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Unexpected and Just Missed: The Separate Influence of the Appraisals of Expectancy and Proximity on Negative Emotions

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Previous research has suggested that a goal-incongruent outcome leads to more intense negative emotions when it is unexpected and close to a goal-congruent outcome. Until now, however, no studies have disentangled the influence of the appraisals of expectancy and proximity on emotions. We experimentally manipulated each of these variables in 3 slot machine experiments and measured emotions via differences in motivation (i.e., the tendency to repair the goal incongruence) and feelings (i.e., disappointment, frustration, and anger). The experiments consisted of a series of trials that each started with the sequential presentation of 3 symbols. In case of a win trial, all symbols were equal (e.g., AAA) and the participant gained 10 cents; in case of a loss trial, one or more of the symbols differed and the participant gained 0 cents. Three different loss trials were compared: unexpected proximal ones (e.g., AAB), expected proximal ones (e.g., ABA), and expected distal ones (e.g., ABC). The tendency to repair was measured online via behavior as well as retrospectively via self-reports; feelings were measured retrospectively (Experiments 1 and 2) or online (Experiment 3). Unexpected losses seemed to increase the tendency to repair as well as feelings of disappointment (in all experiments) and feelings of frustration and anger (in Experiments 1 and 3). Proximal losses increased only the tendency to repair (in all experiments). This suggests that the appraisals of expectancy and proximity have a distinct influence on emotions.

Keywords: motivation, expectancy, disappointment, frustration, repair

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Life is filled with opportunities, maybes, and pities: the political candidate that was ahead in the exit polls but eventually loses the elections by a couple of votes; the tennis champion who plays the final of her favorite tournament but loses the last set in a tie break; the audience of Romeo and Juliet that anticipates a happy ending, but ends up watching Romeo commit suicide a few seconds before Juliet wakes up from an induced coma. Negative outcomes seem to induce much more intense and long-lasting emotions when a positive outcome was highly anticipated and just missed than when a positive outcome was never anticipated and missed by far. To date, it remains unclear whether the expectation of a positive outcome and the perception that it was just missed (i.e., proximity) both influence emotions or whether one of the two dictates the emotion. We present two studies in which we experimentally teased apart expectancy and proximity to investigate their influence on negative emotions.

As in most contemporary emotion research, we adopted a componential view of emotions. This view states that emotions have various components: (a) a cognitive component consisting of an appraisal of the situation, (b) a motivational component consisting of changes in action readiness and specific action tendencies, (c) a somatic component consisting of (neuro)physiological changes, (d) a motor component consisting of expressive and gross behavior, and (e) a feeling or experience component (Moors, 2009; Scherer, 2005). In addition, we adopted the assumption of appraisal theories that the appraisal of the stimulus, not the stimulus itself, determines the content of the (other) componential changes (Arnold, 1960; Frijda, 1986). Appraisal is a process that evaluates the significance of a stimulus for well-being (Frijda, 1986; Scherer, 2001; Smith & Lazarus, 1990). Appraisal theories propose that stimuli are appraised on a number of variables, such as goal relevance, goal congruence, coping potential, agency, and expectancy (Frijda, 1986; Lazarus, 1991; Roseman, Antoniou, & Jose, 1996; Scherer, 1988). *Goal relevance* refers to the extent to which a stimulus touches on the person's goals or concerns. *Goal congruence* refers to the degree to which a stimulus matches with these goals (values: goal incongruent vs. goal congruent). *Coping potential* refers to the potential that a person has to turn a goal-incongruent stimulus into a goal-congruent one (low vs. high coping potential). *Agency* refers to the cause of the stimulus (values: self, other, circumstances). *Expectancy* refers to the degree to which a stimulus matches with the person's expectations (values: expected vs. unexpected). *Proximity* is not mentioned in existing appraisal theories, yet the idea that it plays a role in emotion elicitation and/or differentiation is compatible with an appraisal view and could be incorporated in these theories. Proximity is shorthand for causal proximity (Kahneman & Varey, 1990), and is used to describe the number of elements of the causal sequence of the current stimulus that are shared with the causal

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sequence of an alternative (here, goal-congruent) stimulus. In case many elements are shared (proximal outcome), one can say that the alternative almost happened; in case few elements are shared (distal outcome), one can say that the alternative was far from happening.

Appraisal theorists further propose that the output of the appraisal process directly drives the action tendencies that prepare the organism to respond to its environment (Frijda, Kuipers, & ter Schure, 1989; Scherer, 1994). This preparation process has (neuro)physiological correlates, such as an increase in heart rate and activity in motor cortices, and can elicit actual behavioral changes (Frijda et al., 1989; Scherer, 1994). A feeling or emotional experience arises when the appraisal, action tendencies, physiology, and behavior are reflected in consciousness (Grandjean, Sander, & Scherer, 2008).

We investigated the influence of the appraisals of expectancy and proximity on the motivational and the feeling components. Several emotion researchers have suggested that the appraisal of expectancy has an influence on emotions (e.g., Fraisse, 1964; Reisenzein, 2009; Roseman, 2011). In the counterfactual thinking literature (Kahneman & Miller, 1986; Kahneman & Tversky, 1982; Medvec & Savitsky, 1997), however, the idea is prevalent that proximity influences emotions. Our first aim was to examine whether a stimulus appraised as goal incongruent elicits different motivations and feelings when it is also appraised as expected versus unexpected, while controlling for the appraisal of proximity. Our second aim was to investigate whether a stimulus appraised as goal incongruent elicits different motivations and feelings when it is also appraised as proximal versus distal to a goal-congruent stimulus, while controlling for the appraisal of expectancy. Our third aim was to directly compare the influence of the appraisals of expectancy and proximity. On the basis of construal level theory, one could predict that both expectancy and proximity influence emotional responding. Construal level theory builds on the counterfactual thinking literature and suggests that emotions depend not only on the immediate situation, but also on mental construals of alternative situations (Trope & Liberman, 2010). Moreover, this theory proposes that the intensity of the emotional response depends on the psychological distance between the current situation and its construed alternative. Among other things, the psychological distance depends on the probability of an alternative (Trope & Liberman, 2010). Expectancy and proximity both relate to the probability of an alternative: If an obtained outcome (e.g., a loss) is appraised as unexpected, this implies that *at an earlier point in time* the probability of an alternative (e.g., a win) was estimated as high; if an obtained outcome is appraised as proximal to an alternative, it implies that *after obtaining the outcome*, one retrospectively estimates that the probability of obtaining the alternative was high. Thus, both appraisals of expectancy and proximity relate to the psychological distance to the goal-congruent outcome and each may influence the emotional response.

A multiplicity of studies have investigated the influence of the appraisals of either expectancy or proximity on motivations and/or feelings but most of them fail to control (experimentally or statistically) for the other variable. Moreover, there is virtually no research that compares the influence of both variables. In the next sections we describe a handful of these studies. We distinguish between studies that examined the motivational component of the emotion and studies that examined the feeling component.

The Motivational Component

Previous research has suggested that a goal-incongruent stimulus that is appraised as unexpected and proximal to a goal-congruent stimulus elicits more active behavior, more problem-solving behavior, and more risk-taking behavior. Most existing studies, however, do not allow isolating the effects of expectancy and/or proximity nor comparing the effects of expectancy and proximity. For instance, a number of studies with animals and children (Amsel, 1958; Ryan & Watson, 1968) have shown that a violation of expectations in the form of a nonreward (i.e., the withholding of a reward) leads to an increase in vigor of the subsequent behavior. This line of research fails to provide clear support for an effect of expectancy on emotions for two reasons. First, many of these studies confound expectancy with goal congruence because they contrast nonreward with reward (Amsel, 1958; Ryan & Watson, 1968). Second, expectancy is often confounded with proximity. For instance, Haner and Brown (1955) instructed children to fill a marble board in order to win a prize. At varying distances from the goal, the experimenter pushed a handle to release all marbles. The closer participants were to the goal, the more force they used to push a plunger that stopped a noise that was initiated when the marbles were released (see also, Endsley, 1966; Pederson & McEwan, 1970, for one replication and one failed replication). In this study, participants' expectation to reach the goal was manipulated by their proximity to the goal.

Studies with adult participants can be found in the gambling literature on the near-miss effect. Just missing a win when gambling seems to increase the motivation to continue gambling, both in laboratory studies (Clark, Crooks, Clarke, Aitken, & Dunn, 2012; Côté, Caron, Aubert, Desrochers, & Ladouceur, 2003; Qi, Ding, Song, & Yang, 2011) and in real life (Ariyabuddhiphongs & Phengphol, 2008). Again, most operationalizations of near-misses confounded the appraisals of expectancy and proximity. For instance, in a slot machine game by Clark et al. (2012), near-misses were trials during which the winning symbol stopped at one position from the payline (high expectation to win, high proximity) and full-misses were trials during which the winning symbol stopped at a position farther from the payline (low expectation to win, low proximity). Some studies succeeded at manipulating expectancy unconfounded with proximity. Strickland and Grote (1967) manipulated the proportion of unexpected goal-incongruent trials in a slot machine game in which three winning symbols led to a monetary gain. One group of participants was exposed to many unexpected goal-incongruent trials: Winning symbols appeared frequently in the first slot, but infrequently in the last slot. Another group of participants was exposed to many expected goal-incongruent trials: Winning symbols appeared frequently in the last slot, but infrequently in the first slot. They found that participants in the first group had a stronger tendency to continue gambling than participants in the second group (but see Reid, 1986, for a failed replication).

To summarize, existing research has suggested that unexpected (high prior expectations of reaching the goal) and proximal (almost reaching the goal) goal-incongruent outcomes are associated with an increased readiness to act compared with expected and distal

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goal-incongruent outcomes. To date, it remains unclear whether the appraisals of expectancy and proximity both contribute to this effect or whether it is driven primarily by one of the two variables. In addition, it remains unclear whether these appraisals result in a general increase of motivation or whether they activate specific action tendencies.

The Feeling Component

The unexpectedness of an event often is considered a general amplifier of positive and negative feelings. For instance, Kahneman and Miller (1986) proposed that abnormal events (e.g., events that violate expectations) produce more intense feelings. This idea was supported in studies in which expectations were measured (McGraw, Mellers, & Ritov, 2004; Siemer, Mauss, & Gross, 2007) or experimentally manipulated (Mellers, Schwartz, Ho, & Ritov, 1997; Shepperd & McNulty, 2002; van Dijk & van der Pligt, 1997). These studies suggest that it is always better to expect the worse: Expecting the occurrence of a goal-incongruent event (a) attenuates negative feelings when the goal-incongruent event (expectedly) does occur and (b) increases positive feelings when a goal-congruent event (unexpectedly) occurs. On the other hand, expecting the occurrence of a goal-congruent event (a) attenuates positive feelings when the goal-congruent event (expectedly) does occur and (b) increases negative feelings when a goal-incongruent event (unexpectedly) occurs (McGraw, Mellers, & Tetlock, 2005). In several of these studies, however, the effects can also be explained by differences in proximity (e.g., McGraw et al., 2004; Mellers et al., 1997; Siemer et al., 2007). Moreover, a number of other studies have failed to show that prior expectations influence the intensity of positive and negative feelings (Feather & Simon, 1971; Golub, Gilbert, & Wilson, 2009; Marshall & Brown, 2006; but see Sweeny & Shepperd, 2010, for a reply).

In a variety of contexts such as sports (Markman, McMullen, & Elizaga, 2008), gambling (Clark et al., 2012; Clark, Lawrence, Astley-Jones, & Gray, 2009; Qi et al., 2011), and study grades (Medvec & Savitsky, 1997), negative feelings in face of goal-incongruent outcomes seem to be more intense when a goal-congruent outcome is proximal. On the other hand, there are reasons to believe that being close to a goal-congruent outcome partly releases the positive valence tied to the goal-congruent outcome, even when the outcome is missed (Dixon & Schreiber, 2004; Reid, 1986; Skinner, 1953). Near-misses in gambling seem to activate the same brain areas as wins (Clark et al., 2009), and are associated with a reduced feedback-related negativity in event-related potentials compared with full-misses (Luo, Wang, & Qu, 2011). Again, few studies clearly separated the influence of expectancy and proximity (but see Medvec & Savitsky, 1997).

To summarize, previous research has not produced a clear pattern of results with respect to the influence of expectancy and proximity on the intensity of negative feelings. The disparity in the literature may be partly due to the fact that few studies clearly separated the two variables.

The Present Research

We set up three experiments in which we examined the separate influence of expectancy and proximity on emotions. The experiments were designed as slot machine games that participants played for actual money. Each experiment consisted of a series of trials, and each trial started with the sequential presentation of three pieces of fruit, in one of four combinations: (a) a win trial (AAA: three times the same fruit), (b) an unexpected proximal loss trial (AAB: two times the same fruit followed by a different fruit), (c) an expected proximal loss trial (ABA/ABB: two times the same fruit in Slots 1 and 3 or in Slots 2 and 3), and (d) an expected distal loss trial (ABC: three times a different fruit). Emotions were measured via the motivational component and the feeling component. For the motivational component, we measured the tendency to repair a loss or goal-incongruent outcome. Repairing can be regarded as a problem-solving behavior that is usually not harmful (unlike risk taking or gambling). The tendency to repair was measured trial by trial, by registering the extent to which participants took the opportunity to play a repair game on the loss trials. Participants also self-reported on the tendency to repair on the different trial types at the end of the experiment. For the feeling component, participants reported on their feelings of disappointment, frustration, and anger at the end of the experiment (Experiments 1 and 2) or trial by trial (Experiment 3). In Experiments 1 and 2, the feeling component was measured retrospectively to avoid (a) interference with the trial-by-trial assessment of the motivational component and (b) demand effects when participants would become aware that we measured their emotions. In Experiment 3, the feeling component was measured trial by trial because retrospective measures have been shown to suffer from a number of biases (Barrett, 1997; Robinson & Clore, 2002).

Although feelings and action tendencies were only measured in response to the displays with three fruit symbols, we considered it likely that participants updated their appraisals along with the presentation of each new symbol. More specifically, it can be assumed that all fruit symbols appearing in the first position would be appraised similarly, given that they all yielded an equal chance at winning and appeared equally frequently in the first position. The second symbol introduced novel information and may have caused expectations (AA trials vs. AB trials may have caused the expectation of a win vs. a loss) and appraisals of goal congruence (AA trials vs. AB trials as goal congruent vs. goal incongruent). The third symbol, together with the information that the trial was a loss versus a win trial, may have caused (changes in) the appraisals of goal congruence (goal congruent vs. goal incongruent), expectancy (unexpected vs. expected), and proximity (proximal vs. distal). With regard to the third symbol, we assumed that even if participants saw combination AB and thus knew that the trial was a loss trial, they would still update their appraisals according to the last symbol (A/B vs. C) and thus would appraise the proximity of the current outcome to a goal-congruent outcome. This assumption was based on the famous missed flight example of Kahneman and Tversky (1982). In the example, two men arrive at the airport 30 min after the scheduled departure time of their respective flights. One person is told that his flight left on time and the other person is told that, because of a delay, his flight left only five min ago. The researchers predicted that, although both missed their flight, the latter person would feel more upset. This can only be the case if the appraisal process continues after the goal-incongruent outcome is definitive. To check whether participants indeed updated their appraisals along with the presentation of the second and third symbols, we asked them to rate the goal congruence of the two-fruit displays and of the three-fruit displays.

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Feelings and action tendencies were measured in response to the three-fruit displays, because only when all three symbols were presented, did it became clear whether the trial was a win trial versus an unexpected proximal loss trial, or an expected proximal loss trial versus an expected distal loss trial. In other words, only the emotional response locked on the third symbol could be used to calculate the effects of interest.

Experiments 1 and 2 had a similar procedure, but with small variations in trial distribution. In Experiment 1, participants received an equal number of AAB trials, ABA/ABB trials, and ABC trials (see Table 1). This way of counterbalancing has the (statistical) advantage that each cell of the design contains an equal number of trials and that the effects of trial type as well as the specific effects of expectancy and proximity can be calculated on an equal number of trials. A potential drawback of this design, however, is that the total number of unexpected loss trials (AAB) is lower than the total number of expected loss trials (ABA/ABB plus ABC) and that the total number of proximal loss trials (AAB plus ABA/ABB) is higher than the total number of distal loss trials (ABC). To warrant an interpretation of our effects in terms of expectancy and proximity rather than in terms of differences in trial frequency, a different counterbalancing procedure was employed in Experiment 2. In this experiment, half of the participants received an equal number of unexpected and expected loss trials (i.e., the number of AAB trials was equal to the sum of ABA/ABB and ABC trials) whereas the other half received an equal number of distal and proximal loss trials (i.e., the number of ABC trials was equal to the sum of ABA/ABB and AAB trials). In Experiment 3, we employed the same counterbalancing procedure used in Experiment 1, but measured feelings online rather than retrospectively.

Experiment 1

Method

Participants. Thirty-seven students at Ghent University (M_{age} = 22 years, 4 men) participated in the experiment in return for payment (€8, augmented with the amount they won in the game). The students in this sample had a moderate to high experience with gambling in general (M = 4.92, SD = 1.93) but a low experience with slot machines (M = 2.00, SD = 1.27), as was evident from their ratings on scales ranging from 1 (*completely not experienced*) to 7 (*very experienced*).

Materials. The experiment was programmed and run in Affect, Version 4.0 (Spruyt, Clarysse, Vansteenwegen, Baeyens, & Hermans, 2010). It was administered on a computer connected to a keyboard, a 19-in. CRT screen, two speakers, and a mouse-shaped response box (Voss, Leonhart, & Stahl, 2007). Other materials in the room were a transparent money bank and a bag filled with 10-cent coins.

The slot machine presented on the computer screen had three parts (see Figure 1). The upper part contained the slots in which the fruits appeared. The middle part contained three information boxes, from left to right labeled as "credits" (with the number of available credits), "bet" (with the number of credits bet on a particular trial), and "winning bet" (the number of credits needed to repair a goal-incongruent outcome; this information appeared only after a successful bet in the repair game). The lower part contained three spin buttons (in the first phase of each trial) or a feedback message (in the second phase of each trial).

Design. The experiment consisted of nine win trials (AAA), 48 unexpected proximal loss trials (AAB), 48 expected proximal loss trials (24 ABA, 24 ABB), and 48 expected distal loss trials (ABC; see Table 1).

Procedure. All participants were tested individually in a session of 45 min. Each participant was seated at a table facing the CRT screen, holding the left hand on the numerical part of the keyboard and the right hand (index and middle finger) on the response box. The experimenter was seated at a table situated orthogonally to the participants' table, and was unable to see the computer screen. The money bank was positioned between the participant and the experimenter, and was visible to both. At the start of the experiment, participants had no money, but received 1,200 credits to bet throughout the experiment.

Table 1
Overview of the Trial Types, Associated Appraisal Values, Game Outcomes, and Distributions in Experiments 1 and 2

Trial type	Example	Appraisal		Outcome	Exp 1	Exp 2	
		Expectancy	Proximity			36-ABC/72-AAB	72-ABC/36-AAB
ABC		Low	Low	0 cent	48	36	72
ABA		Low	High	0 cent	24	18	18
ABB		Low	High	0 cent	24	18	18
AAB		High	High	0 cent	48	72	36
AAA		High	—	10 cent	9	9	9

Note. Exp = experiment.

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Figure 1. The slot machine with the three slots (upper part), the three information boxes (middle part), and the three spin buttons (lower part).

The experiment consisted of 153 trials presented in a random order in three blocks of 51 trials. At trial start, the slot machine had three empty slots. Under each slot, there was a button with the word "spin." When the participant pressed number key "1," the spin button under the first slot was activated (indicated by a yellow border that appeared around the button), and the slot machine spun the wheel of the first slot for a time interval between 500 and 1,500 ms (together with the sound of a spinning wheel) until a piece of fruit appeared (together with a clicking sound). After the first fruit appeared, the participant could press number key "2" to activate the spin button under the second slot. After the second fruit appeared, the participant could press number key "3" to activate the spin button under the third slot. The pictures of pieces of fruit that could appear in the slots were a lemon (L), a prune (P), and a melon (M). They could appear in one of the following five combinations: AAA, AAB, ABA, ABB, or ABC. For each trial, the three pictures were assigned randomly to the function of A, B, and C. The three pieces of fruit remained on screen together for 1,000 ms before a win feedback message ("10 cent," printed in green) or a loss feedback message ("0 cents," printed in red) appeared in the bottom part of the slot machine, replacing the spin buttons. The win feedback was accompanied by a positive sound and a deposit of 10 cents by the experimenter into the money bank. The loss feedback was accompanied by pictures of two red buttons that appeared simultaneously on the screen and that were tagged "second chance" (left button) and "pass" (right button). Participants could choose a second chance or could pass by clicking the corresponding left or right button of the response box. When participants chose to pass, the next trial started 1,000 ms later and a negative sound was played. When participants chose for a second chance, they could bet a number of credits to repair the goal-incongruent outcome. The start bet was 10 credits. Participants could choose to bet 10 or more credits. When the second chance button was clicked for the first time, the start bet was made and the pass button turned into a stop button (i.e., the word "pass" was replaced by the word "stop"). Each additional click on the second chance button increased the bet by one credit and decreased the available credits by one. When participants pressed the stop button, the two buttons disappeared and the computer compared the number of credits bet with a random number between 0 and 50. If the bet was equal to or exceeded the random number, the win feedback message and the random number were displayed, a positive sound was played, and the experimenter made a deposit of 10 cents. If the bet was lower than the random number, the loss feedback message remained on screen and a negative sound was played (the random number was not shown). The feedback remained on screen for 3,000 ms before a new trial started.

Prior to the experiment, participants received written and oral instructions, a demonstration trial, and a practice trial (both ABC trials). During the demonstration trial, the experimenter showed participants how to repair the negative outcome and explained that higher bets yielded a higher chance at winning (a bet of 10 credits was said to correspond to a low chance at winning, 15 credits to a slightly higher chance, 25 credits to a chance of 50%, 35 credits to substantially more than 50% chance, and 50 credits to a 100% chance). The practice trial was identical to the experimental trials, except that participants could not win money or lose credits (the number of available credits was reset to 1,200 after the practice trial). Before the actual experiment, each participant was instructed to use the 1,200 credits sparingly, more specifically, to spend them equally across the three blocks of the experiment (i.e., $\pm$ 400 credits per block). After each block, the game paused and the number of available credits was displayed. The experimenter then evaluated whether the participant had followed the instructions and, if not, repeated them.

After the experiment, participants completed a questionnaire in which they were asked to rate the different game events on scales ranging from 1 (*not at all*) to 7 (*yes completely*). The questionnaire displayed the different trial types in a sequential manner: the two-fruit display LL was followed by the three-fruit displays LLL and LLM; the two-fruit display LM was followed by the three-fruit displays LML and LMP. The two-fruit displays were added as a manipulation check. They allowed us to test (a) whether the expectation of winning was higher for LL displays than for LM displays, and (b) whether participants updated their appraisals (more specifically, the appraisal of goal congruence) from the second to the third symbol or whether on some trials (e.g., LM trials) the third symbol was ignored. For the two-fruit displays LL and LM, participants rated their expectation of winning 10 cents ("To what extent do you expect to win 10 cents?") and their appraisal of goal congruence ("To what extent do you think the situation is positive?"). For all loss displays (i.e., LLM, LML, and LMP), participants rated the appraisal of goal congruence, negative feelings (i.e., anger, disappointment, and frustration), the tendency to pass, the tendency to choose a second chance, the number of credits they wanted to bet in the repair game, and the appraisal of coping potential ("When you bet 25 credits in the repair game, to what extent do you expect to win back the 10 cents in the repair game?"). The latter appraisal was included to examine whether any effects of expectancy or proximity were moderated or mediated by coping potential. If participants appraised their coping

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potential as higher on unexpected proximal losses than on expected distal losses, this could explain a higher tendency to repair on the former than on the latter trials. The questionnaire was administered in three versions to counterbalance the order of appearance of the different trial types. In the first version, the order was LL(M), LL(L), LM(L), and LM(P); in the second version, it was LM(L), LM(P), LL(M), and LL(L); and in the third version, it was LM(P), LM(L), LL(M), and LL(L). After completion of the questionnaire, participants were thanked and debriefed, and the money in the money bank was exchanged for bigger coins.

Results

Analyses. For each dependent variable, we first conducted a repeated-measures multivariate analysis of variance (MANOVA) with the within-subjects variable trial type (unexpected proximal or AAB, expected proximal or ABA/ABB, and expected distal or ABC). Second, to investigate the unique effect of expectancy, we used planned comparisons to contrast unexpected proximal trials (AAB) with expected proximal trials (ABA/ABB). Third, to investigate the unique effect of proximity, we used planned comparisons to contrast expected proximal trials (ABA/ABB) with expected distal trials (ABC). Fourth, to examine whether the effect of expectancy differed significantly from the effect of proximity, we used polynomial contrasts to test for a quadratic trend in the relation between AAB, ABA/ABB, and ABC trials. Table 2 provides the means and standard deviations for these analyses. Fifth, we inspected the correlations between the effects of expectancy on the different dependent variables and similarly for the effects of proximity (see Table 3). More specifically, we correlated the difference scores representing the effects of expectancy on the various dependent variables with each other; for example, the effect of expectancy on the percentage of choosing a second chance (i.e., the difference between the percentage of choosing a second chance on AAB minus ABA/ABB trials) with the effect of expectancy on ratings of disappointment (i.e., the difference between feelings of disappointment on AAB minus ABA/ABB trials). Similarly, we correlated the effects of proximity on the various dependent variables with each other. Finally, we investigated whether differences in coping potential could explain the effects of expectancy and proximity. It should be noted that we did not examine the interaction between expectancy and proximity, because our design did not contain unexpected distal trials. Before turning to the results of these analyses, we report the results of a manipulation check.

Manipulation check. A repeated-measures analysis of variance (ANOVA) revealed that participants' expectation of winning 10 cents was significantly higher on LL trials ($M = 4.41$, $SD = 1.09$) than on LM trials ($M = 2.43$, $SD = 1.37$), $F(1, 36) = 58.28$, $p < .001$, $\eta_p^2 = .62$. Moreover, the LL display was rated as more goal congruent ($M = 5.22$, $SD = 1.11$) than the LM display ($M = 3.05$, $SD = 2.05$), $F(1, 36) = 35.18$, $p < .001$ $\eta_p^2 = .49$.

To test whether participants updated their appraisals from the second to the third symbol on LM trials (despite knowing that the trial would be a loss trial), we compared the appraisal of goal congruence on (a) the LML versus LMP displays, (b) the LM versus LML displays, and (c) the LM versus LMP displays. A repeated-measures ANOVA revealed that LML trials were rated as significantly more goal congruent ($M = 3.27$, $SD = 1.72$) than

Table 2
Overview of the Results of Experiments 1 and 2

	Experiment 1						Experiment 2					
	AAB[a]	ABA/ABB[a]	ABC[a]	Expectancy[b]	Proximity[b]		AAB[a]	ABA/ABB[a]	ABC[a]	Expectancy[b]	Proximity[b]	
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	Diff[c]	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	Diff[c]
Behavior												
Second chance (%)	46.68 (16.84)	41.27 (15.92)	29.62 (17.02)	2.60 (6.25)*	5.60 (11.68)**	.17	50.32 (19.35)	44.72 (15.31)	28.47 (15.88)	5.60 (16.42)†	16.25 (20.39)***	.029
Bet	22.41 (5.85)	21.79 (6.06)	21.64 (5.81)	0.63 (2.02)†	0.15 (2.73)	.51	21.07 (5.83)	20.74 (5.30)	20.37 (4.48)	0.34 (2.18)	0.37 (4.57)	.98
SR second chance	5.03 (1.40)	4.30 (1.43)	3.68 (1.73)	0.73 (1.73)*	0.62 (2.00)†	.83	4.90 (1.32)	4.47 (1.25)	3.60 (1.87)	0.43 (1.10)*	0.87 (1.96)*	.31
SR pass	3.19 (1.35)	3.60 (1.48)	4.30 (1.58)	−0.41 (1.66)	−0.70 (2.00)*	.53	3.27 (1.46)	3.83 (1.42)	4.47 (1.63)	−0.57 (1.59)*	−0.63 (1.56)*	.88
SR bet	25.24 (9.40)	22.76 (11.15)	20.87 (11.10)	2.49 (6.33)*	1.89 (10.78)	.79	21.53 (9.17)	18.27 (8.57)	16.17 (11.69)	3.27 (10.29)†	2.10 (13.17)	.74
Feelings												
Disappointment	3.38 (1.89)	2.46 (1.54)	2.35 (1.55)	0.92 (1.23)***	0.11 (1.17)	.016	3.47 (1.57)	2.77 (1.44)	2.70 (1.53)	0.70 (0.99)***	0.07 (1.11)	.061
Frustration	2.92 (1.77)	2.24 (1.62)	2.03 (1.57)	0.68 (1.23)**	0.22 (0.82)	.091	2.21 (1.37)	2.07 (1.19)	2.03 (1.18)	0.14 (0.79)	0.03 (0.42)	.48
Anger	2.35 (1.53)	1.78 (1.23)	1.78 (1.25)	0.57 (0.80)***	0.00 (0.85)	.006	2.03 (1.10)	2.03 (1.03)	2.10 (1.03)	0.00 (0.79)	−0.07 (0.64)	.75

Note. Diff = Difference; SR = self-reported.
[a] Values of the dependent variables on each trial type. [b] Values of the separate effects with standard deviation. [c] The *p* values of the difference tests between expectancy and proximity.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

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Table 3
Correlations Between the Effects of Expectancy as Well as the Effects of Proximity on the Different Dependent Variables: The Tendency to Repair as Measured by the Percentage of Choosing for a Second Chance (BH Second), the Average Bet Placed After Choosing for a Second Chance (BH Bet), the Self-Reported Tendency to Choose a Second Chance (SR Second), the Self-Reported Tendency to Pass (SR Pass), the Self-Reported Bet (SR Bet), and Feelings of Disappointment, Frustration, and Anger (All Self-Reported)

	Experiment 1							Experiment 2						
	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Expectancy														
1. BH second														
2. BH bet	−.10							−.12						
3. SR second	.15	−.21						.60***	−.28					
4. SR pass	−.13	.19	−.75***					−.60**	.19	−.41*				
5. SR bet	.06	.20	.24	−.34*				.11	−.17	.15	−.51**			
6. Disappointment	.00	−.16	.20	−.18	.25			−.16	−.36†	.16	.02	−.04		
7. Frustration	−.06	.04	.25	−.16	.20	.66***		.29	−.16	.38*	−.28	−.10	.24	
8. Anger	.18	−.18	.11	−.14	.16	.72***	.69*	−.05	−.05	.12	.25	−.09	.09	.11
Proximity														
1. BH second														
2. BH bet	.26							.02						
3. SR second	.40*	.22						.21	.41*					
4. SR pass	−.46**	−.28	−.78***					−.32†	−.26	−.83***				
5. SR bet	.33*	.39*	.67***	−.67***				.37*	.39*	.62***	.70***			
6. Disappointment	.14	−.17	−.30†	.06	−.10			.04	−.36†	.07	.03	−.26		
7. Frustration	.10	.02	.10	−.04	.01	.26		.10	.07	.05	−.02	.02	.15	
8. Anger	.10	.13	−.03	−.07	−.02	.39*	.64***	.00	.13	.02	.13	−.04	−.28	−.38*

Note. BH = behavior; SR = self-reported.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

LMP trials ($M = 2.30$, $SD = 1.73$), $F(1, 36) = 7.08$, $p = .012$, $\eta_p^2 = .16$. Further analyses showed that the appraisal of goal congruence decreased marginally from LM displays to LMP displays ($M = 2.62$, $SD = 1.83$), $F(1, 36) = 4.08$, $p = .051$, $\eta_p^2 = .10$, and did not change from LM displays ($M = 3.05$, $SD = 2.05$) to LML displays ($M = 3.24$, $SD = 2.83$), $F(1, 36) = 0.83$, $p = .37$, $\eta_p^2 = .022$.

Influence of expectancy and proximity on the tendency to repair. The tendency to repair was measured using repair behavior (online) and self-reports (at the end of the experiment). Below, we discuss the results for each measure as well as the correlations between the measures.

Behavioral measures. We analyzed two aspects of repair behavior: (a) the percentage of choosing for a second chance and (b) the average bet placed after choosing for a second chance. The analysis of the percentage of choosing a second chance revealed a significant effect of trial type, $F(2, 35) = 7.07$, $p = .003$, $\eta_p^2 = .29$. Choosing a second chance was influenced by both expectancy (i.e., participants more often chose a second chance on unexpected proximal or AAB trials than on expected proximal or ABA/ABB trials), $F(1, 36) = 6.37$, $p = .016$, $\eta_p^2 = .15$, and proximity (i.e., participants more often chose a second chance on expected proximal or ABA/ABB trials than on expected distal or ABC trials), $F(1, 36) = 8.48$, $p = .006$, $\eta_p^2 = .19$ (see Table 2). The effect of proximity did not differ significantly from the effect of expectancy, $F(1, 36) = 1.93$, $p = .17$, $\eta_p^2 = .051$ (see Table 2).

The analysis of the average bet after choosing for a second chance revealed a trend effect of trial type, $F(2, 32) = 2.61$, $p = .089$, $\eta_p^2 = .14$. There was a trend effect of expectancy (i.e., the average bet was higher on unexpected proximal or AAB trials than on expected proximal or ABA/ABB trials), $F(1, 33) = 3.28$, $p = .079$, $\eta_p^2 = .090$. The effect of proximity was not significant, $F(1, 33) = 1.03$, $p = .75$, $\eta_p^2 = .003$. There was no significant difference between the influence of expectancy and proximity, $F(1, 33) = 0.45$, $p = .51$, $\eta_p^2 = .013$ (see Table 2).

Self-reports. Three items of the questionnaire reflected the tendency to repair: (a) the tendency to choose a second chance, (b) the tendency to pass, and (c) the number of betted credits. The self-reported tendency to choose a second chance was significantly influenced by trial type, $F(2, 35) = 7.10$, $p = .003$, $\eta_p^2 = .29$. There was a significant effect of expectancy (i.e., participants reported a stronger tendency to choose a second chance on unexpected proximal or AAB trials than on expected proximal or ABA trials), $F(1, 36) = 6.61$, $p = .014$, $\eta_p^2 = .16$, a trend effect of proximity (i.e., participants reported a stronger tendency to choose a second chance on expected proximal or ABA trials than on expected distal or ABC trials), $F(1, 36) = 3.56$, $p = .067$, $\eta_p^2 = .09$, and no difference between the two effects, $F(1, 36) = 0.047$, $p = .83$, $\eta_p^2 = .001$ (see Table 2).

For the tendency to pass, there was again a significant effect of trial type, $F(2, 35) = 4.24$, $p = .022$, $\eta_p^2 = .20$. The effect of expectancy was not significant, $F(1, 36) = 2.21$, $p = .15$, $\eta_p^2 = .058$, but the effect of proximity was significant (i.e., the tendency to pass was lower on expected proximal or ABA trials than on expected distal or ABC trials), $F(1, 36) = 4.58$, $p = .039$, $\eta_p^2 = .11$. There was no difference between the two effects, $F(1, 36) = 0.40$, $p = .53$, $\eta_p^2 = .11$ (see Table 2).

For the number of credits bet, there was no global effect of trial type, $F(2, 35) = 3.74$, $p = .34$, $\eta_p^2 = .18$. Nevertheless, the effect of expectancy was significant (i.e., self-reported bets were higher

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on unexpected proximal or AAB trials than on expected proximal or ABA trials), $F(1, 36) = 5.71$, $p = .022$, $\eta_p^2 = .14$. The effect of proximity was not significant, $F(1, 36) = 1.14$, $p = .29$, $\eta_p^2 = .03$, but did not differ significantly from the effect of expectancy, $F(1, 36) = 0.075$, $p = .79$, $\eta_p^2 = .002$ (see Table 2).

Correlations. For the effects of both expectancy and proximity, we examined the correlations (a) among the effects obtained with the two behavioral measures of the tendency to repair, (b) among the effects obtained with the three self-report measures of the tendency to repair, and (c) between the effects obtained with both types of measures. For the effects of expectancy, only two correlations were significant: The effect of expectancy on the self-reported tendency to pass correlated negatively with the effect of expectancy on the self-reported tendency to choose a second chance and negatively with the effect of expectancy on the self-reported bet (see Table 3).

For the effects of proximity, the data pattern differed slightly. The correlation among the behavioral measures again was not significant, but all correlations among the self-report measures were significant (see Table 3). Additionally, there were significant correlations between the effects of proximity on the tendency to repair as measured by behavior and as measured by self-reports: The effect of proximity on all three self-report scales correlated significantly with the effect of proximity on the percentage of choosing a second chance, and the effect of proximity on the self-reported bet correlated with the effect of proximity on the actual bet (see Table 3).

Influence of expectancy and proximity on negative feelings. We examined the influence of expectancy and proximity on the self-reported feelings of disappointment, frustration, and anger. For disappointment, we found a significant effect of trial type, $F(2, 35) = 11.96$, $p < .001$, $\eta_p^2 = .41$. As can be seen in Table 2, the effect of expectancy was significant (i.e., participants felt more disappointment on unexpected proximal or AAB trials than on expected proximal or ABA trials), $F(1, 36) = 20.54$, $p < .001$, $\eta_p^2 = .36$, but the effect of proximity was not significant, $F(1, 36) = 0.31$, $p = .58$, $\eta_p^2 = .009$. The effect of expectancy was significantly stronger than the effect of proximity, $F(1, 36) = 6.45$, $p = .016$, $\eta_p^2 = .15$.

A similar pattern of results emerged for frustration: There was a significant effect of trial type, $F(2, 35) = 8.12$, $p = .001$, $\eta_p^2 = .317$, a significant effect of expectancy (i.e., participants felt more frustration on unexpected proximal or AAB trials than on expected proximal or ABA trials), $F(1, 36) = 11.24$, $p = .002$, $\eta_p^2 = .24$, and no effect of proximity, $F(1, 36) = 2.57$, $p = .12$, $\eta_p^2 = .067$. The difference between the two was marginally significant, $F(1, 36) = 3.02$, $p = .091$, $\eta_p^2 = .077$ (see Table 2).

For anger, there was also a significant effect of trial type, $F(2, 35) = 9.05$, $p = .001$, $\eta_p^2 = .34$. The effect of expectancy was significant (i.e., participants felt more anger on unexpected proximal or AAB trials than on expected proximal or ABA trials), $F(1, 36) = 18.59$, $p < .001$, $\eta_p^2 = .34$, and the effect of proximity was not, $F(1, 36) = 0.00$. The effect of proximity differed significantly from the effect of expectancy, $F(1, 36) = 8.40$, $p = .006$, $\eta_p^2 = .19$ (see Table 2).

For both the effects of expectancy and proximity, we examined the correlations among the different negative feelings as well as between these feelings and the tendency to repair. The effects of expectancy on disappointment, frustration, and anger were highly interrelated (see Table 3). The same held for the effects of proximity on anger and frustration, and the effects of proximity on anger and disappointment. There were no significant correlations between feelings and the tendency to repair (neither for the effects of expectancy nor for the effects of proximity; see Table 3).

Role of coping potential. We investigated whether differences in the appraisal of coping potential moderated or mediated the effects of the appraisals of expectancy and proximity on the tendency to repair and on negative feelings. First, we investigated whether expectancy or proximity had an influence on coping potential. Coping potential differed significantly across the trial types, $F(2, 35) = 3.47$, $p = .042$, $\eta_p^2 = .17$. There was a significant effect of expectancy: Participants rated their coping potential as higher on unexpected proximal or AAB trials ($M = 4.49$, $SD = 1.04$) than on expected proximal or ABA trials ($M = 4.16$, $SD = 1.01$), $F(1, 36) = 6.34$, $p = .016$, $\eta_p^2 = .15$. There was no effect of proximity: Coping potential was rated as equally high on expected proximal or ABA trials ($M = 4.16$, $SD = 1.01$) and on expected distal or ABC trials ($M = 4.22$, $SD = 1.03$; $F < 1$). To examine whether the effect of expectancy on any of the dependent variables was mediated, moderated, or unaffected by coping potential, we regressed the difference between AAB trials and ABA trials for each dependent variable on two predictors: (a) the centered sum score of coping potential on AAB trials and ABA trials, and (b) the difference score in coping potential on AAB trials and ABA trials (Judd, Kenny, & McClelland, 2001). The interpretation of this analysis is as follows (Judd et al., 2001): (a) If the difference score of the dependent variable is significantly predicted by the centered sum score of coping potential, then coping potential moderates the effect of expectancy; (b) if the difference score of the dependent variable is significantly predicted by the difference score of coping potential, then coping potential mediates the effect of expectancy; and (c) if the intercept is significant, the residual effect of expectancy is significant over and above the difference in coping potential. We executed eight regressions for each of the difference scores of the dependent variables (i.e., disappointment, frustration, anger, frequency of choosing a second chance, average bet, self-reported bet, self-reported tendency to choose a second chance, and self-reported tendency to pass). We found no support for a moderation effect for any of the eight variables (ts < 1). We did find support for a mediation effect for two dependent variables: the self-reported bet, $\beta = .39$, $t(36) = 2.46$, $p = .019$, and the self-reported tendency to choose a second chance, $\beta = .34$, $t(36) = 2.08$, $p = .045$. The positive regression weights indicate that the more participants estimated their coping potential as higher on AAB trials than on ABA trials, the more their self-reported tendency to repair was increased on AAB trials compared with ABA trials. There was no residual effect of expectancy for the self-reported bet, $t(36) = 1.39$, $p = .18$, or for the self-reported tendency to choose a second chance, $t(36) = 1.64$, $p = .11$, suggesting full mediation. The effects of none of the other variables were mediated by coping potential (ts < 1).

Discussion

The results of the first experiment suggest that the appraisals of expectancy and proximity both influence emotional responding to goal-incongruent events. Expectancy and proximity separately augmented the tendency to repair: Both variables affected the

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decision to engage in repair behavior (i.e., to take a second chance), and expectancy additionally had a marginal effect on the number of credits that were invested subsequently. Data on the self-reported tendency to repair largely confirmed this pattern. The absence of correlations between the tendency to repair, as measured by self-reports and as measured by behavior, may indicate that participants' behavior was influenced by additional factors that did not influence self-reported action tendencies (such as strategic influences) or that participants did not (or could not) accurately report on their action tendencies.

A different pattern of results emerged for feelings of disappointment, frustration, and anger. All feelings remained largely unaffected by proximity, but were significantly increased by expectancy. Additional analyses suggested that most of our results could not be attributed to differences in coping potential, except in the case of an influence of expectancy on the self-reported tendency to repair: Participants appraised their coping potential to be higher on unexpected than on expected loss trials, and this difference mediated the effects of expectancy on the self-reported tendency to repair.

To ascertain whether our results generalized across different trial distributions, we conducted a second experiment in which trial distribution was directly manipulated. In Experiment 1, the amount of unexpected proximal loss or AAB trials, expected proximal loss or ABA/ABB trials, and expected distal loss or ABC trials was balanced (i.e., each trial type occurred 48 times). This way of counterbalancing implied, however, that the frequency of expected loss trials (i.e., ABA/ABB plus ABC trials, 96 trials in total) was higher than the frequency of unexpected loss trials (i.e., AAB trials, 48 in total), and that the frequency of proximal loss trials (i.e., ABA/ABB plus AAB trials, 96 trials in total) was higher than the frequency of distal loss trials (i.e., ABC trials, 48 in total; see Table 1). This leaves open a number of alternative explanations for the findings of Experiment 1. For example, the finding that only expectancy influenced feelings of disappointment, frustration, and anger could be explained by the fact that the amount of unexpected loss trials was relatively low (i.e., 48 trials) compared with the amount of proximal loss trials (i.e., 96 trials). Mere exposure to frequent events (e.g., trials starting with AB) may have diminished negative feelings to those events compared with infrequent ones (e.g., trials starting with AA). In other words, this finding could reflect a habituation effect instead of an effect of expectancy. In Experiment 2, we employed two new manipulations of trial distribution. In a first condition, we matched the number of expected and unexpected loss trials. In a second condition, we matched the number of proximal and distal loss trials. Replication of the effects of Experiment 1 across the different trial distributions would allow us to safely conclude that the obtained effects were a function of the manipulations of expectancy and proximity rather than of differences in trial frequencies.

Experiment 2

Method

Participants. Thirty first-year psychology students at Ghent University (M_{age} = 19, 8 men) participated in the experiment in return for course credits. As in Experiment 1, the students had a moderate to high experience with gambling in general (M = 5.00, SD = 1.74), but a low experience with slot machines (M = 2.00, SD = 1.20).

Design. The experiment consisted of two between-subjects conditions (see Table 1): The first condition had 72 unexpected proximal loss trials (AAB), 36 expected proximal loss trials (18 ABA trials, 18 ABB trials), and 36 expected distal loss trials (ABC). The second condition had 36 unexpected proximal loss trials (AAB), 36 expected proximal loss trials (18 ABA trials, 18 ABB trials), and 72 expected distal loss trials (ABC). In all conditions, participants received nine win trials (AAA trials). For ease of communication, in the remainder of the text, we refer to these two conditions as the 72-AAB/36-ABC condition and the 36-AAB/72-ABC condition, respectively.

Procedure. The procedure was identical to the procedure of Experiment 1, except that the item for coping potential was not included in the questionnaire.

Results

Analyses. The analyses of Experiment 2 were identical to the analyses of Experiment 1, except that the between-subjects factor trial distribution was added to the repeated-measures MANOVA.

Manipulation check. A Trial Type (LL vs. LM) × Trial Distribution analysis for the ratings of the expectation to win 10 cents revealed a main effect of trial type, $F(1, 28) = 33.69$, $p < .001$, $\eta_p^2 = .55$, no main effect of trial distribution, or Trial Type × Trial Distribution interaction (Fs < 1). Participants had a higher expectation of winning 10 cents on LL trials (M = 4.47, SD = 1.25) than on LM trials (M = 2.27, SD = 1.36). Additionally, a Trial Type (LL vs. LM) × Trial Distribution analysis for the ratings of goal congruence suggested that the LL display was rated as more positive (M = 5.31, SD = 1.34) than the LM display (M = 2.62, SD = 1.78), $F(1, 28) = 42.50$, $p < .001$, $\eta_p^2 = .60$. There was no influence of trial distribution on the ratings of goal congruence (Fs < 1).

An analysis of Trial Type (LML vs. LMP) × Trial Distribution for the ratings of goal congruence revealed a main effect of trial type, $F(1, 28) = 10.05$, $p = .004$, $\eta_p^2 = .26$. This suggests that participants did not ignore the third and last symbol on LM trials. Confirming the pattern of results in Experiment 1, LML trials were rated as more goal congruent (M = 3.24, SD = 1.83) than LMP trials (M = 2.62, SD = 1.83). There was no main effect of trial distribution or Trial Type × Trial Distribution interaction (Fs < 1.06, ps > .31). Further analyses revealed that the appraisal of goal congruence increased significantly from LM (M = 2.60, SD = 1.75) to LML (M = 3.27, SD = 1.72), $F(1, 28) = 5.82$, $p = .023$, $\eta_p^2 = .17$, and did not change from LM to LMP (M = 2.30, SD = 1.73), $F(1, 28) = 2.42$, $p = .14$ $\eta_p^2 = .08$.

Influence of expectancy and proximity on the tendency to repair. The tendency to repair was measured using repair behavior (online) and self-reports (at the end of the experiment). Below, we discuss the results for each measure in turn.

Behavioral measures. We analyzed two aspects of repair behavior across the different trial types: (a) the percentage of choosing for a second chance and (b) the average bet placed after choosing for a second chance. The Trial Type × Trial Distribution analysis for the percentage of choosing a second chance revealed a main effect of trial type, $F(2, 27) = 10.18$, $p = .001$, $\eta_p^2 = .43$, a main effect of trial distribution, $F(1, 28) = 6.98$, $p = .013$, $\eta_p^2 =$

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.20, and no Trial Type × Trial Distribution interaction, $F(2, 27) = 0.93$, $p = .41$, $\eta_p^2 = .065$. Choosing a second chance was marginally influenced by expectancy (i.e., participants more often chose a second chance on unexpected proximal or AAB trials than on expected proximal or ABA/ABB trials), $F(1, 28) = 3.59$, $p = .069$, $\eta_p^2 = .11$, and was significantly influenced by proximity (i.e., participants more often chose a second chance on expected proximal or ABA/ABB trials than on expected distal or ABC trials), $F(1, 28) = 18.57$, $p < .001$, $\eta_p^2 = .40$ (see Table 2). The influence of proximity was significantly stronger than the influence of expectancy, $F(1, 28) = 5.30$, $p = .029$, $\eta_p^2 = .16$ (see Table 2). The main effect of trial distribution suggested that participants in the 36-AAB/72-ABC condition more often chose for a second chance ($M = 46.14\%$, $SD = 11.27$) than participants in the 72-AAB/36-ABC condition ($M = 36.20\%$, $SD = 9.24$).

The Trial Type × Trial Distribution analysis for the average bet after choosing for a second chance yielded no main effect of trial type, $F(2, 26) = 0.55$, $p = .58$, $\eta_p^2 = .041$, no main effect of trial distribution, $F(2, 26) = 1.45$, $p = .24$, $\eta_p^2 = .051$, and no Trial Type × Trial Distribution interaction, $F(2, 26) = 0.67$, $p = .52$, $\eta_p^2 = .049$. There was no effect of expectancy, $F(1, 27) = 0.73$, $p = .40$, $\eta_p^2 = .026$, no effect of proximity, $F(1, 27) = 0.20$, $p = .66$, $\eta_p^2 = .007$, and no difference between the effects of proximity and expectancy, $F(1, 27) < 0.01$, $p = .98$ (see Table 2).

Self-reports. We discuss the results for the three items of the questionnaire that reflected the tendency to repair: (a) the tendency to choose a second chance, (b) the tendency to pass, and (c) the number of betted credits. The Trial Type × Trial Distribution analysis for the self-reported tendency to choose a second chance revealed a main effect of trial type, $F(2, 27) = 5.42$, $p = .010$, $\eta_p^2 = .29$, a marginal main effect of trial distribution, $F(1, 28) = 3.84$, $p = .06$, $\eta_p^2 = .12$, and no Trial Type × Trial Distribution interaction, $F(2, 27) = 1.23$, $p = .31$, $\eta_p^2 = .084$. There was a significant effect of expectancy (i.e., a stronger tendency to choose a second chance on unexpected proximal or AAB trials than on expected proximal or ABA trials), $F(1, 28) = 4.57$, $p = .041$, $\eta_p^2 = .14$, a significant effect of proximity (i.e., a stronger tendency to choose a second chance on expected proximal or ABA trials than on expected distal or ABC trials), $F(1, 28) = 6.01$, $p = .021$, $\eta_p^2 = .18$, and no difference between the two effects, $F(1, 28) = 1.08$, $p = .31$, $\eta_p^2 = .037$ (see Table 2). The marginal effect of trial distribution suggested that participants in the 36-AAB/72-ABC condition reported a higher tendency to choose a second chance ($M = 4.69$, $SD = 0.96$) than those in the 72-AAB/36-ABC condition ($M = 3.96$, $SD = 1.09$).

For the tendency to pass, there was a significant effect of trial type, $F(2, 27) = 5.61$, $p = .009$, $\eta_p^2 = .29$, a trend effect of trial distribution, $F(1, 28) = 3.91$, $p = .058$, $\eta_p^2 = .12$, and no Trial Type × Trial Distribution interaction, $F(2, 27) = 2.21$, $p = .13$, $\eta_p^2 = .14$. We again observed an effect of expectancy (i.e., a lower tendency to pass on unexpected proximal or AAB trials than on expected proximal or ABA trials), $F(1, 28) = 4.23$, $p = .049$, $\eta_p^2 = .13$, an effect of proximity (i.e., a lower tendency to pass on expected proximal or ABA trials than on expected distal or ABC trials), $F(1, 28) = 4.75$, $p = .038$, $\eta_p^2 = .15$, and no difference between the two effects, $F(1, 28) = 0.02$, $p = .88$, $\eta_p^2 = .001$ (see Table 2). The trend effect of trial distribution suggests that participants in the 72-AAB/36-ABC condition reported a higher tendency to pass ($M = 4.24$, $SD = 1.08$) than those in the 36-AAB/72-ABC condition ($M = 3.47$, $SD = 1.08$).

For the number of credits bet, there was no main effect of trial type, $F(2, 27) = 2.43$, $p = .11$, $\eta_p^2 = .15$, no main effect of trial distribution, $F(1, 28) = 0.09$, $p = .97$, $\eta_p^2 < .001$, and no Trial Type × Trial Distribution interaction, $F(2, 27) = 0.55$, $p = .58$, $\eta_p^2 = .039$. There was a trend effect of expectancy (i.e., higher bets on unexpected proximal or AAB trials than on expected proximal or ABA trials), $F(1, 28) = 2.94$, $p = .097$, $\eta_p^2 = .095$. The effect of proximity was not significant, $F(1, 28) = 0.75$, $p = .39$, $\eta_p^2 = .026$, but was also not significantly different from the effect of expectancy, $F(1, 28) = 0.11$, $p = .74$, $\eta_p^2 = .004$ (see Table 2).

Correlations. For both the effects of expectancy and proximity on the tendency to repair, we examined the correlations (a) among the effects on the two behavioral measures, (b) among the effects on the three self-report measures, and (c) between the effects on both types of measures. For the effects of expectancy, similar to Experiment 1, we observed significant correlations among a subset of the self-report measures, but not among the behavioral measures (see Table 3). Unlike in Experiment 1, however, we did observe significant correlations between subsets of the self-report and behavioral measures: The effect of expectancy on the percentage of choosing a second chance was correlated with the effect of expectancy on the self-reported tendency to choose a second chance and with the effect of expectancy on the self-reported tendency to pass.

For the effects of proximity, the pattern of correlations was largely comparable with Experiment 1: There was no correlation among the behavioral measures, but all correlations among the self-report measures were significant. Conform to Experiment 1, there were also several significant correlations between the effects of proximity on behavioral and self-report measures of the tendency to repair (see Table 3).

Influence of expectancy and proximity on negative feelings. We examined the influence of expectancy and proximity on the feelings of disappointment, frustration, and anger. For disappointment, we found a significant effect of trial type, $F(2, 27) = 9.19$, $p = .001$, $\eta_p^2 = .41$, no effect of trial distribution, $F(1, 28) = 0.19$, $p = .66$, $\eta_p^2 = .007$, and no Trial Type × Trial Distribution interaction, $F(2, 27) = 0.49$, $p = .62$, $\eta_p^2 = .035$. As can be seen in Table 2, the effect of expectancy was significant (i.e., participants felt more disappointment on unexpected proximal or AAB trials than on expected proximal or ABA trials), $F(1, 28) = 14.99$, $p = .001$, $\eta_p^2 = .35$. The effect of proximity was not significant, $F(1, 28) = 0.10$, $p = .75$, $\eta_p^2 = .004$. The effect of expectancy was marginally stronger than the effect of proximity, $F(1, 28) = 3.82$, $p = .061$, $\eta_p^2 = .12$.

For frustration, there was no effect of trial type, $F(2, 26) = 0.49$, $p = .62$, $\eta_p^2 = .036$, no effect of trial distribution, $F(1, 27) = 0.77$, $p = .39$, $\eta_p^2 = .028$, and no Trial Type × Trial Distribution interaction, $F(2, 26) = 1.52$, $p = .24$, $\eta_p^2 = .10$. The effect of expectancy was not significant, $F(1, 27) = 0.95$, $p = .34$, $\eta_p^2 = .034$, nor was the effect of proximity, $F(1, 27) = 0.16$, $p = .69$, $\eta_p^2 = .006$. There was no difference between the effects of expectancy and proximity, $F(1, 27) = 0.52$, $p = .48.$, $\eta_p^2 = .019$ (see Table 2).

The pattern for anger was more complicated. There was no effect of trial type, $F(2, 27) = 0.22$, $p = .81$, $\eta_p^2 = .016$ and no effect of trial distribution, $F(1, 28) = 0.66$, $p = .41$, $\eta_p^2 = .023$, but

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there was a marginally significant Trial Type × Trial Distribution interaction, $F(2, 27) = 3.27$, $p = .054$, $\eta_p^2 = .20$. In the 36-AAB/72-ABC condition, there was a marginal effect of trial type, $F(2, 13) = 3.76$, $p = .051$, $\eta_p^2 = .37$. The effect of expectancy was also marginally significant: Participants felt more anger on unexpected proximal or AAB trials ($M = 2.33$, $SD = 1.23$) than on expected proximal or ABA trials ($M = 2.00$, $SD = 1.07$), $F(1, 14) = 4.38$, $p = .055$, $\eta_p^2 = .24$. The effect of proximity was significant, but in the other direction than we expected: Participants felt less anger when the loss was proximal to a win (i.e., on expected proximal or ABA trials; $M = 2.00$, $SD = 1.07$) than when the loss was distal to a win (i.e., on expected distal or ABC trials; $M = 2.27$, $SD = 1.10$), $F(1, 14) = 5.09$, $p = .041$, $\eta_p^2 = .27$. The effect of proximity differed significantly from the effect of expectancy, $F(1, 14) = 7.88$, $p = .014$, $\eta_p^2 = .36$. In the 72-AAB/36-ABC condition, there was no effect of trial type, $F(2, 13) = 1.23$, $p = .33$, $\eta_p^2 = .16$. There was no effect of expectancy: Participants were equally angry on unexpected proximal or AAB trials ($M = 1.73$, $SD = 0.88$) and on expected proximal or ABA trials ($M = 2.07$, $SD = 1.03$), $F(1, 14) = 2.50$, $p = .14$, $\eta_p^2 = .15$. There was also no effect of proximity: Participants were equally angry on expected proximal or ABA trials ($M = 2.07$, $SD = 1.03$) and on expected distal or ABC trials ($M = 1.93$, $SD = 0.96$), $F(1, 14) = 0.48$, $p = .50$, $\eta_p^2 = .033$.

Contrary to the high correlations in Experiment 1, there were no correlations between the effects of expectancy on anger, disappointment, and frustration (see Table 3). For proximity, the only correlation that was significant was a negative correlation between the effect of proximity on anger and the effect of proximity on frustration. Confirming the pattern of Experiment 1, few significant correlations were observed between the effect of expectancy and proximity on the tendency to repair, on the one hand, and the effects of expectancy and proximity on negative feelings, on the other hand. Exceptions were: (a) a marginal negative relation between the effect of expectancy on disappointment and the effect of expectancy on the amount of credits bet, (b) a marginal negative relation between the effect of proximity on disappointment and the effect of proximity on the amount of credits bet, and (c) a significant positive relation between the effect of expectancy on the self-reported tendency to choose a second chance and the effect of expectancy on frustration.

Discussion

Most of the findings of Experiment 1 were confirmed across the two new trial distributions introduced in Experiment 2. Trial distribution did not interact with any of the effects of expectancy and proximity on the dependent measures, except when angry feelings were considered. Trial distribution did have a global motivational effect, however. Participants in the condition with the least (36) unexpected proximal loss or AAB trials and the most (72) expected distal loss or ABC trials were more inclined to repair the goal-incongruent outcomes than participants in the condition with the most (72) unexpected proximal loss or AAB trials and the least (36) expected distal loss or ABC trials. This data pattern confirms previous findings that participants especially persist in gambling in face of moderate (instead of high) amounts of near-misses (Kassinove & Schare, 2001).

Most importantly, the majority of the findings of Experiment 1 were replicated in Experiment 2, which confirms that these findings were robust across variations in trial distribution. We again observed that both expectancy and proximity influenced the tendency to repair as measured by behavior (i.e., to choose a second chance) and as measured by self-reports. We also replicated the result that unexpected losses led to more disappointment than expected losses, but that feelings of disappointment were unaffected by the appraisal of proximity. Different from Experiment 1, however, this result did not replicate for feelings of anger and frustration. The effect of expectancy on anger seemed to be dependent on the specific distribution of the trials: Feelings of anger were marginally increased on AAB trials compared with ABA trials for participants who received a low amount of AAB trials and a high amount of ABC trials (the 36-AAB/72-ABC condition), but not for participants who received a high amount of AAB trials and a low amount of ABC trials (the 72-AAB/36-ABC condition). It may be noted that participants' expectation of winning 10 cents on AA trials was equally high in both conditions. A possible explanation for this pattern of findings is that when expectations are frequently disconfirmed (in the 72-AAB/36-ABC condition), feelings of anger following unexpected events are attenuated.

In Experiment 3, we further examined the effects of expectancy and proximity on feelings of disappointment, frustration, and anger. Experiments 1 and 2 suggested that the feeling component was influenced only by the appraisal of expectancy, whereas the motivational component (i.e., the tendency to repair) was influenced by both the appraisals of expectancy and proximity. Importantly, however, the feeling component was measured retrospectively, whereas the motivational component was measured both retrospectively and trial by trial. The observed differences between the feeling and motivational component thus could be an artifact of our measurement method. In Experiment 3, we investigated whether the observation that negative feelings are influenced by the appraisal of expectancy and not by the appraisal of proximity would replicate using a trial-by-trial assessment of feelings.[1]

Experiment 3

Method

Participants. Thirty-four participants (M_{age} = 23 years, 6 men) took part in the study in return for payment (€10, augmented with the amount they won in the game). Twenty-nine participants were students, of whom 14 studied psychology, two were doctoral students of Ghent University (both faculty of medicine and health sciences), and three were employed elsewhere.

Procedure. The procedure was similar to the procedure of Experiment 1 (using the same design with a balanced number of

[1] We recently discovered that a subset of our findings was replicated by another research group, which pursued a similar line of research and did employ a trial-by-trial assessment of feelings (Junge, Loureiro, & Reisenzein, 2010). These researchers used a similar design to manipulate expectancy and proximity (i.e., slot-machine games) and asked participants to rate after each trial their disappointment about missed wins (the study solely focused on feelings, so no action tendencies were measured). They also found that disappointment was influenced by the appraisal of expectancy, but not by the appraisal of proximity.

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AAB, ABA/ABB, and ABC trials), with the following changes: First, we instructed participants that, on some trials, we would measure their feelings with regard to the slot machine outcome. We also demonstrated the nature of measurement before the start of the experiment. On a subset of trials, 2,000 ms after a goal-incongruent outcome (0 cent) was presented, a visual analog scale appeared below the slot machine, ranging from *not at all* to *yes completely*, together with one of the following labels: the Dutch words for disappointment (*teleurstelling*), frustration (*frustratie*), and anger (*kwaadheid*). Participants were asked to indicate the degree to which they experienced these feelings by clicking at a position on the scale and pressing ENTER. After the participant had responded, the second chance and pass buttons appeared. The data from the visual analog scale ranged from 0−100. Second, participants could choose for a second chance or pass using two keys of the keyboard (respectively, 7 and 9) instead of using the mouse-shaped response box (Voss et al., 2007). This was done to avoid confusion with the mouse responses used to collect online self-reported feelings in this experiment.

Third, we reduced the total number of credits that participants could bet throughout the game. This allowed us to measure feelings of disappointment, frustration, and anger in exactly the same circumstances on AAB, ABA/ABB, and ABC trials. Experiments 1 and 2 suggested that participants' tendency to repair goal-incongruent outcomes was stronger on AAB trials than on ABA/ABB trials and stronger on ABA/ABB trials than on ABC trials. Hence, if we could obtain differences in feelings between the different trial types, it could be a direct effect of expectancy and proximity, but also of anticipating or not anticipating a repair action (e.g., negative feelings may be attenuated when anticipating a repair action). By reducing the number of credits to 100, we reduced the number of trials in which a repair action was possible. With a total of 100 credits, participants could place five bets with 20 credits, which was the average bet in Experiments 1 and 2, or a maximum of 10 bets with 10 credits (which was the minimum bet). Hence, we anticipated that we would obtain a sufficient number of AAB trials, ABA/ABB trials, and ABC trials on which participants did not repair and, therefore, did not anticipate a repair action. This enabled us to eliminate any impact of the anticipation of a repair action by conducting all analyses on the set of AAB, ABA/ABB, and ABC trials on which participants did not anticipate a repair action.

Fourth, we took a number of additional measures to keep participants motivated to play the game, despite the reduction in repair opportunities. First, to compensate for the decrease in profit due to the reduced repair opportunity, we rewarded participants with 20 cents instead of 10 cents. Second, we reduced the total number of trials from three blocks of 51 trials to one block of 51 trials, with 10 measurement trials for each feeling (i.e., disappointment, frustration, and anger): three AAB trials, three ABC trials, and four ABA/ABB trials (two ABA and two ABB trials). In Experiments 1 and 2, the tendency to repair was repeatedly measured on a large number (144) of goal-incongruent trials, because we anticipated that complex strategies and changes in those strategies might cause noise that could overshadow the effects of expectancy and proximity. However, such a high number of trials on which the game is interrupted for the assessment of feelings results in a very lengthy procedure that is likely to be very tedious. Hence, we reduced the number of trials.

Results

The analyses were similar to the analyses of Experiment 1, with two exceptions. First, in Experiments 1 and 2, there was one (retrospective) data point for each combination of feeling (disappointment, frustration, and anger) and trial type (AAB, ABA/ABB, and ABC). In Experiment 3, we collected multiple (online) data points for feelings of disappointment, frustration, and anger on the different trial types. Hence, these data points were first averaged across feeling (disappointment, frustration, and anger) and trial type (AAB, ABA/ABB, and ABC) before they were entered in the repeated-measures MANOVAs. Second, the trial-by-trial assessment of feelings allowed us to control for a potential confounding factor, anticipation of a repair action, by performing two analyses for each dependent variable: one analysis including all trials (also those on which participants repaired after rating their feelings) and one analysis excluding trials on which participants repaired after rating their feelings (12.65% of the trials).

Despite the restricted possibility to repair goal-incongruent outcomes in Experiment 3, trial type did influence whether participants took a second chance, $F(2, 32) = 4.67$, $p = .017$, $\eta_p^2 = .23$ (but not the number of credits bet, $F < 1$; $M_{AAB} = 16.91$, $SD = 5.21$; $M_{ABA/ABB} = 17.27$, $SD = 5.11$; $M_{ABC} = 17.35$, $SD = 5.40$). The effect of expectancy on taking a second chance was not significant, $F(1, 33) = 1.06$, $p = .55$, $\eta_p^2 = .017$. Participants took a second chance equally often on unexpected proximal or AAB trials ($M = 13.42\%$, $SD = 6.55$) and on expected proximal or ABA/ABB trials ($M = 12.32\%$, $SD = 6.96$). However, the effect of proximity again was significant, $F(1, 33) = 16.94$, $p = .008$, $\eta_p^2 = .19$, suggesting that participants more often took a second chance on expected proximal or ABA/ABB trials ($M = 12.32\%$, $SD = 6.96$) than on expected distal or ABC trials ($M = 7.90\%$, $SD = 6.40$). Thus, in Experiments 1 and 2, we found both an influence of proximity and expectancy on the tendency to repair, but, in Experiment 3, in which the opportunity to repair was severely restricted, we only found an effect of proximity on the tendency to repair.

The results of the analyses are presented in Table 4. This table shows that the difference between the analyses on the full trial set (including repair trials) versus the trimmed trial set (excluding repair trials) was negligible. Hence, we will only describe the results of the trimmed analyses in the text and refer the reader to Table 4 for the results of the full analyses.

For feelings of disappointment, we obtained a strong effect of trial type, $F(2, 32) = 9.89$, $p < .001$, $\eta_p^2 = .38$. The effect of expectancy was significant (i.e., participants felt more disappointment on unexpected proximal or AAB trials than on expected proximal or ABA/ABB trials), $F(1, 33) = 20.38$, $p < .001$, $\eta_p^2 = .38$. The effect of proximity was not significant, $F(1, 33) = 0.12$, $p = .73$, $\eta_p^2 = .004$. The effect of expectancy was significantly stronger than the effect of proximity, $F(1, 33) = 10.96$, $p = .002$, $\eta_p^2 = .25$.

For feelings of frustration, we obtained a significant effect of trial type, $F(2, 32) = 4.24$, $p = .023$, $\eta_p^2 = .21$. The effect of expectancy was significant (i.e., participants felt more frustration on unexpected proximal or AAB trials than on expected proximal or ABA/ABB trials), $F(1, 33) = 8.45$, $p = .006$, $\eta_p^2 = .20$. The effect of proximity was not significant, $F(1, 33) = 0.29$, $p = .60$,

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Table 4
Overview of the Results of Experiment 3 With and Without Repair Trials

	AAB[a]	ABA/ABB[a]	ABC[a]	Expectancy[b]	Proximity[b]		Correlation expectancy[d]		Correlation proximity[d]	
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	Diff[c]	1	2	1	2
1. Disappointment										
Incl repair	34.08 (27.48)	25.35 (24.46)	25.52 (23.56)	8.73 (9.90)***	−0.17 (10.16)	.002				
Excl repair	32.58 (27.28)	25.31 (24.48)	25.89 (24.03)	7.26 (9.38)***	−0.57 (9.64)	.002				
2. Frustration										
Incl repair	29.58 (27.18)	26.20 (25.79)	24.09 (23.43)	3.38 (9.18)*	2.11 (9.66)	.60	.00		.52**	
Excl repair	29.85 (27.88)	25.33 (25.00)	24.38 (23.75)	4.51 (9.06)**	0.95 (10.32)	.14	.13		.38*	
3. Anger										
Incl repair	22.32 (26.95)	17.17 (19.57)	16.87 (19.59)	5.15 (9.94)**	0.30 (8.92)	.033	.33†	.20	.52**	.30†
Excl repair	22.67 (27.69)	17.58 (20.83)	17.09 (20.60)	5.09 (9.79)**	0.49 (9.01)	.036	.12	.31†	.53**	.25

Note. Diff = difference; incl = including; excl = excluding.
[a] Values of the dependent variables on each trial type. [b] Values of the separate effects with standard deviation. [c] The *p* values of the difference tests between expectancy and proximity. [d] The correlations between the effects of expectancy and the effects of proximity on the different dependent variables.
† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

$\eta_p^2 = .009$. The effect of expectancy was not significantly stronger than the effect of proximity, $F(1, 33) = 2.29$, $p = .14$, $\eta_p^2 = .065$.

For feelings of anger, we obtained a significant effect of trial type, $F(2, 32) = 4.46$, $p = .020$, $\eta_p^2 = .22$. As can be seen in Table 4, the effect of expectancy was significant (i.e., participants felt more anger on unexpected proximal or AAB trials than on expected proximal or ABA/ABB trials), $F(1, 33) = 9.17$, $p = .005$, $\eta_p^2 = .22$. The effect of proximity was not significant, $F(1, 33) = 0.10$, $p = .75$, $\eta_p^2 = .003$. The effect of expectancy was significantly stronger than the effect of proximity, $F(1, 33) = 4.80$, $p = .036$, $\eta_p^2 = .13$.

We calculated the correlations between the effects of expectancy on the different negative feelings as well as the effects of proximity on the different negative feelings. The effects of expectancy on disappointment, frustration, and anger were unrelated, except for two marginally positive correlations between anger and disappointment and anger and frustration, which failed to generalize across trial set (full vs. trimmed). Contrary to the effects of expectancy, the effects of proximity on disappointment, frustration, and anger were interrelated (see Table 4).

Discussion

Experiment 3 provides further support for the conclusion that feelings of disappointment, frustration, and anger are unaffected by the appraisal of proximity, but are significantly influenced by the appraisal of expectancy. More specifically, we again observed that unexpected goal-incongruent events elicited stronger feelings of disappointment, frustration, and anger than expected goal-incongruent events. We discarded the alternative hypothesis that a confounding factor (the anticipation of a repair action) explained the differences between the trial types by conducting our analyses on a trial set that was limited to those trials in which participants did not repair (and hence did not anticipate a repair action). It may be noted that the effect size of the effect of expectancy on feelings of disappointment was much larger than the effect of expectancy on feelings of frustration and anger, and that this difference was more pronounced in the trial-by-trial assessment of feelings of Experiment 3 than in the retrospective assessment of Experiment 1. In addition, we observed that, despite the severe restriction on the number of times participants could repair (i.e., on average, participants repaired on five trials during the entire experiment), proximity still had a significant influence on repair behavior. Thus, Experiment 3 again suggested that the appraisals of both expectancy and proximity play a distinct role in emotion elicitation.

General Discussion

Previous research has suggested that goal-incongruent events hit harder when they are unexpected and when the goal was just missed than when they are expected and the goal was missed by far. In this research, however, expectancy and proximity often were confounded. The aim of the present experiments was to investigate whether emotions are separately enhanced by the appraisals of expectancy and proximity or whether only one of the two variables determines the emotional response. We manipulated expectancy and proximity in a gambling experiment and measured emotions via changes in action tendencies (the tendency to repair) and negative feelings (disappointment, frustration, and anger).

Our studies suggest that expectancy and proximity each have a separate influence on emotions. Expectancy affected both the motivational and the feeling component of the emotion: Unexpected losses increased the motivation to repair a goal-incongruent event and intensified feelings of disappointment (all experiments) as well as feelings of frustration and anger (Experiments 1 and 3) compared with expected losses. Our data thus support the idea that expecting to attain a goal generally amplifies negative affect when that goal is not attained. Proximity, on the other hand, affected the motivational component of the emotion only. When a goal-congruent outcome was just missed, participants' motivation to repair a goal-incongruent event was stronger than when a goal-congruent outcome was missed by far. Proximity did not affect feelings of disappointment, frustration, and anger.

The finding that expectancy influenced both the motivational and the feeling component of the emotion whereas proximity influenced the motivational component only is compatible with emotion theories that emphasize the importance of the appraisal of expectancy (Reisenzein, 2009; Roseman, 2011). Of note, our manipulation checks and motivational data excluded the possibility that the proximity information was simply ignored (i.e., that on

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trials that were used to calculate the effect of proximity, i.e., ABA/ABB vs. ABC trials, participants ignored the crucial third symbol). Construal level theory (Trope & Liberman, 2010) might explain this pattern of findings via a differential impact of expectancy and proximity on the psychological distance to a win. Psychological distance is assumed to be influenced by the probability of a win: As the probability of a win increases, the psychological distance to a win decreases (Trope & Liberman, 2010). The probability of a win is estimated as high versus low (a) prospectively (before the loss), in the case of an unexpected versus expected loss, and (b) retrospectively (after the loss), in the case of a proximal versus distal loss. It could be that the psychological distance is more strongly affected by the probability of a win when it is estimated prospectively rather than retrospectively.

The present findings can be relevant for the literature on emotion regulation. At first sight, lowering one's expectations seems beneficial to reduce feelings of disappointment (and perhaps also frustration and anger) when obtaining a goal-incongruent outcome. Our studies reveal, however, that such a regulation strategy could have a detrimental effect on the motivation to repair a goal-incongruent outcome. To the extent that repairing is possible and functional, this is a negative side effect. Our studies furthermore suggest that changes in the appraisal of proximity do not influence negative feelings, but do change the tendency to repair. Thus, reappraising a loss as less proximal to a win may not be the most effective strategy to regulate feelings of disappointment, frustration, and anger.

Future research could address a number of potential boundary conditions of the present findings. More specifically, our results may be bound to the use of a specific sample, a specific experimental context, or a specific measurement method of the tendency to repair. First, with regard to the specific sample, participants of Experiments 1 and 2 reported having a moderate to high experience with gambling. Past research has suggested that experienced gamblers may be more sensitive to the effects of near-misses (Habib & Dixon, 2010, but see Reid, 1986). The role of proximity was thus possibly overestimated in our studies. A replication with participants who are less experienced with gambling would solve this issue.

Second, our results could be bound to the specific context of the slot machine game or to the context of gambling in general. For instance, in our experiments, the goal-incongruent events were caused by an external, nonliving agent. The effects of expectancy and proximity may turn out to be different when the goal-incongruent events are caused by the self. It may be noted that in other, more naturalistic, settings, it may be difficult to disentangle the influence of proximity and expectancy from each other and from other (appraisal) variables such as coping potential and agency. For instance, when a student receives a grade that is incongruent with his or her desired grade, the appraisal that the actual grade is close to the desired grade may often go together with the appraisal of high coping potential (i.e., the student may believe that he or she can obtain the desired grade next time). Moreover, when the student had a high expectation to obtain the desired grade, he or she may be more likely to attribute the cause of (unexpectedly) not obtaining this grade externally (e.g., to an unfair grading method or professor) rather than internally (i.e., to the self). One other important contextual factor may be the amount of expected/unexpected and proximal/distal goal-incongruent trials. Although Experiment 2 partly addressed this issue, some questions remain unanswered, such as whether the findings of Experiment 3 would replicate across different trial frequencies and whether the same findings would be obtained in a single trial experiment.

Third, there was a relatively high degree of coherence between the tendency to repair as measured by behavior and as measured by self-reports. This could be attributed to the fact that participants had the opportunity to reflect on their behavior in the game. In future studies, researchers could investigate the effects of expectancy and proximity on repair behavior that is measured under conditions that reduce this opportunity, such as time pressure and/or a secondary task that has to be completed. In this way, we could investigate whether our results generalize to automatically activated repair tendencies that are less easy to report.

Our studies have other limitations that might be addressed in future research. First, the design of the current studies only allowed us to investigate (a) the effect of expectancy within a context of high proximity and (b) the effect of proximity within a context of expected losses. Future studies may aim for a more complete design that includes unexpected distal loss trials so that one can examine the influence of each variable given all values of the other variable as well as the interaction between expectancy and proximity. There may be ways to induce unexpectedness without also inducing high proximity. For instance, unexpectedness could be induced by providing participants with information on the probability of a win before the start of a trial, instead of letting them infer this from the repetition of the same symbol in AA trials. Both expected and unexpected losses can then be combined with the information that a win almost happened (i.e., proximal loss) or not (i.e., distal loss). Such an experiment would mimic unexpected but distal losses in real life. For example, a tennis player may have a high expectation of winning before the match but eventually lose the match (unexpectedly) with an extremely low score. It remains an empirical question whether in cases like this there is actual independence of expectancy and proximity or whether one variable has a systematic influence on the other.

Another objection may be that the obtained differences in the tendency to repair do not reflect "emotional" action tendencies, but elaborated strategies to maximize one's chances at winning. Deciding whether a particular action tendency or behavior is part of an emotional episode or not depends on one's definition of emotions or emotional episodes. Some would argue that positive and negative feelings are a defining property of emotions (Ortony & Turner, 1990) and that emotional behavior is behavior that is accompanied by positive and negative feelings (e.g., the affect-as-information model; Clore, 1994; Ketelaar & Au, 2003; Schwarz & Clore, 1983). According to this view, one might argue that the effect of expectancy on the tendency to repair was more "emotional" than the effect of proximity, because on unexpected loss trials the feelings of disappointment, frustration, and anger exceeded a threshold that could lead one to decide that these feelings were present (e.g., received an average rating of at least 3 on a 7-point scale ranging from *not at all* to *yes completely* in Experiment 1 or an average rating of at least 25 on the visual analog scale in Experiment 3).

Others have defined emotions as states that tilt behavior toward irrationality (but see Damasio, 1994; Frank, 1988; Lazarus, 1995).

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This idea is especially popular in folk psychology (Parrott, 1995) and has some adherents in the scientific world. For instance, some researchers have proposed that emotions were adaptive for our ancestors, but give rise to suboptimal or irrational choices in the modern world (Haselton & Ketelaar, 2006; Sripada & Stich, 2004), and that emotional behavior typically relies on heuristics rather than on accurate cost-benefit analyses (Quartz, 2009). Repair behavior can be considered as rational or as stemming from a cost-benefit analysis when it is more frequent on trials in which the participant believes that repairing will be relatively easy (i.e., coping potential is high) than on trials in which the participant believes that repairing will be relatively difficult (i.e., coping potential is low). In this respect, the influence of expectancy on repair behavior could be considered more rational and less "emotional" than the influence of proximity, because expectancy was related to coping potential (participants rated their coping potential as higher on unexpected proximal loss trials than on expected proximal loss trials), whereas proximity was not (participants rated their coping potential as equal on expected proximal loss trials than on expected distal loss trials).

Still other emotion researchers (Scherer, 2009) have suggested that emotional episodes are characterized by a high degree of synchronization between the components (i.e., cognitive, motivational, somatic, motor, and feeling). One could thus argue that the lack of significant correlations between feelings and the tendency to repair suggests that neither the effects of expectancy nor proximity are truly emotional. There are, however, several reasons not to attach too much weight to the correlations obtained in our studies (e.g., our small sample sizes and the presence of experimental manipulations that tend to push participants in the same direction and remove the interindividual variation that is necessary to obtain correlations). Future studies may investigate the presence of other criteria that have been proposed to disentangle emotional from nonemotional episodes, such as characteristic facial expressions (Ekman, 1994), or the extent to which the action tendency takes priority over other goals (i.e., control precedence; Frijda, 1986). It may finally be noted that some authors have argued that there are no objective criteria that separate emotional from nonemotional episodes (Russell, 2009). Even without consensus on how to classify an episode as emotional or not, studying the influence of appraisal on action tendencies remains valuable in its own right.

Conclusion

There is an old Taoist saying that "loss is not as bad as wanting more." Our studies are the first to show that the unexpectedness of an outcome as well as the thought that a better outcome was within reach independently increase the motivation to obtain that outcome. Disconfirmed expectations, moreover, increased feelings of disappointment, frustration, and anger.

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