ABSTRACT

Current theories of assimilation and contrast propose mechanisms for contrast that can be thought of as requiring relatively high or low degrees of thought. The purpose of this research was to examine whether high or low thought contrast judgments would have implications for the strength of the resulting judgment. Strength was assessed by the degree of confidence individuals had in their judgments. In two studies, amount of processing was varied by manipulating ability or motivation to engage in effortful thinking. In Experiment 1, a manipulation of on-line versus memory based processing led to greater certainty, without influencing the extent of contrast. In Experiment 2, personal relevance was manipulated and also led to greater certainty, without influencing the extent of contrast. This research provides evidence for differential consequences of the same contrastive judgments and links the voluminous literature on judgmental contrast to that on attitude strength.
Dedicated to Ingrid and Jo
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td></td>
<td>ii</td>
</tr>
<tr>
<td>Dedication</td>
<td></td>
<td>iii</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td></td>
<td>iv</td>
</tr>
<tr>
<td>Vita</td>
<td></td>
<td>v</td>
</tr>
<tr>
<td>List of Figures</td>
<td></td>
<td>vii</td>
</tr>
<tr>
<td>Chapters:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Introduction</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>2. Experiment 1</td>
<td></td>
<td>13</td>
</tr>
<tr>
<td>Method</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Results</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>3. Experiment 2</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Method</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>Results</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>Discussion</td>
<td></td>
<td>41</td>
</tr>
<tr>
<td>4. General Discussion</td>
<td></td>
<td>44</td>
</tr>
<tr>
<td>Bibliography</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>Appendices:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Materials for Experiment 1</td>
<td></td>
<td>56</td>
</tr>
<tr>
<td>B. Materials for Experiment 2</td>
<td></td>
<td>61</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Time 1 attitude ratings (Experiment 1)</td>
<td>20</td>
</tr>
<tr>
<td>2.2</td>
<td>Time 1 certainty ratings (Experiment 1)</td>
<td>21</td>
</tr>
<tr>
<td>2.3</td>
<td>Behavioral intentions (Experiment 1)</td>
<td>22</td>
</tr>
<tr>
<td>2.4</td>
<td>Time 2 attitude ratings (Experiment 1)</td>
<td>23</td>
</tr>
<tr>
<td>3.1</td>
<td>Attitude ratings (Experiment 2)</td>
<td>38</td>
</tr>
<tr>
<td>3.2</td>
<td>Certainty ratings (Experiment 2)</td>
<td>39</td>
</tr>
<tr>
<td>3.3</td>
<td>Behavioral intentions (Experiment 2)</td>
<td>40</td>
</tr>
</tbody>
</table>
Judgments are by nature comparative. The standards we compare to the target of our judgment can influence our assessment of the qualities of that target. This influence can take two forms: contrast or assimilation. The influence of a standard results in contrast if the judgment of the target is biased by the standard such that the evaluation of the target diverges from that of the standard, increasing the difference between the evaluations. To illustrate, consider the classic Donald paragraph describing the ambiguously hostile behavior of Donald as he accompanies a friend around town. Research has shown that when Donald is compared to extreme exemplars, his actions seem more like the opposite of the qualities of those exemplars. In other words, Donald seems more hostile when compared to Shirley Temple and more friendly compared to Adolf Hitler then he would on his own (Herr, 1986).

Assimilation is the opposite of contrast. Instead of the target and standard diverging, assimilation occurs when the judgment of the target is biased by presentation of a standard such that the target seems more similar to the standard. Research that also utilizes the Donald paradigm has shown that when participants were primed with trait words, Donald’s behavior seemed more like those traits. For example, Donald seems
friendlier after being primed with the concept of friendly and more hostile after being
primed with the concept of hostile than he otherwise would (Srull & Wyer, 1979, 1980).

Contrast Can be Based on High or Low Thought

The goal of the current research is to show that not all judgmental biases of the
same magnitude are alike. That is, they can differ in strength. To provide an initial
examination of this possibility, the current research focuses only on contrast effects. The
most important reason for this is that past research and theory has more clearly indicated
that contrastive judgments can be produced under both relatively high and low thought
conditions, a proposed antecedent of differential strength consequences. Although some
have proposed that the extent of thinking could affect the extent of contrast (e.g.,
Mussweiler, 2003), no prior research has proposed that the extent of thinking could affect
other important aspects of contrast such as how important the contrast effect will be for
subsequent behavior. After reviewing research and theory suggesting that contrast can
occur under both low and high thought conditions, the predictions for the current research
are outlined.

On the low thought end of the thinking continuum, the Interpretation Comparison
Model (Stapel, 2007; Stapel & Blanton, 2004; Stapel & Koomen, 2000, 2001; Stapel,
Koomen, & Ruys, 2002; Stapel & Suls, 2004) suggests that contrast does not require high
levels of conscious thought. The ICM focuses on how accessible knowledge is used at
which stage (encoding or judgment) of impression formation. The model states that
assimilation occurs when accessible knowledge is used to interpret and understand a
target stimulus during the encoding stage. So, standards essentially guide the
interpretation of targets, as the targets are processed. Contrast occurs when accessible
knowledge is used to evaluate and appraise a target stimulus during the judgment stage. In other words, standards provide a basis or anchor to compare to the target. This judgment/comparison process is not assumed to require high levels of thought.

In one study, for example, self-judgments of friendliness were impacted by subliminal pictures of a hostile or friendly person (Stapel & Blanton, 2004, Study 3). Specifically, in this study, participants were subliminally presented several times with pictures of either Gandhi or Hitler. They were then asked to rate themselves on a scale from friendly or unfriendly. Participants who had been primed with Gandhi rated themselves significantly less friendly than those participants who had been primed with Hitler. In this study, participants were presumably unable to engage in effortful and elaborative comparison of the standards and target, as the standards were presented subliminally. However, participants could have engaged in much thought about the target guided by the subliminal primes. Nevertheless, despite this possibility, the ICM assumes that contrast involves a relatively simple comparison process involving relatively little thought (for a similar argument, see Dijksterhuis, Spears, & Lepinasse, 2001; Dijksterhuis et al., 1998; Spears, Gordijn, Dijksterhuis, & Stapel, 2004; Stapel & Koomen, 2006; Stapel et al., 2002)

Other theorists have proposed that relatively more thoughtful processes are involved in contrast effects. For instance, the Selective Accessibility Model (Mussweiler, 2001a, 2003, 2007; Mussweiler & Strack, 1999) proposes a more elaborative set of processes for contrast. The SAM proposes that both assimilation and contrast result from a search for information consistent with the either the hypothesis that the standard and target are similar (in the case of assimilation) or the hypothesis that the standard and
target are different (in the case of contrast). This process takes place in two steps. The first step is a quick assessment of whether the target and standard are generally similar or dissimilar. The result of this assessment determines the hypothesis to be tested. If the standard and target are judged to be similar, “similarity testing” occurs; if they are judged to be dissimilar, “dissimilarity testing” occurs. Knowledge consistent with the hypothesis is then generated. In the case of similarity testing, knowledge supporting the idea that the standard and target are similar comes to mind, which leads to assimilation. Conversely, in the case of dissimilarity testing, knowledge supporting the hypothesis that the standard and target are *dissimilar* comes to mind, which results in contrast.

In one study, for example, participants’ judgments of their adjustment to college were influenced by comparing themselves to a description of a very well-adjusted college student (Mussweiler, 2001b). Participants first completed a procedural priming task in which they listed either similarities (similarity-focused condition) or differences (dissimilarity-focused condition) between two pictures. Then, they read the description of the college student and were finally asked to write a few sentences comparing their own adjustment to college with the adjustment of the target person. Those in the similarity-focused condition listed more similarities than those in the dissimilarity-focused condition. In the main study, the same procedure was carried out, except that some participants read about a maladjusted student while others read the original description. For all participants the thought listings were replaced by ratings of their own levels of adjustment. Participants in the similarity-focused condition assimilated the description of the student to themselves, reporting greater adjustment when they had read about the well-adjusted student than the maladjusted student. In contrast, participants in a
dissimilarity mindset contrasted themselves from the descriptions, reporting less adjustment after reading about the well-adjusted student than the maladjusted student. In these two studies, assimilation and contrast apparently result from generating thoughts that support the hypothesis that one is similar or that one is dissimilar from the standard. It appears, then, that contrast can also occur through relatively thoughtful means (for a similar argument, see Bless & Schwarz, 1998; Bless, Schwarz, & Wänke, 2003; Schwarz & Bless, 1992, 2007.

Clearly, the mechanisms proposed for contrast and the methodologies used to produce contrast vary in terms of how much elaboration is presumed to be needed. That is, while some researchers have theorized that contrast can result from relatively low effort comparison processes (e.g., Stapel, 2007), others have argued that contrast typically involves a more elaborative dissimilarity testing (e.g., Mussweiler, 2003). The current research argues that the extent of thinking going into a contrastive judgment is an important determinant of the strength of that judgment. This has not been proposed previously in the literature on assimilation and contrast. Rather, if anything, the extent of thinking is believed to determine the extent of contrast (Mussweiler, 2003). The current hypothesis is based on research on the strength of attitudes based on differing amounts of thinking. In the literature on attitude strength (Petty & Krosnick, 1995), it has been shown that even when the extent of attitude change is the same, differing amounts of elaboration can still have an important impact on the strength of the attitude (for a review see Petty, Haugtvedt, & Smith, 1995). Strong attitudes are those that are persistent over time, resistant to change, and impactful on other judgments and behavior (Krosnick & Petty, 1995).
Attitudes Based on High or Low Thought Vary in Strength

Research on attitude change has shown that the same variable (e.g., source credibility, emotion) can have an impact on attitudes by relatively thoughtful or nonthoughtful processes (e.g., Chaiken & Maheswaran, 1994; Petty, Schumann, Richman, & Strathman, 1993; Wegener, Clark, & Petty, 2006). Furthermore, whether the process by which a variable produces change involves a low or high degree of elaboration might not influence the extent of attitude change, but it will impact the strength with which the attitude is held.

To illustrate, consider the effect of transitory emotions on persuasion. Emotions can affect attitudes by either serving as a simple cue that directly impacts persuasion (e.g., Schwarz & Clore, 1983) or by biasing the thoughts that come to mind (e.g., Blaney, 1986). While the former process does not require much thought, the latter requires some minimum level of thinking (otherwise there are no thoughts to bias). Petty and colleagues (1993) conducted a study that examined the processes through which incidental emotion leads to attitude change under high and low elaboration conditions. They found that positive (compared to neutral) mood led to more positive attitudes, and that the extent of positivity did not differ between high- and low-thinking groups based either on a manipulation of personal relevance (Petty & Cacioppo, 1979) or by assessing it as an individual difference in need for cognition (Cacioppo & Petty, 1982). However, the mediation of the impact of emotion on attitudes was different in the high and low thinking groups. In particular, emotion only affected the valence of thoughts under high-, but not low-involvement. Furthermore, under high elaboration, the effect of emotion on attitudes was mediated by the positivity of the thoughts that came to mind, suggesting
that mood had influenced the attitudes by biasing the thoughts that came to mind (as in Blaney, 1986). Conversely, under low elaboration, mood directly impacted the attitudes themselves and not the thoughts consistent with the use of emotion as a heuristic (as in Schwarz & Clore, 1983).

In a subsequent study, Chaiken and Maheswaran (1994) found a similar effect for source expertise. Specifically, under low processing conditions (i.e., when the attitude was of low importance), source expertise served as a cue that directly impacted attitude judgments (when credibility was low, attitudes were more negative than when credibility was high). In contrast, under high processing (i.e., when the attitude was of high importance), source credibility biased the processing of the persuasive message which in turn led to essentially the same attitudes as those participants who had not elaborated upon the message carefully. However, this was only the case for ambiguous messages. For unambiguous messages, there was no effect of source expertise, which suggests that stimuli must be somewhat ambiguous for biased processing to occur (as is the case in the literature on assimilation and contrast, see Philippot, Schwarz, Carrera, de Vries, & Van Yperen, 1991; Stapel et al., 1997; Stapel & Suls, 2004).

As noted earlier, the mechanism by which an attitude is changed – involving relatively high or low amounts of thought is important because of the overall strength of the attitudes formed. Numerous studies have documented a link between high thought and strong attitudes. For example, in one study (Wegener, Clark, & Petty, 2006), participants were placed in high or low cognitive load conditions (to vary the extent of processing) and were given a description of a child of low socioeconomic status named Donald. Then they viewed an intelligence test ostensibly completed by Donald with a
moderate number of answers marked incorrect. Next, participants rated his performance and abilities. Following their initial impression of Donald, participants were given a counter-attitudinal persuasive message that took the form of feedback that another person had viewed a videotape of Donald and rated him more positively than they did. Finally, participants rated Donald’s performance and abilities again. Cognitive load did not impact the initial impressions of Donald. However, participants who formed their initial impression under low cognitive load were less influenced by the counter-attitudinal message and reported lower impressions of his abilities and performance than participants who had been under high load. The ability of an attitude to resist change in the face of contrary information is a key consequence of attitude strength (Krosnick & Petty, 1995).

Preliminary Work Suggesting Variations in Strength of Contrast Judgments

Based on the attitudes literature just reviewed, it was hypothesized that if contrast can result from high and low thought processes, the contrast judgments should differ in their strength with high thought contrast effects being stronger (more consequential) than low thought contrast effects. Before turning to the current studies, it is useful to review some past research that provides some preliminary support for this idea. In this prior work, the key manipulation was the order of presentation of the standards and the target stimuli. This manipulation was selected because prior research had suggested that the order of target and standards does not result in differing amounts of contrast, though order might impact the extent of thought involved in the contrast. For example, in one prior study (Stapel et al., 1997, Experiment 3) participants were primed with hostile (Dracula, Stalin, Hitler) or friendly (Aladdin, Gandhi, Mandela) standards either before
or after the participants read the ambiguously friendly Donald paragraph. Regardless of whether the standards came before or after Donald, participants rated him as more hostile when the standards were friendly than when the standards were hostile people.

Although the extent of the contrast did not differ in prior research varying the order of standards and targets, the research just reviewed on elaboration and attitude strength suggests that order might matter for the strength of the judgment. This is because order is plausibly related to the amount of thinking involved in the contrast judgment with more thinking going into the contrast judgment when standards precede targets than when they follow targets.

To test this idea, two studies were carried out examining the effect of order on the extent and strength of judgmental contrast (Rucker, Petty, & Shackarchi, 2004; Shoots-Reinhard, Rucker, & Petty, 2008). Order was hypothesized to impact elaboration because when the context of a judgment (e.g., the standards) comes first, people may be able to elaborate more on the comparison of the standards and target and make the comparison (or engage in dissimilarity testing) on-line, whereas when the target of the judgment comes first, the subsequent comparison of standards and target (or dissimilarity testing) relies on the memory of the target, which could be less elaborative. Furthermore, if the comparison is more elaborative when the standards come first, it would also be expected that the resulting judgment would be held with more strength than the attitudes formed when the target comes first.

To assess strength in this research, the investigators assessed the certainty with which the judgment was held. Certainty is a well accepted indicator of strength (see Gross, Holz, & Miller, 1995; Petty, Briñol, Tormala, & Wegener, 2007, for reviews). In
particular, attitudes held with high certainty have been shown to be more persistent (e.g., Bassili, 1996), resistant (e.g., Tormala & Petty, 2002), and predictive of behavior (e.g., Fazio & Zanna, 1978), than attitudes held with low certainty.

In the first study (Rucker et al., 2004), participants were asked to read descriptions of three individuals. All participants read about the same neutral target person, Jason, who engaged in a number of behaviors intended to make him seem rather ambiguous. He parked in someone else’s parking space, which is slightly negative, but he bought some Girl Scout cookies from a local troop, which is slightly positive. For half of the participants, the remaining individuals, Matt and Mike, performed extremely positive behaviors (e.g., helping an elderly woman cross the street). For the other half, the remaining individuals performed extremely negative behaviors (e.g., mugging someone). In addition, half of the participants read about Matt and Mike (the extremely positive or negative standards) first, whereas the other half read about Jason (the ambiguous target) first.

Participants did contrast Jason from Matt and Mike, rating him more positively when the behaviors of the standards were extremely negative than when their behaviors were extremely positive. Furthermore, the extent of contrast did not differ depending on the order of target and standards (replicating Stapel, et al., 1997). It is important that the attitudes did not differ in extremity (i.e., were not affected by the order manipulation). If processing was successfully manipulated and impacted strength, but the attitudes formed under high elaboration were more extreme, it could be the case that any observed difference in strength was due to differences in extremity.
Although order did not impact the magnitude of contrast, order did, however, impact certainty such that participants were more certain of their judgments of Jason when they had read about Matt and Mike first than when they read about Jason first. In addition, a mediational analysis provided some evidence that order led to different levels in certainty, which in turn moderated attitude-intention consistency.

The second study (Shoots-Reinhard et al., 2008) was conducted to determine whether the difference in certainty observed in the first study was due to elaboration. Participants in this study were asked to rate a hotel (Ramada Inn) they read about. They were asked to rate the hotel by comparing it to either inexpensive (e.g., Motel 6, Super 8) or expensive (e.g., Hilton, Ritz-Carlton) hotels. This comparison instruction came either before or after the information about the Ramada, so that some participants were able to compare the standards to the target on-line, as they read about the target, whereas other participants had to make the comparison based on what they could recall of the target from memory, after they had already read about it.

As in the first study, participants did contrast the standards and target, rating the Ramada Inn as more expensive when compared to the inexpensive hotels than when compared to the expensive ones, and the extent of this contrast was not at all impacted by the manipulation of order. Order did impact certainty, however (replicating Rucker, et al., 2004), as well as ratings of perceived effort at the task. Furthermore, the effect of order on certainty was mediated by perceived effort, such that when the comparison instruction came first, participants perceived themselves as having put more effort into the task, which led to more certainty.
The Current Research

These two previous studies suggest that order affects judgment strength without affecting the extent of contrast and that this difference is impactful (as measured by certainty and attitude-intention consistency). However, in this research, the extent of thinking was not manipulated directly but was assumed from a manipulation of order. To provide more definitive evidence that the extent of elaboration can affect the strength of contrast judgments, more well-validated and direct manipulations of the extent of thinking were used in the current studies.

Thus, the primary goal of the current research was to first replicate the effects of elaboration on judgmental strength without affecting the extent of contrast, by manipulating elaboration directly. This would more clearly demonstrate that different degrees of elaboration can result in contrast judgments of different strength. To vary the extent of elaboration, Experiment 1 used a standard manipulation of on-line versus memory-based processing (e.g., Mackie & Asuncion, 1990), and Experiment 2 used a common manipulation of personal relevance (e.g., Petty & Cacioppo, 1979). In each case it was predicted that the extent of contrast would be the same under high and low thinking conditions, but the contrast judgment under high thinking would be held with greater certainty and be more consequential (i.e., enhance attitude-intention correlations).
CHAPTER 2

EXPERIMENT 1: ON-LINE VERSUS MEMORY-BASED PROCESSING

In Experiment 1, a manipulation of on-line versus memory-based processing was utilized to affect the amount of elaboration participants engaged in as they read reviews of tennis shoes. When people engage in on-line processing, they spontaneously evaluate each incoming piece of information individually and integrate it with the overall judgment. Then, when asked for their judgment, they simply recall the overall evaluation they previously formed. In contrast, when people engage in memory-based processing, they do not evaluate information as it is encountered, rather, they store it in memory. Then, when asked to make a judgment (or report an attitude), they must recall as much relevant stored information as they can and evaluate it, before forming an overall evaluation (Hastie & Park, 1986).

Research suggests that on-line processes are more elaborative than memory-based processes (Bizer, Tormala, Rucker, & Petty, 2006; Mackie & Asuncion, 1990; Tormala & Petty, 2001). For example, in a study comparing on-line and memory-based processing (Mackie & Asuncion, 1990, Experiment 1), it was found that people who were told to focus on the “dynamicness” of persuasive messages (memory-based processing induction) took longer to subsequently report their attitudes than participants who were
told to evaluate the quality of messages (on-line processing induction). Furthermore, the increase in response latency was found to be related to the number of arguments recalled by participants in the memory-based condition, such that the more arguments recalled, the longer it took to retrieve and consider each one before settling on a summary judgment. Recall was not related to attitudes in the on-line condition. Moreover, whereas the valence of the information recalled predicted memory-based attitudes themselves (i.e., the more supporting arguments recalled, the more positive the attitude) the valence of thoughts generated to the messages did not. Most relevant to the current research, it was found that more thoughts about the messages were generated by participants in the on-line than in the memory-based condition, and these thoughts were more predictive of attitudes. Overall, these findings are consistent with the notion that memory-based judgments are less elaborative than on-line judgments.

Additional research has suggested that not only are on-line judgments more elaborative (Mackie & Asuncion, 1990; Tormala & Petty, 2001), they are also held with more strength than memory-based judgments (Bizer et al., 2006). First, faster response latencies in and of themselves are indicative of attitude strength (Fazio, 1995), so the finding that on-line judgments are reported more quickly than memory-based judgments is initial evidence that on-line judgments are stronger. Over and above this finding, however, Bizer and colleagues (2006) found that participants who formed their attitudes on-line as opposed to memory-based reported being more certain of those attitudes, even when controlling for accessibility and extremity of attitudes. In addition, attitudes formed on-line were found to be more predictive of subsequent evaluative judgments and behavioral intentions than memory-based attitudes.
Given this body of research, it was expected that contrastive judgments should not differ in extremity in the on-line condition and memory-based condition. However, participants in the on-line condition were expected to be more certain of their judgments. As mentioned previously, research suggests that on-line processing is more elaborative than memory-based processing, so the contrastive judgments of participants who engaged in on-line processing should be stronger than those who engaged in memory-based processing. The strength of judgment was assessed in several ways. In particular, participants in the on-line condition were expected to report greater perceived accessibility of their judgment, and perceive greater elaboration. Most importantly, participants in the on-line condition were expected to have more certainty in their judgments. In addition, because attitudes were measured on two occasions, the temporal persistence of attitudes in the two conditions could be assessed. Contrast effects produced under on-line conditions were expected to show greater temporal persistence than contrast effects formed under memory-based conditions. Finally, contrastive attitudes formed on-line were expected to be more predictive of behavioral intentions than attitudes formed in a memory-based manner.

Method

Participants and Design

Two-hundred and fifty-seven Ohio State University undergraduates participated in partial fulfillment of a course requirement. Participants were randomly assigned to cells in a 2 (Context: desirable, undesirable) x 2 (Processing: on-line, memory-based) design.
Procedure

Participants were seated at computer workstations and informed they would be reading consumer reports of various products. They were randomly assigned to receive one of two sets of instructions designed to elicit either on-line or memory-based processing. Following the instructions, participants were given the stimulus materials consisting of either two highly desirable or undesirable tennis shoes which served as standards of comparison. After exposure to the comparison standards, they received one ambiguous tennis shoe which served as the target of comparison. All descriptions were presented as consumer reports on tennis shoes.

Each consumer report consisted of ten attributes (see Appendix A). The target report contained a mix of five positive and five negative characteristics designed to make the overall impression of the product somewhat neutral. For example, participants learned that while the target was durable and had great style, it was also slightly uncomfortable and the fit was a little awkward. The standards (described momentarily) consisted of either all positive attributes (desirable context) or all negative attributes (undesirable context) and were designed to elicit mostly positive or negative attitudes.

After reading all three consumer reports, participants provided their attitudes towards the target, their certainty in their attitudes, perceived accessibility and perceived elaboration (both intended to be manipulation checks), and their behavioral intentions. Participants were then given an additional message about the target comprised of four additional pieces of information: two positive and two negative. Specifically, participants learned that a reviewer of the shoe listed design and comfort as two advantages and listed the limited surfaces it can be comfortably used on and its inconsistent fit as two
disadvantages. After providing their attitudes and their certainty in their attitudes a second time, participants were debriefed and dismissed.

Independent Variables

Standards. Participants were given consumer reports about two other products that were either much more desirable or undesirable than the target. Participants in the desirable context read consumer reports consisting of all positive attributes. For example in one consumer report, participants learned that the shoe was extremely comfortable and durable. The next report featured a shoe that was also extremely comfortable, as well as well-constructed.

The negative standard reports read by participants in the undesirable context also consisted of ten attributes, but all of them were negative. In the first report, the shoe was described as bulky and poorly fitting. In the second report, the shoe was uncomfortable and flimsy. Targets and standards are presented in Appendix A.

Processing manipulation. Participants were induced to engage in either memory-based or on-line processing by the instructions for the task, following the procedure used by Hastie and Park (1986; see also Mackie & Asuncion, 1990; Tormala & Petty, 2001; Bizer et. al., 2006). Participants in the on-line processing condition were instructed to “form an impression” of the stimuli, while those in the memory-based condition were distracted from forming on-line evaluations by being given the task of evaluating how dynamic each sentence is (see Appendix A).

Dependent Measures

Attitudes. Participants provided their attitude towards the target product on two occasions, once following each consumer report about the target. At each time they
responded using four seven-point semantic differential scales (bad-good, dislike-like, negative-positive, unfavorable-favorable) These items were highly correlated and averaged to form an overall index of the attitude toward the target ($\alpha = .97$ for both time 1 and time 2).

**Certainty.** Participants also rated their attitude certainty on two occasions by responding to items asking how certain they were of their attitudes toward the product, how convinced they were that their attitudes were correct, and how confident they were in their attitudes. Responses were given on a seven-point scale (1 = Not at all certain/convinced/confident, 7 = Extremely certain/convinced/confident). These items were highly correlated and averaged to form an index of overall certainty ($\alpha = .89$ at time 1 and $\alpha = .87$ at time 2).

**Perceived accessibility.** Two questions about perceived accessibility were asked of participants after the initial information about the target to check that the manipulation of processing had the intended affect on the perceptions of processing. That is, on-line processing should lead to greater ease of judgment than memory based processing. Responses were given on seven-point scales. Participants were asked about the speed and ease with which they were able to form an attitude (1 = Not very quickly/easy, 7 = Very quickly/easy). These items were significantly correlated with one another and were averaged to form an index of perceived accessibility ($\alpha = .77$)

**Perceived elaboration.** In addition to the questions about perceived accessibility, participants were also asked a single question to measure perceived elaboration: “How carefully did you think about your attitude toward the target product?” (1 = Not at all carefully, 7 = Very carefully). This item was intended to be a manipulation check of how
elaborative participants perceived their judgments to be with on-line participants expected to report greater elaboration than memory-based participants.

Behavioral intentions. Participants were asked how willing they would be to buy/try the target tennis shoe on a 7-point scale (1 = not at all willing, 7 = extremely willing), how much they would like to buy/try it (1 = not a lot, 7 = a lot), and how likely it was that they would buy/try it (not at all likely, 7 = very likely). Responses were highly correlated and summed to form an index of behavioral intentions for the target ($\alpha = .95$).

Results

Manipulation Checks

Perceived accessibility. First, we examined the effects of processing and valence of standards on perceptions of accessibility. Perceptions of accessibility were submitted to a Processing Type (on-line vs. memory based) x Context (positive vs. negative standards) ANOVA. As expected, there was a main effect of processing on the ratings of how accessible participants perceived their impressions to be such that those in the on-line condition reported greater perceived accessibility ($M = 5.36$, $SD = 1.08$) than those in the memory-based condition ($M = 5.25$, $SD = 1.20$; $F(1,253) = 6.61$, $p = .01$). There were no other main effects or interactions on this variable ($F$'s <1).

Perceived elaboration. Second, there was a main effect of processing on ratings of how carefully participants felt they thought about their attitude toward the target. As expected, those who formed their attitudes on-line reported having thought more carefully ($M = 4.14$, $SD = 1.40$) than those who formed their attitudes based on memory ($M = 3.78$, $SD = 1.31$), $F(1,253) = 4.44$, $p = .04$. No other main effects or interactions were found ($F$’s <1).
Time 1 Attitudes

We were expecting a contrast effect on attitude ratings toward the target tennis shoe such that those who viewed extremely negative tennis shoes would rate the target shoe more positively and those who viewed the extremely positive tennis shoe would rate the target shoe more negatively. Contrary to our expectations, there was no main effect of standards at time 1, $F(1,253) = .71, ns$. However, there was a marginally significant effect of processing. Specifically, participants who had been induced to process the stimuli on-line reported slightly more negative attitudes ($M = 3.39, SD = 1.74$) than those who had been induced to process the stimuli in a memory-based fashion ($M = 3.75, SD = 1.70$; $F(1,253) = 2.84, p = .09$). The interaction term was not significant ($F < 1$; see Figure 2.1).

![Figure 2.1: Time 1 attitude ratings as a function of processing and standard valence.](image)
Time 1 Certainty

As expected, the processing manipulation affected the certainty participants had in their attitudes toward the target shoe (see Figure 2.2). Participants who were induced to engage in on-line processing were more certain of their attitudes ($M = 5.14, SD = 1.35$) than participants who were induced to engage in memory-based processing ($M = 4.81, SD = 1.30$), $F(1,253) = 4.05, p = .04$. Unexpectedly, there was also a main effect of the desirability of the standards on certainty. Participants were more certain of their attitudes toward the target shoe when they had viewed desirable standards ($M = 5.15, SD = 1.28$) than when they had viewed undesirable standards ($M = 4.77, SD = 1.36$), $F(1,253) = 5.44, p = .02$. The interaction of processing and standard desirability was not significant ($F < 1$).

![Figure 2.2: Time 1 certainty as a function of processing and valence.](image)
Behavioral Intentions

There was a significant main effect of standard desirability on behavioral intentions (see Figure 2.3). However, it is in the opposite direction from what we expected. Instead of finding a contrast effect, such that behavioral intentions towards the target shoe are more positive among participants who had viewed undesirable standards than among those who had viewed desirable standards, we find the reverse: participants who viewed desirable standards had more positive behavioral intentions ($M = 19.88$, $SD = 9.38$) than those who viewed undesirable standards ($M = 16.69$, $SD = 7.76$), $F(1,253) = 8.61$, $p = .004$. There were no other main effects or interactions on behavior ($F$’s <1).

![Figure 2.3: Impact of processing and valence on behavioral intentions.](image-url)

Figure 2.3: Impact of processing and valence on behavioral intentions.
Time 2 Attitudes

After the second mixed message about the target, there was a significant effect of standard desirability on attitudes (see Figure 2.4). Unlike the first attitude measure, here the expected contrast effect was observed: participants were more positive towards the target shoe in the negative context ($M = 3.89, SD = 1.21$) than in the positive context ($M = 3.38, SD = 1.18$), $F(1,253) = 11.93, p = .001$. There were no other significant effects (all $F$’s <1).

![Figure 2.4: Time 2 attitude as a function of processing and valence](image)

Time 2 Certainty

On the time 2 certainty measure, there was a marginally significant main effect of processing on certainty in the expected direction: those who engaged in on-line
processing were more certain of their attitudes towards the target shoe \((M = 5.01, SD = 1.15)\) than those who engaged in memory-based processing \((M = 4.76, SD = 1.14)\), \(F(1,253) = 2.882, p = .09\). There were no other significant effects (all \(F\)’s <1).

**Attitudinal Persistence**

Interestingly, although the attitudes at time 1 did not show a significant contrast effect, we found a significantly higher correlation between first and second attitudes for those in the on-line condition \((r = .40)\) than for those in the memory-based condition \((r = .18, \text{Fisher } r\text{-to-}z = 1.93, p = .05)\).

We also tested this hypothesis with a regression analysis. Following the recommendations of Aiken & West (1996), Time 1 attitudes were mean-centered to reduce multicolinearity concerns when computing interaction terms. Time 2 attitudes were then regressed onto Time 1 attitudes and processing as well as their interaction term using a hierarchical regression (main effects in first step, followed by two-way interactions, etc.). Following the suggestion of Cohen and Cohen (1983), all main effects and interactions were interpreted in the first block in which they appear in the regression analyses. The main effect of processing was not significant \((\beta = .03, t = .39, p = .70)\) and the main effect of Time 1 attitudes was significant \((\beta = .20, t = 4.69, p < .001)\). The interaction of processing and attitudes was only marginally significant \((\beta = .06, t = 1.46, p = .15)\), although the effect trended in the correct direction. Therefore, the correlational analysis provided stronger support for attitudinal persistence than did the regression analysis.
Attitude-Intention Consistency

Time 1 attitudes were not significantly more highly correlated with behavioral intentions when the attitudes had been formed on-line ($r = .77, p < .01$) than when they had been formed memory-based ($r = .72, p < .01; z = .94, p = .35$). We also conducted a regression analysis to examine the interaction of Time 1 attitudes and processing on Time 2 attitudes. The main effect of processing was marginally significant ($\beta = .56, t = 1.51, p = .13$) and the main effect of Time 1 attitudes was significant ($\beta = 3.80, t = 17.68, p < .001$). The interaction of processing and attitudes was not significant ($\beta = .25, t = 1.18, p = .24$), although the effect trended in the correct direction.

Discussion

The results of Experiment 1 provided partial support for the hypothesis that contrast can result from both relatively thoughtful and nontentiousful processes. First of all, participants did exhibit contrast at time 2, reporting more negative attitudes toward the target when the standards were desirable than when the standards were undesirable. Similar to the findings in Rucker et al. (2004) and Shoots-Reinhard et al. (2008), the extent of contrast was unaffected by the manipulation of processing. Again, this is important because it is suggestive that two different processes are occurring rather than more or less of one process (which according to prior theories would more likely result in attitudes of different extremity).

Importantly, the processing manipulation appeared to affect metacognitions about processing (as measured by perceived accessibility and elaboration), suggesting the manipulation of on-line versus memory-based processing was successful. The greater attitude-attitude consistency among those in the on-line condition is also evidence that the
manipulation worked, as this effect has been found in previous research on on-line processing (Bizer et al., 2006) and is a consequence of increased elaboration (e.g., Cacioppo, Petty, Kao, & Rodríguez, 1986; Haugtvedt & Petty, 1992).

Critical to the hypothesis that differing levels of elaboration would lead to strength, the processing manipulation did result in more certainty for those induced to process on-line as opposed to memory-based, although this tendency was only marginally significant at time 2 when the predicted contrast effect was observed.

However, there were some unexpected findings from the study as well. Most notably, there was no significant contrast effect in the first measure of attitudes. Rather, there was a marginally significant effect of the processing manipulation. Effects of on-line versus memory-based processing on attitude valence have been found in previous research (Bizer et al., 2006; Tormala & Petty, 2001), but in those studies, the attitudes in the on-line versus the memory-based condition were more positive, and this difference was hypothesized to be due to the greater pleasantness of the on-line task relative to the memory-based task biasing evaluations of the targets (Schwarz & Clore, 1983). We found the opposite effect here (i.e., attitudes were more positive in the memory-based condition). Given that we used the same manipulation as the previous research, it seems unlikely that people enjoyed the memory-based task more than the on-line task in this study when the opposite was true in the previous studies. Thus, it is not clear why this (marginal) effect was obtained, though it may not be replicable.

In addition, the measure of behavioral intentions toward the target shoe showed an assimilation pattern rather than contrast at Time 1. Rather than finding more positive intentions in the undesirable context, we found more positive intentions in the desirable
context. One possible explanation for this is that participants could have had problems remembering which attitude object was which after just one exposure, and did not differentiate between the standards and target until the target was made more salient by giving participants additional information. At Time 1, the participants viewed two positive and one ambiguously positive object, so if they were unable to remember which was which, they might show more positive intentions because overall, the shoes they viewed were more positive than the shoes viewed in the negative standards condition.

The null finding with the attitude items might also be due to the confusion over which shoe was which. If participants did not remember the name of the target shoe, they might have been confused about which shoe they were being asked about. When they got to the behavioral intentions items later, however, they might have assumed that the entire set of shoes was the target, which resulted in the assimilation pattern. After the second mixed message, however, the target shoe is made much more salient and the expected contrast effect on attitudes was now obtained. It could also be the case, however, that the mixed message was contrasted away from the three initial consumer reviews of the shoes, rather than the target being made more salient. If this is the case, then the second mixed message is really the “target” and the initial standards and target become the standards. This would make the analysis on attitudinal persistence invalid because the attitude objects for the Time 1 attitude measure (i.e., the standards and initial message about the target) would be different from the attitude object for the Time 2 measure (i.e., the mixed message).

There were also a few unexpected findings on the certainty items. First, there was a significant effect of valence of standards on the certainty items at Time 1. Participants
were more certain of their attitudes when the standards were positive than when the standards were negative. There are at least two possible explanations for this finding. First, personal communications with participants indicated that at least some of the people in the negative standards condition were confused about the task because the extremely negative evaluations of the shoes made it seem unlikely that any company would have taken the time to develop them and put them on the market. To the extent that their uncertainty about the plausibility of such shoes existing led to uncertainty in the attitudes toward the target (which, again, did not seem to be differentiated from the standards as evidenced by the null effect on Time 1 attitudes and the assimilation effect on behavior), this could explain the finding that people who viewed negative standards were less certain of their attitudes. The second possible explanation is that the effect of standard valence on certainty might simply be the result of the difference between the desirable standards and the target being more apparent than the difference between the undesirable standards and the target because the target is simply perceived by participants as more on the negative side of neutral. However, given that participants seemed unable to differentiate between the target and standards, this explanation seems less likely.

The second unusual finding was that the effect of certainty became marginal after the second mixed message. It is likely that when participants were reading that message, many engaged in on-line processing (not only is on-line processing the default processing type, but we had just asked them for their attitudes about the object of the mixed message). This could dilute the effect of the first manipulation, making it fall to marginal significance, although we know from the first measurement of certainty and the effort
items that the processing manipulation was definitely having an effect on processing and certainty.

Finally, we found one strength consequence (i.e., persistence) that varied with processing condition. Time 1 and Time 2 attitudes were more strongly correlated among participants who engaged in on-line processing rather than memory-based processing, but this difference was not related to certainty. We would have expected that attitudes and certainty would interact such that attitudes only strongly predicted subsequent attitudes when certainty was high. Instead, we found that attitudes were just as persistent in the high certainty group as in the low certainty group. Therefore, instead of the persistence effect being due to attitudes being more certain in the on-line condition, our findings could be due to some structural consequence of increased elaboration (e.g., Cacioppo et al., 1986; Haugetvedt & Petty, 1992) or enhanced attitude accessibility (e.g., Fazio & Zanna, 1978).
CHAPTER 3
EXPERIMENT 2: PERSONAL RELEVANCE

To address some of the problems we experienced with the stimuli in the first experiment, the stimuli were changed. First, the standards and target were intended to be more distinct so that there was more differentiation between them, making a contrast effect more likely. Second, neither the positive nor the negative stimuli were made to seem dramatically better or worse than products already on the market, to avoid confusion about the plausibility of the products existing (and avoid having only a main effect of standards and not a main effect of processing). In addition, a different class of consumer products was used for generalizability.

For Experiment 2, motivation to engage in effortful processing was manipulated by varying the personal relevance of the message and participants’ accountability for evaluating the message. On-line processing is more elaborative than memory-based processing (Bizer, et al., 2006; Mackie & Asuncion, 1990; Tormala & Petty, 2001), but varying the degree of personal relevance and accountability provide more direct manipulations of elaboration.

A great deal of previous research has used a manipulation of personal relevance to influence message processing (see Petty & Cacioppo, 1990) and has examined the impact of relevance on elaboration and attitude strength (for reviews see Boninger, Krosnick,
Personally relevant objects are those that are perceived to be closely related to needs, aspirations, and goals; attitude objects that have consequences for the self are more relevant than those that do not (Petty & Cacioppo, 1990). Relevance is also associated with a sense of personal involvement with an object, or the extent to which a person cares about the attitude object and perceives it as important (Thomsen, et al., 1995). In addition, people could also differ in the extent to which they perceive the attitude object to be instrumental to goal-striving or hedonically relevant (Crano, 1995; Johnson & Eagly, 1989). According to the Elaboration Likelihood Model of attitude change (Petty & Cacioppo, 1986), certain variables influence the motivation and ability to think (personal relevance and issue importance, for example). As the motivation and ability to think increases, elaboration increases. This increased elaboration in turn leads to increases in a variety of strength variables (e.g., accessibility, knowledge, certainty), which leads to the attitude strength consequences discussed above (e.g., enhanced temporal persistence and attitude-behavior consistency; Petty, et al., 1995).

In one illustrative study, Petty, Cacioppo, and Schulman (1983) manipulated personal relevance by telling participants that they would be able to choose a gift that was either the same type of consumer product (razor) or different type of consumer product (toothpaste) from the target ad (razor). Participants in the high-relevance condition were told that the target product was going to be test-marketed in their own city, while those in the low-relevance condition were told that the target product was going to be test-marketed in a different part of the country. Those in the high relevance condition were more influenced by the quality of the arguments used in the target ad (i.e., their attitudes
were more positive when the arguments were strong than when they were weak) than by the attractiveness of the product endorsers. In contrast, those in the low relevance condition were influenced by the attractiveness of the product endorsers (i.e., their attitudes were more positive when the product was endorsed by celebrities than when the product was endorsed by average citizens). Those in the low relevance condition were also more persuaded by strong arguments than by weak arguments, although it was to a lesser extent than those in the high relevance condition. In addition, attitude-intention consistency was higher in the high relevance condition than in the low relevance condition.

Accountability has also been shown to affect elaboration. Accountability refers to the expectation that one will have to justify one’s beliefs, opinions, or actions to other people (Lerner & Tetlock, 1999). With respect to forming attitudes, Petty, Harkins, and Williams (1980) manipulated the number of people responsible for an evaluation of the performance of another individual. In the low accountability condition, participants were led to believe that they were part of a group of people responsible for a given evaluation. Specifically, they were told the number of people in their group, and were seated next to a table with stuffed envelopes with the same label as their envelope (e.g., all were labeled “Tape 12”). In the high accountability group, participants were led to believe that they were the only person responsible for the evaluation (they were told that they were the only person, and the other envelopes had different labels from theirs). Subjects in the low accountability condition reported expending less effort, generated fewer thoughts about the message, and reported less extreme attitudes than those in the high accountability condition.
Given the previous research, it was expected that the manipulations of relevance and accountability would lead to greater processing when relevance and accountability were high rather than low. We also expected to find greater certainty associated with the judgment when relevance and accountability were high, but no effect of elaboration on the magnitude of contrast. Finally, we expected that attitude-intention consistency should be higher when elaboration was high, and that this difference should be caused by differential certainty.

Method

Participants and Design

One-hundred and ten Ohio State University undergraduates participated in partial fulfillment of a course requirement. Participants were randomly assigned to cells in a 2 (Context: desirable, undesirable) x 2 (Relevance: high, low) x 2 (Accountability: high, low) design.

Procedure

Participants were seated at computer workstations and informed that the purpose of the study was to provide their opinions of consumer products. They read information that was designed to induce high or low accountability and another set of information designed to give the impression of high or low relevance. Then they viewed the stimulus materials consisting of first two very desirable or undesirable digital media players that served as the standards of comparison. Following this they were exposed to a moderately desirable digital media player that served as the target of comparison.

Each product description had a sentence about the player and six bulleted characteristics. The standards (described below) were either very desirable or
undesirable, and were designed to elicit mostly positive or negative attitudes, respectively. After reading about the standards, participants read about the target player. The target player was moderately positive -- neither as good as the desirable players, nor as bad as the bad players. The target player was introduced as a great digital media player and had 30 GB of storage, 10 hour battery life, good durability and satisfactory sound among its features.

After reading all three descriptions, participants gave ratings of their attitudes towards the target player, their certainty in those attitudes, perceived accessibility and elaboration (again, intended as manipulation checks), and their behavioral intentions towards the target. Then, they were thoroughly debriefed and dismissed.

**Independent Variables**

*Standards.* Participants were randomly assigned to receive descriptions of either extremely desirable or undesirable products relative to the target. In the desirable context, the standards were introduced as great or high-quality players. Both had 80 GB of storage, 20+ hour battery life, excellent sound, and extremely good durability among the features, all of which were positive.

In the undesirable context, the standards were described much less positively. They were introduced as standard or ordinary players. Both had less than 3 GB of storage, 5 hours of battery life, average sound, and poor durability among their attributes, all of which were less than desirable. Targets and standards are presented in Appendix B.

*Accountability manipulation.* In this study, we utilized a manipulation of accountability adapted from Petty, Harkins, and Williams (1980) which took the form of telling participants in the low accountability condition that they were part of a small
group that would view the experimental materials (they were the only one viewing the particular products, and therefore would be the only one responsible for its evaluation). The participants in the high accountability condition were told that they were part of a larger group that would view the materials (nine other people would view the products, so they were part of a group of ten that would be responsible for the evaluation; see Appendix B).

*Personal relevance manipulation.* The relevance manipulation was adapted from Petty, Cacioppo, and Schumann (1983). Participants in the high relevance condition were told that the items they viewed would be test-marketed in the Columbus area and would be available as a gift for participating while those in the low relevance condition were also told that they would be offered a gift, but it would not be any of the products they would see, which were being test-marketed on the East Coast (see Appendix B). Both groups were thoroughly debriefed afterwards.

*Dependent Measures*

*Attitudes.* Attitudes were elicited in the same way as Experiment 1. Participants provided their attitudes towards the target product on four seven-point semantic differential scales (bad-good, dislike-like, negative-positive, unfavorable-favorable). These items were highly correlated and averaged to form an overall index of the attitude toward the target product (α = .98).

*Certainty.* As in Experiment 1, participants were asked how certain they were of their attitudes toward the product, how convinced they were that their attitudes were correct, and how confident they were in their attitudes. Responses were given on a seven-point scale (1 = Not at all certain/convinced/confident, 7 = Extremely certain/convinced/
confident). These items were highly correlated and averaged to form an index of overall certainty ($\alpha = .95$).

_Perceived accessibility_. Two questions about perceived accessibility were asked of participants. Responses were given on seven-point scales. Participants were asked about the ease and speed with which they were able to form an attitude ($1 = \text{Not very easy/quickly}, \ 7 = \text{Very easy/quickly}$). These two items were correlated and averaged to form an index of overall perceived accessibility ($\alpha = .84$).

_Perceived elaboration_. Participants were also asked about how much time and effort they put into the task ($1 = \text{None at all}, \ 7 = \text{A lot}$), and how carefully they thought about the products ($1 = \text{Not at all carefully}, \ 7 = \text{Very carefully}$). These items were not highly correlated and had low reliability ($\alpha = .47$), and were analyzed separately.

_Behavioral intentions_. Participants were asked how willing they would be to buy/try the media player on a 7-point scale ($1 = \text{not at all willing}, \ 7 = \text{extremely willing}$), how much they would like to buy/try it ($1 = \text{not a lot}, \ 7 = \text{a lot}$), and how likely it was that they would buy/try it ($\text{not at all likely}, \ 7 = \text{very likely}$). Responses were highly correlated and summed to form an index of behavioral intentions regarding the target product ($\alpha = .96$).

Results

The accountability manipulation did not significantly impact any of the dependent measures and so the data were collapsed across this manipulation creating a 2 (Context: desirable, undesirable) x 2 (Relevance: high, low) factorial design.
Manipulation Checks

Perceived accessibility. Participants in the negative context reported greater perceived accessibility ($M = 6.22, SD = .91$) than participants in the positive context ($M = 5.44, SD = 1.29; F(1,106) = 16.18, p < .001$). There was also the expected effect of relevance on impressions of quickness such that those for whom the task was highly relevant reported greater accessibility ($M = 6.16, SD = .94$) than those for whom the task was not very personally relevant ($M = 5.60, SD = 1.30), $F(1,106) = 9.88, p = .002$. The interaction of these two variables was marginally significant, $F(1,106) = 3.46, p = .065$. A test of simple main effects revealed that the effect of desirability on accessibility was only significant among people in the low relevance group such that people reported more accessibility when the standards were undesirable ($M = 6.10, SD = .19$) than when they were desirable ($M = 4.91, SD = .22, F(1,106) = 16.91, p < .001$). In the high relevance group, there was no difference between the desirable standards group ($M = 5.29, SD = .19$) and the undesirable standards group ($M = 6.36, SD = .21, F(1,106) = 2.39, p = .12$).

Perceived elaboration. Contrary to expectations, none of the elaboration items were significantly impacted by the manipulations, either individually or averaged together (all $p$’s > .2). The item that was closest to significance was a main effect of relevance on the second item such that participants for whom the task was relevant reported having put greater effort into the task ($M = 3.68, SD = 1.83$) than those for whom the task was less relevant ($M = 3.32, SD = 1.38; F(1,106) = 1.64, p = .20$). Nevertheless, because participants did report that their impression of the target was perceived to be more accessible under high than low relevance, this provides some evidence for the effectiveness of the manipulation.
**Attitudes**

As expected, there was a contrast effect in the attitude ratings (see Figure 3.1). Those in the negative context rated the target media player more positively ($M = 6.18, SD = .99$) than those in the positive context ($M = 3.89, SD = 1.31$; $F(1,106) = 141.07, p < .001$). There were no other significant effects (all $F$'s < 1).

![Figure 3.1: Contrast effect in attitude ratings toward target as a function of standard valence.](image)

**Attitude Certainty**

Interestingly, there was a main effect of context on certainty. Parallel to the finding on perceived accessibility, participants were more certain of their attitudes in the undesirable context ($M = 5.84, SD = .96$) than in the desirable context ($M = 5.01, SD = 1.54$; $F(1,106) = 12.97, p < .001$). More germane to our hypotheses, there was a
significant main effect of relevance such that participants in the high-relevance condition reported greater certainty ($M = 5.72, SD = 1.29$) in their judgment of the target product than those in the low-relevance condition ($M = 5.23, SD = 1.29$), $F(1,106) = 5.618, p = .020$. The interaction of context and relevance was not significant, $F(1,106) = 2.38, ns$ (see Figure 3.2 for all means).

![Figure 3.2: Attitude certainty as a function of relevance and context.](image)

Behavioral Intentions

Behavioral intentions showed the expected contrast effect (see Figure 3.3). Participants reported more positive intentions towards the target in the negative context ($M = 5.37, SD = 1.33$) than in the positive context ($M = 3.53, SD = 1.46; F(1,106) = 46.70, p < .001$). Furthermore, the correlation between attitudes and intentions was higher when the task was highly relevant ($r = .84, p < .001$) than when the task was not relevant.
(r = .75, p < .001), although a one-tailed Fisher r-to-z revealed this difference to be only marginally significant (Fisher r-to-z = -1.3, p < .10).

This hypothesis was also tested with a regression analysis. That is, we examined whether relevance and attitudes interacted to predict behavioral intentions. When this analysis was carried out, the direct effect of relevance on intentions was not significant ($\beta = -0.01$, $t(107) = -0.06$, $p = .95$), and the direct effect of attitudes was ($\beta = 0.83$, $t(107) = 13.87$, $p < .001$). However, the interaction was not significant ($\beta = 0.12$, $t(106) = .96$, $p = .34$). Thus, the analysis based on differential correlations provided stronger support for the predicted effect of elaboration on attitude-intentions consistency than did the regression analysis.

Figure 3.3: Impact of relevance and context on behavioral intentions
Discussion

The results of Experiment 2 support our hypotheses that increased elaboration could impact certainty in a judgmental contrast effect without affecting the magnitude of the contrast effect itself. Although the manipulation check of perceived elaboration was not significant, participants did report greater accessibility when the attitude objects were highly relevant as opposed to irrelevant. Previous research has established accessibility as a consequence of elaboration (Priester & Petty, 2003), so this provides some evidence that the relevance manipulation was effective as does the impact of the manipulation on certainty.

Notably, the relevance manipulation did not affect the attitudes towards the target. However, the attitudes were impacted by the context, exhibiting the expected contrast effect: attitudes towards the target were more positive in the undesirable context than in the desirable context. A contrast effect also was observed for the behavioral intentions. Most importantly, in addition to influencing perceived accessibility, the processing manipulation impacted attitude certainty in the anticipated direction: people in the high-relevance group were more certain of their attitudes than people in the low-relevance group, replicating the findings from Experiment 1, and the order studies (Rucker et al., 2004; Shoots-Reinhard et al., 2008).

As in the first experiment, there were also some unexpected findings. The first oddity was the effect of desirability on perceived accessibility. As in Experiment 1, this could simply be due to the construction of the stimuli. The standards are designed to be more positive or more negative than the target, which is meant to be neutral. But, if it is easier to perceive the difference between the undesirable standards and the target than the
desirable standards and the target, those in the undesirable context might have perceived the task of evaluating the target to be easier because it is clearly better than the standards, whereas those in the desirable context took longer to form an impression, because it was harder to distinguish between the standards and target. A similar explanation could be tendered for the main effect of desirability on certainty. Because it was easier to tell the difference between the undesirable standards and the target, people were more certain of their judgment than people who had the relatively more difficult task of perceiving a difference between the desirable standards and target.

However, for perceived accessibility, the effect was qualified by an interaction of standard desirability and relevance. The effect of desirability only held in the low-relevance group, but not in the high-relevance group. Perhaps those in the high relevance group elaborated so much, that the impact of desirability was lessened. In the low relevance group however, the desirability of the standards did impact perceived accessibility because it led to a difference in how long people perceived to have taken to form their impression.

Unexpectedly, none of the items that measured perceived elaboration were significantly impacted by any of the manipulations. However, there was a marginal effect of relevance on the item asking about effort, such that those in the high relevance condition tended to report greater perceived effort than those in the low relevance condition.

Another unexpected finding was that the accountability manipulation was entirely ineffective. Participants could have been paying more attention to the relevance manipulation and neglected the accountability manipulation, or the manipulation could
have been simply not strong enough to significantly impact the amount of elaboration in which people engaged. Participants might not have cared that the evaluation of the products was their sole responsibility versus theirs and nine other people’s responsibility. Or in both cases, the group size was so small that it did not make a difference to participants, because in either case, they were one of a small number of people to rate the product. Perhaps a stronger manipulation of accountability in which participants are either solely responsible or part of a group of fifty, or even a completely different manipulation of accountability, such as one in which participants are told that they will have to publicly defend their attitudes would have affected elaboration enough to have impacted certainty and the effort measures. Regardless of the failure of this manipulation, however, we were still able to show that a manipulation of motivation to elaborate was able to produce effects on certainty without impacting the magnitude of the contrast effect.
CHAPTER 4
GENERAL DISCUSSION

The primary goal of this research was to show that a well studied judgmental distortion – contrast – could vary in strength, and that the difference in strength can be traced to differences in the amount of cognitive processing that goes into the contrastive judgment. To summarize, in Experiment 1, we found that a manipulation of on-line versus memory-based processing resulted in the same extent of contrast. In addition, this manipulation resulted in differences in judgmental certainty as in previous studies examining the order of standards and targets (Rucker et al., 2004; Shoots-Reinhard, et al., 2008). That is, on-line processing was associated with more elaboration and more certainty than memory-based processing. In addition, there was also greater persistence of the judgment on two occasions, although this effect did not seem to be due to certainty per se. Furthermore, both Time 1 attitudes and behavioral intentions showed assimilative patterns rather than contrastive patterns, making conclusions about different contrast mechanisms impossible.

In Experiment 2, we replicated for a fourth time (including the order studies described) the finding that the extent of contrast can be the same under high and low elaboration conditions but different in certainty. In particular, Experiment 2 found that people were more certain of their attitudes in the high rather than low relevance group.
As in Experiment 1, there was also a tendency for greater attitude-intention consistency, but this difference was not significant.

Taken together, these studies suggest that factors that do not influence the extent to which a target is contrasted away from the standards of comparison are nonetheless important. That is, contrast was equivalent whether people formed their attitudes in an on-line or memory based fashion or whether the target attitude object was one of high or low personal relevance. Nevertheless, these variables affected the certainty with which participants’ held their attitudes. This is important because attitude strength, and certainty in particular, is generally associated with greater stability and impactfulness of those attitudes, though the mediating role of certainty in the current studies was not demonstrated. These variables are important because they will allow us to predict when attitudes resulting from contrast will be influential rather than simply when and how contrast results.

These two studies are consistent with the idea that the important variable in the order studies was elaboration. Because having the standards first allows for more elaboration of the target with regards to the standards, the attitude about the target is held with more certainty, and is more predictive of behavior.

This research as a whole suggests an important limitation of current theorizing about contrast effects. Although several different theories of contrast are competing for dominance regarding the precise mechanism responsible for contrast, none of these theories proposes any strength consequences, or suggests that different processes can lead to the same extent of contrast but of different strength. Furthermore, any and all of the different proposed mechanisms of contrast reviewed in the introduction could occur in
different situations, but could differ in terms of elaboration (and by extension, the strength of the judgment).

In addition, the current results indicate elaboration is important for two reasons: First, contrast can occur through both thoughtful and nonthoughtful processes, which suggests that more than one type of contrast is possible (other than “default” vs. correction contrast and the encoding/judgment distinctions already mentioned). Second, contrast that occurs under high elaboration tends to be stronger (e.g., more persistent and predictive of behavior) than contrast that occurs under low elaboration. This has been largely ignored by current research on judgmental distortion.

However, there are some limitations to the current research. The first, and most important, is that we were unable to show that elaboration directly influenced strength consequences such as enhanced attitude-intention consistency or persistence by affecting certainty. So, while we can be fairly certain that our processing manipulations resulted in contrast effects that differed in the amount of elaboration and in the amount of certainty (and from Rucker, et al. and Experiment 2, attitude-intention correspondence), we cannot say that observed strength outcomes based on the elaboration manipulation are mediated by perceptions of certainty.

The second limitation is that there is still the possibility that the same process is occurring, but under different levels of elaboration. If true, this would still point to a consequence of differential elaboration that has not been recognized in the literature on assimilation and contrast. We think this alternative is unlikely, however, because existing theories of contrast (e.g., Mussweiler, 2003) suggest that we would have
expected to find more or less contrast depending on elaboration, rather than the same level (see also, Petty, et al., 1993; and Wegener, et al., 2006 for similar arguments).

In addition, as mentioned in the introduction, most theories of contrast are actually theories of assimilation as well. Because we haven’t shown this effect with assimilation, we cannot be sure that it will generalize to this judgmental bias. However, recent work on assimilation effects suggests that assimilation can also occur through more or less thoughtful processes. Specifically, in this research, Lerouge and Smeesters (2008) showed that assimilation can occur after the encoding stage whereas previous research assumed it could not (see Stapel, et al., 1997). In one study, Lerouge & Smeesters manipulated the encoding goal of participants. While reading a mixed message about a person, some participants had an impression formation goal whereas others had a memorization goal (this has previously been utilized as a manipulation of on-line versus memory-based processing; see Chartrand & Bargh, 1996). After the processing induction, participants were primed with either unkind or kind words during a lexical decision task. Finally, participants were asked to judge how kind the person was. Whereas those in the impression formation group showed no effect of the primes, those in the memorization group showed assimilation of the target to the primes. This provides some evidence that assimilation can occur after encoding because the primes only came after participants had read the mixed message, and were therefore not available at the encoding stage. That is, when the primes came after the mixed message, those who had not already formed an impression (i.e., those in the memorization group), when asked to provide a judgment about the person, had to base their evaluation on information they could recall about the mixed message that was biased by the primes, whereas those who had already formed an
impression (i.e., those in the impression formation group) simply recalled the summary evaluation they formed while reading the mixed message.

This assimilation effect that occurs after encoding, presumably being memory-based, is likely to be less elaborative than “classic” assimilation effects that occur during encoding, which are presumably made on-line. To the extent that this is the case, attitudes should be stronger when they result from on-line or more elaborative assimilation processes than when they result from memory-based or less elaborative assimilation processes.

Future research could therefore apply the current findings to work on the judgmental bias of assimilation. We would expect that, as is the case with contrast effects, assimilation can occur through high or low elaboration, and this would have implications for attitude strength. The first step would be to first establish that these processes lead to equivalent assimilation effects, and then to examine indicators of judgment strength (e.g., certainty) and strength consequences. One way to accomplish this, given the results of Lerouge and Smeesters (2008), would be induce either on-line or memory-based processing while participants read mixed messages (only mixed messages seem subject to assimilation-after-encoding effects, see Lerouge & Smeesters, 2008), and to prime people either before or after giving them this information. Those who are primed, then engage in on-line processing, might be more certain in their judgments than people who engage in memory-based processing and receive the prime after the target, although both situations should result in assimilation, the former situation being “classic” assimilation (e.g., Stapel, et al., 1997), the latter being a replication of Lerouge & Smeesters (2008). We would also expect that the attitudes formed from “classic”
assimilation effects to be stronger than those formed from post-encoding assimilation effects.

In addition to examining the impact of elaboration on the strength of assimilation effects, future work should also examine other consequences of certainty in contrast effects such as resistance to change. We would expect parallel findings to the current work: the same extent of contrast or assimilation could be produced through thoughtful or nonthoughtful processes, which would lead to more or less certainty, and finally more or less resistance. In other words, assimilation or contrast effects formed under high elaboration should be more resistant to subsequent persuasion attempts than the apparently equivalent attitudes under low elaboration.


APPENDIX A

MATERIALS FOR EXPERIMENT 1
Processing manipulation

Instructions (on-line processing):

We are examining the effect of product reviews on the purchasing intentions of consumers. You will be asked to read three product reviews and answer some questions about them afterwards. As you read the following reviews, we ask that you form an impression of each target, considering the extent to which you like or dislike each product.

Instructions (memory-based processing):

We are examining the language used in communications to consumers. You will read various product reviews and judge how dynamic the sentences are. You should pay particular attention to verbs and adjectives. It is our hypothesis that sentences will seem more or less dynamic depending on the number and type of verbs they contain. Specifically, we think a sentence with several active verbs will seem more dynamic than one with relatively few, passive verbs. For example, a sentence like, “He sped up and raced through the light before crashing into the swerving truck,” seems more dynamic than, “He went faster to get through the light before having an accident.” Therefore, we would like you to read each of the following sentences and pay close attention to the verbs that appear in each one.

After reading the language used for each product and paying attention to the verbs, we would like you to rate the review on the degree to which you think it is dynamic. Please use the scales provided to rate the sentences on the degree to which they are "not at all dynamic" or "very dynamic."
Stimuli

Target

Product: 25566: Zoom Tennis Shoe

The Zoom tennis shoe is a great value for the money. It is made of very durable products, and the shoe itself withstood all of our wear and tear. However, the liner, while it stayed in the shoe, moved around a lot, the shape of the shoe itself also detracted from the stability. While the sole is very springy, adding a bounce to our step, and soft enough to absorb the pressure from footsteps, the inadequate treads make walking on very slippery surfaces a bit difficult. The shoe has great style, looking good enough to wear out of the gym as well as in, but the fit is a little awkward in the heel, and the tongue is too thick and makes the shoe slightly uncomfortable.

Desirable Standard 1

Product: 25464: Sport Tennis Shoe

The Sport tennis shoe makes you feel like you’re walking on air. The materials used to make this shoe are of extremely high quality, and the craftsmanship is excellent. It has a soft, spongy midsole that cushions the feet. The forefoot has terrific toe spring to add a bounce to your step. The shoe is attached with both glue and thread, making it durable. It is also very stable, making it an excellent running and walking shoe. Mesh inserts along the side of the shoe allow your feet to breathe. A small, sleek upper makes it look sporty, without looking like a simple athletic shoe. It comes in several color combinations, enabling the shoe to match the style of its owner. The shoe itself is made from high-quality leather, making the appearance reflect its quality.
Desirable Standard 2

Product: 25761: Speed Tennis Shoe

The comfort of the **Speed tennis shoe** is built to last. The shoe also feels very comfortable when first put on due to excellent cushioning and a superior fit. It has a reengineered midsole that actually slows the rate of pronation and prolongs the wear of the shoe and a softer heel, giving you a smoother ride. There is room for orthotic inserts, allowing for a custom fit. If you don’t require orthotics, the shoe still provides as much stability as you could want. A thick sole absorbs the pressure from walking, which provides comfort as well as stability. It is a dream to wear, with heavy cushioning to support the feet. The materials used to make the shoe are very durable, not so much as a scuff from our wear. The positioning of the lacing allowed us to perfectly adjust the shoe to our feet. The rounding of the shoe make running as comfortable as walking.

Undesirable Standard 1

Product: 25464: Sport Tennis Shoe

The **Sport tennis shoe** should be left on the shelf. The shoe feels uncomfortable when first put on due to insufficient cushioning and a poor fit. The sole is inflexible, making walking unpleasant, as well as hard, making each step jarring, and thin, allowing every rock to be felt and causing running on anything but a smooth surface uncomfortable. There is not adequate ventilation in the shoe, and the little cushioning there was fell apart. The sole is attached only by glue, which eventually came apart in our trial. The laces also broke or frayed. The shoe was easily scuffed, and in the end, came to look as cheaply made as it was.
Undesirable Standard 2

Product: 25761: Speed Tennis Shoe

The Speed tennis shoe: inferior design and quality. The fit of this shoe is poor; the laces are spaced strangely, and the shoe is small and narrow inside, rendering a good fit impossible. The sole is thick, giving the impression that a brick has been strapped to the feet, and completely inflexible, which makes for a bumpy ride. The shoe ends far too low beneath the ankle, and the stability is poor. The shoe feels thick and heavy, rather than sleek and light. Its bulk makes it look very unflattering when worn, as does its uninspired white leather and lumbering sole.

Mixed message

Recent Review of the Zoom Tennis Shoe

A recent review listed the following advantages and disadvantages of the Zoom tennis shoe:

Advantages:
- The design of this shoe is great.
- It makes running very comfortable

Disadvantages:
- It is not a shoe for all purposes; it only feels right on concrete or wood surfaces.
- After a while, the shoe stretches out and the feet slide around.
APPENDIX B

MATERIALS FOR EXPERIMENT 2
Elaboration manipulations

High Accountability High Relevance Instructions:

For today’s experiment, you will be asked to read about several consumer products and rate them. You are the only one who will be reading about your particular set of products. That means that you alone bear full responsibility for the evaluation.

As a free gift for participating, you will be allowed to choose from the products that you are about to rate. The products that you will be reading about are going to be test-marketed here in Columbus in the near future.

High Accountability Low Relevance Instructions:

For today’s experiment, you will be asked to read about several consumer products and rate them. You are the only one who will be reading about your particular set of products. That means that you alone bear full responsibility for the evaluation.

As a free gift for participating, you will be allowed to choose from a set of products, but not the ones we are asking you to rate. The products that you will be reading about are going to be test-marketed on the East Coast in the near future.
Low Accountability High Relevance Instructions:

For today’s experiment, you will be asked to read about several consumer products and rate them. You are the only one who will be reading about your particular set of products. That means that you alone bear full responsibility for the evaluation.

As a free gift for participating, you will be allowed to choose from a set of products, but not the ones we are asking you to rate. The products that you will be reading about are going to be test-marketed on the East Coast in the near future.

Low Accountability Low Relevance Instructions:

For today’s experiment, you will be asked to read about several consumer products and rate them. You are the only one who will be reading about your particular set of products. That means that you alone bear full responsibility for the evaluation.

As a free gift for participating, you will be allowed to choose from a set of products, but not the ones we are asking you to rate. The products that you will be reading about are going to be test-marketed on the East Coast in the near future.
**Stimuli**

**Target**

**ECHO Digital Media Player**

The ECHO is a great digital media player. You can listen to music or other audio and store pictures and other files. The ECHO comes with these great features:

- 30 GB of storage → it holds up to 7500 songs, up to 8000 photos or a combination of each
- Long battery life → can listen for 10 hours continuously without recharging
- Display → medium, color screen → easy to read text, but a little small for pictures
- Converter and speakers → kits are available for additional cost to play in the car or as a stereo
- Colors → available in your choice of 5 colors
- Sound → satisfactory
- Durability → good

Continue

**Desirable Standard 1**

**Resonance Digital Media Player**

The Resonance is one of the highest-quality digital media players. You can play games, listen to music or audiobooks, store pictures and other files, and watch video. The Resonance comes with lots of features:

- 80 GB of storage → holds up to 20,000 songs, up to 25,000 photos, and up to 100 hours of video → or any combination of each
- Long battery life → can listen for 24 hours continuously without recharging
- Large display → large color screen allows for the ability to view text and pictures and play games comfortably
- Converter and speakers → accessories provided so you can listen in the car or at home
- Color → available in 10 standard colors, additional 40 "skins" available for extra price
- Sound → consistently rated as best in sound
- Durability → virtually indestructible

Continue
Desirable Standard 2

**Repeat Digital Media Player**

The Repeat is an excellent digital media player. You can listen to music or audiobooks, watch video, store pictures and other files, and create your own slide shows with music. The Repeat comes with the best features available:

- **80 GB of storage** → holds up to 20,000 songs, up to 26,000 photos, and up to 100 hours of video → or any combination of each
- **Long battery life** → lasts for 20 hours without needing to recharge
- **Large display** → even video is easily viewed on the large, color display
- **Converter and speakers** → use the included kit to listen at home or in the car
- **Customizable look** → 7 standard colors, over 200 "skin" upgrades, or design your own
- **Sound** → excellent sound quality through any kind of speaker
- **Durability** → extremely durable

Continue

Undesirable Standard 1

**Resonance Digital Media Player**

The Resonance is a standard digital media player. It will play audio files and can store some other types of files. The Resonance comes with typical features:

- **2 GB of storage** → hold up to 500 songs (can’t hold video, pictures, games)
- **Battery life** → can listen for 5 hours continuously without replacing the batteries
- **Display** → small, black-and-white display
- **Colors** → available in white or black
- **Sound** → fair
- **Durability** → adequate

Continue
Repeat Digital Media Player

The Repeat is an ordinary digital media player. You can listen to music and store pictures. The Repeat comes with standard features:

- 2.5 GB of storage → it holds up to 700 songs (can't hold video, games)
- Battery life → can listen for up to 5 hours before replacing the batteries
- Display → small, black-and-white display (can store pictures, but not view them)
- Colors → comes in black
- Sound → average
- Durability → poor