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Expectations Influence How Emotions Shape Behavior

Maya Tamir and Yochanan E. Bigman
The Hebrew University

Emotions shape behavior, but there is some debate over the manner in which they do so. The authors propose that how emotions shape behavior depends, in part, on how people expect emotions to shape behavior. In Study 1, angry (vs. calm) participants made more money in a negotiation when they expected anger to be beneficial. In Study 2, angry (vs. calm) participants killed more enemies in a computer game when they expected anger (but not calmness) to promote performance. In Study 3, excited (vs. calm) participants were more creative when they expected excitement to promote performance, whereas calm (vs. excited) participants were more creative when they expected calmness to promote performance. These findings demonstrate that, at least sometimes, what emotions do depends on what we expect them to do.

Keywords: emotion, behavior, expectations, beliefs

Stepping onto the battlefield, would you fight more aggressively when angry or calm? Staring at an empty canvas, would you paint more creatively when calm or excited? Although answers may vary, people typically expect emotions to shape behavior. How emotions shape behavior likely determines how people expect emotions to shape behavior. To the extent that anger leads to aggression, for instance, people are likely to come to expect anger to lead to aggression. However, might it also be the case that how people expect emotions to shape behavior determines how emotions actually shape behavior? For instance, might anger lead to aggression simply because people expect it to do so? According to this possibility, whether one fights more or less aggressively when angry or calm and whether one paints more or less creativity when calm or excited, depends, in part, on what one expects. In this investigation, we tested whether expectations regarding the potential impact of emotions on behavior can change the actual impact of emotions on behavior.

How Do Emotions Shape Behavior?

Emotions and behavior are inextricably linked. Some theories argue that emotions activate fixed behavioral programs (e.g., Ekman, 1992). According to other theories, emotions increase the readiness of behavioral programs, but their activation depends on contextual constraints (e.g., Frijda, 1986). According to different theories, there are no inherent links between emotions and specific behavioral patterns, and although emotions influence behavior, the manner in which they do so varies across people and contexts, and depends on prior experiences and situational demands (e.g., Barrett, 2006; Russell, 2003).

At the empirical level, some evidence is consistent with the possibility of emotion-specific behavioral programs, yet other evidence demonstrates that the effects of emotions on behavior are dynamic and context-dependent (Baumeister, Vohs, DeWall, & Zhang, 2007). For example, according to some theories, anger prepares individuals to fight (e.g., Frijda, 1986). Consistent with this hypothesis, some studies found that anger promotes competition (Van Kleef, De Dreu, & Manstead, 2004) and leads to aggression (e.g., Berkowitz & Geen, 1967; Dollard, Doob, Miller, Mowrer, & Sears, 1939). For instance, people were more likely to concede to angry negotiator partners, presumably because anger led such partners to be more aggressive (Sinaceur & Tiedens, 2006; Van Kleef et al., 2004). Other evidence, however, demonstrates considerable variability in the link between anger and aggression. Some studies have failed to find that anger leads to aggression (e.g., Averill, 1982; Berkowitz, 1989), and other studies found that anger can even lead to prosocial behavior (e.g., Fischer & Roseman, 2007; van Doorn, Zeelenberg, & Breugelmans, 2014; Van Kleef & Côté, 2007).

One explanation for this variation is that effects of emotions on behavior are constantly modified through learning and are adapted to given circumstances (e.g., Barrett, 2006; Russell, 2003). According to Russell (2003), for instance, specific emotions do not produce specific actions or action tendencies. Instead, the effects of emotion on behavior in a given situation depend on prior experiences, current goals, and secondary appraisals, combined to produce a behavior that is most likely to minimize costs and maximize benefits (Russell, 2003). Moors (2017) recently offered a related perspective, according to which emotions do not necessarily trigger a fixed set of responses. Instead, emotions reflect assessments of goal-related information. Such assessment can trigger related goals and means, which are selected as a function of their expected utility. Anger, therefore, may lead to aggression in some contexts, but not in others.

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Maya Tamir, Department of Psychology, The Hebrew University; Yochanan E. Bigman, Department of Psychology and The Federmann Center for the Study of Rationality, The Hebrew University.

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Correspondence concerning this article should be addressed to Maya Tamir, Department of Psychology, The Hebrew University, Mount Scopus, Jerusalem 91905, Israel. E-mail: tamirm@mscc.huji.ac.il

If emotions help people optimize adaptation in a given context, the effects of emotions on behavior should be at least somewhat malleable and vary as a function of expected utility (for similar arguments, see Moors, 2017). In this investigation, therefore, we propose that prior expectations might moderate the effects of emotions on behavior. According to our hypothesis, an emotion may lead to a particular behavior when people expect it to do so, but fail to lead to that particular behavior when people do not expect it to do so. Anger, for instance, may lead to aggression when people expect it to do so but may fail to lead to aggression when people do not expect it to do so.

Expectations Inform Behavior

Expectations inform us about the likelihood of future events, but they can also influence expectancy-related outcomes (Olson, Roese, & Zanna, 1996; Roese & Sherman, 2007). In particular, people often behave in a manner that confirms their expectations, without necessarily being aware of doing so (e.g., Kirsch, 1985).

People have expectations regarding personal achievement, the outcomes of substances and procedures, and other people. Such expectations can yield expectancy-confirming effects (i.e., self-efficacy, Bandura, 1982; placebo effects, Ross & Olson, 1981; and self-fulfilling prophecies, Merton, 1948, respectively). For instance, expectations regarding personal achievement can influence personal achievement (e.g., Archibald, 1974). People are more likely to succeed in a task if they expect to succeed in it (see Roese & Sherman, 2007). This is, in part, because they persist longer on tasks they expect to succeed in (e.g., Carver, Blaney, & Scheier, 1979; Feather, 1966). Similarly, people are more likely to fail in a task if they expect to fail in it, in part, because they exert less effort or engage in self-defeating behaviors (e.g., Steele & Aronson, 1995). Expectations can also change the psychological or physiological effects of external substances or procedures, such as in the case of placebo effects (e.g., Stewart-Williams & Podd, 2004). For instance, people who expected a treatment to decrease pain subsequently experienced less pain during a pain induction, even when the treatment they received had no inherent powers (e.g., Benedetti & Amanzio, 1997; Montgomery & Kirsch, 1996).

People cultivate many types of expectations, including expectations regarding the effects of emotions on behavior. Emotion-outcome expectancies refer to the outcomes people expect an emotion to have. For instance, people differ in the degree to which they expect anger to promote aggression (e.g., Tamir & Ford, 2012), or excitement to promote creativity (e.g., Cohen & Andrade, 2004). Given that expectations can be self-confirming, we hypothesized that emotion-outcome expectancies might influence the actual outcomes of emotions. In this investigation, therefore, we tested whether emotion-outcome expectancies moderate the effects of emotions on behavior. In a series of studies, we tested whether leading individuals to expect emotions to have (or fail to have) certain effects on behavior changed the objective likelihood of these effects.

The Current Investigation

In three studies, we manipulated emotional experiences as well as emotion-outcome expectancies. Across studies, we used objective measures of behavior. Given that anger has been previously shown to promote competition (Van Kleef et al., 2004) and aggression (e.g., Dollard et al., 1939), we tested the effects of anger-outcome expectancies on competitive (Study 1) and aggressive (Study 2) behavior. We predicted that anger would promote performance in competitive and aggressive tasks when expected to do so, but fail to do so otherwise. In Study 3, we extended our analysis to pleasant emotions. Given that excitement, but not calmness, has been found to promote creativity (Baas, De Dreu, & Nijstad, 2008), we tested the effects of outcome expectations of excitement and calmness on creative performance. We predicted that both excitement and calmness would promote creativity when expected to do so, but that they would fail to promote creativity otherwise.

Study 1

Anger can increase personal gain in negotiations (e.g., Van Kleef et al., 2004). In Study 1, therefore, we tested whether associations between anger and negotiation performance are moderated by the expectation that anger would promote such performance. We manipulated the expected impact of anger and the experience of anger and used objective indices to measure negotiation performance.

To manipulate the expected effects of anger on negotiation, we used a manipulation of emotion-outcome expectancies, which has been validated in prior research (e.g., Porat, Halperin, & Tamir, 2016; Tamir, Bigman, Rhodes, Salerno, & Schreier, 2015). Participants received feedback from bogus participants who presumably performed well on the task. Some of this feedback either implied that anger was useful or did not refer to anger. To manipulate emotional experiences in a manner that minimizes potential semantic priming, we asked participants to listen to emotion-inducing music (for a review, see Vastfjall, 2001).

To assess performance, participants negotiated with another participant, who was new to the study and did not undergo an expectancy manipulation (and served only as a negotiation partner). The participant and the negotiation partner received individual payoff tables listing the value (in points) of each level of the negotiated issues. The issues involved the distribution of time spent on subsequent experimental tasks, and were personally relevant to the participants. Negotiation performance was assessed by monetary gain. We expected angry participants to make more money in the negotiation than participants in the neutral state, but only when they expected anger to promote negotiation performance.

Method

Participants. Participants were 78[1] American undergraduate students (50% female, aged 18–21),[2] who were paired with a same-sex partner for the negotiation task. Participants were paid $10 for their participation plus individual earnings as dictated by the outcomes of the negotiation. The study was approved by the institution's ethics review board.

[1] As the first exploratory study in the series, our sample size was relatively small. In subsequent studies, we determined our sample sizes based on power analyses, using the observed effect size in Study 1.

[2] Because of a technical error, the exact age of each participant was not recorded.

Procedure. Participants were told this was a study on peer influence. They were informed that they will complete a real negotiation task with real monetary consequences. They were told that to help them prepare for the task, they would have the opportunity to receive input from past participants who performed well on it. Participants were randomly assigned to either an anger = useful condition or to a control condition (see the Materials section).

All participants were then told that some research suggests that listening to music can help people focus, and that is why we offer them the opportunity to listen to music as they prepare for the upcoming negotiation. They were further told that the music they will listen to would be selected at random from a list of recommendations provided by prior participants and that they would be asked to provide their own recommendations later in the study so that we can expand our selection. Participants were assigned at random to either an angry or a neutral music condition. After listening to the music participants rated their emotional experiences.

Participants were introduced to their negotiation partner, who completed only the negotiation task and no further part in the study. Both the participants and their partners were given instructions about the negotiation and completed the negotiation task (see the Materials section). Once they reached an agreement, participants were asked how credible they considered the input from prior participants (which comprised the expectancy manipulation) to be, ranging from 0 (*not at all*) to 6 (*extremely*). They were probed for suspicion, debriefed, and paid according to the outcomes of the negotiation.

Materials

Expectancy manipulation. All participants read three paragraphs that included basic information about negotiations (e.g., "A negotiation is a dialogue between two or more people or parties, intended to reach an understanding"). Next, participants were randomly assigned to expectation condition (i.e., anger = useful vs. control) and read six bogus testimonials, presumably from prior participants. In both conditions, three of the testimonials did not mention emotions and were identical across conditions (e.g., "The negotiation is tricky. Most partners are going to want more money for themselves and you need to be persistent or you're not going to get what you want. I used this strategy and was pretty successful"). Participants in the anger = useful condition also read three testimonials that suggested that anger may promote performance (e.g., "I think the most important part of the whole process is figuring out how to act so you can get the most money for yourself. Throughout the negotiation, I was persistent. Eventually I got angry and my partner felt compelled to give me what I wanted"), whereas participants in the control condition read three more testimonials that did not mention anger or other emotions (e.g., "I think the most important part of the whole process is figuring out how to act so you can get the most money for yourself. Throughout the negotiation, I was persistent. Eventually I was reasonable and my partner gave me what I wanted").

Emotion induction. All participants listened to four music clips, beginning with a calm clip (i.e., *First Thing* by Fourtet). Participants in the anger condition went on to listen to three consecutive anger-inducing clips (i.e., *Curse of the Werewolf: Finale* by Benjamin Frankel, *Inquisition* by Apocalyptica, and *Refuse/Resist* by Apocalyptica), whereas participants in the neutral condition listened to three consecutive neutral clips (i.e., *Indecision* by Yo-Yo Ma, *Aerial Boundaries* by Michael Hedges, and *Tree Fingers* by Radiohead). A pilot test, in which participants ($N = 10$) listened to all the clips and rated their emotional reactions to them, confirmed that participants felt more angry after listening to the angry clips ($M = 2.43$), on a scale ranging from 0 (*not at all*) to 8 (*extremely*) compared to the neutral clips ($M = .17$), $t(9) = 5.044$, $p = .001$.

Emotional experiences. Participants rated the intensity of their current experiences (0 = not at all, 3 = moderately, 6 = extremely). To assess anger, we averaged across ratings of angry and irritated ($\alpha = .64$). To assess calmness we averaged across ratings of calm and relaxed ($\alpha = .77$). These items were interspersed among other items.[3]

Negotiation task. The goal of the negotiation was to divide five blue and five green chips between the partners. Participants were given a payoff table that represented the monetary value of each chip for them and were told that the values might differ for their partners. Negotiation pairs sat across a table, facing each other. The participant who underwent the manipulations made the first offer and the negotiation proceeded in the form of offer and counteroffer. Participants had up to 10 min to reach an agreement. All participants reached an agreement within that timeframe.

Results

Emotion manipulation check. Table 1 presents the means and standard errors of experienced anger and calmness in each experimental cell. To test whether our emotion induction had its intended effects, we ran a repeated-measures analysis of variance (ANOVA), predicting emotional experiences, with emotion (anger, calmness) as a within-subject factor, expectancy condition (anger = useful, control), and emotion induction (anger, neutral) as between-subjects factors. We found a main effect for emotion, $F(1, 74) = 117.82$, $p < .001$, $\eta_p^2 = .61$, such that on average, participants reported feeling more calm ($M = 5.04$, $SE = .21$) than angry ($M = 1.75$, $SE = .17$). As expected, we found a significant Emotion × Emotion Induction interaction, $F(1, 74) = 4.49$, $p = .037$, $\eta_p^2 = .06$. Follow-up comparisons confirmed that participants in the anger condition felt significantly angrier ($M = 2.28$, $SE = .25$) than those in the neutral emotion induction ($M = 1.22$, $SE = .23$), $F(1, 77) = 9.62$, $p = .003$, $\eta_p^2 = .12$, indicating that the anger manipulation changed emotional experiences as expected. No other effects were significant, Fs < 1, ps $> .32$, further showing that the emotion manipulation was equally effective across outcome-expectancy conditions (see Footnote 3).

Effects on negotiation performance. To test whether performance in the negotiation differed as a function of anger experience and anger-outcome expectancies, we ran an ANOVA predicting performance, with expectancy condition (anger = useful vs. con-

[3] In addition to the anger-related and calmness-related items, participants also rated the following items: *happy*, *fearful, worried, cheerful, excited, enthusiastic, pleasant, unpleasant, curious, tired, hungry, thirsty, focused, lazy, confused, interested, bored, determined,* and *comfortable*. We tested whether our emotion induction influenced ratings of any of these items. We found a significant effect on ratings of unpleasantness, $F(1, 74) = 4.35$, $p = .04$, such that participants in the anger condition felt more unpleasant than those in the neutral condition. No other effect was significant, Fs < 2.40.

Table 1
Means and Standard Errors (in Parentheses) of Emotional Experiences as a Function of Emotion and Belief Conditions (Studies 1–3)

	Study 1				Study 2				Study 3			
	Experienced anger		Experienced calmness		Experienced anger		Experienced calmness		Experienced excitement		Experienced calmness	
	Emotion induction				Emotion induction				Emotion induction			
Belief condition	Neutral	Anger	Neutral	Anger	Calmness	Anger	Calmness	Anger	Calmness	Anger	Calmness	Anger
Control	1.05 (.34)	2.42 (.35)	5.28 (.40)	4.71 (.42)								
Anger = useful	1.40 (.35)	2.15 (.34)	5.03 (.42)	5.15 (.40)								
Calmness = useful					1.33 (.11)	1.97 (.14)	4.09 (.18)	2.89 (.22)				
Anger = useful					1.29 (.12)	1.80 (.14)	4.30 (.20)	3.00 (.22)				
Calmness = useful									2.53 (.21)	3.77 (.20)	5.00 (.15)	4.19 (.16)
Control									2.95 (.19)	3.68 (.20)	4.81 (.15)	4.03 (.17)
Excitement = useful									3.15 (.21)	3.95 (.18)	4.78 (.17)	4.00 (.15)

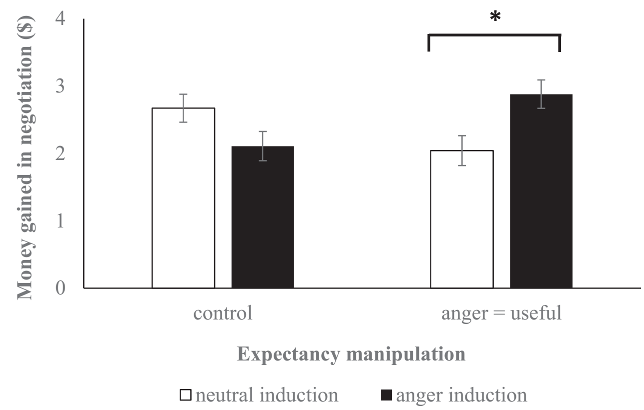

Figure 1. Negotiation performance as a function of expectancy condition and emotion induction (Study 1). Error bars reflect ±1 standard error of the mean. * $p < .05$.

trol), and emotion induction (anger vs. neutral) as predictors. As expected, we found a significant Expectancy Condition × Emotion Induction interaction, $F(1, 77) = 9.41$, $p = .003$, $\eta_p^2 = .11$ (see Figure 1). Follow-up comparisons confirmed that angry participants performed better in the negotiation than those in a neutral state, but only if they expected anger to promote performance, mean difference = .90, $p = .005$, 95% confidence interval (CI): .277,1.529. Angry participants and participants in a neutral state did not differ in their negotiation performance in the control expectancy condition, mean difference = .46, $p = .148$.

Probing for suspicion. All participants found the alleged input from prior participants credible ($M = 3.26$ on a 0–6 scale). Ratings of credibility did not vary by expectancy or emotion inductions, Fs < 1, ps $> .33$. None of the participants identified the true purpose of the study. When probed for suspicion, six participants were suspicious of the input from prior participants (three in the anger = useful and three in the control condition). Results remained unchanged when these participants were excluded from the analyses.

Discussion

The findings in Study 1 demonstrate that whether anger promoted negotiation performance or not depended on whether participants expected it to do so. Among participants who expected anger to promote performance in the negotiation, those who felt angry ended up making more money in the negotiation than those who did not. This, however, was not the case among participants who were not led to expect anger to improve their performance. Such participants performed equally well whether they felt angry or not.

The results of Study 1 supported our hypotheses. Nonetheless, there are several important limitations to the study. First, although the observed power in Study 1 was adequate (= .87), the sample size was small. Second, we did not directly assess the efficacy of our emotion-outcome expectancy manipulation. Study 2, therefore, included a larger sample size and a manipulation check for both our emotion and expectancy manipulations. Study 2 was also designed to test whether our effects generalize to more direct indices of aggressive behavior.

Study 2

Anger is assumed to promote aggression (e.g., Anderson & Bushman, 2002; Frijda, 1986). In Study 2, therefore, we focused more directly on the link between anger and aggression. We tested whether anger-outcome expectancies moderate the effects of anger on aggressive performance in a first-person shooter game. We also included an expectancy manipulation check, by asking people to what extent they expected anger to be useful for promoting performance in similar computer games. As in Study 1, we expected angry participants to perform better in the aggressive game than participants in a neutral state if they expected anger to promote performance in the game, but potentially worse if they did not.

Method

Participants. Participants were 159[4] Israeli university students (M_{age} = 23.53, *SD* = 33.2, 82% females), who received 10 NIS (approximately $4) or course credit for their participation, in addition to a monetary bonus based on their performance. Seventeen additional participants began but failed to complete the study due to technical difficulties (e.g., the computer game crashed, the audio player failed). The study was approved by the institution's ethics review board.

Procedure. Participants were told the study concerned the influence of exposure to media outlets (e.g., music) on performance in computer tasks. Participants were told they would play a computer game later in the session and that they should try to perform as best they can to receive a monetary bonus for good performance. They were further told that before playing the game they could read feedback from prior participants who performed well in the task. Participants were assigned to either an anger = useful or a calmness = useful expectancy condition (see the Materials section).

After the expectancy manipulation, participants were randomly assigned to listen to either anger-inducing or calmness-inducing music for 2 min and rated their emotional experiences. The experimenter then introduced and explained a first-person shooter game, where the goal was to kill as many avatars without getting killed and that they would receive 0.5 NIS for each kill. Participants practiced playing the game for two minutes in the presence of the experimenter, who ensured the participants understood how to play the game. Then the experimenter restarted the game and left the room, and the participant played the game for 5 min, while listening to the same neutral or anger-inducing music they listened to earlier. After 5 min, the experimenter entered the room and recorded the participant's score in the game. Participants rated the extent to which they expected various emotions, including anger and calmness, to promote performance on similar computer games. Finally, participants were asked to offer their own recommendations to future participants. They were then paid according to their game performance and probed for suspicion.

Materials

Expectancy manipulation. Participants read three bogus testimonials from previous participants. All participants read one testimonial that did not mention emotions (i.e., "What helped me the most in the game was paying attention to what happens around me and not staying in the same place for too long, that way you can surprise your enemies and hit many of them"). Participants in the anger = useful condition read two additional testimonials that suggested that anger may promote performance in the game (e.g., "At first I didn't do so well, and the avatars got me before I could get to them. But then I got annoyed and I started to shoot and I succeeded"). In the calmness = useful condition participants read testimonials that suggested that calmness may promote performance in the game (e.g., "At first I didn't do so well, and the avatars got me before I could get to them. But then I took a deep breath and it helped me think clearly and I succeed"). To ensure participants read and considered the plausibility of the testimonials, participants were asked to select two of the testimonials and briefly explain whether and why they agree with them.

Emotion induction. Participants in the anger condition listened to two anger-inducing clips (i.e., *Refuse\Resist* and *Domination* by Apocalyptica). Participants in the calmness condition listened to two calmness-inducing clips (i.e., *First Thing* by Fourtet and *Tree Fingers* by Radiohead). A pilot test (N = 10) confirmed that participants felt more anger in response to the angry than the calm clips (Ms = 2.88 vs. 0.43, respectively, on a scale of 0 = not at all, to 8 = extremely), $t(9) = 2.85$, $p = .019$, 95% CI [4.39, .051]. Participants also felt more calm in response to the calm than the angry clips (Ms = 4.63 vs. 2.10, respectively), $t(9) = 2.91$, $p = .017$, 95% CI [4.49, 2.91].

Emotional experiences. Participants rated the extent to which they felt various emotions ranging from 0 (*not at all*) to 5 (*extremely*). To assess anger, we averaged across ratings of angry and irritated ($\alpha = .79$). To assess calmness, we averaged across ratings of calm and relaxed ($\alpha = .92$). Participants also rated other items, in an attempt to conceal the target items.[5]

Emotion-outcome expectancies. Participants rated the extent to which they expected different emotional states to promote performance in computer games similar to the one they had just played on a 0 (= not at all) to 5 (= extremely) scale. To assess anger-outcome expectancies, participants rated the usefulness of feeling angry and irritated ($\alpha = .79$). To assess calmness-outcome expectancies, participants rated the perceived usefulness of calmness and relaxation ($\alpha = .86$).

Results

Emotion manipulation check. Table 1 presents the means and standard errors of experienced anger and calmness in each experimental cell. To test whether the emotion inductions changed emotions in the expected direction, we predicted emotional experiences in a repeated-measures ANOVA, with emotion (anger, calmness) as a within-subject variable, and emotion induction (anger, calmness), and expectancy condition (anger = useful, calmness = useful) as between-subjects variables. We found a main effect for emotion, $F(1, 154) = 206.18$, $p < .001$, $\eta_p^2 = .57$,

[4] We ran a power analysis to determine the required sample size in Study 2, based on the results of Study 1, using G*power 3.1.9.2. The analysis indicated that to detect an interaction, with an F effect size of 0.25 and power of 0.8, we needed a total sample of 128 participants. To allow for potential dropouts we oversampled by approximately 20%.

[5] Participants also rated the following items: *concentration, pleasure, activation, fear, worry, confusion, happiness, excitement, enthusiasm, curiosity,* and *determination*. We tested whether our emotion induction influenced ratings of any of these items. We found significant effects on ratings of activation, fear, excitement, and enthusiasm, $F(1, 156)$s > 7.35, ps $< .007$, such that participants in the anger condition felt more activation, fear, and excitement than participants in the calmness condition.

such that on average, participants felt more calm ($M = 3.57$, $SE = .10$) than angry ($M = 1.60$, $SE = .06$). More importantly, as predicted, we found a significant Emotion × Emotion Induction interaction, $F(1, 154) = 43.82$, $p < .001$, $\eta_p^2 = .22$. Participants felt angrier after listening to the angry ($M = 1.88$, $SE = .10$) than the calm music ($M = 1.31$, $SE = .08$), $F(1, 154) = 20.82$, $p < .001$, $\eta_p^2 = .12$. Participants also felt calmer after listening to the calm ($M = 4.19$, $SE = .13$) than the angry music ($M = 2.95$, $SE = .16$), $F(1, 154) = 36.84$, $p < .001$, $\eta_p^2 = .19$. No other effects were significant, Fs < 1.40, ps $> .33$, showing that our manipulations were equally effective across outcome-expectancy conditions (see Footnote 5).

Expectancy manipulation check. Table 2 presents the means and standard errors for beliefs about the expected usefulness of anger and calmness in each experimental cell. To test whether our expectancy manipulations were successful, we ran a repeated-measures ANOVA, predicting the expected usefulness of anger and calmness from emotion induction (anger, calmness), expectancy condition (anger = useful, calmness = useful) and their interaction. We found a main effect for emotion, $F(1, 152) = 25.69$, $p < .001$, $\eta_p^2 = .15$, such that on average, participants expected calmness to be more useful ($M = 3.69$, $SE = .13$) than anger ($M = 2.75$, $SE = .12$). As we predicted, we found a significant Emotion × Expectancy Condition interaction, $F(1, 153) = 11.90$, $p = .001$, $\eta_p^2 = .07$. Participants in the anger = useful condition expected anger to be more useful ($M = 3.04$, $SE = .18$) than participants in the calmness = useful condition ($M = 2.45$, $SE = .17$), $F(1, 152) = 5.72$, $p = .018$, $\eta_p^2 = .04$. Similarly, participants in the calmness = useful condition expected calmness to be more useful ($M = 4.04$, $SE = .17$) than participants in the anger = useful condition ($M = 3.34$, $SE = .18$), $F(1, 152) = 7.89$, $p = .006$, $\eta_p^2 = .05$. No other effects were significant, Fs < 1, ps $> .36$. These analyses demonstrate that our expectancy manipulations were successful, and equally effective across emotion manipulation conditions.

Effects on computer game performance. To assess performance we counted the number of enemies the participants killed during the game and subtracted the number of times the participant's avatar was killed (following the procedure described in Tamir, Mitchell, & Gross, 2008). We then ran a univariate ANOVA, predicting game performance from emotion induction (anger, calmness), expectancy condition (anger = useful, calmness = useful), and their interaction. As predicted, we found a significant Emotion Induction × Expectancy Condition interaction, $F(1, 155) = 5.73$, $p = .018$, $\eta_p^2 = .04$. As shown in Figure 2, angry (vs. calm) participants performed better in the game when they expected anger (vs. calmness) to be useful, $F(1, 155) = 4.81$, $p = .030$, $\eta_p^2 = .03$. Contrary to our prediction, calm participants did not perform better than angry participants did as a function of expectations, $F < 1.40$, ps $> .42$.

Probing for suspicion. None of the participants identified the true purpose of the study when probed for suspicion. Thirteen participants (8%) expressed some suspicion regarding the authenticity of the testimonials. Effects remained significant when these participants were excluded from the analysis.

Discussion

The results of Study 2 show that the effect of anger on aggression can be moderated by manipulated anger-outcome expectancies. Participants who expected anger to promote their performance in an aggressive shooting game played better in the game when they felt angry than when they felt calm. This, however, was not the case among participants who expected calmness to promote performance. We found no significant differences in the performance of such participants as a function of emotion induction. Although we expected these participants to play better when calm than when angry, this hypothesis was not supported. This may have been due to insufficient power or perhaps to the relatively strong beliefs in the usefulness of calmness across conditions. Another possibility is that our effects in Study 2 were dependent on high levels of arousal. To test this possibility in Study 3, we independently manipulated beliefs about emotions that are either high in arousal (i.e., excitement) or low in arousal (i.e., calmness). Studies 1–2 provide evidence for the role of expectations in moderating the impact of emotions on behavior. In Study 3, we also sought to test the generalizability of our findings and explore the mechanism that might underlie them.

Study 3

Recent evidence suggests that excitement promotes creativity, whereas calmness does not (Baas et al., 2008). Therefore, in Study 3, to extend our findings beyond anger, we tested whether the effects of excitement and calmness on creativity depend on people's expectations. We predicted a double dissociation, such that

Table 2
Means and Standard Errors (in Parentheses) of Expected Usefulness Ratings as a Function of Emotion and Belief Conditions (Studies 2–3)

	Study 2				Study 3			
	Anger usefulness		Calmness usefulness		Excitement usefulness		Calmness usefulness	
	Emotion induction				Emotion induction			
Belief condition	Calmness	Anger	Calmness	Anger	Calmness	Excitement	Calmness	Excitement
Calmness = useful	2.53 (.21)	2.38 (.26)	4.24 (.22)	3.85 (.27)				
Anger = useful	3.07 (.23)	3.00 (.27)	3.60 (.24)	3.08 (.28)				
Calmness = useful					4.12 (.19)	4.40 (.20)	5.05 (.17)	4.66 (.18)
Control					4.26 (.19)	4.12 (.19)	4.53 (.17)	4.24 (.19)
Excitement = useful					4.83 (.21)	4.69 (.19)	4.58 (.20)	4.39 (.17)

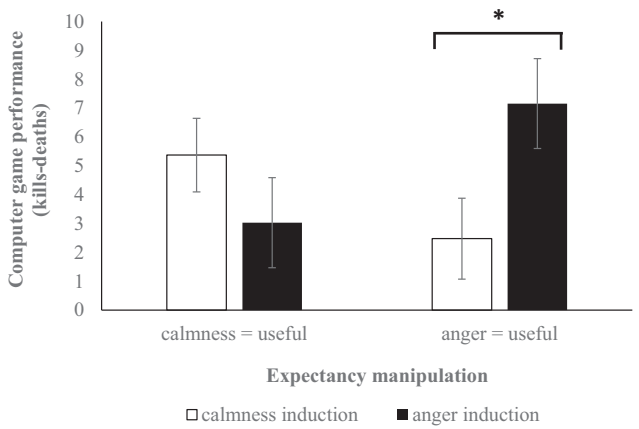

Figure 2. Computer game performance as a function of expectancy conditions and emotion inductions (Study 2). Error bars reflect ±1 standard error of the mean. * $p < .05$.

the effect of either excitement or calmness would be moderated by manipulated expectations regarding excitement or calmness, respectively. To assess the unique effect of each manipulated expectancy, we included a control condition, in which expectations were not manipulated. Participants were also assigned to excitement or calmness emotion manipulations. We expected excitement and calmness to promote creative performance, when people expected them to do so, but not to promote creative performance when they were not expected to do so. We used a validated standardized test (Guilford, 1967) to assess creative performance. Furthermore, to explore the mechanism that might underlie the moderating effect of expectations, we tested whether emotion-outcome expectancies influence performance by increasing task persistence (e.g., Carver et al., 1979). We did so, by measuring the time spent on the creativity task.

Method

Participants. Participants were 218[6] American undergraduate students (72.30% female; $M_{age} = 19.7$), who participated for $5 or course credit. Data from six additional participants could not be included in the analysis, due to technical problems (i.e., computer or audio player malfunction, or experimenter's errors). The study was approved by the institution's ethics review board.

Procedure. Participants were told the study examined the impact of different types of media on performance. They were told that they would be randomly assigned to either read a newspaper article, watch a short movie clip, or listen to music, and then perform a creativity task. Participants were then randomly assigned to three possible expectancy conditions: an excitement = useful, a calmness = useful, or a control condition, where no information was provided (see the Materials section). All participants were told they had been assigned to listen to music. Participants were then randomly assigned to listen to either exciting or calm music. Participants rated their emotional experiences and completed the creativity task (see the Materials section). After the task, participants rated the extent to which they expected different emotions to promote performance on tasks similar to those they had just completed. Finally, participants were asked to offer their own recommendations to future participants, and evaluate the recommendations they read earlier. Participants were probed for suspicion and debriefed.

Materials

Expectancy manipulations. Participants received feedback from bogus prior participants, who presumably performed well on the creativity task. All participants read three statements. One statement was consistent across conditions and did not mention emotions: "In tasks of this sort, it is important to keep an open mind and to think about things from many possible perspectives." Participants in the excitement = useful condition read two more statements that suggested that excitement may promote performance (e.g., "This is a creativity task—you need to approach it with lots of energy and enthusiasm. If you stay positive and open minded, you are bound to do well"). Participants in the calmness = useful condition read two more statements that suggested that calmness may promote performance (e.g., "This is a creativity task—it is important to stay calm and collected. Then you can focus and think clearly and solutions will come to you"). Participants in the control condition read two more statements that did not mention emotions (e.g., "Even if you think that you are not creative, have faith in yourself and you'll do better than you expect"). As in Study 2, participants were asked to pick two suggestions they agreed with the most and briefly explain whether and why they endorse them.

Emotion inductions. Participants listened to two consecutive music clips for approximately 5 min. Participants in the excitement condition listened to two excitement-inducing clips (i.e., *Riding Forth the Wave* performed by Catch 22 and *Dreamoz* by Jah Hannah). Participants in the calmness condition listened to two calmness-inducing clips (i.e., *First Thing* by Fourtet and *Tree Fingers* by Radiohead). A pilot test ($N = 10$) confirmed that the exciting music induced more excitement than the calm music (Ms = 4.15 vs. 1.40), on a scale ranging from 0 (*not at all*) to 8 (*extremely*), $t(9) = 3.23$, $p = .009$, whereas the calm music induced more calmness than the exciting music (Ms = 4.95 vs. 2.90), $t(9) = 3.05$, $p = .014$.

Emotional experience. Participants rated the degree to which they experienced various feelings in the moment, on a scale ranging from 0 (*not at all*) to 5 (*extremely*). To assess experienced excitement, we averaged across ratings of excited and enthusiastic ($\alpha = .93$). To assess experienced calmness, we averaged across ratings of calm and relaxed ($\alpha = .86$).

Creativity task. To assess creative fluency, we used the standardized Alternative Uses Task (Guilford, 1967). In the task, participants are asked to generate as many possible uses for a common object (i.e., a brick). Creative fluency was indexed by the total number of uses provided (see Arden, Chavez, Grazioplene, & Jung, 2010). We also recorded the time participants spent on the task.

Emotion-outcome expectancies. Participants were asked to consider the creativity task they just completed and rate the extent to which they think that various mental states might promote

[6] We ran a power analysis to determine the required sample size in Study 3, based on the results of Study 1, using G*power 3.1.9.2. The analysis indicated that to detect an interaction, with an F effect size of 0.25 and power of 0.8, we needed a total sample of 187 participants. To allow for potential dropouts we oversampled by approximately 20%.

performance on such a task on a scale ranging from 0 (*not at all*) to 5 (*extremely*). To assess excitement-outcome expectancies, we averaged across ratings of excited and enthusiastic ($\alpha = .90$). To assess calmness-outcome expectancies, we averaged across ratings of calm and relaxed ($\alpha = .82$).

Results

Emotion manipulation check. Table 1 presents the means and standard errors of experienced excitement and calmness in each experimental cell. To test whether our emotion inductions influenced emotions as expected, we ran a repeated-measures ANOVA, predicting the experience of excitement and calmness from emotion induction (excitement, calmness), expectancy condition (excitement = useful, calmness = useful, control) and their interaction. We found a main effect for emotion, $F(1, 207) = 161.69$, $p < .001$, $\eta_p^2 = .44$, such that on average, participants felt more calmness ($M = 4.47$, $SE = .07$) than excitement ($M = 3.34$, $SE = .08$). As we predicted, we found a significant Emotion × Emotion Induction interaction, $F(1, 207) = 92.58$, $p < .001$, $\eta_p^2 = .31$. Participants felt more excited after listening to the excitement-inducing music ($M = 3.80$, $SE = .11$) than the calmness-inducing music ($M = 2.88$, $SE = .11$), $F(1, 207) = 34.56$, $p < .001$, $\eta_p^2 = .14$. Participants also felt more calm after listening to the calmness-inducing music ($M = 4.86$, $SE = .09$) than the excitement-inducing music ($M = 4.07$, $SE = .09$), $F(1, 207) = 36.50$, $p < .001$, $\eta_p^2 = .15$. We also found a significant Emotion × Expectancy Condition interaction, $F(1, 207) = 3.89$, $p = .022$, $\eta_p^2 = .04$. Although there were no significant differences across expectancy conditions in excitement or calmness, participants in the excitement = useful condition felt more excitement overall ($M = 3.55$, $SE = .14$) than those in the calmness = good condition ($M = 3.15$, $SE = .14$), $p = .038$, 95% CI [.023, .785]. No other effects were significant, $F < 1$, $p > .41$.[7]

Expectancy manipulation check. Table 2 presents the means and standard errors of beliefs about the expected usefulness of excitement and calmness in each experimental cell. To test whether our expectancy manipulations were successful, we ran a repeated-measures ANOVA, predicting the expected usefulness of excitement and calmness from Emotion Induction (excitement, calmness), Expectancy Condition (excitement = useful, calmness = useful, control) and their interaction. The only significant effect was an Emotion × Expectancy Condition interaction, $F(1, 207) = 8.30$, $p < .001$, $\eta_p^2 = .07$. Participants in the excitement = useful condition expected excitement to be more useful ($M = 4.76$, $SE = .14$) than participants in the calmness = useful condition ($M = 4.26$, $SE = .14$), $p = .012$, 95% CI [.113, .897], and in the control condition ($M = 4.35$, $SE = .14$), $p = .038$, 95% CI [.023, .807]. Participants in the calmness = useful condition expected calmness to be more useful ($M = 4.86$, $SE = .13$) than participants in the excitement = useful condition ($M = 4.48$, $SE = .13$), $p = .041$, 95% CI [.015, .732], and in the control condition ($M = 4.48$, $SE = .13$), $p = .034$, 95% CI [.029, .736]. Finally, the Emotion × Emotion Induction interaction approached significance, $F(1, 207) = 3.69$, $p = .056$, $\eta_p^2 = .02$, such that people who listened to calm music expected calmness to be more useful than excitement, $p = .034$ (Ms = 4.72 and 3.30 for beliefs about the usefulness of calmness and excitement, respectively), but such a difference did not emerge for people in the excitement condition, $p = .88$ (Ms = 4.49 and 4.51 for beliefs about the usefulness of calmness and excitement, respectively). No other effects were significant, $F < 1.05$, $p = .36$.

Effects on creative performance. To test whether the effects of emotions on creativity depended on participants' expectations, we ran a univariate ANOVA, predicting the number of uses produced in the creativity task from emotion induction (excitement, calm), expectancy condition (excitement = useful, calmness = useful, control), and their interaction.[8] As predicted, we found a significant Emotion Induction × Expectancy Condition interaction, $F(2, 207) = 5.34$, $p = .006$, $\eta_p^2 = .05$. No other effects were significant, Fs < 1.04, $p > .35$. As depicted in Figure 3, follow-up comparisons indicated that excited participants were significantly more creative than calm participants in the excitement = useful condition, $F(1, 207) = 4.22$, $p = .041$, $\eta_p^2 = .02$. Similarly, calm participants were more creative than excited participants in the calmness = useful condition, $F(1, 207) = 5.55$, $p = .019$, $\eta_p^2 = .03$. Calm and excited participants did not differ in their performance in the control condition, $F < 1.06$, $p > .30$.[9]

Task persistence. To test whether our manipulations influenced how long participants persisted on the task, we predicted the amount of time spent on the creativity task from emotion induction (excitement, calm), expectancy condition (excitement = useful, calmness = useful, control), and their interaction. The Emotion Induction × Expectancy Condition interaction did not reach statistical significance, $F(2, 217) = 2.55$, $p = .081$, $\eta_p^2 = .02$, but the means were in the expected direction. Participants in the excitement = useful condition tended to spend more time on the task when they were excited ($M = 176.30$ seconds, $SE = 17.30$) than calm ($M = 132.47$ s, $SE = 19.73$), $p = .096$, $\eta_p^2 = .01$, whereas participants in the calmness = useful condition tended to spend more time on the task when they were calm ($M = 183.09$ seconds,

[7] In addition to the calmness-related and excitement-related items, participants rated the following items: *happy, energetic, irritated, alert, pleasant, afraid, joyful, confused, interested, worried, focused,* and *angry*. As would be expected, our emotion induction influenced ratings of arousal (energetic and alert), and ratings of pleasure, Fs $(1, 207) > 10.46$, ps $< .001$, such that participants in the excitement condition felt more aroused and more pleasant than those in the calmness condition. There was no significant effect on anger, $F(1, 207) < 2.68$, $p > .10$. We did find a significant effect on fear, such that participants in the calm condition felt more fear than those in the excitement condition, $F(1, 207) = 4.02$, $p = .046$.

[8] Data from five participants whose performance was more than 3 *SD* above the creativity mean were excluded from the analyses. These participants produced an average of approximately 50 uses of a brick within a few minutes, raising concerns about the validity of their responses (e.g., snorting).

[9] Following the request of an anonymous reviewer, we conducted additional sets of analyses in each study, where self-reported emotional experiences, beliefs, and their interaction term were included as simultaneous predictors of performance in a linear regression analysis, instead of experimental conditions. In these analyses, we failed to find significant interactions, ts < 1. There may be several explanations for these findings. For instance, it may be that effects of expectancies involve aspects of emotional states other than emotional intensity per se. Another possibility is that our effects may involve automatic processes that are not necessarily captured by conscious reports of emotional experiences.

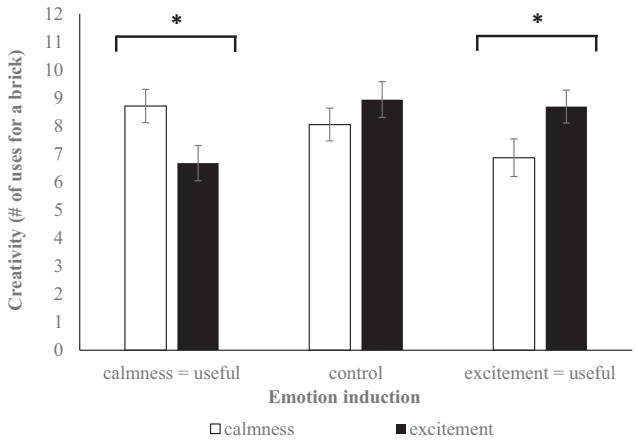

Figure 3. Creative performance (i.e., number of uses for a brick) as a function of expectancy conditions and emotion inductions (Study 3). Error bars reflect ±1 standard error of the mean. * $p < .05$.

SE = .17.53) than excited (*M* = 144.58 s, *SE* = 18.53) $p = .133$, $\eta_p^2 = .01$. No other effects were significant, *F*s < 1, *p*s > .73.[10]

Probing for suspicion. None of the participants identified the true purpose of the study when probed for suspicion. On average, participants found the feedback from prior participants moderately convincing (*M* = 3.96 on a scale of 1–6, *SD* = 1.16). Seven participants (3%) suspected that the testimonials were fabricated. Results remained largely the same when these participants were excluded from the analysis.

Discussion

The findings of Study 3 demonstrate that our manipulation of emotion-outcome expectancies moderated the effects of emotions on performance. The findings also show that the effects generalize to different emotions, and to different types of performance. Although effects on time spent on the task did not reach statistical significance, they suggest that emotion-outcome expectancies might influence task persistence. By including a control condition, we were able to demonstrate that the effects of emotion-outcome expectancies are emotion-specific.

Comparisons to the control conditions also suggest that whereas expectations of harmful outcomes lead emotions to impair performance, expectations of beneficial outcomes do not necessarily lead emotions to promote performance. In particular, we did not find that performance was enhanced among excited participants who expected excitement to be useful (vs. those in the control expectancy condition). However, performance was impaired among excited participants who expected calmness to be useful (vs. those in the control expectancy condition). A parallel pattern was found for calm participants. Such conclusions, however, should be tested further in future research.

General Discussion

Our findings demonstrate that expectations regarding the impact of emotions on behavior can influence the actual impact of emotions on behavior. Anger enhanced negotiation performance when participants expected it to promote performance, but not otherwise. Anger promoted performance in an aggressive computer game, but only when participants expected it to do so. Finally, excited participants were more creative than calm participants when expecting excitement to promote creativity, whereas calm participants were more creative than excited participants when expecting calmness to promote creativity. These findings indicate that sometimes emotions shape behavior the way we expect them to.

Understanding How Emotions Shape Behavior

There is some debate regarding the manner in which emotions shape behavior (e.g., Baumeister et al., 2007). According to some theories, emotions trigger emotion-specific behavioral tendencies (e.g., Ekman, 1992; Frijda, 1986), that can either run their course or be actively inhibited. According to other theories, there are no inherent links between emotions and behavior. Instead, people learn about emotions from prior experiences, in a context-dependent manner (e.g., Barrett, 2006; Mesquita, 2010; Russell, 2003). Our findings suggest that if emotion-specific behavioral tendencies exist, they cannot fully account for the effects of emotions on behavior. Instead, what emotions do is also a function of what people expect emotions to do.

By demonstrating that manipulations of emotion-outcome expectancies can moderate how emotions influence behavior, our findings point to one mechanism that might explain variation in emotion-behavior links. We manipulated expectations by changing semantic knowledge about emotions. Outside the laboratory, however, emotion-outcome expectancies may depend on past experiences (e.g., Barrett, 2006) and expected utility (Moors, 2017). Expectations, therefore, may be one mechanism by which past experiences shape subsequent experiences of emotion.

Our findings raise new questions about the type of expectations people have regarding the effects of emotions on behavior, and their potential implications. If emotions are linked to fixed patterns of behavior, emotion-outcome expectancies could be either accurate or inaccurate, and their effects may be constrained to facilitating or inhibiting existing emotion-behavior links. For instance, perhaps anger could show stronger or weaker effects on aggression, but it could not lead to submissive behavior. Alternatively, if the effects of emotions on behavior are learned, emotion-outcome expectancies might play an important role in determining how emotions shape behavior, and their effects may be constrained only by what people can expect. For instance, perhaps anger could lead to aggression, empathic behavior, or creativity, to the extent that people expect it to do so. Our current findings are consistent with either of these accounts. However, an important task for future research is to identify which emotion-outcome expectancies people are willing to endorse and the extent to which such expectations can affect various emotion-behavior links. Finally, this investigation tested how emotions shape behavior, but it is also

[10] For exploratory reasons, we examined how much of the variance explained by the interaction of Emotion Induction × Expectancy Condition may be accounted for by time spent on the task. The eta squared of the interaction was 0.049. When adding time to the analysis as a covariate, the eta squared of the interaction was reduced to 0.016. This suggests that 67% of the effect size of the interaction may be accounted for by time spent on the task. Although this is consistent with our expected mediation effect, these results should be interpreted with caution, given that the effect of our manipulations on time spent on the task were only marginally significant.

likely that behavior shapes emotions. Future research should examine such bidirectional effects and whether or how they reinforce each other.

Expectations About Emotions and Other Mental States

Our investigation joins a growing body of research that tests whether and how beliefs about mental states shape subsequent outcomes. For instance, Jamieson and colleagues have recently shown that altering expectations regarding physiological arousal changed its objective consequences. In one investigation, participants who were led to expect arousal to promote academic performance subsequently performed better on an academic achievement test when in a high arousal state (Jamieson, Mendes, Blackstock, & Schmader, 2010). In another study, participants who were led to expect physiological arousal to be helpful when coping with stress subsequently had more adaptive cardiovascular and cognitive reactions to a stressor (Jamieson, Nock, & Mendes, 2012). The authors proposed that thinking about arousal as advantageous facilitated appraisals of challenge over threat, shifting physiology and behavior in a congruent manner. It is possible that a similar process underlies the current effects. Taken together, these findings and our own suggest that expectations might moderate not only the effects of emotions on behavior, but also the effects of arousal, pleasure, and other affective states.

Limitations and Future Directions

Our findings demonstrate that at least some of the effects of emotions on behavior could be moderated by expectations. However, our studies also have several limitations. First, given that our measures were based on self-report, we could not entirely rule out the possibility of demand effects. Future studies could attempt to do so, for instance, by manipulating emotion-outcome expectancies implicitly. Second, our studies were conducted in relatively artificial laboratory settings. To test the generalizability of our effects, future studies should examine the effects of emotion-outcome expectancies on performance in more naturalistic settings.

Third, we examined a limited set of emotion-outcome expectancies, using relatively direct manipulations. In future studies, it would be important to assess the potential effects of emotion-outcome expectancies as they pertain to other types of emotions and behaviors (e.g., empathy and helping). In particular, we focused primarily on approach-related emotional states (i.e., excitement and anger; see Carver, 2001). Future studies should test whether avoidance-related states, such as fear or anxiety, could also promote performance, when people expect them to do so. It would also be important to test whether our findings replicate when using other manipulations and measures of emotions and beliefs (e.g., indirect measures), and when counterbalancing the order of the manipulation checks.

Fourth, it would be important to test the boundary conditions of our effects. For instance, certain emotion-outcome expectancies may be more malleable than others. We have found that it is possible to lead people to expect anger to either promote or hinder aggressive performance. However, it is possible that whereas some emotion-outcome expectancies (e.g., anger leads to aggression) are relatively easy to modify, others (e.g., empathy leads to aggression) may be difficult or even impossible to modify. Such possibilities could be directly tested in future research.

Finally, another question concerns the manner in which emotion-outcome expectancies exert their effects. According to Kirsch (1985), all expectations influence behavior directly. However, there is still debate over the mechanism underlying at least some expectancy effects (see Stewart-Williams et al., 2004). Future research should examine how emotion-outcome expectancies operate, as well as potential mediators of their effects (e.g., task persistence).

Conclusions

The effects of emotions on behavior are not fixed. Instead, they vary in context-sensitive ways. This investigation demonstrates that the contextual factors that determine how emotions shape behavior include our own beliefs and expectations. When people expect an emotion to yield (or fail to yield) a particular outcome, these expectations contribute to the likelihood of such outcomes. At least in some cases, what we expect emotions to do may determine what they actually do.

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