The Influence of Selective Attention and Inattention to Products on Subsequent Choice

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A fundamental assumption of choice models is that products are valued for the benefits they provide. The only non-benefit-based source of preference is the processing fluency (e.g., ease of perceiving, encoding, comprehending, or retrieving information) that results from prior exposure to the product. This research documents an additional source of non-benefit-based "preference formation." Repeatedly allocating attention to a product (selective attention) and away from other products (inattention) subsequently influences choices between these products and competing products. Five experiments show that prior selective attention (inattention) to a product increases the likelihood the product will be selected (rejected) in a subsequent choice. Demonstrating that prior acts of attention can influence subsequent choices has implications for any visually complex environment in which marketers communicate about a brand (e.g., banner advertising, packaging). The results also speak to how stimulus-based choices can have enduring consequences.

A number of models have been developed to explain how consumers choose among alternatives, including multiattribute utility models (Currim and Sarin 1984), noncompensatory choice strategies (Elrod, Johnson, and White 2004), and decision heuristics (Tversky and Kahneman 1974). A fundamental assumption of each of these models is that products are valued for the benefits they provide (Lancaster 1966). More recent research has challenged this fundamental assumption. For example, the processing fluency literature shows that the ease of processing an option (e.g., ease of perceiving, encoding, comprehending, or retrieving information) can influence the preference for an option, independent of the benefits the option provides (Schwarz 2004). This demonstration of "preference-from-process," as opposed to "preference-from-information," suggests that there may be other cognitive processes that contribute to preference formation.

Attentional processes are one possible source of preference formation. Attention has traditionally been thought of as a mechanism that selects information for additional processing (Greenwald and Leavitt 1984). Yet the process of selective attention is complex, involving both the enhanced perception of attended material and the degraded perception of unattended material (Desimone and Duncan 1995; Reynolds and Chelazzi 2004). One of the more popular models of selective attention, the biased competition model, argues that attention localizes to certain stimuli in a display because of an increased (decreased) firing rate of the visual cortex neurons that are associated with the features of the target (nontarget) stimulus (Reynolds and Chelazzi 2004). These feature-based screening processes generalize from the individual features of a stimulus to the other features of a stimulus, so that entire stimuli are more likely to be repeatedly selected (neglected) for attention (Desimone and Duncan 1995; O'Craven, Downing, and Kanwisher 1999; Reynolds and Chelazzi 2004, 640). As a consequence, selective attention (inattention) to a logo, brand name, or prod-

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uct package at an initial viewing can influence attention to these stimuli during a subsequent viewing. The increased attention to a product during choice will increase (decrease) the likelihood that it is chosen (Fazio, Powell, and Williams 1989; Janiszewski 1998; Pieters and Warlop 1999).

We investigate situations in which people are encouraged to selectively attend to one of two products (henceforth, the designated alternative) and, in doing so, ignore a second product (henceforth, the neglected alternative). Subsequently, when people are asked to express a preference between the designated (neglected) alternative and a neutral but equally familiar option, they prefer the designated (neutral) alternative (experiment 1). We refer to the preference for the designated alternative as a *mere selection* effect, because prior selective attention to the alternative increased the preference for it. We refer to the lack of preference for the neglected alternative as a *mere neglect* effect, because prior inattention to the alternative decreased the preference for it. In experiment 2, we strengthen the mere selection and mere neglect effects using a key prediction of the biased competition model, namely, that making selective attention and inattention more difficult should lead to stronger effects. The remaining three studies address concerns that information-based processes associated with accessibility (i.e., retrieval fluency), representation (i.e., declarative knowledge), and behavior (i.e., habit formation) could be masquerading as mere selection and mere neglect effects.

SELECTIVE ATTENTION AND INATTENTION

Inferences about the influence of attention on choice depend on the assumptions one makes about the role of attention in information processing. For example, stage models of information processing (e.g., Atkinson and Shiffrin 1968; Greenwald and Leavitt 1984) conceptualize attention as a support activity for higher-order information processing performed in working memory. Attention is used to select information that is necessary and/or influential in subsequent judgments. As a consequence, marketers strive to control consumer attention in shopping environments by using packaging, shelf space allocation, end-of-aisle displays, and other attention-drawing techniques to encourage consideration of product offerings (Chevalier 1975; Drèze, Hoch, and Park 1993; Wilkinson, Mason, and Paksoy 1982). The logic is that increased attention to a product encourages more consumers to consider purchasing it (Allenby and Ginter 1995; Chandon et al. 2009).

A second conceptualization of attention focuses on the processes supporting the acts of attention and perception (i.e., identification), independent of any assumptions about downstream processing behavior. Our initial discussion of attention and perception will offer a short explanation of how visual selective attention is accomplished in the visual cortex. Although this explanation is admittedly reductionist, it illustrates many principles of attention. Next we will discuss the biased competition model of attention. Finally we will discuss how attention/inattention can influence choice.

Attention and Perception

Attentional processes are typically conceptualized as multilayered neural networks with feedback connections (Heinke and Humphreys 2003; Mozer 1991). Given the complexity of neural networks, metaphors are often used to enhance the understanding of attentional processes. A useful metaphor for understanding the attentional processes that will be discussed in this article is the paintbrush metaphor. Visual attention can be thought of as relying on a collection of paintbrushes (neurons) that are trying to paint stimuli (objects in the environment) on a canvas (the visual cortex) so that perceptual processes can interpret the canvas. When the visual environment is complex, there are not enough paintbrushes to paint everything in detail, so the entire scene can be roughly painted or specific locations in the scene can be finely painted while other locations are coarsely painted (Kristjánsson 2006; Mack and Rock 1998). Attention can increase the detail associated with certain objects/locations by painting faster in those areas (neural excitation) while painting slower in other locations that contain competing stimuli (neural inhibition). Increased detail (neural excitation) is advantageous because it aids perception (i.e., a person is more likely to perceive the objects in locations that are painted in more detail).

The challenge of any model of attention is to understand how decisions are made about adding and removing (limiting) detail from the objects/locations in the painting. After all, attentional processes are painting the canvas with no knowledge of what is being painted. Perceptual feedback connections are one method of assisting in this process. Just as a paintbrush can be specialized for certain applications, neurons can be specialized to react to specific stimuli characteristics such as color, contour, or shape. Perceptual feedback connections encourage increases in the speed of specialized brushes (e.g., neurons) that are painting certain locations (i.e., making a more detailed painting) while encouraging decreases in the speed of specialized brushes in competing locations (i.e., making a coarser painting). As a particular feature of selective attention, brush speed is faster in painting a relevant object when there is perceptual competition from an irrelevant object than when the relevant object is presented (attended) in isolation. Conversely, brush speed in painting an irrelevant object is slower when this object is competing for attention with a relevant object than when the irrelevant object is presented in isolation.

A second source of attentional control is the neural network itself. The neural network that composes attention can learn that an increase in the speed of certain brushes is typically accompanied by a decrease in the speed of other brushes. This type of attentional learning can be general (increase the speed of similar brushes and decrease the speed of dissimilar brushes so as to isolate objects) or specific (increase the speed of a common configuration of brushes and decrease the speed of other configurations so as to isolate familiar objects). Control over this process often occurs at higher levels in the network so that control is exerted over an integrated set of brushes that correspond to entire stimuli. In effect, perceptual feedback and network learning allow a person to “see this” and "not see that" in complex visual environments. These processes are the source of attentional blindness, a perceptual phenomenon in which people fail to see irrelevant information (e.g., a person in a gorilla suit) when attending to competing information in the same scene (e.g., counting the number of bounce passes between a team of basketball players; Mack and Rock 1998; Simons and Chabris 1999).

Attentional and perceptual processes can be illustrated with an example. Consider a shopper who wants to buy a can of Coke. This act will require the perception of the Coke can as distinct from other brands. To the extent that a Coke can has been seen before, perceptual feedback connections can increase the firing rates of neurons that are specialized for the configuration of visual features (color, contour, contrast) associated with the can of Coke. Attention enhances the firing rate of this configuration of neurons so that the Coke can (and its red color and distinctive font) becomes a more viable perceptual outcome. Attention also reduces the firing rate of neurons corresponding to other brands so that competing perceptual organizations (e.g., seeing the blue color and distinctive logo of a Pepsi can) become less viable outcomes. If this selection has been perceived often in the past, neural network memory makes this attention-based excitation and inhibition more pronounced. Together perceptual feedback and neural network learning allow the person to "see" the Coke can and fail to "see" everything else, even though all of the other perceptual organizations are possible and could be seen with a different processing goal.

This example illustrates a situation where attentional processes support perception in a goal-directed activity, but the same principles apply even when attention is more arbitrary. For example, consider a person who is simply looking at a product in a catalog. This person can shift attentional gaze to see model features, product descriptions, accessories, or other products on the page. These stimuli can be "seen" because they are similar to stimuli that have been seen in the past (i.e., neural network learning aids the perception of the stimulus). As important, when attention shifts, and a new item is seen, other items (e.g., products) are now not seen. These ideas are formalized in the biased competition model of attention.

The Biased Competition Model of Attention

The biased competition model of attention argues that attention localizes to certain objects in a display via an increased (decreased) firing rate of visual cortex neurons that are associated with the features of the target (nontarget) stimulus (Desimone and Duncan 1995). The model is specifically concerned with situations where there are two or more items in a visual display, as attentional processes are qualitatively different when there is a single item in a display (i.e., there is no need for neural excitation or inhibition). When there are more than two items in a display, neural responses to selectively attended (unattended) items are enhanced (inhibited).

The biased competition model of attention makes a number of assumptions that inform our understanding of how attentional processes might uniquely influence subsequent judgments. First, the visual cortex has limits on the amount of information it can process at any instant. The enhancement and inhibition of neural firing rates is an evolutionary adaptation that helps ensure that attention is directed to the information that is most relevant to ongoing behavior. Second, there are three sources of influence on neural firing rates: experience (things that have been seen previously are more likely to be seen again), top-down goal directedness (things that are relevant are more likely to be seen), and bottom-up environmental cues (things that are more salient in the environment are more likely to be seen). Third, neural enhancement and inhibition effects are stronger when there is more visual competition because isolating the perception of a single item becomes more difficult. More visual competition occurs when items are more closely located in the visual field (Bahcall and Kowler 1999; Cutzu and Tsotsos 2003; Luck et al. 1997) or are perceived using similar specialized neurons (Reynolds and Chelazzi 2004). Finally, neural enhancement and inhibition can be learned by the attentional system. That is, learning to attend to, and neglect, specific stimuli during an initial viewing session can influence subsequent attention to these stimuli (Desimone and Duncan 1995; O'Craven et al. 1999).

Attention and Choice

The biased competition model proposes that selective attention is a consequence of the neural excitation corresponding to information in a target location (perceived stimulus) and neural inhibition corresponding to information in other locations (neglected stimuli; Kastner and Ungerleider 2000). These stimulus-specific excitatory and inhibitory patterns are retained in the neural architecture of the visual processing system (an implicit assumption of connectionist models), so that it can influence the perception of these stimuli when they are encountered at a later time. Consequently, previously selected (neglected) stimuli are more likely to (not) be attended to during later encounters with the stimuli.

We propose that selective attention (inattention) can influence choices among products in that previously attended (neglected) products are more likely to be chosen (rejected) during a subsequent choice task. The influence of attention on choice is likely multiply determined. First, it could be that previously attended to (neglected) products are more likely to be seen (not seen) much in the same way that attentional blindness makes a limited set of perceptions available to working memory (Mack and Rock 1998; Simons and Chabris 1999). People are more (less) likely to choose what is perceptually available (unavailable). Second, it could be that previously attended to (neglected) products pop out of (retract into) a choice display (Treisman and Gelade 1980). If products that pop out of (retract into) a choice display are (are not) the first to be considered for choice, then consideration itself could encourage the choice of these (other) products (Chandon et al. 2009; Mantonakis et al. 2009). Finally, it could be that engaging in selective attention (inattention) primes cognitive processes that are instrumental in choice. Studies on procedural priming show that cognitive processes involving specific stimuli can have an impact on subsequent decisions concerning those same stimuli (Franks et al. 2000). It could be that processes supporting the attention-based selection and rejection of stimuli prime similar processes involved in the choice-based selection and rejection of the same stimuli (i.e., common approach/avoidance processes are both specific to stimuli and generalizable across cognitive acts). Muthukrishnan and Wathieu (2007) provide evidence for stimulus-specific, choice-priming effects, though the processes supporting these effects were not attentional.

Our hypothesis differs from prior hypotheses about attention and choice because it is not information based. That is, attention is not being used to increase the consideration of the merits of a product. Instead, the hypothesis is process based—selective attention (inattention) to a product subsequently influences the attention to/perception of the product, which in turn influences the choice of the product. Prior selective attention leads to a subsequent mere selection effect (i.e., an increased preference for a product relative to equally familiar stimuli), and prior inattention leads to a subsequent mere neglect effect (i.e., a decreased preference for the product relative to equally familiar stimuli). We begin the investigation with a pilot study that places more emphasis on external validity and then follow with five studies that are more focused on internal validity.

PILOT STUDY

The pilot study was designed to provide initial evidence that repeated selective attention (inattention) could influence a subsequent choice. The procedure involved a sorting task at time 1 and a choice at time 2. The sorting task required participants to separate sticks of regular gum from sticks of sugar-free gum. Separating the two types of gum forced repeated selective attention (inattention) to one type of gum. Afterward participants were invited to select a piece of gum as appreciation for participating in the experiment. The key dependent measure was whether participants chose the selected or neglected gum as their parting gift.

Method

Design. The experiment used a two-cell within-subject design (selectively attended vs. unattended) with a between-subjects *instruction generalization* factor ("select" vs. "remove") and a between-subjects *initial selection counterbalance* factor (type of chewing gum selected during sorting). The instruction generalization factor was used out of concern that participants might infer that selecting an item was a positive event. If similar results are observed when participants are asked to remove an item, then it is unlikely that evaluative inferences, if they are being made, influenced the results. The initial selection counterbalance factor was included in case people had preferences toward different types of chewing gum (regular, sugar-free).

Procedure. The data were collected at the University of Florida. Participants entered a behavior lab and were seated in a private computer carrel. The carrel contained a computer with experimental instructions and five plastic baskets of dimensions 6 inches by 4 inches and approximately 1 inch deep. One of the baskets was empty, and the other four contained 10 pencils and 10 pens, 10 quarters and 10 nickels, 20 chocolates (10 in unlabeled red wrappers and 10 in unlabeled blue wrappers), and 20 pieces of gum (10 large dimension and 10 small dimension pieces).

The instructions stated that the experiment investigated manual dexterity. Participants were then told:

> We want to assess how the shapes of different items influence your ability to sort the items. On the table in front of you, you see four baskets of items. Pick up the basket that includes pens and pencils. Place the basket on the side of the keyboard that corresponds to your dominant hand. Remove the empty basket from under the basket with the pens and pencils and place it directly to the outside of that basket. Your job is to remove [select] all of the pens [pencils] and place them in the empty basket. You will time yourself as you do this. When you are ready to start
>
> 1. Place the index finger of your nondominant hand on the spacebar and your dominant hand in the pens and pencils.
> 2. Hit the space bar and begin sorting. You will see the timer on the screen.
> 3. When you are done sorting, hit the space bar a second time. The timer will stop.
> 4. You will then proceed to the next sorting task.

Half of the participants had their attention focused on the pens and half had their attention focused on the pencils. In addition, half of the participants were told that they would be removing the item from the basket, and half were told that they would be selecting the item from the basket. When the sorting was complete, the participant recombined the pens and pencils and moved on to the next sorting task.

The participant then sorted coins, chocolates, and gum (in that order), using the same select/remove instruction in each situation. The gum pieces were two different sizes, the larger dimension pieces being regular gum and the smaller dimension pieces being sugar-free gum. The gum was not labeled, and participants were not informed of the type of gum they were sorting (i.e., they were asked to select or remove the larger or smaller pieces). After the gum sorting was complete and the gum had been recombined in a single basket, participants were invited to take a piece of gum as a thank you for their participation. Participants did not know they would receive this gift until it was offered.

It should be noted that the procedure included constraints that increased the likelihood that any observed choice effect could be attributed to selective attention (inattention). First, the size of the to-be-sorted gum was randomly assigned. Second, the gum wrappers lacked diagnostic information. Third, although the sorting task was not intended to provide information about the appeal of the gum, some participants selected and others removed the gum. To the extent that this factor is not significant, it is less likely that evaluative attributions about the behavioral act associated with the sorting are exerting an influence.

Results

One hundred and fourteen participants from an undergraduate subject pool participated in the experiment in exchange for extra credit. Sixty-one percent of the participants ($n = 69$) chose the gum that they had sorted earlier, a percentage greater than chance ($z = 2.30, p < .05$). A logistic regression found that the choice percentage did not depend on the sorting instruction (e.g., "select" or "remove"; $\chi^2 = .02$, $p > .05$). The logistic regression did show a preference for the larger pieces of gum ($\chi^2 = 7.86$, $p > .05$) but, critically, this preference did not interact with the sorting instruction ($\chi^2 = .41$, $p > .05$).

EXPERIMENT 1

The pilot study provided concurrent evidence for a mere selection effect and a mere neglect effect. The advantage of this procedure was that it approximated a situation in which a consumer repeatedly focuses attention on one item while repeatedly ignoring another. The disadvantages of the procedure were (1) it could not provide independent evidence of both a mere selection effect and a mere neglect effect and (2) the procedure combined attentional processes with motor actions, actions that could have created habits. In experiment 1, the procedure was designed to more strongly focus on attentional processes while at the same time providing independent tests of the mere selection and neglect hypotheses. Experiment 5 will address the habit formation hypothesis.

Experiment 1 used a two-part procedure. At time 1, participants were instructed to identify a designated alternative from among two items in a display (i.e., designated and neglected). The identification of the designated alternative was accomplished by indicating the location of the product in a display. At time 2, one-half of the participants were asked to state a preference between the designated alternative and a "neutral" option that had an equivalent exposure history. The other half of the participants were asked to state a preference between the neglected alternative and a neutral option that had an equivalent exposure history. In each case, exposure histories were equalized to control for exposure-based processing fluency effects (i.e., mere exposure effects; e.g., Zajonc 1980) and stimulus novelty (Desimone and Duncan 1995). Thus, any differences in preference should be more attributable to selective attention (inattention).

Method

Design. The experiment used a 2 (type of choice task: designated vs. neutral, neglected vs. neutral; between-subjects) × 4 (replicate category: cheese, chocolate, shampoo, soda; within-subject) design. There were two stimulus sets in each replicate category, and thus participants made eight choices. The experiment was conducted entirely on a computer.

Procedure. The data were collected at the University of Florida. Participants were told that the experiment investigated "the way consumers find products in a shopping display." To investigate this process, they would have to locate product packages presented on the computer screen. This activity would be repeated in four product categories: cheese, chocolate, shampoo, and soda. (A web appendix illustrates the procedures used in experiment 1.) Participants were told that the procedure involved a presentation of the target product they would have to find (i.e., the designated alternative), a presentation of a search screen containing two products (i.e., the designated alternative and the neglected alternative), a location identification screen that allowed the participant to indicate the location of the target product, and the presentation of a reset screen containing a different product to clear visual memory (i.e., the neutral alternative). This reset screen was included for the purpose of balancing the number of exposures received by each of the stimuli. This procedure was presented for two sets of products in each product category (more details below).

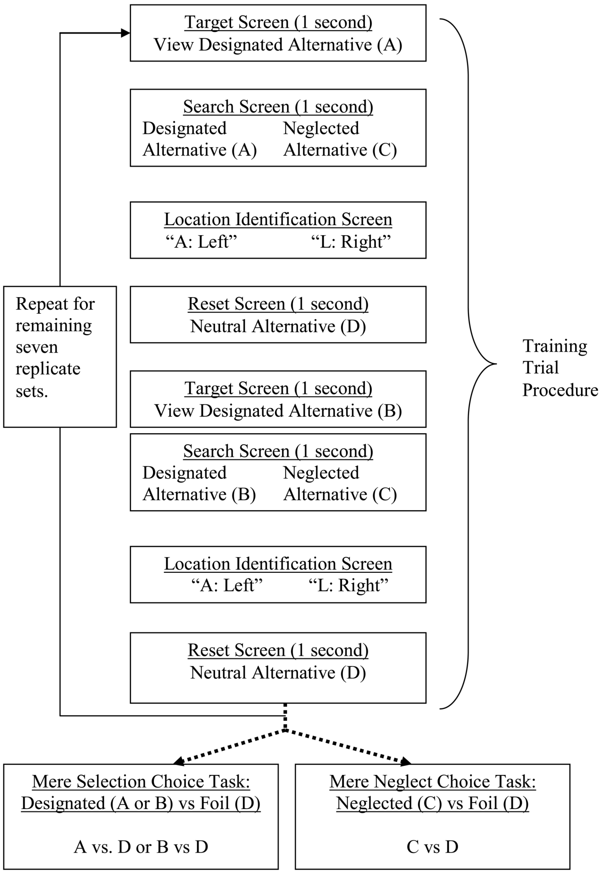
After the participant completed the trials for all product categories but before the preference task, a series of six comics were presented to clear short-term memory. Each comic was presented for 10 seconds. Participants were then told they would have to choose between some of the products they had just seen. They were told that pairs of products would be flashed on the screen briefly, and they would have to indicate a preference. Then the designated and neutral alternatives or the neglected and neutral alternatives were presented for 1 second, a presentation time that should limit higher-order processing of the stimuli. On the following screen, participants responded to the question, "Which product do you prefer?" by selecting a button labeled "product 1" (i.e., product on left side) or "product 2" (i.e., product on right side).

After participants had completed the preference task, they were asked to respond to a postexperimental inquiry (Allen and Janiszewski 1989). First, participants were asked to indicate how they generated their preferences. The options were *picked the product that was most familiar*, *picked the target product*, *picked the product that was not the target product*, *picked according to my preferences*, and *randomly*. Participants could select as many options as applied. When participants said they chose either the target or the nontarget products, a second question asked why they used this strategy. The options were *I liked those products more*, *it was the easiest way to make the choice*, *I thought it was what you* (*the experimenter*) *wanted me to do*, and *I just did it that way*.

Stimulus Presentation. The selective attention (inattention) procedure (i.e., training procedure) and preference elicitation task (i.e., dependent measure) followed a strict regimen to help control for potential alternative explanations. Figure 1 shows a training procedure for a set of four stimuli

FIGURE 1

STIMULUS PRESENTATION PROCEDURE FOR EXPERIMENT 1



(the web appendix illustrates this procedure). The first screen in the sequence presented the designated alternative (e.g., stimulus A) and told participants they would have to locate this alternative on a two-item search screen. The screen had the title "target," so participants would know it was the item to be found, and this appeared for 1 second. Next, the search screen appeared, containing the designated alternative (stimulus A) and the neglected alternative (stimulus C; location randomized). After 1 second, the search screen disappeared, and the participant saw the location identification screen that said "Which side of the screen was the target on?" with the answers "A: Left" and "L: Right." The participant pressed the "A" or "L" key to indicate whether the designated alternative had been on the left or right side of the search screen. This screen was followed by a "reset screen." The reset screen presented a single object (stimulus D) for 1 second, ostensibly to reset "visual memory." In reality, this object was used as the "neutral" alternative during the choice task.

At this point in the procedure, the designated alternative (A) had been presented twice (i.e., once on the target screen and once on the search screen), while the neglected alternative (C) and the neutral alternative (D) had been presented only once each (i.e., once on the search screen and once on the reset screen, respectively). To balance exposure histories, this process was repeated using a second designated alternative (B), while holding the neglected (C) and neutral (D) alternatives constant. Again, the target screen, search screen, and reset screen appeared for 1 second. Thus, across a total of eight slides, each of the designated alternatives (A, B) appeared twice for a total of 2 seconds (i.e., 1 second on the target screen and 1 second on the search screen), the neglected alternative (C) appeared twice for a total of 2 seconds (i.e., 1 second on each search screen), and the neutral alternative (D) appeared twice for a total of 2 seconds (i.e., 1 second on each of the reset screens). This procedure allowed us to equalize the time of exposure for all stimuli presented in the subsequent choice task, thus controlling for mere exposure and novelty effects.

The training procedure was repeated for eight sets of four stimuli, with two sets of four stimuli coming from each of four product categories. After all stimuli had been seen, participants were asked to engage in a choice task. For this task, a screen contained a 1 second presentation of the designated and neutral alternatives (a test of the mere selection effect) or a 1 second presentation of the neglected and neutral alternatives (a test of the mere neglect effect). The type of choice screen was a between-subjects factor. The location of the designated/neglected and neutral alternatives (foils) on the choice screen was randomized. The use of a specific designated alternative (i.e., A or B) in the mere selection choice was randomly determined. Participants indicated their preference (made choices) eight times, twice for each product category.

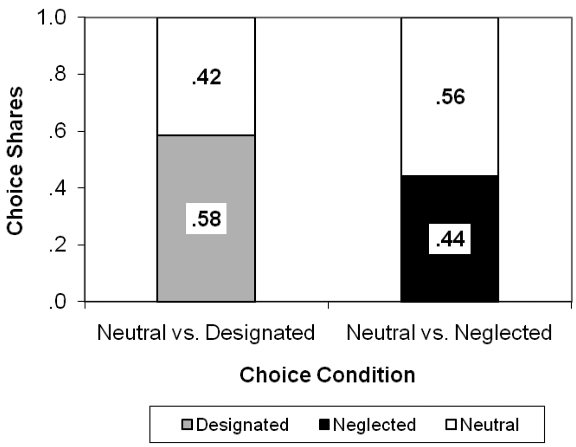
Stimuli. The design required that there be four unique stimuli for each training trial. Eight stimuli were collected in the product categories of shampoo, soda, cheese, and chocolate bars (see the appendix). The stimuli were either package shots (cheese, shampoo, and soda) or labels (chocolate bars). All of the stimuli were unfamiliar to the participant population. As a consequence, it was unlikely that the participants had a strong preference for any one of the eight products relative to the others. Stimuli were randomly assigned to the eight stimulus slots (A through H) for a given replicate. The random assignment occurred by participant. Training procedures for stimulus sets in the product categories were presented in random order.

Results

Eighty-three participants from an undergraduate subject pool participated in the experiment in exchange for extra credit. Two participants identified nine and seven of the 16 designated alternatives and were dropped from the analysis. The results are shown in figure 2. There was a main effect of the type of choice task ($F(1, 79) = 0.78$, $p < .01$). The designated alternative was chosen 57.3% of the time, a percentage greater than chance ($z = 2.64$, $p < .01$). The ne-

FIGURE 2

RESULTS OF EXPERIMENT 1



glected alternative was chosen 44.1% of the time, a percentage less than chance ($z = -2.11$, $p < .05$). There was no influence of the replicate factor ($F(3, 237) = .32$, $p > .05$), and there was no interaction of the replicate factor and the choice task ($F(3, 237) = .78$, $p > .05$). The location of the designated alternative on the search and choice screens was a random factor, so its influence was part of the error term.

The analysis of the postexperimental inquiry data suggested that the results were not due to a demand effect. Seven participants mentioned that they tried to pick the target product. Of these seven participants, three participants could not act on this decision rule because the designated alternative was not part of their choice task (i.e., they chose between the neglected and neutral alternatives). When the remaining four participants are removed from the analysis, the choice share of the designated alternative falls to 56.1% ($z = 2.07$, $p < .01$).

Discussion

The results of experiment 1 show that selective attention to an alternative in a visual search task increased the likelihood it would be chosen at a later time, whereas inattention to an alternative decreased the likelihood it would be chosen at a later time. The influence of an initial mere selection (neglect) on a subsequent choice occurred even though no objective criteria guided the initial selective attention/inattention. In our demonstration, the initial task was simply to indicate the location of an alternative designated by the experimenter. There was no a priori preference associated with the target alternative because the alternative was randomly assigned to a participant. There was also no stigma associated with the neglected alternative.

Although experiment 1 was not designed to be definitive with respect to the source of the mere selection and neglect effects, the procedure does allow us to rule out a small set of alternative explanations. First, the results cannot be attributed to processing fluency associated with mere exposure. This is because all alternatives were presented the same number of times, and for the same duration, prior to the preference task. The implication is that attention amplifies perceptual responding to a selected stimulus above and beyond the effect of mere exposure. Second, the equal exposure history also guards against effects of novelty, in particular, with respect to the mere neglect effect. Despite being equally novel (exposed), inattention inhibited perceptual responding toward a neglected stimulus. This mere neglect effect is particularly noteworthy as it is the opposite of what would be predicted by the mere exposure effect. This is not strictly contradictory, however, as the type of "selecting this and not that" in our design is absent by design in the mere exposure paradigm. Finally, it is unlikely that the effects are an endowment effect. Participants did not take possession of the designated alternative in the initial training task. Instead, participants simply indicated the location of the alternative. Moreover, the existing literature contains no evidence of an anti-endowment effect (but see Brenner et al. 2007).

EXPERIMENT 2

While experiment 1 suggests that the mere selection and mere neglect effects are the result of selective attention and inattention, we have not yet isolated a process consistent within this account. Experiment 2 was designed to assess whether attentional processes moderate the mere selection and neglect effects by excitation and inhibition, respectively. The experiment focused on a factor that the biased competition model predicts should influence the neuronal excitation (inhibition) associated with targets (distractors)— the spatial distance between the targets and distractors (Bahcall and Kowler 1999; Cutzu and Tsotsos 2003; Luck et al. 1997). The biased competition model predicts that excitation (inhibition) effects will become more exaggerated as targets and distractors are presented in closer visual proximity. This prediction is based on the premise that proximal stimuli are harder to visually differentiate and thus the attentional system must create more neuronal excitation (inhibition) for the target (distractor) stimulus.

The effect of proximity on neuronal excitation and inhibition has been shown physiologically in studies involving single-cell recordings in monkeys (Chelazzi et al. 2001) and functional MRI (magnetic resonance imagining) recordings in humans (Geng et al. 2006). Negative priming effects (i.e., response times to previously neglected stimuli) have also been shown to be stronger the closer the distractor is to the target at training (e.g., Fox 1994). Thus, if attentional processes create a mere selection (neglect) effect via excitation (inhibition), then a proximal (*side-by-side*) display format should amplify the mere selection and neglect effects relative to a distal (*separated*) display format.

Method

The experiment used a 2 (search screen display format: separated, side-by-side; between-subjects) × 2 (type of choice task: designated vs. neutral alternatives, neglected vs. neutral alternatives; between-subjects) × 3 (replicate category: cheese, shampoo, soda; within-subject) design. The chocolate label replicate was dropped from this procedure because the width of the labels made it difficult to execute the screen display manipulation. Thus, participants made six choices (one for each of the two stimulus sets in each replicate category). There was an additional counterbalance factor related to the order in which choices were made for the first or second stimulus set in a replicate category. This factor did not interact with the other manipulations, or their interaction, and will not be discussed further. The experiment was conducted entirely on a computer.

The procedure was the same as in experiment 1. The only difference was a manipulation of the search screen used during the selective attention training procedure. The *separated* condition used a search screen that was identical to the search screen used in experiment 1, wherein the designated alternative and the neglected alternative were separated by approximately 3 inches (on a 15 inch computer monitor). The *side-by-side* manipulation moved the designated alternative and the neglected alternative closer so that they were separated by only 1 inch. This meant that the selective attention task would be more difficult because interstimulus competition is more intense (i.e., there was an opportunity for more visual receptor suppression and enhancement; Janiszewski 1998). The data were collected at the University of Florida.

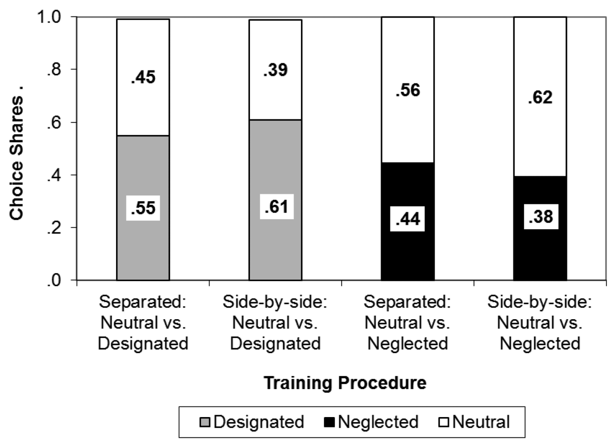
Results

Three hundred and sixty-two participants from an undergraduate subject pool participated in the experiment in exchange for extra credit. Two participants identified four and seven of the 16 designated alternatives, and they were dropped from the analysis. An analysis of the postexperimental inquiry data indicated that 11 of the participants claimed to be demand aware, eight of which were in the neglected alternative condition. Removing the three participants that claimed demand awareness in the designated alternative condition did not change the significance of the results, so all participants were retained. The results are shown in figure 3.

There was a two-way interaction between the type of display format and the choice task ($F(1, 356) = 8.50$, $p < .05$). The likelihood of selecting the designated alternative increased as the distance between the products on the search screen decreased ($\hat{p}_{\text{separated}} = .549$, $\hat{p}_{\text{side-by-side}} = .609$; ($F(1, 356) = 4.33$, $p < .05$). In contrast, the likelihood of selecting the neglected alternative decreased as the distance between the products on the search screen decreased ($\hat{p}_{\text{separated}} = .443$, $\hat{p}_{\text{side-by-side}} = .383$; ($F(1, 356) = 4.17$, $p < .05$). An ancillary analysis found that the designated alternative was chosen 57.6% of the time, a percentage greater than chance ($z = 3.56$, $p < .01$), whereas the neglected alternative was chosen 41.9% of the time, a percentage less than chance ($z = -3.75$, $p < .01$). There was no interaction of the product category replicate factor and display format ($F(2, 704) = .81$, $p > .05$), choice task ($F(2, 704) = 1.07$, $p > .05$), or the combination of the two ($F(2, 704) = .26$, $p > .05$).

FIGURE 3

RESULTS OF EXPERIMENT 2



Discussion

The results of experiment 2 suggest that attentional processes that operate via neural excitation and inhibition contribute to the mere selection (neglect) effect. The mere selection (neglect) effect was amplified when the selective attention task was more difficult and interstimulus competition was more intense. In the case of mere neglect, this echoes findings from the negative priming and stimulus devaluation literature. For example, the devaluation of a distractor relative to a target (there was no novel baseline) was strongest for those distractors closest to the target (Raymond, Fenske, and Westoby 2005).

The results of experiment 2 are inconsistent with a competing explanation of the mere selection and neglect effects. It could be argued that selective attention (inattention) simply encourages more (less) processing of a stimulus, resulting in a stronger (weaker) memory trace, more (less) retrieval fluency (or more/less familiarity), and more (less) preference. Yet, if this were true, the side-by-side condition of experiment 2 should have (1) had no impact on preference for the selectively attended stimulus and (2) increased preference for the neglected stimulus relative to the separated condition. The two display format conditions should not have produced different mere selection effects because the target stimulus was selectively attended in both conditions. The side-by-side conditions should have created a weaker mere neglect effect because the nontarget stimulus was more likely to receive inadvertent attention when it was closer to the target stimulus. The results (i.e., stronger mere selection and neglect effects in the side-by-side condition) were inconsistent with each of these predictions.

EXPERIMENT 3

The remaining experiments were designed to provide evidence that downstream information-processing activities (e.g., changes in the strength of the memory trace, changes in declarative knowledge, habit formation) were not masquerading as attentional process effects. Experiment 3 investigated a memory accessibility explanation by using common manipulations of memory enhancement that were anticipated to impact attentive processes in a different way. Two common strategies for enhancing declarative memory are repeated stimulus presentations and an increase in the amount of time between presentations (Dempster 1996; Ebbinghaus 1913/1985). For example, a Janiszewski, Noel, and Sawyer (2003) meta-analysis shows that memory for spaced stimulus presentations is three times stronger than for massed stimulus presentations. Repetition and spacing enhance memory whether a stimulus presentation is focal (i.e., a designated alternative) or incidental (a neglected alternative; Janiszewski et al. 2003; Roediger 1990). Hence, if mere selection/neglect effects are really a consequence of memory traces, then training trial repetition and spacing should increase (decrease) the strength of a mere selection (neglect) effect. In the case of mere neglect, a stronger memory trace would make the stimulus more, not less, accessible and more, not less, likely to be chosen.

The biased competition model makes a different prediction about the consequences of training trial repetition. Training trial repetition (e.g., repeated selective attention and inattention) should strengthen the mere selection effect and the mere neglect effect. More instances of selective attention should create a stronger mere selection effect owing to experience (things that have been seen previously are more likely to be seen again). More instances of selective inattention should create a stronger mere neglect effect because attention processes are being trained to fail to see the irrelevant (things that are irrelevant are less likely to be seen in the future). Thus, in the case of the mere neglect effect, the biased competition model prediction is the opposite of the memory trace prediction. The biased competition model is agnostic with respect to training trial spacing (i.e., it makes no prediction).

Method

The experiment used a 2 (number of training trials: one or five; within-subject) × 2 (presentation schedule: massed, spaced; between-subject) × 2 (choice task: designated alternative vs. neutral, neglected alternative vs. neutral; between-subjects) × 4 (replicate: cheese, chocolate, shampoo, soda; within-subject) design. At test, participants made four choices between stimuli presented in a single learning trial and four choices between stimuli presented in five learning trials. The experiment was conducted entirely on a computer.

The training procedure was similar to experiment 1, with one critical change. The procedure was adjusted to allow for repetition of training trials involving one-half of the stimuli. To allow for repetition, four stimuli (A through D) in each product category were assigned to the one repetition condition, designated M, N, O, and P for the four product category replicates, and four stimuli (E through H) were assigned to the five repetition condition, designated Q, R, S, and T for the four product category replicates. In the massed presentation condition, the order of training trials was Q, Q, Q, Q, Q, M, R, R, R, R, R, N, S, S, S, S, S, O, T, T, T, T, T, P, where each of the letters refers to a training trial as illustrated in figure 1. In the spaced presentation condition, the order of training trials was Q, R, S, T, M, Q, R, S, T, N, Q, R, S, T, O, Q, R, S, T, P, Q, R, S, T. All other factors associated with stimulus assignment, stimulus presentation, and choice task were identical to experiment 1. The data were collected at the University of Florida.

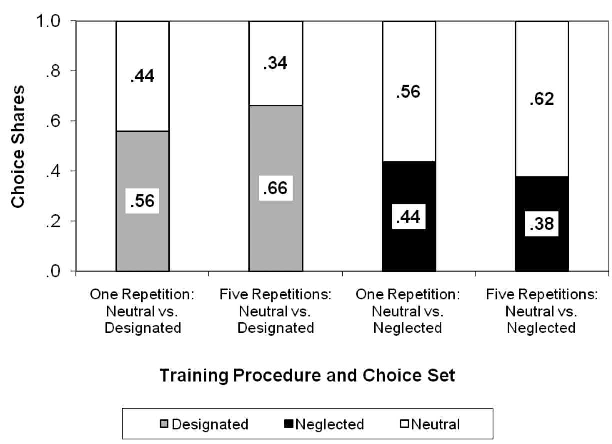
Results

Ninety-three participants from an undergraduate subject pool participated in the experiment in exchange for extra credit. The three-way interaction between the presentation schedule, repetition factor, and the type of choice task was not significant ($F(1, 89) = .43$, $p > .10$). Two-way interactions between the presentation schedule and repetition ($F(1, 89) = .25$, $p > .10$) and the presentation schedule and type of choice ($F(1, 89) = .31$, $p > .10$) were not significant. There was also no main effect of the presentation schedule ($F(1, 89) = .66$, $p > .10$). The means, collapsed across presentation schedule, are shown in figure 4.

There was a two-way interaction between the type of choice and the repetition factor ($F(1, 89) = 3.65$, $p = .06$). The likelihood of selecting the designated alternative increased as the number of training trials increased from one ($\hat{p} = .560$) to five ($\hat{p} = .663$) occasions (McNemar's $\chi^2 =$

FIGURE 4

RESULTS OF EXPERIMENT 3



5.92, $p < .05$). The likelihood of selecting the neglected alternative decreased as the number of training trials increased from one ($\hat{p} = .426$) to five ($\hat{p} = .378$) occasions (McNemar's $\chi^2 = 4.18$, $p < .05$). An ancillary analysis found that the designated alternative was chosen 61.1% of the time, a percentage greater than chance ($z = 4.26$, $p < .01$), whereas the neglected alternative was chosen 40.7% of the time, a percentage less than chance ($z = -3.61$, $p < .01$).

There was no influence of the product category replicate factor ($F(3, 267) = 1.51$, $p > .05$), and there was no interaction of the replicate factor and the type of choice ($F(3, 267) = 1.89$, $p > .05$), repetition factor ($F(3, 267) = 1.20$, $p > .05$), or the combination of the two ($F(3, 267) = .71$, $p > .05$).

The analysis of the postexperimental inquiry data suggested that the results were not due to a demand effect. Nine participants mentioned that they tried to pick the target. Of these nine participants, six participants could not act on this decision rule because the designated alternative was not part of their preference task (i.e., they chose between the neglected and neutral alternatives). Removing the remaining three participants from the analysis slightly increased the mere selection effect in the one repetition condition ($\hat{p} = .575$) and slightly decreased the mere selection effect in the five repetition condition ($\hat{p} = .653$; McNemar's $\chi^2 = 5.77$, $p < .05$).

Discussion

The results of experiment 3 provide additional evidence that the mere selection and neglect effects are a consequence of attentional processes. The biased competition model predicted that the repetition manipulation would strengthen both the mere selection effect and the mere neglect effect. These results were observed. In contrast, the results were not consistent with the hypothesis that selective attention/inattention in the training task was altering the memory traces of the designated and neglected alternatives, which, in turn, was influencing choice. There was no influence of the spacing manipulation, a robust memory effect, on choice, and the mere neglect effect became stronger, not weaker, with additional repetitions. Given that additional exposures to a stimulus always increase the strength of a memory trace, even when these exposures are incidental, it seems prudent to conclude that declarative memory processes are not contributing to the mere selection and neglect effects.

EXPERIMENT 4

Experiment 4 investigated whether or not a different declarative memory explanation could account for the results —namely, that locating (not locating) the designated (neglected) alternative affectively enhances the cognitive representation of this alternative. It has been hypothesized that when motivated processing results in the selection (rejection) of stimuli from the environment, these stimuli are automatically tagged with an affective marker (Ortony, Clore, and Collins 1988). Affective tagging is useful because somatic markers can guide future actions—without cognitive awareness—by creating stress signals that help respondents approach (avoid) positive (negative) outcomes (Damasio 1994). Consistent with this hypothesis, Raymond, Fenske, and Tavassoli (2003) show that the act of locating (ignoring) a designated (neglected) abstract pattern resulted in the designated target pattern being rated cheerier/less dreary than a neglected one.

However, there is an additional source of declarative memory that can provide an alternative explanation for the results. Declarative memory can also be altered through motor behavior via misattribution. Contractions of certain muscles are associated with positive or negative affect and can serve as a peripheral cue when evaluating a novel attitude object. For example, Cacioppo, Priester, and Berntson (1993) observed that unfamiliar Chinese ideographs evaluated during arm flexion (approach behavior) were evaluated more favorably than ideographs evaluated during arm extension (avoidance behavior). Pushing the left versus right button in the location task of our experiments might have served as similar approach and avoidance cues that influence stimulus evaluation (declarative memory).

We attempted to find an experimental design that would make contrasting predictions for an attentional explanation (the biased competition model) and a declarative memory explanation (the somatic marker hypothesis, misattribution of approach/avoidance motor behavior). To illustrate, consider a two-cell design in which the designated alternative appeared with either a distractor (i.e., neglected alternative) or on its own. If successfully locating the designated alternative provides somatic or motor feedback, then the designated alternative should be affectively enhanced in both conditions because it has to be located in both conditions. In other words, the somatic marker and misattribution hypotheses predict a mere selection effect in both conditions, with no difference between the conditions.

In contrast, the biased competition model predicts that the mere selection effect should only be obtained when the search environment contains more than one stimulus. Thus, comparing the choice share of the designated alternative in the distractor-present condition to that in the distractor-absent condition allows us to isolate the process of selective attention from an otherwise identical locating behavior, as the biasing effects of attention (neuronal excitation and inhibition) are absent when stimuli are presented in isolation in a search display (e.g., Chelazzi et al. 2001; Luck et al. 1997).

Method

Design. The experiment used a three-cell, between-subjects design (two-item search screen with a designated vs. neutral alternative choice task, two-item search screen with a neglected vs. neutral alternative choice task, one-item search screen with a designated vs. neutral alternative choice task) with four replicate categories (cheese, chocolate, shampoo, soda; within-subject). Thus, participants made eight choices (one for each of the two stimuli sets in each replicate category). The experiment was conducted entirely on a computer.

Procedure. The procedure of experiment 4 was similar to the spaced, five-repetition condition of experiment 3, with four exceptions. First, participants experienced five training trials for each of the eight stimulus sets. These training trials were spaced so that a specific stimulus set appeared on every ninth training trial. Second, one of the three between-subjects conditions asked participants to locate the designated alternative in the absence of a distractor (i.e., neglected alternative). This distractor-absent condition was identical to the distractor present condition except for the absence of the neglected alternative—the designated alternative simply had to be located on the left or right side of the screen. Third, the eight choices were presented in a random order by participant so that the replicate factor became part of the error term. Fourth, a postexperimental inquiry was not used in this study. The data were collected at the University of Florida.

Results

Forty-eight participants from an undergraduate subject pool participated in the experiment in exchange for extra credit. The results of the distractor-present condition replicated the findings of prior experiments. The designated alternative in the distractor-present condition was chosen 57.8% of the time, a percentage greater than chance ($z = 1.76$, $p < .05$), whereas the neglected alternative was chosen 40.8% of the time, a percentage less than chance ($z = -2.02$, $p < .05$). In contrast, the designated alternative in the distractor-absent condition was chosen only 47.8% of the time, a percentage that was not different from chance ($z = -0.51$, NS) but significantly lower than that of the designated alternative in the distractor-present condition ($z = 1.75$, $p < .05$).

Discussion

The findings of experiment 4 suggest that the mere selection and neglect effects are not a consequence of an affective tag or a misattribution of approach/avoidance motor behavior that operate via declarative memory. The mere selection effect was not observed when a target was located in the absence of a distractor, an activity that relied on the same motor response, contained the same (potential) implicit reward, and should have resulted in a positive affective tag. This result illustrates that attention is not sufficient to generate a mere selection effect. Instead, selective attention (i.e., locating a target in the presence of a distractor) is necessary for the mere selection effect. This result is consistent with the predictions of the biased competition model.

EXPERIMENT 5

Experiment 5 was designed to examine the process of habit formation as a potential alternative explanation for the mere selection and neglect effects. In the context of visual learning, a habit to select (or avoid; Danner, Aarts, and de Vries 2007) an alternative could develop when there is a slow, incremental accrual of information in procedural memory (Wood and Neal 2007). This is a process in which reinforcement, frequency, and stability of repetition are paramount (Hull 1943; Lally et al. 2008; Skinner 1938; Watson 1914; Wood and Neal 2007, 2009). Although experiments 1 and 2 relied on only a single repetition of the visual search (location) task and experiment 4 offered the equivalent (potential) implicit reinforcement in all conditions—making the process of habit formation an unlikely explanatory—it is still prudent to more directly differentiate the processes of selective attention from that of habit formation.

Therefore, an attempt was made to find an experimental design that could provide unique evidence for the habit formation hypothesis relative to the biased competition model. To do so, we focused on the issue of context stability. Meta-analytic reviews of research, across multiple behavioral domains, demonstrate stronger habits for behaviors formed in stable contexts as compared to varying conditions (e.g., Ouellette and Wood 1998). Similarly, habit formation is hindered to the extent contextual cues are associated with multiple responses as opposed to a few responses (Wood and Neal 2007). Thus, if the mere selection (neglect) effect relies on the process of habit formation, the effects should be stronger when mere selection (neglect) is repeated across stable rather than varied contexts.

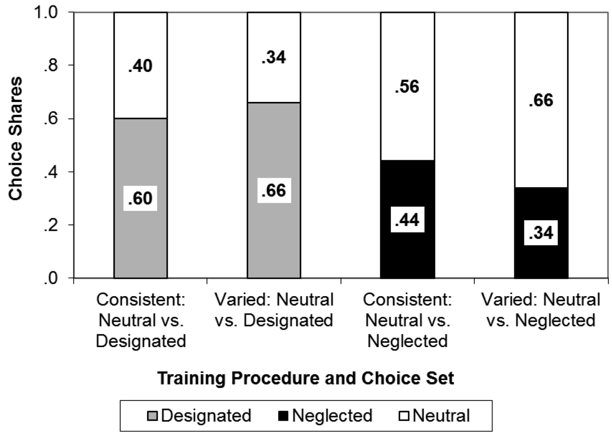
In contrast, a mere selection (neglect) effect based on the process of selective attention should produce *stronger* neural excitation (inhibition) when the context is varied across repeated instances of selecting/ignoring. This is because stable contexts across repeated trials require *fewer* additional attentional resources to successfully select/ignore alternatives (i.e., it is less necessary that attentional processes create neural excitation and inhibition). Each time a context changes, the attention system has to create a new way to excite (inhibit) neurons associated with the target (neglected) stimulus. Excitation (inhibition) that is based on more features (sets of neurons) should create stronger mere selection and neglect effects. Put differently, akin to the distance manipulation of experiment 2, repeating the visual search (locating) task across stable contexts should be easier and require the recruitment of *fewer* attentional resources than across varied contexts. As a result, the cumulative excitation or inhibition should be *lower* for the stable than varied contexts. Selective attention therefore makes the opposite prediction as one based on the process of habit formation.

Method

Design. Experiment 5 used a 2 (designated/neglected alternative: consistent or varied; between-subjects) × 2 (type of preference task set: designated alternative vs. neutral, neglected alternative vs. neutral; between-subjects) × 4 (replicate: shampoo, soda, cheese, chocolate; within-subject) design. Participants made four choices (one for each of the replicate categories). The experiment was conducted entirely on a computer.

FIGURE 5

RESULTS OF EXPERIMENT 5



Procedure. The experiment used a five-repetition procedure that was similar to the experiment 4 procedure, with the following exception. The procedure was adjusted so that the pairings between the designated and neglected alternatives either remained consistent (stable) or were varied (switched) on each of the five training trials. In the consistent condition, the procedure was as shown in figure 1. Stimuli were randomly assigned to the A, B, C, and D stimulus slots and the choice was between a designated alternative and a neutral alternative (A vs. D or B vs. D; randomly determined). In the varied condition, the identity of the designated or neglected alternative was varied across the five training trials. When the choice was between a designated alternative and the neutral alternative (A vs. D or B vs. D), the neglected alternative was a different stimulus (i.e., C1–C5) on each trial. When the choice was between a neglected alternative and the neutral alternative (C vs. D), the designated alternative was a different stimulus (i.e., A1–A5, B1–B5) on each trial. Given that there were only eight stimuli in a product category, the A and B stimuli with similar numbers were identical (e.g., A1 and B1 were the same stimulus). This meant that there were 10 neglected alternative training trials, as in experiments 3 and 4, but that there were only five different designated alternatives across these ten trials. In each of the varied conditions, stimuli were randomly assigned. A programming error kept postexperimental inquiry data from recording. The data were collected at the University of Florida.

Results

Three hundred and sixty-six participants from an undergraduate subject pool participated in the experiment in exchange for extra credit. Eleven participants were excluded for identifying the designated alternative less than 90% of the time. The means are shown in figure 5. There was a two-way interaction between the type of choice task and the consistency of the designated/neglected alternative ($F(1, 349) = 7.79$, $p < .01$). The likelihood of selecting the designated alternative increased as the identity of the neglected alternative went from consistent ($\hat{p} = .598$) to varied ($\hat{p} = .664$; $F(1, 349) = 4.33$, $p < .05$). The likelihood of selecting the neglected alternative decreased as the identity of the designated alternative went from consistent ($\hat{p} = .441$) to varied ($\hat{p} = .344$; $F(1, 349) = 3.89$, $p = .05$). An ancillary analysis found that the designated alternative was chosen 63.3% of the time, a percentage greater than chance ($z = 3.71$, $p < .01$), whereas the neglected alternative was chosen 39.3% of the time, a percentage less than chance ($z = -2.68$, $p < .01$). There was no interaction of the replicate factor and the type of choice ($F(3, 1{,}044) = .36$, $p > .05$), the consistency of the designated/neglected alternative ($F(3, 1{,}044) = .51$, $p > .05$), or the combination of the two ($F(3, 1{,}044) = 1.08$, $p > .05$).

Discussion

Experiment 5 provided additional evidence that the processes supporting selective attention/inattention, as distinct from that of habit formation, are responsible for the mere selection and mere neglect effects. If these effects were supported by the process of habit formation, they should have been stronger in stable contexts. In fact, the effects were stronger in varied contexts—those that required different strategies for neural excitation and inhibition across trials.

GENERAL DISCUSSION

Five experiments suggest that excitatory and inhibitory attentional processes contribute to a mere selection and a mere neglect effects. Experiment 1 demonstrated that identifying the location of a designated alternative on a two-item search screen increased the likelihood the alternative would be chosen at a later time. Alternatives that were not identified in the search task were less likely to be chosen at a later time, even after a single trial. Experiment 2 showed that the mere selection and mere neglect effects became stronger as the difficulty of the initial location identification task increased (i.e., interstimulus competition was more intense). Experiment 3 showed that the mere selection and mere neglect effects became stronger with repeated selective attention/inattention, but not with a spaced presentation schedule. Experiment 4 showed that the mere selection effect is contingent on a location identification task that includes more than one option (i.e., selective attention, not mere attention, is necessary for the effect). Experiment 5 showed that the mere selection and mere neglect effects get stronger when the location identification task varies targets/distractors across contexts. Together, the results suggest that the act of selectively attending to (neglecting) an alternative influences subsequent choices.

Managerial Relevance

Although the procedures used in the five experiments put a strong emphasis on internal validity, this does not suggest that mere selection and mere neglect are unlikely to influence consumer behavior. As the pilot study demonstrated, a real and incentive-compatible choice was strongly influenced by merely selecting a product in a sorting task. Experiments 2–5 further suggest managerially practical strategies for enhancing the mere selection and mere neglect effects. Consumers selectively attend to products when visual identification is difficult and do so in varying contexts (e.g., in different stores). For example, there are situations (e.g., store coupon, shelf screamers, salience vis-à-vis surrounding products) where selective attention to a designated alternative might be arbitrary. Even so, much of the selective attention in a shopping environment is motivated, suggesting information-based reasons for choice. For this reason, we expect that mere neglect is more likely to operate in common consumer contexts. Every time a consumer searches for a product in a shelf display, the immediately adjacent products receive inattention. This inattention will happen more frequently in high turn-over product categories and could apply to competing brands or competing products in a product line. Thus, the inattention that accompanies the selective attention to frequently purchased products has the potential to influence the consideration, trial, and intermittent purchase of the neglected products.

We expect that there are other strategies that might enhance mere selection and neglect effects. Factors that increase salience and attract attention—physical properties such as motion, contrast, and size—should moderate the effects. For example, large, bright, or flashing banner ads are harder to ignore and should create a stronger mere neglect effect when a situation requires their neglect (e.g., web-based reading). Alternatively, more salient visual targets should require less excitation from attentional processes (i.e., the information signal is already strong) and, thus, result in weaker mere selection effects.

Limitations

In our studies, we isolate the mere selection and mere neglect effects from that of a mere exposure situation (i.e., our neutral alternative). It should be noted that there are several scenarios in which neglected alternatives should be processed in ways consistent with mere exposure—namely, when neglect is not a consequence of selective attention. For example, consider when a consumer is engaged in the primary task of driving while inattentively listening to a radio advertisement, or where a consumer is flipping through a magazine or chatting on the telephone during a commercial television break. Even though the advertisements are not the primary focus of attention, the consumer is not engaged in the process of selecting "this and not that" or preparing for a response. Similarly, roadside billboards or branded materials in, say, a race car video game might be peripherally distracting, but they are not selected against. Indeed, divided attention manipulations have not been found to eliminate the mere exposure effect (Seamon, Brody, and Kauff 1983). Instead, the mere neglect effect might apply to settings such as video games in which players have to shoot branded "bad guys" while avoiding shooting branded "good guys." From a purely attentional perspective, this game should enhance the evaluation of the bad-guy brands but devalue the good-guy brands.

Of course, the preceding discussion raises the issue of what it means to selectively attend to and selectively attend against. We expect that there are three conditions that must be met for selective attention. First, there must be more than one stimulus in the environment, as shown in experiment 4. Second, there must be a motivation to attend to one stimulus or a subset of the stimuli. That is, even though the selectively attended stimulus can be arbitrary (i.e., assigned by an external source), there must be a target stimulus. Third, competing stimuli must be viable competitors to the target stimuli (i.e., there must be difficulty associated with the selective attention task). If target or neglected stimuli are familiar, then the selective attention task is more likely to rely on attentional processes that create excitation/inhibition. Similarly, if the neglected stimuli are very different from the target stimulus (i.e., there are no shared visual features), the selective attention task might be too easy (i.e., selective attention can be accomplished with limited excitation/inhibition).

If the limiting conditions for a mere selection and neglect effect are correct, then it may be the case that the mere selection effect dissipates with more experience (i.e., more perceptual fluency). More experience makes a designated alternative easier to attend, though varying contexts may slow the rate of dissipation. In contrast, the mere neglect effect may be much more likely to persist. Neglected options are less likely to become familiar. Applied to a supermarket context, this implies that regional, small-share, and infrequently purchases brands will have a difficult time getting trial/market share because consumers have learned not to see these brands. In effect, these brands achieve a level of invisibility that must be overcome with marketing activity.

Future Research

The most pressing conceptual issue is an understanding of how selective attention and inattention influence choice. We expect that selective attention can influence choice via three broadly defined routes: altering the *type of information* made available to downstream activities (e.g., choice), altering the *quality of this information*, and the *priming of processes* used to manipulate this information. With respect to the type of information, selective attention and inattention may limit perception to a subset of the available alternatives or focus attention on one of the alternatives (Kristjánsson 2006; Mack and Rock 1998). In each case, the increased consideration of a specific alternative could increase the likelihood of choice (Chandon et al. 2009; Mantonakis et al. 2009). With respect to the quality of the information, selective attention (inattention) should result in a more detailed (coarser) representation of an alternative. The detail and richness of a stimulus representation could influence affective judgments by creating a saliency bias (Milosavljevic et al. 2012) or an attention-based fluency effect (Mantonakis 2012). An enriched stimulus representation could also increase confidence about the stimulus and encourage choice (Hoch and Ha 1986).

To understand how attentional processes can prime downstream cognitive processes, one must first update assumptions about the role of attention in information processing. Modern views of attention and perception assume that the visual system economically represents information in working memory (Kristjánsson 2006). People do not represent everything in their sensory environment—they only represent information that is relevant to the current task at hand. If this is so, how does attention know what to select, especially given the dynamic nature of information processing? The favored conceptualization is that of an attentional system that continuously interacts with downstream processes (Gao et al. 2011; Rensink 2000). That is, attention does not start information processing, it supports information processing. If this is so, attentional processes work in conjunction with inference, judgment, and choice processes. As a consequence, acts of attention may be able to prime acts of process. Moreover, because attention is a content-driven process, a combination of content and attentional process may be able to prime what are typically considered higher-order cognitive processes (e.g., investigate, evaluate, compare, choose, consume).

Conclusion

To summarize, we have highlighted how mere selection and mere neglect have consequences beyond and counter to mere exposure. This research is nascent but promises a variety of new insights that are central to marketing. Instead of the old marketing dictum that every exposure is a good exposure, we need to pay heed to Heisenberg's (1927) discovery that the mere act of observing an object changes it . . . and not always for the better.

APPENDIX

FIGURE A1

STIMULI IN EXPERIMENTS

Cheese

Chocolate

Shampoo

Soda

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