resources. The execution manipulation was intended to be a manipulation of the likelihood of engaging in argument elaboration. The measurement of individual differences in need for cognition was also related to argument elaboration likelihood. Given an insulting tone (limited argument elaboration) or low need for cognition, argument elaboration was assumed to be low. Indirectly, total attentional resources were assumed to be relatively high in these conditions (hence, the predictions of a positive effect of imagery). There was, however, no measurement of resources available during the reading of the persuasive communication. Without direct manipulations or measurements, inferences about the role of attentional resources are necessarily speculative.

An additional limitation of dissertation Study 1 involved inferences regarding the argument elaboration manipulation. Although the available data from Study 1 strongly indicated that the limiting argument elaboration condition was associated with less
effective argument elaboration, the face validity of the manipulation is certainly questionable. In addition, the use of aggressive and presumptive language in the limited argument elaboration conditions allows for a slew of alternative interpretations of this manipulation (e.g., increased correction motives or reactance).

In sum, the two main limitations of dissertation Study 1 were a failure to measure attentional resources and ambiguities regarding the true effect of the argument elaboration manipulation. Others limitations involved a constrained sample size, and weak manipulation check evidence regarding the argument elaboration manipulation and the message imagery manipulation. The proposed study was designed to address each of these concerns.

Proposal for Future Study

To address the lack of measurement of attentional resources in dissertation Study 1, a commonly used probe task (described below) will be administered during reception of a persuasive communication. Generally, in conditions in which imagery and argument elaboration are expected to be occurring simultaneously, latencies in responding to the probes should be slower.

The psychological refractory period (PRP) refers to the phenomenon whereby engaging in one task slows or impairs performance on another task. To study the PRP, researchers have devised a number of methods, but the most popular has been the dual-task interference paradigm. One common dual-task paradigm is the probe reaction time task. With probe tasks, participants are directed to engage in some primary task (i.e., listening to a persuasive communication), and to allocate extra resources to responding to some unrelated stimuli. Typically, when the probe stimulus appears, participants are
directed to respond in some way (e.g., push a button) to turn it off. The latency of probe
task response acts as a relative measure of resources not being allocated to the primary
task of rehearsal (see Posner & Boies, 1971). Relative differences in resources not be
allocated to the primary task can then be compared across experimental conditions.

This type of probe task has been used extensively to study cognitive resource
models in both the study of basic cognitive phenomena (see Pashler, 1994 for a review),
and in the more specific domain of text comprehension (e.g., Britton, Ziegler, &
Westbrook, 1980; Inhoff & Fleming, 1989). Furthermore, in the past 20 years, the use of
probe tasks in social psychology has become increasingly routine (e.g., Bargh, 1982;
Macrae, Bodenhausen, Schloerscheidt, & Milne, 1999; Pendry & Macrae, 1994).

One key distinction between probe task paradigms is the difference between
continuous versus targeted probe measures. Much work in cognition has used
specifically placed targeted probes that are designed to measure resources available at
very specific points (e.g., at various intervals before or after the presentation of a letter or
word). In these cases, researches may be interested in the patterns of probe latencies
across time. Alternatively, research on social psychological concepts such as stereotype
activation (e.g., Macrae et al., 1999; Pendry & Macrae, 1994), and on text comprehension
(e.g., Britton et al., 1980; Inhoff & Fleming, 1989) has often made use of continuous
measurement. In the present study, the average amount of resources available while
performing a primary task is of interest. In these cases, researchers have typically
administered 4-5 probes. Sometimes these probes occur randomly across the duration of
the primary task (e.g., Macrae et al., 1999; Pendry & Macrae, 1994), and sometimes they
are placed at fixed intervals (Bargh, 1982). Regardless, what is key is that the probe intervals do not follow a predictable pattern.

To make strong inferences about resource allocations using probe tasks, several caveats must be addressed. Most importantly, probe tasks will only be a true measure of resources needed to complete the primary task given that participants are devoting a sufficient amount of resources to the primary task. Hence, participants must be directed to attend most intently on the primary task, and to use only extra, additional, resources to complete the probe task. One way of checking on the success of this instruction is to include a no-probe control. Typically, researchers have included a relatively small number of “throw-away” participants who do not complete the probe task (e.g., Bargh, 1982).

The use of a probe task in dissertation Study 1 would probably not have yielded useful information for a number of reasons. The act of reading itself requires abundant attentional resources, and the corresponding attentional allocation may have swamped any variance related to differences in imagery elaboration or argument elaboration. Furthermore, it is likely that participants would have desired both to read the message, and to perform well on the probe task. Given that the pacing of the messages was completely controlled by the participants, they may have merely stopped reading for some portion of time when a probe occurred, and then resumed reading afterwards. In a related vein, differences in reading abilities and speeds made it impossible to know exactly at what point during the communication a given probe occurred. Particularly slow readers would tend to experience probes near the beginning of the communication. Extremely fast readers might finish reading before all probes has been administered.
All of these problems can be addressed by using an orally delivered communication. In this case, the pacing is not under the control of the participant and so there can be much more exacting control over the placement of the probes. Furthermore, the act of listening is much less resource intensive than reading, and so differences in attentional allocation due to manipulations are much more likely be detectable by probe latencies.

We now turn to the manipulation of likelihood of imagery and argument elaboration. In dissertation Study 1, elaboration was manipulated in a round about way: by varying the execution of a persuasive communication. In the present study, we intend to take a more direct approach. A number of studies have manipulated attentional focus relatively directly by instructing participants to selectively engage in one type of mental process or another (relevant studies reviewed in Chapter 2 of the dissertation). For example, McGill and Anand (1989) had participants read persuasive appeals that were written in either a vivid or pallid manner. In what was described as a “high elaboration” condition, participants were told to use their imaginations. In the “low elaboration” condition, participants were told to “be careful and well-reasoned”. In fact, these manipulations seem more correctly described as image-focus vs. argument-focus, respectively. Analyses revealed that vividness was only effective in increasing persuasion when participants were told to focus on imagery (the “high elaboration” condition).

Furthermore, merely putting participants to an evaluative mindset has almost always been sufficient to reduce or completely disrupt the positive effects of imagery on persuasion (relevant studies reviewed in Chapter 2 of the dissertation). Hence, in the
present study, the allocation of attentional resources will be manipulated by relevant instructions. In one condition, participants will be instructed to focus on the imagery elicited by the message, and they will be discouraged from engaging in argument elaboration. In a second condition, participants will be instructed to evaluate and scrutinize the argument offered by the communication. Finally, in a third condition, these two instructions sets will be merged such that participants will be instructed to focus on both the imagery in the message and the strength and plausibility of the arguments.

The imagery focus condition is analogous to the conditions from dissertation Study 1 in which argument elaboration was relatively low. Hence, here it is predicted that message imagery should have a positive effect on attitudes. When participants are asked to focus on argument elaboration, imagery should not influence persuasion at all, yet persuasion should still be relatively high given that strong message arguments are used. Finally, when participants are instructed to engage in both processes concurrently, resource depletion should result, and persuasion should be limited (again, regardless of message imagery).

Method

Participants and Design

Participants will be approximately 300 male and female undergraduates participating for partial credit in their introductory psychology course. One hundred eighty participants will be randomly assigned to a 2 message imagery (high imagery, low imagery) x 3 resource allocation instructions (imagery focus, argument focus, imagery/argument focus) between-participants design. These 180 participants will complete the probe-task during the reception of the persuasive communication. In
addition, 90 participants will be run through the same design, but will not complete the probe task during the reception of the persuasive communication. Finally, 30 participants will hear an unmanipulated control message that will allow for an attitudinal baseline on the key attitudinal variables.

**Procedures**

Participants will be recruited through the online participant recruiting website of the Research Experience Program. Participants will be asked to show-up for a study regarding thoughts and comprehension. The study will be conducted in a computer lab. Upon arriving at the lab, participants will be seated at their own computers, and will be asked to put on a pair of headphones. They will be told that they will listen to an essay on one of several randomly chosen topics. Participants will then be told to read a sheet of essay-listening instructions that will be presented on the computer screen (see resource allocation instructions section below). Participants will be unable to continue without demonstrating a basic understanding of the resources allocation instructions.

The persuasive communication will be delivered through the headphones. When the tapes containing the persuasive communications begin, the probe-task program will also be activated (for those completing the probe-task measure). Participants in the no-probe-task conditions will simply listen to the persuasive communication.

Following reception of the persuasive communication, participants will complete a battery of dependent measures. First, participants will indicate attitudes and behavioral intentions relevant to the persuasive communication. In addition, participants will report source opinions, and emotions felt during reception. Next, participants will complete thought- and image-listing protocols. They will be asked a number of questions about
how they were allocating their attention during the reception of the persuasive communications, and whether they attempted to correct their judgments in any way. Finally, participants will complete the need for cognition scale.

Resource allocation instructions. Participants will receive one of three sets of instructions prior to listening to the persuasive communication. In each case, the instructions will begin with the same description of the essay. Participants will be told that an essay has been produced, and that the author is trying to make a given point. In the imagery focus condition, participants will be told that professional essays often attempt to use vivid language to help them make their points by bringing relevant pictures into the minds of the recipients. As such, participants will be told that we are interested in people’s production of such mental images. Hence, they will be instructed to focus all of their attention to the images described by the author, while ignoring for the time the reasoning involved in the essay. Specifically, they will asked to actively form the images suggested by the author in their mind. Participants in the argument focus condition will be told that they should focus on the logical arguments and reasoning employed by the author. They will be asked to ignore the style of writing, and other aspects of the presentation of the arguments, and to “get to the heart of the matter”. Finally, participants in the argument/imagery focus condition will be told that people typically respond to communications in multiple ways, and so they will be asked to engage in two different processes while listening to the persuasive communications. Following this introduction, the imagery and argument focus conditions above will be merged.
Participants will be told before reading the instructions that they will be tested on their understanding of the instructions after reading them, and that they will need to reread the instructions if they have not demonstrated an understanding.

These directions will be pretested to insure that they produce the intended effects. Specifically, the imagery focus instructions should produce a greater percentage of image listings, and a higher rating of essay vividness. The argument focus instructions should yield a great number of thought-listing. Most importantly, in the imagery focus condition, imagery listings and ratings of vividness should correlated highly with attitudes. In the argument focus condition, positive thoughts should correlate highly with attitudes. In the imagery/argument focus condition, neither image listings nor positive thoughts should correlate highly with attitudes.

*Persuasive communications.* Various topics will be pretested to find one for which the average participant has relatively neutral preexisting opinions. We will avoid counterattitudinal topics so that imagery correction will not be an alternative explanation in the study. Once a basic message topic is chosen, strong arguments in favor of the given topic will be created. A basic message template will be augmented in the high imagery condition with corresponding imagery statements (similar to dissertation Study 2). The two basic message conditions (high and low imagery) will be pretested along with a control message to insure sufficient attitudinal impact. We will also attempt to verify the difference in imagery evocation between the high and low imagery message, while minimizing unintended differences (argument strength, complexity, etc.). All messages will be orally recorded onto tapes by a trained reader. Attempts will be made
to insure that the two message imagery conditions do not vary in terms of length, reader pacing, or reader affectation.

*Probe task.* Participants completing the probe-tasks will be told that they while listening to the persuasive communication, they will also be engaging in a visual perception task. While listening to the essay, participants will be told to keep their eyes on the computer screen. At several random intervals throughout the essay reading, participants will be told, a dot will appear in the center of the screen. When the dot appears, participants will be told to hit a key on the keyboard as quickly as they can to make the dot go away.

Participants will be instructed to focus their attentional resources on listening to the essay, and on focusing on the instructed portions of the essay. An unrelated portion of orally delivered text will be used to allow participants practice the probe detection task. It will be stressed that they respond to the dots only with the attention they have left over from their primary tasks. The no probe task condition will be used as a comparison to insure that participants in the probe task condition actually stuck to this exhortation.

**Expected Results**

*Analytic Strategy*

Initially, we will examine whether the probe task interacted with the two manipulations in the study. Assuming that it does not, we will then analyze the data of the group that completed the probe task. Individual differences in need for cognition, message imagery, and resource allocation focus will be used as predictors in these analyses. It is expected that the strong resource allocation instructions should overwhelm
variance in processing differences that are due to need for cognition. Hence, below, we will discuss patterns of data that are collapsed over this factor.

**Main Analyses**

*Attitudinal dependent measures.* Within the imagery focus condition, there should be a positive effect of imagery. In this condition, participants should have the available resources to process and appreciate the imagery in the messages when present. Within the argument focus condition, there should be no effect of imagery. In this condition, participants should be ignoring the imagery to large extent. Because the strength of the arguments in the high and low imagery messages will be held constant, no difference in attitude change across these two conditions are expected. In both the high and low imagery conditions, argument-focus should yield sufficient attitude change above and beyond the control group (because strong arguments will be used). Focusing just on the high imagery cells, the imagery focus condition is expected to yield somewhat more attitude change than the argument focus cells due to the persuasive power of imagery. Finally, in the imagery/argument-focus condition, persuasion should be limited in general due to resource depletion. These predictions are summarized in Table Q.1.

*Probe latencies.* Predictions for probe latencies were formed by considering both instruction set and the messages themselves in the various conditions. Hence, for example, in the imagery focus conditions, the process of focusing on imagery should tap attentional resources, but more should be tapped in the high imagery messages where there is actually grist (vivid language) for imagery elaboration. In contrast, in the argument focus conditions, the process of argument elaboration should require resources,
but the grist for argument elaboration (arguments) should not differ from the high to the low imagery message.

To summarize the predictions, in the imagery focus/high message imagery condition, full attention should be allocated to the processing of the abundant message imagery. However, responding to the probe tasks should not be exceedingly difficult (400ms was chosen as a predicted baseline level of response latency). In the imagery focus/low imagery condition, participants should have somewhat less grist for imagery elaboration, and hence should have slightly more attentional resources available for the probe task. In the argument focus condition, participants should be largely ignoring the imagery in the messages; yet in both the high and low imagery messages, there should be abundant grist for argument elaboration (hence the predicted 400ms baseline in both conditions). Maximal resource depletion should be evident when participants attempt to engage in both imagery elaboration and argument elaboration. In this case, the high imagery condition should yield somewhat more resource depletion because of the additional grist for imagery elaboration. Computationally, the predictions for the imagery/argument focus condition were arrived at by adding together the corresponding cells from the imagery focus and argument focus conditions. All probe latency predictions are contained in Table Q.2.

Mediation Analyses

The most important mediational analyses with respect to the CRM involve the imagery focus cells and the imagery/argument focus cells. In these conditions, differences in attitude change due to the resources allocation manipulation should be mediated by both emotions and the probe task latencies (representing resource depletion).
The imagery focus condition should be associated with more stance-consistent emotional reactions, and these should be correlated with increased attitudes (see Figure Q.1). Similarly, the imagery focus condition should be associated with quicker probe latencies, and probe latencies should be negatively correlated with attitudes (see Figure Q.2).

We will also analyze the relative contribution of imagery versus argument elaboration. Within the argument focus condition, positive thoughts should mediate attitude change, and image listings should not. Within the imagery focus condition, the reverse should be true. In the imagery/argument focus condition, we expect both image-listings and positive thoughts to be only weakly correlated with attitudes (due to resource depletion).

Conclusions

If the predicted results are obtained, strong and unambiguous evidence in favor of the CRM will have been obtained. Effectively, we will have shown that the conditions under which imagery augments persuasion may be fairly limited in many common contexts. When people are primarily focused on argument elaboration, imagery should not influence attitude change whatsoever. Similarly, when people are focused on both imagery and argument elaboration, resource depletion may render imagery particularly ineffective. Only when people are able to concentrate fully on the imagery elicited by a persuasive communication should imagery have positive effects on attitude change. The probe task will help to reinforce the CRM interpretation of the predicted pattern of data.

Taken together, dissertation Study 1 and the proposed study complement each other well. Dissertation Study 1 manipulated argument elaboration by, in some cases, limiting argument elaboration with an overbearing message execution, and also by
measuring differences in likelihood of argument elaboration with the need for cognition scale. In the present study, processing resources will be specifically directed towards imagery elaboration, argument elaboration, or a combination of both processes. With both studies completed, we hope to conclude that in any condition in which argument elaboration was likely to be occurring at a normal level, or was relatively high, manipulations of message imagery were either not effective, or decreased persuasion. We also hope to show that argument elaboration reduces the effectiveness of imagery in part by severing the link between imagery, emotions, and attitude change (as established in dissertation Study 1). Finally, the proposed study improves upon dissertation Study 1 by directly measuring attentional resources available rather than merely conjecturing about them.
References


<table>
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<th>Message Imagery</th>
<th>Imagery Focus</th>
<th>Argument Focus</th>
<th>Imagery/Argument Focus</th>
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</thead>
<tbody>
<tr>
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<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Low Imagery</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

Note. Assumes a 7-point scale and control attitudes of 2.

Table Q.1: Predicted Influence of message imagery and resources allocation instructions on attitudinal dependent measures (expected means).
<table>
<thead>
<tr>
<th>Message Imagery</th>
<th>Imagery Focus</th>
<th>Argument Focus</th>
<th>Imagery/Argument Focus</th>
</tr>
</thead>
<tbody>
<tr>
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<td>400</td>
<td>800</td>
</tr>
<tr>
<td>Low Imagery</td>
<td>200</td>
<td>400</td>
<td>600</td>
</tr>
</tbody>
</table>

Note. Lower numbers indicate more available resources. Higher numbers correspond with increased attentional resource depletion.

Table Q.2: Predicted influence of message imagery and resources allocation instructions on probe task response latencies (expected means in milliseconds).
Note. Numbers are projected, standardized Beta values. Number in parentheses is the path between instructions and attitudes after emotions has been partialled out.

Figure Q.1: Predicted mediation of the effect of focus instructions on attitudes by emotions.
Note. Numbers are projected, standardized Beta values. Number in parentheses is the path between instructions and attitudes after probe latencies have been partialled out.

Figure Q.2: Predicted mediation of the effect of focus instructions on attitudes by probe latencies.
APPENDIX R

FUTURE DIRECTIONS IN THE CONTINUING VALIDATION OF THE IMAGERY CORRECTION MODEL (A PROPOSED STUDY)

Overview of Previous Work

Dissertation Study 2 was designed to provide initial confirmation of the Imagery Correction Model. The ICM holds that in some cases, the recipients of persuasive communications containing vivid imagery will become motivated to correct the effects of imagery out of their judgments. When able to do so, such motivation to correct one’s attitudes for the perceived influence of imagery should generally decrease attitude change given that laypersons tend to assume that imagery enhances persuasion.

In Study 2, we tried to increase motivation to correct in general by providing participants with a counterattitudinal advocacy from an untrustworthy source (a faculty committee proposing a raise in tuition to increase faculty salaries). Motivation to correct was also manipulated by encouraging some participants to report accurate attitudes (“please correct your judgments for any unwanted biases”), whereas another group was not reminded to report accurate attitudes. As in Study 1, imagery was manipulated by providing participants with either vividly or pallidly written message arguments. One final manipulation either encouraged increased argument elaboration by instructing participants to focus on the message arguments during their reading, or limited argument
elaboration by instructing participants to focus on the style of writing used by the author (instead of the strength of the arguments). Hence, the argument-focus condition was designed to replicate the findings of dissertation Study 1 with respect to the CRM, and the writing-focus condition was designed to cleanly test the ICM without alternative explanations based on the possibility of argument elaboration induced resource depletion.

In the writing-focus condition, an interaction between message imagery and instructions to correct was found such that, given no instructions to correct, there was a positive effect of imagery on attitudes, whereas given instructions to correct, there was actually a trend towards more negative attitudes given imagery. In the argument-focus condition, imagery tended to reduce persuasion regardless of instructions to correct—a pattern replicating the findings of dissertation Study 1 and once again confirming the CRM. All participants reported imagery experienced during the reading of the persuasive message. These images were coded in terms of whether the image was elicited directly by the text (the image came straight from the text), or whether the image was generated by the participant in response to the text (the image was not in the text). As expected, self-generated images did not relate to perceptions of unfair persuasion, nor to self-reports of imagery correction. In contrast, text-elicited images were positively correlated with perceptions of unfairness, and with reports of imagery correction.

Limitations. The mean patterns of attitudes and reports of correction in dissertation Study 2 appeared to strongly confirm the ICM predictions. Nevertheless, there were several key limitations to dissertation Study 2. For example, the key measure of correction asked people to what extent they tried to correct the influence of imagery out of their judgments. For any given participant, however, this question could mean
different things. Participants may have assumed that the imagery in the messages might have distracted them from rationale arguments, or that the imagery was in bad taste. In these cases, correction may have been in the service of putting judgments more in line with the message stance.

Another problem with the measurement of correction is that we did not examine factors other than imagery that might have been corrected for. Participants may have thought they were biased in that they would be naturally opposed to any tuition increase due to monetary concerns. In that case, when prodded, they may have corrected their judgments to be more in line with the stance of monetary concern. Generally, because the correction prod was so nonspecific, participants could have been correcting for just about anything (e.g., personal factors, message factors, source factors). Some participants may have corrected their judgments to make them more in line with the essay stance (tuition raise), perhaps fearing that their aversion to pay more money may have biased them against the communication.

These issues concerning the measurement of correction may have been responsible for the null correlation between reports of correction and attitudes. Hence, better measurement of correction is an essential next step in the validation of the ICM.

One final limitation of dissertation Study 2 is that the extent to which this study can be generalized to the real world remains unclear. The correction prod used in Study 2 was designed to create the best possible chance of demonstrating imagery correction. In many cases, however, explicit prods to remove bias (provided by the slight correction instructions condition) will typically not be present in real-world contexts. Hence, several questions relating to the external validity of our findings remain unanswered: Do
people actually correct for the influence of imagery in the real world? Under what common circumstances? We intend to provide initial answers to these questions with the proposed study.

Proposal for Future Study

In the proposed follow-up to dissertation Study 2, message imagery will be manipulated as in dissertation Study 2. In addition, participants will in some cases be prodded to correct their judgments prior to reporting their attitudes. However, the prod used in the proposed study will differ from that used in dissertation Study 2 in that it will be specific to biasing factors related to the message that might have biased them in favor of the essay stance. This new prod will be described in more depth in the Method section. Finally, the presence of ulterior source motives of the source will be manipulated (extreme ulterior motives vs. no ulterior motives).

In contrast to the dissertation Study 2, a topic will be chosen that ranges from neutral to somewhat counterattitudinal for participants. In essence, we want participants to be wary of persuasion, but not so utterly defensive that the manipulations will be ineffective. In conditions where the source is painted as extremely untrustworthy (due to ulterior motives), we hope to push defensiveness to a high level. Here, imagery should be ineffective due to correction regardless of the correction prod. When the source is relatively trustworthy, however, we expect imagery to be effective when no correction prod is presented, and ineffective given the correction prod. Hence, we will show that activating accuracy motivation in general (via prodding) can reduce the effectiveness of imagery, but also that certain variables (ulterior source motives) can also “turn on” correction motivation in the absence of a prod.

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The other crucial aspect of the proposed study will be the improved measurement of reports of correction. In dissertation Study 2, participants were asked to respond to the following statement, “I tried to adjust my opinions due to the influence of the imagery in the message.” However, this question obscured the direction of correction as well as the magnitude. These issues are addressed below in the Method section.

Method

Participants and Design

Participants will be approximately 270 male and female undergraduates participating for partial credit in their introductory psychology courses. Two hundred forty of these participants will be randomly assigned to one cell of a 2 message imagery (high imagery, low imagery) x 2 correction instructions (present, absent) x 2 source ulterior motives (present, absent) between-participants design. In addition, 30 participants will receive a control message that will allow for an attitudinal baseline on the key dependent measures.

Procedures

Participants will be recruited through the online participant recruiting website of the Research Experience Program. Participants will be asked to show-up for a study regarding essay reading. They will be told that they have been assigned to listen to one of several randomly chosen essays. Prior to reading the essays participants will be given a short overview of the topic at hand, and will also read about the author of the essay. Half of the participants will find out the author of the essay stands to gain from persuading people of his or her position (ulterior motives), and half will read that the
source cannot possibly benefit, and may even take some personal loss, from persuading others of their stance (no ulterior motives).

The essays themselves will then be presented to participants. To limit argument elaboration, all participants will be told to focus on the writing-style of the author (that is, the primary focus of the study). Half of the participants will read a high imagery version of the persuasive essay, and half will read a low imagery version (described below). After reading the essay, participants will be told that we are interested in their personal opinions about the chosen topic (because such opinions might have influenced their perceptions of the writing style, and we may want to take their opinions into account when analyzing their responses). Half of the participants will then continue on to report their attitudes. The other half, however, will be asked to remove any unwanted biases due to the writing of the message. Specifically, they will be told that aspects of the essay-writing itself may have unduly influenced their opinions, and so they should think about the presentation of the arguments, and techniques that the writer may have used, and then, if need be, correct their judgments accordingly. It will be stressed to them that their judgments might not, in fact, have been biased, and so correction might not be necessary.

All participants will complete standard measures relating to attitudes, behaviors, and emotions regarding the stance of the essay. Following this, participants will immediately be asked a number of question relating to correction. In a funnel-like fashion, they will first be asked to list any factors that they had considered might have biased their opinions. They will then be asked whether they had considered that the author’s use of vivid language and imagery might have influenced them. Following this,
they will be probed concerning reports imagery correction, the direction of such correction, and finally, the estimated magnitude.

Following reports of correction, participants will complete thought and image listing protocols. Image listings will be coded as images derived from the essay (text-elicited) and those generated by the participant (not from the essay: self-generated). Participants will also be asked to rate the source, and to give their perceptions of how certain persuasive tactics might have been used against them, and how that made them feel. Finally, participants will complete the need for cognition scale.

**Persuasive communications.** Various topics will be pretested to find one for which the average participant has relatively neutral to counterattitudinal preexisting opinions. Once a basic message topic is chosen, strong arguments in favor of the given topic will be created. A basic message template will be augmented in the high imagery condition with corresponding imagery statements (similar to dissertation Study 2). The two basic message conditions (high and low imagery) will be pretested along with a control message to insure sufficient attitudinal impact. We will also attempt to verify the difference in imagery evocation between the high and low imagery message, while minimizing unintended differences (argument strength, complexity, etc.).

Expected Results

**Analytic Strategy**

The three manipulated variables will be entered into ANOVAs with the relevant dependent measures. Initially, we will employ the regression procedures used in dissertation Study 1 to insure that need for cognition does not interact with any of the dependent variables.
Main Analyses

Attitudinal dependent measures. As summarized above, in conditions where the source is painted as extremely untrustworthy (due to ulterior motives), imagery should be ineffective due to correction regardless of the prod. In contrast, when the source is relatively trustworthy (no ulterior motives), we expect imagery to be effective when no correction prod is presented, and ineffective given the correction prod (correction spurred by accuracy motivation). These predictions are summarized in Table R.1.

Correction for imagery reports. Predictions for reports of correction (it is unclear exactly what combination of the correction report variables will provide the most accurate measurement of correction), are in some ways a mirror-image of the attitude predictions. For the low imagery messages, participants, hopefully regardless of prod and ulterior motives, should have little reason to correct for imagery. For the high imagery messages, in contrast, given a prod to correct or a source with ulterior motives, participants should more frequently report correction for imagery. Only given a source with no ulterior motives, and no prods to correct, should reports of imagery correction be slight. These predictions are summarized in Table R.2.

Mediational Analyses

In dissertation Study 2, we examined the intercorrelations between self-generated and text-elicited imagery, attitudes, reports of imagery correction, emotions, and perceptions that imagery was being used unfairly. Similar analyses will be conducted in the present study. We expect that the high imagery messages will increase reports of text-elicited imagery, which will increase perceptions that imagery was being used unfairly (especially given a correction prod or an untrustworthy source). Perceptions that
imagery is being used unfairly should increase negative emotions, and should also increase reports of imagery correction. Both of these latter two variables, in turn, should be negatively related to attitudes. Self-generated imagery is not expected to correlate significantly with any of the variables discussed above. Figure R.1 contains this pattern of corrections in a diagram.

Conclusions

Study 2 in the dissertation demonstrated that people can and will, when prodded, correct the perceived biasing effects of imagery out of their judgments. However, insufficient measurement of reports of such correction made it difficult to link correction directly to attitudes. Furthermore, the external validity of the dissertation Study 2 was somewhat questionable due to the use of an explicit prod to correct judgments which is typically lacking in real world persuasion situations. The proposed study intends to address both of these criticisms of dissertation Study 2 by measuring correction more effectively, and also by inducing correction in a condition with no explicit prod to correct (with ulterior motives). Assuming the results of the proposed study are as anticipated, then taken together, these two studies will constitute a very strong initial confirmation of the Imagery Correction Model.
<table>
<thead>
<tr>
<th>Message Imagery</th>
<th>No Ulterior Motives</th>
<th>Ulterior Motives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prod to Correct</td>
<td>No Prod to Correct</td>
</tr>
<tr>
<td>High Imagery</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Low Imagery</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Note. Attitudes will be measured on a 7-point scale. Assumes a control attitude of 1.

Table R.1: Predicted influence of message imagery, correction instructions, and source ulterior motive manipulation on attitudes.
<table>
<thead>
<tr>
<th>Message Imagery</th>
<th>No Ulterior Motives</th>
<th>Ulterior Motives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prod to Correct</td>
<td>No Prod to Correct</td>
</tr>
<tr>
<td>High Imagery</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Low Imagery</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Note. Reports of correction for imagery will be measured on a 7-point scale.

Table R.2: Predicted influence of message imagery, correction instructions, and source ulterior motive manipulation on reports of correction for imagery.
Note. Numbers represent correlations between the various constructs.

Figure R.1: Predicted pattern of interrelationships between key variables in the proposed study.
APPENDIX S

TABLES
Imagery Mediation Relating to the Reception

Grabs and maintaining attention.
Enhances comprehension.
Increases memorability and availability of arguments.
Distracts from central message arguments.
Mimics direct experience.
Enhances emotional responses and arousal.
Influences source salience
Elicits disengagement due to graphic nature.

Imagery Mediation Relating to Message Processing

Influences motivation to elaborate.
Influences motivation and ability to counterargue message.
Increases self-relevant responding.
Functions as a metaphorical referent.
Enhances transportation.
Promotes or aids holistic processing.

Imagery Mediation Relating to Evaluation

Aids classical conditioning.
Enhances automatic evaluation.
Fosters attitude/belief consolidation.
Acts as an anchor for subsequent judgments.
Creates a cognitive set that discourages alternative interpretations.
Affects source evaluations.

Table S.1: Potential mechanisms of image-based persuasion.
Imagery Moderators Relating to Source Factors

Source likeability
Source credibility
Source polish

Imagery Moderators Relating to Communication Factors

Congruency of imagery
Eloquence of imaginal language
Imagery interactivity
Appropriateness

Imagery Moderators Relating to Qualities of the Communication

Argument complexity
Number of imagery sources
Modality
Narrativity
Time of measurement
Online vs. memory-based judgment
Prior attitudes
Emotional quality of attitudes
Imagery ability
Topic relevance
Prior knowledge
Valence of associated elaborations
Self-relevance of imagery

Imagery Moderators Relating to Context Factors

Attentional competition

Table S.2: Potential moderators of the effects of imagery on persuasion.
<table>
<thead>
<tr>
<th></th>
<th>Pictorial Perception</th>
<th>Non-Pictorial Stimuli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orienting Response</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Imagery elaboration</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Argument Elaboration</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Maintenance/Manipulation</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

Table S.3: Processing of pictorial and non-pictorial imagery in persuasive communications: Resource allocations.
Cognitive resource predictions made. & ELM & RMM & LCM & CRM \\
--- & x & x & x & x \\
Distinguishes between RA < RR and RA ≥ RR. & x & x & x & x \\
Distinguishes between RA = RR and RA > RR. & x & x &  \\
Specific predictions about resource interference between multiple processes. &  \\
Specific about the general levels at which resource competition would occur. & x & x &  \\
Specific about the actual pool(s) of resources that are limited. & x &  \\

*Note.* ELM = Elaboration Likelihood Model; RMM = Resource Matching Model; LCM = Limited Capacity Model; CRM = Cognitive Resources Model; RA = Resources Available; RR = Resources Required.

Table S.4: Comparison of models that contain resource predictions.
<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Support for CRM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Studies that Manipulated Imagery Focus</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sherman, et al. (1985)</td>
<td>120</td>
<td>+</td>
</tr>
<tr>
<td>Rossiter &amp; Percy (1978)</td>
<td>88</td>
<td>+</td>
</tr>
<tr>
<td>Kisielius &amp; Sternthal (1984—Study 1)</td>
<td>90</td>
<td>+</td>
</tr>
<tr>
<td><strong>Studies that Allow Inferences about Degree of Argument Elaboration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keating &amp; Latane (1976)</td>
<td>682</td>
<td>+</td>
</tr>
<tr>
<td>Sullivan &amp; Macklin (1988)</td>
<td>54</td>
<td>+</td>
</tr>
<tr>
<td>Miller &amp; Marks (1992)</td>
<td>124</td>
<td>+</td>
</tr>
<tr>
<td>Burns, et al. (1993)</td>
<td>377</td>
<td>+</td>
</tr>
<tr>
<td>Chaiken &amp; Eagly (1983—Study 1)</td>
<td>321</td>
<td>+</td>
</tr>
<tr>
<td>Chaiken &amp; Eagly (1983—Study 2)</td>
<td>179</td>
<td>+</td>
</tr>
<tr>
<td>Reyes, et al. (1980)</td>
<td>54</td>
<td>+</td>
</tr>
<tr>
<td>Keller &amp; Block (1997—Study 1)</td>
<td>120</td>
<td>+</td>
</tr>
<tr>
<td>Keller &amp; Block (1997—Study 2)</td>
<td>94</td>
<td>+</td>
</tr>
<tr>
<td>Keller &amp; Block (1997—Study 3)</td>
<td>190</td>
<td>+</td>
</tr>
<tr>
<td>Smith &amp; Shaffer (2000)</td>
<td>288</td>
<td>+</td>
</tr>
<tr>
<td>Adaval &amp; Wyer (1998—Study 1)</td>
<td>80</td>
<td>+</td>
</tr>
<tr>
<td>Adaval &amp; Wyer (1998—Study 2)</td>
<td>144</td>
<td>-</td>
</tr>
<tr>
<td><strong>Studies that Manipulated Attentional Resources</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chaiken &amp; Eagly (1976)</td>
<td>321</td>
<td>+</td>
</tr>
<tr>
<td>Wilson, et al. (1989)</td>
<td>102</td>
<td>+</td>
</tr>
<tr>
<td>Shedler &amp; Manis (1986)</td>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td>Kisielius &amp; Sternthal (1984—Study 2)</td>
<td>58</td>
<td>+</td>
</tr>
<tr>
<td>Frey &amp; Eagly (1993)</td>
<td>171</td>
<td>mixed&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>1</sup> See text for explanation.

Note: Studies are order as they are discussed in the text.

Table S.5: Summary of Studies Relevant to the CRM
<table>
<thead>
<tr>
<th></th>
<th>High Need for Cognition</th>
<th></th>
<th>Low Need for Cognition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Limited Argument Elaboration</td>
<td>Normal Argument Elaboration</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
<td>High Imagery</td>
</tr>
<tr>
<td>Initial Attitudes</td>
<td>5.31</td>
<td>3.76</td>
<td>4.22</td>
</tr>
<tr>
<td>Delayed Attitudes</td>
<td>5.21</td>
<td>3.05</td>
<td>3.10</td>
</tr>
<tr>
<td>High Imagery</td>
<td>4.48</td>
<td>4.37</td>
<td>4.56</td>
</tr>
<tr>
<td>Low Imagery</td>
<td>3.89</td>
<td>3.14</td>
<td>4.44</td>
</tr>
</tbody>
</table>

Table S.6: Projected initial and delayed attitude means by message imagery, message execution, and need for cognition.
<table>
<thead>
<tr>
<th></th>
<th>Limited Argument Elaboration</th>
<th>Normal Argument Elaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
</tr>
<tr>
<td>Behavioral Intent</td>
<td>5.76</td>
<td>3.73</td>
</tr>
<tr>
<td>Low Need for Cognition</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limited Argument Elaboration</td>
<td>Normal Argument Elaboration</td>
</tr>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
</tr>
<tr>
<td>Behavioral Intent</td>
<td>4.28</td>
<td>4.14</td>
</tr>
</tbody>
</table>

Table S.7: Projected behavioral intent means by message imagery, message execution, and need for cognition.
<table>
<thead>
<tr>
<th></th>
<th>Limited Argument Elaboration</th>
<th>Normal Argument Elaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
</tr>
<tr>
<td>High Need for Cognition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative Emotions</td>
<td>4.62</td>
<td>3.90</td>
</tr>
<tr>
<td>Low Need for Cognition</td>
<td>Limited Argument Elaboration</td>
<td>Normal Argument Elaboration</td>
</tr>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
</tr>
<tr>
<td>Negative Emotions</td>
<td>4.23</td>
<td>3.42</td>
</tr>
</tbody>
</table>

Table S.8: Projected negative emotion composite means by message imagery, message execution, and need for cognition.
<table>
<thead>
<tr>
<th></th>
<th>Limited Argument Elaboration</th>
<th>Normal Argument Elaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Imagery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Imagery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive Thoughts</td>
<td>0.52</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td>0.44</td>
<td>0.56</td>
</tr>
</tbody>
</table>

|                        |                              |                             |
| High Imagery           |                              |                             |
| Low Imagery            |                              |                             |
| Positive Thoughts      | 0.43                         | 0.43                        |
|                       | 0.70                         | 0.34                        |

Table S.9: Projected positive thought index means by message imagery, message execution, and need for cognition.
<table>
<thead>
<tr>
<th>Source Liking</th>
<th>Limited Argument Elaboration</th>
<th>Normal Argument Elaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Imagery</td>
<td>4.63</td>
<td>4.63</td>
</tr>
<tr>
<td>Low Imagery</td>
<td>3.69</td>
<td>4.80</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source Liking</th>
<th>Limited Argument Elaboration</th>
<th>Normal Argument Elaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Imagery</td>
<td>4.23</td>
<td>6.01</td>
</tr>
<tr>
<td>Low Imagery</td>
<td>4.17</td>
<td>3.75</td>
</tr>
</tbody>
</table>

Table S.10: Projected source liking means by message imagery, message execution, and need for cognition.
Table S.11: Mediational accounts of the Cognitive Resources Model for Study 1.

<table>
<thead>
<tr>
<th>Need for Cognition</th>
<th>Argument Elaboration</th>
<th>Message Imagery</th>
<th>Assumed Mediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. High</td>
<td>Limited</td>
<td>High</td>
<td>Imagery/Emotion</td>
</tr>
<tr>
<td>2. High</td>
<td>Limited</td>
<td>Low</td>
<td>No Prediction</td>
</tr>
<tr>
<td>3. High</td>
<td>Normal</td>
<td>High</td>
<td>Argument</td>
</tr>
<tr>
<td>4. High</td>
<td>Normal</td>
<td>Low</td>
<td>Argument</td>
</tr>
<tr>
<td>5. Low</td>
<td>Limited</td>
<td>High</td>
<td>Imagery/Emotion</td>
</tr>
<tr>
<td>6. Low</td>
<td>Limited</td>
<td>Low</td>
<td>No Prediction</td>
</tr>
<tr>
<td>7. Low</td>
<td>Normal</td>
<td>High</td>
<td>Imagery/Emotion</td>
</tr>
<tr>
<td>8. Low</td>
<td>Normal</td>
<td>Low</td>
<td>No Prediction</td>
</tr>
</tbody>
</table>

Note: “Imagery/Emotion” denotes mediation of persistence based on imagery elaboration and corresponding emotion. “Argument” denotes mediation of persistence based on argument elaboration. “No Prediction” indicates that no specific mediational account is offered by the CRM.
<table>
<thead>
<tr>
<th></th>
<th>Writing Focus</th>
<th>Slight Correction Instructions</th>
<th>No Correction Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
<td>High Imagery</td>
</tr>
<tr>
<td>Attitudes</td>
<td>M 5.33</td>
<td>5.95</td>
<td>6.00</td>
</tr>
<tr>
<td></td>
<td>SD 2.09</td>
<td>1.93</td>
<td>1.57</td>
</tr>
<tr>
<td>Argument Focus</td>
<td>Slight Correction Instructions</td>
<td>No Correction Instructions</td>
<td>High Imagery</td>
</tr>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
<td>High Imagery</td>
</tr>
<tr>
<td>Attitudes</td>
<td>M 5.77</td>
<td>6.17</td>
<td>5.32</td>
</tr>
<tr>
<td></td>
<td>SD 1.74</td>
<td>2.00</td>
<td>1.98</td>
</tr>
</tbody>
</table>

Table S.12: The effects of message imagery, correction instructions, and reading instructions on attitudes (means and standard deviations).
<table>
<thead>
<tr>
<th></th>
<th>Slight Correction Instructions</th>
<th>No Correction Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
</tr>
<tr>
<td>Imagery M</td>
<td>5.52</td>
<td>4.30</td>
</tr>
<tr>
<td>Correction SD</td>
<td>1.71</td>
<td>1.40</td>
</tr>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
</tr>
<tr>
<td>Imagery M</td>
<td>5.15</td>
<td>3.96</td>
</tr>
<tr>
<td>Correction SD</td>
<td>1.85</td>
<td>1.81</td>
</tr>
</tbody>
</table>

Table S.13: The effects of message imagery, correction instructions, and reading instructions on reports of imagery correction (means and standard deviations).
Table S.14: The effects of message imagery, correction instructions, and reading instructions on the negative emotion composite (means and standard deviations).
Table S.15: The effects of message imagery, correction instructions, and reading instructions on the perceptions that imagery was unfair composite (means and standard deviations).
Table S.16: The effects of message imagery, correction instructions, and reading instructions on text-elicited imagery (means and standard deviations).
<table>
<thead>
<tr>
<th>Writing Focus</th>
<th>Slight Correction Instructions</th>
<th>No Correction Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
</tr>
<tr>
<td>Self-Gen. M</td>
<td>1.72</td>
<td>2.96</td>
</tr>
<tr>
<td>Imagery SD</td>
<td>2.23</td>
<td>2.64</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Argument Focus</th>
<th>Slight Correction Instructions</th>
<th>No Correction Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
</tr>
<tr>
<td>Self-Gen. M</td>
<td>1.46</td>
<td>3.00</td>
</tr>
<tr>
<td>Imagery SD</td>
<td>1.14</td>
<td>1.91</td>
</tr>
</tbody>
</table>

Table S.17: The effects of message imagery, correction instructions, and reading instructions on self-generated imagery (means and standard deviations).
<table>
<thead>
<tr>
<th>Writing Focus</th>
<th>Slight Correction Instructions</th>
<th>No Correction Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High Imagery</td>
<td>Low Imagery</td>
</tr>
<tr>
<td>Positive Thoughts</td>
<td>M</td>
<td>0.44</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>0.29</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Argument Focus</th>
<th>Slight Correction Instructions</th>
<th>No Correction Instructions</th>
</tr>
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<tr>
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<td>High Imagery</td>
<td>Low Imagery</td>
</tr>
<tr>
<td>Positive Thoughts</td>
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</tr>
<tr>
<td></td>
<td>SD</td>
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Table S.18: The effects of message imagery, correction instructions, and reading instructions on the positive thoughts index (means and standard deviations).
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<tr>
<td>1. Imagery Manipulation</td>
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<td>2. Text-elicited Imagery</td>
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<td>3. Self-generated Imagery</td>
<td>-.13</td>
<td>-.18*</td>
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<td>4. Negative Emotions Composite</td>
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<td>-.25**</td>
<td>.17*</td>
<td>—</td>
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<tr>
<td>5. Perceptions of Unfair Imagery</td>
<td>.19**</td>
<td>.20**</td>
<td>.09</td>
<td>.19**</td>
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<td>6. Reports of Imagery Correction</td>
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<td>.17*</td>
<td>-.06</td>
<td>.06</td>
<td>.36**</td>
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<td>7. Attitudes</td>
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<td>.28**</td>
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<td>.03</td>
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</tr>
</tbody>
</table>

Note: For all variables, higher number corresponded with more of the measured construct.

† $p < .10$.  * $p < .05$.  ** $p < .01$.

Table S.19: Intercorrelations between key variables.
APPENDIX T

FIGURES
Note: Values are standardized Beta-values. The value in parentheses is the effect of message imagery on delayed attitudes after partialling out negative emotions.

\* \( p < .05 \)      \** \( p < .01 \).

Figure T.1: Mediation of the effect of message imagery on delayed attitudes by negative emotions \((N = 50)\).
Note: Values are standardized Beta-values.

** $p < .01$.

Figure T.2: Lack of mediation of the effect of message imagery on delayed attitudes by negative emotions (N= 22).