Do People Brace Sensibly? Risk Judgments and Event Likelihood

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Previous research has shown that people become pessimistic about potentially bad news to "brace for the worst." Three studies examined whether people brace differently for rare and common negative events. Results reveal that people brace more for rare negative events than for common negative events (Studies 1-3a), but only when the event is self-relevant (Study 3b). Results also show that people brace more for rare events when feedback is imminent (Study 1), when negative outcomes are salient (Study 2), and when the outcomes are important or consequential (Study 3a). The authors discuss several possible explanations for the findings, including ignorance of the base rate, random responding, and anchoring and adjustment, and ultimately suggest that people may brace "enough."

Keywords: *optimism; pessimism; expectations; risk judgments; bracing*

"Pessimism is like optimism, only less dangerous."
—*The Neurotic's Notebook* (McLaughlin, 1963)

People's predictions about the future influence their thoughts, feelings, and actions in preparation for and response to possible outcomes. Although research suggests that people derive considerable benefit from having an optimistic outlook (Aspinwall & Taylor, 1992; Scheier & Carver, 1985; S. Taylor & Brown, 1988; S. Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000), the sentiment expressed in *The Neurotic's Notebook* (McLaughlin, 1963) suggests that a pessimistic outlook may be wiser. Pessimism under some circumstances can serve to motivate people toward action and to protect them from having their hopes crushed by disappointment (for a review, see Shepperd, Sweeny, & Carroll, 2006). Because optimism and pessimism both carry potential benefits, it seems that people's predictions about the future should be weighed carefully to ensure that their predictions strike a sensible balance between the two extremes. The present research examines whether people form sensible expectations about the future, that is, predictions that best take advantage of the benefits of optimism and pessimism. People consider many factors when forming expectations about the future, and we examine how event likelihood influences the balance between optimism and pessimism. We make the counterintuitive suggestion that being sensible means tipping the balance toward pessimism when negative outcomes are relatively unlikely to occur and toward optimism when negative outcomes are likely to occur.

BRACING FOR BAD NEWS

People are often unrealistically optimistic when predicting personal outcomes, believing that they are less likely to experience negative events and more likely to experience positive events than objective evidence would warrant (see Carroll, Sweeny, & Shepperd, 2006, for a review). However, people will shelve their optimism and brace for bad news if they believe their optimistic outlook might be challenged. Bracing refers to judging that

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an undesirable outcome is more likely to occur than objective evidence would warrant in an effort to prepare for possible bad news. Studies document bracing for events ranging from academic performance to tests for disease to financial outcomes (e.g., Gilovich, Kerr, & Medvec, 1993; Nisan, 1972; Sanna, 1999; Shepperd, Findley-Klein, Kwavnick, Walker, & Perez, 2000; Shepperd, Ouellette, & Fernandez, 1996; K. Taylor & Shepperd, 1998). For example, students in one study estimated their scores on an exam at several points prior to receiving their scores. As the moment of truth drew near, participants shifted from optimism to realism and eventually to pessimism in their predictions (Shepperd et al., 1996).

Bracing represents a type of preparedness in which people attempt to prepare for uncertainty. Preparedness "is an adaptive goal state of readiness to respond to uncertain outcomes" (Carroll et al., 2006, p. 64). In some instances, preparedness involves being ready to take advantage of opportunities for growth and advancement. In other instances, preparedness involves being equipped to handle negative outcomes and setbacks. The ambient state for most people is optimism, and optimism serves preparedness needs by directing energy toward seeking and facilitating positive outcomes. In addition, optimism provides emotional, physical, and social benefits (e.g., Aspinwall & Taylor, 1992; Carver & Scheier, 1981; Scheier & Carver, 1985; S. Taylor et al., 2000) that serve preparedness needs indirectly by providing people the resources to respond to the demands of daily activities.

Bracing, on the other hand, prepares people for the possibility of an undesired outcome. As the moment of truth draws near, people benefit in two ways from bracing for bad news. First, bracing can prompt people to take actions that reduce the likelihood that an undesired outcome will transpire (Carroll et al., 2006). Indeed, the negative outlook of defensive pessimists illustrates this benefit of pessimism (Norem & Cantor, 1986). Defensive pessimists are generally successful people who nevertheless make pessimistic predictions in anticipation of a performance. They then harness the anxiety resulting from their doom-and-gloom predictions to fuel behavior designed to ensure that the negative outcome does not come to pass.

Second, bracing prepares people for undesired outcomes by reducing negative emotions associated with such outcomes. The intensity of negative emotions in response to undesired outcomes depends in part on how the outcomes compare with expectations. People are elated when outcomes exceed expectations and disappointed when outcomes fall short of expectations (van Dijk & van der Pligt, 1997; Zeelenberg, van Dijk, Manstead, & van der Pligt, 2000). By lowering their expectations, people can proactively mitigate or avoid negative feelings such as disappointment should things not turn out as hoped.

SENSIBLE BRACING

People cannot brace for all possible undesired outcomes, and recent research suggests that people make predictions based on anticipated costs and benefits of optimism versus pessimism (Sackett & Armor, 2006). For example, imagining one's death at the hands of a drunk driver every time one is behind the wheel of a car is emotionally exhausting and can paralyze people into inaction. Bracing for all possible outcomes can undermine normal functioning. On the other hand, if loved ones are "missing in action" during war, it may be wise to brace for the worst. These two examples raise an important question: When is it wise or sensible to brace and when is it not?

A number of studies reveal that people generally brace sensibly and thus appear to balance the benefits of optimism and pessimism. First, people typically brace only when they anticipate feedback about their outcomes in the near future (Shepperd et al., 1996). As noted earlier, an optimistic outlook has affective and motivational benefits. Selectively bracing only when feedback is imminent is sensible because it postpones sacrifice of the benefits of optimism until absolutely necessary. Second, people brace only for outcomes that are important or consequential, such as a severe disease or a large financial setback (Shepperd et al., 2000; K. Taylor & Shepperd, 1998). Bracing for important outcomes also seems sensible because people have less need to prevent outcomes or reduce the negative effects of outcomes that are inconsequential. Third, people brace when the undesirable outcome is easily imaginable. For example, participants in one study were less confident about their exam performance if they mentally simulated an undesired outcome (Sanna, 1999). Again, this pattern of bracing seems sensible because easily imagined outcomes are more accessible and therefore provoke a greater need to neutralize concerns over the effects of those outcomes. In sum, prior research on bracing suggests that people are generally sensible when they shelve their optimism in favor of pessimism. They shelve their optimism when they anticipate imminent feedback, when outcomes are important, and when they can easily imagine undesired outcomes occurring.

Event Likelihood and Sensible Bracing

When people contemplate risks that vary in probability, at first blush bracing sensibly would seem to mean that people should brace more for common events (events that are highly likely to occur) than rare events (events that are highly unlikely to occur). Common sense suggests that preparatory energies are best allocated toward events that are objectively most likely to

occur. Furthermore, traditional models of decision making, such as the subjective expected utility model, suggest that people should prepare most for events that are more likely to occur (Edwards, 1954; Ronis, 1992). However, although people may judge their likelihood of experiencing an outcome as greater when the event is common than when it is rare, likelihood judgments in and of themselves do not tell us whether people are bracing more for common events than for rare events.

For example, imagine a woman who learns prior to receiving her midterm exam scores that 80% of students in her psychology class and 20% of students in her calculus class failed the first exam. Imagine further that she estimates that her chances are 75% that she failed her psychology exam and 15% the she failed her calculus exam. Although 75% is higher than 15%, both estimates fall equally (i.e., 5%) below the objective base rate. Given no other information, it would appear the student is not bracing for either outcome. Now, imagine that she estimates that her chances are 75% that she failed her psychology exam and 25% that she failed her calculus exam. Although 75% is higher than 25%, 75% falls 5% below the objective base rate, whereas 25% falls 5% above the objective base rate. In this case, although 75% is objectively higher than 25%, the student appears to be bracing for the low-probability event but not for the high-probability event.

For several reasons, we believe that bracing sensibly entails bracing more for rare events than for common events. First, considerable evidence suggests that bracing reflects, at least in part, an attempt to regulate feelings of disappointment. Negative events are unpleasant in their own right. However, they are particularly unpleasant when unexpected (Mellers, Schwartz, Ho, & Ritov, 1997; Shepperd & McNulty, 2002; van Dijk & van der Pligt, 1997). The chief emotion people experience when outcomes fall short of expectations is disappointment (van Dijk & van der Pligt, 1997). People seem quite sensitive to the link between outcomes, expectations, and disappointment and will make pessimistic predictions at the moment of truth to reduce or avoid feelings of disappointment. Rare events by their very nature are less expected than common events and thus have the greater potential to produce disappointment should they occur. Thus, rare events seem more likely to produce more pessimistic predictions (relative to the base rate) than common events.

Second, evidence reveals that people brace only in anticipation of news regarding serious or consequential outcomes. Specifically, participants in one study learned that an enzyme deficiency they were tested for had either serious or nonserious side effects. Participants awaiting their test results displayed pessimism, overestimating their risk of testing positive relative to the base rate, only when the enzyme deficiency was described as having serious consequences (K. Taylor & Shepperd, 1998). Other evidence suggests that people perceive negative outcomes as more severe when they are rare than when they are common. For instance, participants in one study rated a disease as more serious when it was described as rare than when it was described as prevalent (Jemmott, Ditto, & Croyle, 1986). The finding that people brace more for serious than nonserious events coupled with the finding that people perceive rare negative events as more serious than common negative events suggests that people are more likely to brace for rare than for common negative events.

Third, people should brace more for rare negative events because of the greater implications such events have for identity. According to Kelley's (1967) attribution model, attributions for a person's outcomes are influenced by consistency, distinctiveness, and consensus of the outcome. From our perspective, the most important component is consensus—the extent to which other people experience the same outcome. Although people may not be perfect users of consensus information, audiences are generally more inclined to make situational attributions for a person's outcomes to the extent consensus is high and are more likely to make dispositional attributions to the extent that consensus is low (see also Correspondence Inference Theory; Jones & Davis, 1965). The logic is quite simple. Imagine the student described earlier fails her exam in psychology. Others are more inclined to make a dispositional attribution for the exam failure if she is the only student who failed the exam (a rare event) than if 80% of students failed the exam (a common event). Awareness of the undesirable identity implications of rare negative events presumably should prompt people to brace more for rare negative events than for common negative events.

In sum, bracing sensibly entails bracing more for rare negative events than for common negative events because rare negative events are more likely to lead to disappointment, are viewed as more serious, and have greater identity implications.

It is noteworthy that some prior research finds a link between event likelihood and risk judgments. These studies typically reveal that people overestimate their risk for rare events and underestimate their risk for common events (Brandstätter, Kühberger, & Schneider, 2002; Fischhoff, 1981; Hertwig, Pachur, & Kurzenhäuser, 2005; Pulford & Colman, 1996; Rothman, Klein, & Weinstein, 1996; Slovic, 1987; Weinstein & Lyon, 1999). For example, people underestimate their risk (i.e., show optimism) for common diseases such as the human papilloma virus and chlamydia and overestimate their risk (i.e., show pessimism) for rare diseases such as chronic liver disease and cirrhosis (Rothman et al.,

1996; see also Lichtenstein, Slovic, Fischhoff, Layman, & Combs, 1978). However, these instances of underestimating rare and overestimating common undesirable events are most likely driven by ignorance of the base rate rather than by an attempt to brace for undesired outcomes. Specifically, sometimes people overestimate their risk simply because they have no idea how rare some negative events are. Our goal in this research is to examine whether people overestimate their risk for rare events even when they are aware of the base rate.

Overview and Predictions

We examined in three studies whether people brace differently for low- versus high-prevalence undesirable outcomes. We propose that bracing for rare undesirable outcomes is more sensible and thus predicted that relative to the base rate, people will brace more for low-prevalence (rare) events than high-prevalence (common) events. We also include manipulations of other factors shown to influence bracing, thereby allowing us to examine whether these factors might moderate the extent to which people brace differently for common versus rare undesirable outcomes. Study 1 examined the effect of anticipating feedback on bracing for a rare versus common undesirable outcome, whereas Study 2 examined the effect of exam difficulty. Studies 3a and 3b moved the test of the hypothesis from predictions of exam performance to predictions of a financial setback. These studies examined whether individual differences in outcome importance (Study 3a) and personal relevance (Study 3b) influenced predictions for rare versus common undesirable outcomes. In general, we predicted that people would brace more when anticipating feedback, when taking an extremely difficult test, and when the outcome is important and personally relevant. However, more important to our specific focus, we predicted that people would brace more for rare undesirable events than common undesirable events.

STUDY 1

Study 1 examined whether people brace more for a high- versus low-prevalence outcome. Participants took an intelligence test and received base rate information indicating that failure on the test was relatively common (occurring for 82% of the population) or rare (occurring for 18% of the population). Participants also believed that they would or would not receive performance feedback on the test. Prior studies reveal that people supply lower predictions only when anticipating feedback that might challenge optimistic predictions (Carroll et al., 2006). Thus, we predicted that participants would report a lower score when they anticipated feedback than when they did not anticipate feedback. Moreover, we predicted that compared to the base rate of either 82% or 18%, participants would display pessimism only when they anticipated feedback. We also explored whether anticipating feedback might moderate any effects of outcome prevalence on outcome predictions.

Finally, participants estimated the likelihood that the typical student would fail the exam, providing an alternative way to assess our predictions. Prior research finds that participants display comparative optimism, estimating a better outcome for themselves than for the average person, only when test feedback is not expected (K. Taylor & Shepperd, 1998). We explored whether outcome prevalence also might influence comparative judgments.

Method

Introductory psychology students (N = 77) participating in sessions of 1 to 4 took a 12-min test comprising 50 moderately difficult word and number problems. Participants were told that the test measured analytical reasoning skills and predicted a number of important outcomes and that scoring depended on both the number of questions completed and the number answered correctly. After participants completed the test, the experimenter explained that the test would be scored out of 200 points, with 160 points and above indicating exceptional ability, 80 to 160 points indicating average ability, and below 80 points indicating poor ability (i.e., failing). Participants in the common-event conditions were told that although some people do well on the test, many people fail. Participants in the rare-event condition were told that although some people fail, most do well on the test. The experimenter then gave participants a packet of innocuous questionnaires to complete and left the room to score the tests.

After participants had sufficient time to complete the questionnaire, the experimenter returned, wrote a score distribution on a white board at the front of the room, and explained that the distribution represented the number of students that passed versus failed based on the most recent 100 scores. In the common-event condition, the experimenter wrote on the board, "Passing = 18, Failing = 82." In the rare-event condition, the experimenter wrote, "Passing = 82, Failing = 18." Crossed with the Prevalence manipulation was a Feedback manipulation. In the feedback condition, the experimenter displayed a sealed envelope for each participant and explained that the envelopes contained participants' test scores. The experimenter announced that participants could open their envelopes and see their individual test score after completing one final questionnaire. In the no-feedback condition, the experimenter announced that the computer had

TABLE 1: Mean Likelihood Estimates of Failing the Test for Self and Average Student (Study 1)

	n	*Own Likelihood* M (SD)	*Average Student's Likelihood* M (SD)	M *Difference* (SD)
Rare event (18% probability)				
No feedback expected	18	25.7 (15.7)	23.3 (11.6)	2.4 (16.4)
Feedback expected	24	42.2 (25.6)	27.2 (13.6)	15.0 (28.5)
Common event (82% probability)				
No feedback expected	18	53.4 (29.9)	64.2 (25.2)	–10.7 (24.6)
No feedback expected	17	69.1 (25.1)	77.8 (15.7)	–8.6 (21.9)

NOTE: A positive difference score indicates comparative pessimism; a negative difference score indicates comparative optimism.

malfunctioned while scoring their tests and that they would not receive their test results. However, the experimenter requested that they still complete the final questionnaire. On the final questionnaire, participants estimated (in counterbalanced order) the probability (0% to 100%) that they and the average student would receive a failing score.

Results

Probability judgments. Did probability judgments vary as a function of outcome prevalence and feedback? Our preliminary analyses examined probability judgments using a 2 (Prevalence: rare vs. common) × 2 (Feedback: feedback expected vs. no feedback expected) ANOVA. Analyses revealed a main effect of Feedback, $F(1, 73) = 8.03$, $p = .006$, $d = 0.66$. Participants predicted that they were more likely to fail in the feedback condition ($M = 53.4$, $SD = 28.5$) than in the no-feedback condition ($M = 39.6$, $SD = 27.4$). Analysis also revealed a main effect of Prevalence, $F(1, 74) = 23.14$, $p < .0001$, $d = 1.11$. Participants judged that they were more likely to fail when failure was common ($M = 61.1$, $SD = 28.4$) than when failure was rare ($M = 35.1$, $SD = 23.2$). The Prevalence × Feedback interaction was not significant, $F(1, 73) = .01$, $p = .94$, $d = 0.02$.

These preliminary analyses aside, our primary dependent measure was how estimates compared to the base rate. Mean self-estimates and their standard deviations appear in Table 1. One-sample *t* tests revealed that participants were pessimistic for rare events (compared to the 18% base rate) both when expecting feedback, $t(23) = 4.62$, $p < .0001$, $d = 1.93$, and when not expecting feedback, $t(17) = 2.07$, $p = .05$, $d = 1.00$. Furthermore, participants were more pessimistic for rare events when expecting feedback than when not expecting feedback, $F(1, 74) = 4.67$, $p = .03$, $d = 0.50$. Participants were optimistic for common events (compared to the 82% base rate) when expecting feedback, $t(17) = –2.11$, $p = .05$, $d = 1.02$, and when not expecting feedback, $t(16) = –4.06$, $p < .001$, $d = 1.97$. Finally, analyses revealed a marginally significant tendency toward greater optimism in the common-event conditions when no feedback was expected than when feedback was expected, $F(1, 74) = 3.56$, $p = .06$, $d = 0.45$. In sum, when failure was rare, participants were pessimistic, particularly when expecting feedback. When failure was common, participants were optimistic, particularly when not expecting feedback.

Judgments relative to the average person. In addition to comparisons to a base rate, optimism and pessimism also can be defined in terms of self-judgments versus judgments for the average person in the study. The second column of means in Table 1 presents participants' estimates of the likelihood that the average student in the study failed the test, and the third column represents the difference between personal and average person likelihood estimates. One-sample *t* tests revealed that only participants expecting feedback for a rare event believed they were more likely than the average person to fail, $t(23) = 2.58$, $p = .02$, $d = 1.08$. Participants in the Rare Event/No Feedback condition, $t(17) = .62$, $p = .54$, $d = 0.30$, and the Common Event/Feedback condition, $t(16) = 1.63$, $p = .12$, $d = 0.82$, did not differ in their likelihood estimates for themselves and the average person, and participants in the Common Event/No Feedback condition showed a trend toward optimism in their comparative estimates, $t(23) = .1.85$, $p = .08$, $d = 0.90$. In sum, participants were comparatively pessimistic only when expecting feedback about a rare event.

Discussion

In line with previous research, participants in Study 1 predicted a greater likelihood of failing when they expected feedback than when they did not expect feedback. Of greater importance, participants braced more for rare events than for common events. Indeed, when failure was relatively common, participants showed no pessimism whatsoever. Instead, they generally appeared optimistic. Comparisons of participants' self-judgments versus judgments for the average person paint a similar picture. Participants showed comparative pessimism only when failure was rare and they expected feedback.

TABLE 2: Mean Estimates of Own Likelihood and Average Student's Likelihood of Failing (Study 2)

	n	*Own Likelihood* M (SD)	*Average Student's Likelihood* M (SD)	M *Difference* (SD)
Rare event (18% probability)				
Moderately difficult test	30	24.5 (21.6)	25.6 (14.1)	–1.1 (21.2)
Extremely difficult test	36	68.2 (31.8)	48.3 (30.1)	19.9 (28.2)
Common event (82% probability)				
Moderately difficult test	48	58.4 (27.9)	67.1 (20.8)	–8.7 (21.2)
Extremely difficult test	42	83.3 (25.1)	68.0 (24.4)	15.3 (26.8)

NOTE: A positive difference score indicates comparative pessimism; a negative difference score indicates comparative optimism.

STUDY 2

We hypothesized that participants would be more pessimistic relative to the base rate for rare negative events than for common negative events. We also hypothesized that all participants would be somewhat pessimistic when expecting feedback. After all, prior studies typically find pessimism in predictions in anticipation of feedback (Carroll et al., 2006). What we found surprising was that participants anticipating feedback were optimistic for common negative events, underestimating their likelihood relative to the base rate. Why were these participants optimistic?

One factor shown to influence outcome predictions in anticipation of feedback is the ease with which people can imagine an undesirable outcome. The easier it is to imagine an undesirable outcome, the more pessimistic people are in their predictions (Sanna, 1999). Perhaps the optimism for common events in Study 1 was due to these participants being unable to imagine that they may have failed the test. Perhaps the test we used in Study 1, although challenging, was not so difficult that participants in the common outcome condition felt that they had 82% chance of failing. To test this possibility, we used a more difficult test in Study 2. We predicted that participants would again show pessimism for rare events but that the optimism for common events would diminish for an extremely difficult test.

Method

Introductory psychology students ($N = 160$) participating in sessions of 1 to 4 took either the moderately difficult test used in Study 1 or a 5-min test of 35 extremely difficult analytical questions. A pilot test of 16 participants who completed both tests and then rated their difficulty (1 = *not at all difficult*, 9 = *very difficult*) confirmed that the extremely difficult test was perceived as more difficult ($M = 8.31$, $SD = 0.87$) than the moderately difficult test ($M = 3.25$, $SD = 1.61$), $t(15) = 12.26$, $p < .0001$. The rest of the procedure was identical to Study 1, except that all participants were told that they would receive feedback after completing the final questionnaire.

Results

Personal risk judgments. Did likelihood estimates vary as a function of outcome prevalence and test difficulty? To explore this question, we conducted a 2 (Prevalence: rare vs. common) × 2 (Test Difficulty: moderately difficult vs. extremely difficult) ANOVA. Analyses revealed the predicted main effect of Prevalence on participants' estimates, $F(1, 152) = 31.89$, $p < .0001$, $d = 0.91$. Participants judged that they were more likely to fail the test when failure was common ($M = 70.0$, $SD = 29.3$) than when failure was rare ($M = 44.4$, $SD = 34.4$). Analysis also revealed the predicted main effect of Test Difficulty, $F(1, 152) = 62.33$, $p < .0001$, $d = 1.27$. Participants who took the extremely difficult test predicted that they were more likely to fail ($M = 77.0$, $SD = 28.9$) than did participants who took the moderately difficult test ($M = 43.9$, $SD = 30.4$).

The Prevalence × Difficulty interaction also was significant, $F(1, 152) = 4.69$, $p = .03$, $d = 0.35$ (see the first data column in Table 2). Simple-effects tests indicated that participants' estimates for rare and common events were more similar when the test was extremely difficult, $F(1, 152) = 5.60$, $p = .03$, $d = 0.38$, than when the test was moderately difficult, $F(1, 152) = 33.21$, $p < .0001$, $d = 0.93$.

Once again, our primary dependent measure was how estimates compared to the base rate. One-sample *t* tests revealed that when the test was extremely difficult, participants were pessimistic for the rare outcome (compared to the 18% base rate), $t(29) = 8.63$, $p < .0001$, $d = 3.21$, but not for the common outcome (compared to the 82% base rate), $t(41) = .33$, $p = .75$, $d = 0.10$. When the test was moderately difficult, participants displayed a marginally significant trend toward pessimism for the rare outcome, $t(35) = 1.81$, $p = .08$, $d = 0.61$, and displayed significant optimism for the common outcome, $t(47) = –5.86$, $p < .0001$, $d = 1.73$.

Judgments for the average person. As in Study 1, participants rated the likelihood that the typical participant in the study would fail the test. The second column of means in Table 2 presents participants' estimates for the average student. We again operationalized optimism in

terms of participants' own likelihood estimates relative to their likelihood estimates for the average student. The results of the pairwise comparisons presented in Table 2 reveal that participants rated their likelihood of failure as significantly different from that of the average student in three of the four conditions. One-sample *t* tests revealed that participants were comparatively pessimistic for both rare events, $t(35) = 3.86$, $p < .001$, $d = 1.30$, and common events, $t(41) = 3.69$, $p < .001$, $d = 1.15$, when the test was extremely difficult, and they were comparatively optimistic for common events when the test was moderately difficult, $t(47) = 2.83$, $p < .01$, $d = 0.83$. Participants' personal and average estimates did not differ when failure was rare and the test was moderately difficult, $t(35) = 0.31$, $p = .75$, $d = 0.61$.

Discussion

Replicating the results of Study 1, participants were pessimistic when failure was rare but not when failure was common. In addition, as predicted, participants only showed optimism for common events when the test was moderately difficult; when the test was extremely difficult, participants were realistic about their probability of failure. These results suggest that participants in the common-event condition in Studies 1 and 2 may have adjusted their likelihood estimates based on their perception of test difficulty. When the test was moderately difficult, participants adjusted toward optimism because they perceived the test as being easier than the failure rate indicated. When the test was extremely difficult, participants made estimates that indicated their acceptance of the high rate of failure. Finally, comparisons of participants' self-judgments with their judgments for the average person were generally in line with the findings in Study 1. In Study 2, participants showed comparative optimism for common events when failure was difficult to imagine and comparative pessimism for both rare and common events when failure was easy to imagine. This latter finding is consistent with prior research revealing that people show a "worse-than-average" effect for difficult tasks (Kruger, 1999) and suggests that the pessimism may be egocentric in nature.

STUDY 3A

Study 3a sought to replicate the finding that participants brace more for rare events than for common events in a new setting by examining judgments for a financial event. Students who varied in their level of financial need reported their reactions to a billing error that would adversely affect few versus many students. Changing the event from an analytical test to a billing error reduced the possibility that unintended factors such as test difficulty or perceptions of test performance would influence likelihood judgments. It also allowed us to test the generality of our findings to another type of event. We included a measure of financial need in Study 3a because prior research finds that need strongly influences the extent to which people are pessimistic in anticipation of a financial setback (Shepperd et al., 2000). Level of financial need represents an individual difference in the extent to which participants view a financial setback as consequential or serious, and prior research reveals that people display greater pessimism when they view a forthcoming negative event as serious (Shepperd et al., 2000; K. Taylor & Shepperd, 1998). Once again, we provided students with a base rate by telling them the number of affected students (20% in the rare condition, 80% in the common condition).

We predicted that participants would display greater pessimism relative to the base rate when they believed that few students would receive a bill (a rare event) than when they believed many students would receive a bill (a common event). We also predicted that participants would display greater pessimism in their predictions if they were high in financial need than if they were low in financial need. Finally, we explored whether level of financial need might moderate the effects of outcome prevalence on predictions.

Method

Participants. Students ($N = 221$) from three introductory psychology classes participated voluntarily and were assigned randomly to conditions.

Procedure. Participants who varied in financial need received a description of a recently discovered billing error that would affect either 20% (common event) or 80% (rare event) of the student body. Participants in each condition learned that students affected by the error would receive a $178 bill and that the bills would be sent out in 3 to 4 weeks. We assessed financial need using two items that asked participants the extent to which they were on a tight financial budget (1 = *not on a tight budget*, 11 = *extremely tight budget*) and how much difficulty they had making ends meet (1 = *extreme difficulty*, 11 = *no difficulty*). We summed and then averaged the two items, after reverse coding the second item, to represent a single index of need with a potential range of 1 to 11 ($M = 5.38$, $SD = 2.55$, Cronbach's $\alpha = .84$). Second, participants estimated the probability (0%-100%) that they would receive a bill. Third, participants completed three additional items that assessed the extent to which they regarded the outcome (i.e., receiving a bill) as consequential. Participants indicated

TABLE 3: Mean Likelihood Estimates of Receiving a Bill for Self (Study 3a) and Average Student (Study 3b)

	Estimates for Self	*Estimates for the Average Student*
	Study 3a M (SD)	*Study 3b* M (SD)
Rare event (20% probability)		
Low financial need	27.4 (31.2)	18.1 (5.3)
High financial need	40.2 (33.7)	19.2 (6.9)
Common event (80% probability)		
Low financial need	40.8 (36.1)	65.5 (22.5)
High financial need	59.8 (35.0)	67.2 (22.4)

how much the bill would affect their lives (1 = *little impact*, 11 = *great impact*), what effect the bill would have on their finances (1 = *little impact*, 11 = *great impact*), and the extent to which a bill would affect their budget (1 = *not at all*, 11 = *a great deal*). Again, we summed the three items and used the average to represent a single index of importance with a potential range of 1 to 11 ($M = 5.31$, $SD = 2.92$, Cronbach's $\alpha = .94$).

Finally, the questionnaire asked participants who made a personal estimate different from the base rate they received to explain what factors influenced their estimate. Participants could choose from several options (e.g., "I think it's wise to be optimistic and not to imagine the worst") or could write their own explanation if their reason was not included in the list of options we provided. We included this item to probe for suspicion and did not include it in our analyses. After participants completed all measures, they were thoroughly debriefed and made aware that no student would receive a bill. No participants reported adverse reactions to the experimental procedures.

Results

From the initial pool of 221 participants, we omitted from analyses data from 39 participants for one of two reasons. First, we omitted data from 5 participants because they did not believe a billing error had occurred. Second, we omitted from analyses data from 34 participants because they indicated that their likelihood of receiving a bill was 50%. Research finds that people who respond 50% to questions of personal risk often do not mean that their risk is actually 50%. Rather, their response frequently means 50/50—it will either happen or it will not (Bruine de Bruin, Fischhoff, Millstein, & Halpern-Felsher, 2000). It is noteworthy that including these participants did not change the basic findings.

We examined whether our measure of financial need was an accurate assessment of event importance by conducting a regression procedure in which Need (after centering) was entered as a predictor of the three-item measure of event importance. Analyses revealed the expected main effect of Need, $F(1, 179) = 254.92$, $p < .0001$, $d = 2.39$, such that the higher participants' financial need, the more they viewed receiving a bill as consequential or important.

Likelihood estimates. Did likelihood estimates vary as a function of prevalence and financial need? To explore this question, we conducted simultaneous multiple regression procedures in which Need (after centering), Prevalence (rare vs. common), and the Need × Prevalence interaction were entered as predictors. Analyses once again revealed a main effect of Prevalence on participants' estimates, $F(1, 178) = 9.75$, $p = .002$, $d = 0.46$. Participants judged that they were more likely to receive a bill in the common-event condition ($M = 49.3$, $SD = 36.7$) than in the rare-event condition ($M = 35.3$, $SD = 33.2$). Analyses also revealed the predicted main effect of Need, $F(1, 178) = 9.57$, $p = .002$, $d = 0.46$, such that participants high in financial need judged that they were more likely to receive a bill than did participants low in financial need. The Need × Prevalence interaction was not significant, $F(1, 178) = 0.45$, $p = .50$, $d = 0.10$.

As in Studies 1 and 2, our primary dependent measure was how estimates compared to the base rate (see Table 3). When participants estimated their likelihood of receiving the bill, they once again significantly overestimated their risk compared to the base rate when the bill was rare, $t(85) = 4.28$, $p < .0001$, $d = 0.93$, and significantly underestimated their risk compared to the base rate when the bill was common, $t(95) = -8.20$, $p < .0001$, $d = 1.68$.

Regarding the main effect of Need, for illustration purposes, we separated participants into high- and low-need groups using a median split of their responses to the need inventory ($Mdn = 5.0$). Again comparing estimates to the base rate, participants in all but one condition made estimates that differed significantly from the base rate. Specifically, in the rare-event condition, the estimates of financially needy participants were significantly greater than the 20% base rate they received, $t(52) = 4.37$, $p < .0001$, $d = 1.21$, whereas the estimates of non-needy participants were not, $t(32) = 1.37$, $p = .18$, $d = 0.48$. In the common-event condition, both needy and not needy participants estimated that their probability of receiving a bill was less than the 80% base rate, both ts > 3.78, ps < .0005, ds > 1.16. In sum, in the rare-bill condition, needy participants were pessimistic, whereas non-needy participants were not. In the common-bill condition, both needy and non-needy participants were significantly optimistic.

Discussion

Consistent with Studies 1 and 2, participants braced for rare events yet were optimistic for common events. Furthermore, in line with previous research (Shepperd et al., 2000), needy students braced more than did non-needy students. However, bracing only emerged for rare events. Neither needy nor non-needy students braced for common events.

STUDY 3B

We have argued that the pessimistic predictions of participants in the rare-event conditions represent an attempt to brace for possible bad news. It is possible, however, that the high level of pessimism for rare events and the high level of optimism for common events is simply the result of participants in the rare condition having greater room to be pessimistic than optimistic and the participants in the common condition having greater room to be optimistic than pessimistic. For example, in the rare-event condition in Study 3a, participants could be pessimistic by choosing any risk level greater than 20%—a choice of 80 possible values. However, they could be optimistic by choosing any risk level less than 20%—a choice of only 20 possible values. In short, the difference in the extent to which participants in the rare- and common-events conditions displayed optimism and pessimism may be an artifact of how much opportunity they had to display optimism and pessimism. It is noteworthy that this "room-to-estimate" explanation cannot explain why participants in Study 1 supplied more pessimistic estimates when feedback was expected versus not expected, why financially needy students in Study 3a supplied more pessimistic estimates than did non-needy students, and why participants in the common-event condition in Study 2 do not show this effect. Nevertheless, none of these studies directly tested the room-to-estimate explanation.

The room-to-estimate explanation assumes no underlying motivation driving participants' estimates, whereas our position is that the pessimism in the studies conducted thus far reflects an attempt to prepare for possible undesirable news. To test these competing explanations, we had participants in Study 3b supply estimates for an event for which there was no underlying motivation to brace. Specifically, participants again estimated the likelihood of a bill that was either common or rare. However, to completely eliminate any personal motivation to prepare for possible undesirable news, participants learned that the billing error occurred 5 years earlier and estimated the likelihood a student at the university at that time would receive a bill. If the pessimism we found in Studies 1 to 3a reflects participants responding where they have the most room to respond, then participants should continue to show pessimism for the rare negative event, even though they are making estimates on behalf of someone else and for a time prior to their enrollment at the university. However, if the pessimism we found in Studies 1 to 3a reflects bracing, then participants should show no pessimism for this personally irrelevant event. Moreover, the effects of financial need found in Study 3a should disappear.

Participants. Students ($N = 98$) from two introductory psychology classes participated voluntarily and were randomly assigned to either the common condition (80% chance of receiving a bill) or the rare condition (20% chance of receiving a bill).

Procedure. Study 3b was identical to Study 3a except that participants learned that the billing error occurred 5 years earlier and made likelihood estimates for a student who was at the university during that time. We changed these two aspects of the scenario to provide a clear, unambiguous test of whether people are pessimistic for events with no personal consequences.

Results

From the initial pool of 98 participants, we omitted from analyses data from 12 participants for one of two reasons. First, we omitted 4 outlier participants (2 from the rare condition, 2 from the common condition) who provided likelihood estimates that differed from the mean of their risk condition by at least 3 *SD*s. Second, as in Study 3a, we omitted from analyses data from 8 participants who indicated that the likelihood of receiving a bill was 50%.[1]

Likelihood estimates. Did participants' estimates for a former student vary as a function of Prevalence and Financial Need? We again conducted simultaneous multiple regression analyses in which Need (after centering), Prevalence (rare vs. common), and the Need × Prevalence interaction were entered as predictors. Analysis revealed a main effect of Prevalence on participants' estimates, $F(1, 82) = 191.83$, $p < .0001$, $d = 3.07$. Participants judged that a person 5 years ago was more likely to receive a bill when the event was common ($M = 66.4$, $SD = 22.2$) than when the event was rare ($M = 18.6$, $SD = 6.0$). However, there was no effect of Need, $F(1, 82) = 1.20$, $p = .28$, $d = 0.24$. Likewise, the Need × Prevalence interaction also was not significant, $F(1, 82) = 1.45$, $p = .23$, $d = 0.27$.

As in the prior studies, our primary dependent measure was how estimates compared to the base rate. For illustration purposes, we dichotomized level of Need using a

median split ($Mdn = 5.0$). As is evident in Table 3, when the bill was common, both needy and non-needy participants significantly underestimated a former student's likelihood of receiving a bill (compared to the 80% base rate), both ts > 2.61, ps < .02, ds > 1.17. When the bill was rare, however, neither needy nor non-needy participants differed from the 20% base rate in their likelihood estimates, both ts < 1.80, ps > .08, ds < 0.73.

Discussion

As predicted, participants showed no pessimism in predicting the likelihood of a rare event happening to someone else yet were optimistic in predicting the likelihood of a common event happening to someone else. Furthermore, as predicted, the effect of financial need in Study 3a was eliminated when the event was not self-relevant. These results suggest that the pessimism emerging in Studies 1, 2, and 3a was not due to participants making estimates where they had the most room to estimate but rather to people bracing for rare events and not for common events.

GENERAL DISCUSSION

The goal of the present studies was to examine the counterintuitive hypothesis that people brace sensibly when we define sensible bracing as displaying greater pessimism relative to the base rate for rare events than for common events. Consistent with our predictions, participants displayed pessimism relative to the base rate only for rare events. To our surprise, participants were realistic (and more often, optimistic) relative to the base rate in their estimates for common events. However, as expected, participants did not brace for rare or common events when the event happened to someone else (Study 3b).

Comparisons of participants' personal estimates with their estimates for the average student were generally in line with our other findings. Participants showed comparative pessimism for rare events (albeit only when expecting feedback in Study 1 or taking an extremely difficult test in Study 2) and comparative optimism for common events. It is interesting that in their judgments for the average person, participants did not simply report the base rate we provided, which was ostensibly based on the average student's performance. Instead, participants appeared to adjust their estimates for the average person in a way that allowed them to brace sensibly by adopting comparative pessimism for rare events and comparative optimism for common events.

Possible Explanations

Are there alternative explanations for people's tendency to brace only for rare events? One possible explanation lies in the finding that people consistently overestimate their risk of rare events and underestimate their risk of common events (Brandstätter et al., 2002; Fischhoff, 1981; Johnson & Tversky, 1983; Pulford & Colman, 1996; Rothman et al., 1996; Slovic, 1987; Weinstein & Lyon, 1999). This research suggests that when people do not know the base rate for an event, they make predictions based on available knowledge and what seems reasonable. Often, they have a poor understanding of how rare low-prevalence events are and how common high-prevalence events are. As a consequence, they overestimate the likelihood of rare events and underestimate the likelihood of common events.

However, ignorance of the base rate cannot account for our findings. First, the prior studies documenting overestimations of rare events and underestimations of common events typically examine, for example, events with truly low base rates (e.g., events with base rates less than 1%). The rare events we examined had base rates between 18% and 20%. More important, we explicitly provided participants with base rate information. Although participants may have underutilized or misused the base rates we provided, our findings cannot be explained as total ignorance of the base rate. Of course, even when people are aware of the base rate, they may use other information when making probability judgments. Our findings suggest that participants did not ignore the base rates we provided but they adjusted their estimates, depending on the outcome prevalence, toward either optimism or pessimism.

A second possible explanation for the findings is that the estimates were randomly distributed and that the distribution of estimates reflects nothing more than people supplying estimates where they had the most room to estimate. Thus, perhaps participants were pessimistic in the rare-event conditions because they had more room to be pessimistic than optimistic. Conversely, perhaps people were optimistic in the common-event conditions because they had more room to be optimistic. Several of our findings argue against this interpretation. Specifically, this interpretation cannot account for the effect of anticipated feedback in Study 1, the effect of financial need in Study 3a, and the finding that participants in the common-event condition in Study 2 do not show this effect. Finally, Study 3b was designed specifically to test the room-to-estimate explanation and found no support.

Third, one could argue that the greater pessimism for rare negative events than common negative events was not motivated by concerns with disappointment, perceptions of severity, or identity concerns but rather reflects the process of anchoring estimates on the base rate we provided and then adjusting those estimates based on other pertinent information. For example, perhaps participants in the common-event condition in Study 1 adjusted downward from 82% because the test was not so difficult that

they felt they stood an 82% chance of failing. Conversely, perhaps participants in the rare condition adjusted upward from 18% because the test was not so easy that they felt they stood only an 18% chance of failing. Yet, adjusting purely in response to information does not explain why participants displayed greater pessimism when they anticipated feedback than when they did not anticipate feedback. It also requires considerable squinting to explain how adjusting purely in response to information accounts for greater pessimism among financially needy students than non-needy students in Study 3a. This having been said, the judgments of our participants, similar to all judgments, can be explained in terms of anchoring and adjustment if we define anchoring and adjustment more broadly. For example, bracing is a form of anchoring and adjustment in which people adjust their estimates from an initial starting point (or anchor) to prepare themselves for possible bad news.

We proposed at the outset three interrelated reasons why people would display greater pessimism for unlikely negative events than for likely negative events. Unlikely negative events are regarded as more severe (Jemmott et al., 1986), are seen as having greater identity implications (Kelley, 1967), and are capable of evoking greater disappointment (van Dijk & van der Pligt, 1997). Although our studies did not directly test these explanations, none of the other explanations reviewed can account for our findings. An important goal for future research is to test whether the pessimism for unlikely negative events represents a proactive effort to avoid disappointment and whether identity concerns or perceptions of severity contribute to greater pessimism for unlikely negative events.

A second goal of future research is to examine the role of individual differences on bracing for rare and common events. We examined the individual differences of outcome importance (Study 3a) and personal relevance (Study 3b), but other individual differences deserve attention. For example, people who display a general tendency toward pessimism, such as defensive and dispositional pessimists and people with low self-esteem, may be realistic or pessimistic rather than optimistic for common events. On the other hand, people who display a general tendency toward optimism, such as dispositional optimists and people with high self-esteem, may be realistic or optimistic rather than pessimistic for rare events.

Conclusion

The estimates of participants facing the prospect of a relatively rare undesirable outcome are sensible in that rare undesirable events are most likely to be viewed as severe, produce disappointment, and raise identity concerns, should they occur. But how do we account for the estimates of participants facing the prospect of a relatively common undesirable outcome? They never braced in our studies. In fact, in three of four instances, they made optimistic predictions. At first blush, the behavior of participants facing a relatively common undesirable outcome would seem anything but sensible, particularly when they anticipated feedback, when failure was easy to imagine, and when the outcome was important and self-relevant. We suspect, however, that their behavior also is sensible. In fact, it seems reasonable that bracing sensibly means preparing enough for future outcomes. As mentioned at the outset of this article, a pessimistic outlook has benefits and costs. Bracing takes advantage of the benefits of pessimism by prompting action to avoid negative outcomes and reducing negative affect if negative outcomes occur. However, bracing sacrifices the many health, psychological, and social benefits of optimism while also prompting anxiety and negative affect (Shepperd et al., 2006). Bracing enough prompts people to take precautionary action and avoids disappointment while maintaining a measure of optimism.

By way of illustration, consider Americans' responses to the threat of a terrorist attack. Although Americans living in the United States are at extremely low risk of becoming the victim of a terrorist attack, they prepare for the worst by, for example, avoiding air travel. In this case, bracing for the worst serves to remind people that a threat is present, which seems sensible in light of the potential consequences of being unprepared. In contrast, consider residents of areas under frequent threat from hurricanes, such as the coast of Florida, which experienced the brunt of four hurricanes in 2004. These residents face the very real possibility of severe damage to their homes during 5 months of the year, yet few people relocate away from the danger zone. To reduce anxiety and proceed with necessary daily activities during the hurricane season, coastal residents may actually embrace optimism in an otherwise frightening situation. Although the threat of a terrorist attack and the threat of a hurricane differ in multiple ways, they are similar in that Americans' responses to these threats are disproportionate to their risk. Are Americans being realistic about their risk of being a victim of terrorism? No. Is the optimistic coastal resident being realistic? No. However, it seems possible that each form of unreality serves the purpose at hand by balancing the benefits of optimism and pessimism.

NOTE

1. Including participants who made estimates of 50% did not affect our results.

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