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Guilty, Free and Wise: Determinism and Psychopathy Diminish Learning from Negative Emotions

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GUILTY, FREE AND WISE: DETERMINISM AND PSYCHOPATHY DIMINISH
LEARNING FROM NEGATIVE EMOTIONS

By

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ABSTRACT

Emotional experiences can bring about personal growth. For instance, feeling guilty may prompt one to learn from a mistake, and this learning can bring about different and better future behavior. Four studies ($N = 570$) found that belief in free will facilitated learning from emotional experiences, as deterministic beliefs were associated with reduced learning. Studies included both correlational (Study 1) and experimental (Studies 2-4) designs. Emotional responsiveness, as defined by low psychopathy scores, also facilitated learning from emotional experiences (Studies 3 and 4). The degree of learning associated with emotional experiences was measured by self-rating (Studies 1 and 2), independent evaluations of lessons learned (Study 3), and whether participants joined a campus recycling program (after being made to feel guilty about an environmental transgression; Study 4).

CHAPTER 1

INTRODUCTION

The notion that emotions directly cause behavior (e.g., fear causes fleeing) may be popular, but a recent literature review found little empirical support for it (Baumeister, Vohs, DeWall, & Zhang, 2007). Instead, the review found evidence that emotions *indirectly* affect behavior. For instance, feeling guilty may prompt one to learn from a mistake, which then affects how one intends to act in the future.

The present investigation sought to clarify the conditions under which people learn functional lessons from emotional experiences. Our expectation was that belief in free will is an important factor in learning from emotions, such that discouraging belief in free will would undermine learning from emotional experiences. A second prediction was that trait differences in responsiveness to emotions, as defined by psychopathy, would influence learning from emotions. Specifically, we expected that people high in psychopathy (i.e., emotionally unresponsive) would learn less from emotional experiences than people low in psychopathy. We also predicted an interaction between belief in free will and psychopathy, such that disbelief in free will would reduce learning primarily among nonpsychopaths (making them resemble psychopaths with respect to learning from emotional experiences).

1.1 Learning from Emotional Experiences

It is important to clarify what emotions are of interest to the present investigation because there is not unanimity of opinion in the literature regarding what constitutes feeling an emotion. The present investigation is concerned with *conscious emotions*. Conscious emotions are best defined in contrast to automatic affect, which is a relatively immediate and fleeting evaluation of something as good or bad, of which one may or may not be aware (Baumeister et al, 2007; Russell, 2003). Conscious emotions are fully developed, arise and dissipate slowly, are deeply entwined with cognition, and often involve physiological changes. Conscious emotions are more likely than automatic affect to produce opportunities for learning, so conscious emotions will be the focus of the present work.

Indirect causation theory (Baumeister et al., 2007) holds that conscious emotions enable people to profit from their experiences. This is because conscious emotions promote cognitive reflection, and the content of that reflection affects future behavior. According to the theory,

emotions indirectly affect future behavior by virtue of their influence on cognition. For example, a person who carelessly makes a comment that hurts the feelings of a valued friend is likely to feel guilty, which may prompt the offending individual to reflect on the incident and resolve to be more sensitive in the future. Resolving to be more sensitive under such circumstances seems like a rational conclusion, and one that would likely benefit future interactions. Yet this is at odds with the popular notion that emotions primarily cause irrational and socially undesirable behaviors. Instead, indirect causation theory views emotions as indirectly promoting beneficial conduct.

If emotions primarily cause undesirable actions, then one would expect people with impaired emotions to acquit themselves extremely well. Yet evidence suggests the contrary: an absence of emotions can leave one at increased risk to behave irrationally and even unethically. One study found that people who experience blunted emotions (as a result of organic damage to the pre-frontal cortex) were faster to return to a stimulus that caused them a large loss, in hypothetical dollars, relative to those whose emotions were not impaired (Bechara, Damasio, Tranel, & Damasio, 1997). The quick return to the loss-causing stimulus by those with blunted emotions suggests that they did not learn from the experience of losing dollars compared to those with intact emotions. At the least, this study demonstrates that emotional impairment does not improve the rationality of one's actions, as one would expect if emotions primarily caused irrational behavior (*cf.* Damasio, 1994).

The value of intact emotions was also demonstrated in a study in which undergraduate students were given an opportunity to cheat and seemingly improve their grade (Schachter & Latane, 1964). Whereas all participants were given an opportunity to cheat, some participants were unsuspectingly given a tranquilizer. Those given the tranquilizer were subsequently more likely to cheat compared to controls, presumably because the tranquilizer impaired arousal, thereby diminishing feelings of guilt. Thus an absence of guilt led to cheating, suggesting that conscious emotions support ethical behavior. In sum, and contrary to the suggestion that emotions primarily cause bad behavior, people whose capacity to feel emotions had been blunted by brain injury behaved less rationally than those without brain injury, and people whose emotions were impaired experimentally were more likely to behave in morally dubious way than those with fully intact emotions. The assumption that emotions cause poor behavior is at best incomplete.

If emotions do not mainly cause irrational or socially undesirable behavior, what do they do? Research has demonstrated that experiencing conscious emotions stimulates cognitive reflection, consistent with the notion that emotions affect behaviors indirectly, via cognition. In one study, participants who were asked to describe a time they hurt someone, thereby causing feelings of guilt, spontaneously described learning something from the event (Baumeister, Stillwell, & Heatherton, 1994, 1995). Multiple literature reviews have also found that conscious emotions are closely tied to learning, reappraisal of past actions, and counterfactual thinking—all of which can shape future behavior, consistent with indirect causation theory. Schwarz and Clore (2007) reviewed published studies on emotion and concluded that the effect of emotions is primarily mental, rather than behavioral, consistent with the position that emotions stimulate cognitive reflection. One survey of the literature concluded that sadness increased counterfactual thinking (Johnson-Laird & Oatley, 2000). This makes sense from the perspective of indirect causation, as counterfactual thinking might enable one to avoid the actions that lead to sadness. A review by Roese (1997) concluded that negative emotions in general are the main source of counterfactual thinking, and counterfactual thinking can inform future behavior. In sum, empirical evidence supports the view that emotions prompt people to reflect cognitively in order to learn a functional lesson for the future (see Baumeister et al., 2007, for a thorough explication of the theory). In short, emotions allow one to profit more fully from one's experiences.

Yet the process of learning from emotions is imperfect and uneven in its success, such that some emotional events cause people to learn quickly and other events do not. The focus of the current investigation was the identification of variables that would moderate the relationship between emotional events and learning lessons. We concentrated on two variables expected to be closely related to learning from emotional experiences: belief in free will and emotional responsiveness.

1.2 Belief in Free Will

Free will, as observed by Mele (2006), has no standard definition, but is generally understood to be the power or ability to perform free actions. There are several philosophical refinements on this basic definition (*cf.* Mele, 2009). The one that best fits the present work is the *agent-causal libertarian theory* of free will, a view that rejects determinism and regards agents (people) as the source of free actions in a way that is not completely reducible to their emotional

or motivational states. Agent-causal libertarianism does not assert that all actions all people perform at all times are free actions, only that people can, and sometimes do, act freely.

Thus, *belief in free will* refers to the extent to which one perceives his or her own actions, and presumably those of others, as being freely chosen and caused by the individual. It is important to note that most laypersons believe in free will. This is suggested by the relatively high degree of agreement with questionnaire items assessing belief in free will (Paulhus & Margesson, 1994). Likewise, some level of free will is assumed in nearly all systems of law, which mete out less severe punishments, or no punishment at all, when an individual is incapable of acting otherwise (e.g., the proverbial “gun to the head”) or when a person acts out of an unexpected and unusually strong impulse (Ancel, 1958). Likewise, the legal system will excuse a person from having to fulfill a contract or agreement if it can be shown that the person did not enter into it of his own free will (i.e., was under duress). Furthermore, studies in which people’s beliefs about free will are influenced experimentally (via determinism, free will, and control conditions) demonstrate negligible differences between the free will and control conditions on outcome variables, whereas the determinism condition differs from both control and free will conditions on outcome variables (Baumeister, Masicampo, & DeWall, 2009; Vohs & Schooler, 2008). In other words, encouraging belief in free will does not change behavior relative to the control condition, but encouraging belief in determinism does change behavior relative to the control condition, suggesting that disbelief in free will a departure from the norm.

Yet people do not universally subscribe to a belief in free will; some people reject the agent-causal libertarian view that they can cause their behavior and can choose actions freely, instead favoring a belief in the inevitability of their actions. That is, some people espouse deterministic views in which their actions are considered the inevitable outcome of childhood experiences, genetics, fate, etc. The implications of belief and disbelief in free will seem especially relevant to the process of learning from one’s experience. If a person did not believe that behavior was freely chosen—if a person did not believe in free will—there would be little sense in contemplating behavioral alternatives that, from a deterministic perspective, do not exist. Determinists would have virtually no incentive to reflect on alternative ways they could have acted, because those alternatives would be viewed as logically impossible. In other words, disbelief in the possibility of alternatives makes pondering alternatives seem futile. In contrast, belief in free will is readily compatible with thinking that one could have acted differently in the

past, and a that a different (perhaps more favorable) outcome was possible. Consequently, determinists may be less likely than those who believe in free will to put forth the effort of reflecting upon alternative ways they could have acted following an emotional event.

The proposal that disbelief in free will would reduce reflecting on emotional events seems especially likely when one considers that people already have a strong tendency to limit cognition (Fiske & Taylor, 1991), which suggests that people may welcome a reason not to exert themselves mentally in the contemplation of hypothetical actions. Indeed, Vohs and colleagues (2008) demonstrated that cognitive exertion, as defined by making decisions, consumes a limited mental resource (a process termed *ego depletion*; Baumeister, Bratslavsky, Muraven, & Tice, 1998). The limited nature of mental resources suggests a need to conserve them, and pondering logically impossible events seems like a poor allocation of such resources. In other words, providing a reason not to bother thinking about alternative outcomes to past events is likely to make people less willing to do so. Determinism excuses the exertion of mental resources, because it dictates that there are no alternative outcomes to consider. In sum, convincing people that they are deterministically bound to act the way they do provides a reason not to engage in a mentally taxing consideration of alternative ways of acting, and considering alternative ways of acting is an essential part of identifying an optimal way of acting. Therefore we expected disbelief in free will to disrupt the process of learning from one's experiences.

The expectation that disbelief in free will would be associated with an absence of effortful psychological processes is consistent with recent research. Vohs and Schooler (2008) showed that participants who were persuaded not to believe in free will cheated more on a test (thereby stealing money) compared to when a belief in free will had been affirmed or when participants' free will beliefs were unaltered. In these studies, participants were paid for correctly solving problems, such as those appearing on the Graduate Record Examination. Cheating was made to be an easy and effective way to get money relative to solving the problems correctly, and all participants had equal opportunity to cheat and (presumably) an equal desire for money. However, participants in the determinism condition were given a reason—all outcomes are inevitable—not to bother exerting control over the impulse to cheat. Results indicated that participants in the determinism condition did cheat more, apparently because efforts to resist the impulse to cheat were undermined by the view that whether they cheated had been predetermined.

These findings were extended by research showing that inducing disbelief in free will increased acts of aggression and decreased acts of helping (Baumeister et al., 2009). When provoked, the automatic response for most people is to act aggressively, and overcoming the desire to act aggressively requires expending mental energy (DeWall, Baumeister, Stillman, & Gailliot, 2007). Similarly, behaving selfishly seems to be automatic, such that helping others requires one to exert control over selfish impulses (DeWall, Baumeister, Gailliot, & Maner, 2008). Thus, like cheating, acting aggressively and behaving selfishly are automatic impulses that require the exertion of self-control or mental energy to override them, and disbelief in free will seems to undermine mental exertion.

We expect that the tendency for deterministic beliefs to serve as a cue that one need not bother expending mental efforts will extend to the cognitive reflection necessary to learn from emotional experiences. Our expectation is that naturally occurring disbelief in free will, as well as experimentally induced belief in determinism, will result in learning less from emotional experiences, relative to those who believe in free will or whose belief in free will is unaltered.

1.3 Emotional Responsiveness

We expected that emotional experiences would promote learning (unless belief in free will was undermined), but this assumed one is responsive to emotions. Individual differences in emotional responsiveness can be viewed in two ways. The first is in the strength with which emotions are experienced, with emotionally responsive people feeling emotions more strongly than emotionally unresponsive people, who experience shallower emotions. One would expect people who experience emotions strongly to learn more from an emotional experience than those who experience shallow emotions. A second form of emotional responsiveness refers to whether an emotional event prompts one to reflect, such that emotionally responsive people are more likely to think about the emotion-provoking event than people who are not emotionally responsive. Again, one would assume emotional responsiveness would be associated with learning more from an emotional experience.

Psychopathy is a trait associated with both kinds of emotional unresponsiveness as well as a failure to learn from punishment (Lykken, 1957). Psychopathic criminals are at a much higher likelihood of recidivism relative to nonpsychopathic criminals (Hemphill, Templeman, Wong, & Hare, 1998), indicating a failure to learn from the negative experience of incarceration (and incarceration, ostensibly, is partly designed to teach people not to break the law). Why is

psychopathy associated with a failure to learn? One perspective holds that psychopathy results from an affective deficit, or a tendency to experience shallow emotions, whereas another perspective holds that psychopathy stems from a cognitive deficit, or a failure to think about one's experience. Either way, psychopathy, like disbelief in free will, is likely to be associated with diminished learning from emotions.

According to Hare (1998), emotions (especially guilt and remorse) give “bite” to conscience (pp.112), which is necessary for one's conscience to succeed in controlling one's behavior (a view that fits well with Baumeister et al.'s 2007 indirect causation thesis). He argued that psychopaths do not fully experience guilt and remorse, making conscience “little more than intellectual awareness of rules others make up—empty words” (Hare, 1998; pp. 112). Empirical evidence has demonstrated that individuals high in psychopathy demonstrate less physiological reactivity to images of people in pain (e.g., crying or otherwise distressed) than do nonpsychopaths, indicating a relative deficit of emotionality (Blair, Jones, Clark, & Smith, 1997).

There is also evidence that psychopathy is a cognitive deficit. According to this view, psychopathy is primarily an inability to override one's dominant response (Gorenstein & Newman, 1980). In one study, researchers had participants play a card-turning game, in which participants were monetarily rewarded when they uncovered a face card but lost money when they uncovered a number card (Newman, Patterson, & Kosson, 1987). Early in the experiment, the ratio of face cards to numbered cards favored face cards, and all participants quickly learned that turning over cards was advantageous. Thus turning over cards became the dominant response. In subsequent trials, however, the ratio began tilting toward punishment cards. Psychopaths continued to turn cards, long after nonpsychopaths learned to inhibit the dominant response. This indicates a failure to learn to modify their behavior. In a later study, psychopaths' inability to modulate a dominant response was associated with not pausing after punishments (Newman, Patterson, Howland, & Nichols, 1990). It seems likely that for nonpsychopaths, the pause after a punishment was used to process the loss cognitively, leading to a change in behavior. Psychopaths did not pause, suggesting a lack of cognitive reflectivity that might otherwise have led to altering the dominant response.

The cognitive deficit perspective is central to one proposed model of psychopathy, which holds that the root of psychopaths' inability to learn from punishment is a failing to change from

automatic processing to a more reflective and contemplative way of processing (Patterson & Newman, 1993). A similar description of psychopathy was offered by Gorenstein (1991), who described it as an extreme tendency for automatic processing, to the exclusion of more contemplative thought.

Psychopaths' deficiency may primarily be in experiencing emotional events, or the deficiency may be mainly in thinking about emotional events. It may also be a combination of affective and cognitive deficits. Regardless, one would expect individuals high in psychopathy not to learn as much from negative experiences as nonpsychopaths. (Inversely, people very low in psychopathy seem likely to learn quickly from negative events). Accordingly our expectation was that individuals high in psychopathy would learn less from emotional experiences than those low in psychopathy.

CHAPTER 2

PRESENT INVESTIGATION

The current work sought to identify the conditions under which people learn lessons from emotional experiences. Our expectation was that belief in free will would be important to the process of learning from emotional experiences, such that deterministic views would correspond with learning little. A second key variable in this investigation was emotional responsiveness. Our expectation was that people high in psychopathy (i.e., low in emotional responsiveness) would learn substantially less than those low in psychopathy.

Study 1 was an initial test of the hypothesis that a deterministic perspective weakens learning from emotions. We assessed naturally occurring individual differences in belief in free will, and our expectation was that people who believe in free will would report learning more from a guilt-inducing event than those who espouse deterministic views. Study 2 was similar to Study 1, except that it used an experimental design in which participants were assigned to conditions promoting free will or determinism, with others assigned to a neutral control condition. We predicted that the determinism condition would reduce what people learned from a guilt-inducing event relative to those in the free will condition or the neutral control condition. Study 2 also took into account intensity of emotions, with the expectation that disbelief in free will would decrease learning mainly for situations evoking high levels of guilt (rather than for routine, low-guilt situations).

In Study 3, we expanded our focus beyond guilt. Accordingly we brought about feelings of guilt, fear, or pride in participants to discover the characteristics of emotions most impacted by disbelief in free will. A second goal of Study 3 was to test whether people high in psychopathy would learn less from emotional experiences than those low in psychopathy. We also predicted an interaction between experimental condition (determinism or control) and psychopathy. Our expectation for this interaction was that people high in psychopathy would learn little from their emotional experience, whether they were in the determinism condition or not, while the determinism induction would make people low in psychopathy resemble psychopaths in how much they learned. (Alternatively, we also considered it plausible that the effects of deterministic beliefs would be strongest for those high in psychopathy, as the lack of self-reflection suggested by determinism would be especially resonant for them). A final aim of

Study 3 was to move beyond self-ratings of learning by asking participants to articulate what they learned, and submitting the lessons learned to the judgment of independent raters. We expected determinism to be associated with lessons independently viewed as poorer.

Study 4 had two main objectives. The first was to present participants with a novel and standardized emotional experience (in contrast to the autobiographical accounts of emotional experiences used in Studies 1-3). The second was to ensure that the implications of reflecting on a guilt-inducing event went beyond affirmations of learning. Accordingly we measured whether participants, after reading about the high environmental costs of inadequate recycling, would volunteer their time to benefit a local recycling program—presumably to avert guilt related to inadequate recycling.

2.1 Study 1

The purpose of this study was to determine whether individual differences in belief in free will were related to differences in learning from emotional experiences, with stronger belief in free will expected to correspond to learning more.

Method

Participants and Procedure

One-hundred five participants (89 female) participated in an online research study in exchange for partial course credit. Racial demographics were as follows: 76% were White, 12% were Black, and the remainder was of other races or did not report race. Nine percent reported Hispanic ethnicity.

Participants took part in the study at a time of their choosing. They completed a six-item questionnaire assessing individual differences in belief in free will (Nadelhoffer & Brewer, 2008). Items include “People have free will”, “How people’s lives unfold is largely up to them”, and “Some decisions and actions are freer than others” from 1(Strongly disagree) to 7(Strongly agree). Reliability was good, $\alpha = .80$.

Later, participants were asked to think about an event that caused them to feel guilty. They were then asked to provide a brief description of the event, and what—if anything—they learned from the event. Last, participants were asked to gauge the extent to which they had learned from the experience. This was rated on a scale from 1(learned nothing at all) to 7 (learned a great deal).

Results and Discussion

As anticipated, stronger belief in free will was associated with the perception of having learned relatively more from a guilt-inducing event, $r = .22$, $p = .03$. This is consistent with the proposal that belief in free will is important to learning from emotional experiences.

2.2 Study 2

Study 1 established a relationship between belief in free will and learning from an emotional experience, and Study 2 sought to build on this finding in two ways. The first was to establish causality in the relationship between belief in free will and learning by experimentally varying belief in free will. The second goal was to take into account the intensity of the emotion, as events that produce a low state of emotionality seem less likely to provoke cognitive reflection than events causing substantial emotionality. We also predicted an interaction between emotionality (in this case, guilt) and experimental condition, such that the effects of experimental condition would primarily affect those reporting high levels of guilt (as mundane or routine events causing low levels of guilt are not a strong test of our hypothesis).

Method

Participants

Participants were 132 undergraduates (80 female) who participated in exchange for partial course credit. Racial demographics were as follows: 80% were White, 8% were Black, and the remainder was of other races or did not report race. Twelve percent reported Hispanic ethnicity.

Procedure

Participants arrived at the laboratory individually. After giving informed consent, they were randomly assigned to one of three conditions: a condition affirming belief in free will, a neutral condition, and a condition affirming determinism. Our free will manipulation followed that of Vohs and Schooler (2008), who used a Velten procedure (1968) to bring about temporary changes in belief in free will. Participants were given a small booklet in which one sentence was printed on each of the fifteen pages. Instructions asked participants to ponder each sentence for one minute. Each minute, participants were prompted to turn the page and consider a new statement. The content of the booklets constituted the manipulation of free will. In the free will condition, participants pondered statements favorable to free will, such as “I am able to override the genetic and environmental factors that sometimes influence my behavior.” In the neutral condition, participants read random and irrelevant facts, e.g., “Pocket calculators become

common items only after 1970”. In the determinism condition, the booklet contained statements contrary to belief in free will, such as “A belief in free will contradicts the known fact that the universe is governed by lawful principles of science”.

Following the experimental manipulation, participants were asked to write about a time they did something that hurt someone, which has previously been used to elicit feelings of guilt (Baumeister et al., 1994, 1995). In the present experiment, we asked participants to provide specific details about the event, such as the initials of the person they hurt and the approximate time the event occurred, to ensure participants had a specific event in mind. Of particular interest was participants’ response to an item in which they rated the intensity of the guilt associated with the event on a scale from 1(no guilt at all) to 7(extreme guilt), as this was expected to moderate the effects of experimental condition.

Lastly, participants were asked to describe the event in as much detail as possible, followed by responding to the question “Do you feel you learned anything from this event?” on a scale from 1(learned nothing at all) to 7 (learned a great deal).

Results

The effects of experimental condition and intensity of guilt on learning were assessed first by contrasting the determinism and the control condition. Using hierarchical linear regression, we entered guilt and experimental condition (determinism vs. control) in the first step. There was a simple effect for intensity of guilt, such that more guilt corresponded with more learning ($\beta = .40, t = 3.91, p < .001$), and no effect for belief in free will, $\beta = .02, t = .16, p = .87$. In the third step, we entered the interaction term and observed a significant interaction, $\beta = .32, t = 3.40, p = .001$. To analyze this interaction, we assessed mean differences in learning among those reporting high-intensity guilt (1 SD above the mean) relative to those reporting low-intensity guilt (1 SD below the mean). People reporting high levels of guilt learned more in the control condition ($M = 6.60, SD = .89$) than those in the determinism condition, $M = 3.83, SD = 2.56, F(1,9) = 5.21, p = .048, d = 1.45$. Among those reporting low-intensity emotions, marginally significant mean differences emerged between participants in the neutral condition ($M = 2.73, SD = 1.91$) and participants in the determinism condition, $M = 4.29, SD = .76; F(1,20) = 4.23, p = .056, d = 1.07$. See Figure 1.

We repeated these analyses, this time contrasting the determinism condition and the free will condition. We again observed a main effect for intensity of guilt ($\beta = .28, t = 2.67, p = .009$),

while the effect of free will condition was not significant, $\beta = .13$, $t = 1.27$, $p = .21$. The interaction was significant ($\beta = .24$, $t = 2.36$, $p = .021$). We again assessed mean differences in reported learning among participants at high and low levels of guilt. Among those reporting high-intensity guilt, belief in free will was associated with learning more ($M = 6.83$, $SD = .41$) compared to the determinism condition, $M = 3.83$, $SD = 2.56$, $F(1,10) = 8.02$, $p = .018$, $d = 1.64$. No differences were found between the free will condition ($M = 4.00$, $SD = 1.87$) and the determinism condition ($M = 4.29$, $SD = .76$; $F < 1$, $p = .72$, $d = .2$) for participants reporting low-intensity guilt.

We repeated the above analyses by contrasting the determinism condition with a combination of the free will and control conditions. As expected, there was a simple effect for guilt ($\beta = .45$, $t = 5.74$, $p < .001$), no effect for free will condition ($F < 1$, $p = .83$), and a significant interaction, $\beta = .27$, $t = 3.57$, $p = .001$. Among those reporting high levels of guilt, the conditions in which belief in free will was not undermined reported high levels of learning ($M = 6.73$, $SD = .64$), whereas those in the determinism condition did not, $F(1,15) = 13.18$, $p = .002$, $d = 1.55$. Differences between the determinism condition and the combined control conditions ($M = 3.05$, $SD = 1.93$) did not emerge for those reporting low-intensity emotions, $F(1,25) = 2.61$, $p = .12$, $d = .85$.

Lastly, we note that there were no significant differences between the free will condition and the control condition for either high ($F < 1$, $p = .58$) or low [$F(1,18) = 1.67$, $p = .21$] levels of guilt. Thus the important differences emerged in comparison to the determinism condition.

Discussion

Participants who reported experiences causing them high levels of guilt reported learning more than people who reported low levels of guilt. This was expected, as bringing to mind a highly emotional experience is more likely to promote reflection on one's actions than an event causing little emotion. Yet the tendency for highly emotional events to prompt learning was dependent upon the belief that one acts freely: When belief in free will was undermined, learning from highly emotional experiences was diminished. Low emotionality was generally associated with little learning (though there was an unexpected and nonsignificant trend such that learning was higher in the determinism condition than controls among participants reporting low emotionality).

Among participants reporting highly emotional experiences, those assigned to the determinism condition reported learning less than those in the control condition, whereas there were no differences between the free will condition and control condition. Thus the deterministic induction reduced learning, rather than the free will induction increasing learning, suggesting that belief in free will is the prevailing stance for most people. This is consistent with other research, in which differences emerge between the determinism and control conditions, but not free will and control conditions (Baumeister et al., 2009; Vohs & Schooler, 2008).

2.3 Study 3

Study 3 sought to build upon the previous studies in three ways. The first goal was to address one shortcoming of the previous studies, which is that they dealt only with the emotion of guilt. Guilt, along with shame, embarrassment, and pride, are self-conscious emotions, which is to say that they are self-focused emotions that generally result from a perceived social evaluation (Tangney & Fischer, 1995). Guilt is also a negative emotion, unlike joy or pride, for instance. Our first goal was to uncover whether the effects of determinism are stronger for negative emotions or self-conscious emotions.

To do so, we assessed guilt (negative, self-conscious), fear (negative, non self-conscious), and pride (positive, self-conscious). This allowed contrasting two negative emotions with a positive one (pride), and contrasting two self-conscious emotions with a non self-conscious emotion (fear).

Our second goal was to identify an individual-difference variable that would moderate the effects of belief or disbelief in free will. We assessed psychopathy and anticipated that those high in psychopathy would learn little from emotional experiences. We expected an interaction between psychopathy and experimental condition, such that disbelief in free will would reduce learning primarily among nonpsychopaths.

The third objective was to go beyond self-reports of learning. In Studies 1 and 2 learning was measured by self-rating. In the present study, we asked participants to articulate the lesson they had learned in essay format, after which we evaluated the essays for content. The capacity to articulate a meaningful and valuable lesson is a more robust measure of learning than self-ratings. Our expectation was that challenging one's belief in free will would not only reduce self-ratings of learning, but that it would also be sufficient to impair one's ability to articulate a useful lesson stemming from an emotional experience.

The design of the present study was *intensity of emotion* (continuous) X *type of emotion* (negative vs. positive; also self-conscious vs. non self-conscious) X *psychopathy* (continuous) X *determinism condition* (control vs. determinism induction). As in Study 2, we expected that the effects of the variables of interest would depend upon the intensity of the emotional event, with stronger effects expected for participants reporting highly emotional events. Thus our interest was primarily in experiences of high emotionality.

In Studies 1 and 2, we found relatively strong effects of belief in free will on learning for guilt-inducing experiences. This could be attributable to the fact that guilt is a negative emotion or that it is a self-conscious emotion. One could therefore predict that the effects of belief in free will on learning would be strongest for those assigned to report either self-conscious emotions (guilt and pride, but not fear) or negative emotions (guilt and fear, but not pride). We expected that differences in learning would emerge primarily for those assigned to report negative emotions, because negative emotions promote counterfactual thinking (Roese, 1997; 2008). Thus we predicted a three-way interaction, such that the effect of belief or disbelief in free will on learning would be dependent upon both type and intensity of emotion, with the effects of free will beliefs being most influential for intense and negative emotions.

We further predicted that the effects of belief or disbelief in free will, among those reporting high-intensity, negative emotions, would depend upon individual differences in psychopathy. In other words, we predicted a 4-way interaction such that determinism condition and psychopathy would interact for high-intensity negative emotions. Our primary prediction for this interaction was that deterministic beliefs would reduce learning among people low in psychopathy. That is, we expected those high in psychopathy to learn little regardless of experimental condition, but that people low in psychopathy would learn little only when in the determinism condition. However, we also considered it plausible that the lack of self-restraint suggested by determinism would resonate with people high in psychopathy and exert an especially strong impact on them.

Method

Participants

Participants were 195 (157 females) undergraduates who participated in exchange for partial course credit. Seventy-four percent reported their race as White, 15% were Black, and the remainder was of other races or did not report race. Ten percent reported Hispanic ethnicity.

Procedure

Participants arrived at the laboratory individually and gave informed consent. The questionnaires and other stimulus materials were administered via computer. Participants completed a self-report measure of primary psychopathy (Levenson, Kiehl, & Fitzpatrick, 1995). This self-report measure of psychopathy has been validated (Lynam, Whiteside, & Jones, 1999), and showed good reliability in the current sample, $\alpha = .80$. Next, participants were asked to describe an emotion-evoking event that elicited guilt, fear, or pride (as determined by random assignment). We requested a minimum of three sentences in the description. As in Study 2, participants were also asked to provide specific details about the event, such as the approximate time the event occurred. Also following Study 2, the intensity of the event was assessed by asking how emotional the experience was, from 1(not at all intense) to 7(very intense).

Participants were then randomly assigned to either the determinism condition or control condition. The procedure used was similar to that of Study 2, with the exceptions that in the present study there was not a condition affirming free will and the materials were presented via computer. Following the determinism or control condition, participants then indicated what they had learned by self-rating on a scale from 1(learned nothing at all) to 7 (learned a great deal). Next, a manipulation check was administered in which participants rated their agreement with the statement “My actions are due to genetics and my past experiences, and nothing more” from 1(strongly disagree) to 11(strongly agree). Last, participants were prompted to describe in a brief essay what they learned from the emotion-evoking event.

The essays were subsequently evaluated by four research assistants who rated each essay on three dimensions. While ratings are inherently subjective, we hoped to have general agreement among raters, which would suggest objective differences between lessons learned. These ratings included evaluating the value of the lesson learned from 1(not at all valuable) to 7(extremely valuable). There was agreement among raters about what constituted a valuable lesson, $\alpha = .77$. The second rated dimension was the extent to which participants appeared intent on changing their behavior, rated from 1(has no intention to change behavior) to 7 (very much intends to change behavior). There was agreement among raters, $\alpha = .71$. Also rated was the degree to which the lesson learned would be beneficial over a protracted period of time. Ratings were from 1(not at all beneficial in the long run) to 7(very beneficial in the long run), $\alpha = .65$.

Results

Preliminary Analyses

Belief in free will. Manipulation of belief in free will was successful, as participants were more likely to report having deterministic beliefs in the determinism condition ($M = 4.11$, $SD = 3.41$) than in the neutral condition, $M = 3.41$, $SD = 2.42$, $F(1,193) = 3.88$, $p = .05$. Means in both conditions were well below the scale midpoint (6), suggesting general belief in free will.

Type of emotion. A naïve research assistant read the description of each event and coded it according to whether it was likely to cause guilt, fear, and pride. All three emotions were coded dichotomously for all participants. As expected, events independently perceived as generating guilt were associated with the guilt condition ($X^2 = 136.20$, $p < .001$), fear was associated with the fear condition, ($X^2 = 132.64$, $p < .001$), and pride with the pride condition ($X^2 = 184.37$, $p < .001$).

Intensity. A naïve research assistant (different than the one coding essay topics) rated the description of each event according to the emotional intensity one would expect. Objective ratings matched up well with those supplied by the participant for guilt ($r = .37$, $p = .002$), fear ($r = .37$, $p = .002$), and pride ($r = .23$, $p = .07$), suggesting that participants' reactions to the events were a reflection of the event rather than a manifestation individual differences. It is theoretically plausible that psychopathy and intensity of emotional experience would not be independent, but we found no relationship, $r = .05$, $p = .49$. (This finding is more consistent with psychopathy as a cognitive deficit than an emotional deficit).

Self-rated Learning

We first computed two four-way interactions: one in which type of emotion was operationalized as positive (pride) compared to negative emotions (fear and guilt), and one in which type of emotion was operationalized as self-conscious emotions (guilt and pride) compared to non self-conscious emotion (fear). As expected, the four-way interaction between determinism/control condition, psychopathy, emotional intensity, and type of emotion was significant when type of emotion was defined as a contrast between positive and negative emotions $F(1,179) = 4.21$, $p = .04$. When type of emotion was defined as the contrast between self-conscious and non self-conscious emotions, there was no four-way interaction, $F(1,179) < 1$, $p = .42$.

To make sense of the significant interaction, we examined the relationship between determinism/control condition, psychopathy, and emotional intensity for both positive and

negative emotions separately. There was a three-way interaction among participants reporting negative emotional experiences, $F(1,119) = 5.94, p = .016$. This three-way interaction was not significant for the positive emotion condition $F(1,60) = 1.06, p = .31$. Thus, effects were stronger for negative emotions than positive emotions, while self-conscious and non self-conscious emotions were not different. Hereafter we focus our analysis on those assigned to report negative emotions.

Next, we sought to clarify the role of emotional intensity in this interaction, with the expectation that psychopathy and determinism/control condition would interact at high, but not low levels of intensity. We conducted a median split on emotional intensity and tested for an interaction between psychopathy and determinism condition, yet no significant interaction emerged among either those reporting low-intensity experiences $F(1,46) = 2.27, p = .14$ or for those reporting high-intensity experiences $F(1,73) = 2.52, p = .11$. (There was no interaction at high or low levels of intensity among those reporting positive emotions, $F_s < 1.76, p_s > .23$).

However, in previous research, self-reports of psychopathy have been dichotomized into high and low groups because it has been suggested that psychopathy only distinguishes itself from other psychological constructs at high and low levels (e.g., Mahmut, Homewood, & Stevenson, 2008). We therefore dichotomized psychopathy into those scoring high (1 *SD* above the mean) or low (1 *SD* below the mean), and again tested for an interaction between psychopathy and disbelief in free will. For those reporting high-intensity negative emotions, the interaction was significant [$F(1,19) = 8.80, p = .008$], but not for those reporting low-intensity emotions, $F(1,19) = 2.19, p = .16$. (Again, no interactions were observed among those in the positive emotion condition, $F_s < 3.6, p_s > .20$.) In short, the anticipated two-way interaction between psychopathy and determinism condition emerged, and it only emerged under the expected conditions: high-intensity negative emotions.

We conducted planned contrasts to elucidate the interaction between psychopathy and determinism/control condition and found that those high in psychopathy assigned to the determinism condition reported learning relatively little ($M = 9.8, SD = 3.56$) compared to those high in psychopathy in the control condition, $M = 13.60, SD = .89, F(1,8) = 5.35, p = .049, d = 1.46$. Thus deterministic beliefs decreased learning among those high in psychopathy. The determinism induction did not decrease reported learning among those low in psychopathy. Rather, there was a nonsignificant trend such that individuals low in psychopathy ($M = 13.25$,

$SD = 1.39$) increased reported learning somewhat relative to those in the neutral condition, $M = 10.80$, $SD = 3.49$, $F(1,11) = 2.26$, $p = .10$, $d = .92$. Among participants in the determinism condition, people low in psychopathy reported learning significantly more than those high in psychopathy, $F(1,11) = 6.27$, $p = .03$, $d = 1.28$. These findings contradict our primary expectation for the interaction, which was that the effects of the determinism condition would be strongest among those low in psychopathy. Results instead favor an alternative prediction, which was that deterministic beliefs would primarily impact those high in psychopathy.

The present findings are consistent with Studies 1 and 2 but also suggest that the negative effect of deterministic beliefs on learning from emotional experiences is strongest for negative emotions. In addition, the findings suggest that deterministic beliefs reduced learning primarily among those high in psychopathy.

Objectively Rated Lessons. One important objective of the present study was to go beyond self-ratings of learning. Raters scored the lessons articulated by participants on three criteria: How valuable the lesson was, how intent participants seemed to be on altering their behavior, and the extent to which the articulated lesson would benefit the learner in the long run. The findings for these independently rated assessments of learning followed those of self-ratings, with the exception that four-way interactions did not emerge (all F s < 2.21 ; all p s $> .13$). However, three-way interactions did emerge for negative (but not positive) emotions, again demonstrating stronger effects of deterministic beliefs on learning from negative emotions.

Value of lesson. A significant three-way interaction for psychopathy, intensity, and determinism/control condition emerged for negative emotions on the value of lesson learned [$F(1,119) = 6.12$, $p = .015$], but not for positive emotions, $F(1,57) = 1.94$, $p = .17$. Following the above analysis, we tested for an interaction between psychopathy and determinism/control condition on lesson value for participants reporting high intensity emotions. Again, a significant two-way interaction between determinism/control condition and psychopathy (at one SD above or below the mean) emerged among those reporting high intensity, negative emotions, $F(1,19) = 12.38$, $p = .002$. The other three possible two-way interactions between psychopathy and determinism/control condition (at low-intensity negative emotions, low-intensity positive emotions, and high-intensity positive emotions) were not significant, F s < 4.13 , p s $> .12$.

Planned contrasts revealed that among participants high in psychopathy, the determinism induction reduced the ability to articulate a valuable lesson ($M = 16.40$, $SD = 4.83$) relative to

those in the neutral condition, $M = 23.40$, $SD = 2.07$, $F(1,8) = 8.87$, $p = .018$, $d = 1.88$. For those low in psychopathy, the determinism induction did not have an effect on the value of the lesson learned ($M = 23.13$, $SD = 3.04$) relative to those in the control condition, $M = 20.80$, $SD = 1.48$, $F = 2.48$, $p = .15$, $d = .97$. There was a significant difference among participants in the determinism condition, such that those high in psychopathy learned significantly less valuable lessons than those low in psychopathy, $F(1,11) = 9.68$, $p = .01$, $d = 1.67$. See Figure 2.

Intentions for behavioral change. There was a modest trend toward a three-way interaction among psychopathy, intensity, and determinism/control condition for participants reporting negative emotions, $F(1,119) = 2.30$, $p = .13$. We found a marginally significant interaction between determinism/control condition and psychopathy on ratings of apparent intention for behavioral change among participants reporting high-intensity negative emotions, $F(1,19) = 3.41$, $p = .08$. There was no suggestion of this interaction for low-intensity negative emotions, low-intensity positive emotions, or high-intensity positive emotions, $F_s < 1$, $p_s > .44$.

Among those high in psychopathy, the average rating of intentions for behavioral change was lower in the determinism condition ($M = 13.60$, $SD = 5.12$) than for those assigned to the neutral condition ($M = 18.00$, $SD = 3.67$), but this was not significant $F(1,8) = 2.43$, $p = .16$, $d = .99$. Among those low in psychopathy, the determinism induction did not affect intentions for behavioral change ($M = 18.88$, $SD = 3.27$) relative to those in the neutral condition, $M = 17.60$, $SD = 1.82$, $F < 1$, $p = .45$, $d = .48$. Planned contrasts revealed that among those assigned to the determinism condition, people high in psychopathy intended to do significantly less behavioral change than those low in psychopathy, $F(1,11) = 5.23$, $p = .04$, $d = 1.23$. See Figure 3.

Long-term benefit. The three-way interaction between psychopathy, free will, and intensity was significant for those reporting negative emotions, $F(1,119) = 7.02$, $p = .009$, but not for those reporting positive emotions, $F < 1$, $p = .94$. Again, the two-way interaction between determinism/control condition and psychopathy on ratings of the likely long-term benefit of the lesson occurred for negative emotions at high intensity, $F(1,19) = 5.15$, $p = .035$, but for none of the other possible interactions, $F_s < 1$, $p_s > .34$.

An examination of this interaction revealed effects similar to those reported above. The determinism induction significantly decreased the long-term benefit of the lesson among those high in psychopathy ($M = 15.80$, $SD = 4.38$) relative to control, $M = 22.20$, $SD = .35$, $F(1,8) = 6.74$, $p = .032$, $d = 2.06$. For participants low in psychopathy, the determinism induction did not

reduce the capacity to articulate a long-term benefit ($M = 22.38$, $SD = 3.07$) relative to those in the control condition, $M = 21.40$, $SD = 4.73$, $F < 1$, $p = .66$, $d = .25$. Again, low psychopathy was associated with learning more than high psychopathy in the determinism condition, $F(1,11) = 10.26$, $p = .008$, $d = 1.74$. See Figure 4.

Discussion

Study 1 found that people who espouse deterministic views were less likely to report learning from a guilt-inducing experience than those affirming belief in free will. Study 2 indicated that the effect of belief in free will depended upon the intensity of an emotional experience, such that disbelief in free will undercut learning at high levels of emotion. Study 3 indicated that the effects of determinism went beyond self-ratings; deterministic beliefs were associated with learning lessons that were independently rated by others as less valuable and less likely to contribute to one's long-term well being than those in the control condition.

Study 3 also demonstrated that the effects of disbelief in free will were stronger for negative emotions than for positive emotions, whereas whether an emotion was self-conscious had no appreciable effect. We expected the effects of deterministic beliefs to be especially evident for negative emotions. This is because negative emotions are a primary source of counterfactual thinking (Roese, 1997; 2008), and counterfactual thinking is crucial to learning from one's experience. Counterfactuals assume some freedom of action, so eroding one's belief in free will seems likely to reduce counterfactuals and thereby reduce learning.

Psychopathy moderated the effect of free will beliefs on learning, such that the determinism induction reduced learning at high levels of psychopathy more than at low levels. However, this finding was contrary to our original prediction that the effects of disbelief in free will would be strongest for those low in psychopathy, making the reactions of people low in psychopathy similar to those of people high in psychopathy.

One possible explanation for the actual pattern of results is as follows. Participants low in psychopathy, who are highly responsive to emotions, had already reflected on the emotional experience they reported. In other words, they had already learned a lesson, so the determinism induction had little effect on what was learned. In contrast, it seems likely that those high in psychopathy had not done much prior reflection on the event, but they were willing to reflect about the event when required by the experiment. That is, they had not previously reflected on the lessons to be learned until after the deterministic belief induction (or control), meaning that

the content of their reflection was subject to the effects of the manipulation. In sum, the determinism induction may have reduced learning among those high in psychopathy partly because it was a more novel task for them than it was for those low in psychopathy (who presumably had thought more about the event prior to the experiment). In brief, the determinism induction caused participants high in psychopathy not to bother reflecting on an emotional event even though they were instructed to do so as part of an experiment.

If this explanation is correct, then one would expect the determinism induction to decrease learning among people low in psychopathy for a novel emotional experience. Thus in Study 4 we tested whether deterministic beliefs would affect people low in psychopathy for events that had not previously been the subject of deliberation.

2.4 Study 4

One shortcoming of the previous three studies was that participants all supplied their own autobiographical emotion-causing event, and differences in psychopathy may have influenced the extent to which that event had been the subject of reflection prior to the experiment. Study 4 provided participants with a novel guilt induction that would not have been the subject of any prior reflection. Our expectation was that introducing a novel emotional experience would make the determinism condition effective in reducing learning, even for participants low in psychopathy.

We sought to improve measurement of the dependent variable further. Independent analyses of what people reported learning (assessed in Study 3) demonstrated that deterministic beliefs decreased the quality of lessons learned, rather than simply reducing self-reports of learning (as measured in Studies 1 and 2).

However, one limitation of the previous three studies we sought to address was that self-reports of learning—including the independent evaluations of lessons learned—do not entail a commitment to any specific behavior or action. Thus, in the present study, we went beyond self-reports of learning and measured whether deterministic beliefs would reduce willingness to commit to a specific action (volunteering).

We also sought to distinguish primary psychopathy, measured in Study 3, and secondary psychopathy. Primary psychopathy mainly entails the lack of emotional responsiveness previously discussed, while secondary psychopathy is a reflection of lifestyle, with people high in secondary psychopathy being more antisocial and socially deviant than others are (Harpur,

Hare, & Hakstian, 1989). We expected that belief in free will would interact with primary but not secondary psychopathy, as primary psychopathy involves emotional unresponsiveness.

Method

Participants

Participants were 138 undergraduates (all female) who participated in exchange for partial course credit. Seventy-six percent were White, 8% were Black, and the remainder was of other or did not choose to specify race. Twenty-two percent reported Hispanic ethnicity.

Procedure

Participants first gave informed consent, and then completed a self-report measure of primary ($\alpha = .81$) and secondary psychopathy ($\alpha = .78$; Levenson et al., 1995). Next, participants were randomly assigned to either the determinism or control condition in the manner used in Study 3. As a manipulation check, belief in free will was assessed by measuring agreement with the statement “My actions are due to genetics and my past experiences, and nothing more” on a scale from 1 (strongly disagree) to 11 (strongly agree).

Participants were then induced to feel guilt by reading a bogus newspaper article linking the polluting lifestyles of Florida State University students to a decline in nearby manatee populations. The article included two pictures, one of a seemingly happy and healthy Manatee, the other of a dead Manatee pup in a nearby nature reserve. The article contained a thorough explanation of the link between failure to recycle, pollution, and Manatee health. It concluded by quoting an expert, who declared, “If there had been more support for recycling from the community and students, we could have prevented Manatee deaths. No question.” After reading the article, participants rated feelings of guilt from 1 (no guilt at all) to 11 (very guilty) among several other decoy items.

Before leaving, participants were then given the opportunity to volunteer to become part of a “campus recycling program” in which they would be asked to volunteer approximately three hours per week. To volunteer, participants had to supply their name and contact information, coded 0 = did not volunteer, .5 = asked to receive additional information, and 1 = agreed to volunteer.

Results

Manipulation Checks

Participants rated feelings of guilt that were significantly above the scale midpoint of 5, $t(137) = 3.05, p = .003$, indicating that we had successfully placed participants in a state of guilt. Deterministic beliefs were higher in the determinism condition ($M = 3.64, SD = 2.15$) than in the control condition, $M = 2.54, SD = 1.96, t(82) = 2.43, p = .017$. We note again that these ratings are substantially lower than the scale midpoint of 6, indicating general disagreement with determinism.

Volunteering

We began by dichotomizing primary psychopathy into those scoring high (1 SD above the mean) and those scoring low (1 SD below the mean), as in Study 3 (see also Mahmut et al., 2008). We observed a significant effect for both determinism condition ($\beta = .39, t = 2.52, p = .02$) and primary psychopathy ($\beta = -.39, t = -2.52, p = .02$) such that the determinism condition and high psychopathy were associated with not volunteering. The interaction was also significant, $\beta = .35, t = 2.40, p = .02$. An analysis of the interaction revealed no volunteers among those high in psychopathy ($M_s = 0, SD_s = 0$) in either the control or determinism condition. Those low in psychopathy were rather likely to volunteer in the control condition ($M = .44, SD = .53$), but this tendency was erased in the determinism condition $M = 0, SD = 0, F(1,17) = 7.16, p = .02$. See Figure 5.

Secondary psychopathy did not interact with experimental condition as a dichotomous (± 1 SD) variable, or as a continuous variable ($F_s < 1, p_s > .45$). Secondary psychopathy did have a modest negative effect on volunteering when assessed alone and as a continuous variable, $F(1,136) = 2.84, p = .09$. It appears that the determinism manipulation does not have differential effects based on whether one leads an antisocial lifestyle (as measured by secondary psychopathy), but it does have differential effects according to whether one is affectively sensitive (measured by primary psychopathy).

Discussion

In Study 4, as in the previous studies, deterministic beliefs were associated with learning relatively little from an emotional event. One important change in the current study is that we moved beyond self-reports of learning altogether. Instead, we measured whether participants, after reading about the high environmental costs of inadequate recycling, would volunteer their time to benefit a local recycling program—presumably to avert guilt related to inadequate recycling. As expected, deterministic beliefs caused a decrease in volunteering.

The findings of the current study differed from those of Study 3 in revealing ways. In Study 3, participants recalled an autobiographical event. Results indicated that deterministic beliefs decreased learning among people high in psychopathy, whereas people low in psychopathy were relatively unaffected by deterministic beliefs. One plausible reason that participants low in psychopathy did not demonstrate a loss in emotion-based learning is that they had already reflected on the event and had already learned a lesson. Accordingly, participants in the current study were presented with a novel emotional event—one that had not previously been the subject of reflection—the purpose of which was to determine whether people low in psychopathy would be influenced by disbelief in free will. Overall, psychopathy had the expected effect on learning, as there were no volunteers at high levels of psychopathy. We also observed an interaction between psychopathy and disbelief in free will, such that participants low in psychopathy readily volunteered in the control condition, whereas the determinism condition eliminated volunteering completely. Thus deterministic beliefs decreased learning among those low in psychopathy. The results of Study 4 are consistent with our interpretation of Study 3, which was that participants low in psychopathy did not demonstrate a loss in emotional learning because they had already reflected on the event and had already learned a lesson.

Statistically, the interactions between disbelief in free will and psychopathy in Studies 3 and 4 were in the opposite direction, with disbelief in free will reducing learning among participants high (but not low) in psychopathy in Study 3 and participants low (but not high) in psychopathy in Study 4. We interpret Study 3 as indicating that disbelief in free will had a stronger effect on people high in psychopathy than those low in psychopathy but hesitate to interpret Study 4 as demonstrating that disbelief in free will has a relatively stronger effect on those low in psychopathy. This is due to a floor effect on volunteering among high psychopathy participants in Study 4; the determinism condition could not have caused fewer than zero people to volunteer (which was the number of high-psychopathy participants in the control condition). The data for the current study do not directly speak to how deterministic beliefs affect those high in psychopathy for novel emotional experiences, though it seems likely that determinism would decrease learning.

Primary psychopathy and secondary psychopathy were differentiated in their capacity to predict learning. We expected the effect of psychopathy on learning from emotions to be specific to primary psychopathy, because a core element of primary psychopathy is emotional deficiency.

Secondary psychopathy, in contrast, reflects a rebellious lifestyle and a general disinclination toward following rules. Our expectations were supported, as secondary psychopathy did not predict learning alone or in interaction with disbelief in free will. This suggests that it is affective responsiveness, more than living a conventional lifestyle, which is important to learning from emotional events.

CHAPTER 3

GENERAL DISCUSSION

In four studies, we found that deterministic views caused a decrease in learning from emotional experiences. We also identified the circumstances under which disbelief in free will caused this decrease. Events that produced high levels of emotionality were more impacted by free will beliefs than low-emotionality events, as observed in Studies 2 and 3. This may have been due to a floor effect, because mundane and unemotional events were relatively less likely to evoke any kind of serious reflection. Deterministic beliefs impaired learning primarily for highly emotional events, but not all highly emotional events were equally affected by free will beliefs. Disbelief in free will caused a greater decrease in learning for (strong) negative emotions than (strong) positive emotions, whereas whether the emotion was self-conscious made no difference. These findings indicate that learning from emotional experiences depends, at least in part, on belief in free will, and the importance of free will beliefs in learning from emotional experiences is especially evident for intense, negative emotional experiences.

We anticipated that disbelief in free will would cause an especially strong reduction in learning among participants reporting negative emotions. Negative emotions are a primary source of counterfactuals (Roese, 1997; 2008), and counterfactuals are an important step in considering alternative and better ways of acting. Yet counterfactuals presuppose the possible existence of alternatives. That is, counterfactual thinking assumes multiple possible outcomes (and a choice among them), which conflicts with the essence of determinism. Thus increasing one's belief in determinism (i.e., decreasing one's belief in possible alternatives) would seem likely to reduce counterfactual thinking, thereby reducing learning.

Not all participants reporting intense, negative emotions responded equally to the determinism induction; individual differences in psychopathy moderated the effects of manipulated free will beliefs (Studies 3 and 4). When participants provided autobiographical accounts of emotional events, we found that those high in psychopathy were more affected by the determinism induction than those who were low in psychopathy (Study 3). In other words, Study 3 indicated that the determinism condition caused a greater decrease in learning among those high in psychopathy than those low in psychopathy. This was contrary to our prediction, which was that psychopathy would decrease learning mainly among those low in psychopathy.

One plausible explanation for this is that people low in psychopathy had already identified a lesson from the experience described in the autobiographical narrative, rendering the subsequent determinism manipulation ineffective at diminishing the lesson. In contrast, those high in psychopathy may not have previously learned a lesson, so their thinking about the emotional event was susceptible to being influenced by the determinism manipulation.

If the above explanation is correct, then one would expect a novel emotional stimulus to affect those low in psychopathy. In Study 4, we presented participants with a standardized emotional experience that had not been the subject of prior reflection: a fictitious article blaming the deaths of manatees on students' failure to recycle. We found that among those low in psychopathy, determinism condition had a strong negative effect on learning. (In this case, we defined learning as taking a practical step to avoid future guilt due to inadequate recycling: whether students volunteered to benefit a local recycling program). Results indicated that those low in psychopathy were quite willing to volunteer when in the control condition, but there were no volunteers in the determinism condition (or among those high in psychopathy). Thus deterministic beliefs reduced learning, even for those low in psychopathy.

The effects of psychopathy indicate that emotional responsiveness benefits learning from emotional experiences. Yet if our inference about the differential effects of psychopathy in Studies 3 and 4 is correct—if those low in psychopathy were relatively unaffected by the determinism manipulation in Study 3 because they had already learned something from the event—then this suggests something about how free will beliefs affect learning from emotional events. In particular, the suggestion is that the adoption of deterministic beliefs has a stronger prospective impact than a retroactive impact. In other words, the effects of determinism are especially strong as to how one thinks about current emotional events, although this is partly inferred.

The effects of deterministic beliefs on learning were not restricted to an artificial laboratory procedure, as people who espouse deterministic beliefs naturally and without manipulation reported learning less from an emotional experience than those who believe in free will (Study 1). Further, the fact that the decrease in learning associated with a deterministic perspective did not only occur after experimental manipulation suggests that the experimental effects are not due to participants experiencing discomfort resulting from the contemplation of threatening or nontraditional views. Convergence of results across different operationalizations

of free will indicates that adopting deterministic views would prevent one from fully profiting from emotional experiences, perhaps increasing the likelihood of repeating undesired behaviors.

Determinism is the view that all outcomes are inevitable, and if one believes that a given behavior is deterministically unavoidable, it makes little sense to reflect on how that behavior could have been different. Our prediction regarding the effect of disbelief in free will on learning from emotional experiences was based on the incompatibility of determinism with considering alternative ways of acting, given that such consideration is a vital part of deciding upon an optimal way of acting. Determinism, in effect, furnishes an excuse not to bother reflecting on alternatives to one's actions or committing to change them.

We readily acknowledge that our findings do not speak to the larger debate regarding the existence of free will. Yet the present research does demonstrate that disbelief in free will has potentially negative social and interpersonal implications. This is consistent with other research, in which disbelief in free will has been shown to contribute to cheating (Vohs & Schooler, 2008) as well as aggression and a refusal to help people in need (Baumeister et al., 2009). These studies, along with the present investigation, suggest that deterministic beliefs undermine socially desirable behaviors. Again, the reason for this seems to be that belief in inevitability of one's outcomes reduces willingness to curb natural, prepotent responses—be they dishonest actions, aggressive impulses, or a reluctance to consider how one might act better in the future.

The present investigation was inspired by the indirect causation theory of emotions (Baumeister et al., 2007), which holds that emotions can indirectly affect future behavior by virtue of their influence on cognition. The indirect causation theory stands in contrast to two popular beliefs. One is that the main function of emotions is to cause behavior directly (e.g., fear causes fleeing), and the other is that emotions primarily cause ill-advised behavior (e.g., frustration causes bad driving). These notions may have some merit, but they ignore both the beneficial consequences of experiencing emotion and the effect of emotions on cognition. The core of indirect causation theory is that there is value in experiencing emotions, perhaps especially negative emotions, because they prompt cognitive reflection on how one should act in the future. We sought to capture the essence of indirect causation theory by measuring whether people felt like they learned something from an emotional experience (Studies 1 and 2), whether emotions prompted people to learn something that independent observers considered worthwhile (Study 3), and whether emotional experiences would prompt conduct aimed at eliminating a

negative emotion (agreeing to spend hours promoting recycling after being made to feel guilty for environmental transgressions; Study 4). For all learning measures, the success with which emotions brought about learning depended on belief in free will, as adopting a deterministic perspective decreased learning. Being emotionally sensitive also facilitated learning, as higher levels of psychopathy contributed to less learning. Our data also suggest that deterministic beliefs have an especially strong negative impact for novel emotional events (those that have not previously been the subject of reflection) and a weaker impact on events for which lessons have already been learned.

Limitations and Future Directions

Counterfactuals are closely related both to belief in free will and negative emotions, and presumably learning from emotional experiences as well. One shortcoming of the present investigation is that counterfactuals were not measured, so future research may include measuring the relationship between belief in free will and the generation of counterfactuals. A second suggestion for future research is to focus on factors that moderate the success with which lessons are translated into life changes (though Study 4 does speak to this), perhaps using a longitudinal design.

CHAPTER 4

CONCLUSION

Emotions are an integral part of the human experience. They can enrich lives by prompting people to reflect on different and better ways of acting—to the benefit of future behavior. In other words, emotions enable people to learn from their experiences. Yet emotions do not invariably produce learning. The current research found that learning from emotional experiences depends in part on belief in free will, as deterministic views undercut this process. Emotion-based learning also relies on emotional responsiveness, such that emotionally sensitive people are likely to learn something from emotional experiences. In sum, emotionally sensitive people who view themselves as having free will are well positioned to gain the full benefit of their experiences.

APPENDIX

Figure 1. Self-ratings of learning as a function of guilt and experimental condition in Study 2.
Note. Higher scores correspond to learning more; possible scores range from 1 to 7.

Figure 2. Objective ratings of lesson value as a function of psychopathy and experimental condition in Study 3.

Note. Graph represents participants reporting high-intensity negative emotions. Four raters' scores (1-7) were summed such that higher scores indicate more valuable lessons learned.

Figure 3. Objective ratings of intentions for behavioral change as a function of psychopathy and experimental condition in Study 3.

Note. Graph represents participants reporting high-intensity negative emotions. Four raters' scores (1-7) were summed such that higher scores indicate greater intention to change behavior.

Figure 4. Objective ratings of long-term benefit of lesson as a function of psychopathy and experimental condition in Study 3.

Note. Graph represents participants reporting high-intensity negative emotions. Four raters' scores (1-7) were summed such that higher scores indicate greater long-term benefit.

Figure 5. Volunteering as a function of psychopathy and experimental condition

Note. Higher scores represent more volunteering, scored such that not volunteering = 0, asking for additional information = .5, and volunteering = 1.

Nadelhoffer & Brewer Free Will and Autonomy Scale

Alternative possibilities are necessary for free will.

People have the power to rise above their circumstances.

People have a choice concerning what to do even when they are faced with hard decisions.

How people's lives unfold is largely up to them.

People have free will.

People have the ability to do otherwise.

Some decisions and actions are freer than others.

People's lives are genuinely open-ended — like a series of forking paths.

Note. Scale is rated from 1 (strongly disagree) to 7 (strongly agree)

Levenson, Kiehl, & Fitzpatrick Psychopathy Scale

Primary Psychopathy

1. Success is based on survival of the fittest; I am not concerned about the losers.
2. For me, what's right is whatever I can get away with.
3. In today's world, I feel justified in doing anything I can get away with to succeed.
4. My main purpose in life is getting as many goodies as I can.
5. Making a lot of money is my most important goal.
6. I let others worry about higher values; my main concern is with the bottom line.
7. People who are stupid enough to get ripped off usually deserve it.
8. Looking out for myself is my top priority.
9. I tell other people what they want to hear so that they will do what I want them to do.
10. I would be upset if my success came at someone else's expense.
11. I often admire a really clever scam.
12. I make a point of trying not to hurt others in pursuit of my goals.
13. I enjoy manipulating other people's feelings.
14. I feel bad if my words or actions cause someone else to feel emotional pain.
15. Even if I were trying very hard to sell something, I wouldn't lie about it.
16. Cheating is not justified because it is unfair to others.

Secondary Psychopathy

17. I find myself in the same kinds of trouble, time after time.
18. I am often bored.
19. I find that I am able to pursue one goal for a long time.
20. I don't plan anything very far in advance.
21. I lose interest in tasks I start.
22. Most of my problems are due to the fact that other people just don't understand me.
23. Before I do anything, I carefully consider the possible consequences.
24. I have been in a lot of shouting matches with other people.
25. When I get frustrated, I often "let off steam" by blowing my top.
26. Love is overrated.

Note. Scale is rated from 1 (strongly disagree) to 4 (strongly agree).

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BIOGRAPHICAL SKETCH

Tyler F. Stillman

Tyler Stillman was born. Later, he co-founded the rock group *Scary Treehouse*. Scary Treehouse was a powerful and mysterious presence in the Salt Lake City metal scene. When dreams of rock-stardom faded, Tyler took a job on an assembly line. Then he was fired. Following that, he sold quality eyewear (ready in about an hour!). Then he quit. Next, he worked at some other crappy job and was laid off. At this point Tyler started studying for the GRE. He later met his wife Debra, who is a total babe.