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Motivated Use of Numerical Anchors for Judgments Relevant to the Self

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Abstract

The anchoring effect has been replicated so extensively that it is generally thought to be ubiquitous. However, anchoring has primarily been tested in domains in which people are motivated to reach *accurate* conclusions rather than *biased* conclusions. Is the anchoring effect robust even when the anchors are threatening? In three studies, participants made a series of probability judgments about their own futures paired with either optimistic anchors (e.g., "Do you think that the chances that your current relationship will last a lifetime are more or less than 95%?"), pessimistic anchors (e.g., "more or less than 10%?"), or no anchors. A fourth study experimentally manipulated motivation to ignore the anchor with financial incentives. Across studies, anchors that implied high probabilities of unwanted events occurring were ineffective. Together, these studies suggest that anchoring has an important boundary condition: Personally threatening anchors are ignored as a result of motivated reasoning processes.

Keywords

judgment and decision making, anchoring, motivation, self, romantic relationships

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Suppose you were asked to estimate the chances that someone will break your heart in the next 5 years, from 0% to 100%. How would you answer this question? You might draw from relevant information that you have on hand, such as your own relationship experiences, in an effort to make a more accurate judgment. You might also use a potentially relevant anchor point, such as average rates of infidelity or divorce. However, imagine that before being asked this question, you were tallying the grades for a term paper, and the class average happened to be 60%. Would this arbitrary number influence your own perceived likelihood of being left brokenhearted? What if the class average had been 80%—would that higher number prompt you to make a higher estimate?

Current research on the anchoring phenomenon suggests people should be influenced by such an anchor. When people need to make judgments about topics for which they have insufficient information, any available information can be used as an anchor point. Thus, arbitrary or irrelevant information can be overly influential, a phenomenon referred to as the anchoring effect (Tversky & Kahneman, 1974). For example, Chapman and Johnson (1999) asked participants to turn their social security numbers into monetary figures. Next, participants were asked to indicate the minimum amount for which they would be willing to sell a particular lottery ticket. The researchers found that participants used their social security numbers as anchors, such that participants with higher social security numbers provided higher minimum amounts.

The anchoring effect has been demonstrated in hundreds of studies (see Furnham & Boo, 2011, for a review). Indeed, this phenomenon has been so systematically replicated that anchoring has been called "arguably one of the most important truths about human judgment" (Simmons, LeBoeuf, & Nelson, 2010, p. 917), as well as "a truly ubiquitous and robust phenomenon" (Mussweiler & Strack, 1999, p. 137). However, no study that we know of has examined anchoring in the context of judgments that participants should personally prefer (naturally or because of incentives) to be in one direction rather than another. We propose that the anchoring effect may be less robust or even eliminated when the perceiver is strongly motivated to reach conclusions that are inconsistent with the anchors. In particular, we propose that anchoring may have important boundary conditions in

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contexts involving meaningful, real-life consequences for the self.

The Anchoring of Unbiased Judgments

The vast majority of anchoring research has examined how anchors affect people's judgments in the domain of general knowledge (see Furnham & Boo, 2011, for review), a domain in which people generally have no reason to be biased toward one judgment or another. For example, numerous studies have examined how people's judgments of facts (e.g., the height of the Brandenburg Gate) are moved in the upward direction by high anchors (e.g., 150 meters), and moved in the downward direction by low anchors (e.g., 25 meters; Strack & Mussweiler, 1997).

Some research has examined anchoring in the more consequential domain of legal sentences (e.g., Chapman & Bornstein, 1996; Englich & Mussweiler, 2001; Englich, Mussweiler, & Strack, 2006). However, such research has placed participants in the role of a neutral third party, motivating accurate—rather than biased—judgments. For example, in some studies, legal professionals have been presented with hypothetical criminal cases and asked to decide on the lengths of the defendants' sentences (Englich & Mussweiler, 2001; Englich et al., 2006). In such cases, although the domain may be consequential—such that participants may be particularly motivated to reach a fair and just conclusion—there is no reason for participants to be motivated to reach a *particular* conclusion. For example, none of the anchors in these studies were personally threatening such as by deciding a length of time the participants would themselves be in jail.

Limited research has examined the influence of anchors on participants' judgments about their own performance: a domain in which people are potentially biased. Participants have been asked to predict how many anagram puzzles they would be able to solve (Cervone & Peake, 1986), or how many sentences they would be able to unscramble (Switzer & Sniezek, 1991). Participants estimated that they could solve more anagram puzzles, or unscramble more sentences, after being given high anchors rather than low anchors. However, in these studies, participants actually engaged in the task at hand, meaning that participants knew that their estimates would be compared with their performance. Because people are less likely to make self-serving evaluations about themselves in cases where the evaluation can be readily compared against objective standards (e.g., Dunning, Meyerowitz, & Holzberg, 1989; Felson, 1981), these studies appear to incentivize for accurate judgments more so than particular judgments.

Plous (1989) examined whether anchors can influence people's judgments about the probability of a nuclear war. Nuclear war was a topic of great concern at the time of this research (Mayton, 1986); therefore, this research may be the closest in the existing literature to a test of our hypothesis that threatening anchors are ineffective. Across six samples, participants were asked to judge the probability of nuclear war after being given a low anchor (1%), a high anchor (90%), or no anchor. The researchers found that the estimates provided in the low-anchor conditions (M = 10.8), the no-anchor conditions (M = 19.1), and the high-anchor conditions (M = 25.7) were significantly different from one another. Thus, this study points to the possibility that threatening anchors may indeed be effective at swaying people's probability judgments: Anchors may be able to lead to the perception that nuclear war is more likely. However, although nuclear war appears on its face to be a threatening outcome, data on participants' motives were not collected, and therefore it is unclear just how motivated participants were to conclude that nuclear war was unlikely.

Some research has experimentally manipulated people's motivations in the context of anchoring. However, such research has focused exclusively on *accuracy* motivation, whereby participants are provided with monetary incentives for choosing correct answers and reaching accurate conclusions (e.g., Epley & Gilovich, 2006; Simmons et al., 2010; Tversky & Kahneman, 1974; Wright & Anderson, 1989). No study that we know of has manipulated people's *directional* motivation; incentivizing participants to reach one conclusion over another.

Overall, we know very little about how the anchoring phenomenon operates when people are motivated to reach a certain conclusion, such as a judgment or decision that is consistent with their own preexisting goals, beliefs, preferences, and biases. The anchoring effect has yet to be tested in highly personally relevant domains—contexts in which people should have naturally strong motivation to reach certain conclusions over others—nor has the anchoring effect been tested in contexts where participants are incentivized to prefer certain conclusions.

The Anchoring of Biased Judgments

The notion that anchors may be less effective when they contradict a person's preferred conclusions is consistent with an attitudinal perspective on the anchoring effect (Wegener, Petty, Detweiler-Bedell, & Jarvis, 2001). Drawing from attitude change theories such as the elaboration likelihood model (Petty & Cacioppo, 1986), an anchor can be thought of as a persuasive message about what judgment one should make. This message may influence the perceiver through thoughtful, elaborative processes, or through less-thoughtful, low-effort processes (Blankenship, Wegener, Petty, Detweiler-Bedell, & Macy, 2008).

Within this attitudinal framework, one of the most empirically supported models of anchoring—the selective accessibility model (Strack & Mussweiler, 1997)—represents an elaborative route through which anchors can affect judgments. The selective accessibility model posits that when people are trying to make an accurate estimate, the presence

of an anchor prompts people to consider similarities between the true answer and the anchor. Anchor-consistent information becomes selectively accessible, leading the perceiver to generate an estimate closer to the anchor. The attitudinal framework suggests that seeking confirming information is *one* elaborative way in which the perceiver may process the anchor. However, in certain circumstances, the perceiver may seek disconfirming information instead. For example, Wegener et al. (2001) found that anchors are less effective when they are implausibly extreme, and argued that this is because implausible anchors lead people to consider ways in which the true answer is *different* from the anchor.

People often seek disconfirming information when they are motivated to reject a persuasive message (Edwards & Smith, 1996). Consistent with this, Wegener et al. (2001) suggested that people may seek disconfirming information in response to anchors when they are motivated to reject the anchors, that is, when they "have some reason to 'disagree' with the value suggested by an anchor" (p. 67). Through such processes, anchors that run counter to the perceiver's biases may be rendered ineffective. These ideas have yet to be empirically tested.

Self-relevant domains offer an ideal context for testing the impact of motivational biases on anchoring. People tend to be highly motivated to reach certain conclusions when making judgments that have meaningful, real-life consequences for the self. Specifically, people make judgments that are important to the self in a motivated fashion such that goal-consistent information (i.e., information that supports one's desired outcome) receives more weight than goal-inconsistent information (e.g., Kunda, 1987, 1990). For example, in the domain of romantic relationships, people tend to make overly optimistic predictions about the longevity of their relationships because they are motivated to ignore the negative aspects of their relationships (MacDonald & Ross, 1999). Such domains offer a suitable test of whether the anchoring effect persists in the face of motivational bias.

The Present Research

The goal of the present research was to test a potential boundary condition to the anchoring effect. Can arbitrary anchors push people toward particular judgments even when those judgments contradict their own preferences? Or, might anchors that threaten preferred conclusions represent an important exception to the otherwise robust anchoring phenomenon? We predicted that anchors are processed consistently with people's personal goals, such that anchors suggesting negative outcomes for the self are relatively ineffective.

In Studies 1 and 2, we examined how arbitrary anchors affect people's estimates of the likelihood of positive and negative events occurring in domains high in personal relevance (e.g., relationship events, life events). We predicted that anchors would be highly effective when they suggested positive outcomes for the self, but less effective when they suggested negative outcomes for the self.

In Study 3, we examined the effects of arbitrary anchors in conjunction with a different motivation. People in romantic relationships tend to defensively derogate alternative potential partners because they threaten their current relationship (e.g., Johnson & Rusbult, 1989). Therefore, we expected that anchors would be effective when they suggested a negative future with an alternative romantic partner, but less effective when they suggested a positive future with an alternative romantic partner.

Finally, in Study 4, we experimentally manipulated people's motivation to reach a particular conclusion with a financial incentive. Specifically, we told participants that they would be assigned to one of two arbitrary groups (Copper vs. Bronze) and asked participants to judge the likelihood that we would assign them to the Copper group. Some participants were told that those in the Bronze group would receive a financial bonus. We predicted that anchors suggesting a high probability of being assigned to the Copper group would be ineffective, but only for participants who were informed about the bonus and thus had motivation to ignore the anchor.

Data and syntax for all four studies can be accessed through the Open Science Framework: https://osf.io/nsed6/?view_only=3f99dbfdf93c424c8fc9124219bf5ac3. Complete lists of probability judgment questions, their respective anchors, and participants' mean probability estimates can be found in Supplementary Tables 1 to 5. Standardized probability estimates were used for all analyses; however, the same patterns of results emerge using unstandardized estimates (see supplementary appendix).

Study 1

In Study 1, we focused on judgments about romantic relationships because people care deeply about the outcomes of their relationships. Thus, this domain should promote a desire to reach biased rather than objectively accurate conclusions. Most people hope and expect that their relationships will succeed (see Fletcher & Kerr, 2010, for review). They view their relationships in an overly optimistic light, and they make strongly biased judgments about their romantic futures (e.g., Baker & Emery, 1993; MacDonald & Ross, 1999). Participants in romantic relationships were presented with positive and negative relationship events that could plausibly happen in the future, and asked to estimate the likelihood that each event would occur. Prior to making their estimates, participants were randomly assigned to receive either optimistic numerical anchors, pessimistic numerical anchors, or no anchors. We predicted that people's motivation to have a successful relationship would affect the relative effectiveness of the anchors, such that anchors suggesting an optimistic romantic future (e.g., anchors suggesting that positive events are likely) would lead to judgments

significantly different from those in the control condition, whereas anchors suggesting a pessimistic future (e.g., anchors suggesting that negative events are likely) would be ineffective.

Participants

A total of 631 North American participants in relationships were recruited online.[1] Sample size was chosen based on a power analysis to achieve 90% power to detect small effects. Thirty-three participants were excluded for not following instructions, 16 because they were single, and 15 expressed suspicion about the purpose of the study. The final sample was 567 participants (227 male), with an average age of 30 (range = 18-67), and an average relationship length of 5 years (range = 1 month-42 years); 296 participants were dating, 54 were engaged, and 217 were common-law or married. This final sample is large enough to detect a small effect size ($\eta_p^2 = .02, f = .14$) at 87% power.

Materials and Procedure

Participants were randomly assigned to one of three experimental conditions: optimistic, pessimistic, or control. All participants were asked to judge the probability that each of nine relationship events would occur in their future, from 0% to 100%. Five of the relationship events were positive (e.g., "What do you think the chances are that your current relationship will last a lifetime?") and four events were negative (e.g., "What do you think the chances are that your partner will one day fall out of love with you?").

Pilot testing confirmed that relationship events were considered highly personally relevant, and thus appropriate for testing the boundary conditions of the anchoring effect. Pilot participants ($N = 196$) in romantic relationships rated the personal meaning of the nine relationship events (1 = *not at all personally meaningful*, 9 = *extremely personally meaningful*), compared with the personal meaning of nine world events that could happen in the future (e.g., "The polar ice cap fully melts away in the next 50 years"). We chose world events because they are similar to measures that have been used in past anchoring research (e.g., Kahneman & Tversky, 1974). A paired-samples t test indicated that relationship events, $M = 7.30$, $SD = 1.48$, were seen as significantly more personally meaningful than world events, $M = 5.10$, $SD = 1.61$, $t(195) = 12.86$, $p < .001$, $d = .92$.

For participants in the optimistic condition, all questions were preceded by optimistic anchors: numbers that suggested a high probability of positive events occurring (e.g., "Do you think the chances that your current relationship will last a lifetime are more or less than 95%?") and a low probability of negative events occurring (e.g., "Do you think the chances that your partner will one day leave you brokenhearted are more or less than 5%?"). Participants responded yes or no, then provided a percentage estimate. Participants in the pessimistic condition received pessimistic anchors: numbers suggesting a low probability of positive events occurring and a high probability of negative events occurring. Participants in the control condition received no anchors. Consistent with past anchoring research (Strack & Mussweiler, 1997), we selected the anchors by taking the 15th and 85th percentiles of baseline estimates provided by a separate pilot sample.[2] Furthermore, some participants were told that the anchors were "randomly generated." As in past anchoring research (e.g., Mussweiler & Strack, 1999; Simmons et al., 2010), we included this to ensure that participants did not assume that the anchors were meaningful (Grice, 1975).

Estimates for each of the nine events were first standardized across the conditions. Scores for the five positive events were aggregated such that higher mean estimates represent more optimistic judgments about one's romantic future. The four negative event scores were aggregated such that lower mean estimates represent more optimistic judgments about one's romantic future.

Results and Discussion

Recall that pessimistic anchors are motivationally inconsistent, particularly when paired with negative events (suggesting a high probability of negative relationship outcomes). We conducted a between-participants multivariate ANOVA with anchoring condition (optimistic, pessimistic, and control) as the predictor, and with probability estimates for positive events and negative events entered as separate dependent variables. A Wilks's lambda multivariate test indicated that anchoring condition significantly influenced participants' probability estimates, $F(4, 1124) = 8.67$, $p < .001$, $\eta_p^2 = .03$. We next examined the effects of experimental condition on probability estimates of positive and negative events separately. Confidence intervals (CIs) were calculated using estimated marginal means, and the p values were calculated using pairwise comparisons with a Sidak correction. See Figure 1 for raw probability estimates for positive and negative relational events.

There was a main effect of experimental condition on probability estimates for positive relational events, $F(2, 563) = 15.34$, $p < .001$, $\eta_p^2 = .05$. Participants who received optimistic anchors, $M = .24$, 95% CI = [.13, .34], $SD = 0.65$, made significantly more optimistic predictions than those in the no-anchor control condition, $M = .02$, 95% CI = [−.09, .12], $SD = 0.73$, $p = .01$, and those in the pessimistic anchors condition, $M = -.19$, 95% CI = [−.29, .08], $SD = 0.79$, $p < .001$. Participants who received pessimistic anchors made significantly more pessimistic predictions than participants who received no anchors, $p = .02$.

There was also a significant main effect of experimental condition on probability estimates for negative relational events, $F(2, 563) = 14.02$, $p < .001$, $\eta_p^2 = .05$. Optimistic anchors, $M = -.29$, 95% CI = [−.40, −.17], $SD = 0.71$, resulted

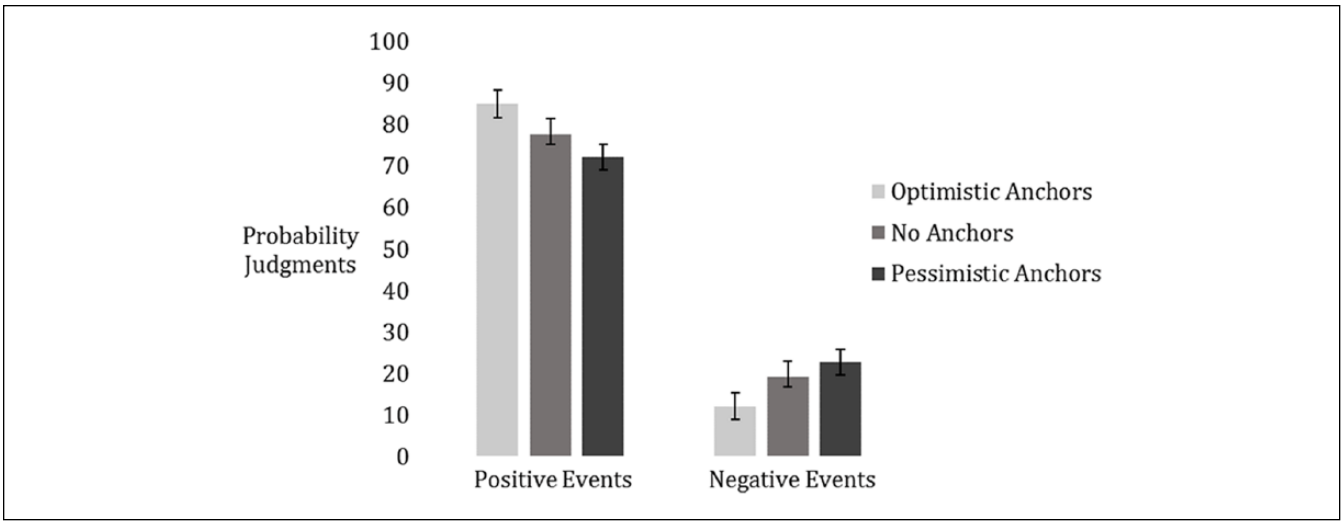

Figure 1. Probability estimates for positive and negative relationship events (Study 1).
Note. 95% confidence intervals were calculated using estimated marginal means.

in significantly more optimistic predictions compared with pessimistic anchors, $M = .14$, 95% CI = [.03, .25], $SD = 0.88$, $p < .001$, and compared with no anchors, $M = .002$, 95% CI = [−.11, .11], $SD = 0.75$, $p = .001$. However, pessimistic anchors did not result in significantly more pessimistic predictions compared with no anchors, $p = .22$. Effects were not moderated by whether or not participants believed that the anchors were meaningful: The same pattern of results emerged for participants who were explicitly told that the anchors were randomly generated.[1]

These results support our hypotheses. Anchors were generally effective at influencing people's estimates about the future of their current romantic relationships. However, particularly threatening anchors—anchors that suggested a high probability of negative relationship events occurring—did not affect probability judgments. This null effect emerged despite a sample size of nearly 200 participants per condition, with 87% power to detect even a small effect size.

Study 2

The purpose of Study 2 was to test the generalizability of our results. First, we examined how anchors affect probability estimates regarding personal, nonromantic life events (e.g., getting fired), expecting to again find that personally threatening anchors would be ineffective. That is, the relationship effects observed in Study 1 are not specific to the relational domain, but extend to any domain associated with strong motivational bias. Second, to ensure our results could not be attributed to an inability to replicate anchoring effects in more standard domains, we included a condition involving estimates of future world events. Third, we aimed to demonstrate that the relationship effects of Study 1 are specific to one's *own* relationship (due to motivational bias), and do not generalize to *any* romantic relationship. When a person makes judgments about a relationship that he or she is not particularly invested in (e.g., about a disliked other's relationship), standard anchoring effects should emerge.

Overall, the study was a 3 × 3 experimental design. Participants were randomly assigned to make judgments about the probability of one of three types of events: nonrelational personal events, world events, or a disliked other's relationship events. These events were paired with either optimistic anchors, pessimistic anchors, or no anchors (control). We expected to replicate Study 1 with personal events but replicate standard anchoring effects with world and disliked other events. These results would suggest that selective, motivated use of numerical anchors extends to any domain that is relevant and important to the self, and is not unique to romantic relationships.

Participants

A total of 1,932 North American participants in romantic relationships completed the study online. Ninety-nine participants were excluded for not following the instructions, 61 participants had already completed one of our previous anchoring studies, 15 participants were excluded because they were single, and nine expressed suspicions about the purpose of the study. The final sample was 1,748 participants (959 male), with an average age of 29 (range = 18-79) and an average relationship length of 4.5 years (range = 1 month-48 years); 677 participants were dating, 99 were engaged, and 971 were common-law or married (one participant did not respond). This sample is large enough to detect a small effect size ($\eta_p^2 = .02$, $f = .14$) at 99.9% power.

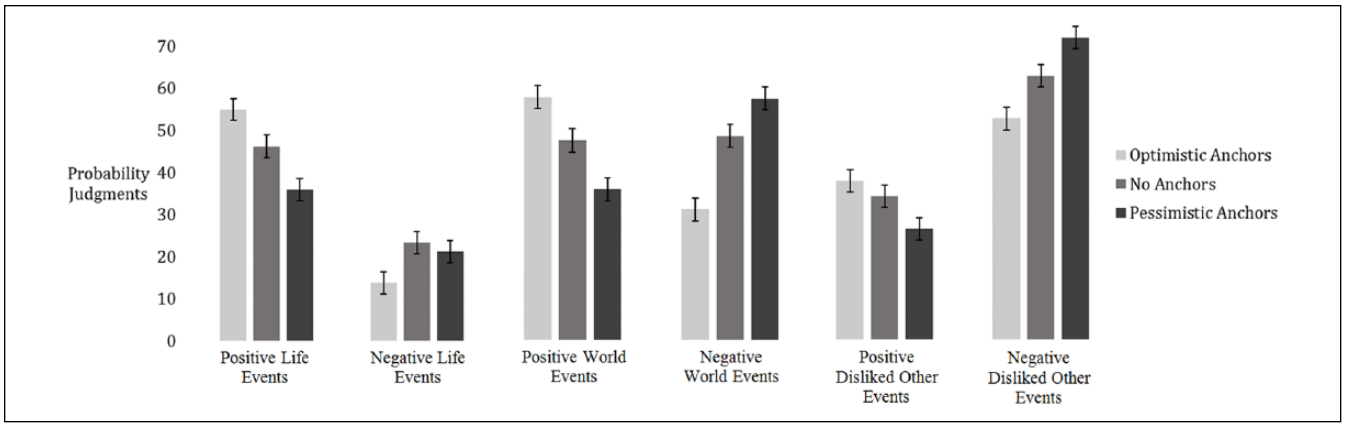

Figure 2. Probability estimates for positive and negative events (Study 2).

Procedure and Materials

Participants were randomly assigned to be presented with one of three types of events: nonrelational life events, world events, or a disliked other's relationship events.

Nonrelational life events. We included five positive life events (e.g., "What do you think the chances are that you will live past the age of 80?") and four negative life events (e.g., "What do you think the chances are that you will one day get fired from your job?") adapted from Weinstein (1980). Pilot results confirmed that these life events were perceived as significantly more personally meaningful than either the world events or the disliked other's relationship events.[3]

World events. We included five positive world events (e.g., "Malaria is eradicated by 2050"), and four negative world events (e.g., "The polar ice cap fully melts away in the next 50 years") that could conceivably happen in the future. These are the same events used for piloting in Study 1. We constructed these events to mirror the types of questions used in classic anchoring studies: global judgments that are of less personal relevance to the decision maker.

Disliked other's relationship events. Participants were told to think about a person they dislike who is currently in a romantic relationship. Participants wrote down the name of this disliked person as well as the name of the disliked person's partner. They were then presented with the same nine relationship events from Study 1, but phrased to be about the disliked person's relationship (e.g., "What do you think the chances are that the quality of Jane's relationship will improve over time?").

As in Study 1, each event was paired with either an optimistic anchor, a pessimistic anchor, or no anchor (control condition). Anchors were chosen based on pilot sample ratings.[4] Participants were told that these anchors were randomly generated and that they contained no useful information. All participants were asked to estimate the probability of each of nine events occurring, from 0% to 100%. Within each judgment topic, estimates for each of the nine events were first standardized across the anchoring conditions. Standardized scores for the five positive events and the four negative events were each aggregated. Each participant thus had two standardized scores representing his or her perceived probability of positive versus negative events occurring, relative to other participants who estimated the same type of event (life events, world events, or disliked others' relationship events).

Results and Discussion

Recall that pessimistic anchors are motive-inconsistent, particularly when paired with negative life events (suggesting a high probability of negative outcomes for the self). We conducted a 3 (anchor type: optimistic, pessimistic, control) × 3 (judgment topic: life events, world events, disliked relationship) between-participants MANOVA with positive and negative estimates as the dependent variables. A Wilks's lambda multivariate test indicated that there was a main effect of anchor type, $F(4, 3458) = 92.95$, $p < .001$, $\eta_p^2 = .10$. Due to the standardization of the estimates within each judgment topic, there was no main effect of judgment topic, $F(4, 3458) = 0.02$, $p = .999$, $\eta_p^2 < .001$. Finally, there was a significant interaction between anchor type and judgment topic, $F(8, 3458) = 6.27$, $p < .001$, $\eta_p^2 = .01$.

Examining positive events and negative events separately revealed that there were main effects of anchor type on estimates about both positive events, $F(2, 1730) = 123.02$, $p < .001$, $\eta_p^2 = .13$, and negative events, $F(2, 1730) = 127.52$, $p < .001$, $\eta_p^2 = .13$. However, these main effects were qualified by interactions between anchor type and judgment topic for both positive events, $F(4, 1730) = 2.96$, $p = .02$, $\eta_p^2 = .007$, and negative events, $F(4, 1730) = 9.85$, $p < .001$, $\eta_p^2 = .02$. We next examined the simple main effects for each judgment topic as in Study 1. See Figure 2 for raw probability estimates of positive versus negative life events, world events, and disliked others' relationship events.

Nonrelational life events. When participants were asked to judge the probability of positive self-relevant, nonrelational events, all anchors influenced participants' judgments. Optimistic anchors, $M = .28$, 95% CI = [.19, .37], $SD = 0.52$, resulted in more optimistic predictions than pessimistic anchors, $M = -.31$, 95% CI = [−.40, −.22], $SD = 0.54$, $p < .001$, or no anchors $M = .02$, 95% CI = [−.07, .11], $SD = 0.55$, $p < .001$. Pessimistic anchors also resulted in more pessimistic predictions than no anchors, $p < .001$. However, when people were asked to judge the probability of *negative* events happening in their lives, not all anchors were effective. Optimistic anchors, $M = -.26$, 95% CI = [−.35, −.17], $SD = 0.59$, resulted in more optimistic estimates than pessimistic anchors, $M = .08$, 95% CI = [−.02, .17], $SD = 0.58$, $p < .001$, or no anchors, $M = .19$, 95% CI = [.09, .28], $SD = 0.67$, $p < .001$. However, those who received pessimistic anchors made estimates that were not significantly different from those in the control condition and were in fact in the opposite direction from the anchors, $p = .28$. These effects replicate those in Study 1: Whereas anchors could be used to make people feel like positive events were *less* likely to happen to them, anchors could not be used to make people feel like negative events were *more* likely to happen to them.

World events. As predicted, all anchors were effective in the context of world events. For positive world events, optimistic anchors, $M = .36$, 95% CI = [.27, .45], $SD = 0.55$, resulted in more optimistic predictions than pessimistic anchors, $M = -.37$, 95% CI = [−.40, −.22], $SD = 0.50$, $p < .001$, or no anchors, $M = .02$, 95% CI = [−.07, .11], $SD = 0.55$, $p < .001$. Furthermore, pessimistic anchors resulted in significantly more pessimistic predictions compared with no anchors, $p < .001$. Similarly, when participants were asked to judge the probability of negative world events, optimistic anchors, $M = -.47$, 95% CI = [−.57, −.38], $SD = 0.57$, resulted in more optimistic judgments than pessimistic anchors, $M = .38$, 95% CI = [.29, .47], $SD = 0.57$, $p < .001$, or no anchors, $M = .09$, 95% CI = [−.003, .18], $SD = 0.60$, $p < .001$. Again, pessimistic anchors resulted in more pessimistic judgments compared with no anchors, $p < .001$. Thus, the ineffectiveness of anchors in personally relevant judgments cannot be attributed to an inability on our part to replicate standard anchoring effects.

Disliked other's relationship. When participants judged the probability of positive relationship events happening to a disliked other, those who received optimistic anchors, $M = .19$, 95% CI = [.10, .28], $SD = 0.76$, made more optimistic judgments than those in the control condition, but not significantly so, $M = .06$, 95% CI = [−.03, .15], $SD = 0.77$, $p = .14$. Pessimistic anchors, $M = -.24$, 95% CI = [−.33, −.14], $SD = 0.82$, resulted in more pessimistic judgments than optimistic anchors, $p < .001$, or no anchors, $p < .001$. All anchors were effective at influencing people's judgments about the likelihood of negative relational events happening to disliked others. Optimistic anchors, $M = -.31$, 95% CI = [−.41, −.22], $SD = 0.77$, resulted in more optimistic estimates than pessimistic anchors, $M = .29$, 95% CI = [.20, .38], $SD = 0.77$, $p < .001$, or no anchors, $M = .01$, 95% CI = [−.08, .10], $SD = 0.74$, $p < .001$. Pessimistic anchors also resulted in more pessimistic estimates than no anchors, $p < .001$. Thus, as predicted, anchors made people feel that positive events were less likely to happen to a disliked other, that negative events were more likely, or that negative events were less likely. Surprisingly, anchors were not completely effective at making people feel that positive events were *more* likely to happen in the romantic relationship of a disliked other.

With one exception, all of Study 2's hypotheses were confirmed. Whereas most anchors were effective at influencing people's judgments, the most personally threatening anchors—those suggesting a high probability of negative events occurring in one's future—were ineffective. This null effect is particularly striking given the very large sample size and the previously established ubiquity of the anchoring effect. Even anchors suggesting a higher probability of negative world events were effective, suggesting that people will accept a high likelihood of negative world outcomes more readily than they will accept a high likelihood of negative personal outcomes.

The only other case in which anchors were ineffective (and the only finding running counter to our hypotheses) was that in which anchors suggested that *positive* events were *more* likely to happen to the relationship of a disliked other. It is possible that disliked others' relationships are threatening in a manner we did not anticipate. People are biased toward believing that their own relationships are better than other people's relationships (perceived superiority effect; for example, Rusbult, Van Lange, Wildschut, Yovetich, & Verette, 2000), and all participants in the current sample were in romantic relationships of their own. The notion of positive events occurring in the relationships of disliked others may thus provide a threatening upward comparison, in turn stimulating motivated processing of anchors.

Study 3

Whereas Studies 1 and 2 demonstrated that motivation for a positive personal outcome can lead negative anchors to be ineffective, in Study 3 we examined whether motivation for a negative personal outcome can lead positive anchors to be ineffective. When might individuals desire *negative* personal outcomes? People in long-term romantic relationships tend to be motivated to believe that their romantic alternatives are undesirable, as this belief supports the conclusion that their current romantic partner is the best possible partner for them. Attractive alternatives, which present a threat to the current relationship, tend to be devalued or derogated (e.g., Johnson & Rusbult, 1989; Meyer, Berkman, Karremans, & Lieberman, 2011). Therefore, we predicted that in the case of romantic alternatives, positive anchors would be threatening and thus ineffective.

Study 3 had a similar design to Study 1 except that we asked participants currently in relationships to imagine that they were no longer with their current partner. Participants estimated the probability of positive versus negative romantic relationship events happening to them with new partners (e.g., "What do you think the chances are that you would find a new partner who is at least as rewarding as your current partner?" "What do you think the chances are that you would ultimately wind up without a romantic partner?"). We predicted that anchors suggesting that negative events would occur in this alternative hypothetical relationship—suggesting low quality of alternatives—would be effective at swaying people's probability estimates. In contrast, we predicted that anchors suggesting that positive events would occur would be less effective because upward estimates would suggest a high quality of alternatives and therefore threatening the current relationship.

Participants

A total of 146 North American participants were recruited online (56 male). Three participants were excluded for not following the instructions, seven because they were single, eight because they had participated in one of our previous studies, and four because they expressed suspicion about the purpose of the study. The final sample was 124 participants (45 male), with an average age of 29.93 (range = 18-59) and an average relationship length of 5 years (range = 1 month-35 years); 70 participants were dating, nine were engaged, and 45 were common-law or married.

The effect size of the main effect of anchoring type on probability estimates ranged from $\eta_p^2 = .05$ to $\eta_p^2 = .13$ in Studies 1 and 2. The present sample size was large enough to detect these effect sizes with between 68.9% power ($\eta_p^2 = .05$) and 98.9% power ($\eta_p^2 = .13$).

Procedure and Materials

Participants were again randomly assigned to one of three conditions: optimistic, pessimistic, and control. Participants were then asked to make seven probability judgments about their romantic alternatives. Prior to each probability judgment question, participants in the optimistic condition received optimistic anchors (e.g., "If you started dating someone new, do you think that the chances that things would progress into a meaningful romantic relationship are more or less than 84%?"), whereas participants in the pessimistic condition received pessimistic anchors (e.g., 9%). To make these numbers look randomly generated, low anchors were randomly selected for each question between 5% and 30%, and high anchors were randomly selected for each question between 70% and 95% (these randomly selected anchors were the same for all participants within a condition). Each estimate was standardized. Positive events were aggregated such that higher estimates represent more optimistic judgments, and negative events were aggregated such that higher estimates represent more pessimistic judgments about one's romantic future without one's current partner. As in Study 2, all participants who received anchors were told that the anchors were randomly generated and that they contained no useful information.

Results and Discussion

Recall that optimistic anchors are motive-inconsistent in this study as they suggest a positive relationship future with someone other than one's current partner. We conducted a between-subjects MANOVA with anchoring condition (optimistic, pessimistic, and control) predicting probability estimates for positive and negative events. A Wilks's lambda multivariate test indicated that anchoring condition had a significant effect on participants' probability estimates, $F(4, 240) = 6.05$, $p < .001$, $\eta_p^2 = .09$. We next examined the effects of experimental condition on probability estimates of positive and negative events separately. See Figure 3 for raw probability estimates.

There was a significant main effect of experimental condition on probability estimates for positive alternative relational events, $F(2, 121) = 6.79$, $p = .002$, $\eta_p^2 = .10$. Participants who received optimistic anchors, $M = .29$, 95% CI = [.04, .53], $SD = 0.80$, did not make significantly more optimistic predictions than those in the control condition, $M = .03$, 95% CI = [−.20, .27], $SD = 0.75$, $p = .37$. Participants who received pessimistic anchors, $M = -.36$, 95% CI = [−.62, −.11], $SD = 0.80$, made marginally more pessimistic predictions than those in the control condition, $p = .07$. The optimistic and pessimistic conditions were significantly different from one another, $p < .001$.

There was also a significant main effect of experimental condition on probability estimates for negative relational events, $F(2, 121) = 5.90$, $p = .004$, $\eta_p^2 = .09$. Participants who received optimistic anchors, $M = -.21$, 95% CI = [−.42, −.002], $SD = 0.64$, did not make significantly different predictions from participants in the control condition, $M = -.07$, 95% CI = [−.27, .13], $SD = 0.11$, $p = .70$. However, participants who received pessimistic anchors, $M = .30$, 95% CI = [.08, .51], $SD = 0.70$, made significantly more pessimistic predictions than those in the control condition, $p = .05$. Participants in the optimistic and pessimistic conditions made predictions that were significantly different from one another, $p = .003$.

These results further support the conclusion that arbitrary anchors can be ineffective when they threaten the self. People in relationships are threatened by the notion that they have high-quality alternatives to their current romantic partner (e.g., Johnson & Rusbult, 1989; Meyer et al., 2011). In the present study, participants who received pessimistic anchors—suggesting that a romantic future with someone other than their current partner would be unsatisfying—provided more pessimistic estimates about their alternative

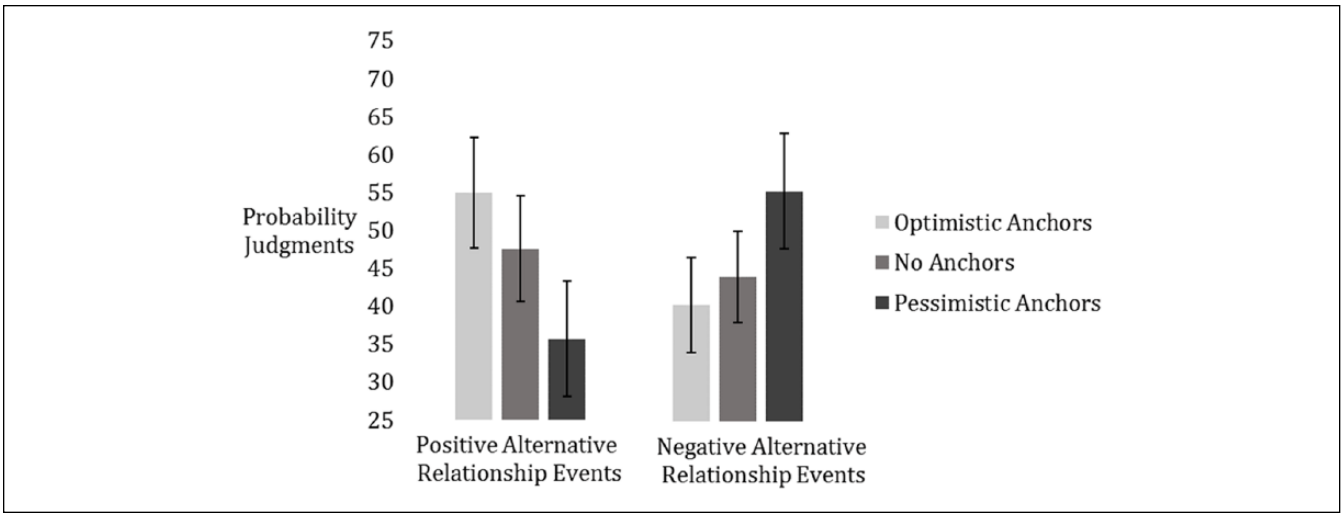

Figure 3. Probability estimates for positive alternative relationship events (Study 3).

romantic prospects relative to participants in the no-anchor control. However, participants who received optimistic anchors—suggesting that they would be able to find relationship happiness without their current partner—did not provide significantly more optimistic estimates about their alternative prospects relative to the control participants.

Study 4

The purpose of Study 4 was to demonstrate that the boundary condition observed in Studies 1 to 3 is specifically due to motivated reasoning processes. We sought to rule out two alternative, nonmotivational explanations for the effect: differential knowledge and differential plausibility of the anchors. In Studies 1 to 3, motivational bias was examined by presenting people with judgment-anchor pairs that were consistent versus inconsistent with their naturally preferred conclusions. However, these judgments and anchors may have differed in other important ways that may have been responsible for their differential effectiveness. One such potential difference is the amount of knowledge people have about each judgment. People may already possess considerable knowledge consistent with their preferred conclusions (e.g., positive qualities of their romantic relationships). When presented with a conclusion-consistent judgment-anchor pair (e.g., high probability of relationship success), participants may readily call this information to mind, enhancing the effectiveness of the anchor. In contrast, participants may possess less knowledge consistent with threatening conclusions, such that they have less confirmatory information available when presented with a conclusion-inconsistent judgment-anchor pair (e.g., high probability of heartbreak). This possibility provides an alternative, nonmotivational explanation why anchors consistent with preferred conclusions are more effective than conclusion-inconsistent anchors. A second, related issue is that conclusion-inconsistent anchors may seem less plausible to the participant than conclusion-consistent anchors. As discussed, highly implausible anchors are less effective than plausible anchors even in nonmotivational contexts (Wegener et al., 2001).

To better tease apart the impact of motivational bias in Study 4, we experimentally manipulated motivational bias while holding the judgments and anchors constant. The study was a 2 (motivational bias: present or absent) × 3 (anchor: high, low, or none) experimental design. Mechanical Turk workers were first asked to write a paragraph of text. Next, participants were told that based on their writing style, they would be assigned to one of two groups: Copper or Bronze. Some participants were told that those assigned to the Bronze group would receive a 50-cent bonus (motivated condition), whereas other participants were not informed of the bonus (objective condition). Participants were then asked to judge their own probability of being assigned to the Copper group. To those in the motivated condition, being assigned to the Copper group represents a failure to obtain a financial bonus, whereas group assignment should be relatively meaningless to those in the objective condition. Participants were presented with either optimistic anchors (20%), pessimistic anchors (80%), or no anchors (control). We expected that participants would selectively ignore the pessimistic anchors—suggesting that their likelihood of failing to achieve the bonus was high—only when they were aware of the bonus.

Participants

A total of 619 North American participants completed the study via Mechanical Turk; 28 participants were excluded for not following the instructions and five participants expressed suspicions about the purpose of the study. The

final sample was 586 participants (199 male), with an average age of 34 (range = 18-75). This final sample is large enough to detect a small effect size (η_p^2 = .02, f = .14) at 75% power.

Procedure and Materials

Participants were first asked to write about the factors they think people consider when deciding whether to invest in a new relationship (this topic was chosen for other research purposes).

Motivational bias manipulation. Upon completing the writing task, all participants received this message: "Thank you for completing this writing task! Different people have different writing styles. We will feed your responses into an algorithm to determine your writing style. You will be sorted into either the Copper group or the Bronze group." Participants randomly assigned to the motivated condition saw this additional information: "Participants sorted into the Bronze group will receive a 50-cent bonus on this HIT. Those sorted into the Copper group will not receive a bonus." Those assigned to the objective condition were not told about the bonus.

No-bonus estimate. All participants were next asked to make a single estimate: "What do you think the chances are that you will be sorted into the Copper group? Please provide a numerical estimate from 0% to 100%." The question was preceded by either an optimistic anchor ("Do you think your chances of being sorted into the Copper group are more or less than 20%?"), a pessimistic anchor (80%?), or no anchor (control condition). Estimates were standardized across conditions.

Manipulation check. Participants were asked, "How much do you hope to be sorted into the Bronze group?" (1 = *not at all* [*indifferent*], 7 = *very much*).

Results and Discussion

Recall that pessimistic anchors are motive-inconsistent, particularly within the motivated condition where they suggest a high probability of missing a financial opportunity. We first conducted an independent t test comparing responses with our manipulation check question in the motivated versus objective conditions. The motivational bias manipulation was effective: Participants in the motivated condition (M = 5.41, SD = 1.98) were significantly more motivated to be assigned to the Bronze group compared with those in the objective condition (M = 3.00, SD = 1.83), $t(292) = 10.84$, $p < .001$.

We next conducted a 3 (anchor type: optimistic, pessimistic, control) × 2 (motivational bias: motivated, objective) between-participants ANOVA with the no-bonus estimate as the dependent variable. There was a main effect of anchor type, $F(2, 579) = 5.93$, $p = .003$, $\eta_p^2 = .02$, but no main effect of the motivational bias manipulation, $F(1, 579) = 0.05$, $p = .83$, $\eta_p^2 < .001$. There was a marginal interaction between anchor type and motivational bias, $F(2, 579) = 2.81$, $p = .06$, $\eta_p^2 = .01$.

We next examined simple main effects in the motivated condition versus the objective condition. Confidence intervals were calculated using estimated marginal means and conditions were compared using pairwise comparisons.[5] For participants in the motivated condition, optimistic anchors, $M = -.15$, 95% CI = [−.35, .05], SD = 1.16, resulted in marginally more optimistic estimates compared with no anchors, $M = .13$, 95% CI = [−.08, .33], SD = 0.94, $p = .06$. Pessimistic anchors, $M = -.03$, 95% CI = [−.22, .16], SD = 1.22, resulted in anchors that were, if anything, *also* more optimistic compared with no anchors although the difference was not significant, $p = .27$. Estimates provided in the optimistic versus pessimistic conditions were not significantly different from each other, $p = .38$.

For participants in the objective condition, optimistic anchors and pessimistic anchors influenced their judgments to roughly the same extent. Participants in the no-anchor control condition, $M = -.002$, 95% CI = [−.20, .20], SD = 0.76, provided estimates that were marginally higher compared with those in the optimistic condition, $M = -.26$, 95% CI = [−.46, −.07], SD = 0.91, $p = .07$, and marginally lower compared with those in the pessimistic condition, $M = .27$, 95% CI = [.06, .47], SD = 0.89, $p = .06$. Estimates provided in the optimistic versus pessimistic conditions were significantly different from each other, $p < .001$. See Figure 4 for raw probability estimates of being assigned to the Copper (no-bonus) group.

These results suggest that people selectively ignore numerical anchors specifically due to motivated reasoning processes. Anchors suggesting a high likelihood of being assigned to the Copper group were ineffective, but only for participants who knew that being assigned to the Copper group meant missing out on a financial bonus opportunity. Because the judgments and anchors were held constant between the motivated versus objective conditions, this study rules out nonmotivational alternative explanations such as differential knowledge about the judgments or plausibility of the anchors. It seems most likely that participants in the motivated condition engaged in cognitive processing that undermined the effectiveness of the anchor (e.g., disconfirmatory search; cf. Wegener et al., 2001) specifically because they disliked the conclusion that the anchor implied.

Mini Meta-Analyses

We conducted mini meta-analyses to compare effect sizes across Studies 1 to 4 (Goh, Hall, & Rosenthal, 2016). We separately examined effects of low versus high anchors, on desirable versus undesirable events, in self-relevant versus

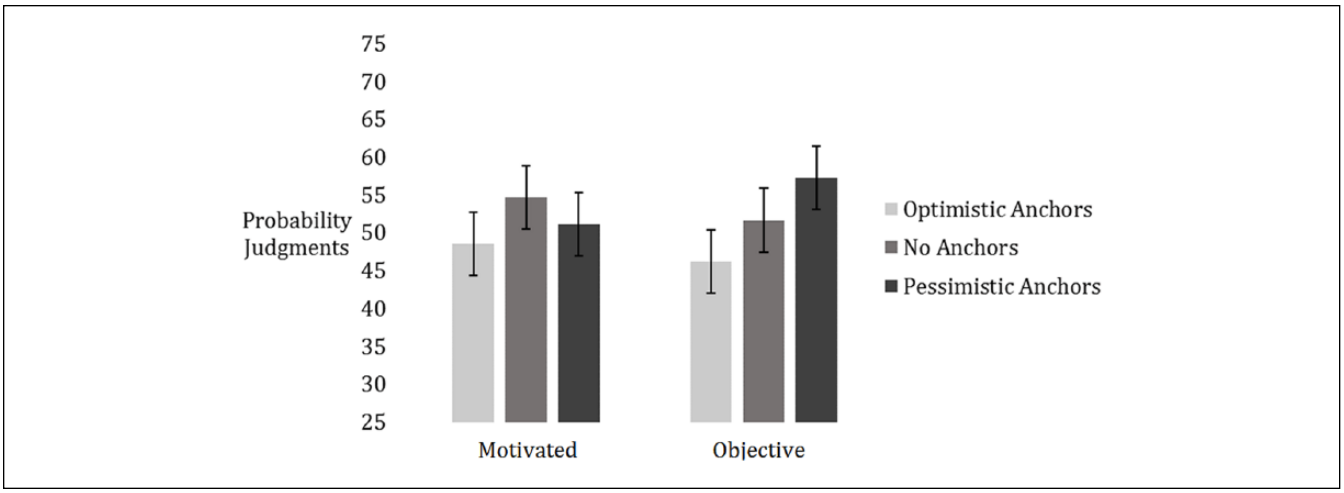

Figure 4. Probability estimates for motivated versus objective judgments (Study 4).

Table 1. Comparing Effect Sizes in Self-Relevant Conditions Across Studies.

	Desirable events				Undesirable events			
	High anchors (motive-consistent)		Low anchors (motive-inconsistent)		High anchors (motive-inconsistent)		Low anchors (motive-consistent)	
Judgment topic	Cohen's *d*	*n*	Cohen's *d*	*n*	Cohen's *d*	*n*	Cohen's *d*	*n*
Study 1								
Own relationship	.32	174, 201	−.17	191, 201	.17	191, 201	−.40	174, 201
Study 2								
Life events	.49	195, 188	−.61	189, 188	−.18	189, 188	−.71	195, 188
Study 3								
Alternative relationship	.52	38, 45	−.21	41, 45	.32	41, 45	−.51	38, 45
Study 4								
Financial bonus					−.14	105, 93	−.27	96, 93
Weighted Cohen's *d*	.42 [.28, .55]		−.36 [−.50, −.23]		−.002 [−.12, .12]		−.50 [−.62, −.37]	
Weighted *p* value	< .001		< .001		.98		< .001	

Note. Sample sizes (*n*) are reported in the format: anchor condition *n*, control condition *n*.

non-self-relevant domains, for a total of eight meta-analyses. Here, low anchors are motive-inconsistent when paired with desirable events (low probability of desirable events occurring), whereas high anchors are motive-inconsistent when paired with undesirable events (high probability of undesirable events occurring).

All examined effect sizes were planned comparison tests between an anchoring condition and a no-anchor control condition. Cohen's *d* values were calculated for each effect by subtracting the control condition mean from the target anchoring condition mean, then dividing by the pooled standard deviation for those two conditions. We conducted eight fixed effect meta-analyses using the metagen function in the "meta" package in *r*. These meta-analyses weighted Cohen's *d*s by sample size across studies and produced an overall weighted Cohen's *d* value and associated *p* value for each meta-analysis. See Tables 1 and 2 for meta-analyses comparing effect sizes in self-relevant contexts and non-self-relevant contexts, respectively. Seven out of eight of the meta-analyses revealed a moderate overall effect size that was significantly different from zero, Cohen's *d*s = |.36 to .63|, all *p*s < .001. As expected, the one exception was the meta-analysis examining the effects of high anchors on undesirable self-relevant events, Cohen's $d = -.002$, $p = .98$. These results confirm that, across studies, anchors were ineffective only when they suggested a high probability of an undesired outcome for the self.

General Discussion

These experiments are the first to demonstrate that a classic judgment and decision-making phenomenon—the anchoring

Table 2. Comparing Effect Sizes in Non-Self-Relevant Conditions Across Studies.

	Desirable events				Undesirable events			
	High anchors (motive-consistent)		Low anchors (motive-inconsistent)		High anchors (motive-inconsistent)		Low anchors (motive-consistent)	
Judgment topic	Cohen's *d*	*n*	Cohen's *d*	*n*	Cohen's *d*	*n*	Cohen's *d*	*n*
Study 2								
World events	.62	192, 193	−.74	195, 193	.49	195, 193	−.97	192, 193
Disliked relationship	.17	192, 197	−.38	198, 197	.37	198, 197	−.42	192, 197
Study 4								
Financial bonus					.32	93, 99	−.31	99, 99
Weighted *d*	.39 [.25, .53]		−.55 [−.70, −.41]		.41 [.28, .53]		−.63 [−.77, −.49]	
Weighted *p* value	< .001		< .001		< .001		< .001	

Note. Sample sizes (*n*) are reported in the format: anchor condition *n*, control condition *n*.

effect—has an important boundary condition. Across four studies, we found that personally threatening anchors were ineffective at swaying people's estimates. In Study 1, we found that romantically attached people were not swayed by anchors suggesting that their current romantic relationships would fail. In Study 2, we found that these effects extend beyond the romantic domain as people were not swayed by anchors suggesting that negative life events would happen to them. In Study 3, we found that motivation for negative outcomes can also bias the processing of anchors: Consistent with research suggesting that people are motivated to derogate romantic alternatives (e.g., Johnson & Rusbult, 1989; Meyer et al., 2011), people were not swayed by anchors suggesting that they would be able to attract romantic partners who are superior to their current partners. Finally, in Study 4, we experimentally manipulated motivation to ignore an anchor with financial incentives. People were not swayed by anchors suggesting that they would be assigned to a "no financial bonus" group, but only if they were aware of the bonus.

The present work suggests that anchoring is influenced by motivated reasoning processes, such that anchors that suggest undesired outcomes for the self are ineffective. These findings highlight a potential shortcoming in anchoring research in that past work appears not to have investigated judgments for which people are strongly motivated to reach one conclusion over another. Although it is perhaps disheartening that the current data suggest that the success of a personal enemy's romantic relationship is more threatening to people than the prospect of global warming, the data nevertheless suggest that judgment and decision-making researchers may need to carefully consider the generalizability of their findings to personally relevant domains such as romantic relationships (Joel, MacDonald, & Plaks, 2013).

The present research tested the effect of anchors on judgments about both positive and negative events. Negative events have been shown to have a much stronger impact than positive events across a variety of domains (e.g., close relationship, major life events; see Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001, for review). Relatedly, a key tenet of prospect theory is that losses loom larger than gains, such that people are more motivated to avoid losses than acquire gains (Kahneman & Tversky, 1979). Consistent with both of these literatures, anchors were ineffective in the present research only when they suggested a *high* likelihood of *undesired* events occurring. Anchors suggesting a low likelihood of desired events occurring were effective despite being inconsistent with people's motivations. This pattern of results speaks to the overall robustness of the anchoring effect: Numerical anchors appear to be ineffective only when strong motivational biases are present.

One important future direction would be to examine the mechanism for the present effects. *How* are people selectively ignoring threatening anchors? As discussed, the present findings are consistent with an attitudinal approach to anchoring (Blankenship et al., 2008; Wegener et al., 2001), which posits that perceivers with sufficient motivation and resources "elaborate" on anchors as with other kinds of persuasive messages. Although elaborative processes often entail generating arguments in support of the anchors (confirmatory search strategies; Mussweiler & Strack, 1997), certain circumstances may compel people to generate counterarguments, lessening the effectiveness of the anchors (Wegener et al., 2001). Future research should test whether people engage in disconfirmatory search strategies in response to personally threatening anchors. For example, if ignoring anchors is an elaborative process that occurs through seeking out disconfirming evidence, the present effects may disappear under conditions of high cognitive load.

Implications and Conclusion

These findings shed light on how people make judgments and decisions about their personal lives. Specifically, even highly self-relevant judgments and decisions may be affected

by seemingly irrelevant sources of influence, as long as that information is not too inconsistent with one's preferred conclusions. Moreover, these effects were obtained even when participants were told that the anchors were meaningless and contained no useful information. Future research should examine how anchoring effects might extend beyond likelihood estimates to personal decisions. For example, salient numerical anchors—such as the age at which friends become pregnant, or the relationship length at which an acquaintance got engaged—may influence personal decisions on these issues. Simultaneously, the ineffectiveness of threatening anchors may shield decision makers from discouraging base rates. For example, these results may help to explain why, in one study, engaged individuals correctly estimated the national divorce rate at a median of 50%, yet estimated the likelihood that they would personally divorce at a median of 0% (Baker & Emery, 1993).

Overall, these findings demonstrate the utility of testing judgment and decision making (JDM) phenomena in nontraditional JDM domains (Joel et al., 2013). This research suggests that anchoring can influence even the most psychologically meaningful areas of our lives. Conversely, these findings demonstrate that this classic heuristic has a key boundary condition: Highly threatening anchors are ineffective. Not only is this heuristic not as pervasive as previously thought, but it is less reliable precisely in the judgment and decision-making domains that may have the greatest emotional impact for people.

Declaration of Conflicting Interests

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Supplemental Material

The online supplemental material is available with the manuscript on the PSPB website.

Notes

1. Study 1 was composed of two samples. Participants in the first sample ($N = 150$) were told nothing about how the anchors were generated. Those in the second sample ($N = 417$) were told that the anchors were randomly generated. A Wilks's lambda multivariate test indicated that there was neither a significant main effect of sample, $F(2, 559) = 0.60$, $p = .60$, $\eta_p^2 = .002$, nor an interaction between condition and sample, $F(4, 1118) = 0.84$, $p = .84$, $\eta_p^2 = .001$. We have therefore merged these samples. Results hold when hypotheses are tested separately in each sample.
2. A pilot sample of 43 romantically attached participants estimated the odds that each positive and negative relationship event from Study 1 would happen to them in the future. These pilot responses provided baseline estimates of each relational event. Optimistic anchors were created by taking the 85th percentiles of baseline estimates for positive events, and the 15th percentiles of baseline estimates for negative events. In contrast, pessimistic anchors were created by taking the 15th percentiles for positive events and the 85th percentiles for negative events.
3. A pilot sample of participants ($N = 196$) in romantic relationships rated the personal meaning of each of the 21 events (1 = *not at all personally meaningful*, 9 = *extremely personally meaningful*). Nonrelational life events, disliked other's relationship events, and world events were all counterbalanced. A repeated measures ANOVA indicated that the personal meaning of events depended on event type, $F(2, 408) = 225.45$, $p < .001$, $\eta_p^2 = .53$. Least significant difference (LSD) pairwise comparisons revealed that nonrelational life events, $M = 6.36$, $SD = 1.41$, were significantly more meaningful than world events, $M = 4.90$, $SD = 1.63$, $p < .001$. The world events, in turn, were significantly more meaningful than the disliked other's relationship events, $M = 3.32$, $SD = 1.76$, $p < .001$. The disliked other's relationship events were also significantly less meaningful than the nonrelational life events, $p < .001$.
4. As in Study 1, the events used in all conditions were first piloted to assess baseline estimates. Out of 150 participants in relationships, 50 estimated the likelihood of nonrelational life events, 50 estimated the likelihood of world events, and 50 estimated the likelihood of relationship events happening to a romantically attached person who they did not like. We then took the 15th and 85th percentiles of pilot ratings to use as the anchors, as in Study 1.
5. The overall impact of the anchors on people's estimates was considerably weaker in Study 4 ($\eta_p^2 = .02$) compared with our previous studies (e.g., $\eta_p^2 = .10$ in Study 2). It may be that in judging the likelihood of being assigned to one of two groups, participants were already anchored at 50%. Regardless, given the weaker power, and given that our predictions for each comparison were confirmatory rather than exploratory, we did not impose a Sidak correction on the simple effects tests in this study.

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