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Please Forgive Me: Transgressors' Emotions and Physiology During Imagery of Seeking Forgiveness and Victim Responses

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Abstract

We assessed transgressors' subjective emotions and physiological responses in a within-subjects imagery study involving 20 male and 20 female participants. Two imagery conditions focused on the transgressor's actions: participants 1) ruminated about a real-life transgression and 2) imagined seeking forgiveness from the victim. Three imagery conditions focused on the victim's possible responses: participants imagined their victims responding with 1) a grudge, 2) genuine forgiveness, and 3) reconciliation. Compared to ruminations about one's transgression or an unforgiving response from the victim, imagery of forgiveness-seeking and merciful responses from victims (forgiveness and reconciliation) prompted improvements in basic emotions (*e.g.*, sadness, anger) and moral emotions (*e.g.*, guilt, shame, gratitude, hope), and greater perceived interpersonal forgiveness. Perceptions of self-forgiveness increased during forgiveness-seeking imagery, whereas perceptions of divine forgiveness increased during transgression-focused imagery. Imagery of victims' merciful responses prompted less furrowing of the brow muscle (*corrugator* EMG) associated with negative emotion and more smiling activity (*zygomatic* EMG); imagery of forgiveness-seeking affected only *corrugator* activity. Autonomic nervous system measures were largely unaffected by imagery, although skin conductance data suggested emotional disengagement when victims held grudges.

Key words: transgression, forgiveness, reconciliation, grudge, emotion, physiology

Scientific interest in forgiveness has focused primarily on securing benefits for victims of interpersonal harm rather than for the blameworthy transgressors (e.g., Al-Mabuk, Enright, & Cardis, 1995; Coyle & Enright, 1997; Enright & Fitzgibbons, 2000; Freedman & Enright, 1996; Hebl & Enright, 1993; McCullough, Worthington, & Rachal, 1997). Yet, understanding the transgressor's perspective—in seeking and receiving forgiveness, or having forgiveness denied—is an important topic. As Volf (1999, p. 34) says, "…each of us is both Abel and Cain. In different aspects and at different junctures of our lives, we are both innocent victims and guilty perpetrators. In our innocence, we should not forget our sinfulness, and in our sense of endangerment, we should remember to fear our own dark shadows." We are both victims and perpetrators. We can identify with *both* the Prodigal Son *and* the resentful elder brother (Luke 15:11-32), with *both* David the innocent victim of Saul's persecution (I Samuel 19-27) *and* King David the heartless homewrecker (II Samuel 11).

This article focuses on the role of the transgressor. We empirically investigated the subjective emotions and physiological responses of transgressors as they imagined seeking forgiveness from an individual they had hurt in real life, and as they imagined the victim's possible responses to their forgiveness seeking. To investigate the effects of *seeking forgiveness*, we assessed transgressors' subjective and physiological responses as they 1) reflected on a real-life transgression in which they had hurt someone compared to when they 2) imagined seeking forgiveness from the victim. To investigate the effects of victims' responses, we assessed transgressors' subjective and physiological responses as they imagined that the victim 1) harbored a grudge, 2) genuinely granted forgiveness, and 3) reconciled in a way appropriate to the nature of the relationship.

Seeking Forgiveness

The Psalmist provides a good model for transgressors: "Then I acknowledged my sin to you and did not cover up my iniquity. I said, 'I will confess my transgressions to the LORD'--and you forgave the guilt of my sin" (Psalm 32:5)[1]. But this model is difficult to follow because acknowledging our own culpability runs counter to our self-serving bias. For example, Stillwell & Baumeister (1997) compared the responses of participants assigned to victim and perpetrator roles in a scenario-based experiment. Although all participants engaged in self-serving distortions, perpetrators tended to minimize or exclude information that could motivate them to accept blame or seek forgiveness. In a separate study of personal experiences as victims and as perpetrators, perpetrators' written narratives emphasized apologies and minimized harm done compared to victim accounts (Baumeister, Stillwell, & Wotman, 1990).

Although difficult, seeking forgiveness is an important part of repairing relational damage. It is also central to the life of faith. Christians are called to honestly confess, repent, and seek forgiveness both from others and from God, recognizing that a person "is destroyed only by his sin and can be healed only by forgiveness" (Bonhoeffer, 1954, p. 119). The very nature of God, as described in Exodus 34:6-7, encourages believers to confess their sins and trust God to forgive: "the LORD, a God merciful and gracious, slow to anger, and abounding in steadfast love and faithfulness, keeping steadfast love for the thousandth generation, forgiving iniquity and transgression and sin…." Both the Old Testament and the New Testament connect confession and repentance to blessing (Proverbs 28:13, "No one who conceals transgressions will prosper, but one who confesses and forsakes them will obtain mercy." Acts 3:19-20a, "Repent therefore, and turn to God so that your sins may be wiped out, that times of refreshing may come from the presence of the Lord…"). The failure to confess and repent is linked with suffering (Psalm 32:3-4, "While I kept silence, my body wasted away through my groaning all day long…my strength was dried up as by the heat of summer. Then I acknowledged my sin to you, and I did not hide my iniquity; I said, 'I will confess my transgressions to the LORD,' and you forgave the guilt of my sin."). The New Testament includes

[1] All Scripture passages are taken from the New Revised Standard Version.

commands to confess our sins to God and to other people, linking confession, prayer, and healing in James 5:16.

Before actually seeking forgiveness, transgressors often imagine confessing, apologizing, and requesting forgiveness. Imagery therefore serves as a useful technique in research, allowing for the assessment of emotional and physiological responses that mirror those that occur during real-world experiences (see Lang, 1979). In the current investigation, we used imagery to assess a variety of research questions about forgiveness-seeking. What sorts of emotions are aroused by imagery of seeking forgiveness compared to ruminations about one's transgression? Do people feel comparatively better or worse when imagining seeking forgiveness? What facial expressions do transgressors display when contemplating their transgressions or seeking forgiveness? Is physiological stress exacerbated or alleviated by imagining seeking forgiveness?

In their exploration of the benefits of and barriers to expressing repentance, Exline and Baumeister (2000) proposed that repentance may proffer emotional and even physical benefits. They also note that when people express repentance, they are more likely to receive forgiveness from those they have hurt. When transgressors confess (Weiner, Graham, Peter, & Zmuidinas, 1991) and apologize (Couch, Jones, & Moore, 1999; Darby & Schlenker, 1982; O'Malley & Greenberg, 1983; Ohbuchi, Kameda, & Agarie, 1989), victims may be more likely to grant forgiveness, perhaps because apologies promote empathy (McCullough, Worthington, & Rachal, 1997). Given this, might transgressors actually perceive greater forgiveness when they confess and apologize? Might they also *feel* better—experiencing a reduction in negative emotions and an increase in positive emotions?

This possibility was supported by Meek et al. (1995), who had participants imagine 1) lying to their boss to get time off work, 2) then meeting a coworker who had to work extra hours because of their absence, and finally 3) confessing to the boss. Participants reported feeling less guilt after imagery of confessing to the boss than after the other two types of imagery. These results are consistent with Exline and Baumeister's (2000) theory that "expressions of … repentance could symbolically erase the roles of victim and perpetrator, placing the involved parties on more equal footing" (p. 138), thereby reducing the negative affect that perpetrators may associate with their culpability.

Similarly, Sandage et al. (2000) describe seeking forgiveness as "a motivation to accept moral responsibility and to attempt interpersonal reparation following relational injury in which one is morally culpable" (p. 22). Given Sandage et al.'s emphasis on moral emotions (*e.g.*, guilt, shame, empathy), we assessed participants' ratings of their guilt (behavior-focused), shame (self-focused), empathy for the victim, and the degree of hope they experienced during two types of imagery about their own actions: reliving their transgressions, and seeking forgiveness from their victim. We hypothesized that although both conditions would evoke negative moral emotions, imagery of seeking forgiveness from one's victim (*i.e.*, confessing, apologizing, and asking forgiveness) would reduce guilt and shame, presumably because one is "doing the right thing," which would reduce negative feelings about one's behavior (*i.e.*, guilt) and also about oneself as a person (*i.e.*, shame). Consistent with this, Meek et al. (1995) found that confession imagery reduced guilt in comparison to transgression imagery.

In contrast to the negative emotions of guilt and shame, we hypothesized that seeking forgiveness would increase transgressors' empathy for the victim and their sense of hope. We expected empathy to increase because imagining the acts of confession and apology involve a focus on the possible response of the victim, placing the victim's perspective in a central role. We expected hope to increase because when seeking forgiveness, transgressors take this step in anticipation that the victim may respond favorably.

We also compared participants' perceptions of forgiveness when imagining their transgressions versus imagining seeking forgiveness. We expected transgressors to feel more forgiven by victims when they were seeking forgiveness. This is because seeking forgiveness is a moral response to culpable behavior and moves transgressors closer to the point of being able to receive forgiveness from their victims (who often wait for signs of contrition before

forgiving). We also hypothesized that perceptions of forgiveness by God and self-forgiveness would be greater during forgiveness-seeking imagery because the desire for forgiveness is central to this condition.

In addition to influencing moral emotions, transgressors' imagery of committing transgressions and seeking forgiveness may also influence their basic emotions, much as imagery of responding to a perpetrator has influenced victims' basic emotions in prior research (Witvliet et al., 2001). We assessed transgressors' sadness, fear, and anger, hypothesizing that sadness and anger would be less potent during forgiveness-seeking imagery, but that fear may be greater because transgressors may be concerned about how their victims will respond (cf. Dorff, 1998).

We also measured the dimensions of emotional valence (negative – positive), arousal, and perceived control. The valence and arousal dimensions of emotion are related to a range of physiological responses, as found by Witvliet and Vrana (1995). Specifically, greater *corrugator* (brow) tension occurs when emotional valence is more negative, whereas greater *zygomatic* (smile muscle) activity occurs when emotional valence is more positive. With increasing levels of arousal, muscle tension under the eye, heart rate, and skin conductance (sweat) are greater. Given these emotion-physiology relationships in prior research (Witvliet & Vrana, 1995), we measured these physiological responses on-line as participants actively imagined themselves committing the transgression and seeking forgiveness. We hypothesized that both imagery conditions would evoke arousing and negative emotions, but that transgression imagery would be comparatively more negative and arousing than forgiveness-seeking imagery. Hence, we predicted that transgression imagery would elicit greater brow (*i.e.*, *corrugator*) and eye muscle (*i.e.*, *orbicularis oculi*) tension, less smile muscle (*i.e.*, *zygomatic*) activity, and the greater physiological stress responses (*i.e.*, higher heart rate and skin conductance level scores). Beyond these emotional measures, we assessed the level of effort transgressors exerted in each type of imagery. We hypothesized that seeking forgiveness would demand more effort than reflecting on one's transgression, although seeking forgiveness would yield greater emotional benefits.

The Impact of the Victim's Responses

The second focus of the study assessed the emotional impact of having one's forgiveness-seeking behavior met with unforgiving, forgiving, or conciliatory responses from the victim. Bearing the brunt of a harbored grudge or receiving the merciful gift of forgiveness represent the counterparts of previous research on the emotions victims experience when they harbor grudges or grant forgiveness (Witvliet, Ludwig, & Vander Laan, 2001). Witvliet et al. (2001) asked participants to imagine responding to a particular real-life offender in unforgiving versus forgiving ways using a within-subjects repeated measures design. Participants reported significantly higher levels of negative emotion (*e.g.*, anger, sadness) during the unforgiving imagery trials. In contrast, they reported higher levels of positive emotion and greater perceived control during the forgiving imagery conditions. Participants also showed significantly greater reactivity in the cardiovascular (heart rate, blood pressure) and sympathetic nervous system systems (skin conductance levels) as well as greater brow muscle (*corrugator*) tension during the unforgiving imagery trials compared to the forgiving imagery trials. Furthermore, the heart rate, sweat, and brow muscle effects persisted after imagery into relaxing recovery periods, suggesting that the effects of unforgiving thoughts were difficult to quell. These results suggest that when people harbor unforgiving responses toward their offenders, they may incur emotional and physiological costs. Instead, when they adopt forgiving responses, they may reduce these costs and accrue psychophysiological benefits, at least in the short term.

Witvliet et al.'s (2001) findings converge with other studies linking victims' forgiving responses to more positive mental health (Al-Mabuk, Enright, & Cardis, 1995; Coyle & Enright, 1997; Freedman & Enright, 1996; Hebl & Enright, 1993; McCullough, Worthington, & Rachal, 1997), and anger/hostility to physical health problems (*e.g.*, cardiovascular disease; Miller et al., 1996). However, research on transgressors' emotional and physiological experiences has not kept pace.

Only one prior study has examined transgressors' emotions during imagery of receiving an unforgiving versus a forgiving response. Meek et al. (1995) asked participants to imagine confessing a transgression to a boss who responded either with forgiveness or unforgiveness. Participants who imagined receiving the forgiving response reported feeling significantly better than those who imagined receiving an unforgiving response.

The current study was designed to build on this research base by assessing a range of emotional and physiological responses evoked by imagining forgiveness denied or granted. We hypothesized that transgressors would experience similar emotional and physiological effects as victims did in Witvliet et al.'s (2001) study of unforgiveness and forgiveness, primarily because we expected unforgiving imagery to prompt negative, arousing emotion, and forgiving imagery to prompt more positive, less arousing emotion. Consistent with this, we anticipated that transgressors would feel less sad, angry, and fearful, but more in control in the forgiveness imagery condition compared to the condition in which victims refused to grant forgiveness and held a grudge. We also hypothesized that when transgressors imagined receiving the gift of forgiveness, they would feel more forgiven by the victim, and more grateful. Although interpersonal forgiveness is distinct from divine forgiveness and self-forgiveness, we anticipated that transgressors would show higher levels of perceived forgiveness by God and oneself along with higher levels of forgiveness by the victim. We also hypothesized that transgressors would feel less guilt about their behavior, less shame about themselves as people, more empathy for their victims, and more hope during the imagery of receiving forgiveness—because this gift of mercy would blot out much of the negative affect transgressors felt and would increase their sense of resolution of the problem and anticipation of good experiences in the future.

Along with the subjective emotional shifts, we hypothesized that in the forgiveness condition, participants would show lower *corrugator* (brow) EMG tension (associated with reductions in negative emotion) and higher *zygomatic* (cheek) EMG activity (associated with more positive emotion), and lower heart rate, skin conductance levels, and *orbicularis oculi* EMG tension (all associated with lower levels of arousal; cf. Witvliet & Vrana, 1995). We hypothesized that reconciliation imagery would evoke differences in dependent measures similar to those evoked by forgiveness as compared to grudge imagery because reconciliation would involve resolution of the interpersonal problem and the negative affect associated with it, whereas bearing the brunt of a grudge would involve exacerbation of the problem.

By separately studying the conditions of receiving forgiveness and of reconciling with the victim, this study follows in the tradition of distinguishing forgiveness from reconciliation (*e.g.*, Enright & Coyle, 1998; Smedes, 1996; Worthington, 1998). In prior work, theorists and therapists have drawn this distinction primarily for the benefit of victims who may choose to forgive an offender in the absence of an ongoing relationship—perhaps because the transgressor has died, has been abusive, or is likely to cause harm again. As Smedes (1996, p. 27) framed it, "We can forgive even if we do not trust the person who wronged us once not to wrong us again. Reunion can happen only if we can trust the person who wronged us once not to wrong us again."

Method

Participants

Forty introductory psychology students (20 male, 20 female, age 18-22) voluntarily participated in this experiment, and were given credit in their classes for participation. The participants included 39 whites and one Latino. Heart rate data for one participant and *zygomatic* data for another participant were unusable due to errors in data acquisition.

Procedure

This study used a standard within-subjects emotional imagery paradigm (Vrana & Lang, 1990; Witvliet & Vrana, 1995, 2000). Each participant was tested individually in a two-hour session. Initially, the participant identified an incident in which he or she was to blame for significantly hurting the feelings of another person, and completed a questionnaire about the nature of the offense, the victim's responses,

and his or her own responses. Then the participant completed eight imagery trials of each of the five different imagery conditions, with orders counterbalanced across participants. In each condition, all participants followed a script designed to prompt that type of imagery related to the interpersonal offense. Following the techniques of Witvliet et al. (2001), the imagery scripts encouraged participants to consider the thoughts, feelings, and physical responses that would accompany each imagery condition.

Two conditions used imagery scripts focusing on the transgressor's actions: the participant 1) ruminated about the transgression (recalling the feelings associated with hurting the victim) and 2) imagined seeking forgiveness from the victim (confessing the wrong, genuinely apologizing to the victim, and asking for forgiveness). Three conditions used imagery scripts focusing on the effects of three possible victim responses: 3) refusing forgiveness and holding a grudge, 4) genuinely forgiving the transgressor, and 5) reconciling in a way appropriate to the nature of the relationship.

The imagery portion of the study was broken down into blocks of imagery trials, with two types of imagery trials in each block. Acoustic tones (high, low) were used to signal exactly when the participant was to imagine each type of imagery. Medium tones signaled participants to engage in a relaxation task, thinking the word "one" every time they exhaled (e.g., Vrana & Lang, 1990; Witvliet & Vrana, 1995, 2000).

Physiological Measurements. On-line physiological monitoring allowed us to measure the immediate psychophysiological effects of participant's responses as they occurred. (See Footnote 2 for a description of the equipment and settings used.)[2] During each trial, the participant's heart rate was measured on a heartbeat-to-heartbeat basis, and cardiac interbeat intervals were converted off-line to heart rate in beats per minute for each imagery period. Facial EMG and SCL data were measured on a second-to-second basis. Within each type of imagery condition, the physiology measures were averaged over the 8 trials for that condition. Each trial consisted of an 8-s baseline (relaxation) period, 16-s imagery period, and 8-s recovery (relaxation) period. Each period was divided into 4-s epochs, resulting in two 4-s epochs during the baseline period, four 4-s epochs during the imagery period, and two 4-s epochs during the recovery period. During the imagery and recovery periods, the physiological data for the 4-s baseline epoch immediately before the imagery period were subtracted from each of the 4-s epochs for the imagery and recovery periods. This approach was used so that the directional effects of the conditions on each physiological measure (*e.g.*, increases or decreases) can be conceptualized clearly.[3]

Self-Report Ratings. Following each block of imagery trials, participants rated their feelings during the preceding two types of

[2] A Dell 486 computer timed the experimental events and collected on-line physiological data (using VPM software by Cook, Atkinson, & Lang, 1987). Imagery and relaxation trials were signaled by auditory tones at three frequencies—high (1350 Hz), medium (985 Hz), and low (620 Hz). The tones were 500 ms long and 73 dB[A]. They were generated by a Coulbourn V85-05 Audio Source Module with a shaped-rise time set at 50 ms. The tones were presented through Altec Lansing ACS41 speakers located 2.5 feet to the left of the participant's head during the instructions, and through Optimus Nova 67 headphones during data collection.

Facial EMG was recorded at the *corrugator* (i.e., brow), *zygomatic* (i.e., cheek), and *orbicularis oculi* (i.e., under the eye) muscle regions using sensor placements suggested by Fridlund and Cacioppo (1986). Facial skin was prepared using an alcohol pad and Medical Associates electrode gel. Then miniature Ag-AgCl electrodes filled with Medical Associates electrode gel were applied. EMG signals were amplified (X 50,000) by a Hi Gain V75-01 bioamplifier, using 90-Hz high-pass and 1-kHz low-pass filters. The signals were rectified and integrated by a Coulbourn multifunction V76-23 integrator (nominal time constant = 10 ms).

Skin conductance levels (SCLs) were measured by a Coulbourn V71-23 isolated skin conductance coupler using an applied constant voltage of 0.5 V across two standard electrodes. Electrodes were filled with a mixture of physiological saline and Unibase (Fowles et al., 1981) and applied to the hypothenar eminence on the left hand after it was rinsed with tap water. A 12-bit analog-digital converter sampled the skin conductance and facial EMG channels at 10 Hz.

Electrocardiogram data were collected using two standard electrodes, one on each forearm. A Hi Gain V75-01 bioamplifier amplified and filtered the signals. The signals were then sent to a digital input on the computer that detected R waves and measured interbeat intervals in milliseconds.

[3] We wish to thank an anonymous reviewer for the suggestion to analyze the raw physiological data using each condition's baseline as the covariate for each dependent variable. With this approach to analysis, we found that only three of the 20 analyses differed in terms of statistical significance from the approach reported here. Specifically, the trend for corrugator EMG to differ across the victim responses of grudge, forgiveness, and reconciliation became significant, and the non-signficant zygomatic EMG differences became significant. In the recovery period, the significant zygomatic differences after grudge, forgiveness, and reconciliation imagery failed to reach significance.

imagery. They did so privately and were encouraged to be completely honest. Using a standard computerized technique, they manipulated a joystick to register their ratings of the effort they had expended during imagery, their emotional valence (negative – positive), arousal, perceived control, sadness, fear, anger, guilt, shame, gratitude, hope, empathy for victim, and perceived forgiveness from the victim, from God, and from themselves. As a manipulation check, participants also rated the vividness of their imagery. Using a standard approach, all ratings were converted to numerical form using a scale that ranged from 0 to 20 (e.g., Witvliet & Vrana, 1995; Witvliet et al., 2001). (See Footnote 4 for a description of the ratings technique.)[4]

Results

Transgression Questionnaire Data

The most common transgressions involved breaking someone's heart by ending a relationship (40%), breaking someone's trust (22.5%), and saying something hurtful in the heat of the moment (17.5%). The most common victims of these transgressions were romantic partners (40%), parents (30%), and friends (25%). Most victims were female (62.5%). All transgressions were identified as emotional—rather than physical—offenses. Most transgressions reportedly occurred within a year prior to the study (60%). The majority of the participants had apologized to their victims (85%), and most had repaired relationships with the victims (82.5%) prior to the study.

Nearly half (47.5%) of the participants rated their offenses as highly severe (ratings were considered high if they were 6 or 7 on the 7-point scale). Over half of the sample reported high levels of guilt about their transgression behavior (52.5%), and the majority felt shame about themselves as transgressors (55%). Most of the participants felt highly forgiven by the victim (62.5%), and—of the 92.5% of participants who reported belief in God—the majority felt highly forgiven by God (75%). Of the 62.5% of participants who felt they had *not* received "complete" forgiveness from the victim, 68% had a high desire for forgiveness. The vast majority of participants (90%) reported valuing forgiveness highly.

Seeking Forgiveness

Self-Report Ratings. (See Table 1) Paired samples *t*-tests were also conducted to assess whether self-reported emotions differed for the imagery conditions. Significant differences occurred for almost every rating, with the exceptions of level of perceived control, fear, empathy, and the manipulation check for comparable vividness of imagery [all ts$\leq$ |-1.74|, all ps$\geq$ .09].

Compared to the transgression imagery condition, imagery of seeking forgiveness prompted participants to exert more effort [$t(39) = -6.43$, $p < .001$], but to feel less negative [Valence $t(39) = -3.07$, $p < .01$] and less aroused [$t(39) = 3.30$, $p = .002$]. Specifically, they reported less sadness [$t(39) = 3.85$, $p < .001$], less anger [$t(39) = 4.46$, $p < .001$], less guilt about the transgression [$t(39) = 2.16$, $p < .05$] and less shame about themselves [$t(39) = 3.65$, $p = .001$]. Conversely, seeking forgiveness prompted more gratitude [$t(39) = -6.21$, $p < .001$] and more hope [$t(39) = -8.05$, $p < .001$]. Participants' perceptions of forgiveness by the victim [$t(39) = -8.46$, $p < .001$] and themselves [$t(39) = -3.01$, $p = .005$] were greater when seeking forgiveness from the victim, but their perceptions of greater divine forgiveness were greater when they focused on their transgressions [$t(39) = 3.06$, $p = .004$].

Physiology. (See Table 2) To assess differences in physiological reactivity for the two imagery conditions, we conducted

[4] Four of the ratings commonly measured in the emotion and physiology literature are emotional valence (negative–positive), arousal (low–high), perceived control/dominance (low–high), and vividness of imagery, assessed with Hodes, Cook, and Lang's (1985) technique of manipulating the expressions of an androgynous figure. Using a joystick, participants could choose any point along a continuum from an extreme frown to an intense smile replete with dimples (valence), from a relaxed/peaceful/sleepy looking figure to an aroused/excited one that jumped up and down (arousal), and from a tiny to a huge figure (perceived control/dominance in the imagined situation). Vividness of imagery was rated by manipulating the image of a 3-D box from completely clear and vivid to completely fragmented and unidentifiable. To register the other single-item emotion ratings, participants used the joystick to place a cursor along a continuous line anchored by "Not At All" on the far left, "Moderately" in the middle, and "Completely" on the far right. For each of the following ratings, participants were asked "How much did you feel _____ during your imagery?": "anger," "sadness," "gratitude," "fear," "bad about your behavior" (guilt), "bad about yourself as a person" (shame), "hope," "empathy for the victim," "you forgave yourself," "forgiven by the victim," and "forgiven by God."

paired-samples *t*-tests (two-tailed). *Corrugator* EMG was significantly higher (*i.e.*, greater furrowing of the brow muscle occurred) during the transgression imagery than during the forgiveness-seeking imagery [$t(39) = 2.01$, $p = .05$]. No other significant physiological differences occurred between the transgression and forgiveness-seeking conditions during imagery periods [all *t*s $\leq$ |1.03|, all *p*s $\geq$ .31] or recovery periods [all *t*s $\leq$ |1.43|, all *p*s $\geq$ .16].

The Impact of the Victim's Responses

Because there were three types of imagery about the victim's possible responses, we analyzed the ratings and physiology data for the three imagery conditions in one-way repeated-measures *ANOVA*s using the SPSS multivariate approach as recommended by Maxwell and Delaney (1990), interpreting the results using the multivariate tests because they do not assume sphericity (cf. Green, Salkind, & Akey, 2000, p. 213). The *F* statistic equivalent for Wilks' *Lambda* is reported for each each self-report rating and physiology measure (during imagery and recovery periods). For significant effects, planned paired-samples *t*-tests (two-tailed) were conducted to test our predictions concerning grudge-forgiveness and grudge-reconciliation differences, and to explore differences between forgiveness and reconciliation

Multivariate Analyses of Variance

Participant ratings are presented in Table 1. Significant effects occurred for level of effort expended [$F(2,38) = 6.16$, $p < .01$], valence (positive-negative) [$F(2,38) = 120.94$, $p < .001$], arousal [$F(2,38) = 6.13$, $p < .01$], perceived level of control (dominance) [$F(2,38) = 28.10$, $p < .001$], sadness [$F(2,38) = 77.18$, $p < .001$], fear [$F(2,38) = 30.63$, $p < .001$], anger [$F(2,38) = 63.90$, $p < .001$], guilt [$F(2,38) = 13.30$, $p < .001$], shame [$F(2,38) = 35.10$, $p < .001$], gratitude [$F(2,38) = 160.15$, $p < .001$], hope [$F(2,38) = 120.07$, $p < .001$], empathy [$F(2,38) = 5.48$, $p < .01$], and forgiveness from the victim [$F(2,38) = 66.14$, $p < .001$]. No significant effects were found for ratings of self-forgiveness, forgiveness by God, or the manipulation check for comparable imagery vividness [all *F*s $\leq$ 2.22, all *p*s $\geq$ .12].

Physiological data are presented in Table 2. During the imagery periods, no significant effects of imagery condition occurred for the physiology measures [all *F*s $\leq$ 2.15, all *p*s $\geq$ .09]. However, a trend occurred for *corrugator* EMG [$F(2,39) = 2.77$, $p = .075$]. This trend is reported because planned paired-samples t-tests were performed and significant effects found. During recovery conditions, skin conductance [$F(2,39) = 4.52$, $p < .05$], *zygomatic* EMG [$F(2,37) = 4.53$, $p < .05$], and *corrugator* EMG [$F(2,38) = 5.06$, $p < .05$] differed significantly across imagery conditions. No significant effects occurred for heart rate or *orbicularis oculi* EMG under the eye during recovery conditions [*F*s $\leq$ .76, *p*s $\geq$ .48].

Grudge-Forgiveness Comparisons

Ratings. Interestingly, participants reported expending more effort during their imagery of receiving forgiveness compared to having a grudge held against them [$t(39) = -3.25$, $p < .01$]. Yet, imagery of receiving forgiveness prompted ratings of more positive (valence) emotion [$t(39) = -15.62$, $p < .001$], less arousal [$t(39) = 2.89$, $p < .01$], and greater perceived control [$t(39) = -6.41$, $p < .001$].

During the grudge imagery condition, as compared to the forgiveness imagery condition, participants felt greater levels of sadness [$t(39) = 12.00$, $p < .001$], fear [$t(39) = 7.85$, $p < .001$], anger [$t(39) = 11.18$, $p < .001$], guilt [$t(39) = 4.00$, $p < .001$], and shame [$t(39) = 6.62$, $p < .001$].

During the forgiveness imagery condition, as compared to the grudge imagery condition, participants more gratitude [$t(39) = -17.88$, $p < .001$], more hope [$t(39) = -15.70$, $p < .001$], more empathy [$t(39) = -3.22$, $p < .01$], and more forgiveness from the victim [$t(39) = -8.43$, $p < .001$].

Physiology. Follow-up analysis of the *corrugator* trend during imagery showed that—as predicted—participants had greater increases in *corrugator* EMG (brow muscle tension) during the grudge imagery than during the forgiveness imagery [$t(39) = 2.18$, $p < .05$], and during the grudge recovery period than during the forgiveness recovery period [$t(39) = 2.79$, $p < .01$]. Post hoc analyses also indicated a marginal effect for *zygomatic* change scores in the predicted direction. Participants showed greater *zygomatic* (smile

muscle) activity when they imagined being forgiven by their victims compared to when they imagined having a grudge held against them ($t(39) = -1.944$, $p = .059$). (Because we predicted this directional difference in *zygomatic* change scores based on the emotion and psychophysiology literature, we note that for the one-tailed paired-samples *t*-test $p = .03$.) Consistent with this, participants continued to show higher *zygomatic* EMG activity during the forgiveness recovery period than during the grudge recovery period [$t(39) = -2.90$, $p < .01$].

Grudge-Reconciliation Comparisons

Ratings. As predicted, the grudge-reconciliation comparisons paralleled the grudge-forgiveness results. Participants reported expending more effort during the reconciliation imagery than during the grudge imagery [$t(39) = -2.43$, $p < .05$]. Despite the effort associated with reconciliation, participants reported feeling more positive (valence) [$t(39) = -8.46$, $p < .001$], less arousal [$t(39) = 3.06$, $p < .01$], and greater perceived control [$t(39) = -6.43$, $p < .001$].

During the grudge imagery condition, as compared to the reconciliation imagery condition, participants felt greater levels of sadness [$t(39) = 10.17$, $p < .001$], fear [$t(39) = 6.90$, $p < .001$], anger [$t(39) = 10.90$, $p < .001$], guilt [$t(39) = 5.20$, $p < .001$], and shame [$t(39) = 8.21$, $p < .001$].

During the reconciliation imagery condition, as compared to the grudge imagery condition, participants felt more gratitude [$t(39) = -16.45$, $p < .001$], more hope [$t(39) = -13.74$, $p < .001$], more empathy [$t(39) = -2.26$, $p < .05$], and more forgiveness from the victim [$t(39) = -11.47$, $p < .001$].

Physiology. As predicted, participants had greater *corrugator* EMG tension associated with negative emotion during the grudge imagery than during the reconciliation imagery [$t(39) = 2.34$, $p < .03$] and during grudge recovery periods than reconciliation recovery periods [$t(39) = 3.22$, $p < .01$]. Follow-up analyses of the *zygomatic* EMG data indicated that smiling activity was marginally greater during reconciliation imagery compared to grudge imagery, as predicted, $t(39) = -1.856$, $p = .07$. (Because we predicted this directional difference in *zygomatic* change scores based on the emotion and psychophysiology literature, we note that for the one-tailed paired samples, *t*-test $p = .036$) However, *zygomatic* EMG activity did not differ after grudge compared to reconciliation imagery [$t(39) = -1.44$, $p = .16$]

The skin conductance data were counter to our predictions: levels were lower after grudge imagery than after reconciliation imagery, indicating greater habituation after grudge imagery[$t(39) = -3.02$, $p < .01$]. We had hypothesized that imagery of having one's victim hold a grudge would be more stressful and arousing than receiving forgiveness—prompting higher skin conductance levels—and that these effects would linger after imagery (cf. Witvliet et al., 2001). Given this unexpected result, we also conducted a post-hoc analysis of skin conductance levels during the imagery periods. Consistent with the recovery period data, we found that skin conductance change scores tended to be lower during grudge imagery than during reconciliation imagery [two-tailed $t(39) = -1.89$, $p = .066$].

Forgiveness-Reconciliation Comparisons

Ratings. Only two differences occurred in the ratings assigned to imagery of receiving forgiveness versus imagery of reconciling with the victim. In the forgiveness imagery condition, as compared to the reconciliation imagery condition, participants experienced more positive emotion [$t(39) = -4.68$, $p < .001$]. In the reconciliation imagery condition, as compared to the forgiveness imagery condition, participants felt more forgiveness from the victim [$t(39) = 2.54$, $p < .05$].

There were no significant differences between the forgiveness and reconciliation imagery conditions ratings of effort, arousal, control, sadness, gratitude, fear, anger, guilt, shame, hope, or empathy [all ts$\leq |-1.82|$, all ps$\geq .08$].

Physiology. Follow-up analyses indicated that forgiveness and reconciliation conditions did not differentially affect *corrugator* EMG or *zygomatic* EMG during imagery [both ts$\leq |-1.26|$, ps$\geq .21$] or recovery periods [both ts$\leq |0.51|$, ps$\geq .61$]. A marginal effect was found for skin conductance level change scores, which were higher during recovery from reconciliation than forgiveness imagery, [$t(39) = .1.88$, $p = .068$].

Discussion

Seeking Forgiveness

Imagining oneself seeking forgiveness carried a range of emotional benefits. Compared to the ruminations about one's transgression, imagery of seeking forgiveness mitigated negative emotion and brought emotional arousal down to moderate levels. Specifically, participants felt less sad and angry, less guilt about the transgression, and less shame about themselves during forgiveness-seeking compared to transgression-focused imagery. Still, the actual ratings values indicate that both conditions were associated with relatively high levels of guilt (transgression = 16.21; forgiveness-seeking = 15.14; 0-20 scale) and shame (transgression = 15.78; forgiveness-seeking = 13.78; 0-20 scale) as predicted. The experience moderately high guilt and shame is not surprising because even though forgiveness-seeking imagery involved taking an active step to repair relational damage, participants still focused on their culpability. This likely emphasized both regret over past behavior (*i.e.*, guilt) and an awareness of one's failings as a person (*i.e.*, shame). Exline and Baumeister (2000) have argued that acts of confession—especially when public—are likely to evoke feelings of shame. We found this to be the case even when acts of confession were contained in imagery rather than overtly carried out in the presence of the victim, although levels of shame—and guilt—were significantly reduced during forgiveness-seeking imagery compared to transgression imagery.

Three findings illuminate some reasons people may resist seeking forgiveness despite its emotional benefits. Specifically, transgressors' fear and perceived control were *not* significantly improved by imagery of seeking forgiveness. In his analysis of obstacles to seeking forgiveness, Dorff (1998) identified that part of the difficulty in asking forgiveness from another person—as compared to God—is that openness from the victim cannot be assured, and "the offender has every reason to fear that the victim will shun him or her" (p. 32). Another obstacle to seeking forgiveness may be the greater effort that accompanied contemplating this action versus reflecting on one's transgression. This heightened effort may reflect the challenges that accompany humbling oneself and acknowledging one's own culpability (Dorff, 1998)—acts that work against self-serving bias. Despite these obstacles, imagery of seeking forgiveness prompted significant increases in hope, likely because forgiveness-seeking is inherently goal-directed.

Consistent with their greater hope, participants reported feeling more forgiven by their offenders and themselves when seeking forgiveness than when focusing on the transgression incident. In contrast (and contrary to our hypothesis), participants reported feeling significantly more forgiven by God when they focused on their transgression than when they imagined seeking interpersonal forgiveness. While ratings of perceived forgiveness by others and God do not indicate *actual* forgiveness granted or received, they reflect participants' perceptions.

Self-forgiveness can be a thorny issue both for logistical and moral reasons (Smedes, 1996). In tackling the difficult nuances involved in self-forgiveness, Smedes (1996) claims "none but the contrite has a right to forgive himself [or herself]. Remorse is a price we pay to forgive ourselves" (97). He also notes that people can only engage in self-forgiveness for "wrongful things that we deserve blame for doing" (p. 99). Consistent with these elements, participants in the current research were asked to identify a real-life situation in which they felt that they were to blame for significantly hurting the feelings of another person. The participants reported higher levels of self-forgiveness when they imagined the forgiveness-seeking behaviors of confessing to the victim, apologizing sincerely, and asking for forgiveness—behaviors that parallel some of the issues Smedes (1996) has raised.

In contrast to self-forgiveness, transgressors reported feeling greater divine forgiveness only when they focused on their transgression rather than on seeking forgiveness directly from the victim. This inward focus on one's transgression has some parallels to the act of confessing one's sins to God, an act closely linked with the assurance of pardon in worship. This result may indicate that people are freer to perceive God's forgiveness when they are more focused on honestly acknowledging their culpability and less focused on receiving forgiveness from others. It may also be that because

participants reported feeling significantly lower levels of interpersonal and self-forgiveness during transgression imagery, they emphasized divine forgiveness to compensate for lack of forgiveness from others and oneself.

In victims, empathy for the transgressor is strongly linked with granting forgiveness (*e.g.*, McCullough, Worthington, & Rachal, 1997; McCullough, Rachal, Sandage, Worthington, Brown, & Hight, 1998). However, in our study of transgressors, empathy ratings did not differ across conditions, despite significant differences in forgiveness ratings. Although we had hypothesized that participants would feel more empathic toward their victims during forgiveness-seeking imagery, empathy ratings during transgression imagery may have been as high as those during forgiveness-seeking because the imagery was inherently focused on the other as a victim of one's actions.

In terms of physiology, only one statistically significant difference occurred. Consistent with our hypothesis rooted in prior research (Witvliet et al., 2001; Witvliet & Vrana, 1995), transgression-focused imagery was perceived as more emotionally negative and prompted greater increases in *corrugator* (brow) muscle tension than forgiveness-seeking imagery. However, no other physiological differences occurred during imagery or recovery periods. This may be due to the relationships between valence and arousal ratings for the two imagery conditions. Considering the 0-20 scale, the actual valence ratings for the two conditions (transgression = 3.75; forgiveness-seeking = 6.36), and the actual arousal ratings (transgression = 14.55; forgiveness-seeking = 11.33) were more similar than in other research with significant physiological differences (*e.g.*, Witvliet & Vrana, 1995).

In sum, despite the effort involved during forgiveness-seeking compared to transgression imagery, participants experienced significant improvements in basic and moral emotions, as well as their perceived forgiveness by the victim and themselves. This complex of subjective emotional benefits may offset the obstacles to forgiveness-seeking and motivate transgressors to actually seek forgiveness.

The Impact of the Victim's Responses

The current results suggest that—to a large extent—transgressors' subjective emotions parallel the emotions of victims during unforgiving and forgiving imagery (cf. Witvliet et al., 2001). The current study found that transgressors expended more effort and felt higher levels of arousal, sadness, fear, anger, guilt, and shame when they imagined a real-life victim bearing a grudge against them. By contrast, transgressors felt more positive emotion, control, gratitude, hope, empathy, and forgiveness from the victim when they imagined receiving forgiveness or reconciling with the victim.

Despite the findings that both granting forgiveness (cf. Witvliet et al., 2001) and receiving forgiveness (the current study) carry subjective benefits, receiving forgiveness may not be as physiologically beneficial as granting forgiveness (cf. Witvliet et al., 2001). The current study generally failed to observe the predicted differences for heart rate and skin conductance (as well as *orbicularis oculi* EMG). This may be related to participants' similar arousal ratings across conditions. Compared to basic emotion research (Witvliet & Vrana, 1995) and research on victims using the same ratings methodology (Witvliet et al., 2001), arousal ratings in the current study were quite similar across conditions (forgiveness = 11, reconciliation= 10.7, grudge= 14.6; the range of 0 – 20 corresponds to calm/relaxed – aroused/excited). Emotional arousal, in particular, is linked with heart rate and skin conductance levels in emotional imagery paradigms (Witvliet & Vrana, 1995). In their research of victims, Witvliet et al. (2001) found significantly higher arousal ratings for the unforgiving (15.3) than forgiving imagery (7.2), and corresponding significant differences between the heart rate, blood pressure, and skin conductance in these conditions. In addition, all measures but blood pressure continued to show significantly higher scores during recovery periods after unforgiving than forgiving imagery. (Note that the current study did not measure blood pressure.) Simple examination of the self-report means in this study also suggests that having forgiveness denied by a victim may be more sadness-inducing than anger-arousing, which is consistent with the relative lack of physiological effects. This contrasts with Witvliet et

al.'s (2001) data, which indicate that bearing a grudge against a perpetrator is more anger-arousing than sadness-inducing.

The current study of transgressors indicated a trend in which grudge imagery stimulated greater tension at the *corrugator* muscle region (*i.e.,* brow) than either forgiveness or reconciliation imagery. Notably, *corrugator* reactivity continued to be significantly higher during the recovery period after grudge imagery—when participants tried to clear their minds and relax—than after either forgiveness or reconciliation imagery. These *corrugator* data are consistent with the more negative ratings participants assigned to their grudge imagery compared to either the forgiveness or the reconciliation imagery. This association between *corrugator* tension and negative emotion is consistent with findings from research on victims (Witvliet et al., 2001) and basic emotion research (*e.g.,* Witvliet & Vrana, 1995).

In general, *zygomatic* (smile muscle) EMG showed the a pattern opposite to *corrugator* (brow muscle) EMG, as predicted. *Zygomatic* EMG was higher during forgiveness imagery and recovery periods compared to grudge imagery and recovery periods. Participants also tended to have higher *zygomatic* EMG during reconciliation imagery than grudge imagery. Prior research links *zygomatic* activity with positive emotion (*e.g.*, Witvliet et al., 1995), which may have persisted after imagery of receiving forgiveness from or reconciling with the victims of the participants' transgressions.

The final physiological effects indicated that skin conductance levels tended to be lower during grudge imagery than reconciliation imagery, and were significantly lower in the grudge recovery periods than the reconciliation recovery periods. Skin conductance is often considered an indicator of sympathetic nervous system activity, and responsive to emotional arousal. We had hypothesized that skin conductance would have been higher during and after the more arousing grudge imagery. Instead, the data suggest that sympathetic nervous system activity was lower during grudge imagery, and especially when grudge imagery was discontinued. It may be that participants became more engaged in the reconciliation imagery, dwelling on their relationship with the victim, and finding it more engaging and difficult to halt these thoughts in comparison to thoughts of having a grudge held against them. Interestingly, participants reported that they expended more effort during the reconciliation (and forgiveness) condition than the grudge condition. Complementing this view, it may be that when forgiveness-seeking is met with refusal, transgressors may feel deflated and withdraw their emotional investment rather expending effort to rectify the relationship. Alternatively, receiving merciful responses of forgiveness and reconciliation may run counter to transgressors' implicit expectations of how they should be treated after behaving wrongly, stirring arousal.

An additional aim of this study was to investigate possible differences in the emotions induced by imagery of receiving forgiveness versus reconciling with the victim. The results are striking primarily for the absence of significant differences in all but two ratings measures. In particular, transgressors rated forgiveness imagery as more positive than reconciliation imagery. The other difference was a tendency for transgressors to feel even more forgiven by victims during reconciliation imagery than forgiveness imagery. This finding suggests that—in the minds of transgressors—reconciliation implied that forgiveness was granted and took the additional convincing step of repairing the relationship. Marty (1998) has observed that the distinctions between forgiveness and reconciliation may be somewhat artificial, noting their linkage throughout the New Testament. The current data suggest that forgiveness and reconciliation may not only be difficult to separate in practice—especially in the context of otherwise healthy relationships—but that imagining each experience stimulates similar feelings.

Conclusions

We see this research as congruent with the biblical themes relating forgiveness not only to one's relationship with God, but with blessing and healing. Psalm 103:3 identifies the Lord as the one "who forgives all your iniquity, who heals all your diseases." The Psalms also connect forgiveness with blessing (Psalm 65:3, "When deeds of iniquity overwhelm us, you forgive our transgressions." Psalm 32:1, "Happy are those whose transgression is forgiven, whose sin is

covered."). When Jesus healed the paralytic man, as recorded in Mark 2:1-12, he both forgave him and enabled him to stand up, take his mat, and walk. In addition to divine forgiveness, Scripture also calls us to interpersonal confession and links it with healing (James 5:16, "Therefore confess your sins to one another, and pray for one another, so that you may be healed"). Whether this healing is meant to be spiritual, emotional, and/or physical, Scripture connects confession and forgiveness with wholeness.

In combination with prior work, this research suggests that forgiveness may similarly benefit the subjective emotions of victims and perpetrators, but that forgiveness has greater physiological effects and potential health implications for victims (cf. Witvliet et al., 2001). Both the victims in Witvliet et al.'s (2001) research and the transgressors in the current study experienced more positive emotion, greater perceived control, and less negative emotion (as well as lower *corrugator* EMG scores) during imagery of forgiveness granted compared to forgiveness refused. However, only victims experienced less physiological stress (as indicated by heart rate, blood pressure, and skin conductance) when they were agents of forgiveness compared to unforgiveness (Witvliet et al., 2001); transgressors did not show significant differences in heart rate or skin conductance when they imagined having their victims grant or withhold forgiveness in the current study.

We hope that future research will refine our understanding of whether and how transgressors may benefit emotionally from seeking forgiveness, receiving forgiveness, and reconciling. Additional work is also needed to determine whether the physiological benefits of forgiveness and costs of unforgiveness are more potent for victims who are agents, rather than for transgressors who are recipients of forgiveness. It may be that when it comes to forgiveness and physiology, it is more blessed to give than to receive.

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Table 1
Means and (Standard Deviations) of Self Report Ratings

	Seeking Forgiveness		The Impact of Victim Responses		
Measure	**Reliving Transgression[t]**	**Seeking Forgiveness[s]**	**Holding Grudge[g]**	**Offering Forgiveness[f]**	**Experiencing Reconciliation[r]**
Effort	**6.00**	**11.53[ts***]**	**8.43**	**11.79**	**11.03[gf**,gr*]**
	(4.73)	(5.15)	(4.20)	(5.18)	(4.87)
Valence	**3.75**	**6.36[ts**]**	**4.33**	**17.10**	**13.26[gf***,gr***,fr***]**
	(2.57)	(4.83)	(3.59)	(2.73)	(5.16)
Arousal	**14.55**	**11.33[ts**]**	**14.55**	**10.99**	**10.70[gf**,gr**]**
	(3.48)	(4.83)	(5.11)	(6.93)	(6.59)
Control	**6.88**	**8.43[ns]**	**6.00**	**11.03**	**11.53[gf***,gr***]**
	(5.02)	(4.20)	(4.73)	(4.87)	(5.15)
Sadness	**16.14**	**13.40[ts***]**	**14.65**	**4.33**	**3.94[gf***,gr***]**
	(2.95)	(3.72)	(4.00)	(3.43)	(4.61)
Fear	**10.11**	**9.80[ns]**	**10.01**	**2.91**	**3.51[gf***,gr***]**
	(5.48)	(4.80)	(6.04)	(2.79)	(4.25)
Anger	**10.10**	**5.75[ts***]**	**12.93**	**2.11**	**2.21[gf***,gr***]**
	(5.85)	(5.46)	(5.64)	(3.01)	(3.14)
Guilt	**16.21**	**15.14[ts*]**	**13.49**	**9.01**	**7.61[gf***,gr***]**
	(3.01)	(3.01)	(4.34)	(5.33)	(5.74)
Shame	**15.78**	**13.78[ts***]**	**14.26**	**8.25**	**6.76[gf***,gr***]**
	(3.76)	(4.34)	(3.84)	(5.28)	(5.68)
Gratitude	**3.48**	**7.58[ts***]**	**2.98**	**16.65**	**15.86[gf***,gr***]**
	(2.94)	(4.51)	(2.96)	(2.91)	(3.09)
Hope	**4.88**	**10.71[ts***]**	**5.10**	**16.60**	**16.04[gf***,gr***]**
	(3.22)	(4.65)	(3.56)	(2.93)	(3.37)
Empathy	**15.36**	**15.74[ns]**	**10.93**	**13.90**	**13.36[gf**,gr*]**
	(4.09)	(3.56)	(4.87)	(3.83)	(4.65)
Victim Forgiveness	**4.33**	**13.26[ts***]**	**6.36**	**15.56**	**17.10[gf***,gr***,fr*]**
	(3.59)	(5.16)	(4.83)	(3.70)	(2.73)
Self-Forgiveness	**3.68**	**6.11[ts**]**	**4.53**	**7.39**	**7.14[ns]**
	(5.10)	(7.19)	(5.86)	(7.81)	(7.56)
Divine Forgiveness	**14.55**	**10.70[ts**]**	**11.33**	**9.78**	**10.99[ns]**
	(5.11)	(6.59)	(4.83)	(7.16)	(6.93)
Vividness	**15.03**	**14.54[ns]**	**14.36**	**15.60**	**16.03[ns]**
	(4.05)	(3.87)	(3.89)	(2.82)	(2.72)

Note. Ratings were made on a 0-20 scale. For valence, 0 = negative and 20 = positive. For arousal, 0 = calm/relaxed to 20 = aroused/excited. For all other measures, 0 = "not at all" and 20 = "completely." Denotations for statistical significance are as follows for paired samples t-tests (two-tailed): $p > .05^{ns}$, $p \leq .05$*, $p \leq .01$**, and $p \leq .001$***.

Table 2
Means and (Standard Deviations) of Physiological Measures

	Seeking Forgiveness		Victim Responses		
Measure	**Reliving Transgression Imagery[t]**	**Seeking Forgiveness Imagery[s]**	**Holding Grudge Imagery[g]**	**Granting Forgiveness Imagery[f]**	**Experiencing Reconciliation Imagery[r]**
Corrugator EMG	**.93** (2.85)	**.71[ts*]** (2.35)	**.74** (1.90)	**.10** (.45)	**.01[gf*,gr*]** (.28)
Zygomatic EMG	**.30** (.98)	**.33[ns]** (1.59)	**.33** (1.18)	**1.02** (3.31)	**.94[gf+,gr+]** (3.14)
Orbicularis Oculi EMG	**.50** (.89)	**.38[ns]** (.68)	**.50** (.85)	**.57** (1.03)	**.73[ns]** (1.20)
Skin Conductance	**-.08** (.08)	**-.09[ns]** (.12)	**-.08** (.07)	**-.06** (.09)	**-.05[gr+]** (.10)
Heart Rate	**1.24** (1.97)	**1.27[ns]** (2.36)	**1.48** (2.22)	**1.32** (1.81)	**1.35[ns]** (2.43)

	Seeking Forgiveness		Victim Responses		
Measure	**Reliving Transgression Recovery[t]**	**Seeking Forgiveness Recovery[s]**	**Holding Grudge Recovery[g]**	**Granting Forgiveness Recovery[f]**	**Experiencing Reconciliation Recovery[r]**
Corrugator EMG	**0.62** (1.69)	**0.43[ns]** (1.05)	**0.48** (1.10)	**0.07** (0.56)	**0.10[gf**,gr**]** (0.73)
Zygomatic EMG	**0.13** (0.48)	**0.14[ns]** (0.53)	**0.13** (0.56)	**0.40** (.096)	**0.50[gf**]** (2.08)
Orbicularis Oculi EMG	**0.06** (0.78)	**0.07[ns]** (0.43)	**0.08** (0.73)	**0.21** (0.66)	**0.22[ns]** (1.07)
Skin Conductance	**-0.17** (0.17)	**-0.18[ns]** (0.20)	**-0.17** (0.20)	**-0.16** (0.16)	**-0.09[gr**,fr+]** (0.22)
Heart Rate	**1.30** (2.75)	**1.41[ns]** (3.45)	**1.43** (3.20)	**1.58** (2.54)	**1.45[ns]** (2.58)

Note. All values represent the average change from the baseline relaxation period immediately preceding *each* 16-second imagery trial and 8-second recovery period. *Corrugator*, *zygomatic*, and *orbicularis oculi* EMG was measured in microvolts. Skin conductance levels were measured in microsiemens. Heart rate was measured in beats/min. Denotations for statistical significance are as follows for paired samples t-tests (two-tailed): $p > .07^{ns}$, $p \leq .07^{+}$, $p \leq .05$*, $p \leq .01$**, and $p \leq .001$***.