

## **Retroactive pessimism: a different kind of hindsight bias**

ORIT E. TYKOCINSKI,\* DANA PICK  
AND DANA KEDMI

*Ben Gurion University, Israel*

### *Abstract*

*In an attempt to regulate disappointments people may sometimes change their perceptions of the events leading to an undesirable outcome so that in retrospect this outcome seems almost inevitable. This retroactive pessimism effect was demonstrated in three studies. In the first, sports fans rated the likelihood of success for their team and its opponent before and after an important soccer match. Evidence for significant pre- and post-game probability shifts was found for the fans of the defeated team but not for the supporters of the winning opponent. In the second and the third experiments participants responded to a scenario depicting a loss of stipend that was either large or small in value. Participants were expected to show more evidence of retroactive pessimism with greater disappointment. Indeed, estimates of the probability of a more favorable counterfactual outcome were sensitive to the magnitude of the loss with lower estimates of the probability that things could have turned out better in the large stipend condition. The effect was attenuated, however, when the loss was not personal but rather that of a friend (Experiment 2), or when the disappointment was mitigated (Experiment 3). Copyright © 2002 John Wiley & Sons, Ltd.*

When confronting disappointing events the realization that things could have easily turned out in our favor will probably make us feel much worse. If we decide, however, that what happened was in a sense inescapable or 'bound to happen' these bitter outcomes may become more palatable. Consistent with this assumption, research on this 'retroactive pessimism' effect indeed demonstrated shifts in the perceived probabilities of relevant events *post-facto*, so that the disappointing reality appears to perceivers to be almost inevitable and the more positive alternatives now seem highly unlikely (Tykocinski, 2001).

A process of retroactive reevaluation of probabilities of events leading to a particular known outcome is well documented in the hindsight bias literature (Christensen-Szalanski & Willham, 1991;

\*Correspondence to: Orit E. Tykocinski, Department of Behavioral Sciences, Ben Gurion University, Beer-Sheva, Israel.  
E-mail: Oritt@bgumail.bgu.ac.il

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Fischhoff, 1975; Hawkins & Hastie, 1990; Wasserman, Lempert, & Hastie, 1991). Once the outcome of an event is known the perception of causes leading to this outcome shifts so that they engulf the representation of the past in a way that makes this outcome appear predetermined. But unlike the hindsight bias that was generally explained in pure cognitive terms, post-disappointment probability shifts seem to be emotion based, motivated by the need to cope with a negative psychological state of disappointment. Consequently, these shifts are sensitive to the magnitude of the experienced disappointment and are larger when the disappointment is more intense.

In Tykocinski's (2001) Experiment 1, for example, participants were asked to imagine themselves in a situation in which they had failed to get to a store on time and as a result missed a special sale price. The attractiveness of the missed bargain was manipulated to vary the magnitude of disappointment. Participants in this experiment who failed to secure an attractive deal later rated the likelihood of a counterfactual alternative (i.e. getting to the store on time) as significantly lower compared to participants who failed to secure a less attractive deal. Similar results were found in a survey of Israeli voters who were asked to evaluate Ehud Barak's chances of winning the Prime Minister race against Benjamin Netanyahu before and after the elections. Whereas all voters showed the hindsight bias by allocating higher chances for Barak after the elections results were known, this tendency was stronger for voters who supported the losing candidate Netanyahu (Tykocinski, 2001, Experiment 2).

According to the counterfactual thinking literature the emotional impact of different events is determined not only by the nature of the event itself but also by the counterfactual alternatives that come to mind (Gleicher et al., 1990; Johnson, 1986; Kahneman & Miller, 1986; Kahneman & Tversky, 1982; Landman, 1987, 1995; Medvec, Madey, & Gilovich, 1995; Miller, Turnbull, & McFarland, 1990). A negative event will be experienced as more tragic if we can easily imagine countless ways in which the unwelcome outcome could have been avoided. Similarly, recent decision-making research demonstrated that the perceived probability of negative outcome affects its emotional impact. Surprising losses produce greater disappointment than expected ones (Mellers, 2000; Mellers, Schwartz, & Ritov, 1999, 1997; Van Dijk & Van der Pligt, 1997).

Counterfactual thoughts affect not only our valuation of an event but also the extent to which it seems predetermined. As Sherman (1991) explained, 'to the extent that counterfactuals are easily and spontaneously generated, the past seems less inevitable: Other outcomes were clearly possible' (p. 182). Post-disappointment reassessment may allow us to discount these alternatives as highly unlikely thus rendering the outcome more predetermined and less distressing. By blocking or discounting alternative counterfactual scenarios we may be able to find comfort in the perception that 'we never had a chance' or that 'it just wasn't meant to be'.

The goal of the current work was first to replicate the retroactive pessimism effect in another natural setting (Experiment 1), and to examine its hypothesized defensive function (Experiments 2 and 3).

## EXPERIMENT 1

### Method

#### *Overview*

In this study supporters of two major Israeli soccer teams ('Hapoel Tel-Aviv' and 'Beitar Jerusalem') were asked to rate each of the team's chances of winning the game before and after a crucial match. The match which was broadcast live on TV was won by Hapoel Tel Aviv by a score of 2 to 1.

### Participants

Using ads posted on bulletin boards around the campus of Ben Gurion University, sports fans who intended to watch the upcoming soccer match on TV were invited to participate in this study. Of the 46 volunteers, 12 identified themselves as supporters of the Hapoel team (H-fans), 31 as supporters of Beitar (B-fans), and 3 had no preference between the two teams and were therefore excluded from the analysis.

### Procedure

A few days before the game participants were asked to fill out the pre-match questionnaire and gave their permission to be called at their homes immediately after the match. Post-game ratings were obtained in a brief phone interview that was conducted shortly after the TV broadcast of the game was finished.

### Pre-match Questionnaire and Follow-up Telephone Interview

The pre-match questionnaire was completed individually in a laboratory session 2 to 3 days before the match. Participants were asked which team they supported and were categorized accordingly as 'H-fans' and 'B-fans'. Then they were asked to rate the chances of winning for each of the teams on two 11-point scales ranging from 0 (*almost zero chance*) to 10 (*very high chance*). In the post-match telephone interview participants were asked if they had watched the game and whether they could indicate the final score.<sup>1</sup> They were then asked 'now that you have seen the game try to think in retrospect what in fact were the chances of Hapoel to win the game'. Participants responded to this question using the 11-point scales as before. They were then asked an identical question concerning the chances of the second team—Beitar. Finally, participants were asked how they felt about the outcome of the match using an 11-point scale ranging from 0 (*very disappointed*) to 10 (*very happy*).

### Results

As one would expect, the supporters of Beitar Jerusalem, the team that had lost the game, were much less pleased with the outcome of the match compared to the supporters of Hapoel Tel Aviv ( $M_s$  2.12 versus 7.80),  $F(1, 41) = 55.18$ ,  $p < 0.001$ . Beitar supporters were also more likely than Hapoel supporters to change their winning assessments. Over 70% (70.9%) of the supporters of this team gave a different evaluation on the phone interview than their pre-game assessments for at least one of the teams, compared to only 38.4% among the supporters of Hapoel ( $p < 0.02$ ).

Participants' assessments of each team's chances of winning before and after the match are shown in Figure 1. These results were analyzed using a general linear model with the participants' team preference as a two-level between variable (H-fans and B-Fans) and two repeated measures: time of assessment ('before the game' and 'after the game') and target of assessment ('Hapoel' and 'Beitar'). This analysis yielded a marginally significant three-way interaction  $F(1, 41) = 3.12$ ,  $p < 0.084$ . As can be seen in Figure 1, B-fans were not too optimistic about their team's chances of success even before the game. Once their team lost, however, its chances were rated even lower. This difference was found significant in a planned comparison ( $M_s$  4.80 versus 4.00),  $F(1, 41) = 7.53$ ,  $p < 0.008$ . The opposite tendency is evident in B-fans ratings of the chances of the opponent team Hapoel. Relative to the

<sup>1</sup>This question was intended to make sure that the participants indeed watched the game and was answered correctly by all.

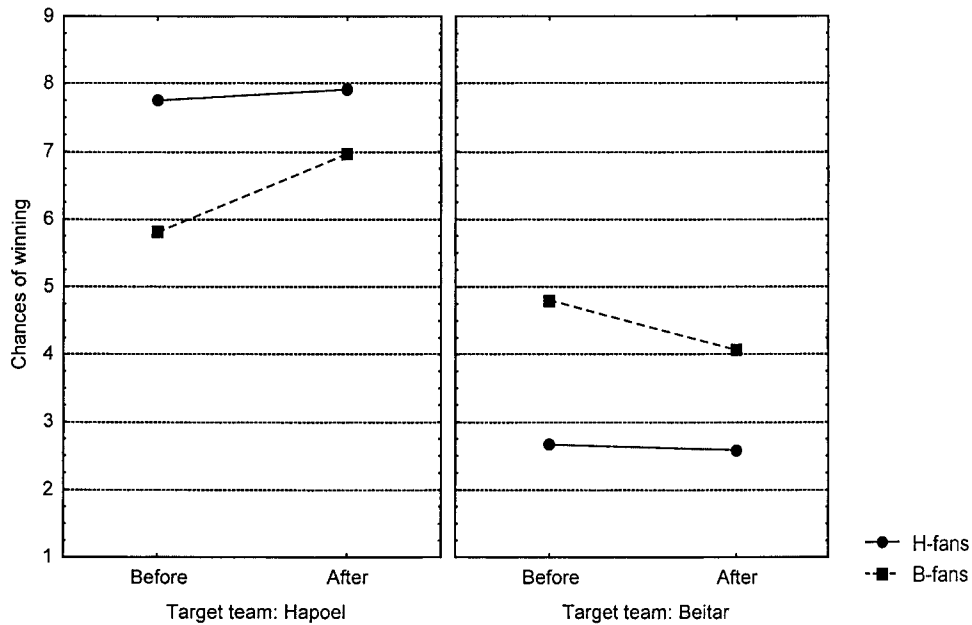


Figure 1. Chances of winning for 'Hapoel' and 'Beitar' as rated by the teams' supporters, before and after the game

judgements made before the match, B-fans rated Hapoel's chances higher after its victory ( $M_s$  5.80 versus 6.96),  $F(1, 41) = 14.5$ ,  $p < 0.0004$ . In contrast, H-fans showed little evidence of hindsight or change as a function of outcome knowledge. Although their evaluations for Hapoel were slightly higher after the victory ( $M_s$  7.75 versus 7.91), this difference was not significant ( $F < 1$ ), and their assessments of the chances of Beitar hardly changed at all ( $M_s$  2.66 versus 2.58),  $F < 1$ .

In addition to the three-way interaction, the analysis yielded a main effect for the target team reflecting the fact that Hapoel was both the favorite and the winning team,  $F(1, 41) = 66.26$ ,  $p < 0.0000$ . A significant two-way interaction between participants' team preferences and the target team being evaluated was also found. This interaction reflects a favorable bias toward one's team,  $F(1, 41) = 13.71$ ,  $p < 0.0006$ . Finally, the analysis revealed a significant two-way interaction between the time of evaluation and the team being evaluated. Consistent with the hindsight bias after the game the chances of the winning team were ranked higher whereas those for the losing team were ranked lower,  $F(1, 41) = 5.28$ ,  $p < 0.02$ . Note however that the simple comparisons reported earlier suggest that these shifts reflect first and foremost the evaluations made by the disappointed B-fans.

Although these results are consistent with the idea of emotion-based shifts rather than simple cold hindsight, there are two alternative explanations that should be addressed. First, it is possible to argue that H-fans did not show much change in their pre- and post-game evaluations because their initial ratings were more extreme to begin with (7.75 for their own team, and 2.66 for Beitar) and therefore the lack of movement could be attributed to a scale end-point effect. Looking at individual H-fans scores, however, suggests that this is not the case. The range of scores used by individuals in this group covers the entire scale (0 to 10). In addition, although H-fans pre-game ratings were indeed more extreme, they still had 20% of the scale open for them to shift up and 25% of the scale to shift down if they so wished.

A second alternative explanation that should be addressed is that the greater tendency to shift found among B-fans represents the fact that their initial estimates were less realistic to begin with and hence more in need to be corrected. In this perspective the difference in the magnitude of the probability

shifts of H-fans and B-fans merely represents the size of the adjustment required in view of outcomes, rather than the result of the emotional impact that these outcomes produced. If indeed this is the case the magnitude of the disappointment among B-fans should not be related to the magnitude of the shifts in their assessments. Thus, to further investigate the relationship between emotional reactions and probability shifts, a correlation between the emotional reaction to the results of the game and the magnitude of the total shifts in pre- and post-match evaluations was calculated. For the supporters of Beitar, a significant negative correlation was found  $r = -0.37$ ,  $p < 0.04$ , reflecting greater shifts associated with greater disappointment.<sup>2</sup> This correlation pattern lends further support to the idea that the observed probability shifts are at least to some extent emotion-based.

## Discussion

The fact that the chances of the winning team were evaluated higher after victory and those of the losing team were rated lower following its defeat could have been interpreted in terms of the hindsight bias. If we consider however that this pattern was only significant for those participants who were disappointed by the outcome, it becomes clear that it does not reflect the classic hindsight as much as it reflects retroactive pessimism. The driving force behind the probability shifts found in the evaluations of disappointed supporters of the defeated team seems to be the need to cope with personal discontentment. This interpretation is consistent with the fact that for this group the extent of the shifts correlated significantly with the extent of disappointment.

One way of examining the role of emotions in judgments is to compare responses to events that vary in their emotional impact. The graver the disappointment, the more we are likely to rely on our defensive repertoire to process it. Thus, the second experiment included a manipulation of the negativity of the outcomes. The participants read a scenario describing a chain of unfortunate events leading to the loss of a stipend that was either small or large in value. If retroactive pessimism is indeed a defensive tactic that may help in regulating disappointment we should expect graver loss to produce greater pessimism. It was therefore hypothesized that the loss of the larger stipend would result in lower estimates of the probability that things could have turned out better. Experiment two also included a manipulation of perspective. The scenario was presented as either happening to the self (the participants were asked to imagine themselves in this situation) or happening to a close other (these events had happened to a friend). Our empathic aptitudes notwithstanding, the function of defense mechanisms is to protect the self. Thus, it was expected that sensitivity to the magnitude of the loss would characterize first and foremost judgements made in the self-relevant disappointment condition. This assumption is consistent with a large body of research on motivated reasoning demonstrating that self-interest can lead to distortions of judgment processes (e.g. Kunda, 1987, 1990; Pyszczynski & Greenberg, 1987).

## EXPERIMENT 2

### Method

#### *Participants*

Ninety-two introductory psychology students at Ben Gurion University participated in this study in exchange for course credit.

<sup>2</sup>In contrast, the relationship between these variables for the supporters of Hapoel was insignificant and in the opposite direction  $r = 0.27$ ,  $p = 0.38$ .

### *Procedure*

The experimental session was held in a large classroom. The students were randomly assigned to one of six cells in  $2 \times 3$  design with two levels of stipend (large versus small), and three levels of perspective (self, other, and control). The resulting number of participants in each cell was 17 in the large stipend, self and other conditions, and 15 in the small stipend, self and other conditions, and 14 in the two control groups.

### *Scenario*

The scenario depicted the attempts of a student to obtain a document from a former employer to support an application for a stipend. The letter from the university stipend office requesting the immediate submission of this additional document was delivered by mistake to the wrong mailbox so that the student only finds out about it the evening before the application deadline. Without this document the application will not be processed and the stipend would be lost. Early the next morning the student heads to Tel-Aviv to the office of his former employer with the intent to obtain the document and return with it to Beer-Sheva before the stipend office closes. Unfortunately, the student is delayed by a severe traffic accident near Kiryat-Gat and the resulting heavy traffic jams up the entrance to Tel-Aviv. Furthermore, finding the employer proves to be difficult. Apparently the company had temporarily moved to a new address due to renovations. Discovering the new whereabouts of the firm and getting there entails further delays, as the temporary location happens to be in an obscure street on the other side of town. It is already 1 p.m. when the student arrives at the employer's office and receives the required document, at which point he heads back to Beer-Sheva by bus. Once arriving in Beer-Sheva he or she rushes to the stipend office but discovers that it has already closed for the day. At this point the student realizes that the stipend is lost.

To manipulate the magnitude of the disappointment, the size of the stipend was specified as either 10% of regular school fees (1000 IS) or 50% of the fees (5000 IS). In the 'self' version of the scenario the students were asked to imagine themselves in the situation described to them. In the 'other' condition, they were asked to imagine that this story was told to them by a friend to whom it had happened.

Immediately after reading the scenario the students responded to the following question (text for the 'small stipend' and for the 'other' condition appears in parentheses):

'That evening at home you think about the 5000 (1000) shekels you (your friend) lost and the events of the day (the events your friend described). You ask yourself in retrospect, given all that had happened—the accident and the employer's change of address, what were your (your friend's) chances of getting to the stipend office and submitting the forms on time. You conclude that these chances were . . .'.<sup>3</sup> Participants indicated their responses on an 11-point scale ranging from 0 (*almost zero*) to 10 (*very high chances*).

Participants in the control groups read the 'self' version of the scenario but were asked to make their probability judgements before the unfortunate outcome was known. The text for the 'control' condition was therefore identical to the text of the 'self' version except that it ended when the student is taking the bus back to Beer-Sheva and has as yet no knowledge about the outcome. The question in this condition read:

'On the bus back to Beer-Sheva you are thinking about the 5000 (1000) shekels you are hoping to receive and the events of the morning. You ask yourself, given all that had happened—the

<sup>3</sup>This is a translation by the first author of the original Hebrew text.

Table 1. Study 2: mean likelihood estimates as a function of stipend size and participants' perspective

	Stipend size	
	Large stipend	Small stipend
Self perspective	2.7	4.73
Other perspective	3.47	3.67
Control	6.28	5.36

Note: Participants indicated the likelihood of arriving on time on an 11-point scale ranging from 0 (almost zero) to 10 (very high chance).

accident and the employer's change of address, what are your chances of getting to the stipend office and submitting the forms on time. You conclude that these chances are ...'.

## Results

Table 1 shows the mean estimates for arriving at the stipend office on time in the six groups. These estimates were analyzed in a two-way ANOVA model which yielded a main effect for perspective  $F(2, 86) = 9.95$ ,  $p < 0.0001$ . Independent of the size of the stipend, the participants in the control condition were significantly more optimistic about their chances of getting to the stipend office on time compared to participants in the self condition ( $M_s$  5.82 versus 3.72),  $F(1, 86) = 9.67$ ,  $p < 0.001$ , and compared to participants in the other condition ( $M_s$  5.82 versus 3.57),  $F(1, 86) = 15.44$ ,  $p < 0.0001$ . Note that the control perspective is unique in that participants are making their probability assessments before they know the outcomes of their efforts. Thus the main effect for perspective could be interpreted in terms of simple hindsight. Simple hindsight could not, however, explain the significant interaction found between perspective and size of stipend,  $F(2, 86) = 3.61$ ,  $p < 0.03$ . As expected, ratings of participants in the self condition were sensitive to the size of the stipend lost. Participants in the large stipend condition rated their chances of getting to the stipend office on time significantly lower than participants in the small stipend condition,  $F(1, 86) = 7.04$ ,  $p < 0.009$ . In contrast, when the unfortunate events happened to someone else, participants' ratings were not significantly influenced by the size of the stipend that the friend lost,  $F < 1$ . Finally, in the control condition in which the likelihood of arrival assessments were obtained before the outcome was known, participants tended to rate their chances higher when the stipend was large rather than small. This difference, however, was not significant  $F(1, 86) = 1.29$ ,  $p < 0.25$ .<sup>4</sup>

## Discussion

The main effect for perspective that was found in the second experiment could be explained in terms of simple hindsight. Probability judgements made before the unfortunate results were known were indeed higher compared to judgements made *post-facto*. Simple hindsight, however, cannot account for the interaction between perspective and magnitude of loss, which was also found. Without allowing for an emotional factor, it is difficult to explain why the size of the lost stipend should affect the probabilities assigned to the counterfactual alternative (i.e. arriving at the stipend office on time), or the attenuation of this effect when the loss happens to someone else. On the other hand, both the main effect and the

<sup>4</sup>Note that although the difference between self and other perspective was larger in the small than in the large stipend condition (1.06 and 0.77, respectively), in a direct comparison test neither was found to be significant.

interaction that were found are consistent with the characterization of retroactive pessimism as an emotionally based defensive mechanism. Such a mechanism will be needed only after the fact, once the disappointment is already experienced, and the graver the disappointment the more we are likely to need the aid of a defensive tactic to regulate it. In addition, empathy to the woes of others notwithstanding, our defensive repertoire is in place first and foremost to help us cope with our own personal misfortunes. An unfortunate event that happens to someone else may arouse sympathy but is less likely to trigger a defensive process and produce probability estimates that are sensitive to the magnitude of the friend's loss.

The effects of the magnitude of disappointment on retroactive probability estimates were again tested in Experiment 3. The same stipend scenario (self version) was used here, but for half of the participants the disappointment was mitigated. In this mitigated version, although the student had failed to arrive at the stipend office on time, the secretary agrees to allow a late submission on the following day. Without mitigation we expected to replicate the findings of Experiment 2 (i.e. lower probability ratings when the lost stipend was large rather small). This pattern, however, was expected to disappear once the disappointment was mitigated.

### EXPERIMENT 3

#### Method

##### *Participants*

Sixty-eight introductory psychology students at Ben Gurion University participated in this study in exchange for course credit.

##### *Procedure*

The experimental session was held in a large classroom. The students were randomly assigned to one of four cells (17 participants in each cell) in  $2 \times 2$  design with two levels of stipend (large versus small), and two levels of mitigation (mitigated, unmitigated).

##### *Scenario*

The scenario in the unmitigated condition, as well as the dependent measure question, were identical to the ones used in the 'self' version of Experiment 2. The mitigated version included an additional sentence which read as follows: 'The next day you decide not to give up and instead try again to submit the documents you obtained from your employer. Luckily when you arrive at the stipend office the administrator in charge is not there and the secretary listens to your request and agrees to take the material.' The dependent measure question was slightly modified for this version and read as follows:

'After submitting the documents to the stipend office you think of the events of the previous day. You ask yourself in retrospect, given all that had happened—the accident and the employer's change of address, what were your chances of getting to the stipend office and submitting the forms yesterday before the office closed. You conclude that these chances were . . . .' Participants indicated their responses on an 11-point scale ranging from 0 (*almost zero*) to 10 (*very high chances*).

Table 2. Study 3: mean likelihood estimates as a function of stipend size and mitigation of disappointment

	Stipend size	
	Large stipend	Small stipend
Unmitigated disappointment	2.65	4.47
Mitigated disappointment	3.76	3.12

*Note:* Participants indicated the likelihood of arriving on time on an 11-point scale ranging from 0 (almost zero) to 10 (very high chance).

## Results

Table 2 shows the mean estimates for arriving at the stipend office on time in the four groups. These estimates were analyzed in a two-way ANOVA model and yielded a significant interaction between size of stipend and mitigation  $F(1, 64) = 6.56, p < 0.01$ . As expected, with no mitigation the results of the 'self' version in Experiment 2 were replicated. Participants in the large stipend condition rated their chances of getting to the stipend office on time lower than participants in the small stipend condition  $F(1, 64) = 7.15, p < 0.009$ . In contrast, when the disappointment was mitigated stipend size had the opposite effect, with lower probability estimates when the stipend was small rather than large. This trend, however, was not significant,  $F < 1$ .

## Discussion

The results of the third experiment for the unmitigated condition directly replicated those for the personal disappointed version of Experiment 2. When the disappointment was not mitigated, participants' responses were sensitive to the magnitude of their loss. With greater loss, participants indicated lower probability for the counterfactual alternative. A different pattern emerged when the disappointment was mitigated. Although the observed trend was not significant, participants in the mitigated condition tended to rate their chances lower when the stipend in question was small rather than large.

It is not entirely clear why in the mitigated condition participants still tended to rank their chances of getting to the stipend office on time rather low compared to the ratings in the unmitigated small stipend group. Perhaps these low ratings indicate that allowing late submission may have mitigated the disappointment over losing the stipend but did not entirely wipe out the negative experience of the previous day. In fact, this experience may seem particularly unfortunate when one realizes that the entire ordeal could have been easily avoided, as late submission was in fact possible. Having secured the stipend, its value may become less relevant.

## GENERAL DISCUSSION

Bell (1985) defined disappointment as the psychological reaction to an outcome that does not match prior expectations. The magnitude of the disappointment depends on the probability of this outcome and the extent of its undesirability. Disappointment is most intense when a negative outcome is least expected. This link between disappointment and unfulfilled expectations is common across different characterizations of this emotion (Frijda, 1986; Ortony, Clore, & Collins, 1988).

Van Dijk and Van der Pligt (1997) empirically tested the hypothesized association between perceived probability and intensity of disappointment. Based on their findings they concluded that unlike elation following success (which is more influenced by the magnitude of the desirable outcomes), disappointment following failure is influenced first and foremost by prior probability estimates. Independent of the subjective or objective nature of these estimates, the higher the perceived probability of success, the more intense was the disappointment following failure.

Because of this strong link between expectations and disappointment, people may sometimes lower their expectations of success before approaching a difficult task as a way of defending themselves *a priori* against future disappointment (Norem & Cantor, 1986; Shepperd, Ouellette, & Fernandez, 1996). Norem and Cantor (1986) used the term 'defensive pessimism' to describe this tactic. Some evidence suggests that people may use this strategy to brace themselves against disappointment even after the task was already performed if the outcomes are forthcoming but not yet known (van Dijk, Zeelenberg, & van der Pligt, 'Blessed are those who expect nothing: Lowering expectations as a way of avoiding disappointment', unpublished manuscript, 1999).

These safeguards notwithstanding, people are not immune to the bitter experience of disappointment. When we encounter disappointing outcomes we may seek comfort in at least two ways. We may focus on the magnitude of the outcomes and decide that 'things are not as bad as they seem' or focus on the likelihood of the outcomes and convince ourselves that 'it was bound to happen'. Because disappointment was found to be influenced more by the probability of the outcomes than by their magnitude (van Dijk & van der Plight, 1997), the latter defensive strategy might be more effective than the former.

The post-outcome probability shifts that were observed in the three reported studies were hypothesized to reflect the workings of a defense mechanism that regulates disappointment. Consistent with this interpretation significant probability shifts were evident in the evaluations of the disappointed fans of a defeated soccer team but not in those of the fans of the victorious opponent. Also consistent with this characterization is the fact that in Experiments 2 and 3 post-disappointment probability estimates were demonstrated to be sensitive to the magnitude of the loss, and hence to the magnitude of disappointment. The primary function of defense mechanisms is to protect the self. Thus it is not surprising that sensitivity to the magnitude of the loss was found only when the loss was ones' own but not when the loss was that of a friend (Experiment 2), and only when the disappointment was not mitigated (Experiment 3).

Probability shifts resulting from retroactive pessimism may sometimes look like simple hindsight bias but in fact these may reflect the result of a process that has a very different function. Whereas hindsight is a predominately cognitive process, the result of the way we select and weigh information about events leading to a certain outcome, retroactive pessimism has a clear motivational function. Like other defense mechanisms, it is a tool designed to help us find comfort in the face of the misfortunes that life lays in our path.

Given the fact that people have a rather rich repertoire of defense mechanisms it is interesting to ask under which conditions will people choose to employ one over the other. When failing to gain admission to a prestigious program one could decide that he or she never had a chance, or, following the classical dissonance reduction technique (Festinger, 1957), decide that the program in question is not that great after all. Specific circumstances of the dilemma may render one tactic easier to employ than the other. It will be rather difficult, for example, to devalue an Ivy League university, whereas the long list of applicants for such institutions will make it relatively easy to decide that the chances of admission were not that good to begin with. Although consolation could probably be obtained either way, it is important to note that the choice of tactic may have implications for future decisions. It seems likely that we might be more inclined to reapply to this program next year if at the time of rejection we had questioned our chances rather than devalued the program.

Finally, one can still wonder about the ultimate effectiveness of different defensive tactics in regulating disappointments. Whereas at this stage we have no direct evidence for the effectiveness of retroactive pessimism in helping people recover from disappointment, the circumstances under which we observe these probability shifts clearly implicate intense personal disappointment in triggering the effect. Further research is needed to shed more light on the immediacy, magnitude, and duration, of the relief that could be obtained through retroactive pessimism, as well as on the costs associated with the use of this defensive tactic. One could argue, for example, that by deciding that we never had a chance to succeed we gain peace of mind at the cost of forfeiting an opportunity to learn from our mistakes.

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### REFERENCES

- Bell, D. E. (1985). Disappointment in decision making under uncertainty. *Operations Research*, *33*, 1–27.
- Christensen-Szalanski, J. J. J., & Willham, C. F. (1991). The hindsight bias: a meta analysis. *Organizational Behavior and Human Decision Process*, *48*, 147–168.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, IL: Row, Peterson.
- Fischhoff, B. (1975). Hindsight  $\neq$  foresight: the effect of outcome knowledge on judgement under uncertainty. *Journal of Experimental Psychology: Human Perception and Performance*, *3*, 349–358.
- Frijda, N. H. (1986). *The emotions*. Cambridge: Cambridge University Press.
- Gleicher, F., Kost, K. A., Baker, S. M., Strathman, A. J., Richman, S. A., & Sherman, S. J. (1990). The role of counterfactual thinking in judgements of affect. *Personality and Social Psychology Bulletin*, *16*, 284–295.
- Hawkins, S. E., & Hastie, R. (1990). Hindsight: biased judgment of past events after the outcomes are known. *Psychological Bulletin*, *107*, 311–327.
- Johnson, J. T. (1986). The knowledge of what might have been: affective and attributional consequences of near outcomes. *Personality and Social Psychology Bulletin*, *12*, 51–62.
- Kahneman, D., & Miller, D. T. (1986). Norm theory: comparing reality to its alternatives. *Psychological Review*, *93*, 136–153.
- Kahneman, D., & Tversky, A. (1982). The simulation heuristic. In D. Kahneman, P. Slovic, & A. Tversky (Eds.), *Judgment under uncertainty: Heuristic and biases* (pp. 201–208). New York: Cambridge University Press.
- Kunda, Z. (1987). Motivation and inference: self-serving generation and evaluation of evidence. *Journal of Personality and Social Psychology*, *53*, 636–647.
- Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, *108*, 480–498.
- Landman, J. (1987). Regret and elation following action and inaction: affective responses to positive versus negative outcomes. *Personality and Social Psychology Bulletin*, *13*, 524–536.
- Landman, J. (1995). Through a glass darkly: worldviews, counterfactual thought, and emotion. In N. J. Roese, & J. M. Olson (Eds.), *What might have been: The social psychology of counterfactual thinking* (pp. 233–258). Mahwah, NJ: Erlbaum.
- Medvec, V. H., Madey, S. F., & Gilovich, T. (1995). When less is more: counterfactual thinking and satisfaction among Olympic athletes. *Journal of Personality and Social Psychology*, *69*, 603–610.
- Mellers, B. A. (2000). Choice and the relative pleasure of consequences. *Psychological Bulletin*, *126*, 910–924.
- Mellers, B. A., Schwartz, A., Ho, K., & Ritov, I. (1997). Decision affect theory: emotional reactions to the outcomes of risky decisions. *Psychological Science*, *8*, 423–429.
- Mellers, B. A., Schwartz, A., & Ritov, I. (1999). Emotion-based choice. *Journal of Experimental Psychology: General*, *128*, 332–345.

- Miller, D. T., Turnbull, W., & McFarland, C. (1990). Counterfactual thinking and social perception: thinking about what might have been. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 305–331). New York: Academic Press.
- Norem, J. K., & Cantor, N. (1986). Defensive pessimism: harnessing anxiety as motivation. *Journal of Personality and Social Psychology*, *51*, 175–182.
- Ortony, A., Clore, G. L., & Collins, A. (1988). *The cognitive structure of emotions*. New York: Cambridge University Press.
- Pyszczynski, T., & Greenberg, J. (1987). Toward an integration of cognitive and motivational perspectives on social influence: a biased hypothesis testing model. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 20, pp. 297–340). San Diego, CA: Academic Press.
- Sherman, S. J. (1991). Thought systems for the past as well as for the future. In R. S. Wyer, Jr., & T. K. Srull (Eds.), *Advances in social cognition* (Vol. 4, pp. 173–195). Hillsdale, NJ: Lawrence Erlbaum.
- Shepperd, J. A., Ouellette, J. A., & Fernandez, J. K. (1996). Abandoning unrealistic optimism: performance estimates and the temporal proximity of self-relevant feedback. *Journal of Personality and Social Psychology*, *70*, 844–855.
- Tykocinski, O. E. (2001). I never had a chance: using hindsight tactics to mitigate disappointments. *Personality and Social Psychology Bulletin*, *27*, 376–382.
- Van Dijk, W. W., & Van der Pligt, J. (1997). The impact of probability of outcome on disappointment and elation. *Organizational Behavior and Human Decision Processes*, *69*, 227–284.
- Wasserman, D., Lempert, R. O., & Hastie, R. (1991). Hindsight and causality. *Personality and Social Psychology Bulletin*, *17*, 30–35.