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The Effects of Nonconsciously Priming Emotion Concepts on Behavior

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Current empirical evidence regarding nonconsciously priming emotion concepts is limited to positively versus negatively valenced affect. This article demonstrates that specific, equally valenced emotion concepts can be nonconsciously activated, remain inaccessible to conscious awareness, and still affect behavior in an emotion-specific fashion. In Experiment 1A, participants subliminally primed with guilty emotion adjectives showed lower indulgence than did participants subliminally primed with sad emotion adjectives; even after the addition of a 5-min time delay, these results were replicated in Experiment 1B. Participants in the different priming conditions showed no differences in their subjective emotion ratings and were unaware of the emotion prime or concept activation. Experiments 2A and 2B replicated these findings using a helping measure, demonstrating that individuals primed with guilt adjectives show more helping than do individuals primed with sadness adjectives. In all studies, effects were moderated by individuals' specific emotion-response habits and characteristics.

Keywords: emotions, automaticity, priming

Much emotion research has focused on the behavioral effects of eliciting conscious and subjective emotions (e.g., Lazarus, 1991, 2000; Lerner & Keltner, 2000; Scherer, 1988; Zajonc, 1980). Such research has relied on either the natural occurrence of emotion (Lerner & Keltner, 2000) or its direct conscious, subjective elicitation (Lerner & Keltner, 2001). For example, common procedures include consciously inducing a given emotional state via autobiographical storytelling (e.g., Martin, 1990) or consciously exposing participants to emotionally laden stimuli (e.g., the Velten mood-induction procedure, Velten, 1968; see also Chartrand, Van Baaren, & Bargh, 2006).

We extend existing emotion research by providing a first demonstration that emotion concepts can be nonconsciously primed, remain inaccessible to conscious awareness, and still influence behavior in emotion-specific ways. Although recent research has examined the effects of nonconscious *affect* primes (Winkielman, Berridge, & Wilbarger, 2005b), such research has focused on the effects of valence and compared only positive and negative affect; it has not accounted for differences among specific, equally valenced, but qualitatively different emotion concepts (Berridge & Winkielman, 2003).

The effect of specific, equally valenced, but qualitatively different emotions on behavior has been repeatedly demonstrated when those emotions were consciously available (e.g., Lerner & Keltner, 2000, 2001). However, there is no evidence to date that such emotion-specific behaviors can be nonconsciously or automatically activated. In the present research, we nonconsciously activated such emotion-specific behaviors by using adjective primes representing two specific emotions, sadness and guilt, and subliminally flashing those primes. This procedure was designed to activate specific emotion-related concepts in a nonconscious manner. We demonstrate that following this procedure, individuals remain unaware of the priming or activation of these emotion concepts, yet they behave in a manner consistent with the specific emotion concept primed. Thus, we provide a first demonstration that nonconscious emotion-adjective primes lead to emotion-specific behaviors, and we argue that this effect occurs because of the activation of emotion-specific schemata or concepts.

The idea of activating emotion concepts is consistent with prior emotion research. Such research has argued that emotions are accompanied by knowledge structures or schemata (Lang, 1993, 1994; Lang, Bradley, & Cuthbert, 1998; Leventhal, 1982; Schachter & Singer, 1962; Shaver, Schwartz, Kirson, & O'Connor, 1987). These emotion schemata or concepts are likened to a neural network in which memories, motivations, and behaviors are linked to emotions and are activated whenever an emotion is consciously or subjectively experienced (Lang et al., 1998; Leventhal & Tomarken, 1986). We argue that these links between emotion concepts and related behaviors can become automatic and nonconscious over time because of repeated coactivation (Bargh & Chartrand, 1999; Chartrand & Bargh, 2002; Lang et al., 1998). We further argue that as a result of this automatic link, these emotion schemata or concepts can be activated outside of conscious awareness; when activated in this manner, they affect behavior in much the same way they would were the emotions and/or schemata consciously available to the individual.

Thus, we demonstrate nonconsciously activated behavioral effects that go beyond affect or valence and extend to specific, qualitatively different emotion concepts. Empirical evidence of

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such effects should meet three main criteria. First, the specific emotions examined should be similar in valence but generate predictably different behaviors. If different specific emotions of similar valence result in different behaviors, this would indicate that behaviors are driven by the specific type of emotion concept primed rather than by valence.

Second, if emotion concepts are active, they should operate in much the same way nonconsciously as they do consciously (Bargh & Chartrand, 1999; Chartrand & Bargh, 2002; Lang, 1994). Thus, if sadness and guilt are commonly accompanied by certain behaviors when those emotions and concepts are consciously available, similar behaviors should result from nonconscious emotion concept activation. In addition, if these behaviors (and concepts) vary across individuals (e.g., on the basis of individual-difference factors), these differences should persist when nonconscious activation methods are used (Lang, Levin, Miller, & Kozak, 1983; Shaver et al., 1987).

Third, it must be demonstrated that individuals were not consciously aware of or able to explicitly report any significant differences in their conscious emotion, with respect to both valence and specific emotion type, across the different emotion concept prime conditions (Winkielman et al., 2005b). Measures for such differences should be administered in close proximity to the emotion-elicitation procedure and prior to the behavioral measure, so as to avoid biases caused by memory or counterfactual thinking (Winkielman et al., 2005b). Lack of increased awareness or sensitivity to the specific emotion adjectives primed would suggest that the emotion concept is not consciously available to the individual.

To satisfy the first criterion, we chose to examine two equally valenced but qualitatively different emotions, guilt and sadness. We chose sadness and guilt because they were both negatively valenced, similarly unpleasant, and similar on other important emotion dimensions (e.g., effort, certainty; Smith & Ellsworth, 1985; Smith & Lazarus, 2001).

We satisfied the second criterion by examining indulging and helping behaviors. These behaviors have been examined under conditions of conscious sadness and guilt and have been shown to vary across these specific emotions (Baumeister, Stillwell, & Heatherton, 1994; Bybee, 1998; Bybee, Merisca, & Velasco, 1998; Rehm & Plakosh, 1975; Tangney & Dearing, 2002; Zemack-Rugar, 2006). Moreover, these behaviors have been shown to vary not only as a function of sadness and guilt but also as a function of a measurable individual-difference factor, guilt-proneness (GP; Tangney, 1999, 2001; Tangney & Fischer, 1995; Tangney, Wagner, & Gramzow, 1992). We discuss the research findings regarding guilt, sadness, indulging, and helping in more detail in Experiment 1A.

To satisfy the third criterion, we used an established emotion measure for evaluating positive versus negative emotions, the Positive and Negative Affect Scedule (PANAS; Egloff, Schmukle, Burns, Kohlmann, & Hock, 2003; Tice, Bratslavsky, & Baumeister, 2001; Watson, Clark, & Tellegen, 1988; Winkielman, Berridge, & Wilbarger, 2005a). This scale was enhanced with added adjectives that were previously shown to differentiate between guilt and sadness when these emotions were consciously induced and subjectively experienced (Zemack-Rugar, 2006). We also examined participants' ratings of the specific emotion adjectives to which they were exposed. Finally, these emotion and awareness measures were administered in close proximity to the emotion prime and before the behavioral measure. Thus, all of our experiments meet the three criteria posed.

There are two sets of two experiments, for a total of four studies. In each set of experiments, we examined one of the behaviors of interest (indulging or helping), with the second study in each set providing a replication of the effects found in the first; because of the novel nature of these data, such replication is of interest. In Experiments 1A and 1B, individuals subliminally primed with guilty adjectives rated all emotion-specific adjectives (including the prime adjectives) no differently than did individuals subliminally primed with sad adjectives. Despite this lack of difference in conscious emotion concept awareness or activation, individuals in the two emotion-prime conditions behaved predictably differently on an indulgence task. These differences were driven not only by the specific emotion-adjective prime condition but also by the participants' individual characteristics. Experiments 2A and 2B showed similar effects for a helping task.

Prior to presenting these experiments, we briefly review the literature relevant to establishing the theoretical links discussed earlier. First, we discuss emotion concepts, their makeup, and activation (Lang et al., 1998; Leventhal, 1982; Shaver et al., 1987). In this context, we discuss previously identified differences between specific, equally valenced emotions and how those might be linked to emotion concepts (Lerner & Keltner, 2000, 2001; Smith & Ellsworth, 1985). We then discuss the issue of the nonconscious and automatic activation of these concepts (Bargh & Chartrand, 1999; Lazarus, 1991; Lerner & Keltner, 2000; Smith & Ellsworth, 1985).

Emotion Concepts and Specific Emotions

There is ample evidence that emotions are accompanied by a variety of cognitions (e.g., Schachter & Singer, 1962; see also Lang, 1994, for a review). These cognitions are composed of the numerous elements that are involved in each individual emotional experience (Shaver et al., 1987). Together, these elements form a mental representation, or schema, that is both emotion and individual specific (Lang et al., 1983, 1998; Leventhal & Tomarken, 1986; Shaver et al., 1987). These emotion schemata or concepts are likened to information networks that link a specific emotion with related memories, cognitions, and action programs (Lang et al., 1998; Leventhal & Tomarken, 1986). As such, these concepts serve as a "steering function" and help in generating emotion-appropriate behaviors (Schachter & Singer, 1962).

Normally, these emotion concepts are activated whenever the person experiences a particular emotion (Lang et al., 1998). The experience of that emotion and the activation of the related schemata cause certain behaviors to be more active and accessible and therefore make certain behavioral responses more likely (Lang et al., 1998; Bradley & Lang, 2000). There is much evidence that such specific behavioral responses are linked to specific emotions (Bradley & Lang, 2000; Lang et al., 1998; Schachter & Singer, 1962) and that these differences go beyond mere valence (Lerner & Keltner, 2000, 2001).

For example, although both fear and anger are negatively valenced emotions, individuals who are experiencing fear tend to shy away from risk, whereas individuals who are experiencing anger tend to be risk takers (Lerner & Keltner, 2001). It has been argued

that the reason for these differences is that the concept or schemata for fear is characterized by cognitions of uncertainty, whereas the concept of anger is characterized by cognitions of certainty (Lerner & Keltner, 2000, 2001). Moreover, emotion concepts and resulting emotion-specific behaviors vary not only across specific emotions but also across individuals. For example, people with snake phobia show arousal and a fight-or-flight response when exposed to live snakes, whereas generally anxious individuals (who are not specifically snake phobic) show no such response (Lang et al., 1983).

Such demonstrations of different behaviors accompanying specific, equally valenced emotions have to date been examined only when the emotions themselves were consciously induced and experienced (Lerner & Keltner, 2000, 2001; Small, Lerner, Gonzalez, & Fischoff, 2006). In this article, we demonstrate that such behaviors can be activated and pursued even when the emotion concepts are nonconsciously activated; we discuss below literature that supports our argument that such concepts can indeed be nonconsciously activated.

Nonconscious Emotion Concept Activation

The repeated activation of a specific set of antecedents, experiential characteristics, and consequences concurrently with specific emotions leads to the formation of emotion-specific concepts (Leventhal, 1982; Shaver et al., 1987). It has been argued that these concepts are represented by a network of nodes in the brain. Because of this network, the activation of a specific emotion makes related emotion-specific nodes more accessible and gives them a higher potential for affecting behavior (Lang, 1993; Lang et al., 1998). In other words, the activation of specific emotions causes the activation of emotion-specific linkages or concepts, which leads to an increase in emotion-specific behaviors (Lang et al., 1998).

Given the repeated coactivation of emotion concepts and emotion-related behaviors, these two elements are likely to become automatically linked (Bargh & Chartrand, 1999; Chartrand & Bargh, 2002). Thus, the activation of the emotion concept should be sufficient to bring about the pursuit of emotion-specific behaviors. Given the strong link between emotion concepts and emotion-specific behaviors, we argue that activation of the concept need not be conscious for the behavior to be pursued.

Furthermore, extensive research on automatic and nonconscious behavior has repeatedly demonstrated that behaviors regularly pursued following the activation of conscious concepts (e.g., goals) are similarly pursued when these concepts are nonconsciously activated (Bargh & Chartrand, 1999; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001; Chartrand & Bargh, 1996, 2002; Chartrand et al., 2006). Moreover, this research has demonstrated that these behaviors are pursued on the basis of not only the specific concept activated but also the habits and characteristics of the individual (Fitzsimons & Bargh, 2003; Winkielman et al., 2005b). Thus, we expect that the nonconscious activation of an emotion concept will lead to the same behaviors that are typical for a particular individual when that emotion concept is consciously active (Bargh & Chartrand, 1999; Chartrand & Bargh, 2002).

There is some evidence that suggests this might indeed occur. For example, individuals who were snake phobic responded with arousal and a fight-or-flight response when pictures of snakes were subliminally presented to them, whereas individuals without snake phobia showed no such responses (Öhman, Flykt, & Lundqvist, 2000); these findings are consistent with findings obtained using supraliminal, conscious snake stimuli (Lang et al., 1983).

There is also evidence in the emotion literature that general approach versus avoidance motivations associated with positive versus negative affective concepts guide behavior when these concepts are nonconsciously primed (Berridge & Winkielman, 2003; Winkielman & Berridge, 2004; Winkielman et al., 2005a, 2005b). For example, individuals subliminally flashed with positive emotion faces tend to drink more of a beverage and evaluate it more positively (i.e., approach) than do individuals subliminally flashed with negative emotion faces (Winkielman et al., 2005b).

However, there is no evidence in the literature that emotion concepts associated with specific, equally valenced emotions can be nonconsciously primed and still affect behavior in an emotion-specific manner. In this article, we present data from four studies that provide such evidence.

Experiment 1A

Theoretical Background: Guilt, Sadness, Guilt-Proneness, and Indulgence Behavior

One empirical requirement posited above was the identification of two equally valenced emotions that are expected to generate different consequences for the same behavioral measure. We selected sadness and guilt; because they are both negatively valenced, differences in behavior following priming of these emotion concepts cannot be attributed to valence.

We selected indulgence as one behavior of interest. Research suggests that when emotion is conscious, guilty and sad individuals tend to adopt different levels of indulgence. Specifically, individuals experiencing sadness tend to be attracted to immediately gratifying or tempting stimuli and tend to increase their consumption of a host of indulgent products (Rehm & Plakosh, 1975; Seeman & Schwartz, 1974; see Tice et al., 2001, for a summary). Thus, sad individuals tend to repeatedly link the experience of sadness with indulgent behavior; over time, such repeated links are likely to become part of the emotion concept and to guide behavior automatically and nonconsciously (Bargh & Chartrand, 1999; Chartrand & Bargh, 2002).

In contrast, guilty individuals tend to avoid indulging, as it is incongruent with the experience of blame or fault and can be perceived as a self-reward (Tangney, 1999, 2001). Instead, guilty individuals avoid self-reward or pleasure and seek to punish or deprive themselves (Bybee et al., 1998; Carveth, 2001). Thus, generally speaking, guilty individuals tend to repeatedly link the experience of guilt with the behavior of abstinence or reduced indulgence.

However, this effect for guilty individuals is moderated by an individual-difference factor, guilt-proneness (Tangney et al., 1992). Specifically, only individuals high in GP tend to respond to potentially guilt-inducing situations with cognitions of blame and fault, and they therefore respond with behaviors of self-denial and self-punishment (Harder, 1995; Harder, Cutler, & Rockart, 1992; Harder & Lewis, 1987). In other words, only individuals high in GP repeatedly link guilt with abstinence. Hence, only these individuals' emotion concepts will be characterized by a repeated link

between guilt and reduced indulgence. This link would be expected to result in lowered indulgence when the concept of guilt is activated, even if this activation is nonconscious.

In our first two studies, we used the allocation of a limited budget to a hedonic, indulgent shopping item versus a nonhedonic, nonindulgent necessity item as our measure of indulgence. On the basis of the emotion–behavior findings cited above, we predicted that individuals nonconsciously exposed to guilt concept primes who were high in GP would show reduced levels of indulgence (i.e., less money allotted to the indulgent option) compared with both individuals exposed to guilt concept primes who were low in GP and individuals exposed to sadness concept primes.

Overview

In Experiment 1A, we examined the effects on participants' indulgence levels of subliminally priming with sad versus guilty emotion adjectives. Consistent with the above discussion of the emotion–behavior link, we predicted that an interaction between emotion concept prime and GP would determine indulgence levels on this task. Specifically, high-GP individuals nonconsciously primed with guilty emotion adjectives were expected to show lower levels of indulgence than low-GP individuals nonconsciously primed with guilty emotion adjectives and individuals nonconsciously primed with sad emotion adjectives.

It is important to note that these effects were expected to occur despite the fact that participants in the different emotion-adjective prime conditions did not report different levels of positive, negative, or guilt-specific emotions. Moreover, participants in the different prime conditions were not expected to report differences in the ratings of the specific adjective primes to which they were exposed. These emotion-adjective ratings were measured explicitly, in close proximity to the prime, and before the behavioral measure. We also conducted a pretest to ensure that participants were unaware of the primes and unable to identify them.

Pretest

Forty undergraduate students from Duke University completed a subliminal priming procedure (see the procedures of Chartrand & Bargh, 1996). Participants were told they were completing a "visual acuity" study. The study was in fact a pretest of the emotion-priming stimuli.

Participants were seated in front of a computer screen that had three asterisks in its center. They were asked to click the space bar as quickly as possible every time a string of letters flashed on the screen. For best performance, participants were advised to focus on the three asterisks in the center of the screen because the stimuli would appear randomly in different quadrants of the screen.

Stimulus words were flashed 16 times each for 60 ms in one of the four quadrants of the screen (randomly). The procedure followed the guidelines set for parafoveal priming in Bargh and Chartrand (2000). Although Bargh and Chartrand (2000) cited evidence that parafoveal priming is successful even with durations of 125 ms (because of the 140-ms delay in moving the eyes' focus from the central focal point of the asterisks to the peripherally flashed stimuli; p. 262), we selected their conservative shorter exposure level of 60 ms.

For the sad condition, stimulus words were *sad*, *miserable*, *depressed*, and *gloomy*. For the guilty condition, stimulus words were *guilty*, *blameworthy*, *guilt-ridden*, and *culpable*. Following each target stimulus word, a backward mask appeared (the letters "XQFBZRMQWGBX"), as is recommended for reducing the visibility of stimulus remnants (Bargh & Chartrand, 2000, p. 262). This mask remained on the screen until participants pressed the space bar, at which point the three asterisks reappeared in the center of the screen and the next trial began. Trials were separated by a randomly selected 2- to 5-s interval. Both words and mask were presented in 24-point black font (all capital letters) against a white background.

Participants were exposed subliminally to either the sad or guilty adjective primes (i.e., four words total for each participant). Following priming, the testing procedures suggested by Bargh and Chartrand (2000) were followed. First, participants were asked if they had been exposed to anything other than the asterisks and the mask. None of the participants indicated they had been exposed to additional words.

Then, participants were told that words had in fact been flashed, and they were asked to identify in each of eight word pairs the word to which they had been exposed. Each pair included one primed word (e.g., *sad* or *guilty*) and one synonym that had not appeared in either prime condition (e.g., *unhappy* or *ashamed*). Although Bargh and Chartrand (2000, p. 262) noted that a test including the actual primed words is extremely conservative (because according to priming theory, sensitivity to those words should increase following the primes, and their correct selection is therefore more likely even if no conscious detection occurred), we thought such a conservative test would be appropriate given the novel nature of our experimental hypotheses.

Following each word-matching question, we asked participants how certain they were of their choice on a scale of 1 (*not at all certain, am guessing*) to 7 (*very certain, am sure I saw this word*) in an attempt to gain a better understanding of whether participants saw any of the words or were simply guessing.

For our scoring and evaluation procedure, we followed Bargh and Chartrand's (2000) guidelines by comparing the ability of individuals who were exposed to a given prime to recognize that prime with the ability of individuals who were never exposed to the prime to recognize that same prime. Thus, for each correct selection of a target word (whether or not the participant was exposed to it), participants received one point. We then calculated a percentage-correct score for sad words (total number of correctly guessed sad words divided by four) and a percentage-correct score for guilty words.

We conducted two logistic regressions using each of the percentage-correct scores as the dependent variable and the emotion-prime condition as the independent variable. If we found an effect of condition, this would suggest that individuals who were primed with the words were better able to select them than were individuals who were not primed with the words. There was no significant effect found for either the sad percentage-correct, χ^2 (1, 40) = 2.05 ($p > .15$; $M = 45\%$), or the guilty percentage-correct χ^2 (1, 40) = 0.55 ($p > .45$; $M = 45\%$), scores. An analysis of variance (ANOVA) revealed that participants were also equally uncertain of their word selection across the different prime conditions ($p > .35$ for both; $M_{\text{guilty certain}} = 1.45$, $SD = 0.80$; $M_{\text{sad certain}} = 1.36$, $SD = 0.69$).

Method

Participants. Ninety-five participants from Duke University completed a study with a two-factor between-subjects design of Emotion Concept Prime (guilty vs. sad) × GP (high vs. low; measured), with a dependent variable of indulgence. A hanging control condition (neutral emotion concept primes) with 68 participants was also included. The experiment took approximately 20 min, and participants were each paid $5.

Procedure. Participants arrived at the lab at random times (determined by signs and flyers throughout the student center) and were run in batches of 1–10 participants. Participants were told that they were going to participate in two studies: a visual acuity study and a consumer choice study.

The visual acuity portion included the subliminal priming task described above. A hanging control condition including neutral prime words (*balanced*, *neutral*, *regular*, *ordinary*) was also conducted at a later time with the same procedures. At the end of this visual acuity portion, participants were asked what they thought the goal of the study was. This question was designed to evaluate whether participants suspected that they had been flashed with anything and whether they believed the cover story for the study.

Participants then began what they were told was a consumer choice study (presented on the same computer with no interruption) and were asked to complete the PANAS (Watson et al., 1988) emotion scale, a common, explicit, widely used measure that allows for a broad range of emotions (Egloff et al., 2003; Schmukle, Egloff, & Burns, 2002; Tice et al., 2001; Winkielman et al., 2005a). We added several adjectives to the scale to better measure both semantic priming effects and guilt.

First, to ensure that there was no increased, specific semantic activation of the priming-stimulus words, we added those emotion adjectives to the PANAS scale. Second, we added the adjective *remorseful* to the scale to allow for the creation of a composite guilt score (average of *guilty*, *guilt-ridden*, *remorseful*, and *blameworthy*) previously shown to differentiate between sadness and guilt when those emotions were consciously elicited and experienced (Zemack-Rugar, 2006).

The timing of the administration of this scale was chosen carefully; it occurred shortly after the subliminal emotion prime but before the main dependent-variable measures. This timing has two important features: (a) Measuring emotion shortly after the prime, rather than later in the experiment, reduced potential contamination by memory bias (Schacter, 2001; Winkielman, Zajonc, & Schwarz, 1997), and (b) explicitly measuring subjective emotion reports before the dependent variable allowed us to examine the participants' sensitivity to the primes and their awareness of the emotion concepts immediately before the behavior of interest.

Following completion of the PANAS scale, participants were asked to complete the behavioral measure for indulgence. This measure required participants to allocate a $50 gift certificate (that they were eligible to win) between a CD/DVD purchase and a school-supply purchase. In an earlier (open-ended) pretest, participants indicated they considered CDs and DVDs to be indulgences; no participant mentioned school supplies as an indulgence. Moreover, in prior research, CD/DVDs were found to be more tempting, enjoyable, and desirable than school supplies and at the same time significantly less good for you, suggesting that they are a good measure for an indulgence (Zemack-Rugar, 2006). Dollars allotted to the CD/DVD purchase served as the dependent variable.

Following the coupon-allocation task, participants completed several questions regarding the degree to which they found each of the options tempting and appealing and the degree to which they would be happy to receive them as a gift (all 7-point scales). These measures served as covariates.

Next, additional hypothesis-guessing checks were administered. Participants were asked to indicate what they believed the goal of the study was (open ended) and then were asked directly if they believed they had been flashed with anything other than the asterisks and the meaningless set of letters at the beginning of the first visual acuity study (*yes/no/I don't know*). For those who responded "yes," we asked what they thought they had seen flashed. Then, to measure GP, we asked the participants to complete the Test of Self-Conscious Affect (TOSCA; Tangney et al., 1992). Finally, participants were debriefed and paid.

Results

Hypothesis guessing. All participants believed the visual acuity cover story, and none indicated suspicion that they had been flashed with something other than the mask. However, following the overt emotion measures and coupon-allocation task, 10 participants indicated they were suspicious that the two measures were related. Although these participants were not aware that their emotion had been manipulated (none suspected the visual acuity task), they made a connection between the emotion measure and the subsequent indulgence measure. This connection may have biased their responses or created demand effects, and we therefore removed these participants from the analysis. Thus, 85 participants are included in the analysis.

Priming stimuli. A composite score of the ratings of adjectives corresponding to the primed words was created for each condition. There was no effect of emotion-prime condition on either the sad, $F(1, 83) = 0.38$, $p > .53$, Cronbach's $\alpha = .85$, or the guilty, $F(1, 83) = 0.95$, $p > .33$, Cronbach's $\alpha = .81$, primed-word scores (see Table 1).

Subjective emotion. Three composite emotion scores were created. Two consisted of the negative and positive valence scales from the original PANAS emotion scale, and the third was a composite guilt score (the average of *remorseful*, *guilty*, *guilt-ridden*, and *blameworthy*; Cronbach's $\alpha = .81$). An ANOVA revealed that there was no significant effect of emotion concept prime condition on the negative emotion scale, $F(1, 83) = 1.87$, $p > .15$; the positive emotion scale, $F(1, 83) = 2.07$, $p > .15$; or the guilt score, $F(1, 83) = 0.62$, $p > .43$ (see Table 1).

Indulgence measure. We conducted an analysis of covariance (ANCOVA) using the overall valuation of the CD/DVD option as a covariate (i.e., the average of *appealing*, *tempting*, and *happy to receive as gift*; Cronbach's $\alpha = .80$) and emotion concept prime condition (sad vs. guilty), the GP score (continuous), and the Emotion Concept Prime × GP interaction as independent variables. The dollars allotted to the CD/DVD option served as the dependent variable.

Table 1
Experiments 1A and 1B: Means (and Standard Deviations) of Emotion Measures

Emotion measure	Experiment 1A			Experiment 1B		
	Sad concept prime condition	Guilty concept prime condition	*p*	Sad concept prime condition	Guilty concept prime condition	*p*
Primed sad adjectives	1.36 (0.56)	1.45 (0.76)	.53	1.59 (0.75)	1.58 (0.67)	.91
Primed guilty adjectives	1.23 (0.47)	1.14 (0.35)	.33	1.16 (0.37)	1.23 (0.49)	.35
Negative affect	1.63 (0.40)	1.51 (0.44)	.17	1.64 (0.44)	1.59 (0.44)	.50
Positive affect	2.38 (0.88)	2.11 (0.88)	.15	2.13 (0.79)	2.09 (0.71)	.78
Guilt score	1.21 (0.41)	1.15 (0.35)	.43	1.16 (0.40)	1.18 (0.48)	.74

A significant Emotion Concept Prime × GP interaction was found, $F(1, 80) = 4.15$, $p < .05$.[1] Planned contrasts with a median split on the GP measure ($M = 3.7$) revealed that, as predicted, participants low in GP allotted the same amount of money to the CD/DVD option whether they were primed with guilty emotion adjectives (least square [LS] means, $M_{guilty} = 31.6$) or sad emotion adjectives ($M_{sad} = 29.4$), $F(1, 80) = 2.72$, $p > .10$. However, participants high in GP allotted less to the CD/DVD option if they were primed with guilty emotion adjectives ($M_{guilty} = 20.2$) than if they were primed with sad emotion adjectives ($M_{sad} = 26.4$), $F(1, 80) = 4.09$, $p < .05$. Moreover, in the guilty concept prime condition, participants high in GP showed significantly less indulgence than did participants low in GP, $F(1, 80) = 5.72$, $p < .05$. No such effects were found for participants in the sad concept prime condition, $F(1, 80) = 1.53$, $p > .21$ (see Figure 1).

We also conducted planned contrasts comparing the hanging control, neutral concept prime condition ($N = 68$, $M_{neutral} = 31.9$) with both the guilty and sad concept prime conditions. Results show that although participants in the sad concept prime condition and in the guilty concept prime/low-GP condition did not differ in their indulgence levels from participants in the neutral concept prime condition—sad $F(1, 146) = 0.02$, $p > .8$; guilty/low GP $F(1, 146) = 0.96$, $p > .3$—participants in the guilty concept prime/high-GP condition showed an absolute reduction in indulgence compared with the neutral concept prime condition, $F(1, 146) = 3.74$, $p = .05$.

Finally, to ensure the viability of the model, we also examined whether the covariate and/or the individual-difference measure was affected by the emotion concept prime procedure. There were no effects of the emotion concept prime condition on either the valuation of the CD/DVD option, covariate $F(1, 83) = 0.08$, $p > .77$, or the individual GP score, $F(1, 83) = 1.92$, $p > .15$.

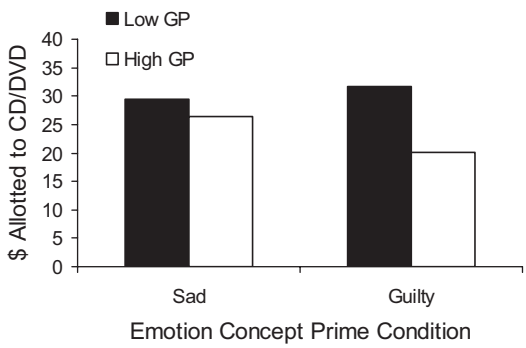

Figure 1. Experiment 1A: Indulgence levels—Emotion Concept Prime Condition × Guilt-Proneness (GP). Fewer dollars allotted indicates lower indulgence level.

Discussion

Experiment 1A demonstrated that subliminal primes of different, specific, negative emotion concepts can affect behavior in predictably different ways. Moreover, behavior was determined not by the specific emotion concept prime alone, but rather by its interaction with an individual characteristic, GP. As predicted, individuals for whom the emotion concept of guilt was primed exhibited less indulgence when they were high in GP than when they were low in GP. In addition, participants for whom the emotion concept of sadness was primed exhibited the same relatively high levels of indulgence regardless of their GP levels. Thus, participants primed with a guilt emotion concept and characterized by high GP showed lower indulgence levels than did both sad- and neutral-concept-primed participants.

It is important to note that these effects occurred even though participants were not consciously aware of the specific emotion concept primes and reported equivalent levels of subjective emotional experience in the emotion concept prime conditions. Individuals in both the guilty and sad emotion concept prime conditions rated negative, positive, and guilt-specific emotion adjectives equally. Moreover, participants' ratings of the specific emotion adjectives used in the priming process did not vary across the sad and guilty concept priming conditions and also did not differ from the emotion ratings of participants in the neutral priming condition. This finding supports the claim that the specific emotion concepts were nonconsciously activated, engaging the emotion–behavior link. Thus, behaviors consistent with the specific emotion concepts were pursued, albeit outside of conscious awareness.

To the best of our knowledge, this is the first demonstration that specific, equally valenced emotion concepts can be subliminally primed, remain unavailable to conscious awareness, and still affect behavior in an emotion-specific fashion. That is, both emotions examined in this experiment were negatively valenced; therefore, the different behaviors observed following the subliminal priming

[1] Results including the individuals who were suspicious of the link between the emotion scale and the indulgence measure were identical for the emotion data ($p > .3$ for all) and directionally similar for the indulgence measure, although significance of the Emotion Concept Prime × GP interaction was reduced, $F(1, 90) = 2.12$, $p = .14$.

of these emotion concepts cannot be explained by valence alone. This experiment further showed that the effects of the subliminally primed emotion concepts were not only emotion specific but also individual specific; thus, the emotion-adjective primes interacted in subtle and predictable ways with participants' individual tendencies to habitually link specific emotions with certain behaviors. This finding suggests that the nonconscious activation of specific emotion concepts led to the activation of an automated emotion–behavior link; because the nature of this automated link varied across individuals depending on their levels of GP, behavior varied accordingly.

Experiment 1B

Because the effects demonstrated in Experiment 1A are novel, there is value in showing that they are replicable. In Experiment 1B, we sought to provide such a replication and some evidence for generality by examining (albeit in a limited way) the longevity of such effects. In Experiment 1B, we replicated the four Emotion Concept Prime (guilty, sad) × GP (high, low) conditions of Experiment 1A, with the addition of a 5-min time delay between the emotion-adjective prime and the behavioral measure. Our prediction was that the effects of Experiment 1A would persist even following the 5-min time delay, providing both a replication of our effects and evidence that these effects remain active even after a short delay.

Method, Participants, and Procedure

One hundred forty-one participants from North Carolina State University completed a replication of all procedures for the four Emotion Concept Prime × GP conditions of Experiment 1A, with only one modification. The modification was the addition of a 5-min time delay between the emotion concept prime and the behavioral measure. During these 5 min, participants were engaged in the task of crossing out all instances of the letter "e" in text taken from a statistics book. This task was selected because it had no materials related to the emotion concept primes and was deemed unlikely to affect individuals' emotional states. To ensure that this was the case, we told participants that the task was designed to readjust their vision following the visual acuity (i.e., priming) task, and we made it clear to them that performance on this task was not going to be evaluated.

Results

Hypothesis guessing. All participants believed the "visual acuity" cover story, and none indicated suspicion that they had been flashed with something other than the mask. However, following the overt emotion and the guilty-pleasure task, 10 participants indicated they were suspicious that the two measures were related. These participants were removed from the analysis, leaving 131 participants.

Priming stimuli. There was no effect of emotion concept prime condition on either the sad, $F(1, 129) = 0.01$, $p > .91$, Cronbach's $\alpha = .82$, or the guilty, $F(1, 129) = 0.87$, $p > .35$, Cronbach's $\alpha = .84$, primed-word composite scores (see Table 1).

Subjective emotion. An ANOVA revealed no significant effect of emotion concept prime condition on the negative emotion scale, $F(1, 129) = 0.44$, $p > .50$; the positive emotion scale, $F(1, 129) = 0.08$, $p > .78$; or the guilt score, $F(1, 129) = 0.11$, $p > .74$, Cronbach's $\alpha = .85$ (see Table 1).

Indulgence. An ANCOVA was conducted with the overall valuation of the CD/DVD option as a covariate (Cronbach's $\alpha = .84$) and the emotion concept prime condition (sad vs. guilty), GP score, and the Emotion Concept Prime × GP interaction as independent variables. The dollars allotted to the CD/DVD coupon served as the dependent variable.

A significant Emotion Concept Prime × GP interaction was found, $F(1, 126) = 3.8$, $p = .05$.[2] Planned contrasts with a median split on the GP measure ($M = 3.8$) revealed that, as predicted, participants low in GP allotted the same amount of money to the CD/DVD option whether they were primed with guilty emotion adjectives (LS mean, $M_{guilty} = 37.1$) or with sad emotion adjectives ($M_{sad} = 33.4$), $F(1, 126) = 0.88$, $p > .34$. However, participants high in GP allotted less to the CD/DVD option if they were primed with guilty emotion adjectives ($M_{guilty} = 26.4$) than if they were primed with sad emotion adjectives ($M_{sad} = 33.4$), $F(1, 126) = 3.75$, $p = .05$. Moreover, in the guilty concept prime condition, participants high in GP indulged significantly less than did individuals low in GP, $F(1, 126) = 7.77$, $p < .05$. No such effects were found for participants in the sad concept prime condition, $F(1, 126) = 0$, $p > .94$ (see Figure 2).

Finally, to ensure the viability of the model, we also examined whether the covariate and/or the individual-difference measure was affected by the emotion concept prime procedure. There were no effects of the emotion concept prime condition on either the valuation of the CD/DVD option, covariate $F(1, 129) = 0$, $p > .9$, or the individual GP score, $F(1, 129) = 0.04$, $p > .8$.

Discussion

Even after the addition of a brief time delay between the emotion concept prime and the self-control measure, the effects found in Experiment 1A were replicated. These findings confirm that emotion concepts can be nonconsciously activated and still affect behavior in emotion-specific ways; the findings also demonstrate that these effects persist after a short delay. In our second set of experiments, we examined whether these findings replicated when a different behavioral measure (an unpleasant helping task) was used.

Experiment 2A

Theoretical Background: Guilt, Sadness, Guilt-Proneness, and Helping Behavior

We selected helping behavior, specifically, helping on an unpleasant task, as the focal behavior for our second set of studies. This behavior was selected because there is evidence to suggest that when emotion is conscious, guilty and sad individuals tend to adopt different levels of helping when the helping task is unpleas-

[2] Results including the 10 individuals who were suspicions of the link between the emotion measure and the indulging task were identical for the emotion measures ($p > .3$ for all). Although the interaction of Emotion Concept Prime × GP on indulgence was reduced in significance, $F(1, 136) = 2.46$, $p = .1$, the direction of the means was identical.

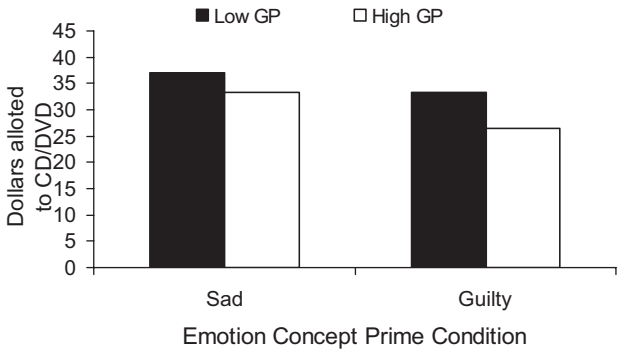

Figure 2. Experiment 1B: Indulgence levels following a time delay—Emotion Concept Prime Condition × Guilt-Proneness (GP). Fewer dollars allotted indicates lower indulgence level.

ant. Specifically, although individuals experiencing sadness tend to engage in helping behaviors (Cialdini, Darby, & Vincent, 1973; Cialdini & Fultz, 1990; Manucia, Baumann, & Cialdini, 1984), such helping is significantly reduced if the helping task itself is unpleasant (Isen & Simmonds, 1978). Thus, sad individuals tend to repeatedly link the experience of sadness with avoiding unpleasant helping tasks.

On the contrary, guilty individuals tend to engage in helping behaviors even when the helping task is unpleasant (Darlington & Macker, 1966; Estrada-Hollenbeck & Heatherton, 1998). Generally speaking, guilty individuals tend to repeatedly link the experience of guilt with helping behavior, regardless of the nature of the helping task. However, much like indulgence, we predicted that the helping behavior of guilty individuals would be moderated by GP (Tangney et al., 1992). Thus, it was only individuals high in GP who were expected to show increased helping when the concept of guilt was nonconsciously activated.

Therefore, for our second set of studies, we used the allocation of time to an unpleasant helping task for charity as our measure. On the basis of the emotion–behavior findings cited above, we predicted that individuals nonconsciously exposed to guilt concept primes who were high in GP would show increased levels of helping (even on an unpleasant helping task) compared with both individuals exposed to guilt concept primes who were low in GP and individuals exposed to sadness concept primes.

Overview

In this experiment, we examined the effects of nonconscious sad versus guilty subliminal emotion-adjective primes on the choice to participate in an unpleasant helping task. As in Experiments 1A and 1B, participants were expected to report no conscious differences in emotion across the two emotion concept prime conditions. However, individuals primed with guilty emotion adjectives were expected to allot more time to the unpleasant helping task than were individuals primed with sad emotion adjectives, but only if they were high in GP (Boster et al., 1999; Darlington & Macker, 1966; Estrada-Hollenbeck & Heatherton, 1998; Tangney et al., 1992).

However, these effects were expected only if participants had the time to complete the helping task. Specifically, Experiment 2A involved a procedure that provided participants with an unexpected opportunity to volunteer time to complete an unpleasant helping task for a charity. In this procedure, for time volunteered to increase, participants must be primed with an emotion concept associated with helping (e.g., guilt), be individually inclined to link that emotion concept to helping (i.e., be high in GP), and be able to volunteer for the helping task given their objective time limitations. For example, an individual who is highly guilt-prone and primed with guilty emotion concept adjectives may have the inclination to volunteer more time to charity than an individual primed with sad emotion concept adjectives. However, if the guilt-concept-primed individual must shortly attend a class or a meeting, whereas the sad-concept-primed individual has no such time limitations, the time volunteered may be determined more by the objective time limitation than by the primed emotion concept. These predictions are consistent with findings that the effects of nonconscious primes interact with individual goals and expectations (Strahan, Spencer, & Zanna, 2002; Winkielman et al., 2005b).

Method

Participants. One hundred ninety-seven undergraduate students from Duke University completed a study with a three-factor between-subjects design of Time Availability (yes vs. no; measured) × Emotion Concept Prime (guilty vs. sad) × GP (high vs. low; measured), with a dependent variable of time allotted to an unpleasant helping task. A hanging control condition (neutral emotion-adjective primes) with 80 participants was also included. The experiment took approximately 20 min, and participants were paid $5 each.

Procedure. The methods for Experiment 2A were identical to those used in Experiment 1A, except for three changes: (a) An unpleasant helping task was substituted for the indulgence task, (b) covariates were collected consistent with the new task, and (c) a time-availability measure was added.

The unpleasant helping task was adapted from Zemack-Rugar (2006). First, the emotion-adjective priming procedure and emotion measures were administered by computer (as in Experiment 1A). Then participants were told on the next computer screen that another experimenter was conducting research in an adjacent room. They were told that the research involved an array of annoying, boring, and repetitive tasks designed to assist a charity in formulating its research questionnaires. The other experimenter was said to be helping this charity for free and was thus unable to pay participants for their time. Participants were asked whether they would be willing to assist the charity. They were told that they did not have to complete the entire charity packet but could allot anywhere from 0 to 20 min to the charity. The charity task was to be completed after they finished the current study, for no additional pay. Participants were then asked to indicate how much time (0–20 min) they wished to allot to the charity; this served as the dependent variable.

Following this task, participants were presented with three questions: how involved they were with charity, how important charity was to them, and how much time they spent on charity (all on 7-point scales). These questions served as covariates. Participants were then asked to indicate what they believed the goal of the study was (hypothesis-guessing check).

Table 2
Experiments 2A and 2B: Means (and Standard Deviations) of Emotion Measures

	Experiment 2A			Experiment 2B		
Emotion measure	Sad concept prime condition	Guilty concept prime condition	*p*	Sad concept prime condition	Guilty concept prime condition	*p*
Primed sad adjectives	1.42 (0.55)	1.46 (0.61)	.65	1.45 (0.55)	1.37 (0.54)	.39
Primed guilty adjectives	1.25 (0.40)	1.24 (0.38)	.89	1.20 (0.33)	1.17 (0.33)	.46
Negative affect	1.49 (0.40)	1.53 (0.42)	.49	1.53 (0.39)	1.49 (0.42)	.56
Positive affect	2.52 (0.81)	2.38 (0.74)	.23	2.29 (0.75)	2.27 (0.73)	.91
Guilt score	1.25 (0.41)	1.25 (0.38)	.93	1.20 (0.30)	1.18 (0.35)	.69

Because the experiment was conducted at the university's student center and participants stopped by at random without prescheduling, a time-availability measure was needed. In particular, participants based their consent to participate in the experiment on the 20-min duration noted on flyers and signs throughout the student center. However, the actual time availability required to participate in the experiment was 60 min (20 min for the experiment, 20 min for the full charity task to be an option, and 20 min travel time from the student center to their next class). Because the charity task measure could not be taken before the emotion prime, it was impossible to screen participants ahead of time on the basis of whether they actually had 60 min available. Consequently, to identify those participants who were objectively limited in their ability to volunteer time to the charity, we asked participants to indicate when their next classes and/or any other set (i.e., time-specific) activities they needed to attend that day were scheduled.

Results

Hypothesis guessing. All participants believed the visual acuity cover story, and none indicated true suspicion that they had been flashed with something other than the mask.[3] However, following the overt emotion and grim necessity for charity measures, 13 participants indicated they were suspicious that the two measures were related. These participants were removed from the analysis, leaving 184 participants.

Priming stimuli. A composite score of the ratings of adjectives corresponding to the primed stimulus words was created for each condition. There was no effect of emotion concept prime condition on either the sad, $F(1, 182) = 0.2$, $p > .65$, Cronbach's $\alpha = .76$, or the guilty, $F(1, 182) = 0.02$, $p > .89$, Cronbach's $\alpha = .66$, primed-word scores (see Table 2).

Subjective emotion. An ANOVA revealed no significant effect of emotion concept prime condition on either the negative emotion scale, $F(1, 182) = 0.46$, $p > .4$; the positive emotion scale, $F(1, 182) = 1.39$, $p > .23$; or the guilt score, $F(1, 182) = 0.01$, $p > .93$, Cronbach's $\alpha = .82$ (see Table 2).

Time availability. The emotion-adjective primes were expected to affect only those participants who did not have a time limitation. Participants' responses to the time-availability question were coded as a dummy variable, with those participants who indicated that they had a set obligation within 1 hr coded as the time-unavailable group (35 participants) and the rest coded as the time-available group. One hr was used as the cutoff because the entire task (including helping for the maximum time) would take 40 min, and the student center was, on average, 20 min away from most classroom locations.

Helping on an unpleasant task. We conducted an ANCOVA using participants' general tendency to volunteer (average of *involvement*, *importance*, and *investment*; Cronbach's $\alpha = .87$) as a covariate and time availability, emotion concept prime condition, GP, and their interactions as independent variables. The dependent variable was the time allotted to charity in minutes. A significant three-way interaction of Time Availability × Emotion Concept Prime × GP, $F(1, 175) = 5.28$, $p < .05$, was found.[4]

To examine the simple effects comprising this interaction, we applied a median split to the GP measure ($M = 3.8$). Planned contrasts revealed, as predicted, no significant effects of emotion concept prime condition in the time-unavailable condition ($p > .2$ for all). Also as predicted, for the time-available condition, participants low in GP allotted the same amount of time to the charity whether they were primed with guilty emotion adjectives (LS mean, $M_{guilty} = 3.1$) or with sad emotion adjectives ($M_{sad} = 2.2$), $F(1, 175) = 0.37$, $p > .54$. However, participants high in GP allotted more time to the charity if they were primed with guilty emotion adjectives ($M_{guilty} = 8.4$) than if they were primed with sad emotion adjectives ($M_{sad} = 3.9$), $F(1, 175) = 8.2$, $p < .005$. Moreover, in the guilty concept prime condition, participants high in GP allotted significantly more time to the helping task than did participants low in GP, $F(1, 175) = 13.18$, $p < .0005$. No such effects were found for participants in the sad concept prime condition, $F(1, 175) = 1.28$, $p > .25$ (see Figure 3).

Planned contrasts were also conducted comparing the hanging control, neutral concept prime condition ($N = 80$, $M_{neutral} = 31.9$)

[3] Six participants answered "yes" in response to the specific question of whether something other than the mask was flashed. However, in response to the follow-up question asking specifically what they saw, none of them provided a response that would suggest that they were truly suspicious. Responses included a repetition of the mask string, a mention of a white screen, or a response of "I don't know." In addition, these participants did not indicate suspicion in either of the open-ended hypothesis-guessing questions. Thus, their data were retained.

[4] Results including the 13 individuals who were suspicious of the link between the emotion measure and the unpleasant helping task were identical for the emotion measures ($p > .2$ for all) and for the interaction of Time × Emotion Concept Prime × GP, $F(1, 188) = 5.80$, $p < .05$; the means were also directionally identical.

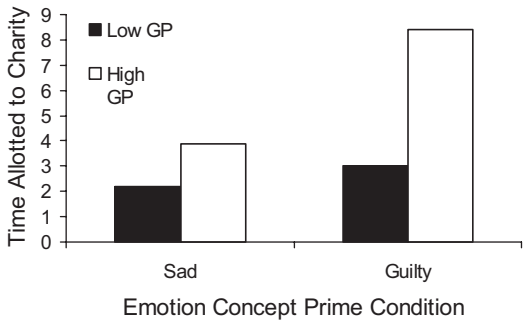

Figure 3. Experiment 2A: Time allotted to helping—Emotion Concept Prime Condition × Guilt-Proneness (GP). Results are for the time-available cells only.

with both the guilty and sad concept prime conditions.[5] Results show that although participants in the sad concept prime and guilty concept prime/low-GP conditions did not differ in their indulgence levels from participants in the neutral concept prime condition—sad $F(1, 255) = .39$, $p > .5$; guilty/low GP $F(1, 255) = .31$, $p > .5$—participants in the guilty concept prime/high-GP condition showed an absolute reduction in indulgence compared with the neutral concept prime condition, $F(1, 255) = 11.41$, $p = .005$.

Finally, to ensure the viability of the model, we also examined whether the covariate and/or the individual-difference measure was affected by the emotion concept prime procedure. There were no effects of the emotion concept prime condition on either the general tendency to volunteer, covariate $F(1, 182) = .03$ ($p > .86$), or the individual GP score, $F(1, 182) = 1.69$ ($p > .19$).

Discussion

We replicated the results found in Experiments 1A and 1B in Experiment 2A using a different behavioral measure. Once again, participants primed with different specific emotion adjectives were not aware of the emotion concept primes and did not report any subjective differences in their conscious experience of emotion. Despite this lack of awareness of the emotion concept activation, participants with no time restrictions behaved consistently with predictions for each specific emotion concept prime condition. Moreover, behaviors were determined not by the specific emotion concept prime alone but by its interaction with individual tendencies to exhibit certain behaviors in response to a given emotion.

Experiment 2B

Method, Participants, and Procedure

To replicate these effects and examine whether they persist over time, we conducted a second study (Experiment 2B). One hundred seventy-three undergraduate students from North Carolina State University participated in this study. The methods and procedure were identical to those used for the Time Availability × Emotion Concept Prime × GP conditions of Experiment 2A, with the addition of the 5-min time delay used in Experiment 1B.

Results

All participants were included in the analysis. There were no significant effects for either the priming-stimuli measure (all ps > .39) or the emotion measure (all ps > .54; see Table 2).

The ANCOVA revealed a significant three-way interaction of Time Availability × Emotion Concept Prime × GP, $F(1, 164) = 6.53$, $p < .05$,[6] with planned contrasts showing that in the time-available condition, participants low in GP allotted the same amount of time to the charity whether they were primed with guilty emotion adjectives (LS mean, $M_{guilty} = 2.0$) or with sad emotion adjectives ($M_{sad} = 2.9$), $F(1, 164) = 0.39$, $p > .53$. However, participants high in GP allotted more time to the charity if they were primed with guilty emotion adjectives ($M_{guilty} = 7.1$) than if they were primed with sad emotion adjectives ($M_{sad} = 3.5$), $F(1, 164) = 4.86$, $p < .05$. Moreover, in the guilty concept prime condition, participants high in GP volunteered to help significantly more than did individuals low in GP, $F(1, 164) = 10.11$, $p < .0005$. No such effects were found for participants in the sad concept prime condition, $F(1, 134) = 0.14$, $p > .70$ (see Figure 4). Thus, the effects of Experiment 2A were replicated even after the addition of a brief time delay.

General Discussion

This research demonstrates in a series of four experiments that specific, equally valenced emotion concepts can be subliminally primed, remain unavailable to conscious awareness, and still affect behavior in an emotion-specific fashion. The first two experiments demonstrated that individuals subliminally primed with sad or guilty emotion adjectives did not report any conscious difference in their emotional state yet behaved differently on an indulgence task. Indulgence levels were determined not by the specific emotion concept prime condition alone but by its interaction with individuals' tendencies to repeatedly link that specific emotion concept with abstinence behavior. As a result, individuals high in GP who were primed with guilty adjectives showed lower levels of indulgence than did both individuals low in GP primed with guilty adjectives and individuals primed with sad adjectives; these effects persisted even after the addition of a 5-min time delay.

In the last two experiments, we replicated the findings of Experiments 1A and 1B using a different behavioral measure, helping on an unpleasant task. Once again, behavior was determined not only by the specific emotion concept prime condition but by its interaction with individuals' habitual emotion-response patterns. These behavioral results once again persisted following the addition of a 5-min time delay.

These findings are consistent with the idea that emotion concepts can be nonconsciously activated and guide behavior outside of conscious awareness. However, they also raise interesting questions regarding understanding of emotions in general. Decades of research have focused on conscious emotions, and consequently, many researchers believe that emotions and their effects are limited to the conscious realm (e.g., Clore, 1994; Ellsworth, 1994). However, a growing group of researchers has argued that emotions may also exert their effects when they are not consciously available (Berridge & Winkielman, 2003; Kihlstrom, 1999; Murphy & Zajonc, 1993; Öhman et al., 2000; Winkielman & Berridge, 2004; Winkielman et al., 2005b; Zajonc, 1980, 1994).

The present research is relevant to this debate. Although we do not provide physiological or other evidence for the activation or

[5] Fifteen participants were classified in the time-unavailable group.

[6] Twenty-nine participants were classified in the time-unavailable group.

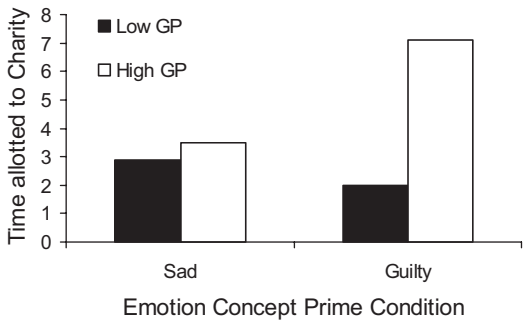

Figure 4. Experiment 2B: Time allotted to helping following a time delay—Emotion Concept Prime Condition × Guilt-Proneness (GP). Results are for the time-available cells only.

presence of emotion during our studies, our results demonstrate that relatively complex behaviors can be pursued even when the emotion concepts guiding these behaviors are unavailable to conscious awareness. Our research thus suggests that appraisals or action tendencies may become automatized and thus can affect behavior outside of conscious awareness. Such automatization seems likely, as the appraisal dimensions of emotions are strongly associated with the emotions themselves and the two are often (if not always) coactivated (Bargh & Chartrand, 1999; Lang et al., 1998; Lazarus, 1991; Leventhal, 1982; Smith & Ellsworth, 1985).

What aspects of emotion concepts are activated following nonconscious emotion concept primes? Does the nonconscious activation of emotion concepts lead to activation of the "hot" physical characteristics of emotion, or is the experience following such primes solely "cold" and cognitive (Schachter & Singer, 1962)? Research examining this question is likely to significantly contribute to the ongoing debate regarding the nature of emotion. We believe that it is worthwhile to consider whether, like many other important human activities (e.g., cognitions, goals), some functions of emotion may also be relegated to the nonconscious or automated self (Bargh & Chartrand, 1999; Bargh & Ferguson, 2000; Bargh et al., 2001; Chartrand & Bargh, 2002; Chartrand et al., 2006).

Another question arising from our data emerges from the persistence of our effects over time. Both emotion and semantic activation can be relatively fleeting. In fact, Bargh et al. (2001) argued that semantic activation can fade after a 5-min time delay. If our emotion concepts are activated semantically via the use of related adjectives, why do they continue to affect behavior even after sufficient time has passed for the semantic component to fade away? Is it possible that once activated, these concepts take on lives of their own?

Specifically, emotion concepts carry information regarding the emotion's behavioral and motivational characteristics (Lang et al., 1998). One possible motivational characteristic of negative emotion concepts may be emotion-regulation goals; such goals commonly accompany negative emotions (Erber, 1996; Erber & Erber, 1994). Because of this repeated coactivation, the nonconscious activation of negative emotion concepts in our studies may have resulted in the activation of a nonconscious emotion-regulation goal (Bargh & Chartrand, 1999). The pursuit of such nonconscious goals has previously been shown to continue and even strengthen over time and to persist in the face of obstacles (Bargh et al., 2001). Thus, a combination of an emotion-concept-driven process (that is expected to fade over time) and a goal-driven process (that is expected to strengthen over time) might underlie our findings that following a 5-min time delay, the results neither decay nor strengthen but remain unchanged. Future research might address this distinction and investigate further the precise mechanism underlying these observed behavioral effects.

In addition, our behavioral effects vary on the basis of individual-difference factors; we intentionally selected behaviors that were expected to vary both across individuals and across specific, negative emotions. We have demonstrated that these effects can be driven by a nonconscious process. How deeply are individual behavioral tendencies engrained? How easy or difficult would it be to change them? Are there emotional primes or circumstances that would lead all individuals to behave in a more similar fashion despite their individual differences? All of these are interesting questions for future research.

Another avenue for future research is the question of what procedures or processes elicit conscious versus nonconscious emotion concept activation. Although we have argued and have presented evidence supporting the view that our subliminal adjective primes elicit nonconscious activation, we do not claim that subliminal primes will never result in conscious emotion concept activation. In fact, different methods of subliminal priming have led to different levels of conscious and nonconscious emotion concept priming. For example, although our adjective primes and the priming of negative versus positive affective facial expressions have led to nonconscious activation (Winkielman et al., 2005b), priming of positive versus negative words (e.g., *music*, *friends*, *war*, *cancer*) has resulted in consciously experienced emotion (Chartrand et al., 2006).

One may question what is driving the differential effects of word primes (as used in Chartrand et al., 2006) compared with our adjective primes. One possible explanation is provided in the work of Stapel and colleagues (e.g., Stapel, Koomen, & Ruys, 2002). Those authors distinguished between early diffuse emotion and late distinct emotion. They argued that exemplars or words (e.g., *war*, *Hitler*) are often more vivid and memorable than general trait information (e.g., *aggressive*, *guilty*). Consequently, subliminal presentation of affect-laden stimuli that are of different levels of distinctiveness (i.e., diffuse vs. distinct) may exert different effects. In particular, we suspect that because our experiments involved diffuse emotion adjectives as the priming stimuli, more diffuse, less vivid emotion concepts were activated; as a result, these emotion concepts were not consciously experienced by individuals. Certainly, the Stapel et al. (2002) framework is only one possible explanation of why certain subliminal stimuli lead to nonconsciously available emotion concepts, whereas others lead to the conscious experience of emotions; further research on this question is likely to yield interesting and important insights into the nature of emotion and emotion concepts.

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