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Research Article

Between a rock and a hard place: The failure of the attraction effect among unattractive alternatives☆

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Abstract

Many important decisions that consumers face involve choosing between options that are unattractive or undesirable—the proverbial "lesser of two evils." Consumers, who face budget or geographical constraints, for example, end up with mostly undesirable consideration sets; yet a choice is necessary. We examine the role of option set desirability in the context of the well-established attraction effect. In five studies, we show that the attraction effect occurs in desirable domains but is eliminated when all the options are undesirable (Experiments 1–4). We further find that this asymmetric effect is consistent with a shift in decision makers' processing styles. Decision makers show more vigilant processing when making choices among undesirable (vs. desirable) domains (Experiments 3A and 3B), which results in an attenuated attraction effect (Experiment 4). Our results indicate that the attraction effect might not be as robust as generally thought and establishes (un)desirability as an important boundary condition.

Keywords: Context effects; Attraction effect; Decision making; (Un)desirability

Introduction

Many decisions that consumers face involve choosing between options that are relatively unattractive or undesirable—the proverbial "lesser of two evils." For example, budget or geographical constraints may force a consumer to make a choice from a consideration set that consists of less desirable options. Similarly, if a consumer is trading down after previously owning a high-end product (perhaps in better economic times), the initial product might serve as a reference point, making the current available alternatives seem less desirable (Zhang & Mittal, 2005). Even the framing of the attributes (e.g., 5% fat or 95% fat free) might change the perceived desirability of an option set. Many of the major decisions that people make in life (e.g., health care, career selection) and particularly those that involve large stakes (e.g., home purchase, investment decisions) include some undesirable components. Thus, understanding the role of desirability is a crucial step toward fully understanding such important decisions.

While the effect of desirability on certain kinds of decisions is well understood, there are important situations that remain unexamined. For example, existing studies have shown that framing options or goals negatively (vs. positively) systematically influences motivations and emotions (Roney, Higgins, & Shah, 1995), changes risk-seeking behavior (Kahneman & Tversky, 1979; Levin, Schneider, & Gaeth, 1998), including health-related behaviors (Block & Keller, 1995; Mittal & Ross, 1998; O'Connor, 1989) and increases the likelihood of deferring choice (Zhang & Mittal, 2005). Despite the evidence in these diverse areas, relatively little is known about how (un) desirability affects decision-making biases and context effects.

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We intend to fill this gap in the literature by examining the role of undesirability in the context of a prominent and robust decision bias: the attraction effect. Our results not only shed light onto the significant changes in consumer decisions when they make choices among undesirable options, but also introduce an important moderator of the attraction effect. We argue that when a choice is made from a set of undesirable options, a more vigilance-oriented mindset is evoked, leading to the elimination of the otherwise robust attraction effect. The remainder of this paper is organized as follows: We first review the literature and present our conceptual framework that predicts a (un)desirability-based attenuation of the attraction effect. Next, we report the results from five experiments, supporting these predictions. Finally, we discuss the implications of our findings.

Conceptual framework

The attraction effect

The attraction effect (sometimes labeled "asymmetric dominance" or the "decoy effect") refers to the phenomenon in which the addition of an asymmetrically dominated third alternative (the "decoy") to a core set of two alternatives increases the share of the alternative dominating the decoy (Huber, Payne, & Puto, 1982). For example, consider a consumer who is trying to decide between two frequent-flier programs: Program A has few blackout days but also few partners, whereas Program B has several partners but more blackout days. If a third inferior option (decoy), which has the same number of blackout days as Program A but even fewer partners, is added to the set, this increases the choice share of A relative to B. In other words, the introduction of a normatively irrelevant decoy makes one of the original options more attractive.

This phenomenon has been researched extensively and found to be robust in various hypothetical choice domains, including consumer products (e.g., beer, computers, restaurants, airplane tickets, apartments, cars, televisions, microwaves; Heath & Chatterjee, 1995; Huber et al., 1982; Park & Kim, 2005; Pettibone & Wedell, 2000), political candidates (Hedgcock, Rao, & Chen, 2009; Pan, O'Curry, & Pitts, 1995), and job candidates (Highhouse, 1996). The attraction effect has also been robust in "real" choice domains (in which participants experienced actual outcomes), including gambles (Herne, 1999), grocery shopping (Doyle, O'Connor, Reynold, & Bottomley, 1999), and political candidates (Pan et al., 1995). The phenomenon has even been demonstrated in other species, such as hummingbirds (Bateson, Healy, & Hurly, 2002), jays, and bees (Shafir, Waite, & Smith, 2002). Finally, the effect has been found for multiple types of decoys, including strictly inferior (Huber et al., 1982), subjectively inferior (Huber & Puto, 1983; Pettibone & Wedell, 2000), compromise (Pettibone & Wedell, 2000), and superior but unavailable (Highhouse, 1996) options.

Several explanations and possible mechanisms have been offered to account for the attraction effect, including attribute weight shifts (Ariely & Wallsten, 1995), changes in the perceived range of attribute values considered (Simonson & Tversky, 1992), ease of justification (Simonson, 1989), loss aversion (Pettibone & Wedell, 2000), and trade-off avoidance (Hedgcock & Rao, 2009; Luce, 1998). Yet, across these many replications and multiple explanations, little emphasis has been given to predicting when and under what conditions the attraction effect will *not* occur. There have been few exceptions of attenuation of this otherwise robust effect, demonstrating options that are of high-quality (Heath & Chatterjee, 1995), those that are described by categorical attributes (Ha, Park, & Ahn, 2009) and those that have a misfit with consumers regulatory orientation (Chatterjee, Roy, & Malshe, 2011; Levav, Kivetz, & Cho, 2010) tend to diminish the attraction effect (see Table 1 for a summary of all factors moderating the attraction effect). We add to this literature by examining an important boundary condition—namely, the desirability of the option set—for the attraction effect. In other words, if the choice set is considered to be either bad (e.g., due to constraints) or less desirable (e.g., due to reference points or framing effects), would the addition of dominated options still influence the choice share of the original alternatives? The current research investigates these questions and establishes option (un)desirability as an important boundary condition for the attraction effect.

Processing of less desirable options

An extensive literature has demonstrated that processing negative (e.g., less desirable) information leads to systematic differences in motivation, perception, learning, and evaluation relative to processing positive (e.g., desirable) information (Ahluwalia, 2002; Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Higgins, 1997; Kahneman & Tversky, 1979). For example, the evolutionary perspective argues that avoiding negative situations is critical to human evolution and survival, which is why negative information is automatically detected (Dijksterhuis & Aarts, 2003) and people can make snap judgments about whether a stimulus is good or bad for them (Pratto & John, 1991). Neuroscientific research supports these assertions by indicating that that there might be neural codes for avoidance of such aversive outcomes and experiences (Smith & Ellis, 1982).

Once negative stimuli are detected in an automatic and speedy manner, they receive more attention in the evaluation stage and are better remembered than positive stimuli (Pratto & John, 1991). When none of the available options are attractive, anticipated regret associated with either of the outcomes evokes negative emotions, which considerably influence information processing (Zeelenberg, 1999). People in negative (vs. positive) moods seek more information before making a decision (Bless et al., 1996) and process information more locally, paying more attention to the details (Gasper & Clore, 2002). As a result, people in negative moods are more accurate and do not show false memory biases or attribution errors exhibited by those in positive moods (Forgas, 1998; Storbeck & Clore, 2005). This suggests that consumers in negative moods process information more vigilantly, which might increase accuracy and decrease context effects.

However, a survey of the decision-making literature provides mixed evidence on the role of (un)desirability and vigilance on the presence and strength of context effects and decision biases. On the one hand, vigilance, operationalized in terms of both

Table 1
Summary of factors moderating the attraction effect.

Factors affecting the size of the attraction effect		
Amplifying Factors		
Quality	Low quality options are more affected by decoys than high quality options This effect reversed in a population that may have placed more importance on cost than quality	Heath & Chatterjee, 1995
No-choice option	No-choice option increased the attraction effect relative to forced choice	Dhar & Simonson, 2003
Justification	Justification increased the attraction effect	Simonson, 1989
Construal Level	High level construal increased the attraction effect	Khan, Zhu, & Kalra, 2011
Promotion Focus	Promotion focus increased the attraction effect	Mourali, Bockenholt, & Laroche, 2007
Category knowledge	Greater category knowledge increased the attraction effect when information is presented verbally	Sen, 1998
Regulatory Fit	Attraction effect larger when attributes are compatible with subjects regulatory focus promotion (prevention) focused people showed an attraction effect if a promotion (prevention) brand dominates the decoy	Levav, Kivetz, & Cho, 2010 Chatterjee, Roy, & Malshe, 2011
Perceived similarity	Similarity between decoy and target can increase the attraction effect	Mishra, Umesh, & Stem, 1993
Depletion	Depletion magnified the attraction effect	Pocheptsova, Amir, Dhar, & Baumeister, 2009
Popularity of decoy	Popularity of decoy can increase the attraction effect	Mishra, Umesh, & Stem, 1993
Attenuating Factors		
Meaningfulness	Unambiguous stimuli description attenuated the attraction effect Relevant stimuli can decrease the attraction effect	Ratneshwar, Shocker, & Steward, 1987 Mishra, Umesh, & Stem, 1993
Product familiarity	Product class knowledge can decrease the attraction effect	Mishra, Umesh, & Stem,1993
Categorical features	Introducing unique categorical features diminished the attraction effect	Ha, Park, & Ahn, 2009
Category knowledge	Greater category knowledge reduced the attraction effect when information is presented numerically	Sen, 1998
Involvement	Involvement can decrease the attraction effect	Mishra, Umesh, & Stem, 1993
Preference strength	Strong prior preferences can decrease the attraction effect	Mishra, Umesh, & Stem, 1993

justification (Miller & Fagley, 1991) and need for cognition (NFC; Chatterjee, Heath, Milbert, & France, 2000) has been associated with a diminished framing effect. Other research however, found little evidence to support a relationship between framing effects and amount of processing either with measured variables like NFC (Levin, Gaeth, Schreiber, & Lauriola, 2002) or with direct manipulation (LeBoeuf & Shafir, 2003). Similarly, Pettibone and Wedell (2007) found that two measures of vigilance (i.e., NFC and response times) were not correlated with decision biases caused by phantom decoys. Therefore, the impact of less desirable choice sets and vigilance on context effects is still an important and unanswered question. Furthermore, none of the aforementioned research examined the attraction effect using asymmetrically dominated decoys and mostly conceptualized vigilance with individual difference variables, not directly measuring or manipulating this construct. Both of these are germane to our examination of the role of undesirable options in decision making, which we discuss next.

Desirability-based elimination of the attraction effect

The attraction effect, like many other decision-making phenomena, is likely robust because it is multiply determined (Huettel et al., 2009). In many contexts the attraction effect may occur when people use the dominance relationship as a heuristic to avoid trade-offs between attributes (Hedgcock & Rao, 2009; Luce, 1998). Based on these explanations, a straightforward prediction would be to expect an amplification of the attraction effect in the undesirable sets. That is, if trade-offs are indeed more difficult to resolve in undesirable domains, consumers should be more likely to avoid these trade-offs by using a heuristic based on dominance, leading to a larger attraction effect.

However, it is also possible that undesirable choice sets activate a more vigilant mindset that is less biased by dominated decoys. In particular, we theorize that when consumers try to choose between undesirable options, their attention is drawn to the negative attributes and to the fact that they are forced to make tradeoffs with no way of avoiding a bad outcome. We argue that this inability to escape an undesirable choice evokes a vigilant mindset. Once activated, this mindset encourages a process by which consumers examine each option in an attempt to find an acceptable choice. That is, even if the decoy initially biases evaluation towards the asymmetrically dominating target, consumers soon realize that the target is also undesirable and move on to evaluate the remaining options. This process results in a choice that does *not* necessarily favor the dominating target over the other options. Thus, consumers' choices are not affected by the presence of asymmetrically dominated alternatives (i.e., decoys), resulting in the failure to demonstrate the attraction effect. Conversely, when choosing among desirable options, consumers are likely to be less vigilant (i.e., not as concerned with finding an acceptable option). Given that all the options are beyond the threshold of acceptability, consumers are more likely to resort to the dominance relationship to make a decision and thus their choices display an attraction effect.

To test our hypothesis, we manipulate desirability with (1) positive and negative attribute values, (2) positive and negative frames, and (3) reference points that alter the options' relative desirability (see Appendix 1 for a summary). Note that although we manipulate desirability of options, participants are always instructed to choose their most preferred option. In all

experiments, participants chose from a set of two or three options that are described by two attributes in a variety of product categories (see Appendix 1 for a summary). Although our goal was to establish the desirability-based attenuation of the attraction effect, we also tried to uncover potential drivers of this effect. To that end, we used both measurement and manipulation approaches to test the relationship between (un) desirability, vigilance and the attraction effect.

Experiment 1

The goal of Experiment 1 was to provide an initial test for our hypothesized effect and to examine the stability of the attraction effect when choosing from a set of less desirable options. In this initial study, we strictly manipulated desirability by changing the positive/negative sign in front of the attributes, while keeping the absolute value of the options constant. We predicted that the attraction effect would occur only when the participants made a choice from a set of desirable alternatives, in which all choices were above average, but not in the less desirable set.

Method

Participants and design

Participants were 295 undergraduate students who completed the experiment to fulfill a course requirement. The experiment was a 3 (decoy: none vs. Option 1 vs. Option 2) × 2 (desirability: desirable vs. less desirable) between-subjects design. Participants were randomly assigned to one of the six between-subjects conditions and indicated their choice among a set of two or three options.

Stimuli and procedure

Participants were presented with a scenario that asked them to imagine choosing a new fitness club. They were told that they had already done some research and had narrowed their choice down to two (or three) options, which were similar in all but two attributes: variety of the machines and cleanliness. The scenario proceeded to explain the rating system of the website they were using, in addition to providing a brief description of the two attributes with the following instructions:

> The website you are using rates a variety of machines *[cleanliness of the club]* on a scale ranging from −10 to +10. A rating of 0 means that variety in this fitness club *[cleanliness of this fitness club]* is average compared to the competition. Positive numbers reflect above-average variety *[cleanliness]*, whereas negative numbers reflect below-average variety *[cleanliness]*.

Approximately one-third of the participants were given a choice between two options with no decoy present. These options had a trade-off between the two attributes. Option 1 had a better variety of machines but was worse on cleanliness, and Option 2 was better on cleanliness but had a poorer variety of machines. Half the participants saw above-average options that were in the positive domain (ranging from 1 to 10), and the other half saw below-average options that were in the negative domain (ranging from −1 to −10). The remaining two-thirds of the participants saw a third option, which was the asymmetrically dominated decoy. Specifically, we manipulated the inclusion of a third decoy option that was dominated by either Option 1 (O1 decoy) or Option 2 (O2 decoy; see Appendix 2).

Results

We measured the attraction effect in two different ways. First, we calculated the difference in relative share of O1 ($\Delta\%O1_{(O1,O2,O1decoy \rightarrow O1,O2)}$), in the set {O1, O2, O1 decoy} where it was the dominating option to its share in the baseline set {O1 and O2} and the difference in relative share of O2 ($\Delta\%O2_{(O1,O2,O2decoy \rightarrow O1,O2)}$), in the set {O1, O2, O2 decoy} where it was the dominating option to its share in the baseline set {O1 and O2}. The attraction effect would be present if the choice share in the conditions with the decoy is significantly higher than the baseline conditions. Note that we predict an attenuation or elimination of the attraction effect in the undesirable condition, and a comparison to the control condition is not a strong test of this prediction. To provide a more robust test, we calculated the attraction effect in a second manner, by taking the difference in relative share of O1 in the set {O1, O2, O1 decoy} where it was the dominating option to its share in the set {O1 and O2, O2 decoy} where O2 was the dominating option. We expected $\Delta\%O1_{(O1,O2,O1decoy \rightarrow O1,O2,O2decoy)}$ to be positive and significant if the attraction effect was present. Since this calculation takes the difference between the two conditions with decoy, it makes it harder to find a non-significant difference, thus providing a stronger test of our hypothesis in the undesirable condition. For brevity, we discuss one of the traditional measures $\Delta\%O1_{(O1,O2,O1decoy \rightarrow O1,O2)}$ in detail (here and in all studies), while reporting the raw choice shares and the statistical significance of all measures in Table 2.

As can be seen in Table 2, we observed the attraction effect when the choice set was desirable, but there was no significant attraction effect when the choice set was undesirable. As predicted, we found that all measures of the attraction effect were larger and significant in the desirable condition and not in the less desirable condition. In particular, in the desirable domain the change in choice share of O1 in set {O1, O2, O1 decoy} (83%) was significantly higher than its share in {O1, O2} (65%; $\chi^2 = 4.19$, $p < .05$). This however was not the case in the less desirable domain ($P_{\{O1,O2,O1decoy\}} = 62\%$ vs. $P_{\{O1,O2\}} = 74\%$; $\chi^2 = 2.34$, $p = .31$; see Table 2 for additional analyses). These results indicate that option set (un)desirability moderates the attraction effect, such that the otherwise robust effect is no longer observed when the options provided are less desirable.

Discussion

Experiment 1 demonstrates systematic differences in the attraction effect depending on the valence of the options. The

Table 2
Experiment 1 results: The attraction effect in positively and negatively rated options.

Choice Set / Options	Desirable			Undesirable		
	O1, O2, O1 decoy	O1, O2	O1, O2, O2 decoy	O1, O2, O1 decoy	O1, O2	O1, O2, O2 decoy
O1 decoy	0% (0/48)			2% (1/50)		
O1	83% (40/48)	65% (32/49)	40% (20/50)	62% (31/50)	74% (37/50)	75% (36/48)
O2	17% (8/48)	35% (17/49)	60% (30/50)	35% (18/50)	26% (13/50)	23% (11/48)
O2 decoy			0% (0/50)			2% (1/48)
NOTE: numbers in parentheses show the raw choice data and cell sizes						
Attraction effect						
$\Delta\%O1_{(O1,O2,O1decoy \rightarrow O1,O2,O2decoy)}$	43%***			-13%^{ns}		
$\Delta\%O1_{(O1,O2 \rightarrow O1,O2,O1decoy)}$	18%*			-12%^{ns}		
$\Delta\%O2_{(O1,O2,O2decoy \rightarrow O1,O2)}$	25%**			-3%^{ns}		

$^{+}$ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$; For each of the attraction effect measure, a separate pairwise comparison analysis has been conducted. Reported significance levels are associated with these analyses and show whether the change in choice share between the two sets are statistically significant.

results replicate prior findings on the attraction effect in the desirable (i.e., positive) domain, but not in the undesirable (i.e., negative) domain. That is, we found that the attraction effect was eliminated when consumers made a choice from a set of undesirable alternatives. These findings support our main prediction that the presence of undesirable options attenuates or eliminates the otherwise robust attraction effect.

Experiment 1 manipulated valence in the strictest sense by introducing negatively rated options. This manipulation enabled us to test directly the effect of desirability on the attraction effect by associating desirability with valence (while maintaining the exact same spatial relationship between the options). Thus, what was desirable and less desirable was based strictly on valence. However, in doing so, the manipulation also produced an unfamiliar task that could have made the evaluation of the negative domain more difficult. That is, in the negative domain, participants might have had difficulty understanding the task because they needed to consider the sign of the options (e.g., −1 is a better rating than −2), which is neither intuitive nor commonly used. If so, our manipulation might have added more noise to the undesirable condition and be responsible for our results. To rule this possibility out, Experiments 2, 3A and 3B address this issue by manipulating desirability with only positive numbers.

Experiment 2

The goal of Experiment 2 was to provide further evidence for our hypothesized effect by generalizing it to a different operationalization of desirability. To that end, we manipulated desirability by using positive and negative framing.

Method

Participants and design

Three hundred and ninety five participants completed the study online via MTurk and were compensated for their participation. One hundred and nineteen participants either did not follow the instructions or failed the attention check and was thus eliminated from further analysis (for a discussion of this participant pool and use of attention check see Goodman, Cryder, & Cheema, in press). The average age of the participants was 31 years; 48% were men (N=129); and 57% resided in North America, 32% in India, and 7% Europe. The experiment followed a 2 (decoy: Option 1 vs. Option 2)×2 (desirability: desirable vs. less desirable) between-subjects design. Participants were randomly assigned to one of the four between-subjects conditions and indicated their choice among a set of three options.

Stimuli and procedure

Participants were presented with a scenario that asked them to imagine choosing one of the three humidifiers. They were further told that the humidifiers were similar in every attribute but two: (1) return period and (2) effectiveness rate. The attributes were defined as follows:

> Return Period is defined as the time window during which the product can be returned—no questions asked.
>
> Effectiveness Rate is measured as the % of consumers that observe one or more desirable health benefits.

The participants were given a set of three options from which to choose. Two of these options had a trade-off between the two attributes. Option 1 was more effective but had a shorter return period, and Option 2 had a longer return period but was less effective. We manipulated the inclusion of a third decoy option, which was dominated by either Option 1 (O1 decoy) or Option 2 (O2 decoy; see Appendix 3). Further, we manipulated the desirability of the option set by altering the framing of the attributes (Levin et al., 1998). In the desirable set, the attributes were presented in a positive framing (i.e., "returns permitted within 15 days" and "effective 90% of the time"), and in the less desirable set, we used a negative framing (i.e., "returns denied after 15 days" and "not effective 10% of the time"). This procedure enabled us to isolate the perceptions of desirability, while keeping the attributes and their objective levels constant.

Results and discussion

We measured the magnitude of the attraction effect as discussed in Experiment 1. The raw choice shares, as well as their statistical significance for this measure, is reported in Table 3.

As expected, the attraction effect was only present in the desirable domain. In particular, in the desirable domain choice share of O1 in set {O1, O2, O1 decoy} (58%) was significantly higher than its share in {O1, O2, O2 decoy} (38%; χ^2=18.05, p<.01). This however was not the case in the less desirable domain ($P_{\{O1,O2,O1decoy\}}$=64% vs. $P_{\{O1,O2,O1decoy\}}$=52%; χ^2=2.37, p=.31).

In experiment 2, we manipulated desirability by making subtle changes to the framing of the attribute values, while keeping the objective values and labels constant. This study replicated our prior findings by showing that the otherwise robust attraction effect was eliminated when the framing of the alternatives was changed and

Table 3
Experiment 2 results: The attraction effect in options with positive and negative frame.

Options \ Choice Set	Desirable		Undesirable	
	O1, O2, O1 decoy	O1, O2, O2 decoy	O1, O2, O1 decoy	O1, O2, O2 decoy
O1 decoy	16% (10/64)		8% (6/73)	
O1	58% (37/64)	38% (29/76)	64% (47/73)	52% (33/63)
O2	26% (17/64)	59% (45/76)	28% (20/73)	40% (25/63)
O2 decoy		3% (2/76)		8% (5/63)
NOTE: numbers in parentheses show the raw choice data and cell sizes				
Attraction effect				
$\Delta O1_{(O1,O2,O1decoy \rightarrow O1,O2,O2decoy)}$	20%***		12%^{ns}	

$^{+}$ $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$; For each of the attraction effect measure, a separate pairwise comparison analysis has been conducted. Reported significance levels are associated with these analyses and show whether the change in choice share between the two sets are statistically significant.

the options became less desirable. That is, changing the wording of a return policy ("returns permitted within 15 days" vs. "returns denied after 15 days") and effectiveness rate ("effective 90% of the time" vs. "not effective 10% of the time") was enough to eliminate the attraction effect. These results suggest that even seemingly trivial changes in the presentation of options can alter the strength and presence of the attraction effect.

These findings are consistent with our theory; undesirable choice sets activate a more vigilant system, which encourages a non-contaminated screening of dominated alternatives, and attenuates the attraction effect. The next set of experiments expands on these findings by examining whether undesirable choice sets activate a more vigilant mindset. In addition, these studies use a reference point approach to manipulating desirability. To do so, we employed two scenarios. The first (Experiment 3A) manipulated desirability by fixing the attribute values and varying the reference point to be either above or below the fixed attribute values. The second scenario (Experiment 3B) manipulated desirability by fixing a reference point and varying attribute values either above (desirable) or below (less desirable) this fixed reference point.

Experiments 3A and 3B

Method

Participants and design

Three hundred and ninety-six participants completed the study online via MTurk and were compensated for their participation. The average age of the participants was 34 years, 46% were men (N = 183), and 67% resided in North America (with India [22%] and Europe [7%] being the other major geographical locations). The experiment followed a 3 (decoy: none vs. Option 1 vs. Option 2) × 2 (desirability: desirable vs. less desirable) × 2 (domain replicate: cell phones, frequent-flier programs) × 2 (order of replicate presentation) mixed design, where product replicate was repeated within subjects. Participants were randomly assigned to one of the 12 between-subject conditions and indicated their choice among the set of options. Order did not produce any main effects, nor did it interact with any of the remaining variables (all Fs < 1). As such, we collapsed the data on this factor.

Stimuli and procedure

Participants were presented with two scenarios. In Experiment 3A, participants were asked to imagine that their cell phone contract was expiring and that they were considering new cell phone plans. We manipulated the desirability of the option set by altering their reference point of their current cell phone plan. In particular, participants were informed that their current plan gave them 50 (or 150) free text messages and charged them 50 (or 20) cents a minute for calls beyond their anytime minutes. The attribute values of the options presented were kept constant, but fell either strictly below or above these reference points (see Appendix 4 for details).

Participants were given a set of two or three options from which to choose. Two of these options had a trade-off between the two attributes. Option 1 had a less expensive call-per-minute rate but fewer free text messages, and Option 2 had higher per minute cost but more free text messages. Some of the participants also saw a third option which was dominated by either Option 1 (O1 decoy) or Option 2 (O2 decoy). Participants were asked to choose an option.

In Experiment 3B, participants were asked to imagine that they had decided to join a frequent-flier program. They were told that their city of residence imposed constraints on the type and number of frequent-flier programs that were feasible to join. The frequent-flier programs were similar in all but two attributes: number of blackout days and number of partner airlines to redeem reward miles. We set the reference point by informing the participants of the industry standards with respect to each attribute. To that end, we provided a brief description of the two attributes with the following instructions:

> The airline industry regularly applies **blackout days**, during which customers are not able to use reward miles to reserve flights. Fewer blackout days mean more opportunities for you to be able to book reward tickets. Based on the most recent data, below are the basic industry statistics:
>
> - Taking all the airlines into consideration, frequent-flier programs on average black out 25 days a year.
> - The minimum number of blackout days by an airline is 5.
> - The highest number of blackouts is 45 days.
>
> Airlines also vary on the **number of partner airlines** they allow you to use when redeeming reward miles, where more partners give you more flexibility. Based on the most recent data, below are the basic industry statistics:
>
> - Taking all the airlines into consideration, the average airline has about 12 partners that they share miles with.
> - The minimum number of partners is 4.
> - The highest number of partners is 20.

The participants were given a set of two or three options from which to choose. Two of these options had a trade-off between the two attributes. Option 1 had more partner airlines, but also more blackout days, and Option 2 had fewer partner airlines but also fewer blackout days. Half the participants saw alternatives with above-average attribute values (fewer than 25 blackout days and more than 12 partners), and the other half saw options with below-average attribute values (more than 25 blackout days and fewer than 12 partners). In addition, we manipulated the inclusions of a third decoy option. Some participants chose from an option set with no decoy while others choose from a set that included a decoy which was dominated by either Option 1 (O1 decoy) or Option 2 (O2 decoy; see Appendix 4 for details). Participants were asked to choose their preferred option.

Lastly, after stating their choices for the scenarios, participants were asked to indicate the extent of their vigilance (i.e., prevention focus) while making their last decision. In particular, we asked them (on an 11-point scale), "To what extent did you consider how your choice would prevent the most problems?" (Levav et al., 2010).

Results

Experiment 3A

We measured the attraction effect using the same three methods described in Experiment 1. The raw choice shares, as well as their statistical significance for the attraction effect under each measurement approach are reported in Table 4.

As predicted, in the desirable domain, choice share of O1 was significantly higher in set {O1, O2, O1 decoy} (69%) than in set {O1, O2} (56%; $\chi^2=5.08$, $p<.05$). This however was not the case in the less desirable domain ($P_{\{O1,\ O2,O1decoy\}}=55\%$ vs. $P_{\{O1,O2\}}=54\%$; $\chi^2=.533$, $p=.47$; see Table 4, Panel A for additional analyses). These results indicate that (un)desirability of the choice domain moderates the attraction effect, such that the otherwise robust effect is no longer observed when the options provided are less desirable.

Experiment 3B

We measured the attraction effect using the same methods previously described. The raw choice shares, as well as their statistical significance for the attraction effect under each measurement approach are reported in Table 4.

As can be seen in Table 4, Panel B, in the desirable domain, choice share of O1 was significantly higher in set {O1, O2, O1 decoy} (31%) than in set {O1, O2} (17%; $\chi^2=4.08$, $p<.05$). This however was not the case in the less desirable domain ($P_{\{O1,O2,O1decoy\}}=37\%$ vs. $P_{\{O1,O2\}}=37\%$; $\chi^2=.226$, $p=.63$; see Table 4, Panel B for additional analyses).

Vigilance

Next, we analyzed participants' self-reported regulatory focus measures, where we had asked the participants to indicate to what extent they were focused on preventing bad outcomes during their choice process. We predicted that evaluating options in less desirable (vs. more desirable) domains would make the participants more vigilant and thus focused on the prevention of a bad outcome. To test this prediction, we ran a 2 (desirability: desirable versus less desirable) ANOVA. Analysis revealed a significant effect of domain desirability on the extent of the prevention focus. That is, as predicted, participants reported significantly higher levels of prevention orientation (i.e., vigilance) when they were evaluating undesirable options ($M=8.28$) than when they were evaluating desirable options ($M=7.81$; $F(1, 394)=4.615$, $p<.05$).

Table 4
Experiment 3A and 3B results: The attraction effect in options above/below reference points.

Panel A: Experiment 3A Results

Choice Set / Options	Desirable			Undesirable		
	01, 02, 01 decoy	01, 02	01, 02, 02 decoy	01, 02, 01 decoy	01, 02	01, 02, 02 decoy
01 decoy	7% (4/59)			9% (5/56)		
01	69% (41/59)	56% (45/81)	34% (18/53)	55% (31/56)	54% (44/81)	48% (32/66)
02	24% (14/59)	44% (36/81)	60% (32/53)	36% (20/56)	46% (37/81)	46% (30/66)
02 decoy			6% (3/53)			6% (4/66)
NOTE: number in parentheses show the raw choice data and cell sizes						
Attraction effect						
$\Delta\%01_{(01,02,01decoy \rightarrow 01,02,02decoy)}$	35%***			7%^{ns}		
$\Delta\%01_{(01,02 \rightarrow 01,02,01decoy)}$	13%*			1%^{ns}		
$\Delta\%02_{(01,02,02decoy \rightarrow 01,02)}$	16%*			0%^{ns}		

Panel B: Experiment 3B Results

Choice Set / Options	Desirable			Undesirable		
	01, 02, 01 decoy	01, 02	01, 02, 02 decoy	01, 02, 01 decoy	01, 02	01, 02, 02 decoy
01 decoy	5% (3/59)			9% (5/56)		
01	31% (18/59)	17% (14/81)	6% (3/53)	37% (21/56)	37% (30/81)	30% (20/66)
02	64% (38/59)	83% (67/81)	91% (48/53)	54% (30/56)	63% (51/81)	67% (44/66)
02 decoy			3% (2/53)			3% (2/66)
NOTE: number in parentheses show the raw choice data and cell sizes						
Attraction effect						
$\Delta\%01_{(01,02,01decoy \rightarrow 01,02,02decoy)}$	25%***			7%^{ns}		
$\Delta\%01_{(01,02 \rightarrow 01,02,01decoy)}$	14%*			0%^{ns}		
$\Delta\%02_{(01,02,02decoy \rightarrow 01,02)}$	8%$^{+}$			4%^{ns}		

$^{+}$ $p<.1$, * $p<.05$ ** $p<.01$, *** $p<.001$; For each of the attraction effect measure, a separate pairwise comparison analysis has been conducted. Reported significance levels are associated with these analyses and show whether the change in choice share between the two sets are statistically significant.

Discussion of experiments 3A and 3B

The results of Experiments 3A and 3B replicate and extend our previous findings. Specifically, Experiment 3A manipulated

desirability with a reference point and employed attribute values that were either above or below the industry average, increasing the external validity of our effect. In Experiment 3B, we kept the attribute values constant across the conditions and instead manipulated desirability with a change in the reference point. These results are quite compelling because they demonstrate that the attraction effect is more malleable than previously thought, in that a simple shift in the reference point might be sufficient to eliminate the attraction effect.

Collectively, Experiments 1–3 tested our theory in a variety of choice settings, with four different manipulations of desirability, providing consistent evidence. In addition, the results of Experiment 3 shed light on the potential process behind the (un)desirability-based attenuation of the attraction effect. In particular, our results indicate that changing the desirability of the choice set has direct implications for participants' vigilance. We find that making choices among less desirable options garners more vigilance, which we hypothesize, results in an attenuated attraction effect. To provide stronger support for this argument, it is necessary to test the direct effects of vigilance on the attraction effect. In Experiment 4, we do so by directly manipulating vigilance.

Experiment 4

In this experiment, we sought to provide direct evidence for the role of vigilance in the presence of asymmetric dominance. Our theory has been that the attraction effect is eliminated when people make decisions from undesirable decision sets because these kinds of decisions induce a vigilant mindset. If this is the case, then inducing participants with a vigilant mindset should also eliminate the attraction effect – regardless of decision set desirability. To test this prediction, we measured the size of the attraction effect while simultaneously manipulating vigilance and desirability.

Method

Participants and design

Two hundred and sixty-nine undergraduate students completed the experiment to fulfill a course requirement. The experiment followed a 3 (decoy: none vs. Option 1 vs. Option 2) × 2 (desirability: desirable vs. less desirable) × 2 (mindset: control vs. vigilance) between-subjects design. Participants were randomly assigned to one of the twelve between-subjects conditions and indicated their choice among a set of two or three options.

Stimuli and procedure

Participants were presented with a scenario, which asked them to imagine purchasing a digital camera. They were told that they had already done some research and had narrowed their choice down to two (or three) options, which were similar in all but two attributes: battery life and picture quality. The scenario proceeded to explain the rating system of the website they were using and displayed the option set, both of which were identical to those used in Experiment 1. Participants were

Table 5
Experiment 4 results: The attraction effect in options with positive and negative frame for control and vigilance conditions.

	Control						Vigilance					
Choice Set / Options	Desirable			Undesirable			Desirable			Undesirable		
	01, 02, 01 decoy	01, 02	01, 02, 02 decoy	01, 02, 01 decoy	01, 02	01, 02, 02 decoy	01, 02, 01 decoy	01, 02	01, 02, 02 decoy	01, 02, 01 decoy	01, 02	01, 02, 02 decoy
01 decoy	4% (1/27)			0% (0/25)			9% (2/23)			17% (4/24)		
01	89% (24/27)	70% (16/23)	43% (9/21)	84% (21/25)	87% (21/24)	73% (16/22)	52% (12/23)	58% (11/19)	45% (9/20)	54% (13/24)	62% (13/21)	60% (12/20)
02	7% (2/27)	30% (7/23)	52% (11/21)	16% (4/25)	13% (3/24)	18% (4/22)	39% (9/23)	42% (8/19)	40% (8/20)	29% (7/24)	38% (8/21)	35% (7/20)
02 decoy			5% (1/21)			9% (2/22)			15% (3/20)			5% (1/20)
NOTE: number in parentheses show the raw choice data and cell sizes												
Attraction effect												
$\Delta\%01_{(01,02,01decoy \rightarrow 01,02,02decoy)}$	46%***			11%^{ns}			7%^{ns}			-6%^{ns}		
$\Delta\%01_{(01,02 \rightarrow 01,02,01decoy)}$	19%*			-3%^{ns}			-6%^{ns}			-8%^{ns}		
$\Delta\%02_{(01,02,02decoy \rightarrow 01,02)}$	22%$^{+}$			5%^{ns}			-2%^{ns}			-3%^{ns}		

$^{+}$ $p < .1$, * $p < .05$ ** $p < .01$, *** $p < .001$; For each of the attraction effect measure, a separate pairwise comparison analysis has been conducted. Reported significance levels are associated with these analyses and show whether the change in choice share between the two sets are statistically significant.

then given a set of two or three options from which to choose. While half of the participants proceeded to make a decision (control), the other half of the participants were given a vigilance manipulation with the following instructions: "Please evaluate the cameras presented below with scores on these two attributes. In doing so, think about which option is best in preventing the most number of problems." (Higgins, 2002).

Results and discussion

We measured the attraction effect using the same three methods described earlier. The raw choice shares, as well as the statistical significance for the attraction effect under each measurement approach are reported in Table 5.

As can be seen in Table 5, the control condition replicated our earlier findings. We observed a significant attraction effect when the choice set was desirable, but there was no significant attraction effect when the choice set was less desirable. Specifically, as before, the attraction effect was significant in the desirable ($P_{\{O1,O2,O1\ decoy\}}=89\%$ vs. $P_{\{O1,O2\}}=70\%$; $\chi^2=4.21$, $p<.05$), but not in the less desirable domain ($P_{\{O1,O2,O1decoy\}}=84\%$ vs. $P_{\{O1,O2\}}=87\%$; $\chi^2=.123$, $p=.73$). This however, was not the case when participants were induced with a vigilant mindset. As predicted, we find that none of the measures of the attraction effect were significant under vigilance in the desirable ($P_{\{O1,O2,O1decoy\}}=52\%$ vs. $P_{\{O1,O2\}}=58\%$; $\chi^2=.002$, $p=.96$) or less desirable domains ($P_{\{O1,O2,O1decoy\}}=54\%$ vs. $P_{\{O1,O2\}}=62\%$; $\chi^2=.042$, $p=.84$; see Table 5 for additional analyses).

Experiment 4 examined the attraction effect while manipulating vigilance and desirability. As predicted, when a vigilant mindset was triggered, the attraction effect was eliminated in both desirable and undesirable domains, indicating that increased vigilance in processing is responsible for the effects we obtained in the previous experiments. The results of Experiment 4 are consistent with our hypothesis that undesirable alternatives induce a vigilant mindset, which attenuates the attraction effect. We find the attraction effect is attenuated when participants choose from undesirable alternatives and when a vigilant mindset is induced.

General discussion

This paper examined preferences and decision-making processes when participants chose from less desirable option sets. In doing so, we focused on the effect of desirability on the attraction effect. Our results indicate that the attraction effect is attenuated when choice sets have negative attribute values (Experiments 1 and 4), are framed negatively (Experiment 2) and consist of options that are below their reference point (Experiments 3A and 3B). We demonstrated this effect in a variety of settings, from services (i.e., frequent-flier programs) to electronics (i.e., humidifiers). Furthermore, we found that making decisions among undesirable options induces vigilance (Experiments 3A and 3B) and that inducing vigilance eliminates the desirability-based attenuation of the attraction effect (Experiment 4).

Theoretical contributions and relationship to literature

During the past three decades, an extensive line of research has examined choices when a normatively irrelevant option (i.e., a decoy) is introduced to a choice set (Heath & Chatterjee, 1995; Huber et al., 1982; Pettibone & Wedell, 2000; Simonson & Tversky, 1992). Although several explanations have been provided to account for this effect, few researchers have systematically studied boundary conditions of the attraction effect. In this paper, we help fill this gap in the literature by establishing that option desirability is an important moderator of the attraction effect. In five experiments, we show that one of the most robust and established effects—namely, the attraction effect—fails if the option sets presented to consumers are undesirable.

This finding has important implications for the study of decision making. Our results imply that the attraction effect (and perhaps other context effects) might be more malleable than previously thought. An examination of the literature shows that nearly all the reported studies on the attraction effect focus on sets that are either neutral or desirable. However, there are many situations in which decision makers are forced to choose from less desirable options. Tougher economic situations lead consumers to face budget constraints that limit their feasible consideration sets. Geographical constraints often limit product availability. In addition to objective changes in the consideration sets, the mere perception of desirability can also affect decisions. The quality of a previously owned item might set a high reference point, making current options less desirable. Our results indicate that even the changes in framing might be enough to shift processing and eliminate the attraction effect. This finding is not trivial, as it points out the malleability of a very established effect, in addition to introducing a theoretically and practically important moderator.

In addition, our research sheds light on the process behind the desirability-based attenuation of the attraction effect. We find that when choosing from predominantly less desirable options, decision makers become more vigilant and tend to be more prevention focused (Experiments 3A and 3B). Furthermore, inducing a vigilant mindset eliminates the attraction effect even with desirable options (Experiment 4). That is, while participants in the control condition displayed the attraction effect with desirable options, this effect was eliminated when participants focused on preventing bad outcomes.

Strategic versus perceptual drivers of the attraction effect

There is growing evidence that several explanations of the attraction effect can be broadly divided into two categories: perceptual and strategic. Strategic processes include explanations such as participants using the dominance relationship as a simplification tool (Hedgcock & Rao, 2009; Luce, 1998; Pettibone & Wedell, 2000; Simonson, 1989). Perceptual processes, on the other hand, are not entirely deliberate (Dhar & Simonson, 2003) and are driven by how the dominance relationship might alter similarity of the options in the attribute space (Pocheptsova et al., 2009). While we did not specifically test this, it seems likely that desirability based attenuation is driven primarily by the strategic process. That is, it is possible that

in situations where the attraction effect is driven by perceptual processes like range-frequency (Simonson & Tversky, 1992), undesirability might not attenuate it. Further research can test this hypothesis by systematically manipulating whether participants evaluate each alternative before making a choice, as this has been shown to be one of the factors that help distinguish between strategic or perceptual drivers of the attraction effect (Park & Kim, 2005).

Regulatory focus

Our research is not the first to draw a relationship between the regulatory focus theory (Higgins, 1997) and the attraction effect. Earlier work by Mourali et al. (2007) has shown that an increase in the promotion-oriented mindsets is associated with an increase in the attraction effect. While both the work by Mourali et al. and ours stemmed from regulatory focus theory (Higgins, 1997), our work diverges as its main premise is derived from changes in vigilance and not in promotion-orientation. Put differently, these two lines of research are complementary as they provide insights about different aspects of the regulatory focus as it pertains to the attraction effect.

Implications and future research

The findings have substantive implications for consumer decision making. Decision makers often find themselves between a rock and a hard place when making a choice between unfavorable options. Our results imply that such situations might affect consumers' mindsets, which then influence their decision process and, ultimately, their choices. In addition, our results suggest that slight changes to the packaging or the promotion of some consumer products could have an important impact on the final choices made. One such case is preventative health care decisions, in which all options available might be aversive in nature. Budget constraints can also influence the desirability of the consideration set. For example, when consumers need to use budgetary guidelines, eliminating more expensive but more desirable options from their consideration effectively creates undesirable choice sets. Our research is one of the first to systematically alter desirability of the choice set to test the robustness of this consumer phenomenon.

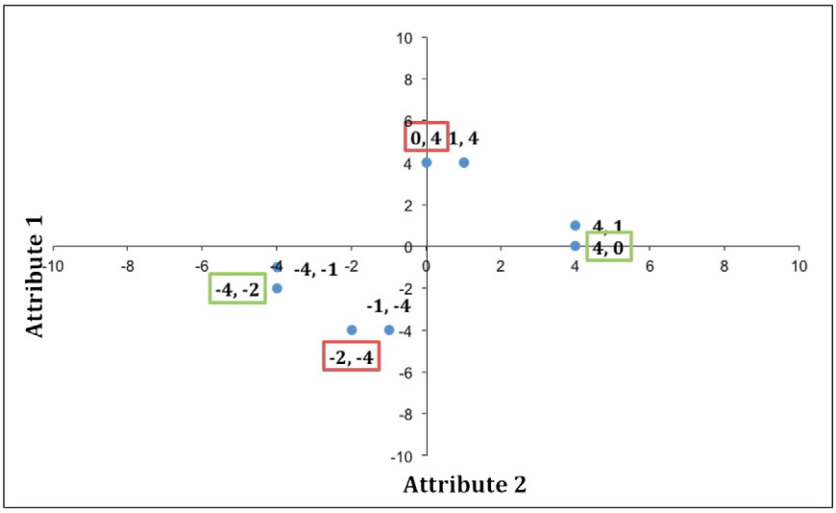
This research establishes the desirability-based attenuation of the attraction effect, but many additional issues remain to be explored. For example, we did not differentiate between attraction and cluster effects (Glazer, Kahn, & Moore, 1991; Sivakumar, 1995). Cluster effects occur when the act of clustering options together leads to increased choice share of the clustered options (i.e., dominance is not needed) and reduces share of the lone alternative. In the undesirable domains, clustering might lead to greater bias if multiple options in attribute space allow consumers to "pick their own poison." Further research could explore whether the effects we observed apply to other context effects (e.g., compromise effect, joint vs. separate evaluations). There are distinct explanations for many context effects, and as such, it is reasonable to expect that not all consumers will react to decreased desirability in the same way. Further research is necessary to identify these instances and their theoretical drivers.

Appendix 1. Product categories, attribute values, and manipulations for all studies

	Product Category & Attributes		
	Product Category	Attribute 1	Attribute 2
Experiment 1	Fitness clubs	Cleanliness	Variety of machines
Experiment 2	Humidifiers	Effectiveness rate	Return policy
Experiment 3A	Cell phone plans	Number of free text messages	Per-minute cost
Experiment 3B	Frequent-flier program	Number of partners	Number of blackout days
Experiment 4	Cameras	Battery Life	Picture Quality

	Manipulation of Desirability	
	Positive	Negative
Experiments 1 & 4	Attribute ratings between 1 & 10, where average is 0	Attribute ratings between –1 & –10, where average is 0
Experiment 2	Positive framing: 90% effective, returns permitted within 30 days	Negative framing: 10% NOT effective, returns denied after 30 days
Experiment 3A	Vary reference point (prior owned product) to be below the options	Vary reference point (prior owned product) to be above the options
Experiment 3B	Vary attribute values to be above reference point (industry average)	Vary attribute values to be below reference point (industry average)

Appendix 2. Attribute space for Experiments 1 and 4



Note. In the positive domain, (1, 4) and (4, 1) were the base options, with either (0, 4) or (4, 0) being added to the alternative set to create asymmetric dominance. In the negative domain, (–4, –1) and (–1, –4) were the base options. We created dominance by adding either (–4, –2) or (–2, –4) to the alternative set.

Appendix 3. Attribute values for Experiments 2

	Desirable Options	
	Returns Permitted Within	Is Effective _____% of the time
Option 1	15	95
Option 2	30	90
Option 1 decoy	7	95
Option 2 decoy	30	88

	Undesirable Options	
	Returns Denied After	Is NOT Effective _____% of the time
Option 1	15	5
Option 2	30	10
Option 1 decoy	7	5
Option 2 decoy	30	12

Appendix 4. Attribute values for Experiments 3A and 3B

Experiment 3A (Cell Phone Providers)		
	Per-minute Cost Beyond Anytime	Free Text Messages
Option 1	30	80
Option 2	40	120
Option 1 decoy	30	60
Option 2 decoy	45	120

Note. Desirability of the options was manipulated with the use a reference point (the current plan). In the desirable domain, the reference point was 50 free text messages and 50 cents a minute. In the undesirable domain, the reference point was 150 free text messages and 20 cents a minute.

Experiment 3B (Frequent- Flier Programs)		
	Desirable Options	
	Blackout Days	Airline Partners the Reward Miles can be Used Toward
Option 1	18	17
Option 2	8	14
Option 1 decoy	20	17
Option 2 decoy	8	13
	Desirable Options	
	Blackout Days	Airline Partners the Reward Miles can be Used Toward
Option 1	40	11
Option 2	30	8
Option 1 decoy	42	11
Option 2 decoy	30	7

Note. Participants were told that the range for blackout days was 5–45 days, with an average of 25 days. The range of airline partners was 4–20, with a mean value of 12.

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