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Opportunity Neglect: An Aversion to Low-Probability Gains

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Abstract

Seven preregistered studies (N = 2,890, adult participants) conducted in the field, in the lab, and online documented opportunity neglect: a tendency to reject opportunities with low probability of success even when they come with little or no objective cost (e.g., time, money, reputation). Participants rejected a low-probability opportunity in an everyday context (Study 1). Participants also rejected incentive-compatible gambles with positive expected value—for both goods (Study 2) and money (Studies 3–7)—even with no possibility of monetary loss and nontrivial rewards (e.g., a 1% chance at $99). Participants rejected low-probability opportunities more frequently than high-probability opportunities with equal expected value (Study 3). Although taking some real-life opportunities comes with costs, we show that people are even willing to incur costs to opt out of low-probability opportunities (Study 4). Opportunity neglect can be mitigated by highlighting that rejecting an opportunity is equivalent to choosing a zero probability of success (Studies 6–7).

Keywords

risk taking, decision making, choice, motivation, open data, open materials, preregistered

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People often have to decide whether to pursue or reject opportunities that have positive payoffs but low probabilities of success. For example, a PhD student may deliberate about whether to submit an abstract to a competitive conference, or a job seeker may consider whether to apply to a prestigious company—and both might decide that the opportunity is not worth it. Sometimes this is sensible. For instance, writing an abstract takes time, and submitting an application could entail reputational costs. However, there are also times when pursuing the opportunity is relatively costless, such as when the abstract has already been written for a previous conference and the application process is fully anonymous. Even in such cases, we suggest that people can exhibit *opportunity neglect*, forgoing these opportunities that have a positive expected payoff but low probability of success.

We studied the phenomenon using everyday scenarios, such as those above, and also controlled paradigms, such as choosing to accept or reject incentive-compatible gambles that yield either a positive dollar amount (e.g., $99) with a very low (1%) probability of success or nothing at all (e.g., "There is a 1% chance that you will win $99, and a 99% chance that you will win nothing"). We expected that a nontrivial percentage of people would reject such opportunities—despite there being no possibility of losing money. Further, we expected people to reject such opportunities even when minimizing or eliminating their objective costs (i.e., of time, money, reputation), and we predicted that people would even be willing to incur time or transaction costs to avoid taking these low-probability opportunities.

Our account—that people may choose to receive nothing rather than take a very low chance at a larger reward—stands in seeming opposition to a core proposition of *prospect theory*: that people overweight small probabilities, leading to risk seeking for low-probability

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gains (Kahneman & Tversky, 1979; Tversky & Fox, 1995; Tversky & Kahneman, 1992). However, paradigms testing prospect theory typically employ a joint paradigm in which individuals choose between prospects (e.g., "Which would you choose? An 80% chance at $4,000 or $3,000 for sure?"), whereas our opportunity-neglect paradigms are separate, requiring individuals to accept or reject a single opportunity ("You have a 1% chance of winning $99. Yes, or no?"). We draw on research demonstrating the effect of framing decisions as joint or separate (Hsee, 1996; Hsee et al., 1999) to suggest that individuals considering single opportunities focus on their low probability of winning (see Slovic & Lichtenstein, 1968), rather than on the fact that 1% is still larger than 0%—leading to opportunity neglect. However, framing the identical decision as a choice between options ("You have a 1% chance of winning $99" and "You have a 0% chance of winning $99") highlights that a 0% chance of winning is dominated by a 1% chance of winning (Huber et al., 1982). Despite the fact that saying "no" is equivalent to choosing a gamble with a 0% chance of winning, we expected joint framing to increase the attractiveness of the oft-neglected opportunity.

Whereas research on opportunity-cost neglect suggests that people can neglect the impact of taking one opportunity on their other opportunities (Frederick et al., 2009; Greenberg & Spiller, 2016), opportunity neglect suggests that people can fail to take opportunities at all.

Statement of Relevance

People often decide whether to pursue opportunities with low chances of success (e.g., applying to a highly prestigious company or university). Rejecting such opportunities can be sensible when there are costs—in time, money, or reputation—but may be less so when opportunities are relatively costless, such as when applications are brief or free. We suggest that people can exhibit opportunity neglect: forgoing low-probability opportunities even in the absence of objective costs. We demonstrate opportunity neglect in naturalistic situations (including applying for jobs and winning consumer products), and with monetary lotteries. Across studies, a non-trivial percentage of participants (ranging from 19.6% to 52.3%) neglected to take low-probability opportunities such as "a 1% chance of winning $99, and a 99% chance of winning nothing." Opportunity neglect was reduced when highlighting that rejecting opportunities is equivalent to a zero chance of success—which reminds people that they have nothing to lose.

Study 1

Borrowing from the opening example, Study 1 documented opportunity neglect in an everyday scenario: applying for an award. As an initial test, we examined participants' attitudes toward low-probability opportunities (1% chance) versus high-probability opportunities (99% chance).

Method

Participants. Participants ($N = 385$;[1] 41.3% male; mean age = 44.54 years, $SD = 16.93$) were recruited from a nationally representative U.S. panel (stratified along gender, age, and ethnicity) using the Prime Panels platform.

Procedure. In two between-subjects conditions, participants imagined that they had the opportunity to be considered for a prestigious award with either a low or high perceived probability of success. Specifically, participants read, "Imagine that you are currently considering applying for a prestigious award. To be considered for the award, you would apply online, simply by uploading a statement that you have already written for a different application." In the low-probability condition, participants read, "You estimate that you have a 1% chance of receiving the award, and a 99% chance of not receiving it." In the high-probability condition, participants read, "You estimate that you have a 99% chance of receiving the award, and a 1% chance of not receiving it."

We assessed participants' likelihood of applying by asking, "How likely would you be to apply to the award?" (1 = *not at all likely*, 7 = *very likely*). Finally, we administered three exploratory individual-level difference scales (prevention and promotion focus, trait optimism, and drive; results reported in Section S1 in the Supplemental Studies section of the Supplemental Material available online).

Across all studies, we targeted a minimum sample size of 100 per condition between subjects, which is consistent with recent thinking on appropriate sample size (Simmons, 2014). We prespecified our sample sizes on the basis of this guidance rather than on estimated effect sizes. We disclose all manipulations and measures, and we preregistered all studies. Our institutional review board approved the studies. No data were excluded. Data, stimuli, and preregistrations are posted on ResearchBox (https://researchbox.org/527).

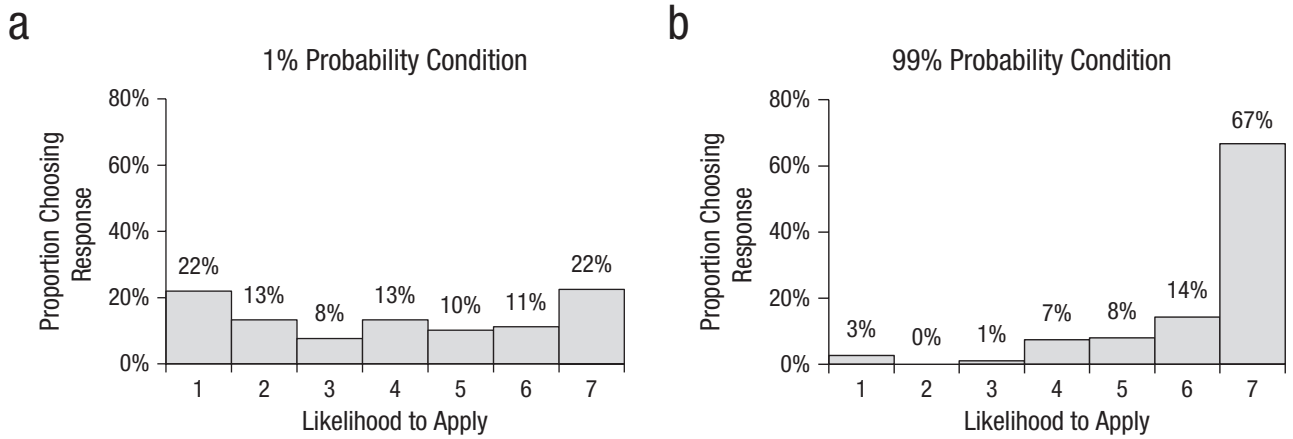

Fig. 1. Distribution of responses in the 1% and 99% probability conditions (Study 1).

Results

As predicted, participants were significantly less likely to apply to the award in the low-probability condition, $M = 4.00$, $SD = 2.28$, 95% confidence interval (CI) = [3.68, 4.32], than in the high-probability condition, $M = 6.28$, $SD = 1.32$, 95% CI = [6.09, 6.46], $t(383) = 11.95$, $p < .001$, $d = 1.22$, 95% CI = [1.00, 1.44]. For this and all other studies, we additionally report Bayesian credible intervals and comparisons in the Supplemental Analyses section in the Supplemental Material.

Exploring the histograms of responses (Fig. 1) highlights notable differences between participants' responses in the two conditions. For instance, 21.9% (95% CI = [16.4%, 28.4%]) of participants in the low-probability condition selected the lowest possible value on the scale, displaying a strong aversion to taking the opportunity, whereas only 2.6% (95% CI = [0.8%, 6.1%]) in the high-probability condition did so, $\chi^2(1, N = 385) = 32.82$, $p < .001$, $\Phi = 0.29$, 95% CI = [0.21, 0.36].

In a conceptual replication using a different everyday situation, participants in another study ($N = 2{,}050$ from a nationally representative sample; see Section S2 in the Supplemental Studies section of the Supplemental Material) were asked whether or not they would apply for their dream job—having already prepared their curricula vitae and cover letters—for which they estimated their probability of success as 1%, 50%, or 99%. (Unlike the continuous measure above, we simply gave participants the option of responding "yes" or "no.") Although very few participants rejected the opportunity in the 99% condition (4.0%, 95% CI = [2.6%, 5.7%]) and the 50% condition (7.3%, 95% CI = [5.5%, 9.5%]), significantly more chose not to apply in the 1% condition (26.6%, 95% CI = [23.4%, 30.1%]; this proportion was significantly different from the other two conditions, $ps < .001$).

Study 1 demonstrated that people tend to reject opportunities with low probability of success. In these settings, however, it is likely that people would consider other costs, including reputational concerns or the minimal costs of uploading one's materials; therefore, in the studies that follow, we further strip away the costs of taking such opportunities.

Study 2

Study 2 examined opportunity neglect using a product; this and all remaining studies used an incentive-compatible design.

Method

Participants. Participants ($N = 200$; 47.3% male; mean age = 31.79 years,[2] $SD = 12.58$) were recruited at the entrance of a subway stop in a major northeastern U.S. city as they waited for a university walking tour to begin. The participation incentive was a $5 Amazon gift card.

Procedure. Study 2 was a two-condition (probability of success: low, high) between-subjects design. An experimenter (dressed in university-branded clothing) approached people who were waiting for a university walking tour to begin. Participants were handed a tablet. The study was presented as the second in a bundle of two; the first survey lasted about 3 min. At the conclusion of that survey, participants learned about the opportunity on offer. In the low-probability (1%) condition, participants read:

> You have a 1% chance of winning a [University]-branded pen and a 99% chance of winning nothing. Would you like to play out this gamble with the experimenter? If so, you will pull a number from a stack of numbers from 1-100. If you pull

the number 1, you will win the gamble and, and with this, a University-branded pen. If you choose not to play the gamble, you will end this study.

In the high-probability (99%) condition, participants read the same basic instructions but learned they had "a 99% chance of winning a branded pen and a 1% chance of winning nothing," and that they would win the pen if they pulled "any number between 2 and 100."

We assessed participants' likelihood of rejecting the gamble by asking, "Would you like to take this gamble?" with response options: "Yes, I would like to take this gamble" and "No, I do not want to take this gamble."

Results

In the low-probability condition, 27.2% (95% CI = [18.9%, 36.8%]) of participants rejected the gamble. As predicted, this rejection rate was significantly higher than the 11.3% (95% CI = [5.8%, 19.4%]) rejection rate observed in the high-probability condition, $\chi^2(1, N = 200) = 7.99$, $p = .005$, $\Phi = 0.20$, 95% CI = [0.06, 0.32].

Participants in Study 2 incurred some minor costs: They had to pull a card (transaction cost), and they may have wanted to avoid an awkward interaction with a stranger (social cost). Because such costs (even when minimal) may deter people from taking opportunities, all remaining studies used monetary gambles in which we made explicit that the opportunities had no possibility of monetary loss and did not require more time.

Study 3

Like the previous studies, Study 3 compared rejection rates for opportunities with low (1%) and high (99%) probabilities of success. In Study 3, however, we held the expected value constant ($0.99).

Method

Participants. Participants ($N = 201$; 43.8% male; mean age = 37.76 years, $SD = 10.72$) were recruited from Amazon Mechanical Turk (MTurk) in return for a $0.30 base payment.

Procedure. Study 3 employed a two-condition (probability of success: low, high) between-subjects design in which we equated the expected value of two gambles.

Participants were given the opportunity to take a gamble. Participants in the low-probability condition were told, "You have a 1% chance of winning $99, and a 99% chance of winning nothing." Participants in the high-probability condition were told, "You have a 99% chance of winning $1, and a 1% chance of winning nothing." Thus, for both conditions, the expected value was $0.99. All participants were then asked, "Would you like to take this gamble?" with response options "yes" and "no."

Finally, participants completed a comprehension check—"Could you have lost any money by taking the gamble?"—with response options "yes" or "no." Overall, 78.1% of participants (85.9% in the low-probability condition and 70.6% in the high-probability condition), $\chi^2(1, N = 201) = 6.85$, $p = .01$, $\Phi = 0.18$, 95% CI = [0.04, 0.33], correctly chose "no"—that is, they understood that there was no possibility of a monetary loss.

For Studies 3 through 7, and those referenced in the Supplemental Material, we report the more conservative reduced-sample results, which excluded participants who failed the comprehension check. We replicated these results for the full sample without exclusions—when we did so, they were even stronger. (In Studies 4 and 6, the comprehension checks were administered up front, and participants were required to answer correctly before proceeding.)

Results

In the low-probability condition, 40.0% (95% CI = [29.5%, 51.2%]) of participants rejected the gamble. As predicted, this rejection rate was significantly higher than the 1.4% (95% CI = [0.04%, 7.5%]) rejection rate observed in the high-probability condition, $\chi^2(1, N = 157) = 33.55$, $p < .001$, $\Phi = 0.46$, 95% CI = [0.36, 0.56].

Study 4

Having demonstrated opportunity neglect across contexts (everyday scenarios, product raffles, monetary gambles), the next two studies tested its robustness.

First, Study 4 made rejection costlier by varying the default option—that is, in order to forgo a low-probability opportunity, participants had to actively opt out (Ebeling & Lotz, 2015; Johnson et al., 2002; Johnson & Goldstein, 2003). We expected that some participants defaulted into taking a low-probability opportunity would be willing to incur transaction costs to switch to rejecting it, suggesting that opportunity neglect is not merely attributable to the ease of a transaction. This paradigm also helps to show that opportunity neglect does not result from mere inattention, because switching away from defaults requires attention.

To provide further evidence that inattention or confusion is not the cause of opportunity neglect, we administered up-front comprehension checks that participants had to pass before proceeding. These questions also served to reduce participants' possible suspicion about the gambles being "too good to be

true": For example, they had to confirm that they would automatically receive their bonus.

Method

Participants. Participants (N = 602; 56.3% male; mean age = 38.05 years, SD = 11.43) were recruited from MTurk in return for a $0.30 base payment.

Procedure. Study 4 employed a 2 (probability of success: low, high) × 3 (default preselection: "yes" preselected, "no" preselected, nothing preselected) between-subjects design. Participants were given the opportunity to take a single gamble. They read,

> In this study, you will encounter a real gamble. On the upcoming screen, you will see the gamble and will choose to either accept or decline it. If you choose to take the gamble and then win it, you will receive an immediate and automatic bonus onto your MTurk account. If you lose the gamble, you will not receive a bonus. (However, you will still receive your base payment for this hit.) We will tell you about the outcome of your gamble immediately. Regardless of your choice, you will spend the same amount of time on this study. Regardless of your choice, we will not contact you after the study has ended.

On the same page, participants were asked five true/false questions that forced their understanding of these instructions: "In this study, I will encounter a real gamble"; "If I take the gamble, I will learn about the outcome of my gamble immediately"; "If I win the gamble, I will automatically and immediately receive a bonus onto my MTurk account, in addition to my base payment for this hit"; "If I lose the gamble, I will still receive my base payment for this hit"; and "The study takes the same amount of time—whether I choose to take the gamble or not." Participants could advance only when they had correctly answered "yes" to all questions.

On the next page, participants in the low-probability conditions read, "There is a 1% chance that you will win $1, and a 99% chance that you will win nothing." Participants in the high-probability conditions read, "There is a 99% chance that you will win $1, and a 1% chance that you will win nothing."

As in previous studies, participants were asked: "Would you like to take this gamble?" with response options "yes" or "no." Between-subjects, we manipulated whether (and which) response option was preselected by default: either "yes," "no," or nothing.

Results

Consistent with previous findings, results showed that participants in the low-probability conditions were significantly more likely to reject their gamble (21.6%, 95% CI = [17.0%, 26.7%]) than participants in the high-probability conditions, as predicted (4.2%, 95% CI = [2.3%, 7.1%]), $\chi^2(1, N = 602) = 41.18$, $p < .001$, $\Phi = 0.26$, 95% CI = [0.19, 0.33]. This was true across every level of the default manipulation (all ps < .003), again as predicted.

We then further explored rejection rates as a function of default preselection within each probability level. In the high-probability condition, in line with previous research on defaults, rejection was lowest when "yes" was preselected (1.0%, 95% CI = [0.02%, 5.3%]), followed by when nothing was preselected (3.9%, 95% CI = [1.1%, 9.6%]), followed by when "no" was preselected (7.7%, 95% CI = [3.4%, 14.6%]), $\chi^2(2, N = 310) = 5.86$, $p = .054$, $\Phi = 0.14$, 95% CI = [0.06, 0.25].

In the low-probability condition, rejection rates did not differ significantly between conditions, $\chi^2(2, N = 292) = 0.39$, $p = .82$, $\Phi = 0.04$, 95% CI = [0.02, 0.18]. When nothing was preselected, 19.6% (95% CI = [12.2%, 28.9%]) of participants rejected the gamble; results were similar when "no" was preselected (23.2%, 95% CI = [15.3%, 32.8%]), and, most important for our account, when "yes" was preselected, 21.9% (95% CI = [14.1%, 31.5%]) still opted out of the gamble. These results demonstrate that people actively wanted to avoid the low-probability opportunity, even incurring a transaction cost (albeit minimal) to do so.

In a conceptual replication (N = 203; see Study S3 in the Supplemental Studies section of the Supplemental Material), we again varied the probabilities (1% vs. 99%); however, rather than using different defaults, we gave participants the opportunity to respond using "yes," "no," or a third option, "I'm indifferent." We continued to observe opportunity neglect: 31.7% (95% CI = [22.8%, 41.7%]) of participants actively rejected the gamble, and only 5.0% (95% CI = [1.6%, 11.2%]) indicated that they were indifferent. In another study (N = 418; see Study S4 in the Supplemental Studies section of the Supplemental Material), we held constant the probability (1%) but varied the stakes of winning from $0.01 to $100; across all levels, we again found evidence of opportunity neglect ranging from 40.7% (95% CI = [29.9%, 52.2%]) to 52.3% (95% CI = [41.3%, 63.2%]).

Study 5

In Studies 1 to 4, a substantial number of people were willing to forgo otherwise objectively costless low-probability opportunities. At the same time, it is difficult

to establish how people should respond to low-probability opportunities. For instance, one could argue that—because of the positive expected value and lack of objective costs—no one should reject these low-probability opportunities. But noise alone makes it unlikely that any condition would elicit a true 0% outcome; therefore, in order to calibrate reasonable upper and lower bounds, Study 5 administered four other possible control conditions.

First, a zero-probability condition gave participants a guaranteed non-win. This control established an upper bound: the highest rejection rate one should expect. Two certainty conditions measured rejection rates when there was a guaranteed win—serving as a lower bound. (One condition framed the opportunity as a gamble and one as a bonus, allowing us to ensure that semantic differences, such as an aversion to gambles, could not account for our results.) Finally, an instructional-manipulation-check condition, based on research by Oppenheimer et al. (2009), asked participants whether they were answering the survey from planet Earth—the percentage who answered "no" provided both a measure of noise and another lower bound for rejection rates.

Method

Participants. Participants ($N = 500$; 53.40% male; mean age = 40.68 years, $SD = 11.82$) were recruited from MTurk in return for a $0.30 base payment.

Procedure. Study 5 employed a between-subjects design with five conditions: low-probability gamble, certain gamble, certain bonus, instructional manipulation check, and zero-probability gamble. All participants began the survey by reading the following instructions: "Regardless of what you do, you will receive your base payment for this hit, and the survey will take the same amount of time."

As in the previous study, participants in the low-probability-gamble condition read, "You have a 1% chance of winning $1, and a 99% chance of winning nothing." They were asked, "Would you like to take this gamble?" with response options "yes" and "no."

Three control conditions established the lower bound for rejection rates. In two certainty conditions (certain gamble and certain bonus), participants were told they would definitely receive a bonus. Participants in the certain-gamble condition read, "You have a 100% of winning $1 and a 0% chance of winning nothing. Would you like to take this gamble?" Participants in the certain-bonus condition read, "Would you like a $1 bonus?" In the instructional-manipulation-check condition, participants were asked, "Are you answering this survey on the planet Earth?" All participants had two options: "yes" and "no."

Finally, a fourth control condition (zero-probability gamble) established the upper bound for rejection rates. Here, participants read, "You have a 0% chance of winning $1, and a 100% chance of winning nothing. Would you like to take this gamble?" Again, their response options were "yes" or "no."

After making their choices, participants were directed to a new page with a comprehension check, which was tailored to reflect the specific conditions participants had encountered. In the three gamble conditions (low-probability gamble, certain gamble, zero-probability gamble), participants read, "I could have lost money by taking this gamble." In the certain-bonus condition, the statement was, "I could have lost money by taking this bonus." In the instructional-manipulation-check condition, the statement was, "I could have lost money by answering 'Yes' to this question." All participants chose between four response options: "True," "False," "I don't know," and "I was not offered a [gamble/bonus]/"I was not asked a question." Overall, 82.4% of participants correctly chose "false"—74.4% in the low-probability-gamble condition, 76.5% in the instructional-manipulation-check condition, 78.4% in the 0%-gamble condition, 86.6% in the certain-bonus condition, and 92.6% in the certain-gamble condition, $\chi^2(4, N = 500) = 16.10$, $p = .003$, $\Phi = 0.18$, 95% CI = [0.12, 0.28].

Results

As predicted, rejection rates differed significantly between conditions, $\chi^2(4, N = 412) = 301.50$, $p < .001$, $\Phi = 0.86$, 95% CI = [0.81, 0.90]. In the three control conditions created to establish the lower bound of rejection rates, the vast majority of participants answered "yes"—very few said "no" to a certain gamble (0.0%, 95% CI = [0.0%, 3.6%]), a certain bonus (1.0%, 95% CI = [0.02%, 5.3%]), or to the instructional manipulation check asking whether they were answering from planet Earth (3.2%, 95% CI = [0.4%, 11.2%]). On the other side, the vast majority of participants answered "no" in the zero-probability condition, which we included to explore the upper bound of rejection rates (96.3%, 95% CI = [89.4%, 99.2%]). By contrast, in the low-probability-gamble condition (i.e., the one measuring opportunity neglect), 32.8% (95% CI = [21.8%, 45.4%]) of participants rejected their gamble, which differed significantly from all other conditions (all ps $< .001$).

Although the two semantic framings tested in the certainty conditions ("gamble" and "bonus") produced comparable rejection rates, it is nonetheless possible that participants in the low-probability-gamble condition were averse to the idea of playing a gamble. Thus, in another study ($N = 463$; see Study S5 in the Supplemental Studies section of the Supplemental Material),

we varied the framing of the low-probability opportunity (a 1% chance at $10). Participants neglected such opportunities when framed as a gamble (44.1%, 95% CI = [33.80%, 54.76%]), draw (43.3%, 95% CI = [32.9%, 54.2%]), lottery (38.1%, 95% CI = [28.5%, 48.6%]), or opportunity (30.0%, 95% CI = [20.8%, 40.6]), $\chi^2(3, N = 370) = 4.82$, $p = .19$, $\Phi = 0.11$, 95% CI = [0.05, 0.23] (all comparisons were nonsignificant). Further, across all framings, participants rejected the low-probability opportunity more frequently than its certainty equivalent (i.e., a certain bonus of $0.10; 4.3%, 95% CI = [1.2%, 10.6%]; all ps < .001).

In Studies 3 through 5, we prioritized documenting opportunity neglect in ways that hold objective costs constant and limit inattention and misunderstanding—yet continue to observe people rejecting low-probability opportunities.

Study 6

The opportunity neglect demonstrated in the previous studies suggests that people see low-probability gambles as not offering a sufficient gain. The final two studies sought to mitigate opportunity neglect by highlighting situations that actually offered nothing to gain (e.g., a 0% chance of winning) to make salient that a 1% chance is, in fact, something. Both interventions highlighted that not taking the gamble (i.e., definitely winning nothing) offers a 0% chance of winning, which is dominated by a 1% chance of winning (Huber et al., 1982).

Study 6 did so by explicitly labeling the "no" response as a "0% chance of winning." This design was modeled after similar work that makes salient the opportunity costs of various choices (e.g., Frederick et al., 2009; Magen et al., 2008; Read et al., 2017). For instance, Frederick et al. (2009) reminded participants that "not buying" meant "keeping the money for other purchases." Analogously, we predicted that reminding participants that selecting "no" meant certainly winning nothing would induce them to accept low-probability gambles.

Method

Participants. We recruited a nationally representative sample (N = 400; 48.5% male; mean age = 45.12 years, SD = 15.70) from Prolific Academic in return for a $0.45 base payment.

Procedure. Study 6 used a two-condition between-subjects design in which we manipulated participants' response options (unlabeled vs. labeled with explicit probabilities).

Before showing participants their gamble, participants read the same instructions as in Study 4. Again, we required understanding up front by using the five comprehension-check questions from Study 4.

Then participants were offered a low-probability gamble: "There is a 1% chance that you will win $10, and a 99% chance that you will win nothing. Would you like to take this gamble?" Between subjects, response options were either unlabeled ("yes" and "no") or labeled with explicit probabilities: "Yes (You have a 1% chance of winning)" and "No (You have a 0% chance of winning)."

Results

Consistent with previous results, results showed that many participants rejected the gamble in the unlabeled condition (18.0%, 95% CI = [12.2%, 23.8%]). However, merely reframing the "no" response as a "0% chance of winning" significantly reduced the rejection rate, as predicted (9.5%, 95% CI = [5.8%, 14.4%]), $\chi^2(1, N = 400) = 6.09$, $p = .01$, $\Phi = 0.12$, 95% CI = [0.02, 0.21].

Interestingly, opportunity neglect was not fully attenuated. Thus, some participants might have been particularly opposed to "taking their chances," perhaps because they simply continued to view a 1% chance as very small. Study 7 tested a different intervention designed to further increase uptake of the low-probability opportunity: asking participants to choose between two gambles.

Study 7

As noted earlier, our opportunity-neglect paradigms required individuals to decide to accept or reject a single prospect. Previous research demonstrated the effects of reframing decisions as choices between gambles (Hsee, 1996; Hsee et al., 1999; Slovic & Lichtenstein, 1968); on the basis of this, Study 7 reframed the yes/no decision as a functionally equivalent but psychologically distinct choice between gambles.

Method

Participants. Participants (N = 602; 47.84% male; mean age = 41.67 years, SD = 12.35) were recruited from MTurk in return for a $0.30 base payment.

Procedure. Study 7 used a 2 (probability of success: low, high) × 2 (frame: single gamble, choice between gambles) between-subjects design. Both decision frames asked participants to choose between two options: taking a gamble, or rejecting it and receiving nothing.

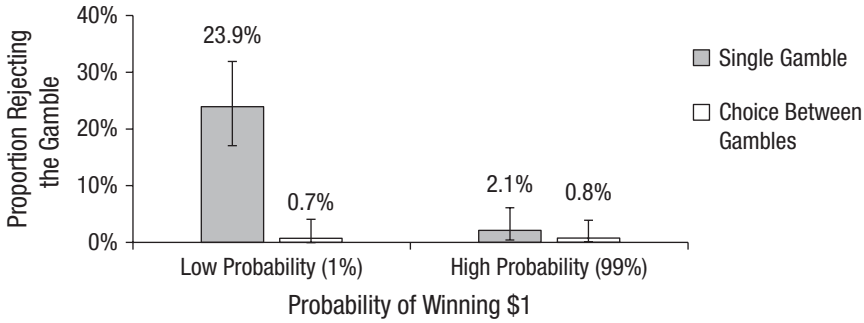

Fig. 2. Proportion of participants rejecting the low-probability (vs. high-probability) gamble as a function of framing (reduced sample, Study 7). Error bars represent 95% confidence intervals.

At the beginning of the survey, participants read that they would accept or decline a real gamble (in the single gamble frame), or choose between two real gambles (in the choice between gambles frame). They would receive feedback immediately. If they won their gamble, a bonus would be paid automatically. If they lost their gamble, they would still receive their base payment for the hit.

On the next page, participants in the single-gamble conditions chose to accept or reject a single gamble. In the low-probability condition, the gamble was, "There is a 1% chance that you will win $1, and a 99% chance that you will win nothing." In the high-probability condition, the gamble was, "There is a 99% chance that you will win $1, and a 1% chance that you will win nothing." Then all participants were asked, "Would you like to take this gamble?" ("yes" or "no").

In the choice conditions, in contrast, participants were asked, "Which of the following two gambles would you like to take?" In the low-probability condition, participants chose between "There is a 1% chance that you will win $1, and a 99% chance that you will win nothing" and "There is a 0% chance that you will win $1, and a 100% chance that you will win nothing." In the high-probability condition, participants chose between "There is a 99% chance that you will win $1, and a 1% chance that you will win nothing" and "There is a 0% chance that you will win $1, and a 100% chance that you will win nothing." If participants chose the second (0% chance) gamble, we treated this as rejection of the first (1% or 99%) gamble.

Next, we assessed participants' understanding of the instructions. In the single-gamble conditions, participants read, "I could not have lost money by taking this gamble. That is, regardless of my outcome, I would still receive my base payment for the hit." In the choice conditions, we replaced "this gamble" with "either gamble." Participants were asked whether the statement was true or false, with response options: "True," "False," "I don't know," and "I was not offered a gamble." Overall, 92.03% correctly chose "True"—92.0% in the low-probability single-gamble condition, 95.3% in the low-probability choice condition, 93.4% in the high-probability single-gamble condition, and 87.5% in the high-probability choice condition, $\chi^2(3, N = 602) = 6.80$, $p = .08$, $\Phi = 0.11$, 95% CI of Φ = [0.05, 0.20].

Results

As predicted, rejection rates differed significantly between conditions, $\chi^2(3, N = 554) = 83.95$, $p < .001$, $\Phi = 0.39$, 95% CI = [0.31, 0.47]. Moreover, an exploratory logistic regression between participants' probability of success and their gamble frame yielded a significant interaction, $B = -3.70$, $SE = 1.37$, $p = .007$, odds ratio (OR) = 0.03, 95% CI for OR = [0.002, 0.37].

Significantly fewer participants rejected the low-probability gamble under the choice frame (0.7%, 95% CI = [0.02%, 3.9%]) than under the single-gamble frame (23.9%, 95% CI = [17.1%, 31.9%]), $\chi^2(1, N = 280) = 35.34$, $p < .001$, $\Phi = 0.36$, 95% CI = [0.28, 0.43] (see Fig. 2). In contrast, rejection rates of the high-probability gamble did not differ significantly between the choice (2.1%, 95% CI = [0.4%, 6.1%]) and single-gamble conditions (0.8%, 95% CI = [0.02%, 4.1%]), $\chi^2(1, N = 274) = 0.90$, $p = .34$, $\Phi = 0.06$, 95% CI = [0.002, 0.15] (Fig. 2).

Together, Studies 6 and 7 show that making salient that 1% is still larger than 0%—whether through verbal descriptions or through reframing the yes/no decision as a choice—attenuated opportunity neglect.

General Discussion

Across seven studies using a range of stimuli, participants engaged in opportunity neglect, failing to take low-probability opportunities even when the objective costs (e.g., transaction costs, time, money, reputation) were minimal or eliminated, and even when forgoing opportunities required incurring transaction costs. These results held with a number of robustness checks

and cannot be explained solely by inattention to or suspicion of the opportunities we presented.

In our studies, we attempted to minimize or eliminate objective costs, such as reputational concerns, transaction costs, monetary costs, and effort. However, we do not suggest that these costs do not influence people's decisions in the real world. Instead, we show that even when such costs are minimized, opportunity neglect still occurs. And of course, decisions to accept or reject opportunities may still come with additional psychological costs—in particular, anticipated disappointment or regret (e.g., Gilovich & Medvec, 1995; Zeelenberg et al., 2000)—which may also contribute to opportunity neglect. At the same time, people may overestimate their negative feelings; because they are not expecting to win, losing should be less surprising and hence less disappointing, and even if people do feel badly, these negative emotions may be short-lived (e.g., Suh et al., 1996). Moreover, the positive effects of any realized opportunity—such as winning $99 or getting one's dream job—are likely considerable. Future research should explore the emotional accounting over time of taking versus forgoing low-probability opportunities. Moreover, to increase the generalizability of our findings and offer insight into underlying mechanisms, future research could use multiple measures, including asking participants for the rationale behind their decisions, to shed further light into the observed differences.

Future researchers could also examine whether (or when) people view opportunity neglect as an error. Certainly, a single-shot application for a dream job, even if sensible, may feel retrospectively like a mistake if the job fails to materialize. At the same time, to be accepted to a highly competitive conference, land a highly selective job, or win a 1% gamble, it is almost by definition necessary for people to take many low-probability opportunities and thus increase their cumulative chance of success. Therefore, failing to take repeated opportunities—and not increasing one's cumulative chances of success—may be a poor strategy for eventual success. Indeed, future researchers could examine other frames that moderate opportunity neglect, such as whether people may be more willing to take many low-probability opportunities (e.g., simultaneously playing 100 gambles with 1% chance of winning) than one single opportunity (see Samuelson, 1963). Finally, considering losses and gains together may offer an additional intervention; people who have experienced a loss may be more likely to take a subsequent opportunity.

Study 7 offers an explanation of an apparent conflict between our results and prospect theory, which suggests that small probabilities are overweighted. We have shown that in the common situations in life in which people decide on a prospect in isolation ("Should I or shouldn't I?"), they frequently neglect low-probability opportunities; however, in the common situations in life in which people are deciding between two prospects ("Should I choose A or B?")—as in a typical prospect-theory paradigm—we see a reduction in people's tendency to neglect opportunities.

Relatedly, opportunity neglect is distinct from the *uncertainty effect*, which suggests that people are willing to pay less for a risky prospect than its worst possible outcome (Gneezy et al., 2006; Mislavsky & Simonsohn, 2018). The uncertainty effect could suggest that people will pay less for a 1% chance at $99 when they also consider a 0% chance at $99, as this highlights the uncertainty of the 1%. In contrast, we show that the inclusion of the 0% highlights the attractiveness of the 1%.

We tested our interventions in the field and on a nationally representative sample, but also used convenience samples from MTurk. Future researchers should collect more diverse samples to test whether race, ethnicity, or other demographic variables moderate our results. Moreover, future researchers could examine other individual-level moderators. In one study (see Study S1 in the Supplemental Studies section of the Supplemental Material), participants with drive (Carver & White, 1994) were more likely to take opportunities; it is possible that satisficers (Cheek & Goebel, 2020), promotion-focused individuals (Haws et al., 2010), or people with higher risk tolerance (Weber et al., 2002) would do the same.

Conclusion

Across studies, a sizable percentage of participants—between 18.0% and 44.0%—exhibited opportunity neglect, rejecting low-probability opportunities with positive expected value and no possibility for monetary loss. Encouraging people to think about rejecting a low-probability opportunity as a zero probability of success reduced this tendency. After all, "you miss 100% of the shots you don't take."

Transparency

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Author Contributions

E. Prinsloo generated the idea. All authors contributed to the study designs. Testing, data collection, and data analysis were performed by E. Prinsloo under the supervision of the remaining authors. All authors contributed to the writing of the manuscript and approved the final version for submission.

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The author(s) declared that there were no conflicts of interest with respect to the authorship or the publication of this article.

Open Practices

All data, materials, and analysis code have been made publicly available via ResearchBox and can be accessed at https://researchbox.org/527. The design and analysis plans for the experiments were preregistered on AsPredicted (copies of all preregistrations are available at https://researchbox.org/527). This article has received the badges for Open Data, Open Materials, and Preregistration. More information about the Open Practices badges can be found at http://www.psychologicalscience.org/publications/badges.

Supplemental Material

Additional supporting information can be found at http://journals.sagepub.com/doi/suppl/10.1177/09567976221091801

Notes

1. To complete the required quotas for the nationally representative sample, our third-party panel administrator collected responses beyond our preregistered sample of 300. We present data for the complete sample, but the results hold if we analyze only the first 300 responses.
2. Some participants did not provide their age.

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