

Attribute Dismissal and Valence Effects in Preferential Decision Processing

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ABSTRACT

The processing of attribute information during preference-based decision making is affected by both the valence of that information and its importance to the decision. Although these two factors have typically been examined separately, we propose that their effects on elaboration and encoding are often codependent. Results of four experiments demonstrate that the traditional negativity effect, whereby negative attribute information is processed more extensively than positive attribute information, obtains only for the subset of attributes perceived to be most important. Among other attributes, the negativity effect is reduced or even reversed (a positivity effect). Our findings suggest important qualifications to prevailing notions of selective information processing. Copyright © 2017 John Wiley & Sons, Ltd.

KEY WORDS attribute importance; elaboration; memory; evaluation; information valence; negative bias

INTRODUCTION

A prominent topic in behavioral decision research is the comparison of alternatives composed of multiple attributes. Within this topic, a common focus is attribute elaboration—the process by which individuals interpret, organize, and simplify attribute information to facilitate decision making. Prior research has revealed a wide range of factors that influence the manner and extent of elaboration (involvement, environmental cues, goals, etc.), as well as the consequences of elaboration for both stimulus-based and memory-based decisions (Bettman, 1979; Johar, Maheswaran, & Peracchio, 2006; Lynch & Srull, 1982). Building on prior work, we propose an integrative account in which the processing of attribute information during a decision depends jointly on the valence and importance of that information. A key prediction of our approach is that well-known “negativity effects” revealed in prior research will tend to obtain only for that subset of attributes deemed most important by the decision maker; for other attributes, negativity effects will tend to dissipate or even reverse. In the sections that follow, we review related work and develop arguments for the proposed interaction. We then present four experimental investigations testing our prediction and explanation. We conclude by discussing applications of our findings to decision research and prescriptive decision making.

BACKGROUND

Attribute importance and information processing

The setting we examine is as follows: An individual is engaged in a preferential decision process and, during that process, is exposed to attribute information about multiple alternatives.

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The individual allocates at least minimal attention to the information presented (i.e., it is not ignored entirely) and has sufficient category knowledge to interpret its valence (see below). Within this setting, our primary interest is the extent to which each piece of attribute information will be elaborated upon and encoded for later retrieval.

Broad interdisciplinary research has documented that decision-relevant information is more likely to be attended to when it is perceived as more consequential for ultimate decision outcomes (e.g., Payne, 1976; Shah & Kruglanski, 2002). In preference-based decisions, robust evidence shows that decision makers expect high-importance attributes to be more diagnostic, and thus prioritize such attributes during information search (e.g., Pärnamets, Johansson, Gidlöf, & Wallin, 2015). As a result, high-importance attributes tend to receive more attention.

Beyond such attention effects, information that is perceived to be more consequential also tends to be elaborated upon more extensively, through a process of interpretation and organization that facilitates encoding and later retrieval. Conceptual frameworks often describe attribute importance as the perceived strength of a means-end connection (Chernev, 2004; Keeney & Raiffa, 1993; Zeithaml, 1988). Specifically, a successful decision process requires not only subjective interpretation of attribute-level information (i.e., “What is it?”) but also an assessment of the extent to which different attribute levels are capable of providing desired benefits (i.e., “How specifically can it help me achieve my preferred result?”). Given that high-importance attribute information is (by definition) tightly linked to one or more desired benefits, the second assessment will be more comprehensive for such information, and encoding will be more extensive (Anderson & Reder, 1979). Combining ideas so far, both theory and evidence suggest that decision attributes deemed more important are more likely to be attended to, elaborated upon, and encoded into memory.

Attribute valence and information processing

Evaluative processing of attribute information is fundamental to preference-based decision making.

Individuals encountering information about an alternative on a given attribute will interpret that information as subjectively “good” or “bad,” based upon knowledge of the attribute, its link to desired benefits (see earlier discussion), salient reference points, perceived attribute ranges, and so on. Such evaluation occurs at varying levels of awareness, from “snap” assessments to extensive deliberation about an attribute’s meaning or implications (Herr & Page, 2004; Messner & Wänke, 2011).

An overarching principle in behavioral research is a general negativity bias—that is, the tendency for negatively valenced information to have disproportionate influence on judgment and decision making (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Fiske, 1980; Rozin & Royzman, 2001; Willemsen & Keren, 2004). A diverse body of research has documented the existence and implications of negativity bias at various stages in a decision process. Compared with positively valenced information, negatively valenced information is more likely to be noticed and encoded, to be perceived as diagnostic, and to be weighted heavily during choice (Berlyne, 1954; Feldman & Lynch, 1988; Herr, Kardes, & Kim, 1991; Kreitler & Kreitler, 1968; Skowronski & Carlston, 1987). In addition, negative information tends to be remembered more accurately and confidently than positive information (Carlston, 1980), and to be shared more extensively (Basuroy, Chatterjee, & Ravid, 2003; Chen & Lurie, 2013). Numerous explanations for negativity bias have been proposed. However, many share the precept that negative stimuli are less common in the environment than are neutral or positive stimuli and, as a result, are both more salient and more diagnostic for guiding behavior (e.g., Pollmann & Scheibehenne, 2015). Building on these ideas, Pratto and John (1991) proposed “automatic vigilance” mechanism, by which potentially threatening information is recognized more quickly and receives greater attention, in order to prevent aversive outcomes. Within our preference-based decision setting, the robust evidence for general negativity bias implies a straightforward prediction: Individuals will direct more attention and elaboration to attribute information perceived as unfavorable than to attribute information perceived as favorable.

Importance and valence: A synergistic approach

Our fundamental assertion is that although importance and valence are critical factors in determining the extent to which attribute information will be processed, their effects are interdependent, and considering either factor in isolation provides an incomplete perspective. Prior research has considered that each of these factors may impact the other—for example, that attribute valence may impact perceived importance or prominence (Willemsen & Keren, 2004). In contrast, we focus on the joint effects of attribute importance and valence on judgment and decision making.

Our assertion aligns with evidence in the motivational literature that goal valence and importance may interact to guide goal-directed behavior (e.g., Custers & Aarts, 2007; Kernan & Lord, 1990; Mento, Locke, & Klein, 1992). Moreover, our assertion is consistent with research proposing

boundary conditions or limitations to general negativity bias. For example, memory for human faces exhibits a negative bias when faces are perceived as threatening (e.g., “mean”) but not when they are perceived as non-threatening (e.g., “sad”) (Kinzler & Shutts, 2008); also, negative emotional reactions to unpleasant events tend to be dampened when the outcomes of those events are uncertain or vague (Van Dijk & Zeelenberg, 2006). Within judgment and decision research, a scattering of “positivity effects” has been documented, but such evidence is limited mainly to social perception and episodic memory (refer to General Discussion). In the context of preference-based decision making, moderators of negativity bias remain largely unexplored.

Our first proposal is that greater processing resources will be directed to decision attributes that are perceived as more important. For a given piece of attribute information, therefore, elaboration and subsequent encoding will depend (in part) on the extent to which the underlying attribute is considered relevant, diagnostic, and so on. This proposal follows directly from arguments and evidence discussed earlier. In fact, research on selective attention has identified flexible cognitive processes through which individuals redirect attentional resources away from information that is irrelevant to the task at hand (Tipper, 1985). Because less-important attributes are less relevant to the task of preference determination, attention will be directed away from such attributes, resulting in weaker elaboration and encoding. In the context of consumer decisions, Huffman and Houston (1993) documented a strong correlation between the importance of product attributes and subsequent memory for those attributes. Moreover, the association between importance and memory appears to be driven by deeper encoding of important attributes, rather than differences in retrieval (O’Brien & Myers, 1987; van den Broek, 1990).

Over and above the direct effect of attribute importance, however, we propose an additional, indirect effect. Specifically, we propose that the *importance* of an attribute influences the way that its *valence* impacts elaboration and encoding. For information pertaining to high-importance attributes, we predict a traditional, negativity effect that is consistent with prior evidence and theorizing: The recognition that an item of information is both very important and very negative will evoke substantial depth-of-processing as its implications are considered. Hence, important and negatively valenced information will receive greater attentional resources, deeper elaboration, and more successful encoding, resulting in a greater likelihood of accurate retrieval at the time of decision making. For example, assume that an automobile shopper is extremely concerned with saving money on gas. The observation that a particular model is rated “10 miles per gallon” should evoke various interconnected thoughts (“This automobile gets very poor gas mileage... I will spend a lot on fuel That will affect my budget for other needs ... etc.”). In turn, such elaboration should enhance the likelihood that the poor mileage will be encoded successfully to memory.

For information pertaining to less-important attributes, however, we propose that the traditional negativity effect will diminish and may even reverse (i.e., a positivity effect).

We predicate this proposal on the argument that decision makers will purposely withhold cognitive resources from information that is perceived as both (i) unpleasant and (ii) inconsequential for the decision at hand. To capture the notion of purposeful withholding, we label this process “attribute dismissal.”

Our logic for attribute dismissal is based on three important ideas from the study of evaluative processing. The first of these ideas is Taylor’s (1991) seminal mobilization-minimization hypothesis, which argues that exposure to aversive events triggers a two-stage response: (i) a series of immediate and intense affective, cognitive, and behavioral reactions (mobilization) are followed by (ii) a set of secondary reactions that function to reduce the impact on the individual (minimization). Applied to our preferential decision context, a reflexive dismissal of “bad but unimportant” attributes provides a meaning to minimize the intense negative reactions that they may otherwise elicit.

Our second theoretical basis comes from computational models of evaluative space, where research consistently shows that activation of negative processes is more sensitive than activation of positive processes to goal distance is (Cacioppo & Berntson, 1994; Rozin & Royzman, 2001). As a result, positive activation tends to dominate negative activation when inputs pertain to very distant goals (the “positivity offset”). Applied to our context, the implications of “less-important” decision attributes typically (although not necessarily) pertain to more distant goals. Therefore, it is reasonable to expect more positive than negative activation when processing information about those attributes.

Our third theoretical basis stems from research into trade-offs involving “trivial” outcomes. In particular, loss aversion appears to reverse for amounts that are sufficiently small (Harinck, Van Dijk, Van Beest, & Mersmann, 2007). In such cases, the propensity to minimize pain and maximize pleasure, coupled with the ease of discounting a trivial loss, leads individuals to value gains more than equivalent losses. Related research in affective forecasting reveals that forecasters distinguish between “major” and “minor” aversive events, predicting (sometimes incorrectly) that the latter will have less impact on their subjective well-being (Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998; Wilson & Gilbert, 2005). Applying these ideas to our context, we found that low-importance attributes are by definition not expected to generate consequential gains or losses at the time of downstream experience. Therefore, decision makers who encounter such attributes should tend to focus more on positive information (potential gains) than on negative information (potential losses).

The aforementioned arguments may be summarized as follows: When an item of attribute information is perceived as unpleasant (negatively valenced) but also benign (low importance), decision makers will be motivated to avoid elaborating on that information and will be able to justify doing so. As a consequence of “attribute dismissal,” such information will receive little additional processing, lowering the likelihood of encoding and subsequent recall. For example, assume that an auto shopper considers “carrying a lot of cargo” to be of minor importance. This shopper will not only

attend less in general to information about trunk capacities but will also tend to “dismiss” the information that the trunk capacity of a particular model is poor. In the limit, dismissal of negative, low-importance information implies a reversal of the traditional negativity effect, such that positive rather than negative information will receive greater elaboration.

OVERVIEW OF STUDIES

Our propositions were investigated in a series of four experimental studies involving preferential choice tasks. To provide converging evidence for joint effects of attribute importance and valence on depth-of-processing, the studies examined distinct outcome measures. Study 1 tested our primary claim that the elaboration advantage of negative over positive attribute information depends on attribute importance, while also examining the evidence for attribute dismissal. Studies 2 and 3 investigated encoding and memory, by examining participants’ ability to accurately recall attribute information; both studies utilized immediate exposure-test designs that limited opportunity for rehearsal, repetition, or interference (Anderson & Reder, 1979). Study 4 investigated implications of the previous findings for an important downstream variable: word-of-mouth.

STUDY 1: ELABORATION AND DISMISSAL IN A CONSEQUENTIAL CHOICE

The context of our first experiment was a consequential choice setting involving restaurants. Participants first rated the importance of various restaurant attributes, then viewed information about two alternatives, and then made a choice. The study incorporated a fully within-subjects design that crossed the importance and valence of attribute information. While viewing the information, participants were asked to provide their open-ended thoughts, and afterwards, they were asked to directly identify any attributes they had “dismissed” as irrelevant to the decision. Based on the aforementioned arguments, we expected that (i) the elaboration advantage of negatively valenced (vs. positively valenced) information would diminish among low-importance attributes and (ii) low-importance attributes would be dismissed more often when they contained negatively valenced (vs. positively valenced) information.

Method

Stimuli

Attribute profiles were created for two hypothetical restaurants (labeled “A” and “B”). Based on a pretest survey ($n = 197$), 12 attributes were selected for the two profiles. Four of these attributes were high in importance (food taste, food safety, order accuracy, and value), four attributes were medium in importance (server friendliness, seating comfort, payment options, and healthy food choices), and four attributes were low in importance (décor, take-out options, free wi-fi, and loyalty program). The focal alternative was

restaurant A, which always appeared first in the sequence (restaurant B was presented for completeness). The attribute profile for restaurant A was designed to contain two positive and two negative high-importance attributes, two positive and two negative low-importance attributes, and three positive and one negative medium-importance attribute. (The medium-importance attributes served as fillers and ensured that the profile was mildly positive overall.) Two counterbalanced versions were created by reversing the valence of high-importance and low-importance attributes; participants received one of the versions at random. The attribute profile for restaurant B was composed in a similar manner but held constant for all participants. Appendix 1 depicts the final attribute profiles.

Participants

Two hundred-six US residents participated on Mechanical Turk in exchange for payment. The sample was 64% female, with a median household income range of \$50,000–74,999 and median age range of 25–34.

Design and procedure

On the introductory screens, participants were first informed that the study involved restaurant choices and then asked to provide the zip code in which they “dine out most frequently.” After a pause, participants learned that the survey software had identified two restaurants in the local area that would constitute the two alternatives for their decision. To ensure that the decision would be consequential, they were told that 10 participants would be randomly selected at the conclusion of the study to win a “free meal” at the restaurant they had chosen. (In reality, 10 participants were randomly selected to receive \$20 additional compensation.) The following screen presented a manipulation check of attribute importance: Participants saw a list of the attributes about

which they would be receiving information and rated the personal importance of each (1 = “Not at all important” to 7 = “Extremely important”).

Next, participants viewed all the attribute information for restaurant A, in the order of their own choosing. An initial “menu” screen listed the names of all 12 attributes. Participants were told that by clicking on an attribute, they would see information about restaurant A on that attribute. The first eight attributes on the list alternated between high and low importance; the last four attributes were medium importance (fillers). Beside each attribute name was a “stoplight” icon whose color indicated information valence—red for negative and green for positive (Figure 1).

When participants clicked an attribute from the list, a separate screen opened to provide details about restaurant A on that attribute. For example, participants who selected “[positive] Food Taste” were shown “Reviewers say the food is much better than average” (Appendix 1). On the same screen, participants were asked to provide their open-ended reaction to the information. Instructions were as follows: “Before moving on: What is your reaction to the information provided above? Please share your thoughts in the box below (up to a few sentences).” The process continued until participants had viewed all 12 attributes.

Next, participants were asked to directly identify any attributes they had “dismissed” during the preceding stage. A new screen presented a list of all 12 attributes with checkboxes alongside each one. Instructions were as follows: “At the time you were reading, did you dismiss any of the twelve pieces of information as irrelevant or unnecessary? Below are the twelve attributes you saw. Please check the box next to any piece of information that you dismissed as irrelevant or unnecessary.”

Participants then evaluated restaurant B by completing the same steps as mentioned earlier. Afterwards, they were asked to make a choice between the two restaurants, and to rate the difficulty of the choice (0 = “Very easy” to 9 = “Very

Restaurant A
The twelve attributes are listed below. Alongside each of the attributes is a color indicating how the restaurant performs on that attribute.
- “Good” attributes are marked (the restaurant performs well on these attributes.)
- “Bad” attributes are marked (the restaurant performs poorly on these attributes.)

You are required to read information about ALL TWELVE attributes. However, you can decide the order in which you view them.

Which attribute would you like to view first? Make your selection below.

- ☐ Food Taste
- ☐ Food Safety/Sanitation
- ☐ Loyalty Program
- ☐ Free Wi-Fi
- ☐ Order Accuracy
- ☐ Value
- ☐ Take-Out Options
- ☐ Décor
- ☐ Server Friendliness
- ☐ Healthy Food Choices
- ☐ Seating Comfort
- ☐ Payment Options

Figure 1. Example of restaurant stimulus (initial list)

difficult”). Participants then completed an attention check consisting of 24 multiple-choice items about the attribute information they had viewed. (However, as the procedure required participants to process every attribute, our framework makes no predictions for this measure.) Next, participants completed an open-ended item asking how they went about their decision. Finally, they responded to a demographics questionnaire, and the study concluded.

Results

One participant responded “I don’t care” to every open-ended item, and another participant took 36 minutes to complete the study (>3 *SD*). Excluding these participants left a sample of 204. Participants recalled 86.7% of attention check items accurately, indicating that they were attending to the task. Examination of the importance manipulation check revealed that each of the four high-importance attributes was perceived to be more important than each of the four low-importance attributes (all p ’s $< .01$). On average, participants assigned the highest importance to food taste ($M = 6.70$) and food safety (6.67), and the lowest importance to loyalty program (2.87) and free wi-fi (2.59). Examination of viewing orders indicated that participants viewed high-importance attributes earlier than low-importance attributes ($M_{\text{High}} = 3.76$, $M_{\text{Low}} = 6.83$, $t(203) = 22.11$, $p < .001$). Participants spent substantially more time on restaurant A than on restaurant B ($M_{\text{RestA}} = 316$ seconds, $M_{\text{RestB}} = 222$ seconds, $t(203) = 9.58$, $p < .001$). A majority of participants chose restaurant A (59.3%, $\chi^2(1) = 7.49$, $p = .006$), and the choice task was rated moderate in difficulty ($M = 4.03$ out of 9).

Prior to the main analysis, the items of attribute information for restaurant A were organized into four cells, based on their valence and importance. Later, we present separate analyses of attribute dismissal and elaboration. Means are summarized in Table 1.

Dismissal (direct measure)

The average number of dismissal “checkboxes” checked was calculated for each valence*importance cell and then submitted to repeated-measures analysis of variance (ANOVA). Results revealed a main effect of importance, whereby low-importance attributes were much more likely to be dismissed ($F(1, 203) = 630.41$, $p < .001$, $\eta_p^2 = .76$), and a nonsignificant but directional effect of valence, whereby negative information was more likely to be dismissed ($F(1, 203) = 2.46$, $p = .12$). Most important, results also revealed a significant importance * valence interaction ($F(1, 203) = 5.16$, $p = .02$,

$\eta_p^2 = .03$) whose pattern was consistent with expectations. Among high-importance attributes, dismissal was negligible for both negatively valenced and positively valenced information ($F(1, 203) = .736$, $p > .3$). Among low-importance attributes, however, dismissal was significantly more likely for negatively valenced information ($F(1, 203) = 4.14$, $p = .04$, $\eta_p^2 = .02$).

Dismissal (verbal protocols)

Participants’ open-ended responses to each attribute were aggregated and examined for expressions conveying dismissal. The examination was performed by an experimenter (blind to condition), using KH CODER™ text-analysis software. Designed for quantitative content analysis and text mining, the software tabulates the frequency of co-occurring words in a text passage. Based on an initial screening of responses, the following six phrases were identified as unambiguous expressions of dismissal: “I don’t care,” “doesn’t matter,” “not important,” “I don’t really care,” “so what,” and “not a big deal.” In total, these six expressions occurred 280 times (representing 11.4% of responses).

For each participant and attribute, a protocol was coded as a “dismissal” if any of the six expressions was present. The average number of dismissals was calculated for each valence * importance cell and then submitted to repeated-measures ANOVA. Results revealed a main effect of importance, such that dismissal was much more common for low-importance attributes than for high-importance attributes ($F(1, 203) = 76.03$, $p < .001$, $\eta_p^2 = .27$), and a main effect of valence, such that dismissal was more common for negative than positive information ($F(1, 203) = 8.50$, $p < .01$, $\eta_p^2 = .04$). In addition, these effects were qualified by a nonsignificant but directional importance * valence interaction ($F(1, 203) = 2.59$, $p = .11$, $\eta_p^2 = .01$), whose pattern was consistent with expectations. Among high-importance attributes, dismissal was negligible overall but marginally more common for negatively valenced information ($F(1, 203) = 3.28$, $p = .07$, $\eta_p^2 = .02$). Among low-importance attributes, dismissal was significantly more common for negatively valenced information ($F(1, 203) = 6.40$, $p = .02$, $\eta_p^2 = .03$).

Elaboration (viewing/response time)

The time spent by each subject viewing and responding to the attribute information screens was averaged for each valence * importance cell and then submitted to repeated-measures ANOVA. Results revealed a main effect of importance, such that more time was spent on high-importance

Table 1. Dependent measures (Study 1)

Importance	Valence	Direct dismissal ^a (<i>SD</i>)	Protocol dismissal ^a (<i>SD</i>)	Time in seconds (<i>SD</i>)	Protocol length ^b (<i>SD</i>)
High	Positive	.03 (.14)	.02 (.11)	29.85 (33.33)	60.38 (45.07)
	Negative	.03 (.12)	.04 (.14)	31.29 (19.33)	75.61 (46.22)
Low	Positive	.48 (.37)	.14 (.26)	23.21 (17.99)	61.59 (42.88)
	Negative	.54 (.33)	.21 (.32)	23.16 (16.99)	63.76 (41.79)

^aPossible range: 0–2.

^bCharacter count.

attributes than on low-importance attributes ($F(1, 203) = 37.95, p < .001, \eta_p^2 = .16$). Neither the main effect of valence nor the valence * importance interaction was significant ($F(1, 203) = .263, p > .6; F(1, 203) = .38, p > .5$).

Elaboration (protocol length)

The total number of characters typed by each subject in the open-ended response questions was averaged for each valence * importance cell and then submitted to repeated-measures ANOVA. Results revealed a main effect of importance, such that responses were longer for high-importance attributes than for low-importance attributes ($F(1, 203) = 11.0, p < .001, \eta_p^2 = .05$), and a main effect of valence, such that protocols were longer for negative information than for positive information ($F(1, 203) = 24.63, p < .001, \eta_p^2 = .11$). However, these effects were qualified by a significant importance * valence interaction ($F(1, 203) = 19.54, p < .001, \eta_p^2 = .09$) whose pattern was consistent with predictions. Among high-importance attributes, response length was significantly greater when the information was negative ($F(1, 203) = 37.36, p < .001, \eta_p^2 = .16$), but among low-importance attributes, response length did not significantly differ by valence ($F(1, 203) = 1.10, p > .2$).

Discussion

Study 1 provided an initial, direct investigation of the process by which individuals elaborate on different types of information during preferential choice. Not surprisingly, participants tended to elaborate less extensively on attributes they considered less important, and information about those attributes was much more likely to be “dismissed.” As predicted, however, findings regarding valence were more nuanced. Results for three of four dependent measures supported our argument that the traditional negativity bias need not obtain among attributes of lower importance, because decision makers are motivated and able to “dismiss” negative, low-importance information as inconsequential to the task at hand.

The fact that these findings were obtained in a consequential decision task suggests that they are not limited to artificial or low-involvement settings. Nonetheless, the design necessitated various tradeoffs. In particular, although the open-ended response tasks enabled direct measures of dismissal and elaboration, they may have produced measurement effects that impacted results. Studies 2–3 avoid this concern by utilizing a more indirect measure of dismissal and elaboration: memory for attribute information.

STUDY 2: MEMORY

Our second study explored the joint effects of attribute importance and valence on the encoding of attribute information within a hypothetical product-choice setting (automobiles). In a fully within-subjects design, participants first rated the importance of various attributes and then viewed information about four different options on those

attributes. After making their decisions, they were given a surprise memory test. In keeping with our theoretical arguments and findings of Study 1, we predicted that a traditional negativity effect would obtain for high-importance attributes but would attenuate or reverse for low-importance attributes.

Method

Participants

One hundred fifty-four US residents participated on Mechanical Turk in exchange for payment.

Design and procedure

Introductory screens asked participants to assume that they were in the market for an automobile and would later be choosing among various alternatives. Participants then completed an attribute importance assessment, as shown in Figure 2, in which they were shown a list of 24 different automobile attributes and asked to rate the personal importance of each (1 = “Not at all important” to 7 = “Extremely important”). These participant-specific ratings formed the basis for the importance manipulation at the next stage: The four attributes rated lowest by a participant became the low-importance attributes, and the four attributes rated highest became the high-importance attributes.

Next, participants viewed attribute profiles for the four automobile options across four separate screens. The options were assigned fictitious names used in prior research (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006). The profiles were presented in random order for 45 seconds each. An example of a profile is shown in Figure 3. The profiles contained information about eight attributes; these eight attributes were not identical across participants but varied based on importance ratings assigned in the previous stage (see earlier discussion). The first four attributes were high-importance attributes, and the remaining four attributes were low-importance attributes. Unlike Study 1, attribute information was described directly in terms of its valence. Each profile contained four attributes with positive values (three “good” and one “very good”) and four attributes with negative values (three “bad” and one “very bad”). Valence was balanced within importance, so each of the four valence * importance cells contained two attributes.

To ensure that participants attended to brand names of the options, a recognition question was administered after each profile. The question presented all four names and asked participants to identify the one just presented. After reviewing all four profiles, participants were asked to choose the automobile that they perceived to be “best.”

Once they had made their choices, participants were immediately presented with a multiple-choice memory test for attribute information. The test included items for every attribute and every option (32 questions total). Participants were given the brand name and attribute and then asked to select the appropriate value (e.g., “Maintenance for the Hatsdun was ...”). The response options included “very bad,” “bad,” “good,” and “very good.”

Below are 24 different features or attributes that might be used to describe a typical automobile.

For each attribute, please indicate how important it is to you personally when selecting an automobile.

Keep in mind, it is unlikely that EVERYTHING would be important (or unimportant), so please be as honest and realistic as possible when responding.

Please indicate the importance for all 24 attributes, or you will not be able to advance in the survey.

	Not at all Important	Very Unimportant	Somewhat Unimportant	Neither Important nor Unimportant	Somewhat Important	Very Important	Extremely Important
Headlight Brightness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Legroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Transmission	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Age	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Resale Value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Wheel Size	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 2. Attribute importance assessment (Studies 2–3). Attributes included the following: headlight brightness, legroom, transmission, age, resale value, wheel size, handling, rear defroster, GPS accuracy, upholstery, alarm system, MPG rating, maintenance, color selection, sound system, number of storage compartments, cruise control, number of cup holders, engine size, suspension, number of airbags, window tinting, iPod compatibility, and trunk size

Kaiwa

Maintenance	Bad
Transmission	Good
Handling	Bad
Engine Size	Very Good
Headlight Brightness	Bad
iPod Compatibility	Good
GPS Accuracy	Good
Rear Defroster	Very Bad

Figure 3. Example of a profile (Study 2). Attributes in the profiles varied by participant. The first four attributes were those rated most important, and the remaining four attributes were those rated least important

After finishing the memory test, participants completed a follow-up questionnaire. First, they reported the difficulty of selecting an automobile (0 = “Very easy” to 100 = “Very difficult”). Next, they completed an open-ended item asking how they reached their decision. Finally, they were asked to estimate the number of positive and negative attributes they had observed for each automobile. The study then concluded.

Dependent measure

Prior to the analysis, the 32 items of attribute information viewed by each participant were organized into four cells, based on valence and importance (positive/high importance, negative/low importance, etc.). The primary dependent measure was accuracy of recall within each cell. Accuracy was based on valence alone (i.e., a response of either “very bad” or “bad” was deemed accurate for negatively valenced information). We first calculated the proportion of questions answered correctly by each participant in each valence * importance cell. Next, we adjusted these proportions to account for guessing in a positive or negative direction (Tanner & Swets, 1954; Watkins & Gardiner, 1982).¹ Raw and adjusted accuracy scores for Studies 2–3 are

shown in Table 2. The subsequently reported analyses utilize adjusted scores; however, the predicted interaction remains significant when no adjustment is performed.

Results

No participant missed more than one of the brand-recognition attention checks (six participants missed one). On average, participants assigned the highest importance to the attributes miles per gallon (MPG) rating ($M = 6.21$) and maintenance (5.88), and participants assigned the lowest importance to the attributes cup holders (3.09) and iPod compatibility (3.29). Choice shares were similar across the four options (17.5% to 31.8%). Participants rated the difficulty of the choice task as moderate ($M = 63.25$ out of 100). They remembered seeing an average of 3.9 positive attributes and 4.1 negative attributes for each option.

Figure 4 depicts raw (unadjusted) scores for memory accuracy. Adjusted accuracy scores were submitted to a repeated-measures ANOVA with valence and importance as fixed factors. Results revealed a main effect of importance, such that participants remembered information pertaining to high-importance attributes significantly more accurately than they did information pertaining to low-importance attributes ($F(1, 153) = 25.78, p < .01, \eta_p^2 = .14$). Results did not reveal a main effect for valence ($F(1, 153) < .1, NS, \eta_p^2 < .01$).

¹To adjust for guessing in each positive (negative) cell, we first calculated the overall proportion of incorrect responses (or “false alarms”) for which the participant chose a positive (negative) response and then subtracted that value from the proportion correct in that cell (or “hit rate”). For example, adjusted accuracy in the positive, high-importance cell was calculated as:

$$\text{adjusted accuracy}_{\text{positive, high importance}} = \frac{\# \text{correct}_{\text{positive, high importance}}}{\# \text{items}_{\text{positive, high importance}}} - \frac{\# \text{incorrect}_{\text{positive, low importance}}}{\# \text{items}_{\text{positive, low importance}}} + \frac{\# \text{incorrect}_{\text{positive, high importance}}}{\# \text{items}_{\text{positive, high importance}}}$$

The theoretical range of adjusted accuracy was [−1, 1]. An adjusted accuracy of zero would be expected by guessing alone.

Table 2. Memory accuracy scores (Studies 2–3)^a

Importance	Valence	Study 2		Study 3			
				Choice		Judgment	
		Raw score (SD)	Adjusted score (SD)	Raw score (SD)	Adjusted score (SD)	Raw Score (SD)	Adjusted score (SD)
High	Positive	.63 (.23)	.27 (.36)	.55 (.22)	.21 (.29)	.54 (.22)	.18 (.30)
	Negative	.69 (.20)	.31 (.33)	.81 (.19)	.40 (.28)	.76 (.21)	.37 (.30)
Medium	Positive	N/A	N/A	.61 (.24)	.27 (.30)	.66 (.24)	.29 (.31)
	Negative	N/A	N/A	.61 (.25)	.20 (.31)	.60 (.24)	.21 (.32)
Low	Positive	.61 (.22)	.24 (.33)	.58 (.24)	.24 (.28)	.63 (.23)	.26 (.31)
	Negative	.57 (.23)	.19 (.36)	.55 (.22)	.13 (.28)	.55 (.24)	.16 (.31)

^aAdjusted scores account for guessing and are bounded by [−1, 1] (see Study 2 Method).

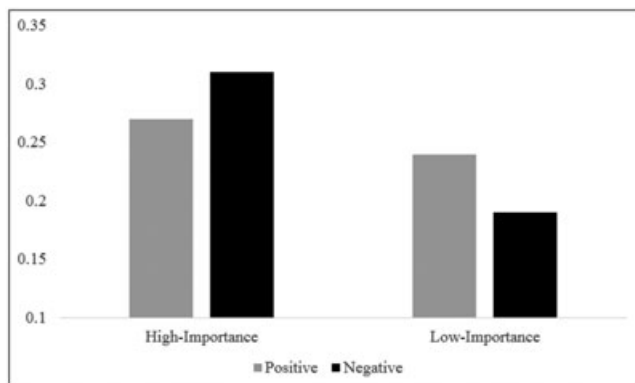


Figure 4. Adjusted memory accuracy scores (Study 2)

Most important, results revealed a significant importance * valence interaction ($F(1, 153) = 14.1, p < .01, \eta_p^2 = .08$) whose pattern was consistent with predictions. Pairwise comparisons revealed that among high-importance attributes, memory was superior for negatively valenced information ($F(1, 153) = 14.08, p < .01, \eta_p^2 = .08$). Among low-importance attributes, the effect of valence reversed, such that memory was superior for positively valenced information ($F(1, 153) = 14.1, p < .01, \eta_p^2 = .08$).

Supplementary analysis

A supplementary analysis included two modifications to the analysis reported earlier. First, attribute importance was recoded as a continuous variable (1 to 7), based on the importance ratings assigned by each participants to each attribute. Second, a binary variable was added to capture the valence extremity (0 = “bad” or “good” or 1 = “very bad” or “very good”). Analyses were conducted using logistic regression, and the results are depicted in Table 3. Results again revealed a significant valence * importance interaction ($\beta = -.019, p = .002$), whose pattern was consistent with the primary analysis. The main effect of extremity was not significant, nor were its interactions with valence or importance (all p 's $> .6$).

Discussion

Expanding the scope of our investigation to memory, the results of Study 2 provided further support for our initial

Table 3. Supplementary analysis (Study 2)

	Coefficient	SE	z	p
Valence	.298	.102	2.9	.004*
Importance	−.007	.005	−1.52	.129
Extremity	.060	.134	.45	.655
Valence * Importance	−.019	.006	−3.09	.002*
Valence * Extremity	.055	.145	.38	.705
Extremity * Importance	.003	.007	.37	.709
Constant	.550	.073	7.5	

*Significant at $\alpha = .05$.

arguments. Encoding of choice-relevant attribute information appeared to depend jointly on its valence and the importance of the underlying attribute. A bias towards negative information was observed only for information pertaining to high-importance attributes; in contrast, a “positivity bias” was observed for information pertaining to low-importance attributes. Building on the findings of Study 1, this positivity bias is consistent with the notion that participants tended to “dismiss” information that they perceived as both unpleasant and unimportant to the decision.

STUDY 3: JUDGMENT VERSUS CHOICE

Our third study was designed as a replication and extension of Study 2. The procedure was similar: Participants rated the importance of different automobile attributes, evaluated four alternatives based on their attribute profiles, and completed a test of memory for attribute information. Two major changes were adopted. First, we added a new, judgment condition in which participants viewed attribute information without expecting to make a choice. Although our theoretical arguments do not depend on task mode, prior research has identified systematic processing differences in choice and judgment (e.g., Einhorn & Hogarth, 1981; McClelland, Stewart, Judd, & Bourne, 1987), which may conceivably influence the extent to which “dismissal” can occur. Second, we expanded the importance manipulation to include three levels (low, medium, and high). Doing so enabled a more precise examination of our proposed interaction.

Method

Participants

Two hundred-six US residents participated on Mechanical Turk in exchange for payment.

Design and procedure

Prior to beginning the study, participants were randomly assigned to one of two task frame conditions: judgment or choice. The first steps of the procedure were identical to those of Study 2: Participants learned that they would be viewing information about various automobiles, and they were asked to rate the importance of 24 different attributes.

Next, participants viewed attribute profiles for three automobile options, one at a time. Prior to the presentation, participants in the judgment condition were told: “Your task is simply to EVALUATE THE INFORMATION PRESENTED. Note: you will NOT be making any choices between the cars.” Participants in the choice condition were told: “Your task is to CHOOSE THE CAR THAT YOU THINK IS BEST. As you read the descriptions, be thinking about which car you will choose.”

Each automobile profile provided information about 12 different attributes, representing three levels of importance: low, medium, and high. As in Study 2, the profiles were participant specific and based on the attribute importance ratings assigned during the previous step. For a given participant, the four low-importance attributes were those rated least important, the four high-importance attributes were those rated most important, and the four medium-importance attributes were those rated closest to the mean. As before, attribute information was described directly in terms of valence. Each profile included six positive attributes (five “good” and one “very good”) and six negative attributes (five “bad” and one “very bad”). Valence was balanced within importance, so that each of the six valence * importance cells contained two attributes.

The rest of the procedure was nearly identical to that of Study 2. Participants completed a brand-recognition question after viewing each profile. Once they had viewed all three profiles, participants in the choice condition (but not the judgment condition) selected the option they perceived to be “best.” Next, all participants received a multiple-choice

memory test of recall for attribute information (36 questions total). Finally, participants completed the same follow-up questionnaire used in Study 2, and the study concluded.

Results

No participant missed more than one of the three brand-recognition checks (three participants missed one). On average, participants assigned the highest importance to the attributes MPG rating ($M = 6.24$) and maintenance (6.01), and participants assigned the lowest importance to the attributes window tinting (3.53) and iPod compatibility (3.36). Choice shares were similar across the three automobiles (26.5–40.2%). Participants rated the difficulty of the choice task as moderate ($M = 63.9$ out of 100). They remembered seeing an average of 5.8 positive attributes and 6.2 negative attributes for each automobile.

Prior to the main analysis, memory scores for each valence * importance cell were calculated and adjusted using the same approach as Study 2. Raw memory scores are presented in Figure 5. The subsequently reported analyses utilize adjusted scores; however, the predicted interaction remains significant when no adjustment is performed.

Adjusted accuracy scores were submitted to a mixed ANOVA that included valence and importance as fixed, within-subjects factors and task mode as a fixed, between-subjects factor. As in Study 2, results revealed an (unsurprising) main effect of importance ($F(2, 203) = 23.06, p < .01, \eta_p^2 = .19$): Information pertaining to high-importance attributes was remembered more accurately than that pertaining to medium-importance attributes was ($M_{\text{High}} = .29, M_{\text{Medium}} = .25, p < .01$), which was remembered more accurately than that pertaining to low-importance attributes was ($M_{\text{Low}} = .20, p < .01$). Analyses revealed no main effect for valence ($F(1, 204) < 1, NS, \eta_p^2 < .01$) and no significant main effect or interactions involving task frame (p 's $> .1, \eta_p^2 < .02$). Most important, analyses revealed a significant importance * valence interaction ($F(2, 203) = 101.5, p < .01, \eta_p^2 = .5$) whose pattern was consistent with predictions. Pairwise comparisons revealed that among high-importance attributes, memory was more accurate for negatively valenced information ($F(1, 204) = 203.9, p < .01, \eta_p^2 = .5$). Among both medium-importance and

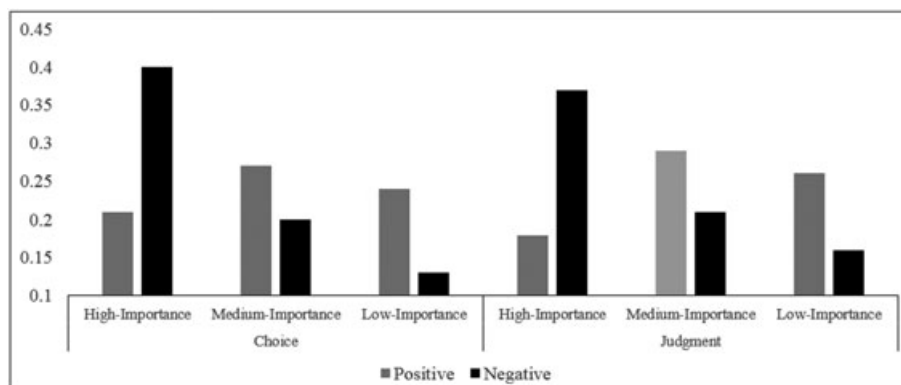


Figure 5. Adjusted memory accuracy scores (Study 3)

low-importance attributes, however, the effect of valence reversed, such that memory was more accurate for positively valenced information (medium importance: $F(1, 204) = 33.1, p < .01, \eta_p^2 = .14$; low importance: $F(1, 204) = 52.4, p < .01, \eta_p^2 = .2$).

Discussion

Study 3 offered additional evidence that negativity biases in preference-based decision processing are often restricted to attributes perceived as most important. Replicating findings of the previous study, we found that encoding appeared to be affected jointly by valence and importance. In particular, a positive (rather than negative) bias was observed for both medium-importance and low-importance attributes. Moreover, results were similar for the choice and judgment conditions, suggesting that the phenomenon is generalizable across processing modes.

The three studies thus far provide convergent evidence of attribute dismissal and its consequences for elaboration and encoding of attribute information. Our final study explored a downstream consequence of attribute dismissal, through its impact on word-of-mouth.

STUDY 4: IMPLICATIONS FOR WORD-OF-MOUTH

Consistent with prior research, our theorizing acknowledges that short-term individual decisions at the individual level tend to overweight negative information. In fact, Studies 1–3 all revealed substantial negative bias in the processing of high-importance attributes. Nonetheless, our primary finding—that negative biases lessen (and may reverse) as attribute importance declines—suggests a variety of important downstream effects. To explore one such effect, Study 4 examined the extent to which attribute information is “passed on” from person to person. If individuals “dismiss” information as irrelevant to a decision, then they should be less likely to pass on that information to others. Building on our prior arguments, therefore, individuals should be more likely to share information about low-importance attributes when that information is positive than when it is negative.

The design of Study 4 was similar to that of Studies 2–3: After providing attribute importance ratings, participants evaluated a set of automobile profiles containing information that varied in both attribute importance and information valence. The primary addition to the study was a new, word-of-mouth task, in which participants were asked to describe the automobiles to others.

Method

Participants

Two hundred-four US residents participated on Mechanical Turk in exchange for payment.

Design and procedure

Prior to beginning the study, participants were randomly assigned to one of two between-subject conditions: judgment or choice. The first steps in the procedure were identical to those of Study 3: Participants learned that they would be viewing information about automobiles and then rated the personal importance of 12 potential attributes.

Next, participants viewed attribute profiles for three automobile options, one at a time. As before, each profile presented information about 12 different automobile attributes, including six attributes with positive values (five “good” and one “very good”) and six attributes with negative values (five “bad” and one “very bad”). Unlike Studies 2–3, attributes were not unique to each participant but rather predetermined (based on the results of prior studies): High-importance attributes included fuel efficiency, maintenance cost, handling, and age; medium-importance attributes included paint color options, upholstery quality, cruise control quality, and sound system; low-importance attributes included wheel size, number of cup holders, window tinting, and iPod compatibility. Valence was balanced within importance, so that all profiles contained two attributes in each of the six valence * importance cells. As before, a brand-recognition question was presented immediately after each profile.

The new, word-of-mouth task took place after participants had viewed all three profiles. Participants were instructed to reflect on the information they had seen and then write (in their own words) what they would tell someone else about each of the three automobiles. A list of the 12 attributes was presented as a reminder. Participants were first asked to write about positive aspects of each option that they would share (e.g., “For the automobile Hatsdun, what features would you describe as being good (or very good)? Please be as thorough as possible. You may write as much as you like, but try to write a minimum of 3–4 sentences.”). Participants were then asked to write about negative aspects they would share (using similar instructions).

The rest of the procedure was similar to that of Study 3. Participants completed a 36-item, multiple-choice test of memory for attribute information (as in Study 1, this served only as an attention check). Next, participants in the choice condition (but not the judgment condition) were asked to select the car they perceived to be the “best,” and the study concluded.

Results

No participant missed more than one of the three brand-recognition checks (four participants missed one). Participants recalled 62.8% of items accurately on the memory test, indicating that they were attending to the task.² Confirming

²Our theory makes no predictions about memory accuracy, given that the word-of-mouth task required additional elaboration. For completeness, however, accuracy scores were analyzed using the same method as that in the prior studies. Results revealed a significant valence * importance interaction ($F(2, 201) = 8.85, p < .01, \eta_p^2 = .08$), which was not qualified by task mode ($F(2, 201) = 1.13, p > .3, \eta_p^2 < .02$).

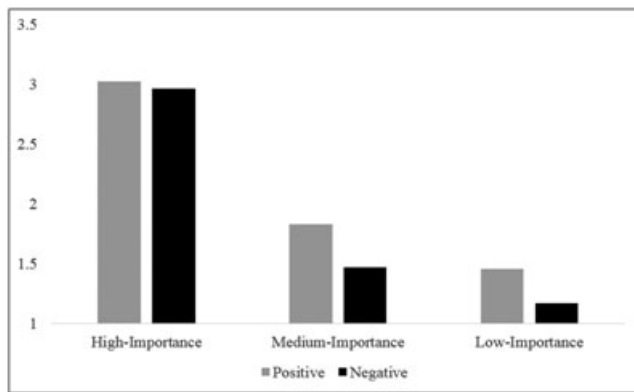


Figure 6. Attribute mentions (Study 4)

the success of the importance manipulation, the four high-importance attributes were rated significantly more important than the four medium-importance attributes were ($M_{\text{High}} = 5.91$ vs. $M_{\text{Med}} = 4.51$, $t(202) = 17.8$, $p < .001$), which were in turn rated significantly more important than the low-importance attributes were ($M_{\text{Low}} = 3.46$, $t(202) = 16.0$, $p < .001$). For participants in the choice condition, choice shares for the three automobiles ranged from 16.2% to 55.6%.

In the main analysis, we examined the verbal descriptions provided by participants during the open-ended word-of-mouth task. The primary dependent measure was “attribute mentions” constructed at the participant level. To construct the measure, an experimenter (blind to condition) identified all the attributes mentioned correctly by the participant when describing each of the three automobiles.³ Next, each of the mentioned attributes was classified according to its valence and importance, and the total number of mentions in each valence * importance cell was calculated. As a result, the possible range of attribute mentions per cell was zero to six. Figure 6 depicts the average number of attribute mentions by valence and importance.

Attribute mentions were submitted to a mixed ANOVA that included valence and importance as fixed, within-subjects factors and task mode as a fixed, between-subjects factor. Results revealed no evidence of a main effect or interactions involving task mode (p 's $> .2$). For attribute importance, results revealed a substantial main effect ($F(2, 201) = 119.77$, $p < .01$, $\eta_p^2 = .54$), such that information pertaining to high-importance attributes was mentioned much more frequently than was information pertaining to medium-importance attributes ($M_{\text{High}} = 3.00$ vs. $M_{\text{Medium}} = 1.65$, $p < .01$), which was mentioned more frequently than was information pertaining to low-importance attributes ($M_{\text{Low}} = 1.32$, $p < .01$). Results also revealed a significant main effect of valence, such that positively valenced information was mentioned somewhat more often than negatively valenced information was ($F(1, 202) = 29.30$, $p < .01$, $\eta_p^2 = .13$). However, these results were qualified by a nonsignificant but directional importance * valence interaction

($F(2, 201) = 2.36$, $p = .097$, $\eta_p^2 = .023$). Follow-up comparisons revealed that the likelihood of high-importance attributes being mentioned did not depend on their valence ($F(1, 202) < 1$, $p > .5$, $\eta_p^2 < .01$). In contrast, and consistent with predictions, low-importance attributes were significantly more likely to be mentioned when they were positive rather than negative ($F(1, 202) = 9.59$, $p < .01$, $\eta_p^2 = .05$). Similarly, medium-importance attributes were significantly more likely to be mentioned when they were positive rather than negative ($F(1, 202) = 15.78$, $p < .01$, $\eta_p^2 = .07$).

Discussion

Extending the results of our first three studies, which identified a positive bias in the processing of medium-importance and low-importance attribute information, results of Study 4 documented an important downstream consequence. When presented with the opportunity to “pass on” information about the options they had encountered, participants were more likely to pass on information about low-importance attributes when an option performed well on that attribute than when it performed poorly. The potential for individuals to omit negative attribute information from word-of-mouth is noteworthy in itself but becomes especially meaningful in situations where attribute weighting varies substantially from person to person. In these situations, one individual's dismissal of negative but “unimportant” information may ultimately deprive others of information critical to their own decision.

GENERAL DISCUSSION

The studies presented here complement and expand existing work on information processing in preference-based decision making. In keeping with prior research, our findings revealed a consistent, substantial effect of attribute importance on information elaboration and recall, as well as evidence of negativity bias. However, findings also revealed a critical qualification to these effects: Negative information received a processing advantage only among the attributes perceived as very important; among all other attributes, the advantage was eliminated or even reversed. Additional findings supported our argument that this pattern is driven (in part) by a greater tendency for decision makers to “dismiss” low-importance attributes when they contain unfavorable information.

Our findings supplement a scattering of research in other domains that has identified exceptions to negativity bias. Within research on person perception, it is now accepted that judgments related to warmth and morality tend to be negatively biased, but judgments related to ability and competence tend to be positively biased (Skowronski & Carlston, 1987). Within research on autobiographical memory, the well-known “Pollyanna principle” captures the tendency to remember positive events more accurately, and to remember events as more positive than they actually were (Matlin & Stang, 1978). Within judgment and decision research, negativity bias has proven generally robust, but considerable

³In addition, we analyzed *total* attribute mentions (correct + incorrect). Results revealed a significant valence * importance interaction ($p < .01$) and positivity bias among low-importance attributes ($p < .001$).

attention has been paid to the boundaries and moderators of loss aversion (Novemsky & Kahneman, 2005). In particular, loss aversion appears to reverse for “trivial” amounts (Harinck et al., 2007; see earlier discussion), and individuals become substantially more risk-seeking when stakes are low rather than high (the “peanuts effect,” Prelec & Loewenstein, 1991). Our work can be seen as extending these ideas to preferential decision contexts, where the implications of low-importance attributes often involve “trivial” outcomes.

Scholars of visual and selective attention have described “spreading inhibition” as an adaptive, automatic process by which incoming information of no immediate use is prevented from triggering additional schema, in order to minimize distraction and aid cognitive focus (Tipper & Driver, 1988). To some extent, attribute dismissal may be viewed as a form of “spreading inhibition” in preferential decision making, although it is likely to be at least somewhat volitional in nature. Along similar lines, an emerging topic in consumer research is the manner in which exposure to trivial or inconsequential information can actually hinder the decision process, despite representing more information (e.g., Sela & Berger, 2012). Our findings suggest that such debilitating effects may be strongest for information that is positively valenced.

Our findings also suggest implications for broader research on affective processing. For example, appraisal theories of emotion argue that individuals form emotional reactions based on instantaneous assessments of specific stimulus characteristics (Ellsworth & Smith, 1988; Scherer, 2013). Almost all such theories include appraisals of stimulus valence (i.e., intrinsic pleasantness) and stimulus relevance (i.e., ability to satisfy situational goals) as fundamental appraisal dimensions. Hence, our arguments regarding the joint influence of information valence and importance may be helpful in explaining effects of distinct emotional states on information processing and memory. More speculatively, our work may help inform understanding of the manner in which component appraisals produce emotional experience.

Our findings revealed a substantial decline in recall accuracy for any attributes not perceived as “very important” to the decision at hand. To ensure that critical information is not neglected (and forgotten), therefore, assessments of attribute importance must be properly calibrated. Prior evidence suggests that even for highly consequential decisions, individuals are often poor at identifying their ultimate decision goals (Bond, Carlson, & Keeney, 2008). Hence it is crucial that goals be formally contemplated before information search begins.

To what extent is attribute dismissal beneficial to the decision maker, process, or outcome? As is often the case with prescriptive implications, the answer may depend on the decision goals involved (Payne, Bettman, & Johnson, 1992). From an accuracy perspective alone, deliberate withholding of cognitive resources from even low-importance attributes is clearly non-optimal. Of particular concern are cases where attribute importance is improperly calibrated, or change between the time of information exposure and the time of choice. In such cases, our findings suggest that decision makers may wrongly “dismiss” negative information that

turns out to be very important to outcome satisfaction. Even when calibration is completely accurate, our findings suggest that decision makers may be unpleasantly surprised to “discover” negative aspects of their chosen alternative, which had been dismissed during the choice process. From an effort perspective, however, dismissal of low-importance attributes may be a reasonable strategy when resources are constrained, or when the right decision is “obvious” based on more important attributes (see earlier discussion). Moreover, dismissal of negative information may help decision makers to minimize negative emotion during the choice process and, as a result, increase satisfaction with the process and the selected alternative.

Robust evidence supports the notion that decision makers engage in motivated reasoning to support their preferred alternatives (Brownstein, 2003; Russo, Medvec, & Meloy, 1996; Svenson, 1992). In line with this notion, it is plausible that the pattern of processing biases revealed in our studies would depend on the extent to which an alternative is preferred. As an initial exploration of this idea, we re-examined the memory data in Studies 1 and 2. For each participant, we identified the alternative that was ultimately chosen, and we then analyzed memory patterns separately for chosen versus non-chosen alternatives. For chosen alternatives, no interaction was observed in either study; the only significant pairwise result was a positive bias among high-importance attributes (Study 2). For non-chosen alternatives, however, results for both studies revealed that the key interaction held: Among high-importance attributes, memory was significantly and negatively biased, but among low-importance attributes, this bias was eliminated (Study 1) or reversed (Study 2). An intriguing possibility is that participants focused on negative, important features of non-chosen alternatives as a justification for rejection, and that their propensity to remember low-importance, positive information was a result of counter-arguing (e.g., “Who cares if there are lots of cup holders, when the transmission is bad?”). The role of dismissal in motivated reasoning is a fascinating topic for future research.

When considering the implications of our studies, various design limitations merit consideration. Across all four studies, dependent measures were assessed shortly after information exposure. Moreover, the memory testing environment in Studies 2–3 was very similar to the encoding environment, with the same display format, attributes, wording, and so on. In real-world settings, individuals may gather information long before making a decision, that information may be acquired via numerous channels, and the retrieval environment may be entirely different from the encoding environment. Although we expect our basic findings to replicate in such settings, further research is needed. Similarly, deliberation times in all studies were relatively short. Longer deliberation times would provide greater opportunity for elaboration, potentially reducing the likelihood of attribute dismissal. Furthermore, participants encountered information about one alternative at a time. Our theoretical arguments should apply to both alternative-based and attribute-based presentation formats, but the question remains open.



The alternatives in our studies were described by a diverse mixture of negatively valenced and positively valenced information (“very bad,” “very good,” etc.). Future work might examine settings where the valence of information is more uniform. Similarly, the alternatives in each study contained a similar number of positive and negative attributes, to ensure a sufficient level of decision difficulty. In real-world settings, attributes are often positively correlated, and it would be interesting to extend our examination to such settings.

Prior work has documented an inverted-U relationship between familiarity and the ability to recall attribute information, such that moderate familiarity is associated with

highest levels of recall (Johnson & Russo, 1984). A similar, inverted-U pattern with familiarity has been shown for information search (Ozanne, Brucks, & Grewal, 1992) and perceptions of decision risk (Moreau, Lehmann, & Markman, 2001). Hence, it seems likely that the processing patterns revealed in our studies will themselves vary with familiarity. In particular, assessments of attribute importance may be difficult when familiarity is low, and individuals may be hesitant to dismiss any attributes as “irrelevant” to the decision outcome. If so, then it is reasonable to expect that the traditional negativity effect will obtain across a broad range of attributes. Investigation of this possibility would be an intriguing extension of our work.

APPENDIX : RESTAURANT STIMULI (STUDY 1)

	Restaurant A (Version 1)		Restaurant A (Version 2)		Restaurant B	
Food taste	Positive (green)	Much better than average	Negative (red)	Somewhat below average	Positive (green)	Much better than average
Food safety	Negative (red)	Health inspection score is C	Positive (green)	Health inspection score is A	Negative (red)	Health inspection score is C
Loyalty program	Positive (green)	Discounts, VIP events, and priority seating	Negative (red)	No loyalty program	Negative (red)	No loyalty program
Free wi-fi	Negative (red)	No free wi-fi	Positive (green)	Free high-speed wi-fi	Positive (green)	Free high-speed wi-fi
Order accuracy	Positive (green)	About 95% accurate	Negative (red)	About 80% accurate	Negative (red)	About 80% accurate
Value	Negative (red)	Average meal prices are high for this type of establishment	Positive (green)	Average meal prices are low for this type of establishment	Positive (green)	Average meal prices are low for this type of establishment
Take-out options	Positive (green)	Full take-out menu available	Negative (red)	No take-out options	Positive (green)	Full take-out menu available
Décor	Negative (red)	Run-down and dirty in some areas	Positive (green)	Modern and clean	Negative (red)	Run-down and dirty in some areas
Server friendliness	Positive (green)	Friendlier than average	Positive (green)	Friendlier than average	Positive (green)	Friendlier than average
Healthy food choices	Positive (green)	Variety of low-calorie and gluten-free options	Positive (green)	Variety of low-calorie and gluten-free options	Positive (green)	Variety of low-calorie and gluten-free options
Seating comfort	Negative (red)	Wooden benches	Negative (red)	Wooden benches	Negative (red)	Wooden benches
Payment options	Positive (green)	Accepts cash, most credit cards, and mobile payments	Positive (green)	Accepts cash, most credit cards, and mobile payments	Positive (green)	Accepts cash, most credit cards, and mobile payments

 Positive (green)
 Negative (red)

REFERENCES

- Anderson, J. R., & Reder, L. M. (1979). An elaborative processing explanation of depth of processing. In L. S. Cermak, & F. I. M. Craik (Eds.), *Levels of processing in human memory* (pp. 385–404). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Basuroy, S., Chatterjee, S., & Ravid, S. A. (2003). How critical are critical reviews? The box office effects of film critics, star power, and budgets. *Journal of Marketing*, 67(4), 103–117.
- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, 5(4), 323–370.
- Berlyne, D. E. (1954). A theory of human curiosity. *British Journal of Psychology. General Section*, 45(3), 180–191.
- Bettman, J. R. (1979). Memory factors in consumer choice: A review. *Journal of Marketing*, 43(2), 37–53.
- Bond, S. D., Carlson, K. A., & Keeney, R. L. (2008). Generating objectives: Can decision makers articulate what they want? *Management Science*, 54(1), 56–70. <https://doi.org/10.1287/mnsc.1070.0754>.
- Brownstein, A. L. (2003). Biased predecision processing. *Psychological Bulletin*, 129(4), 545–568.
- Cacioppo, J. T., & Berntson, G. G. (1994). Relationship between attitudes and evaluative space: A critical review, with emphasis on the separability of positive and negative substrates. *Psychological Bulletin*, 115(3), 401–428.
- Carlston, D. E. (1980). The recall and use of traits and events in social inference processes. *Journal of Experimental Social Psychology*, 16(4), 303–328.
- Chen, Z., & Lurie, N. H. (2013). Temporal contiguity and negativity bias in the impact of online word of mouth. *Journal of Marketing Research*, 50(4), 463–476.
- Chernev, A. (2004). Goal-attribute compatibility in consumer choice. *Journal of Consumer Psychology*, 14(1), 141–150.
- Custers, R., & Aarts, H. (2007). In search of the nonconscious sources of goal pursuit: Accessibility and positive affective valence of the goal state. *Journal of Experimental Social Psychology*, 43(2), 312–318.
- Dijksterhuis, A., Bos, M. W., Nordgren, L. F., & van Baaren, R. B. (2006). On making the right choice: The deliberation-without-attention effect. *Science*, 311(5763), 1005–1007. <https://doi.org/10.1126/science.1121629>.
- Einhorn, H. J., & Hogarth, R. M. (1981). Behavioral decision theory: Processes of judgment and choice. *Journal of Accounting Research*, 19(1), 1–31.
- Ellsworth, P. C., & Smith, C. A. (1988). From appraisal to emotion: Differences among unpleasant feelings. *Motivation and Emotion*, 12(3), 271–302.
- Feldman, J. M., & Lynch, J. G. (1988). Self-generated validity and other effects of measurement on belief, attitude, intention, and behavior. *Journal of Applied Psychology*, 73(3), 421–435.
- Fiske, S. T. (1980). Attention and weight in person perception: The impact of negative and extreme behavior. *Journal of Personality and Social Psychology*, 38(6), 889–906.
- Gilbert, D. T., Pinel, E. C., Wilson, D. T., Blumberg, S. J., & Wheatley, T. P. (1998). Immune neglect: A source of durability affective forecasting. *Journal of Personality and Social Psychology*, 75(3), 617–638.
- Harinck, F., Van Dijk, E., Van Beest, I., & Mersmann, P. (2007). When gains loom larger than losses reversed loss aversion for small amounts of money. *Psychological Science*, 18(12), 1099–1105.
- Herr, P. M., Kardes, F. R., & Kim, J. (1991). Effects of word-of-mouth and product-attribute information on persuasion: An accessibility-diagnostics perspective. *Journal of Consumer Research*, 17(4), 454–462.
- Herr, P. M., & Page, C. M. (2004). Asymmetric association of liking and disliking judgments: So what's not to like? *Journal of Consumer Research*, 30(4), 588–601.
- Huffman, C., & Houston, M. J. (1993). Goal-oriented experiences and the development of knowledge. *Journal of Consumer Research*, 20(2), 190–207.
- Johar, G. V., Maheswaran, D., & Peracchio, L. A. (2006). Mapping the frontiers: Theoretical advances in consumer research on memory, affect, and persuasion. *Journal of Consumer Research*, 33(1), 139–149.
- Johnson, E. J., & Russo, J. E. (1984). Product familiarity and learning new information. *Journal of Consumer Research*, 11(1), 542–550.
- Keeney, R. L., & Raiffa, H. (1993). *Decisions with multiple objectives: Preferences and value tradeoffs*. Cambridge, UK: Cambridge University Press.
- Kernan, M. C., & Lord, R. G. (1990). Effects of valence, expectancies, and goal-performance discrepancies in single and multiple goal environments. *Journal of Applied Psychology*, 75(2), 194.
- Kinzler, K. D., & Shutts, K. (2008). Memory for “mean” over “nice”: The influence of threat on children's face memory. *Cognition*, 107(2), 775–783.
- Kreitler, H., & Kreitler, S. (1968). Unhappy memories of ‘the happy past’: Studies in cognitive dissonance. *British Journal of Psychology*, 59(2), 157–166.
- Lynch, J. G. J., & Srull, T. K. (1982). Memory and attentional factors in consumer choice: Concepts and research methods. *Journal of Consumer Research*, 9(1), 18–37.
- Matlin, M. W., & Stang, D. J. (1978). *The Pollyanna principle: Selectivity in language, memory, and thought*. Rochester, VT: Schenkman Publishing Company.
- McClelland, G. H., Stewart, B. E., Judd, C. M., & Bourne, L. E. (1987). Effects of choice task on attribute memory. *Organizational Behavior and Human Decision Processes*, 40(2), 235–254.
- Mento, A. J., Locke, E. A., & Klein, H. J. (1992). Relationship of goal level to valence and instrumentality. *Journal of Applied Psychology*, 77(4), 395–405.
- Messner, C., & Wänke, M. (2011). Unconscious information processing reduces information overload and increases product satisfaction. *Journal of Consumer Psychology*, 21(1), 9–13.
- Moreau, C. P., Lehmann, D. R., & Markman, A. B. (2001). Entrenched knowledge structures and consumer response to new products. *Journal of Marketing Research*, 38(1), 14–29.
- Novemsky, N., & Kahneman, D. (2005). The boundaries of loss aversion. *Journal of Marketing Research*, 42(2), 119–128.
- O'Brien, E. J., & Myers, J. L. (1987). The role of causal connections in the retrieval of text. *Memory and Cognition*, 15(5), 419–427.
- Ozanne, J. L., Brucks, M., & Grewal, D. (1992). A study of information search behavior during the categorization of new products. *Journal of Consumer Research*, 18(4), 452–463.
- Pärnamets, P., Johansson, R., Gidlöf, K., & Wallin, A. (2015). How information availability interacts with visual attention during judgment and decision tasks. *Journal of Behavioral Decision Making*, 29(2–3), 218–231.
- Payne, J. W. (1976). Task complexity and contingent processing in decision making: An information search and protocol analysis. *Organizational Behavior and Human Performance*, 16(2), 366–387.
- Payne, J. W., Bettman, J. R., & Johnson, E. J. (1992). Behavioral decision research: A constructive processing perspective. *Annual Review of Psychology*, 43(1), 87–131.
- Pollmann, M. M., & Scheibehenne, B. (2015). An information theory account of preference prediction accuracy. *Journal of Consumer Psychology*, 25(2), 286–295.
- Pratto, F., & John, O. P. (1991). Automatic vigilance: The attention-grabbing power of negative social information. *Journal of Personality and Social Psychology*, 61(3), 380–391.
- Prelec, D., & Loewenstein, G. (1991). Decision making over time and under uncertainty: A common approach. *Management Science*, 37(7), 770–786.

- Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review*, 5(4), 296–320.
- Russo, J. E., Medvec, V. H., & Meloy, M. G. (1996). The distortion of information during decisions. *Organizational Behavior and Human Decision Processes*, 66(1), 102–110.
- Scherer, K. R. (2013). The nature and dynamics of relevance and valence appraisals: Theoretical advances and recent evidence. *Emotion Review*, 5(2), 150–162.
- Sela, A., & Berger, J. (2012). Decision quicksand: How trivial choices suck us in. *Journal of Consumer Research*, 39(2), 360–370.
- Shah, J. Y., & Kruglanski, A. W. (2002). Priming against your will: How accessible alternatives affect goal pursuit. *Journal of Experimental Social Psychology*, 38(4), 368–383.
- Skowronski, J. J., & Carlston, D. E. (1987). Social judgment and social memory: The role of cue diagnosticity in negativity, positivity, and extremity biases. *Journal of Personality and Social Psychology*, 52(4), 689–699.
- Svenson, O. (1992). Differentiation and consolidation theory of human decision making: A frame of reference for the study of pre- and post-decision processes. *Acta Psychologica*, 80(1), 143–168.
- Tanner, W. P. Jr., & Swets, J. A. (1954). A decision-making theory of visual detection. *Psychological Review*, 61(6), 401–409.
- Taylor, S. E. (1991). Asymmetrical effects of positive and negative events: The mobilization-minimization hypothesis. *Psychological Bulletin*, 110(1), 67–85.
- Tipper, S. P. (1985). The negative priming effect: Inhibitory priming by ignored objects. *The Quarterly Journal of Experimental Psychology*, 37(4), 571–590.
- Tipper, S. P., & Driver, J. (1988). Negative priming between pictures and words in a selective attention task: Evidence for semantic processing of ignored stimuli. *Memory & Cognition*, 16(1), 64–70.
- van den Broek, P. (1990). The causal inference maker: Towards a process model of inference generation in text comprehension. In D. A. e. a. Balota (Ed.), *Comprehension processes in reading* (pp. 423–446). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.
- Van Dijk, E., & Zeelenberg, M. (2006). The dampening effect of uncertainty on positive and negative emotions. *Journal of Behavioral Decision Making*, 19(2), 171–176.
- Watkins, M., & Gardiner, J. (1982). Cued recall. In R. Puff (Ed.), *Handbook of research methods in human memory and cognition* (pp. 173–195). Cambridge, MA: Academic Press.
- Willemsen, M. C., & Keren, G. (2004). The role of negative features in joint and separate evaluation. *Journal of Behavioral Decision Making*, 17(4), 313–329.
- Wilson, T. D., & Gilbert, D. T. (2005). Affective forecasting knowing what to want. *Current Directions in Psychological Science*, 14(3), 131–134.
- Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: A means-end model and synthesis of evidence. *Journal of Marketing*, 52(3), 2–22.

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