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Psychometric And Experimental Investigation Of Impulsivity, Rumination, Revenge, And Forgiveness

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PSYCHOMETRIC AND EXPERIMENTAL INVESTIGATION OF IMPULSIVITY, RUMINATION, REVENGE, AND FORGIVENESS

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DEDICATION

To Michelle. You take good care of me.

ACKNOWLEDGMENTS

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CHAPTER 1 INTRODUCTION

Revenge is a ubiquitous theme in human relations. It has influenced human activity at all levels of social analysis from the international to the interpersonal. One needs only to read a newspaper or watch the nightly news to observe this. For example, the shooting of workers by disgruntled co-workers (Lamar, 2001); the murder-suicides at Columbine High School (Gibbs, Grace, Gwynne, Harrington, Jackson, Shapiro, & Woodbury/Littleton, 1999), or the mass murders at Virginia Tech University (Gibbs, 2007). Such incidents have attracted great attention and have been discussed at length by social commentators. Some observers imply revenge as the primary reason for the perpetration of these extreme acts. While such opinions may have some merit in the eventual understanding of these and similar events, hindsight analysis does not provide a sufficient explanation.

Scientific methodology might lead to a more precise understanding of some of the factors contributing to such tragedies. Although revenge has been a theme in many cultures throughout history, investigators in the behavioral sciences only recently have given their sustained attention to the exploration of social and psychological factors related to revenge (Vidmar, 2002; Tripp, Bies, & Aquino, 2007).

The fact that the aforementioned examples are extreme and do not occur with great frequency does inhibit the ability of researchers to bring such events under empirical investigation. While most acts of revenge do not end in extreme violence, such examples do draw attention to a more common psychological event that many people experience at some point in their lifetime – to think about and/or exact revenge on those they believe have wronged them. Many people experience interpersonal

offenses of varying degrees. However, not all people punish those they believe have wronged them. When confronted with circumstances they perceive as necessitating redress, many people seek help from authorities (Tyler, 1988). Nonetheless, some people may be disposed to think and act out of revenge in their everyday social interactions.

Those who experience thoughts and feelings of revenge will be the primary focus of this research. The present work will pursue two broad directions. First, important theoretical approaches as well as empirical research on revenge will be reviewed. Second, on the basis of an analysis of past theorizing and research, some new insights into the psychological study of revenge will be proposed along with a strategy for empirically testing hypotheses derived from this analysis.

Psychological Approaches to the Study of Revenge

Because revenge has been construed primarily as a behavioral construct, many efforts have focused on the exploration of precipitating factors which influence resulting behavioral acts of revenge. These factors have been approached in the psychological literature in a number of different ways. Some investigators have explored revenge from the perspective of social and group norms (e.g., Gouldner, 1960; Helm, Bonama, & Tedeschi, 1972; Nisbett, 1993; Cohen, Nisbett, Bowdle, & Schwarz, 1996; Cohen, 1998; Eisenberger, Lynch, Aselage, & Rohdieck, 2004). Others have attached greater importance to understanding revenge as the product of individual psychological variables. Revenge has been discussed alternatively as a motivation (e.g., Heider, 1958; McCullough, Rachal, Sandage, Worthington, Brown, & Hight, 1998), an attitude (e.g., Stuckless & Goranson, 1992; Hutt, Iverson, Bass, & Gayton, 1997) and a

personality dimension (e.g., McCullough et al., 2001). Additionally, some approaches are difficult to categorize, focusing mainly on basic cognitive variables such as the attribution processes of revenge seekers (see Bradfield & Aquino, 1999).

While it is appropriate to recognize that broader social processes such as cultural and/or normative influences may be important in understanding revenge, such considerations would increase the complexity of the present research to the extent that its original purposes could become obscured. For the sake of clarity, the discussion presented here will focus on the comparatively simplest construal of revenge (i.e., an interaction between perceived harm-doer and revenge seeker). The goal is to obtain a greater understanding of the social-cognitive and affect-regulatory processes involved in revenge at the intrapersonal level.

Motivational Approach

The motivational approach to the study of revenge follows from the work of Heider (1958). Treating revenge as the product of motivation provides some advantages over normative approaches to revenge. First, it allows for a clearer account of the psychological factors related to revenge, such as a more precise consideration of cognitive and affective processes of revenge seekers. In other words, what do revenge seekers think and feel? Likewise, identifying individual motives allows for a broader consideration of possible explanations for revenge. Instead of presenting a broad explanation, such as the operation of normative or cultural influences, conceptualizing revenge as the product of motivation can specify a set of possible explanatory alternatives.

A number of motivations have been offered as theoretical explanations for revenge. McCullough, et al. (2001) discuss three of these. The first is a basic need for people to maintain equity relationships with others (e.g., Adams, 1965). The desire for people to 'get even' with those perceived to have wronged them shares much in common with the negative reciprocity norm (Gouldner, 1960). Indeed, it is not too clear how these two concepts differ from each other, unless perceptions of equity are construed as the cognitive basis of negative reciprocity.

Acts of revenge often derive from the need for people to get even with others. However, other factors such as the moral instructive function provide an additional motivational account of revenge (see Heider, 1958). This motive is somewhat different from the equity motive in that people seek to teach a perceived offender a lesson that his or her behavior is not acceptable. Acts of revenge serve to reinforce this objective. The moral instructive function typically does not adhere to an equity formulation since the revenge exacted may be proportionately greater in magnitude than the original offense. In this way, revenge can be viewed as providing an offender with an unambiguous indication that his offending behavior will not be tolerated in the present or on future occasions. This motive can be seen as one intending to produce behavior modification for the good of both the offender and the greater community.

Finally, saving face has been identified as a motive for revenge. Like the moral instructive motive, this typically involves the use of an inequitable response. The intent of this motive is punitive in nature and its instrumentality is related to the goal of deterring future offences in the service of preserving the status as well as the self-esteem of the revenge seeker (Tedeschi & Felson, 1994).

Some motivational accounts of revenge share much with ideas in the broader literature on human aggression. An idea discussed frequently in that literature is instrumental aggression. Instrumental aggression is carried out to serve a particular purpose (Buss, 1961; Feshbach, 1964; Berkowitz, 1993). Bushman and Anderson (2001) define instrumental aggression as "…premeditated, calculated behavior that is motivated by some other goal (e.g., obtain money, restore one's image, restore justice)" (p. 274). From this perspective, revenge is understood as a variant of instrumental aggression, which implies the revenge seeker's awareness of the purposes of his intended behavior. Indeed, much of the psychological research investigating revenge is consistent with this revenge-as-instrumental aggression formulation. For example, McCullough, et al. (2001) state: "Although some acts of vengeance might be spontaneous and impulsive, we posit that motivations to seek revenge frequently result from ruminative thinking about the offense" (p.602). While this motivated-planning approach to revenge may account for a large proportion of variance in revenge behavior, the emphasis on revenge as being subsumed by a concept such as instrumental aggression can be problematic because it largely ignores the instrumental versus hostile aggression distinction that has become a mainstay in the aggression literature (for a review, see Bushman & Anderson, 2001).

Hostile aggression is often characterized as being qualitatively different from instrumental aggression (Buss, 1961; Berkowitz, 1993). These differences arise primarily when one considers the cognitive and affective attributes of each. Instrumental aggression is typically referred to as 'cold' aggression and is viewed as the product of deliberative planning, the relative absence of anger, with the primary goal of

achieving something other than harm. On the other hand, hostile aggression is typically seen as 'hot' and is characterized by a lesser degree of premeditation, the presence of anger, with the ultimate goal of harm itself. Since revenge has often been conceptualized as a motivated behavior, research mostly has overlooked the possibility that a discernable proportion of revenge behavior may be better understood as being characterized in a similar manner as hostile aggression.

In addition, a careful consideration of revenge-as-motivated behavior leaves one without a clear understanding of which motives have the greatest impact on revenge. Several possibilities can be deduced from this. First, one could assert that the various motivations have equal weight and act simultaneously to influence revenge. Second, one could hypothesize that one motive is more influential than others. Finally, it is possible that revenge can be explained as being the product of multiple or mixed motivations. These sorts of questions have been largely set aside in the revenge literature. Attempts at solutions to these questions have been trumped by research on attitudinal aspects of revenge as well as research on vengefulness as a personality dimension – which similarly view motivation as an important component in explaining revenge, but fail to directly address questions of motivation in any programmatic manner.

Although there may be promise in studying revenge from a motivational perspective, the current state of the revenge literature has not sustained efforts on delineating a more precise account of the various motives implicated in revenge. Instead, researchers have placed a greater emphasis on examining the influence of attitudes and personality variables on revenge. The specific reasons for the de-

emphasis of the role of motivation remain elusive given that the related area of forgiveness research has given motivational issues more attention (see McCullough & Hoty, 2002).

Attitude Approach

While the attitude perspective as applied to the study of revenge is not necessarily incompatible with normative or motivational perspectives, it has provided researchers with a more traditional social psychological approach to the study of revenge. Although the attitude approach had been applied to conceptually related areas such as people's attitudes toward capital punishment (e.g., Allen, Mabry, & McKelton, 1998), attitude research on revenge has been slow to develop. Noting the lack of available measuring instruments, Stuckless and Goranson (1992) developed the Vengeance Scale. This work contributed to the advancement of the field in a couple of important ways. First, since few prior studies had specifically assessed revenge as a product of attitudes, Stuckless and Goranson (1992) developed a reliable and valid measure of people's attitudes toward revenge, uncontaminated by social desirability response bias. Second, subsequent research (Holbrook, White, & Hutt, 1995; Hutt, et al., 1997) demonstrated that Vengeance Scale scores were normally distributed and unidimensional. This is important because it showed that the measure possessed the necessary variance for the development of meaningful hypotheses linking revenge attitudes to other psychological processes and variables, which then can provide a basis for the further exploration of more complex questions which arise when contemplating the totality of factors contributing to revenge.

Research either directly or indirectly inspired by the work of Stuckless and Goranson (1992) has yielded some important findings. Studies have linked individual differences in revenge attitudes to a variety of outcomes such as driver aggression (Hennessy & Wiesenthal, 2005), spectator aggression at sporting events (Hennessy & Schwartz, 2007), health outcomes (Little, Simmons, & Nelson, 2007), workplace aggression (Tripp, Bies, & Aquino, 2002), as well as school violence (Duck, 2004). Although the applied importance of these studies cannot be overestimated, they seem to suffer from a lack of theoretical direction. It is not surprising that a person's attitudes can at times predict one's behavior. The findings that revenge attitudes can predict a wide range of aggressive behaviors merely serves as another illustration of the more widely studied attitudes-predicting-behavior phenomenon (for reviews, see Eagly & Chaiken, 1993; 1998).

While on the surface, such findings do appear to provide a basic explanation for revenge behavior, they fail to provide a deeper understanding of the more specific cognitive and affective processes of people who hold pro-revenge attitudes. For example, research from the attitude perspective assumes that revenge attitudes are explicit, meaning that people who hold these attitudes maintain a discernable level of awareness of them. Considering the accumulating evidence for the existence of implicit attitudes in other domains of research (see Greenwald, McGhee, & Schwartz, 1998; Wilson, Lindsey, & Schooler, 2000), one might suggest that at least some revenge attitudes are driven by factors that cannot be assessed with traditional self-report measures. In this regard, research from the attitude perspective shares much in common with the revenge-as-motivated behavior approach. As previously mentioned, it

is quite limiting to assume that a complete explanation of revenge can be achieved when revenge is construed as the product of a carefully planned, deliberative, 'cold' process.

Another issue is the question of the temporal stability of revenge attitudes. The early research on the Vengeance Scale did provide evidence demonstrating the test-retest reliability of the measure (Stuckless & Goranson, 1992; Holbrook, White, & Hutt, 1995; Hutt, et al., 1997). However, most studies from the attitude perspective have assessed revenge attitudes with only a single measurement. Assuming that revenge attitudes operate similarly to other explicitly measured attitudes, a pertinent question that needs greater exploration is the extent to which revenge attitudes are malleable. In other words, can revenge attitudes be changed, and if so, what are the variables that might contribute to their modification? Unfortunately, such questions have not been sufficiently addressed by studies utilizing the attitude perspective.

However, research from the normative perspective has shown how aspects of social influence can contribute to the expression of revenge behaviors. An example of this is research chronicling cultures of honor, which shows that socialization and cultural influence play prominent roles in the expression of revenge (see Nisbett, 1993). Insofar as normative influence can affect the expression of revenge behavior it would not be surprising if such norms can affect people's revenge attitudes. These questions may come into clearer relief if we now examine the personality perspective.

Personality Approach

McCullough et al. (2001) have introduced *vengefulness* as an explanatory mechanism that has further expanded the empirical scope of the literature on revenge.

It has been argued that some people may be dispositionally oriented toward engaging in revenge. These authors define vengefulness as an individual's chronically accessible beliefs and attitudes concerning the righteousness of revenge behaviors and the individual's endorsement of the legitimacy of revenge for solving interpersonal disputes. Accordingly, people who are classified as vengeful are predisposed to experience higher degrees of negative affect, have difficulty with affect regulation, and are thus prone to use revenge as a way to regulate their experience of negative affect.

So how is vengefulness, as a personality dimension, similar to or different from the other conceptualizations of revenge? Vengefulness largely subsumes other psychological explanations for revenge behavior. For example, vengeful people compared to those not considered vengeful are more likely to endorse norms, motivations and attitudes that are conducive to the expression of revenge. Put another way, the cognitive and affective architecture of vengeful individuals seems to be chronically biased in favor of using revenge as a strategy for solving interpersonal disputes.

In terms of personality correlates, vengefulness also has been shown to be related to two of the Big Five super factors of personality (John, 1990; McCrae & Costa, 1987). McCullough, et al. (2001) found that thirty-percent of the variance on a measure of vengefulness could be explained by the Neuroticism and Agreeableness factors. They found vengefulness to be positively associated with Neuroticism and negatively associated with Agreeableness. These authors suggested that Neuroticism, because of its relationship to negative affect, could predispose a person to experience angry thoughts and feelings which, given the right set of circumstances (i.e., the perception of

an interpersonal offense); one could easily convert into vengeful thoughts, feelings and actions. Likewise, these authors explained the negative relationship of vengefulness to Agreeableness as indicating that those who are low in Agreeableness are more likely to engage in conflict and are less empathetic. Since revenge may be characterized as a goal-directed behavior, and is often born out of anger and conflict, these distinctions seem logical. However, it would be an oversimplification to describe vengefulness merely as some combination of these factors. It is possible that some individuals who display high degrees of Neuroticism and low degrees of Agreeableness are not particularly vengeful. Neuroticism and Agreeableness may be necessary conditions for vengefulness, but may not be themselves, sufficient properties of vengefulness. To further understand revenge, other variables need to be accounted for.

Ruminative Thinking

Vengefulness also has been empirically linked to psychological processes other than the Big-Five personality factors. From a cognitive perspective, vengeful individuals appear to exhibit certain cognitive tendencies. Bar-Elli & Heyd (1986) suggested that revenge often occurs after an individual has had some time to think about the offender and the offense. Similarly, Buss (1961) noted that revengeful aggression often results after the avenger has had time to think about significant events that have led up to his decision to retaliate against an offender. The cognitive process of incessantly thinking about the original offense, the offender, and possible vengeful actions has been termed "rumination" (Brown, 2004; McCullough et al., 2001; Bies et al., 1997; Stuckless & Goranson, 1992).

Rumination has been empirically identified as the cognitive hallmark of those who exhibit vengefulness and seek revenge (Stuckless & Goranson, 1992; Bies et al., 1997; Baumeister, 1996; McCullough et al., 2001). It is plausible that one of the keys to predicting whether a vengeful person will actually commit an act of revenge lies in the extent to which he ruminates about the original offense, the offender, and more precisely, the intrusiveness and vividness of the rumination. Nonetheless, research has not yet broached the question of whether or not vengefulness, as an individual difference variable, actually predicts revenge behavior in any reliable way. The depth of analysis of vengefulness is still rooted in correlation analyses of self-report instruments. It is assumed that prolonged and vivid rumination about an offense, if not dissipated, can prolong the negative affectivity associated with the original offense and thus may be construed as a proximal cause of a vengeful action.

However, rumination within the context of vengefulness is not completely understood. Theoretical models that account for the causal link between rumination and revenge have not been specified with any degree of precision. Some researchers have noted that the role of rumination for the vengeful person is to keep the motivational goals of revenge accessible (McCullough et al., 2001; Kim and Smith, 1993). However, this construal of the role of ruminative thinking does not clearly delineate the precise cognitive processes so as to enable us to test if this assertion is empirically supported. Put another way – are there any similarities in the content of the ruminative thoughts of vengeful people? If so, how might these be conceptualized? Does rumination focus on the perceived offender or on the severity of the offence? Does the rumination entail thoughts of injustice? A fuller understanding of these questions might be achieved

when one considers additional thoughts that may preoccupy a person contemplating revenge.

Impulsivity

While the links between revenge/vengefulness and rumination have been gaining empirical support, it would be theoretically and empirically meaningful to examine the contribution of other psychological factors that may help explain variation in revenge and vengefulness. One such variable is impulsivity. Impulsivity has been studied in several areas of psychology (for review see Frederick, Loewenstein, & O'Donoghue, 2003). Numerous definitions have been offered to operationalize it as a psychological construct. For example, Eysenck and Eysenck (1977) equate impulsivity with risk taking, lack of planning, and rapid decision making. Patton, Stanford, and Barratt (1995) identified three aspects of impulsivity, including spontaneous actions, inattention, and lack of careful planning. Theory and research in the domain of human aggression have identified the importance of the relationship between impulsivity and various kinds of aggression (see Plutchik & van Praag, 1995). Since revenge is a form of aggression, it is important to consider how impulsivity might relate to vengefulness and revenge.

Research from the social psychological aggression literature has demonstrated that it is meaningful to categorize aggression into different subtypes (i.e., hostile vs. instrumental) (Bushman & Anderson, 2001); likewise theory and research from the clinical aggression literature have taken a similar view that aggression can be classified into two conceptually similar subtypes. The first subtype, which is often called reactive aggression, emphasizes strong emotionality, the loss of behavioral control and impulsivity. On the other hand, proactive aggression shows the relative lack of emotion;

behavioral control and premeditation (see Houston, Stanford, Villemarette-Pittman, Conklin, & Helfritz, 2003). Reactive aggression is analogous to hostile aggression and encompasses high levels of emotional arousal, lack of control over physiological arousal (i.e., affect regulation) and the relative absence of behavioral control. Conversely, proactive aggression is analogous to instrumental aggression and is typically accompanied by low emotional arousal (Conner, Swogger, & Houston, 2009).

Taking these ideas into account, it appears that examining the extent to which impulsivity may factor into vengefulness and/or behavioral acts of revenge would further advance our understanding of these important concepts. Although accumulated evidence suggests the importance of ruminative thinking, and also the link between vengefulness and rumination, one possibility that remains is that some acts of revenge unfold in a more spontaneous and impulsive manner. A large literature has explored the ways in which impulsivity can affect behavior (see Frederick, Loewenstein, & O'Donoghue, 2003). Yet, and despite that some have acknowledged the possibility of impulsive revenge (e.g., McCullough et al., 2001), there have been no widely embraced empirical demonstrations of this potentially important link. Moreover, existing research does not encompass forgiveness, which impulsive tendencies could substantially impede by biasing individuals to opt instead for revenge.

Belief in a Just World

A major contribution to social justice theory and research is Lerner's (1980) Just World Theory. This theory specifies that people have a critical need to believe that the world is fair, and they are motivated to greater or lesser degrees to see the world this way. Furthermore, Just World Theory builds on the assumption that people are highly

vested in construing their world as a place where "people get what they deserve" and "deserve what they get" (Lerner, 1980, p. 11). Since the central focus of just world theorizing is how people respond to the justice or injustice they have experienced, it may be fruitful to investigate how this construct relates to revenge. Violations of just world expectations or belief in a just world (BJW) could lead to thoughts of revenge. Accordingly, people may "construe events to fit this belief" (Lerner, 1980, p. 12). That BJW influences people's perceptions of events is perhaps the most important aspect of BJW as it relates to the present research. In this regard, people's level of BJW might be useful to understanding their specific cognitive, affective and behavioral reactions to a perceived harm. While the relationship between BJW and revenge has not been thoroughly explored, there is some evidence that suggests BJW could be an important predictor of revenge thoughts. Kaiser, Vick and Major (2004) found overall total BJW scores to be positively correlated with self-reported desire for revenge in the wake of the September 11, 2001 terrorist attacks. Additional investigations of this relationship are warranted to further discern its broader implications. However, a more nuanced approach seems necessary considering recent findings demonstrating the multidimensional nature of BJW.

Recent research has shown BJW to be a multidimensional construct. Lucas, Alexander, Firestone and LeBreton (2007) have articulated the distinction between procedural just world (PJW) and distributive just world (DJW) beliefs. Lucas et al. (2007) have empirically distinguished between belief in the deservedness of rules, processes, and treatment (PJW) from distributive justice criteria (DJW) (i.e., belief in the general fairness of outcomes or allocations). Since revenge can be seen as a reaction to

negative outcomes or to negative rules or processes, it may be useful to investigate the relationship of PJW and DJW to cognitive and affective processes related to revenge.

Forgiveness

It is important to consider alternatives that individuals might choose when confronted with an interpersonal offense. Not all people who experience a significant interpersonal harm commit acts of revenge. As an alternative to revenge, individuals may seek to overcome interpersonal conflict in more prosocial ways. One possibility is forgiveness (e.g., Exline, Worthington, Hill & McCullough, 2003; Gable & Haidt, 2005). Recent studies have revealed much about the influences and individual differences that are relevant to people who choose to forgive interpersonal transgressions (for reviews see McCullough, Root, Tabak & Witvliet, in press; Strelan & Covic, 2006). Just as in the case of revenge, research demonstrates that rumination plays an important role in forgiveness (McCullough, 2000; Worthington, Berry, & Parrott, 2001; Worthington & Wade, 1999), and that rumination is often found to be negatively associated with forgiveness (Barber, Maltby, & Macaskill, 2005; Berry, Worthington, Wade, Witvliet & Keifer, 2005; McCullough et al., 1998; Ysseldyk, Matheson, & Anisman, 2007). Because intrusive and repetitive reflection about a perceived interpersonal transgression can precede an unforgiving or vengeful response (e.g., Bushman, Bonacci, Pedersen, Vazquez, & Miller, 2005), lack of rumination is often identified as a prominent cognitive determinant of forgiveness (though for an alternative possibility see Worthington & Wade, 1999). A study intending to investigate cognitive and affective aspects of revenge should also consider forgiveness, since this alternative could be a viable option for those who have been wronged.

The Present Research

No matter which perspective is taken, a discernable proportion of empirical work on revenge can be construed as focusing on cognitive and affective characteristics of revenge seekers. Recent research has illustrated that revenge is often the end product of prolonged rumination which occurs after one perceives an interpersonal harm. This research has helped to illuminate our current understanding of revenge. However, at least two major assumptions underlie this work.

The first assumption is that revenge is the product of motivated and deliberative planning, which suggests that a discernable amount of revenge behavior is influenced by prolonged thinking about an interpersonal harm. While it may be that a substantial proportion of revenge is influenced by rumination, the literature on revenge could benefit from investigations that look at the inverse of this assumption. Specifically, can revenge occur in the relative absence of rumination? Does 'spontaneous and impulsive' revenge preclude aspects of rumination that have been associated with the motivated-planning approach to revenge? That is, can other factors such as trait impulsivity directly or indirectly impact revenge?

Such a possibility has merit when one considers some recent research in the clinical literature. Investigators have found evidence in support of a dichotomous taxonomy of aggression. Kockler, Stanford, and colleagues (2006) found that one-third of the variance in the Impulsive/Premeditated Aggression Scale was attributable to two distinct factors: impulsivity and premeditation. This finding seems to run parallel with findings in support of a hostile/instrumental dichotomy, with hostile aggression sharing aspects with impulsive aggression and instrumental aggression sharing commonalities

with premeditated aggression. Since revenge is considered a specific case of aggression, revenge might be classifiable along similar lines.

While the classification of different qualitative distinctions in aggression has long been the pursuit of researchers in the broader aggression literature (for reviews, see Berkowitz, 1993; Baron & Richardson, 1994), such pursuits have not gone without criticism. Bushman and Anderson (2001) have criticized the use of such dichotomous classification schemes in lieu of a more dynamic and continuous knowledge structure model, which purportedly does not confuse aggressive motives, and does not confound automatic with controlled cognitive processes. Nevertheless, in their critique of the hostile versus instrumental dichotomy, Bushman and Anderson (2001) mention the importance of such dichotomies as being crucial to the early development of a field's knowledge base.

Taking these criticisms into account, one could argue that (1) the empirical literature on revenge is in its early stages of development and might benefit from a similar classification scheme. Indeed, no known classification scheme applied to revenge currently exists and (2) it may be too early in the development of this research to jump forward to questions related to automatic vs. controlled cognitive processes as they might relate to aspects of revenge. These points can be integrated and lead to more specific research questions. For example, if evidence could be developed that revenge can be either primarily instrumental/premeditated or hostile/impulsive the next step would be to evaluate a set of questions incorporating the criticisms of Bushman & Anderson (2001) and focus on motives as well as issues of automaticity and control. In

the meantime, it seems worthwhile to attempt to establish empirically whether there is heuristic value in classifying revenge into different subtypes.

A second major assumption underlying studies emphasizing the relationship between rumination and revenge is the viewpoint that revenge is the theoretical inverse of forgiveness. This can be seen in research confounding measures of revenge and forgiveness. For example in the seminal paper on vengefulness, McCullough et al. (2001) utilized the Forgiveness of Others Scale (Mauger, et al. 1992), which assesses forgiveness attitudes. These authors viewed low scores on forgiveness as being the equivalent of vengefulness.

This approach can be problematic. First, there is little empirical basis for classifying revenge as the opposite-of-forgiveness. Second, few studies investigating revenge and/or forgiveness have simultaneously used both revenge and forgiveness measures to evaluate the relationship between the concepts. Therefore, it seems important to evaluate the relationship between revenge and forgiveness using measures designed specifically to assess these presumed opposite concepts.

The present research involves 2 studies investigating some of the issues we have raised.

Study 1: Investigating Revenge with Self-Report Measures

Study 1 attempted to extend findings among variables implicated in revenge. First, the assumption that revenge is the product of motivated planning was assessed using measures of revenge and rumination. Theoretically, rumination, (a "…passive and repetitive focus on the negative and damaging features of a stressful transaction" Skinner, Edge, Altman, & Sherwood, 2003, p. 242) implies a time-consuming reflection

on past events. Therefore, it was hypothesized that significant positive associations would be found between revenge and rumination, replicating the work of McCullough, et al. (2001). Second, the inverse hypothesis that revenge could be 'spontaneous and impulsive' also was explored. Study 1 attempted to amplify findings from a pilot study by the author. A major limitation of the pilot research was that it did not include direct measures of rumination or forgiveness.

Three hypotheses were proposed. First, it was hypothesized that measures of revenge would be negatively correlated with measures of forgiveness. While theoretically this relationship appears straightforward, very few studies have investigated the actual relationship between these presumed opposite constructs. Second, it was anticipated that rumination (a cognitive process) would be negatively associated with measures of forgiveness. Since rumination has been empirically linked to revenge, it is important to determine how rumination might relate to forgiveness. Finally, it was hypothesized that impulsivity would be positively correlated with revenge and negatively correlated with forgiveness.

Study 2: Investigating Revenge with a Performance-Based Measure

Study 2 was an exploratory attempt to examine whether it would be possible to relate individual differences measured on a personality test to behavioral responses. Although self-report measures can provide some insight into the dynamics of revenge, they also have limitations. For example, response sets may degrade response quality, which could impact the meaning of any resulting data. The purpose of Study 2 was to explore revenge using an alternative methodology. Specifically, Study 2 was designed

to examine whether individual differences in revenge might relate to cognitive responses in a performance-based situation.

In Study 2 the Emotional Stroop task (see Gotlib & McCann, 1984; Mathews, & MacLeod, 1985; Williams, Mathews, & MacLeod, 1996) was used. Since the Emotional Stroop task is a performance-based measure requiring rapid responses, threats to measurement validity might be reduced. Additionally, the Emotional Stroop task provides a way to measure, in real-time, the possible interplay between affective stimuli and cognitive responses. This might make it possible to study a cognitive and affective construct such as revenge. Little research investigating revenge has included performance-based measures. However, similar methods have been used to explore related concepts such as justice beliefs (see Hafer, 2000; Hafer & Bègue, 2005). No studies have employed the Emotional Stroop task to study intrapersonal aspects of revenge. This is a novel use of the method.

Background: Emotional Stroop Task

The Emotional Stroop task has been used in several areas of psychology (for a review, see Williams, Mathews, & MacLeod, 1996), primarily to assess the interplay between cognitive and affective processes with particular emphasis on inhibition and excitation. The Emotional Stroop task is derived from the original Stroop task (1935) in which participants are required to recognize the color of printed words. The primary dependent measure in the original Stroop task is participant's reaction time (RT) in recognizing the font color of printed words such as "BLUE" and "GREEN" in both congruent and incongruent trials. For example, in congruent trials the words are matched with the color they describe; that is, the word "BLUE" is presented in a blue

font color. In incongruent trials, the word "BLUE" is presented in a different font color, such as red. Because word recognition is mostly an automatic cognitive process, color recognition RTs are typically faster in congruent trials than they are in incongruent trials. Put another way, an interference effect (i.e., *Stroop Effect*) is observed when RTs for congruent trials are found to be significantly faster than the corresponding RTs for incongruent trials. This interference effect is typically viewed as an indicator of failure of participants to override or inhibit the automatic reading response via controlled cognitive processes.

The emotional Stroop task is designed to observe differences in RTs for emotionally laden words (Gotlib & McCann, 1984; Mathews, & MacLeod, 1985; Williams, Mathews, & MacLeod, 1996). The rationale underlying this paradigm is that when an emotionally relevant word such as "REVENGE" is presented in color font to a participant, the participant should demonstrate interference in color recognition when: (1) The semantic meaning of the word has self-referential importance and/or (2) the word is indicative of concepts or thoughts that are either chronically accessible or made temporarily salient by a procedure such as priming. On the other hand, one would not expect to find comparative decrements in RTs for individuals for whom the word "REVENGE" is to a lesser degree self-referential or cognitively accessible.

In the context of the present study, it was thought that words connoting revenge might be more accessible for participants who score high on the Vengeance Scale and TRIM-R. When high revenge participants are presented with a word such as "RETALIATE," it is possible that they might have slower RTs for recognizing the word's color than would low revenge participants because high revenge participants would

experience a greater degree of interference. On the other hand, low revenge subjects might be less likely to have revenge related thoughts and concepts accessible than high revenge subjects and these differences could be observable as differences in relative RTs for revenge relevant words.

It was hypothesized that individual differences in revenge scores might relate to response patterns in the Emotional Stroop task. Compared to participants with lower revenge scores, those possessing higher revenge scores might demonstrate slower RTs for revenge relevant words on the Emotional Stroop task. Additionally, possible relationships between revenge scores and RTs to forgiveness and justice words were also examined.

CHAPTER 2 METHOD

Study 1

Participants

Participants (*N* = 200, 59% female) were selected from the introductory psychology subject pool at an urban Midwestern university. Participants were given partial course credit for their participation. The mean age of participants was 21.83 years (*SD* = 5.28 years). Participants reported their ethnicity in the following percentages: 57.7% White, Non-Hispanic, 13.5% Arab-American, 14.3% African-American, 3.1% Hispanic, and 11.2% as "Other."

Materials

Revenge. The Vengeance Scale (Stuckless & Goranson, 1992) consists of 20 items using 7-point Likert scales (1=*strongly disagree*, 7=*strongly agree*) (see Appendix A). The Vengeance Scale was devised to measure individual differences in attitudes toward revenge. Sample items are: "It is important for me to get back at people who have hurt me" and "People who insist on getting revenge are disgusting." The measure is internally consistent (*α* = .92), possesses good test-retest reliability (*r* = .90) and is uncontaminated by social desirability response biases (Stuckless & Goranson, 1992).

The Transgression Related Interpersonal Motivations Inventory (TRIM) (McCullough, et al., 1998) has a total of 12 Likert-type items (1=*strongly disagree*, 5=*strongly agree*) factor analytically divided into two distinct sub-scales; Avoidance (A) (7 items) and Revenge (R) (5 items) (see Appendix B). Sample items are: "I withdraw from him/her" (A) and "I'm going to get even" (R). McCullough et al. (1998) report Cronbach alphas of .86 and .90 for Avoidance and Revenge subscales respectively as

well as test-retest values ranging from r=.86 (3-weeks) to r =.64 (9-weeks) for

Avoidance and r=.79 (3-weeks) to r = .65 (9-weeks) for Revenge. It is important to note

that McCullough et al. (2001) have interpreted a low revenge score on the TRIM as a

measure of forgiveness.

Rumination. The Impact of Event Scale (IES) (Horowitz, Wilner, & Alvarez,

1979) is a 15-item self-report measure which assesses ruminative tendencies related to

two things, (1) the intrusiveness and (2) the avoidance of distressing life events (see

Appendix C). The IES is presented in a Likert-type format ("1" representing "not at all"

and "7" representing "often.") Sample items include: "Pictures about it popped into my

mind" (Intrusion) and "I tried not to think about it." (Avoidance). The IES is a widely used

measure possessing acceptable psychometric properties. Corcoran and Fisher (1994)

found the IES to possess alphas ranging from .79 to .92. Likewise, the IES has been

found to possess adequate test-retest reliabilities ranging from .79 to .87 (Horowitz, et

al., 1979). Indicators of the scale's validity also have been observed. For example, the

IES has been shown to predict significant changes in coping patterns among clinical

samples experiencing post-traumatic stress symptoms (see Corcoran & Fisher, 1994;

Weiss & Marmar, 1997).

Impulsivity. The Eysenck I.7 Impulsiveness subscale (Eysenck, et al., 1985) is a

19-item self-report questionnaire presented in a yes/no format (see Appendix D).

Representative items are: "Do you usually think carefully before doing anything?" and

"Before making up your mind, do you consider all the advantages and disadvantages?"

Eysenck, et al. (1985) report alphas greater than .80 as well as a one-year test-retest

reliability of r = .76. Likewise, the I.7 has been shown to be significantly positively

correlated with measures of psychoticism and neuroticism, with correlations ranging from .34 to .44.

Forgiveness. The Tendency to Forgive Scale (TTF) and the Attitudes Toward Forgiveness Scale (ATF) (Brown, 2003) are brief self-report measures (see Appendices E & F). The TTF consists of four Likert-type items emphasizing respondents' endorsement of forgiveness relevant behaviors (1=*strongly disagree*, 7=*strongly agree*). A sample item from the TTF: "I tend to get over it quickly when someone hurts my feelings." The ATF consists of six Likert-type items designed to tap into respondents endorsement of forgiveness relevant attitudes (1=*strongly disagree*, 7=*strongly agree*). For example, "I believe that forgiveness is a moral virtue." The TTF is internally consistent (α = .82) possesses good test-retest reliability (r = .71) and is only moderately correlated with social desirability response biases (r =.25). The ATF demonstrates moderate internal consistency reliability (α = .61). It has been found to be significantly negatively correlated with the Vengeance Scale (r = -.45) (Brown, 2003).

Belief in a Just World. The original Procedural and Distributive Just World Beliefs scale (Lucas, et al., 2007) is an eight-item Likert-type measure (1=*strongly disagree*, 7=strongly agree) with four items tapping procedural just world beliefs (PJW), i.e., the extent to which individuals believe that people in general get what they deserve vis-à-vis rules, processes and treatment (see Appendix G). For example, "People usually use fair procedures in dealing with others." Although 10 items were administered to participants, only the 8 refined items from (Lucas, et al., 2007) were scored in the present research. Appendix G indicates the items that were not scored. The 4-item distributive just world beliefs (DJW) subscale emphasizes the extent to which individuals endorse items

pertaining to the deservingness of outcomes or allocations for people in general (e.g. 'people usually receive outcomes that they deserve'). Each subscale has been shown to be factor-analytically distinct and possesses alphas ranging from.89 to .92 (PJW) and .88 to .92 (DJW) (Lucas, et al., 2007).

Procedure

Participants were greeted by the investigator and told that this was a study of opinions about everyday life experiences. The number of participants in each session ranged from 10 to 20. After participants' written consent was obtained, the experimenter distributed packets containing the measures. The measures used in Study 1 were presented in two orders. This was done as an attempt to reduce the influence of earlier measures on later measures. The first order (N = 107) was as follows: Vengeance Scale (Vengeance), I.7 Impulsivity (Impulsivity), Impact of Event Scale (Rumination), Attitudes Toward Forgiveness (ATF), Tendency to Forgive (TTF), PJW, DJW, and TRIM. Order 2 (N = 93) simply reversed Order 1, beginning with the TRIM, DJW, PJW, etc. The experimenter explained that participants' responses would remain anonymous and that they should carefully read and consider all the items. Participants were given fifty minutes to complete the measures. When participants were finished, they were thanked and debriefed as to the specific nature of the study.

Study 2

Participants

In the first session of Study 2, participants (N = 145, 60.7% female) were volunteers from the introductory psychology subject pool at a mid-sized Midwestern university. Participants received partial course credit for their participation. The mean

age of participants was 24.62 years (*SD* = 8.51 years). Participants reported their ethnicity in the following percentages: 55.2% White, Non-Hispanic, 15.2% Arab-American, 14.5% African-American, 4.8% Hispanic, and 10.4% as "Other."

In the second session of Study 2, there were 100 participants (67.4% female) who had previously completed Part 1 of Study 2 and received partial credit for that participation. All participants, with the exception of 1 male (colorblindness) reported having normal color vision. This participant was excluded from the emotional Stroop portion of the study, but was given full-credit for his participation. The mean time interval between session 1 and session 2 was 14 days. The range between sessions was from 2 to 30 days. The mean age of these 100 participants was 24.81 years (*SD* = 8.35 years). Study 2 participants reported ethnicity was 52.8% White, Non-Hispanic, 20.2% Arab-American, 15.7% African-American, 3.4% Hispanic, and 7.8% as "Other."

Measures

The self-report measures used in session 1 of Study 2 were identical to the measures used in Study 1. Only the order of presentation of the 6 measures varied from Study 1. In Study 2, the following order of presentation was used: PJW, DJW, Vengeance Scale, I.7 Impulsivity, IES (Rumination), ATF, TRIM, and TTF.

Selection of Word Lists for the Emotional Stroop Task

Four lists of 4 words each (Total = 16 words) were generated using the following categories: (1) Revenge (2) Forgiveness (3) Justice and (4) Neutral (see Appendix H). These words were selected from a recent edition of Webster's dictionary and thesaurus (1999). Following the recommendations of Larsen, Mercer, & Balota (2006), ANOVAs were performed to ensure that the word lists were equivalent in their lexical features,

such as frequency of use, average word length and orthographic neighborhood, which is the number of different words into which a particular word can be transformed by modifying one letter in the word without changing position of the other letters (Coltheart, Davelarr, Jonasson, & Besner, 1977). Furthermore, using the norms provided at http://elexicon.wustl.edu, the word lists were matched according to average reaction times, naming latencies and overall accuracy. From these analyses, no significant differences were found on the indices of lexical features, reaction times, naming latencies or overall accuracy. This analysis is important because the measurement model of the Emotional Stroop task requires a comparison of average word color recognition latencies to a control list of neutral words. If the word lists are not equivalent in their lexical characteristics, any resulting differences (e.g., slow down in color recognition latencies) between the experimental and control lists could not be attributed to the content of the word lists, but rather, the confounding aspects of differences in lexical features.

Procedure

Study 2 consisted of two sessions. In the first session, participants were given similar instructions as were given to participants in Study 1. Participants were greeted by the investigator and told that this was a study of opinions about everyday life experiences. Additionally, participants were informed that to receive full credit for their participation they would have to attend a subsequent lab session. Participants were given an index card upon which their self-chosen participant identification number was written. Participants were asked to sign-up for a study entitled "Word Recognition

Study" and to bring their participant identification cards with them to the subsequent session.

The number of participants in each group tested in the first session ranged from 8 to 18. After participants' consent was obtained, the experimenter distributed packets containing the measures. The experimenter explained that participants' responses would remain anonymous and that they should carefully read and consider all the items. Participants were given a total of fifty minutes to complete the measures. The same measures used in Study 1 were used for Study 2. While Study 1 used two orders of presentation for the self-report measures, Study 2 used only one order of presentation, which itself differed from the two orders used in Study 1. A third order was chosen for Study 2 because published research using the DJW and PJW measures had always presented these measures before other measures. Additionally, due to the low correlation values of DJW and PJW with other measures in Study 1, it was important to assess whether a different order of presentation might have influenced the correlation coefficients of DJW and PJW with other measures. For Study 2, the order of presentation was as follows: PJW, DJW, Vengeance Scale, I.7 Impulsivity, IES, ATF, TRIM, and TTF.

In the second session, which took place at various time intervals after the first session (M = 14 days; range = 2 – 30 days) individual participants completed a computerized Emotional Stroop task. The stimulus materials were presented using Inquisit Millisecond software version 3.0 (2008). In the second session, participants were tested individually. When participants arrived at the laboratory they were greeted by an experimenter and directed to a computer terminal. The experimenter then

provided oral instructions covering the procedures of the experiment, which were also provided in written form on computer monitors. The oral and written instructions stated:

> This experiment is called the Stroop task. You will be shown a series of words that are written in four different colors: Blue, Green, Red and Yellow. Your task is to identify the font color of each word by reading the font color of the word into the microphone. Make sure that you respond as fast as you can; as soon as you know the answer. You will have a total of five seconds to respond to each word, after which you will be presented with the next word.

After the participants received the initial instructions, they were presented with an initial block of practice trials. The purpose of the practice trials was to acquaint them with example words and font colors and to become familiar with the configuration of the computer monitor and the microphone. Participants were not told that their initial responses were practice trials. The practice block consisted of 16 trials using four different color/word combinations. The practice block was a shorter version of the original Stroop (1935) task. Four color words: BLUE, GREEN, RED and YELLOW were presented to participants in the middle of a white background on the individual's 16-inch computer monitor using a 24-point Arial font. Each color word was presented randomly in its congruent color font and cycled through each of the other incongruent font colors. For example, the word "BLUE" was presented in blue as well as in green, red and yellow fonts. Participants were instructed to record their responses to the various font colors by reading the color of the words that were presented. If the participant did not respond with the correct response, a "!" was presented and an "incorrect response" code was automatically written to the data file. The trials proceeded consecutively until each participant was randomly presented with the 16 word/color combinations.

After the practice block was complete, participants received instructions indicating that they would be presented with another task. Those instructions stated that the participant would be completing a similar task; however, they would be viewing different kinds of words. An example word "SAILBOAT" was presented on the instruction screen. The instructions also directed participants to consult the experimenter if they had any questions. After the participants finished with the instructions, they were presented with the critical trials. The critical trials consisted of the Emotional Stroop task in which participants are randomly presented with words from a list of 16 total words from the following categories: revenge, forgiveness, justice and neutral (4 words per category). Each word was randomly cycled through each of four font colors: blue, green, red and yellow. Each word was presented a total of four times each (once in each font color). Participants completed a total of 64 critical trials. The response procedures in the critical trials were identical to those used in the practice block, wherein participants were asked to verbally state the font colors of the presented words. When participants were finished, they were thanked and debriefed as to the specific goals of the study.

To determine whether the procedure used in Study 2 was sufficient to produce viable effects, the data from the first 20 participants were inspected. This inspection indicated that additional experimental manipulations were not necessary at that point in the study. That is, correlations between the self-report and RT measures were mostly in the anticipated directions.

CHAPTER 3 RESULTS

Overview of Statistical Analyses

The primary purpose of Study 1 was to examine the extent to which individual differences in impulsivity and rumination would predict scores on measures of revenge and forgiveness. It was hypothesized that a measure of rumination would be significantly positively correlated with measures of vengeance and revenge. Likewise, it was hypothesized that a measure of impulsivity would be significantly positively associated with measures of vengeance and revenge. Another goal of Study 1 was to determine the extent to which impulsivity and rumination would predict measures of forgiveness.

To determine the nature of the hypothesized relationships, data analysis followed a three-step framework. First, data screening was performed to ensure statistical assumptions associated with structural equation modeling (SEM) were not violated. Second, bivariate relationships among all measures were examined. Finally, analyses using SEM were conducted to test the potential for more complex relationships among a number of theoretically related variables. All statistical tests used two-tailed tests of significance, which as compared to directional hypothesis tests, provides more conservative p-values, lowering the possibility of Type I errors.

Data Selection and Screening

In Study 1, two orders of presentation were used. The first order ($N = 107$) was as follows: Vengeance Scale (Vengeance), I.7 Impulsivity (Impulsivity), Impact of Event Scale (Rumination), Attitudes Toward Forgiveness (ATF), Tendency to Forgive (TTF), PJW, DJW, and TRIM. Order 2 ($N = 93$) simply reversed Order 1, beginning with the

TRIM, DJW, etc. Study 2 added another 145 participants. The order of presentation in session 1 of Study 2 was as follows: PJW, DJW, Vengeance Scale, I.7 Impulsivity, IES (Rumination), ATF, TRIM and TTF. Since the same self-report measures were used in both Study 1 and Study 2, the samples from both studies were merged for the main data analyses examining relationships among the individual difference measures. This yielded a total sample of 345 (Study 1, order 1 = 107, Study 1, order 2 = 93, Study 2, session 1 = 145). Once the samples were combined, the data were screened following the recommendations of Tabachnick & Fidell (2001), to verify that necessary statistical assumptions were met. The data were checked for missing data, normality and linearity, outliers, multicollinearity, singularity and adequacy of covariances. These analyses revealed no major issues that need to be considered within the context of the main analyses.

Analysis of Bivariate Relationships

To evaluate the potential impact of order effects on the bivariate relationships separate correlation matrices using Pearson's *r* were calculated for each of the two orders used in Study 1 (see Tables 1 & 2). Comparisons between the correlation matrices consisted of an examination of the magnitude, direction and statistical significance of each bivariate relationship. One bivariate relationship (out of a total of 36 possible) emerged as potentially problematic. When comparing the Impulsivity-PJW correlation, a difference was observed. In order 1, *r* = .06, *p* = *ns*. In order 2, *r* = -.29, *p* < .001. Fisher's *r* to *z* transformation demonstrated that the relationships were significantly different for order 1 and order 2 (*z* = 2.49, *p* < .05). After the correlation matrices from orders 1 and 2 were examined, the samples were combined. Table 3

shows that the different orders had a minimal impact on the resulting combined correlation matrix. The only issue was the above mentioned relationship between Impulsivity and PJW.

Table 4 presents the bivariate relationships for the individual differences measures in Study 2. The comparison of Tables 3 (Study 1) and 4 (Study 2) shows differences in 4 correlation coefficients (Impulsivity-ATF, Impulsivity-TTF, Impulsivity-Avoidance, and TTF-PJW) out of 36, between Studies 1 and 2, but the direction of the rs is the same in both studies.

Table 5 presents the results for the combined samples from Studies 1 and 2. A number of meaningful bivariate associations emerge for the total combined samples of Study 1 plus Study 2 ($N = 345$). As hypothesized, negative associations were observed between the revenge and forgiveness measures. The Vengeance Scale correlated with ATF in the predicted direction ($r = -.66$, $p < .001$). Likewise, the Vengeance Scale correlated with TTF ($r = -.51$, $p < .001$). Similar findings were observed when TRIM-Revenge was correlated with ATF ($r = -.46$, $p < .001$) and TTF ($r = -.42$, $p < .001$). It also was hypothesized that a measure of rumination would be negatively correlated with measures of forgiveness. This hypothesis received partial support. While the IES was significantly related to TTF ($r = -.29$, $p < .001$), the hypothesized relationship between the IES and ATF was not significant ($r = -.06$, $p = ns.$). Additionally, the IES was positively associated with TRIM-Revenge ($r = .23$, $p < .001$).

Finally, it was hypothesized that Impulsivity would be positively associated with measures of revenge. Support was observed for the Vengeance Scale ($r = .34$, $p < .001$) and TRIM-Revenge ($r = .33$, $p < .001$). Significant negative relationships were

observed between Impulsivity and Forgiveness: ATF r = -.25, p < .001 and TTF r = -.21, p < .001.

While scrutiny of the bivariate associations reveals support for a number of hypothesized relationships, it is difficult to discern more complex relationships without the aid of more complex statistical analysis. Therefore, structural equation modeling (SEM) analyses were conducted. The combined data from the two studies was used (greater sample size provides increased statistical power to detect significant relationships among the variables included in the model).

Structural Equation Modeling

Using the combined data from Studies 1 and 2 (N = 345), manifest structural equation modeling was used to examine relationships among Impulsivity, Rumination, Vengeance, Revenge, Forgiveness and Avoidance (see Table 6). Because of the minimal effects of DJW and PJW observed in the correlation matrices (no significant relationships in the combined sample), DJW and PJW were not included in the SEM analyses. Analyses were conducted using LISREL 8.30 (Jöreskog & Sörbom, 1999) and maximum likelihood estimation.   The fit of all theoretical models was evaluated using several widely reported fit indices.   These included the nonnormed (NNFI) fit index (Bentler & Bonett, 1980), the comparative fit index (CFI) (Bentler, 1990), the standardized root-mean-square residual (SRMR) (Hu & Bentler, 1999; McDonald & Ho, 2002), and the root mean square error of approximation (RMESA) (Browne & Cudeck, 1993). Values of .90 or higher indicate good overall fit for the NNFI and CFI, while values near or below .05 are considered acceptable for the SRMR. Additionally, values greater than .10 are considered unacceptable for RMESA. To determine the best fitting

but most parsimonious model of relationships, several alternative structural models were identified and compared. All model comparisons utilized a chi-square test, in which significant increases or decreases in chi-square indicated a meaningful change in model fit with the addition or subtraction of various specified paths.

The analysis began with an "all paths model," in which relationships among all measures were free to vary. In the second step of the analysis, the structural path from impulsivity to vengeance was removed to determine the possibility of a direct relationship between these measures. In the third step of the analysis, the structural path from rumination to vengeance was removed to evaluate the potential direct relationship between these measures. In the next step of the analysis, the direct effect of impulsivity on forgiveness, revenge and avoidance was removed to determine the possibility of a mediating effect of vengeance on these measures. Finally, the direct effect of rumination on vengeance, forgiveness, revenge and avoidance was removed to determine whether a direct effect of rumination on these measures was empirically supported.

Identifying the Appropriate Structural Model

Fit statistics are presented in Table 6. After the all paths model was specified, the second step of the analysis was conducted. This step of the analysis indicated that when the structural path from impulsivity to vengeance was removed the model demonstrated significantly lower fit when compared to the all paths model, χ^2 (1, N = 345) = 46.57, $p < .001$ (NNFI = .48, CFI = .90, RMSEA = .36, SRMR = .10) confirming a hypothesized direct relationship between impulsivity and vengeance. In the third step of the analysis, the relationship between rumination and vengeance was assessed to

determine the existence of a direct relationship between these measures. When the path from rumination to vengeance was removed, overall model fit did not improve (χ^2 (1, N = 345) = 1.34, p = ns, NNFI = .99, CFI = .99, RMSEA = .03, SRMR = .02), indicating that the hypothesized direct relationship between rumination and vengeance was not supported.

Next, direct paths from impulsivity to revenge, forgiveness and avoidance were removed from the all paths model. This step of the analysis likewise revealed non-significant findings, χ^2 (4, N = 345) = 4.56, p = ns (NNFI = .99, CFI = .99, RMSEA = .02, SRMR = .02), indicating that the direct paths from impulsivity to revenge, forgiveness and avoidance did not significantly increase model fit and therefore direct links between impulsivity and revenge, impulsivity and forgiveness, as well as impulsivity and avoidance were not confirmed. Finally, direct paths from rumination to vengeance, revenge, forgiveness and avoidance were removed. This revealed significant findings, χ^2 (7, N = 345) = 71.73, p < .001 (NNFI = .68, CFI = .85, RMSEA = .16, SRMR = .11), establishing support for the hypothesized direct relationships between rumination with forgiveness, rumination and revenge.

Overall results of this analysis revealed a final model in which impulsivity demonstrated fully mediated effects on forgiveness, revenge and avoidance through vengefulness, with the absence of direct effects of impulsivity on these measures. Rumination demonstrated the expected direct effects on forgiveness, revenge and avoidance. Unlike the findings for impulsivity, these effects were not at all mediated by vengeance. In other words, impulsivity is linked to forgiveness/revenge only through the vengeance pathway, and these relationships hold even after controlling for known

associations between rumination and forgiveness and revenge. Rumination is only linked to forgiveness and revenge outside of the vengefulness pathway.

Path Estimates of Final Structural Model

Figure 1 provides standardized path estimates obtained for the final structural model. As hypothesized, rumination and impulsivity were positively related (r = .20, p < .001). Likewise, vengeance and impulsivity share a direct relationship (β =.43, p < .001), confirming the hypothesized link between vengeance and impulsivity. The relationship between vengeance and revenge was strong (β =.86, p < .001), as was the negative relationship between vengeance and forgiveness (β = -.56, p < .001). As hypothesized, rumination was significantly positively related to revenge (β =.25, p < .001). Most importantly, the effects of impulsivity and rumination on vengeance, revenge, forgiveness and avoidance showed different paths. As may be seen in Figure 1, the relationship between impulsivity and forgiveness, revenge and avoidance was fully mediated by vengeance. On the other hand, the effect of rumination on these measures was one that was direct and unmediated by vengeance.

Impulsivity Indirect Effects

To further explore relationships between Revenge, Forgiveness, Avoidance and their antecedents, the indirect effects for impulsivity were calculated. As seen in Table 7, impulsivity showed indirect effects on forgiveness (β = -.24, p < .001), revenge (β = .37, p < .001) and avoidance (β = .07, p < .001). While rumination and impulsivity overall were significant predictors of revenge, forgiveness and avoidance, the effect of rumination was exclusively direct, as all of the direct paths from rumination to revenge, forgiveness and avoidance were significant.

Statistical Analyses for Study 2

A major purpose of Study 2 was to explore whether individual differences in measures of revenge (Vengeance Scale and TRIM-R), forgiveness (ATF and TTF), impulsivity (I.7) and rumination (Rumination-Intrusion subscale) would predict reaction time (RT) scores on an emotional Stroop task.

Data Screening

One-hundred people participated in the reaction time experiment. All data were inspected to determine whether they possessed the necessary characteristics for statistical tests associated with the general linear model (GLM). First, descriptive statistics were calculated for the self-report measures to determine if any statistical assumptions, such as linearity, homoscedasticity and normality were violated. No violations of statistical assumptions were observed in the self-report data. Second, the RT data from the emotional Stroop task were carefully scrutinized for the existence of errors (i.e., inaccurate responding) and outliers (i.e., very slow RTs). Frequency counts, histograms and *z*-scores were calculated for each word presented in the emotional Stroop task. Statistical criteria were established to aid this process. Specifically, participants who had error rates in excess of 5% of the critical trials were excluded from the data set. Additionally, participants who had a substantial number ($\geq$ 10%) of skewed RTs (i.e., $z \geq 3.30$) for the words presented in the emotional Stroop task were likewise excluded from subsequent analyses. As a result, a total of 11 participants were excluded from the main analyses, leaving the data from 89 participants to be analyzed in Study 2.

After the data for Study 2 were scrutinized for statistical assumptions, the remaining data (N = 89) were once again checked for normality. Frequency counts, histograms and z scores were again inspected to ensure none of the remaining data were skewed. While the exclusion of 11 participants had the effect of eliminating cases with the greatest amount of skewed responses, the z scores of the resulting data indicated about 12% of the remaining 89 participants had at least one skewed RT among their responses to the 128 word/color combinations. To correct the remaining skewed distributions, the recommendations of Tabachnick and Fidell (2001) were employed. The deviance of the remaining outlying variables was reduced by assigning the outlying cases raw scores which were a unit larger than the next greatest extreme score within each skewed distribution. For example, if a participant's RT to a word such as "FAIRNESS" had an outlying score of 1192 ms, with a corresponding z score of 3.45, and the next greatest RT for the variable was 1066 ms, with a z score of 2.95, the outlying variable's raw score was assigned a value of 1067 ms. According to Tabachnick and Fidell (2001) the effect of this procedure "… is to change the scores(s) on the variables(s) for the outlying case(s) so that they are deviant, but not as deviant as they were" (p. 71).

Multiple Regression Analyses

The data were further screened to verify that necessary statistical assumptions for multiple regression were met. These analyses revealed only minor issues to be considered within the context of the main analyses. First, the ratio of cases to predictors was considered. Given that that the main analyses used six predictors and the total N for the sample was 89, the ratio of cases to predictors was deemed

satisfactory. Next, analyses were performed to determine potential problems associated with the distributions of residuals. No significant violations of normality, linearity or homoscedasticity were found in the regression models. Next, potential issues associated with multicollinearity and singularity was examined. None of the tolerance statistics approached zero, indicating that no significant problems of multicollinearity or singularity were observed.

Four separate multiple regression models were calculated to test hypotheses concerning potential relationships among the selected self-report measures and the RT data. Statistical criteria were used to determine the influence of each of the self-report measures on aggregated RTs for each of the 4 word categories (i.e., Revenge, Forgiveness, Justice and Neutral words). Due to the lack of strong theoretical criteria for the model entry order of the predictors, the statistical criteria used to determine the specific order of entry for each of the predictors conformed to approaches popular when a theoretical order of entry is not specified (Tabachnick & Fidell, 2007). Specifically, predictors were included in the final models using standard multiple regression, which uses a simultaneous entry approach when including predictors into the models.

Each of the four multiple regression analyses used the revenge measures (Vengeance Scale and TRIM-Revenge), forgiveness measures (ATF and TTF) the I.7 Impulsivity measure and the Rumination-Intrusion subscale of the IES as predictors. This yielded an acceptable N to k ratio for multiple regression, which was approximately 15:1 (see Green, 1991; Tabachnick & Fidell, 2001). For each of the regression models, RTs to the emotional and neutral word categories were used as DVs. Therefore, the first

regression analysis used the aggregated RTs to the revenge words, followed by forgiveness, justice, and neutral words.

The results of the multiple regression analyses are presented in Table 8. Overall, the multiple regression analyses provided partial support for the self-report revenge and forgiveness measures as significant predictors of RT. The Vengeance Scale was a significant predictor of RT for the aggregated Revenge words list (β = .38, p < .05), indicating a possible Stroop interference relationship. Likewise, the Vengeance Scale also was a significant predictor of RT for the Forgiveness words list (β = .37, p < .05). For the Justice words list, the Vengeance Scale was a marginally significant predictor (β = .30, p < .10). The Vengeance Scale failed to reach significance for the Neutral words list (β = .22, p < ns).

Further analysis indicated that Rumination-Intrusion yielded slower RT scores for each one of the four word lists, indicating the possibility of a generalized interference effect associated with scores on this measure.

To elaborate on the findings of the multiple regression analyses, it is informative to consider the predicted values of the RTs for each significant beta in selected regression models. Because the findings for the revenge and forgiveness words multiple regression analyses were the most theoretically meaningful these models were further analyzed. In the first multiple regression analysis, RTs of the revenge words were significantly predicted by Vengeance Scale scores, as well as scores from the Rumination-Intrusion subscale of the IES. To more fully understand the implications of this multiple regression model, it is important to consider the predicted RT scores for the revenge words for values for 1 *SD* above and below the mean of each predictor.

Table 9 presents the means and standard deviations of the predictors included in each regression model. In the regression model predicting RTs to revenge words, the following regression equation was derived:

Revenge words RT: $Y' = 325.04 + 1.67$ (Vengeance Scale) -1.95 (TRIM-R) $+ 3.68$ (ATF) $+.51$ (TTF) $- 1.48$ (Impulsivity) $+ 3.09$ (Rumination-Intrusion).

While using the means for the non-significant predictors, the value of 77.94 (+1 *SD*) was entered into the model for the Vengeance Scale. This yielded a predicted value of RT for revenge words = 650.26 ms. Likewise, entering the value of 41.58 (-1 *SD*) into the model yielded a predicted value of RT for revenge words = 589.54 ms. Therefore, when comparing the inclusion of values 1 *SD* above and below the mean of the Vengeance Scale, greater Vengeance Scale scores predict slower RTs for the revenge words list. Conversely, lower Vengeance Scale scores predict faster RTs for the same words.

Rumination-Intrusion also was a significant predictor of revenge word RTs. To determine the predicted RT values for the revenge words lists, a similar procedure was used using values for 1 *SD* above and below the mean of Rumination-Intrusion. Using the means of all the remaining predictors, the value of 38.54 (+1 *SD*) yielded a predicted value of RT for revenge words = 643.60 ms. Additionally, entering the value of 23.20 (-1 *SD*) into the model yielded a predicted value of RT for revenge words = 595.90 ms. Therefore, when comparing the inclusion of values 1 *SD* above and below the mean of Rumination-Intrusion, greater Rumination-Intrusion scores predict slower RTs for the revenge words list; lower Rumination-Intrusion scores predict faster RTs for the same words.

In the second multiple regression analysis, RTs of the forgiveness words were significantly predicted by Vengeance Scale scores, as well as scores from the Rumination-Intrusion subscale of the IES.

A similar regression equation was derived for the forgiveness words list:

Forgiveness words RT: $Y' = 343.01 + 1.62$ (Vengeance Scale) -1.92 (TRIM-R) $+ 2.76$ (ATF) $+.78$ (TTF) $+ 1.32$ (Impulsivity) $+ 2.59$ (Rumination-Intrusion).

While using the means for the non-significant predictors, the value of 77.94 (+1 *SD*) was entered into the model for the Vengeance Scale. This yielded a predicted value of RT for forgiveness words = 637.09 ms. Likewise, entering the value of 41.58 (-1 *SD*) into the model yielded a predicted value of RT for forgiveness words = 578.19 ms. Therefore, when comparing the inclusion of values 1 *SD* above and below the mean of the Vengeance Scale, greater Vengeance Scale scores predict slower RTs for the forgiveness words list. Conversely, lower Vengeance Scale scores predict faster RTs for the same words.

Rumination-Intrusion also was a significant predictor of forgiveness words RTs. To determine the predicted RT values for the forgiveness words lists, a similar procedure was used using values for 1 *SD* above and below the mean of Rumination-Intrusion. Using the means of all the remaining predictors, the value of 38.54 (+1 *SD*) yielded a predicted value of RT for forgiveness words = 627.51 ms. Additionally, entering the value of 23.20 (-1 *SD*) into the model yielded a predicted value of RT for forgiveness words = 587.78 ms. Therefore, when comparing the inclusion of values 1 *SD* above and below the mean of Rumination-Intrusion, greater Rumination-Intrusion

scores predict slower RTs for the forgiveness words list; lower Rumination-Intrusion scores predict faster RTs for the same words.

CHAPTER 4 DISCUSSION

Although empirical research on the psychology of revenge is increasing, most of the research on people's psychological reactions to interpersonal offences has emphasized the psychological variables and processes related to forgiveness. Although forgiveness is a potential option for those who have been wronged, the disproportionate research emphasis on forgiveness seems to have directed investigators' attention away from considering other behavioral alternatives and the psychological variables and processes related to these alternatives. The present research focused on one of these alternatives, revenge, and investigated some of the psychological aspects of revenge. While not conclusive, the results from this research illustrate some important relationships among variables that have been implicated in previous discussions of the topic. This research also provided some hypotheses that have not been widely discussed in past research.

The present research was based on an individual differences perspective. This perspective emphasizes that different individuals possess varying degrees of particular psychological variables. For example, some people may be more vengeful than others, and likewise, some people may be more forgiving than others. The individual differences approach to the study of psychological phenomena is well-established (see Scott, Osgood, & Peterson, 1979; Major & Deaux, 1982; Ackerman & Humphreys, 1990). It is a common approach in many areas of psychological inquiry, including social psychology.

Self-report instruments were used to measure individual differences. These measures were chosen based on their relevance to past research findings as well as for

theoretical reasons. All of the measures had been developed and used by other investigators. The measures were employed in the present research to capture important individual differences in revenge attitudes and motivations, forgiveness attitudes and behavioral intentions, individual differences in impulsivity and rumination, and belief in a just world.

It was hypothesized that measures of revenge would be positively associated with a measure of impulsivity. Bivariate associations indicated significant positive relationships between revenge and impulsivity. While the finding that revenge was significantly associated with impulsivity does shed light on this relationship, this does not imply that the role of rumination is unimportant. As anticipated, rumination also was positively associated with measures of revenge. This latter finding largely replicates past research and indicates that individuals more likely to endorse revenge attitudes, motivations and behaviors appear to have intrusive thoughts which are difficult for them to consciously suppress. Although rumination and impulsivity were associated with measures of revenge, these findings should be interpreted cautiously. First, rumination and impulsivity were positively correlated. While on the surface the bivariate relationships among revenge, impulsivity and rumination seem unambiguous, the findings from the SEM analysis suggest that these relationships are more complex.

Conceptually, rumination and impulsivity appear to be very different concepts. Rumination emphasizes a repetitive cognitive process that includes a level of awareness of one's thoughts. The measure of rumination used in the present research had been developed to provide indicators of two aspects of this awareness: 1) intrusion: unwanted thoughts related to a negative experience a person has endured and 2)

suppression; involves attempts by a person to consciously avoid intrusive thoughts. On the other hand, impulsivity can be viewed in a manner that minimizes the role of controlled thinking, such as 'acting without thinking.' Nonetheless, in the present research rumination and impulsivity were positively associated, indicating that these variables shared a significant amount of variation. There may be several reasons why these variables were found to be positively related.

While there is little research examining the relationship between impulsivity and rumination, the findings presented here indicate that these variables are moderately correlated. As is the case with any correlational finding, the relationship between impulsivity and rumination might be explained in a number of ways. One possibility, not directly measured in the present research, involves negative affect. Some past studies (Lyubomirsky & Nolen-Hoeksema, 1995; Thomsen, 2006) have linked rumination with negative affect and have shown that negative affect regulation may be difficult for highly vengeful people (McCullough et al, 2001). Since negative affect was not directly assessed in this research, this is merely speculative. However, it is plausible that the measures of impulsivity and rumination used in this research had shared variance because of participants' level of negative affect. Future research should explore this possibility, since negative affectivity is a prominent psychological characteristic of vengeful people (McCullough et al., 2001; Stuckless & Goranson, 1992).

It is important to note another possible explanation for the rumination-impulsivity relationship. In Study 1, the measures were presented in two orders. This approach was primarily used to reduce the effect that order of presentation could have on response patterns to the various measures. In order 1, the I.7 Impulsivity measure was

presented immediately before the IES Rumination measure. In order 2, the order of presentation was reversed, with rumination immediately preceding impulsivity. In the first session of Study 2, a third order of presentation was used. This order also presented the impulsivity and rumination measures back-to-back, with impulsivity immediately preceding rumination. Since the main correlational results reported used the combined data from both studies 1 and 2, it was anticipated that any existing order effects would be minimized. However, a potential consequence of arranging the impulsivity and rumination measures in such close proximity could have resulted in a methodologically related artifact. Although there is no direct evidence that this influenced the findings, it is a possibility that must be considered.

It also was hypothesized that measures of revenge would be negatively associated with measures of forgiveness. This hypothesis was empirically supported, as shown by the results of both the correlational and SEM analysis. Although these findings may seem obvious to a lay observer, they are important since very few studies have specifically examined empirical relationships between revenge and forgiveness. Many authors have assumed that revenge and forgiveness are opposite sides of a behavioral continuum that a person could choose when confronted with a significant interpersonal offense. Although the data in the present research cannot rule out the possibility that revenge and forgiveness are the opposite poles of a behavioral spectrum ranging from the antisocial to the prosocial, the findings presented here are not conclusive enough to make this case. One possibility to consider is whether revenge and forgiveness are multidimensional constructs. While the measures used in the present research assume these variables are unidimensional, future research should

focus on developing methods and measures to more fully determine these constructs' psychometric properties.

Observing bivariate relationships in isolation cannot fully elucidate the 'big picture' presented when one considers the results of the SEM analysis. The SEM findings suggest a more complex picture. A specific advantage SEM provides is the consideration of multiple relationships simultaneously, which can help delineate how multiple variables may be related to other variables. To use a simple analogy, single bivariate relationships are the trees, whereas the SEM analysis may provide a better view of the forest. Our SEM analysis provides some interesting relationships to consider when investigating psychological aspects of revenge and forgiveness.

As seen in Figure 1, the results of the SEM analysis confirm a number of relationships that were observed in the correlational analyses. Specifically, the positive relationship between impulsivity and rumination was repeated, as was the negative relationship between rumination and forgiveness. In addition, the correlational finding that impulsivity was positively associated with the Vengeance Scale also was supported. However, the SEM analysis revealed some interesting relationships that could not be observed directly in the bivariate relationships. While impulsivity and rumination were moderately positively correlated, their relationships to other variables were quite different. The relationship of rumination to forgiveness (TTF) was direct and in the negative direction. In other words, people who have a dispositional tendency to forgive seem unlikely to ruminate about significant interpersonal transgressions.

The SEM analysis also revealed that rumination had a direct positive relationship with the TRIM-Revenge measure. Although the Vengeance Scale and TRIM-Revenge

measure were correlated (r = .67), no direct path was established between rumination and the Vengeance scale. While this may appear to be trivial, its meaning may be better understood by considering the psychological foundations upon which the Vengeance Scale and TRIM-Revenge were constructed. The Vengeance Scale is a measure of attitudes toward revenge.   As such, it intends to measure evaluative judgments associated with both the general concept of revenge as well as attitudes toward revenge as a behavior. On the other hand, TRIM-Revenge is a measure of motivation which intends to capture people's more immediate behavioral intentions/reactions toward an actual person who has recently wronged them.

While it makes sense that a person who endorses revenge attitudes would be likely to hold revenge motivations, the two concepts are not necessarily the same. Interestingly, the Vengeance Scale does not direct the responder to think specifically about a single person who was responsible for a specific interpersonal harm. In this way, the measure is more indirect than the TRIM-Revenge measure. Considering that a person's rumination about a specific interpersonal harm might focus exclusively on the person who caused that harm, it could be that TRIM-Revenge would be psychometrically superior to the more general Vengeance Scale in accounting for variance in rumination. Rumination is a specific cognitive process, which can entail vivid recollections of people and events. When these people and events are primed, as may have been the case with the instructions for the TRIM-Revenge measure, the direct relationship between the two measures is more easily understood.

A final direct path was established in the SEM analysis between rumination and TRIM-Avoidance. This finding suggests that rumination is positively associated with

motivation to behaviorally avoid a person who has recently caused one a significant interpersonal harm. Given that rumination is a cognitive process that can incorporate vivid recollections of unpleasant interpersonal events, a person's intention to behaviorally avoid those responsible for these events appears straightforward. In particular, if the event associated with the ruminative thinking was traumatic or was associated with great harm, this finding can be interpreted as one that reinforces a self-preserving, defensive reaction.

Psychologists have been aware of defensive reactions that people exhibit when faced with circumstances they perceive as harmful or fear provoking (for a review, see LeDoux, 1996). Concepts such as the "fight or flight" (Cannon, 1929) response can be easily invoked to illustrate a possible psychological explanation of this finding. Aspects of equity theory (Adams, 1965) also seem to be relevant. One of the predictions of equity theory is that when people become aware of a significant inequity involving the self they may engage in a number of cognitive and/or behavioral responses. Since situations involving interpersonal transgressions can invoke a sense of inequity; one option for an aggrieved person is to avoid the perceived source of the inequity. The motivation of interpersonal avoidance can be considered in the language of equity theory as 'leaving the field.' In either case, interpersonal avoidance is a possible outcome for those who experience a significant interpersonal harm. However, to better understand these direct relationships for rumination, we should now consider the SEM findings associated with impulsivity.

The finding that rumination was directly related to forgiveness, revenge and avoidance provide further empirical evidence that rumination is a key cognitive variable

to consider when investigating the psychological bases of these concepts. These findings are largely in line with prior research on these topics (Brown, 2004; McCullough et al., 2001; Bies et al., 1997; Stuckless & Goranson, 1992). However, something that has been largely unexplored in studies of revenge and forgiveness is the possible role of impulsivity. Past research has shown that impulsivity is a key variable to consider when accounting for a wide range of human behavior. Examples of this are numerous and have been explored in several specialty areas of psychology, including the physiological (Barratt, Stanford, & Kent, 1997), developmental (Côté, Tremblay, & Nagin, 2002), clinical (Evenden, 1999) and social psychology (Emmons & Diener, 1986). At its core, the concept of impulsivity emphasizes behavioral processes that are often performed without reference to consequences and can indicate a shallow level of cognitive processing. Additionally, impulsive behaviors are often accompanied by high levels of emotionality (Berlin, Rolls, & Kischka, 2004; Hinshaw, 2003).

Our findings show that impulsivity and rumination were shown to differentially relate to individual differences in revenge attitudes and motivations, behavioral intentions to forgive and avoidance motivations. Though the relationship of rumination with these variables was primarily direct, the relationship to these variables associated with impulsivity was found to be indirect. As seen in Figure 1, the specific nature of the relationship between impulsivity and forgiveness, revenge and avoidance was mediated by revenge attitudes (Vengeance Scale). High levels of impulsivity and prorevenge attitudes appeared to have inhibitory effects on forgiveness, whereas high levels of impulsivity and prorevenge attitudes appeared to have facilitative effects on revenge

and avoidance motivations. These results suggest several interesting considerations in regard to research concerned with identifying antecedents of forgiveness and revenge.

The experience of a significant interpersonal transgression can leave the perceiver with a number of options to consider and possibly choose in response to the harm-doer. In the present research, three possible reactions were investigated: revenge motivations, forgiveness intentions and avoidance motivations. While there certainly are other things an aggrieved party may do in response to a transgression (e.g., co-opting the resources of a third party to intervene on one's behalf, or doing nothing in response to the experienced harm), many people may be socialized into one or more of the options investigated here. An important question that cannot be adequately addressed from our data asks when different options are available to an aggrieved party, what other processes determine the person's decision to engage in one or more of these options? Although the present research emphasizes individual differences as a possible roadmap for these decisions, a more basic explanation may exist that allows for an enhanced understanding of the pattern of relationships among the individual differences investigated in this study.

Since little previous psychological research has considered impulsivity and rumination together as important antecedents of revenge and forgiveness, a more precise interpretation of the present findings is somewhat difficult to achieve. Nonetheless, two well-established social psychological theories might aid in this interpretation. In seeking a more basic account of our findings, one should not ignore the contributions of Festinger's (1957) cognitive dissonance theory, and the conceptually similar equity theory (Adams, 1965). These classic theories provide

possible avenues of inquiry to consider when attempting to understand the more basic cognitive and affective mechanisms that may underlie the present findings.

Cognitive dissonance theory and equity theory are essentially motivation/decision theories. Despite using different vocabularies, the emphasis in both is on psychological balance. Cognitive dissonance is often described as an unpleasant level of arousal that is perceived when a person experiences intrapsychic conflict. Part motivational theory, cognitive dissonance theory also strives to explain the ways in which the individual attempts to reduce his level of unpleasant arousal in an attempt to achieve a kind of cognitive homeostasis. In the case of revenge and forgiveness, dissonance principles could be used to interpret the findings. If we assume that people are motivated to respond in some way to an interpersonal offense, and they have several alternatives available to them, then we must consider the possibility that people may experience some degree of dissonance over choosing one of these alternatives. On one hand, a person may choose to forgive a transgressor, which is often viewed as prosocial and in accordance with the principles of many religions, laws and codes of ethics. However, in choosing to forgive, a person may leave open the possibility for future transgressions, which would be an undesirable outcome. On the other hand, a person may choose to strike back at a transgressor, which is often viewed as antisocial and is often in opposition to the principles of religion, laws, etc. The revenge response, however, would not guarantee the individual's exclusion from future transgressions, as this action may invoke an escalating sequence of tit-for-tat reciprocity, which also would lead to undesirable outcomes.

In viewing the choice between revenge and forgiveness as a dissonance reduction problem, it is important to consider that a person's view of the self may also contribute to the level of dissonance associated with making a decision in response to an interpersonal transgression. As research on the self-serving bias suggests, most people view themselves in a positive light (for a review see, Mezulis, Abramson, & Hyde, 2004). That is, people seem motivated to maintain a self-image that reinforces a view of being a 'good person.' This perception may have the effect of adding to the level of dissonance associated with choosing an alternative in response to an interpersonal transgression. On one hand, 'good' people are ones who defend themselves against the harms inflicted by others. On the other hand, 'good' people follow rules, laws, and codes of ethics. A person's definition of what it means to be 'good' might lead him toward one behavioral choice or another, with the concomitant self-justifications after the behavior has been enacted. While the present research did not address these possibilities, a fruitful direction for research on revenge and forgiveness would be to examine the function of dissonance processes as they may relate to these concepts. Given the present findings, it appears that an understanding of pertinent individual differences such as impulsivity and rumination might aid in solutions to cognitive dissonance questions that may arise when a person is confronted with a choice between revenge and forgiveness.

Concepts derived from equity theory could be even more relevant than those of cognitive dissonance theory. Although equity theory shares commonalities with cognitive dissonance theory, equity theory is much more closely related to issues of revenge and forgiveness because it specifically addresses the kinds of cognitive and

affective responses that are likely to be experienced by a person who perceives an interpersonal transgression. Like cognitive dissonance theory, equity theory is essentially a motivational theory based on people's perceptions of the external and internal/psychological world. According to cognitive dissonance theory, people are motivated to take steps to reduce the unpleasant psychological effects associated with the dissonance produced by psychological contradictions. In the case of equity theory, perceptions of inequity can be considered the rough equivalent of cognitive dissonance. Equity theory, like cognitive dissonance theory, predicts that a person experiencing perceptions of inequity will take one or more behavioral or psychological steps to reduce the inequity, which will reduce the unpleasant psychological experience associated with a perceived inequity.

Interpersonal transgressions can vary in kind and intensity. For example, some transgressions can involve property; others can involve offenses against the person. Some transgressions may be less severe (e.g., petty theft), whereas others may be more extreme (e.g., physical assault). Admittedly, the severity of an offense is a judgment of the perceiver, and it is also likely that the related feelings of inequity associated may be experienced differently. Nonetheless, interpersonal transgressions of varying kinds and degrees could serve as triggers that lead perceivers to experience thoughts and feelings of inequity. The thoughts and actions a person takes in response to inequity perceptions are at the heart of equity theory. The choice to take revenge or forgive a transgressor may therefore be seen as the individual's attempt to reduce the inequity produced by the transgressor.

In the case of revenge, a person may attempt to restore equity by acting upon the perceived transgressor. This is the equity theory equivalent of engaging in behaviors that alter the inputs or outcomes of another. From an analytical perspective, viewing revenge as an equity restoration mechanism appears straightforward. However, considering forgiveness from an equity restoration perspective appears to be more complex. Surely, forgiveness can involve concrete behaviors directed at a perceived transgressor. For example, an aggrieved party may extend a verbal acknowledgement of forgiveness to the transgressor or forgo pressing charges with authorities against the transgressor. However, these actions may not minimize the inequity produced by the transgressor, as compensation in kind seems to remain unachieved.

This is not to imply that an analysis of forgiveness cannot be achieved using elements of equity theory. Besides behavioral approaches to aid in equity restoration, equity theory also states that people can engage in cognitive approaches to restore equity. When evaluating the choice to forgive an interpersonal transgressor, a victim may engage in a sort of mental equity restoration. For example, the choice to forgive may involve a comparison between the victim and offender; but on the other hand, the victim may seek to maintain a broader form of equity with some other referent. Sometimes, those who forgive others do so in an attempt to maintain their perceived equity relationship with their god or creator. Future studies should examine the extent to which equity theory principles may apply to people's decisions to avenge or forgive.

A major finding of this research shows that individual differences in revenge and forgiveness may be related to impulsivity and rumination in important ways. While prior

research has tended to emphasize the role of rumination in predicting revenge and forgiveness, the importance of impulsivity has received much less attention. That revenge behavior might reflect an abrupt and potentially emotional response makes intuitive sense. For instance, individuals who perceive an 'in the moment' transgression likely experience a salient affective reaction. It is possible that negative affect could lead them to seek revenge immediately rather than eventually. Impulsivity could be an important antecedent of revenge oriented behavior. Additionally, these results suggest impulsivity is negatively associated with forgiveness. Since forgiveness is often viewed as a prosocial response to negative interpersonal events, those interested in promoting interpersonal forgiving in lieu of the potentially destructive consequences of revenge might consider developing techniques aimed at minimizing levels of impulsivity.

While Study 1 was an attempt to establish empirical evidence for a number of hypothesized relationships using self-report measures, Study 2 was an exploratory attempt to establish links between self-report measures and participants' reaction time to different word stimuli via an emotional Stroop task. Study 2 provided an opportunity to engage in a novel approach to study revenge and forgiveness using an alternative set of dependent variables. While the findings associated with Study 2 were not as robust as those of Study 1, Study 2 did provide findings that could be used to advance future investigations of revenge, forgiveness and justice beliefs.

The multiple regression analyses yielded some interesting results. The Vengeance Scale was a significant predictor of RT for the Revenge and Forgiveness word lists in the multiple regression analyses. Additionally, the Vengeance Scale approached significance for the Justice words in the regression analyses. These

findings indicate the possibility of an interference relationship among these self-report and RT measures.

As anticipated, participants scoring high on the Vengeance Scale had slower RTs to the Revenge words. This finding can be interpreted in a couple of ways. First, for those scoring high on the Vengeance Scale, it is possible that semantic meaning of the Revenge words had self-referential importance. In other words, when presented with words connoting revenge, participants' attention may have been interrupted. It is possible that during this attention disruption that self-relevant schemas related to revenge may have been activated; leading to a slower reading of the word colors (Compton, et al., 2003). Another possibility is that revenge words are indicative of concepts or thoughts that are either chronically accessible or made temporarily salient by a procedure such as priming. Since priming procedures were not used in this research, a more likely explanation is that the Vengeance Scale captured cognitions that were chronically accessible in participants.

In the context of the present study, it was thought that words connoting revenge might be more accessible for participants who score high on the Vengeance Scale and TRIM-R. When high revenge participants are presented with a word such as "RETALIATE," it is possible that they might have slower RTs for recognizing the word's color than would low revenge participants because high revenge participants would experience a greater degree of interference. On the other hand, low revenge subjects might be less likely to have revenge related thoughts and concepts accessible than high revenge subjects and these differences could be observable as differences in relative RTs for revenge relevant words.

Past research (e.g., Gotlib & McCann, 1984) has demonstrated that individual differences in depression predicted slower response times to depression-relevant words, when compared to neutral and manic words. On the other hand, these authors were able to rule out the possibility that transient emotional states were responsible for these findings. Using a mood-induction technique, these authors found that creating a temporary emotional state failed to lead to differences in response times on an emotional Stroop task. Whether the explanation for the present findings is related to attention disruption or the chronic accessibility of revenge thoughts requires additional empirical investigation. However, if one considers the possibility that vengefulness is a stable and enduring disposition, the findings produced by the emotional Stroop task used in the present research are more likely to be related to more chronic cognitive structures and processes possessed by vengeful individuals rather than to temporary fluctuations in attention produced by the experimental procedure. Although the finding that the Vengeance Scale predicts slower RTs for Revenge words is encouraging, the finding that the Vengeance Scale similarly predicts the Forgiveness words is somewhat puzzling.   This leads one to consider that people with prorevenge attitudes may engage in more similar cognitive processing of concepts related to revenge and forgiveness than has been previously considered.

Vengeance attitudes increase response times to both revenge and forgiveness words.   That is, the revenge emotion produces interference for both revenge and forgiveness words. It is possible that when revenge schemas are activated, forgiveness schemas might also be at least partially activated. If revenge is a salient emotion, it will take longer to respond because both

Revenge and Forgiveness words involve affective parts of the brain, as well as strictly cognitive areas. Whether negative or positive, the affect lengthens processing time, as compared to non-affective stimuli. While the behavioral outcomes associated with revenge and forgiveness are very different, the cognitive processes that lead to these behaviors may share some similarities. This possibility should be investigated in greater detail.

Multiple regression analyses demonstrated that rumination-intrusion was the lone significant predictor of RT for all four of the word categories. From one perspective, intrusive thoughts can be seen as a mechanism that may lead to a generalized form of cognitive interference that was detected using the emotional Stroop task (Chajut, Lev, & Algom, 2005). Since the association with rumination-intrusion did not vary significantly across the four word categories, this interpretation appears plausible. The role of intrusive thoughts should be more carefully considered in future RT research investigations of revenge and forgiveness, as well as with research utilizing a modified version of the Stroop task.

Limitations

There are a number of limitations that need to be considered. Among these are concerns about the internal consistency reliability of the I.7 Impulsivity measure. In each sample and order, the *KR*-20 values associated with this measure were somewhat low, ranging from .54 to .60.

In addition to measurement limitations, Study 1 respondents were a predominantly young sample of college students, the greatest proportion of who were female (59.7%). Past research has suggested that gender may play a significant role in

revenge, with men more typically endorsing revenge attitudes and engaging in revenge behavior (Hutt et al., 1997). In addition, while the observed findings associated with Study 1 are promising, their generalizability to other populations has not been established.

It is also important to note that the interpretation of the results is limited by the correlational nature of the data. As such, causal interpretations of the results cannot be derived from the methods used in Study 1.   Although it is possible that rumination and impulsivity could be causal mechanisms explaining revenge, forgiveness and avoidance, causality flowing in the opposite direction cannot be ruled out. Thus, while the results show important initial associations, experimental studies will be needed to establish any causal relationships among these variables.

Finally, another concern is the failure to find relationships with the just world beliefs measures (DJW and PJW).   The only exception was a significant positive correlation between PJW and TTF. The lack of significant associations among DJW, PJW and other measures could be attributable to the order in which the various measures were presented to the participants. In previously published research (Lucas, et al., 2007, Lucas, et al., 2008) DJW and PJW were first in the sequence of measures. In Study 1, DJW and PJW appeared after the revenge measures. In the first part of Study 2, participants completed the DJW and PJW measures first.   When these measures were presented first, the significant association between PJW and TTF emerged.

Perhaps more important is the lack of specificity of the justice measures used in this research. For example, BJW measures used in the present research emphasized

generalized just world beliefs about others. Since the revenge and forgiveness scales used dealt only with the self, specific just world measures dealing with the self might be more predictive of revenge and forgiveness. We used the original PJW-DJW measure first reported in 2007 in Lucas et al. That measure asked about justice received by *other* people. However, the other measures we gave to our participants asked about revenge, forgiveness, etc. in oneself. Very recent research (Lucas, et al., 2010) shows that people can have different just world beliefs about themselves than for others, and this is true for both DJW and PJW. Lucas, et al. (2010) show that these different just world beliefs for the self vs. others relate differently to social attitudes and to feelings of personal well-being. Thus, using the new "self" just world measures may be more appropriate for future research on revenge and forgiveness.

The findings presented here extend thinking on revenge and forgiveness. Hopefully they have illustrated some of the difficulties in studying these concepts as well as providing additional avenues of inquiry. While it may be difficult to disentangle the variables and processes involved with the psychology of revenge and forgiveness, it is important that we embrace the challenge.

Appendix A: Vengeance Scale

Listed below are a number of statements that describe attitudes that different people have. There are no right or wrong answers, only opinions. Read each item and decide whether you agree or disagree and to what extent. If you strongly agree circle 7; if you strongly disagree circle 1; if you feel somewhere in between circle any one of the numbers between 1 and 7. If you feel neutral or undecided, the midpoint is 4.

    (1) Disagree strongly
    (2) Disagree
    (3) Disagree slightly
    (4) Neither disagree nor agree
    (5) Agree slightly
    (6) Agree
    (7) Agree strongly

disagree   agree

1	2	3	4	5	6	7	It's not worth my time or effort to pay back someone who has wronged me.
1	2	3	4	5	6	7	It is important for me to get back at people who have hurt me.
1	2	3	4	5	6	7	I try to even the score with anyone who hurts me.
1	2	3	4	5	6	7	It is always better not to seek vengeance.
1	2	3	4	5	6	7	I live by the motto "Let bygones be bygones."
1	2	3	4	5	6	7	There is nothing wrong in getting back at someone who has hurt you.
1	2	3	4	5	6	7	I don't just get mad, I get even.
1	2	3	4	5	6	7	I find it easy to forgive those who have hurt me.
1	2	3	4	5	6	7	I am not a vengeful person.
1	2	3	4	5	6	7	I believe in the motto "An eye for an eye and a tooth for a tooth."
1	2	3	4	5	6	7	Revenge is morally wrong.
1	2	3	4	5	6	7	If someone causes me trouble, I'll find a way to make them regret it.

1   2   3   4   5   6   7   If I am wronged, I can't live with myself unless I get revenge.

1   2   3   4   5   6   7   Honor requires that you get back at someone who has hurt you.

1   2   3   4   5   6   7   It is usually better to show mercy than to take revenge.

1   2   3   4   5   6   7   Anyone who provokes me deserves the punishment that I give them.

1   2   3   4   5   6   7   It is always better to "turn the other cheek."

1   2   3   4   5   6   7   To have a desire for vengeance would make me feel ashamed.

1   2   3   4   5   6   7   Revenge is sweet.

Appendix B: Transgression Related Interpersonal Motivations Inventory

For questions on this page, please indicate your current thoughts and feelings about a person who recently hurt you. Use the following scale to indicate your agreement with each of the questions.

1 = Strongly disagree
2 = Disagree
3 = Neutral
4 = Agree
5 = Strongly agree

1. _____ I'll make him/her pay.

2. _____ I wish that something bad would happen to him/her.

3. _____ I want him/her to get what he/she deserves.

4. _____ I'm going to get even.

5. _____ I want to see him/her hurt and miserable.

6. _____ I keep as much distance between us as possible.

7. _____ I live as if he/she doesn't exist, isn't around.

8. _____ I don't trust him/her.

9. _____ I find it difficult to act warmly toward him/her.

10. _____ I avoid him/her.

11. _____ I cut off the relationship with him/her.

12. _____ I withdraw from him/her.

Appendix C: Impact of Event Scale

Listed below are a number of statements that describe thoughts that different people have when somebody has offended them. There are no right or wrong answers, only opinions. Read each item and decide whether you agree or disagree and to what extent. If you strongly agree circle 7; if you strongly disagree circle 1; if you feel somewhere in between circle any one of the numbers between 1 and 7. If you feel neutral or undecided, the midpoint is 4.

    (1) Disagree strongly
    (2) Disagree
    (3) Disagree slightly
    (4) Neither disagree nor agree
    (5) Agree slightly
    (6) Agree
    (7) Agree strongly

disagree						agree		
1	2	3	4	5	6	7		I thought about it when I didn't mean to
1	2	3	4	5	6	7		I avoided letting myself get upset when I thought about it or was reminded of it
1	2	3	4	5	6	7		I tried to remove it from memory
1	2	3	4	5	6	7		I had trouble falling asleep or staying asleep because of pictures or thoughts about it that came into my mind
1	2	3	4	5	6	7		I had waves of strong feelings about it
1	2	3	4	5	6	7		I had dreams about it
1	2	3	4	5	6	7		I stayed away from reminders of it
1	2	3	4	5	6	7		I felt as if it hadn't happened or wasn't real
1	2	3	4	5	6	7		I tried not to talk about it
1	2	3	4	5	6	7		Pictures about it popped into my mind
1	2	3	4	5	6	7		Other things kept making me think about it
1	2	3	4	5	6	7		I was aware that I still had a lot of feelings about it, but I didn't deal with them
1	2	3	4	5	6	7		I tried not to think about it
1	2	3	4	5	6	7		Any reminder brought back feelings about it
1	2	3	4	5	6	7		My feelings about it were kind of numb

Appendix D: I.7 Impulsivity Scale

Instructions: Please answer each question by putting a circle around the "YES" or the "NO" following the questions. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of the question.

Do you often buy things on impulse?	Yes	No
Do you generally do and say things without stopping to think?	Yes	No
Do you often get into a jam because you do things without thinking?	Yes	No
Are you an impulsive person?	Yes	No
Do you usually think carefully before doing anything?	Yes	No
Do you often do things on the spur of the moment?	Yes	No
Do you mostly speak before thinking things out?	Yes	No
Do you often get involved in things you later wish you could get out of?	Yes	No
Do you get so "carried away" by new and exciting ideas that you never think of possible snags?	Yes	No
Do you need to use a lot of self-control to keep out of trouble?	Yes	No
Would you agree that almost everything enjoyable is illegal or immoral?	Yes	No
Are you often surprised at people's reactions to what you do or say?	Yes	No
Do you think an evening out is more successful if it is unplanned or arranged at the last moment?	Yes	No
Do you usually work quickly, without bothering to check?	Yes	No
Do you often change your interests?	Yes	No
Before making up your mind, do you consider all the advantages and disadvantages?	Yes	No
Do you prefer to "sleep on it" before making decisions?	Yes	No
When people shout at you, do you shout back?	Yes	No
Do you usually make up your mind quickly?	Yes	No

Appendix E: Tendency to Forgive Scale

Listed below are a number of statements that describe thoughts that different people have. There are no right or wrong answers, only opinions. Read each item and decide whether you agree or disagree and to what extent. If you strongly agree circle 7; if you strongly disagree circle 1; if you feel somewhere in between circle any one of the numbers between 1 and 7. If you feel neutral or undecided, the midpoint is 4.

- (1) Disagree strongly
- (2) Disagree
- (3) Disagree slightly
- (4) Neither disagree nor agree
- (5) Agree slightly
- (6) Agree
- (7) Agree strongly

disagree						agree		
1	2	3	4	5	6	7		I tend to get over it quickly when someone hurts my feelings
1	2	3	4	5	6	7		If someone wrongs me, I often think about it a lot afterward
1	2	3	4	5	6	7		I have a tendency to harbor grudges
1	2	3	4	5	6	7		When people wrong me, my approach is just to forgive and forget

Appendix F: Attitudes Toward Forgiveness Scale

Listed below are a number of statements that describe thoughts that different people have. There are no right or wrong answers, only opinions. Read each item and decide whether you agree or disagree and to what extent. If you strongly agree circle 7; if you strongly disagree circle 1; if you feel somewhere in between circle any one of the numbers between 1 and 7. If you feel neutral or undecided, the midpoint is 4.

(1) Disagree strongly
(2) Disagree
(3) Disagree slightly
(4) Neither disagree nor agree
(5) Agree slightly
(6) Agree
(7) Agree strongly

disagree						agree		
1	2	3	4	5	6	7		I believe that forgiveness is a moral virtue
1	2	3	4	5	6	7		Justice is more important than mercy
1	2	3	4	5	6	7		It is admirable to be a forgiving person
1	2	3	4	5	6	7		I have no problem at all with people staying mad at those who hurt them
1	2	3	4	5	6	7		Forgiveness is a sign of weakness
1	2	3	4	5	6	7		People should work harder than they do to let go of the wrongs they have suffered

Appendix G: Procedural and Distributive Just World Items

		Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
1.	I feel that people are generally treated according to fair processes.	1	2	3	4	5	6	7
2.	People usually use fair procedures in dealing with others.	1	2	3	4	5	6	7
3.	I feel that people generally use methods that are fair in their evaluations of others.	1	2	3	4	5	6	7
4.	Regardless of the specific outcomes they receive, people are generally subjected to fair procedures	1	2	3	4	5	6	7
5.	People are generally subjected to processes that are fair.	1	2	3	4	5	6	7
6.	I feel that people generally earn the rewards and punishments that they get in this world.	1	2	3	4	5	6	7
7.	People usually receive the outcomes that they deserve.	1	2	3	4	5	6	7
8.	Regardless of the processes used, people usually receive fair outcomes.	1	2	3	4	5	6	7
9.	People generally deserve the things that they are accorded.	1	2	3	4	5	6	7
10.	I feel that people usually receive the outcomes that they are due.	1	2	3	4	5	6	7

Notes. Items 1-5 = Procedural Just World; items 6-10 = Distributive Just World. Additionally, items 1 and 8 were not scored in Studies 1 & 2.

Appendix H: Emotional Stroop Words List

Justice Words

Deserve, Equality, Fairness, Justice

Revenge Words

Retaliate, Retribution, Revenge, Vengeance

Forgiveness Words

Compassion, Forgive, Forgiveness, Mercy

Neutral Words

Carpet, Kitchen, Mirror, Sailboat

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Table 1

Zero-Order Correlations, Means, Standard Deviations and Cronbach's Alphas among Individual Differences Measures used in Study 1, Order 1 (N=107).

		M	*SD*	α	1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Vengeance Scale	64.45	19.73	.91	–								
2.	Impulsivity	8.31	3.12	.60	.48***	–							
3.	Rumination	66.73	12.99	.77	.05	.20*	–						
4.	ATF	31.70	5.24	.67	-.60***	-.37***	-.15	–					
5.	TTF	15.91	5.67	.80	-.57***	-.31***	-.36***	.43***	–				
6.	PJW	13.61	4.82	.87	-.05	.06	.10	.05	.05	–			
7.	DJW	17.04	5.28	.90	-.04	.16⁺	.05	.13	.03	.37***	–		
8.	Revenge (TRIM)	12.33	4.83	.88	.78***	.49***	.17⁺	-.52***	-.50***	.03	.14	–	
9.	Avoidance (TRIM)	24.27	6.93	.90	.20*	.08	.23*	-.33***	-.25**	.13	-.02	.30***	–

Notes. ⁺*p* < .10. *p < .05. **p < .01. *** *p* < .001.

Table 2

Zero-Order Correlations, Means, Standard Deviations and Cronbach's Alphas among Individual Differences Measures used in Study 1, Order 2 (N=93).

		M	SD	α	1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Vengeance Scale	69.10	22.55	.93	–								
2.	Impulsivity	9.06	3.13	.55	.40***	–							
3.	Rumination	64.87	14.22	.85	.16	.18$^+$	–						
4.	ATF	28.90	5.83	.69	-.68***	-.36***	-.14	–					
5.	TTF	15.30	5.73	.76	-.53***	-.26**	-.26**	.34***	–				
6.	PJW	14.45	5.28	.89	.06	-.29***	-.03	-.02	-.01	–			
7.	DJW	15.77	5.44	.85	.09	-.08	.02	.01	-.01	.53***	–		
8.	Revenge (TRIM)	13.59	5.24	.85	.55***	.20$^+$	.28**	-.37***	-.35***	.11	.15	–	
9.	Avoidance (TRIM)	26.57	6.03	.87	.14	.15	.30**	-.12	-.03	-.14	-.06	.28**	–

Notes. $^+$*p* < .10. **p* < .05. ***p* < .01. **** p* < .001.

Table 3

Zero-Order Correlations, Means, Standard Deviations and Cronbach's Alphas among Individual Differences Measures used in Study 1, Orders 1 & 2 (N=200).

		M	SD	α	1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Vengeance Scale	66.61	21.16	.92	–								
2.	Impulsivity	8.66	3.14	.58	.44***	–							
3.	Rumination	65.87	13.57	.81	.10	.18*	–						
4.	ATF	30.40	5.68	.70	-.65***	-.38***	-.12$^+$	–					
5.	TTF	15.63	5.69	.78	-.55***	-.29***	-.31***	.39***	–				
6.	PJW	14.00	5.05	.88	.02	-.10	.03	-.01	.02	–			
7.	DJW	16.45	5.38	.88	.02	.03	.04	.09	.01	.43***	–		
8.	Revenge (TRIM)	12.92	5.05	.87	.67***	.36***	.22**	-.44***	-.44***	.08	.13	–	
9.	Avoidance (TRIM)	25.34	6.61	.89	.19**	.13$^+$	.25***	-.27***	-.16*	.02	-.06	.31***	–

Notes. $^+$*p* < .10. **p* < .05. ***p* < .01. **** p* < .001.

Table 4

Zero-Order Correlations, Means, Standard Deviations and Cronbach's Alphas among Individual Differences Measures used in Study 2 (N=145).

		M	SD	α	1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Vengeance Scale	62.13	20.28	.92	–								
2.	Impulsivity	7.93	3.21	.60	.17*	–							
3.	Rumination	67.15	12.45	.79	.05	.28***	–						
4.	ATF	31.32	5.35	.68	-.66***	-.05	.04	–					
5.	TTF	15.82	4.70	.65	-.45***	-.08	-.26***	.39***	–				
6.	PJW	20.40	6.13	.89	-.11	-.04	-.12	.04	.19*	–			
7.	DJW	20.46	5.96	.89	.01	.07	-.05	-.07	.11	.58***	–		
8.	Revenge (TRIM)	11.25	4.72	.87	.67***	.27***	.29***	-.48***	-.39***	-.11	.04	–	
9.	Avoidance (TRIM)	24.97	6.34	.89	.23**	.22**	.39***	-.20*	-.36***	-.11	.02	.38***	–

Notes. ^+p < .10. *p < .05. **p < .01. *** p < .001.

Table 5

Zero-Order Correlations, Means, Standard Deviations and Cronbach's Alphas among Individual Differences Measures used in Studies 1 & 2 (N=345).

		M	SD	α	1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Vengeance Scale	64.73	20.28	.92	–								
2.	Impulsivity	8.35	3.19	.59	.34***	–							
3.	Rumination	66.41	13.11	.80	.07	.20***	–						
4.	ATF	30.79	5.56	.69	-.66***	-.25***	-.06	–					
5.	TTF	15.71	5.29	.74	-.51***	-.21***	-.29***	.39***	–				
6.	PJW	18.77	6.29	.89	-.06	-.10⁺	-.01	.02	.08	–			
7.	DJW	20.25	6.16	.88	.02	.05	.01	.02	.05	.51***	–		
8.	Revenge (TRIM)	12.21	4.98	.87	.67***	.33***	.23***	-.46***	-.42***	-.03	.09	–	
9.	Avoidance (TRIM)	18.77	6.49	.89	.21***	.17**	.30***	-.24***	-.23***	-.04	-.04	.34***	–

Notes. $^{+}p < .10.$ $^{*}p < .05.$ $^{**}p < .01.$ $^{***}p < .001.$

Table 6

Impulsivity and Rumination Predicting Vengeance, Revenge, Forgiveness and Avoidance. (N = 345).

Model	χ^2	*df*	NNFI	CFI	RMSEA	SRMR
1. All Paths	0.00	0	1.00	1.00	0.00	0.00
2. Remove Impulsivity to Vengeance	46.57	1	.48	.90	.36	.10
3. Remove Rumination to Vengeance	1.34	1	.99	.99	.03	.02
4. TTF, TRIM-R and TRIM-A with Impulsivity Direct Effect Removed	4.56	4	.99	.99	.02	.02
5. TTF, TRIM-R,TRIM-A and Vengeance with Rumination Direct Effect Removed	71.73	7	.68	.85	.16	.11

Notes. NNFI = Non-Normed Fit Index; CFI = Comparative Fit Index; SRMR = Standard Root-Mean Square Residual; RMSEA = Root Mean Square Error of Approximation.

Table 7

Standardized Total, Direct and Indirect Effects of Impulsivity and Rumination (N = 345).

	Impulsivity	Rumination
Vengeance		
Total	.43***	--
Direct	.43***	--
Indirect	--	--
TRIM-R		
Total	.37***	.28***
Direct	--	.28***
Indirect	.37***	--
TTF		
Total	-.24***	-.37***
Direct	--	-.37***
Indirect	-.24***	--
TRIM-A		
Total	.07***	.31***
Direct	--	.31***
Indirect	.07***	--

Note. ***p < .001.

Table 8

Summary of Multiple Regression Analyses for Individual Differences Measures Predicting Reaction Time Scores on Emotional Stroop Task (N = 89).

| Variable	Revenge Words			Forgiveness Words			Justice Words			Neutral Words		
	B	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*B*
Vengeance Scale	1.67	.70	.38*	1.62	.69	.37*	1.40	.73	.30+	.96	.68	.22
TRIM-Revenge	-1.95	2.44	-.11	-1.92	2.40	-.11	-2.17	2.55	-.11	-.56	2.37	-.03
ATF	3.68	2.38	.23	2.76	2.34	.18	1.92	2.49	.11	2.83	2.32	.18
TTF	.51	2.31	.03	.78	2.28	.04	.07	2.42	.01	1.86	2.25	.11
Impulsivity	-1.48	2.98	.03	1.32	2.94	.05	3.25	3.12	.12	.33	2.90	.01
Intrusion	3.09	1.24	.29*	2.59	1.22	.25*	2.97	1.30	.27*	3.26	1.21	.32**
R^2		.13			.13			.14			.12	
Adjusted R^2		.07			.06			.08			.06	
F		2.07+			1.97+			2.27*			1.89+	

Note. +p < .10. *p < .05. **p < .01.

Table 9

Means and Standard Deviations of Predictors Used in Multiple Regression Analyses of Study 2 Data (*N* = 89).

Measure	*M*	*SD*
Vengeance Scale	59.76	18.18
I.7 Impulsivity	7.36	3.05
Rumination-Intrusion	30.87	7.67
Attitudes Toward Forgiveness	31.24	5.07
Tendency to Forgive	15.80	4.46
TRIM-Revenge	10.62	4.45

Figure 1

***p < .001
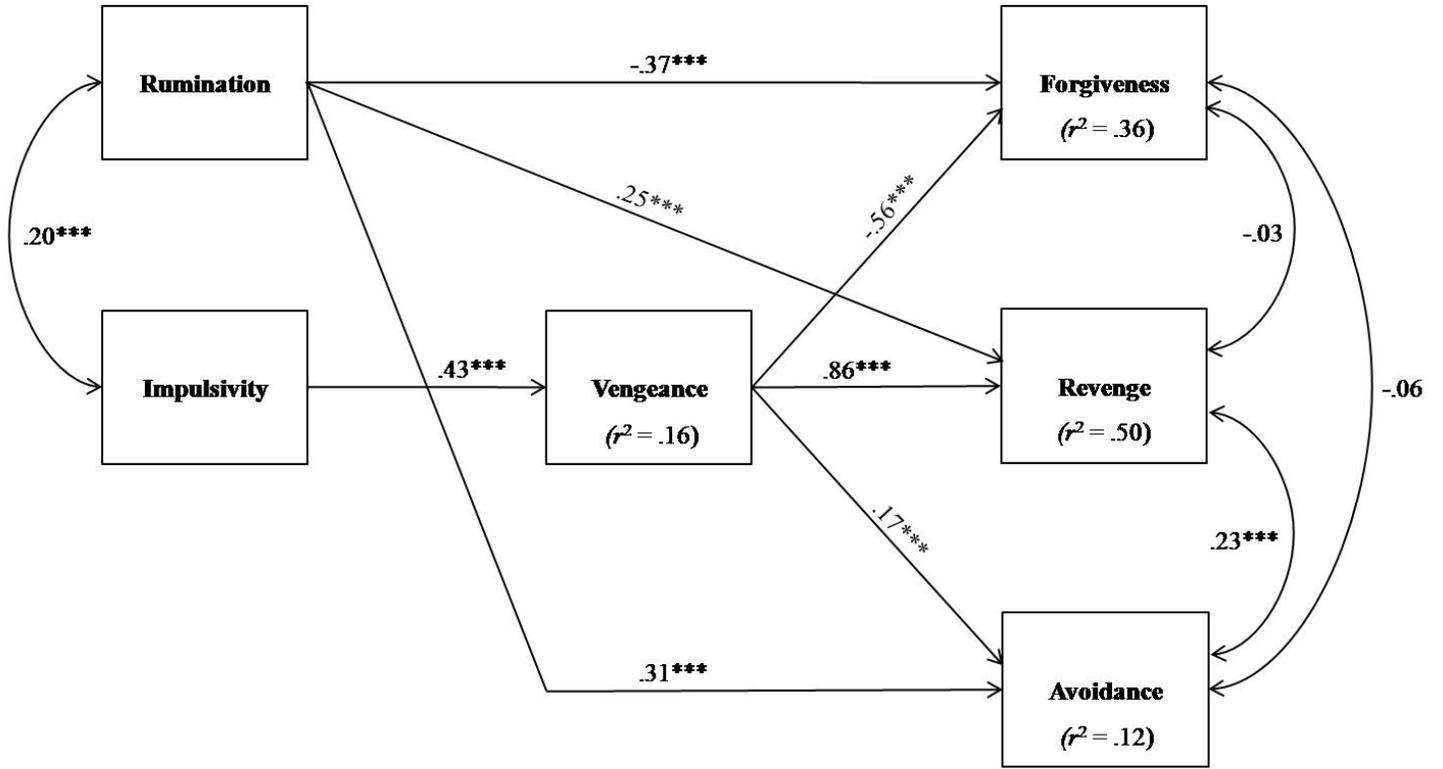
Impulsivity Indirect Effects: Forgiveness = -.24***   Revenge = .37***   Avoidance = .07***

ABSTRACT

PSYCHOMETRIC AND EXPERIMENTAL INVESTIGATION OF IMPULSIVITY, RUMINATION, REVENGE, AND FORGIVENESS

by

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Advisor: Dr. Sheldon Alexander

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Degree: Doctor of Philosophy

Revenge and forgiveness are commonplace aspects of social interaction. Past research has emphasized that rumination is an important cognitive correlate of both revenge and forgiveness.   In the present research, we examined whether revenge attitudes and motivations, as well as forgiveness attitudes and tendencies might also be predicted by impulsivity.   Two studies were conducted to investigate these possibilities. In Study 1 participants (N = 200) completed individual differences measures of impulsivity, rumination, procedural and distributive just world beliefs, and measures of revenge, forgiveness and avoidance.   Structural equation modeling revealed that rumination predicted forgiveness tendencies, revenge motivations and avoidance. Additionally, revenge attitudes were found to mediate the relationship between impulsivity and forgiveness tendencies, revenge motivations and avoidance.   Study 2 was an exploratory attempt to determine whether the self-report individual differences measures used in Study 1 would predict participants' reaction times on a modified Stroop task. Specifically, participants (N = 145) completed the same self-report measures used in Study 1. After completing the self-report measures, 100 participants

completed a modified Stroop task where they were asked to name the color of 16 unique words from four categories: revenge, forgiveness, justice and neutral. Multiple regression analyses indicated that revenge attitudes predicted slower color naming reaction times to the revenge and forgiveness word categories. Additionally, rumination-intrusion predicted slower color naming reaction times across all word categories. The combined findings indicate that cognitive and affective variables such as rumination and impulsivity are important to consider in future investigations of revenge and forgiveness. Limitations, as well as directions for future research also are discussed.

AUTOBIOGRAPHICAL STATEMENT

JASON D. YOUNG

Jason David Young was raised in Wyandotte, Michigan and attended Gabriel Richard High School in Riverview, Michigan. As a student athlete at Gabriel Richard, he co-captioned the men's ice hockey team to the state championship and was awarded many honors for his individual play. Upon graduation from Gabriel Richard, he enrolled at the University of Michigan-Dearborn where he earned his B.A. in Psychology with distinction in 1997.

Mr. Young currently is interested in studying the social history of the United States and is interested in teaching and writing about historical and philosophical aspects related to the development of social psychology. Jason's current research focuses on issues of social justice and perceived fairness. In the future, he intends to conduct a number of studies on the psychological antecedents and consequences of revenge within the context interpersonal relationships. Besides his scholarly activities, he enjoys spending quality time with the love of his life, Michelle, and learning as much as he can about dogs.