The Development of a New Self-Report Behavioural Measure of Forgiveness and Revenge

The University of Adelaide

This thesis is submitted in partial fulfilment of the Honours degree of Bachelor of Psychology (Advanced) (Honours).

Word Count: 9,485

Table of Contents

List of Figures 5

List of Tables 6

Abstract 7

Declaration 8

Contribution Statement 9

Introduction 10

Defining Forgiveness 10

What is Forgiveness? 10

Types of Forgiveness 12

Approaches to Measurement 12

Self-Report 13

Behavioural 14

Construct Validity of the New Measure 15

Forgiveness and Revenge 16

Forgiveness vs Reconciliation 17

Predictors of Forgiveness 18

Current Study Rationale 19

Previous Research 19

Study Aims 20

Hypotheses 21

Method 22

Participants..22

Procedure 23

Materials 24

Behavioural Forgiveness and Revenge 24

Decisional Forgiveness 24

Emotional Forgiveness..24

Willingness to Reconcile 25

State Empathy 25

State Rumination...25

Trait Forgiveness 26

Trait Revenge...26

Social Desirability..26

Results...27

Overview of Transgressions 27

Factor Structure of the New Behavioural Forgiveness and Revenge Measure 27

Construct Validity of the New Behavioural Forgiveness and Revenge Measure................31

New Behavioural Forgiveness Measure 33

New Behavioural Revenge Measure...33

Predictive Validity of the New Behavioural Forgiveness and Revenge Measure 34

New Behavioural Forgiveness Measure 34

New Behavioural Revenge Measure...36

Test-Retest Reliability of the New Behavioural Forgiveness and Revenge Measure 37

Discussion...38

Summary and Interpretation 38

Factor structure of the new measure 38

Forgiveness behaviours..38

Revenge behaviours 40

Test-retest reliability of the new measure 41

Strengths and Limitations 42

Strengths 42

Limitations 43

Implications of the Current Study..44

Theoretical Implications 44

Applied Implications...45

Future Research 45

Conclusion 46

References..48

Appendices...62

Appendix 1: Preregistration Document 62

Appendix 2: Table 5...67

Appendix 3: Table 6...68

List of Figures

Figure 1: The Two-Factor Model for the New Behavioural Forgiveness Measure…………26

List of Tables

Table 1: Summary of Factor Loadings for the New Behavioural Forgiveness Measure……………………………………………………………………………………...…25

Table 2: Pearson's Bivariate Correlations between the new Behavioural Forgiveness and Revenge Measure, Existing Forgiveness Measures, Transgression-Specific, and Trait-Level Variables………………………………………………………………………………...…31

Table 3: Multiple Linear Regression predicting Forgiveness Behaviours…………...………34

Table 4: Multiple Linear Regression predicting Revenge Behaviours……………….,,……..35

Abstract

Although human beings are driven by an inherent desire for connection, we, quite counterintuitively, often act in selfish ways that actively harm our relationships with each other. Thus, our ability to forgive and be forgiven is central to the successful functioning of our relationships (Rowe et al., 1989). Despite forgiveness attracting research attention for upwards of 30 years, there is currently no psychometrically sound self-report measure of forgiveness and revenge behaviours. Thus, the aim of this study is to validate a new behavioural measure of forgiveness and revenge. Participants (*N* = 371) were asked to recall a time in the last 30 days when they were hurt by their partner, and indicated whether they had performed a number of forgiving or vengeful behaviours towards them since the offence occurred. Various existing forgiveness measures, transgression-specific variables and trait-level variables were also collected. Participants were then asked a second time about their behaviours towards their partners 20 days after the initial survey. Through confirmatory factor analysis, the new behavioural measure was found to fit a two-factor structure, indicating forgiveness and revenge. The new measure demonstrated good construct validity, internal consistency and test-retest reliability. Analysis also indicates a positive relationship between forgiveness and revenge behaviours, suggesting that individuals can act in both a forgiving and vengeful manner following a transgression. This new measure of forgiveness and revenge behaviours is hoped to expand the nomological network of forgiveness, and provide a means of measuring performed behaviours in real-world transgressions.

Word Count: 245

Declaration

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, this thesis contains no material previously published except where due reference is made. I give permission for the digital version of this thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

September 2022

Contribution Statement

In writing my thesis, my supervisors created the initial pool of items for the behavioural measure. My supervisors and I collaborated to generate specific constructs of interest and to design the appropriate methodology. I conducted the literature search, completed the ethics application and preregistered the project. I selected the survey questions, created the survey through Qualtrics, and uploaded it to Prolific, funded through Strelan Consultancy Fund. My supervisors and I collaborated to code analyses in R Studio. I wrote up all aspects of the thesis.

The Development of a New Self-Report Behavioural Measure of Forgiveness and Revenge

Human beings are, at our core, social creatures. We depend on one another for our survival and well-being, both physically and psychologically. However, although we are captivated by an inherent desire for connection, we, quite counterintuitively, can act in selfish ways that actively harm our relationships with each other. Thus, our ability to forgive and be forgiven is central to the successful functioning of our relationships (Rowe et al., 1989). As such, forgiveness has gained research attention from various fields, including psychology. Forgiveness research in psychology focuses largely on how to define forgiveness, factors that promote or hinder forgiveness, the measurement of forgiveness, and practical applications of forgiveness interventions (McCullough et al., 2000). Existing self-report measures assess motivations, emotions, behavioural intentions, and decisions (see Fernández Capo et al., 2017, for review). However, despite this rich research base, one significant discrepancy remains; there is currently no psychometrically sound self-report measure of forgiveness behaviours.

Consequently, in this study, I aim to develop and validate such a measure to expand the nomological network of forgiveness and eliminate current barriers to research. Initially, I will establish working definitions of forgiveness and revenge in the context of behaviour, before outlining the applied methodology and the current methodological limitations of both self-report and behavioural measures. Finally, I will turn to established correlates of forgiveness and revenge to demonstrate the construct validity of the new measure.

Defining Forgiveness

What is Forgiveness?

As forgiveness is such a profoundly personal construct, academics have yet to reach a consensus on what forgiving means. However, within psychological literature, there is general agreement on several basic assumptions. Specifically, forgiveness is described as a response to a wrong-doing by another and where the forgiveness of another involves a voluntary decision (Kaminer et al., 2000). Thus, most definitions posit that forgiveness is not merely the lessening of hurt feelings by virtue of time, instead, it is an active choice an individual has to make. Beyond these basic assumptions, there is conceptual ambiguity surrounding what it means to forgive.

Most definitions agree that forgiveness involves the reduction of negative responses to an offence and the transgressor (Gassin & Enright, 1995). Others argue that forgiveness consists of a change in one's emotions (Worthington, 2006), motivations (McCullough, 2001), behavioural intentions (Exline et al., 2003), physiological reactivity (Lawler-Row et al., 2008), and behaviours (Russell, 2020), from a negative state to a positive one. Moreover, McCullough (2001) posits forgiveness as numerous intrapersonal, prosocial motivational changes that occur after being transgressed against, such that, when forgiving, an individual becomes decreasingly motivated by ill-will and desires of avoidance and increasingly motivated by goodwill; a willingness to reconcile.

Worthington (2005) discusses the varying processes of forgiveness based on the relationship between victim and offender, such that when a stranger offends against us, we are primarily focused on the reduction of negative emotions, cognitions, and motivations, and this is the stage at which forgiveness is considered complete. However, when someone we value transgresses against us, it is not until negative feelings are replaced with positive ones, and the relationship is restored, that forgiveness is considered complete. Further, in forgiving someone whose relationship we value, we are not only motivated by a desire to rid ourselves of negative emotions but also to extend an attitude of goodwill towards the transgressor (Holmgren, 1993).

Various measures of forgiveness are based upon different definitions and dimensions and, as such, are operationalised differently. For example, the Transgression-Related Inventory of Interpersonal Motivations-18 (TRIM-18) adheres to the definition of forgiveness as a motivational change. Consequently, it measures forgiveness based on motivations for avoidance, revenge, and benevolence (McCullough et al., 1998). The Decision to Forgive Scale (DTFS) posits forgiveness as the reduction of negative cognition, emotions, and motivations towards an offender, often leading to positive behavioural changes. It highlights making the decision to forgive an offender as a seminal step in the process (Davis et al., 2015). In the current study, I propose a tentative, constitutive definition of forgiveness whereby it involves both the reduction of relationship-destructive behaviours (e.g., insulting the transgressor), and the increase of relationship-constructive behaviours (e.g., continued communication with the transgressor). This operationalisation of forgiveness forms the basis of the new behavioural measure.

Types of Forgiveness

Forgiveness researchers also distinguish between various subtypes of forgiveness, with different measures conceptualising forgiveness differently. Methods that assess dispositional forgiveness measure one’s likelihood to forgive across multiple transgressions and conceptualise forgiveness as a stable personality trait (Thompson et al., 2005). Conversely, episodic forgiveness, which is the focus of this thesis, assesses one’s response to a particular incident, and dyadic forgiveness relates to forgiveness in the context of offences in a specific relationship (Fernández-Capo et al., 2017).

Approaches to Measurement

Boateng et al. (2018) outline three phases and nine steps relevant to the development and validation of scales in health, social, and behavioural research. The current study will focus on phase three, scale evaluation. However, previous studies on the new behavioural forgiveness and revenge measure have explored phases one (item development) and two (scale development), specifically through establishing the definition of forgiveness (as discussed previously), development of the initial item pool, expert review, and extraction of factors. Here, I address current approaches to measurement to outline the real-world need for the self-report behavioural scale I aim to validate.

Self-Report

The means of measuring forgiveness also varies depending on how forgiveness is operationalised. An overwhelming majority of scales are self-report; aimed at gauging a participant's subjective experience of their own emotional, cognitive, and motivational states concerning a particular transgression (Fernández-Capo et al., 2017). The TRIM-18 and the DTFS both adhere to this self-report format, as do many other established forgiveness questionnaires (Davis et al., 2015; McCullough et al., 1998).

The main advantage of a self-report measure is its relative ease of data collection. Further, self-report measures give participants the opportunity for introspection and, thus, give researchers a great deal of insight into the intrapersonal motivational, emotional, and cognitive changes that precede forgiveness (Worthington et al., 2015). However, self-report measures are not without their disadvantages. Self-report measures are sensitive to response biases, in particular, socially desirable responding, as forgiveness is seen as pro-social and, therefore, desirable. Self-report measures also fall victim to acquiescence bias, which relates to the tendency of participants to agree with research questions, irrespective of their content. Both of these biases are confounded by the hurt felt by a participant (Kreitchmann et al., 2019; Lawler-Row et al., 2007). Further, participants may be influenced by recall bias, making them more likely to remember very hurtful transgressions (Coughlin, 1990). Introspective self-report designs are also limited by their inability to report on subconscious responses since a level of self-reflection, and cognitive involvement are required for their successful completion (Greenwald & Banaji, 1995). Finally, measurement of forgiveness intentions or motivations do not necessarily map directly onto one's concrete behaviours, such that one may report motivations for forgiveness or revenge, but not act accordingly. Thus, self-report measures suffer due to participants' lack of objectivity and are therefore unable to fully capture all facets of forgiveness. While these limitations are acknowledged, self-report measures of forgiveness offer an efficient way to collect robust data and, as such are used in this study.

Behavioural

To address these methodological issues in forgiveness research, Dorn et al. (2014) proposed strategies aimed at assessing forgiveness-related behaviours. In one, they adapted the cyber ball paradigm, an online ball-tossing game, whereby participants are excluded from play by standardised computers, which the participants believe to be other players (Scheithauer et al., 2013). In their adaptation, a second round was included. The participant started with the ball and was told that one player from the previous game was returning and another was being replaced. This effectively allowed participants to retaliate against or forgive the players who seemingly excluded them by either including them or excluding them in the new round.

Similarly, applications of the prisoner's dilemma[1], whereby participants are given the opportunity to act selfishly to another player's detriment or co-operatively for less favourable personal outcomes, played in succession, allows researchers to assess behavioural forgiveness (Exline et al., 2004). An offence occurs when one participant acts selfishly while the other acts cooperatively, 'winning' the game for the offending party (O' Riordan, 2000). Thus, a forgiving strategy involves choosing the cooperative option after being offended

---

[1] The classic prisoner's dilemma involves the story of two prisoners who have been arrested and are being interrogated separately. Participants are given the opportunity to confess, or not to confess, and their 'sentence' depends on the combination of their choice and the second participant's choice.

against. Other more general activities, including group resource allocation and listing of positive attributes of offenders, have also been used as behavioural measures of forgiveness (Carlisle et al., 2012; Dorn et al., 2014; Exline et al., 2004).

Traditional behavioural measures of forgiveness allow for greater objectivity in measurement, assessing one's behaviour in real-time as opposed to a skewed recollection clouded by biases. Someone may report they do not feel vengeful, or are not motivated by revenge, potentially due to socially desirable responding or recall bias; however, these behaviours may be seen in the lab. Introducing a behavioural component in forgiveness research minimises bias and adds a new, robust dimension. Despite this, traditional behavioural measures do come with their disadvantages. Primarily, lab-based measures favour standardisation over realism, meaning they are likely to be significantly less severe than transgressions experienced outside the lab (Carlisle et al., 2012). As such, the level of hurt experienced will not be the same as when a similar transgression occurs in real life. Further, responses in lab settings are open to interpretation at the researcher's discretion, such that a cooperative response in the prisoner's dilemma is not necessarily indicative of forgiveness and could instead be a desire to win the game, which can be extended to other behavioural paradigms.

Construct Validity of the New Measure

The first step of scale evaluation outlined by Boateng et al. (2018) involves tests of dimensionality, i.e., testing if latent constructs are as hypothesised, through exploratory and confirmatory factor analysis. Dimensionality in the case of the present study relates specifically to the forgiveness-revenge factor structure.

The second and third steps of scale evaluation focus on expanding the nomological network of the measure through tests of reliability and validity. In the present study, I aim to demonstrate construct validity through predictive, convergent, and discriminant validity with related constructs. Here, I discuss constructs related to the dimensionality and validity of the new behavioural measure, specifically concerning revenge and reconciliation.

Forgiveness and Revenge

In adhering to McCullough's (2001) definition, whereby forgiveness is seen as a motivational change from negative to positive, the opposite of forgiveness can be seen as revenge. Revenge has been described as "the most potent of human passions" (Frijda, 1994, p. 263), a basic animal fighting instinct (Haen & Weber, 2009), and a "kind of wild justice" (Bacon, 1902, p. 19). Stuckless and Goranson (1992) define revenge as the infliction of harm in return for a perceived wrong. Further, the TRIM-18 measures motivation for revenge as antithetical to forgiveness, such that forgiving motivations are relationship-constructive, and high motivation to seek revenge is seen as relationship-destructive (McCullough et al., 1998). Although theoretically similar to punishment, revenge differs in motivations, whereby the goal of seeking revenge is to see a transgressor suffer, and punishment is to change a transgressor's future behaviours (Schumann & Ross, 2010).

One psychological perspective of revenge centres on vengeance as a motivational factor in interpersonal aggression; one acts vengefully to achieve a sense of relief following being transgressed against (Grobbink et al., 2015). However, this perspective may be too simplistic. Boon and Yoshimura (2020) emphasise the value of assessing revenge in terms of appropriateness and effectiveness, as opposed to the perceived moral worth of an act (i.e., is revenge bad or good). The appropriateness of an act of revenge relates to the extent to which an act is fitting to the context, and the effectiveness of revenge relates to the extent to which the act achieves relatively desirable or preferred outcomes (Spitzberg et al., 1994). However, it can be seen that the appropriateness and effectiveness of an act of revenge are relative to the individual evaluating the act. In line with Shnabel and Nadler's (2010) needs-based model of reconciliation, when perceiving oneself as a victim, an individual may conclude that an act was appropriate and effective as it satisfies a desire to restore power. However, this same act will not be considered appropriate and effective by the original offender, as it does not address their own desires for moral acceptance. Furthermore, contrary to conventional wisdom regarding the benefits (i.e., “sweetness”) of revenge, revenge often has unpredictable results, including positive outcomes such as satisfaction or relief (Funk et al., 2014), and adverse outcomes such as regret or shame (Carlsmith & Darley, 2008).

One important factor influencing the appropriateness and effectiveness of revenge for the avenger (i.e., the victim of the initial transgression) is the transgressor’s intent to cause harm. Strelan et al. (2020) found that revenge was empowering when the intention of the transgressor to cause harm was high, and forgiveness was empowering regardless of the intent of the transgressor. However, according to McCullough et al. (2003), forgiveness and revenge are not mutually exclusive concepts, and people can, at times be forgiving, and at others, vengeful, despite lay perspectives. Meaning that, following a transgression, one can seek relief from negative emotions through either vengeful or forgiving means, or both, with varying efficacy.

Forgiveness vs Reconciliation

Generally speaking, psychologists view reconciliation and forgiveness as separate constructs; however, this view does not prevail in the general population (Frise & McMinn, 2010). Reconciliation is theoretically quite similar to forgiveness, and a definition of one may impact the other. In its oldest, most theological sense, reconciliation relates to the end of atonement; a reunion with God (Volf, 1999). Thus, a secular view of reconciliation is a reunion following a conflict, restoration of a relationship to its initial state, or a return to “equilibrium” (Meierhenrich, 2008, p. 199).

Psychologists largely agree that forgiveness and reconciliation are two separate concepts; forgiveness is unilateral and an intrapersonal change, while reconciliation involves both parties and is a relational process (Waal & Pokorny, 2005). Separating forgiveness and reconciliation allows individuals to forgive deceased offenders and forgive someone without restoring a relationship with the offender (Bell, 2019). However, not everyone agrees that forgiveness and reconciliation can occur independently. Frise and McMinn (2010) conceptualise forgiveness as a part of a larger continuum, whereby intrapersonal, subjective forgiveness is at one end; and relational forgiveness, or reconciliation, is at the other. In the context of the current study, it is pertinent to differentiate between reconciliation and behavioural forgiveness to determine whether the new measure is truly different from existing measures assessing reconciliation.

Predictors of Forgiveness

Here, I discuss constructs related to the predictive validity of the new behavioural forgiveness and revenge measure. Specifically, state empathy and state rumination.

Empathy. Empathy is a complex capacity that enables one to share in or deeply understand another's cognitive or affective state (Ioannidou & Konstantikaki, 2008). Broadly, empathy is characterised as the ability to "put yourself in somebody else's shoes"; to feel their pain (Ratka, 2018, p. 1140). Several correlational studies have found strong relationships between the extent to which someone forgives their transgressor and the degree of empathy they feel for them (Aragon, 2016; Macaskill et al., 2002; McCullough et al., 1997; Worthington et al., 2000). Further, others assert that developing empathy for an offender is a necessary step toward forgiving, such that once one's empathic response for the transgressor outweighs vengeful or avoidance-based motivations, forgiveness can begin (McCullough et al., 1997). Thus, all standard, high-quality measures of forgiveness correlate highly with established measures of empathy, including the TRIM-18 and the DTFS (Davis et al., 2015; McCullough et al., 1998).

Rumination. Conversely, research suggests that reducing rumination facilitates the decision to forgive (de la Fuente-Anuncibay et al., 2021). Rumination is an enduring cognitive bias that focuses on negative content, resulting in emotional distress (Sansone & Sansone, 2012). In the context of forgiveness, rumination mainly relates to the rehearsal of memories of the transgression and frequent considerations of its implications. This constant rehearsal acts to re-elicit negative affect (McCullough et al., 2007). Conventional wisdom accepts that excessive rumination on a transgression works to prevent forgiveness, and empirical evidence supports this, with established forgiveness measures frequently being negatively correlated with rumination (McCullough et al., 2007; Ysseldyk et al., 2007).

Current Study Rationale

Although behavioural and self-report measures of forgiveness exist separately, there is currently no measure that assesses forgiving behaviours using a self-report format (Fernández-Capo et al., 2017). The self-report aspect of such a measure would allow participants to consider real-world transgressions. Further, participants may be able to answer more objectively when discussing actual behaviours as opposed to emotions, cognitions, or motivations. Therefore, the current study endeavours to build on previous research to refine and validate a self-report measure of behavioural forgiveness. This new behavioural measure aims to remove existing barriers to behavioural research in forgiveness sciences, such that scholars can conduct research surrounding behavioural forgiveness, form theories, and, importantly, improve existing interventions targeting forgiveness.

Previous Research

The items for the new behavioural measure were developed in several unpublished preliminary studies (see Bradley et al., 2019). In the first, an initial list of 31 items was generated, indicative of either forgiveness or revenge. Exploratory factor analysis (EFA) was employed on a sample (N = 307), which found two distinct overarching factors: forgiveness and revenge. From this initial study, one item was removed due to poor factor loading, eleven items were considered too similar to other items, and five were removed due to redundancy. Thus, eight total items were removed from the measure. Twenty-three items were left behind; 13 items loading on factor ‘forgiveness’ and ten on factor ‘revenge’.

Subsequently, in a previous honour’s thesis, the 23 items were subjected to confirmatory factor analysis, with a sample of (N = 121), as well as correlational analyses to establish construct validity (Bradley et al., 2019). In this study, items were tested against the TRIM-18 (Davis et al., 2015), the Rye Forgiveness Scale (Rye et al., 2001), the Emotional Forgiveness Scale (Worthington et al., 2013), and the Decisional Forgiveness Scale (Davis et al., 2015). Bradley et al. (2019) also assessed correlations between the measure and transgression-specific variables, such as relationship closeness, perceived remorse, and state anger, as well as various trait-level variables, such as agreeableness and neuroticism. Further, this study replicated the two-factor structure from the preliminary testing and found a correlation between forgiveness and revenge behaviours, indicating that people may act in both a forgiving and vengeful manner when transgressed against, and this relationship is mediated by remorse.

After this preliminary validation, in preparation for the current study, the 23 items were distributed to a panel of experts, who were asked to assess the face validity of the items. Through this process, the 23 items were condensed to the 20 presented in this thesis.

Study Aims

This study aims to replicate and refine the validity of a new behavioural measure and, for the first time, to establish the temporal stability of the construct through assessing test-retest reliability. I will attempt to replicate the two-factor structure of forgiveness and revenge, which was demonstrated in preliminary testing (Bradley et al., 2019). I aim to demonstrate high construct validity of the items and further establish the nomological network of the construct through correlational testing with several new transgression-based and trait-level variables that are yet to be tested against this measure: willingness to reconcile, state empathy, state rumination, trait revenge, and trait forgiveness; all of which are well-established predictors of episodic forgiveness. Further, I aim to assess the construct validity of the measure via correlations with similar, existing measures of episodic forgiveness: the Decision to Forgive Scale (Davis et al., 2015) and the Emotional Forgiveness Scale (Worthington et al., 2013). Finally, I aim to assess the test-retest reliability of the measure through a short-term longitudinal design, consisting of data collection at two time points, 20 days apart.

Hypotheses

Specifically, I hypothesise the following:

1. The new behavioural forgiveness measure will demonstrate a two-factor structure, representing forgiveness and revenge.
2. Items designed to indicate forgiveness will load on the factor ‘forgiveness’, and items designed to indicate revenge will load on the factor ‘revenge’; these are elaborated upon in the method.
3. The new forgiveness behaviour measure will have a positive relationship with decisional forgiveness, emotional forgiveness, willingness to reconcile, state empathy, and trait forgiveness but a negative relationship with rumination and trait vengeance.
4. The new revenge behaviour measure will have a negative relationship with decisional forgiveness, emotional forgiveness, willingness to reconcile, state empathy, and trait forgiveness but a positive relationship with rumination and trait vengeance.
5. Decisional forgiveness, emotional forgiveness, willingness to reconcile, state empathy, and trait forgiveness will predict forgiving behaviours.

6. The new forgiveness behaviour measure scores at time one will be positively correlated with forgiveness behaviour scores at time two.
7. The new revenge behaviour measure at time one will be positively correlated with revenge behaviours at time two.

Method

Participants

A total of 374 individuals participated in this study by completing an online survey at time one. Previous research suggests that this sample size is appropriate with an *a priori* Monte Carlo simulation (1000 iterations) with $\alpha = .05$, an effect size estimate of $r = .16$, derived from EFA in preliminary studies, and a power of .80 indicating a required sample size of 350. Thus, to help minimise the likely effects of attrition, $N = 374$ participants between the ages of 19 and 84 ($M = 42.6$, $SD = 13.25$) were recruited on Prolific; an international crowdsourcing website used to recruit participants in psychological studies. Due to the nature of recruitment through Prolific, participants were given £1.50 ($2.55 AUD) for their participation in the study. Participation in the study was contingent upon being older than 18, being fluent in English, and being in an ongoing romantic relationship.

Of the participants, 50.27% identified as female, 49.47% as male, and 0.26% as non-binary or 'other'. The majority of participants were from the United Kingdom (86.36%); however, due to the nature of online recruitment, the sample had participants also identifying as citizens of Australia (6.15%), and the United States (7.49%). Regarding participant-offender relationships, relationship length spanned from 4 months to 55 years ($M = 14.87$ years, $SD = 11.93$ years). Most participants were married (57.57%), with 8.93% saying they were engaged to their partner and 4.96% being in a de-facto relationship; of the remaining participants, 2.23% described their relationship as 'open', and 25.06% as monogamous.

Procedure

Before commencing data collection, the hypotheses, methods, and analysis plan of this study were pre-registered on the website AsPredicted (see Appendix 1 for pre-registration document). The study received ethics approval from the University of Adelaide's School of Psychology Human Research Ethics Committee (22/26).

Participants accessed the initial survey via Qualtrics. All participants first provided informed consent, responded to demographic questions, and were then asked to recall a time in the past 30 days when their partner had hurt them. Participants were asked to describe this transgression and the nature of their relationship with the offender (i.e., whether they were married, had children together, or how long they had been in a relationship). To personalise the survey experience and elicit an emotional response to the questions, the name of the offending person was recorded and displayed in questions when relevant. The name was destroyed after data collection to maintain confidentiality. The remainder of the survey consisted of the new behavioural measure of forgiveness, existing self-report forgiveness measures, transgression-specific, and trait-level variable measures. These measures will be discussed in detail below. Finally, participants were asked to indicate either "yes" or "no" in regards to their perception of their level of forgiveness (i.e., "Have you forgiven X?").

Twenty days after completing the initial survey, participants were invited to partake in a follow-up survey via Qualtrics. Participants provided informed consent, answered questions regarding their relationship between time one and time two (i.e., whether there had been any other transgressions and whether they were still together), and completed the behavioural forgiveness and revenge measure again. These measures will be discussed in detail below.

Materials

All measures use a five-point Likert scale from (1 = *strongly disagree*) to (5 = *strongly agree*) unless otherwise stated. For all items, a higher score indicates a higher endorsement of the construct.

Behavioural Forgiveness and Revenge

Behavioural forgiveness and revenge were measured using the new 20-item scale, initially developed in a pilot study and subsequently administered to a team of experts to assess face validity. Forgiving behaviours were measured with 12 items (e.g., “I have gone out of my way to engage with X”), and vengeful behaviours were measured with eight items (e.g., “I have made X look bad in front of others”), a complete list of items can be seen in Table 1. Participants responded either “yes” or “no”, with higher scores indicating engagement with these behaviours. As opposed to Likert-style responses, the dichotomous yes/no response option was chosen as a means of measuring concrete judgements through actual occurred behaviours. This facilitates the clarity of measurement that behavioural designs are so useful for. Measures of validity of the new behavioural forgiveness and revenge measure will be reported in the results.

Decisional Forgiveness

I measured decisional forgiveness on the Decision to Forgive Scale (DTFS) from Davis et al. (2015). The DTFS assesses whether or not a participant has made a decision to forgive the offender (e.g., “I have made up my mind to forgive X”). The measure demonstrated high reliability in this sample (α = .91) and correlates highly with other measures of interpersonal forgiveness (Mróz et al., 2022).

Emotional Forgiveness

The intrapersonal emotional shift that occurs while forgiving was measured using Worthington et al. (2013) eight-point Emotional Forgiveness Scale (EFS). A sample item is, "I no longer feel upset when I think about X". The EFS demonstrated high reliability in this study (α = .81) and has demonstrated good construct validity through correlations with the DTFS (Cavalcanti et al., 2019).[2]

Willingness to Reconcile

I measured one's willingness to reconcile with the offender using an adapted, nine-item version of the Willingness to Reconcile Scale (Shnabel & Nadler, 2008). Willingness to reconcile relates to the participant's desire to restore the relationship with the offender (e.g., "I am interested in having a warm relationship with X"). Participants rated their agreement on a 7-point Likert-type scale from (1 = *strongly disagree*) to (7 = *strongly agree*). This scale demonstrated high reliability (α = .91).

State Empathy

I measured one's level of empathy towards the offender using the Index of Empathic Concern (Coke et al., 1978). Participants were presented with five adjectives to describe their relationship towards the offender (e.g., "soft-hearted"), before being asked to rate the extent to which they have felt that emotion since the transgression on a 7-point Likert scale, where (1 = *not at all),* and (7 = *extremely).* This scale demonstrated high reliability in the current study (α = .84), as well as demonstrating significant correlations with measures of interpersonal forgiveness (Donovan & Priester, 2020).

State Rumination

State rumination was measured by the 8-item scale from McCullough et al. (2007). State rumination refers to the extent of repetitive and recurrent thoughts related to the offender and the transgression experienced (Whiteman & Mangels, 2020). A sample item is, "I find it difficult not to think about the hurt that X caused me". This scale demonstrated high

[2] The TRIM-18, the most widely used self-report measure of forgiveness, was purposely not included from this study as preliminary research has already established correlation with the new measure.

reliability in the current sample (α = .96), and consistently negatively correlates with the TRIM-18 (Fernandez Capo et al., 2017; McCullough et al., 2007).

Trait Forgiveness

Trait levels of one's tendency to forgive were measured using the 10-item Trait Forgiveness Scale (TFS; Berry et al., 2005). A sample item is, "I can forgive a friend for almost anything". The TFS has demonstrated high reliability in the current study (α = .85) and correlates highly with emotional and decisional measures of forgiveness (Worthington et al., 2013).

Trait Revenge

I measured trait levels of revenge using Stuckless and Goranson's (1992) 7-point Vengeance Seeking Scale (VSS). A sample item is "I try to even the score with anyone who hurts me". Participants will rate their agreement on a 7-point Likert-type scale from (1 = *strongly disagree*) to (7 = *strongly agree*). The VSS demonstrated high reliability (α = .94).

Social Desirability

I measured socially desirable responding using the Balanced Inventory of Desirable Responding Short Form (BIDR-16) from Hart et al. (2015). The BIDR-16 measures socially desirable responding on two dimensions, impression management (e.g., "I don't gossip about other people's business") and self-deceptive enhancement (e.g., "I am a completely rational person"). The BIDR-16 also demonstrated high total reliability in this study (α = .83), as well as reliability for both impression management (α = .76) and self-deceptive enhancement (α = .81). Measuring impression management and self-deceptive enhancement allowed me to control for any social desirability biases that may be present.

Results

Here, the results of statistical analyses will be reported. Results of confirmatory factor analysis to address hypotheses one and two are given first, followed by correlational analyses and multiple regressions to address hypotheses 3 to 7 (inclusive).

Overview of Transgressions

There were a range of transgressions described by participants, including infidelity, dishonesty, and emotional neglect. Time elapsed since the transgression ranged from 0 to 1000 days (M= 26.71, SD= 96.69). In line with my preregistration, a transgression that had occurred more than two standard deviations above the mean time elapsed were excluded[3]. In terms of transgression-specific variables, participants tended to ruminate (M = 33.36, SD = 10.79), more than the midpoint of the scale, $t(373) = 9.60$, $p < .0001$, and felt less empathy (M = 14.05, SD = 6.11) than the midpoint of the scale, $t(373) = -18.83$, $p < .0001$.

Factor Structure of the New Behavioural Forgiveness and Revenge Measure

A confirmatory factor analysis (CFA) was used to test the proposed two-factor structure given in hypothesis one, and the factor loadings given in hypothesis 2. In line with recommendations from Kline (2016), a range of fit indices are provided, including tests of exact fit as well as incremental and residual-based indices that, whilst sensitive to model misspecification, are reasonably robust to sample size. These fit indices are (a) the likelihood ratio chi-square, which determines whether the variance-covariance matrix derived from the model accurately represents the population; (b) the comparative fit index (CFI), which assesses fit via the relative improvement of the model in comparison to the null; (c) Tucker-Lewis index (TLI), which measures the relative reduction in misfit per degree of freedom; (d) root-mean-square error of approximation (RMSEA), which measures discrepancy due to

[3] 26 participants were excluded from the sample based on exclusion criteria discussed in preregistration (see appendix one).

approximation of the model based on the degrees of freedom; and (e) standardized root mean square residual (SRMR), which is an absolute measure of fit and assesses the standardized differences between observed and predicted correlations (Hu & Bentler, 1999; Shi et al., 2019). For all fit indices, adequate fit was determined using cut-off criteria suggested by Marsh et al. (2004), whereby acceptable fit is given by CFI > .95, TLI > .95, RMSEA < .06 and SRMR < .08.

A measurement model was fitted in R statistical software (version 1.2.5033), using the lavaan package (Rosseel, 2012). Generally, the fit of this model was acceptable $\chi^2(374) = 311.995$, $p < .001$, CFI = .970, TLI = .966, RMSEA = .048 with CI_{90} [.039, .056]. However, the SRMR was outside of the acceptable range, with SRMR = .139. Research into the accuracy of SRMR to reflect true model fit under different data conditions is ongoing, such that, little is known about how SRMR acts in non-continuous data. It is likely that the dichotomous nature of the new behavioural measure is a cause of the inflated SRMR value, as CFA is typically used for continuous data sets- although these techniques have been adapted and are widely used in non-dichotomous ordinal datasets through the application of polychoric correlations (Shi et al., 2020). Nevertheless, as recommended by Kline (2016), multiple fit indices should be assessed in CFA, and therefore model fit was deemed acceptable given the excellent fit indicated by the CFI, TLI, and RMSEA.

All items had a significant loading greater than .40 on the factor they were hypothesised to load (see Table 1). The model is given in Figure 1. In this solution, the factors of forgiveness and revenge were negatively correlated ($r = -.277$, $p < .01$). Therefore, hypotheses one and two were supported; the new behavioural measure fits a two-factor structure, indicative of forgiveness and revenge.

Table 1

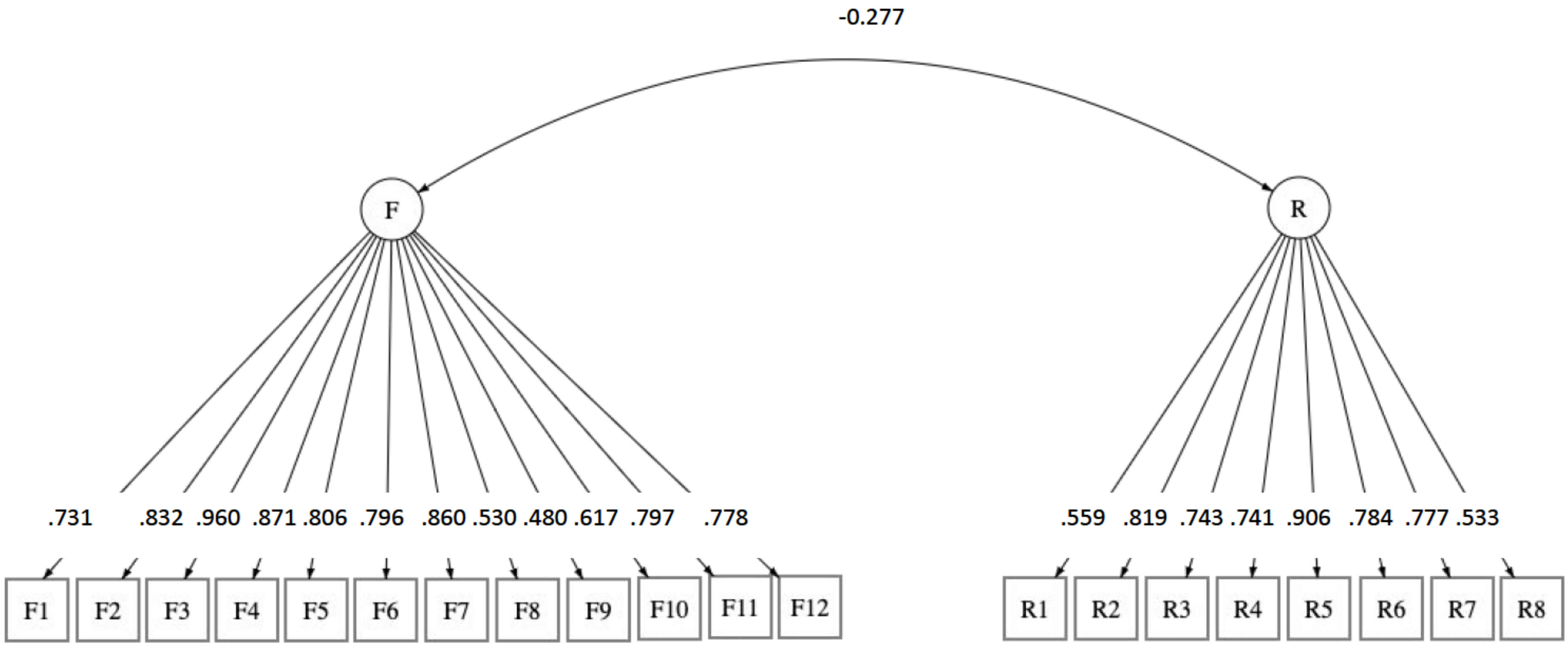
Summary of Factor Loadings for the New Behavioural Forgiveness Measure

Item	Standardised Factor Loadings	
	Forgiveness	Revenge
[F1] I have gone out of my way to engage with X.	.731	
[F2] I have continued to do things with X that we did before the incident	.832	
[F3] I continue to communicate with X [either in person or online].	.960	
[F4] I have interacted with X in a friendly manner.	.871	
[F5] I have assisted/helped X in some way.	.806	
[F6] I have spoken positively of X to other people.	.796	
[F7] I have given X compliments	.860	
[F8] I have said things that have helped X feel better about what he/she did.	.530	
[F9] I have literally told X that I forgive him/her.	.480	
[F10] I have asked X for help/assistance.	.617	
[F11] I have shared my personal achievements/good news with X	.797	
[F12] I have stuck up for X in front of other people.	.778	
[R1] I have insulted X because of what they did.		.559
[R2] I have made X look bad in front of others.		.819
[R3] I have made X feel bad about what they did.		.743
[R4] I have set X up to get into trouble.		.741
[R5] I have told X that I would never speak to them again.		.906
[R6] I have posted hurtful or disrespectful things about X on social media.		.784
[R7] I have reminded X about what they did to me.		.777
[R8] I have explicitly told X what they did to hurt me.		.533

Note. Items denoted F measure forgiveness, and items denoted R measure revenge, $p < .001$ for all items

Figure 1

The Two-Factor Model for the New Behavioural Forgiveness Measure



Construct Validity of the New Behavioural Forgiveness and Revenge Measure

Prior to correlational analyses, normality was assessed using Shapiro-Wilks and Kolmogorov-Smirnov tests of normality. The majority of variables did demonstrate significant deviation from normality ($p < .05$). However, in a sample ≥ 300, these tests are prone to misreporting significant deviations from normality (Mishra et al., 2019). Thus, visual inspection of QQ-plots and histograms was undertaken to determine normality. Upon visual inspection, all variables indicated approximate normality.

A series of Pearson's bivariate correlations were used to assess the relationship between the new total scale scores for behavioural forgiveness and revenge measures and existing forgiveness measures, transgression-specific variables, and trait variables, as predicted by hypothesis three and four. Correlations can be seen in Table 2.

Table 2

Pearson's Bivariate Correlations Between the new Behavioural Forgiveness and Revenge Measure, Existing Forgiveness Measures, Transgression-Specific, and Trait-Level Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Forgiveness Behaviours	-											
2. Revenge Behaviours	.54**	-										
3. Decisional Forgiveness	.37**	.35**	-									
4. Emotional Forgiveness	.35**	.17**	.11*	-								
5. Willingness to Reconcile	-.15**	-.09	-.18**	.16**	-							
6. State Empathy	.40**	.24**	.50**	.17**	-.16**	-						
7. State Rumination	-.09	-.03	-.28**	.21**	.44**	-.39**	-					
8. Trait Forgiveness	.01	.11*	.07	.15**	.28**	-.03	.28**	-				
9. Trait Revenge	.02	.08	.01	.18**	.15**	-.02	.16**	.34**	-			
10. Impression Management	.00	.04	.02	.12*	.05	.03	.13*	.12*	.18**	-		
11. Self Deception	.14	.16**	.04	.16**	.16**	.08	.24**	.15**	.17**	.19**	-	
12. Self-Perceived Forgiveness	.18**	.17**	.49**	.07	-.26**	.39**	-.33**	.03	.06	.00	-.06	-

**p* < .05, ***p* < .01

New Behavioural Forgiveness Measure

Hypothesis three relates to the construct validity of the behavioural forgiveness score, specifically, it was hypothesised that there will be a positive correlation between the new behavioural forgiveness items and decisional forgiveness, emotional forgiveness, willingness to reconcile, state empathy, and trait forgiveness, but a negative correlation with rumination and trait vengeance. As indicated in Table 2, there were significant, positive correlations between the new behavioural forgiveness items and new behavioural revenge items (r = .54), decisional forgiveness (r = .37), emotional forgiveness (r = .35), empathy (r = .40), and self-perceived forgiveness (i.e., “have you forgiven X?”; r = .24). Further, there was a significant negative correlation between the new behavioural forgiveness items and willingness to reconcile (r = -.15). There were no significant correlations between the new forgiveness behaviour measure and rumination, trait forgiveness, trait revenge, impression management, or self-deception. Thus, hypothesis three was partially supported.

New Behavioural Revenge Measure

Hypothesis four relates to the construct validity of the behavioural revenge score, specifically, it was hypothesised that there would be a positive correlation between behavioural revenge and rumination and trait revenge, but a negative correlation between revenge items and decisional forgiveness, emotional forgiveness, willingness to reconcile, state empathy, and trait forgiveness. There were significant, positive correlations between the new revenge items and decisional forgiveness (r = .35), emotional forgiveness (r = .17), state empathy (r = .24), trait forgiveness (r = .11), self-deception (r = .16), and self-perceived forgiveness (r = .17)[4]. There were no significant correlations between the new behavioural

[4] I ran a partial correlation analysis controlling for self-deception, returning significant positive correlations between behavioural revenge and behavioural forgiveness (r = .53), decisional forgiveness (r = .35), emotional forgiveness (r = .15), state empathy, (r = .23,) and self-perceived forgiveness (r = .18). However, when controlling for self-deception, the relationship between revenge behaviours and trait forgiveness became non-significant (r = .09, p = .09).

revenge measure and willingness to reconcile, state rumination, trait revenge, or impression management. Thus, hypothesis four was not supported.

Predictive Validity of the New Behavioural Forgiveness and Revenge Measure

In addition to correlational analyses, multiple regression models were used to assess the construct validity of the behavioural forgiveness and revenge items, as predicted by hypotheses three, four, and five. Two multiple linear regressions were performed, with forgiveness behaviours and revenge behaviours as outcome variables, respectively. In line with recommendations from Tabachnick et al. (2007), assumptions of normality, linearity, and homoscedasticity were assessed through visual inspection of scatterplots of residuals. Given the large sample size (≥ 300), visual inspection was appropriate for this dataset. Importantly, regression analyses are not invalidated by violations of linearity and homoscedasticity, merely weakened (Field, 2013; Tabachnick et al., 2007). The assumption of multicollinearity between predictors was assessed through inspection of variance inflation factors (VIFs). Assumption testing found adequate normality, linearity, and homoscedasticity, as well as no multicollinearity; therefore, regression analysis was appropriate given the dataset. Predictors were not excluded from the regression model based on bivariate correlations, in order to prevent a sample-specific model or underestimation of variance from any one variable (Pandey & Elliott, 2010).

New Behavioural Forgiveness Measure

A multiple linear regression was calculated to predict forgiveness behaviours based on revenge behaviours, decisional forgiveness, emotional forgiveness, willingness to reconcile, state empathy, state rumination, trait forgiveness, trait revenge, impression management, self-deception, and self-perceived forgiveness. A significant regression equation was found, $F(11, 362) = 26.48$, $p < .0001$, adj $R^2 = .43$, with predictor variables accounting for approximately 43% of variance in forgiveness behaviours. As seen in Table 3, revenge behaviours were the best predictors of forgiveness behaviours ($\beta = .05$, $p < .001$), followed by emotional forgiveness ($\beta = .02$, $p < .001$), decisional forgiveness ($\beta = .02$, $p < .05$), willingness to reconcile ($\beta = .02$, $p < .001$), and state empathy ($\beta = .01$, $p < .001$). These results partially support hypotheses three and five.

Table 3

Multiple Linear Regression Predicting Forgiveness Behaviours

Source	*b*	β	95% CI	*t*	*p*-value
Revenge Behaviours	.50	.05	[.35, .57]	9.49	< .001
Decisional Forgiveness	.04	.02	[.01, .09]	2.19	<.05
Emotional Forgiveness	.14	.02	[.10, .20]	5.91	< .001
Willingness to Reconcile	-.05	.02	[-.11, -.03]	-2.76	< .001
State Empathy	.06	.01	[.03, .10]	4.23	< .001
State Rumination	.00	.01	[-.02, .01]	.56	.58
Trait Forgiveness	-.02	.02	[-.07, .02]	-.81	.42
Trait Revenge	-.01	.01	[-.03, .01]	-.54	.59
Impression Management	-.02	.02	[-.04, .02]	-1.28	.20
Self-Deception	.02	.02	[-.02, .05]	1.10	.28
Self-Perceived Forgiveness	-.32	.29	[-.75, .43]	-1.14	.26

Note. $R^2 = .45$; $\Delta R^2 = .43$; CI = confidence interval.

New Behavioural Revenge Measure

Further, a second multiple linear regression was calculated to predict revenge behaviours based on forgiveness behaviours, decisional forgiveness, emotional forgiveness, willingness to reconcile, state empathy, state rumination, trait forgiveness, trait revenge, impression management, self-deception, and self-perceived forgiveness. The model was significant, $F(11, 362) = 16.76$, $p < .001$, adj $R^2 = .32$, with predictor variables accounting for 32% of variance in revenge behaviours. As seen in Table 4, forgiveness behaviour was the best predictor of revenge behaviour ($\beta = .04$, $p < .001$), followed by decisional forgiveness ($\beta = .02$, $p < .001$). These results do not support hypothesis four.

Table 4

Multiple Linear Regression Predicting Revenge Behaviours

Source	*b*	β	95% CI	*t*	*p*-value
Forgiveness Behaviours	.40	.04	[.32, .49]	8.16	< .001
Decisional Forgiveness	.06	.02	[.02, .09]	3.23	< .001
Emotional Forgiveness	-.02	.02	[-.06, .03]	-.80	.69
Willingness to Reconcile	-.01	.02	[-.04, .02]	-.62	.54
State Empathy	-.01	.01	[-.04, .02]	-.65	.52
State Rumination	.00	.01	[-.01, .02]	.53	.60
Trait Forgiveness	.03	.02	[-.01, .07]	1.48	.14
Trait Revenge	.01	.01	[-.01, .02]	.70	.48
Impression Management	.00	.01	[-.02, .03]	.30	.76
Self-Deception	.02	.01	[-.01, .05]	1.49	.14
Self-Perceived Forgiveness	.01	.25	[-.43, .57]	.27	.79

Note. $R^2 = .34$; $\Delta R^2 = .32$; CI = confidence interval.

Test-Retest Reliability of the New Behavioural Forgiveness and Revenge Measure

Prior to correlational analyses, the normality of time two data was assessed using Shapiro-Wilks and Kolmogorov-Smirnov tests of normality. As with the variables at time one, time two data did also demonstrate deviation from normality based on statistical tests, however visual inspection of QQ-plots indicated approximate normality.

In order to assess test-retest reliability, as outlined in hypotheses five and six, a series of Pearson's bivariate correlations were run comparing forgiveness and revenge behaviours at time one and time two. As per the pre-registration, participants were excluded at time two who (a) could not accurately recall the transgression they recounted at time one, (b) had reported separate transgressions since time one, or (c) were no longer in a relationship with the person they identified in time one; resulting in a subsample of n = 136.[5] Test-retest reliability was assessed in line with Cicchetti's (1994) recommendations, such that a .40–.59 correlation was fair, .60–.74 was good, and above .75 denotes excellent test-retest reliability. There were significant correlations between forgiveness behaviours (r = .50, p <.001) and revenge behaviours (r = .38, p < .0001), indicating fair test-test reliability for forgiveness behaviours, and poor for revenge behaviour, partially supporting hypotheses five and six.[6]

---

[5] Time elapsed since transgression at time one was the only significant difference between those who could remember the transgression at time 2 (M = 15.03 days) and those who could not (M = 30.98 days), as measured by a Welch's independent samples *t*-test (t(334.06) = 2.14, p < 0.05).

[6] In terms of time one variables predicting behavioural forgiveness at time two, two multiple linear regression were calculated to predict both behavioural forgiveness and revenge. Both models were significant, (F(13, 115) = 8.67, p<.001, adj R^2 = .44) and (F(13, 115) = 6.85, p < .0001, adj R^2 = .37), respectively. Behavioural forgiveness at time one (β = .10, p <.01) as well as behavioural revenge at time two (β = .10, p <.001) were significant predictors of behavioural forgiveness at time two. Moreover, behavioural forgiveness at time two (β = .07, p <.0001) as well as state rumination at time one (β = .01, p <.05) were significant predictors of behavioural revenge at time two. Regression tables can be seen in appendices two and three.

Discussion

In this study, I aimed to validate a new measure of self-reported forgiveness and revenge, through assessment of dimensionality, construct validity, and test-retest reliability. The findings, their implications, and directions for future research are discussed in detail here.

Summary and Interpretation

Factor structure of the new measure

The first hypothesis proposed a two-factor structure of the new measure, indicative of forgiveness and revenge, which was supported. There was a negative relationship between the latent factors, suggesting that forgiveness and revenge are related, although separate constructs. Moreover, as predicted by hypothesis two, all 20 items had significant loadings above .45 on the factor on which they were expected to load. Thus, the new measure appears to successfully measure both forgiveness and revenge behaviours.

Forgiveness behaviours

The third hypothesis relates specifically to the construct validity of the behavioural forgiveness items. This hypothesis was partially supported, through the positive, significant relationships between behavioural forgiveness and behavioural revenge, decisional forgiveness, emotional forgiveness, state empathy, and self-perceived forgiveness. However, behavioural forgiveness had no relationship with state rumination, trait forgiveness or trait revenge, and the relationship between behavioural forgiveness and willingness to reconcile was negative.

Hypothesis five relates to the predictive validity of the forgiveness items. This hypothesis was partially supported. A multiple linear regression suggested that behavioural revenge, emotional forgiveness, decisional forgiveness, willingness to reconcile, and state empathy were all important predictors of behavioural forgiveness. Contrary to what was hypothesised, there was no predictive relationship between behavioural forgiveness and state rumination, trait forgiveness, trait revenge, or self-perceived forgiveness. These results are somewhat consistent with existing literature.

Research consistently finds significant correlations between state empathy and forgiveness (Ma & Jiang, 2020; Macaskill et al., 2002; McCullough, 2001). The empathy model of forgiveness, proposed by McCullough et al. (1997), posits that an apology from the offender elicits a motivation to forgive, through an increase in empathetic concern in the victim, as such, empathy is the primary motivational mechanism in forgiveness. A victim's experience of empathy leads to renewed care for the offender (McCullough et al., 1998), and, importantly, empathy has been seen to mediate the relationship between apologies and forgiveness (Brown et al., 2008). State empathy may be a more important predictor of forgiving behaviours than trait-level forgiveness, particularly in the context of this study. High levels of trait forgiveness essentially set people up to perceive a given offence as more benign than their counterparts (Fincham et al., 2005). As such, trait forgiveness does not necessarily align with people's behaviours following a transgression, and instead predicts their perception of their own victimisation (Stackhouse, 2019). Central to understanding the results of this study is that participants discussed transgressions involving their romantic partner, with whom we tend to feel quite empathetic, particularly in high-quality relationships (Ulloa et al., 2017). Thus, it is this empathy, rather than the perception of victimhood in the context of the transgression, that facilitates behavioural forgiveness. This may work to explain the non-significant correlation between behavioural and trait forgiveness.

Moreover, positive correlations with decisional and emotional forgiveness suggest good construct validity of the measure. Lichtenfeld et al. (2019) demonstrate that emotional and decisional forgiveness are distinct facets in the forgiveness process, with decisional forgiveness occurring prior to emotional forgiveness. Significant correlations with both suggest that forgiving behaviours begin during or after the emotional forgiveness process, and is another conceptually distinct facet in the process of forgiveness. However, it also suggests that it is truly a measure of forgiveness, and not a related concept such as reconciliation, pardoning, excusing, or condoning (Freedman & Zarifkar, 2015).

Revenge behaviours

The fourth hypothesis relates to the construct validity of the behavioural revenge items. This hypothesis was not supported. There were significant, positive correlational relationships between behavioural revenge and behavioural forgiveness, decisional forgiveness, emotional forgiveness, state empathy, trait forgiveness, self-deception, and self-perceived forgiveness (although when controlling for self-deception, trait forgiveness became non-significant). There were no correlations between revenge behaviours and willingness to reconcile, rumination, or trait revenge. Finally, a multiple linear regression suggested that behavioural and decisional forgiveness were important predictors of revenge behaviours.

These results suggest inconsistencies between the way revenge is conceptualised in an emotional and motivational sense, and how this differs when it comes to concrete behaviours. Previous conceptualisations define forgiveness and revenge as opposites, such that traditionally, emotional measures of forgiveness have strong negative correlations with emotional measures of revenge (Karduz & Sarıçam, 2018). This relationship makes sense intuitively; when we define forgiveness as prosocial motivational and emotional changes towards an offender, it seems almost obvious that revenge, or a desire to ‘get back’ at someone, cannot coexist with forgiveness (McCullough, 2001). However, these same significant negative correlations between forgiveness and revenge have not appeared when considering behaviours. This study proposed that perhaps forgiveness and revenge behaviours can occur simultaneously; further, revenge may even facilitate later forgiveness.

There are a variety of plausible explanations for this effect. Stillwell et al. (2008) outline revenge through the framework of equity theory. Broadly, people are motivated to maintain equity, or fairness, in relation to power in their relationships. As such, when a transgression occurs, this equity balance is disrupted, through costs to the victim, whether material, physical, or emotional. Thus, following a transgression, the victim is motivated to restore equilibrium by seeking ‘justice’. This restoration of belief in a just world empowers victims, which may, in turn, facilitate forgiveness (Strelan, 2018). The victim engaging in vengeful behaviours may also cause an empathetic response in the offender, enabling them to understand the implications of their actions and show remorse. Thus, making it easier for a victim to act forgivingly, as remorse and empathy from the offender are significant predictors of forgiveness (Beyens et al., 2015; Witvliet et al., 2020).

A preliminary study into this measure found that not only was there a positive correlation between perceived offender remorse and behavioural forgiveness and revenge, but this remorse partially mediated the positive relationship between forgiveness and revenge (Bradley et al., 2019). This means that not only is there a direct relationship between behavioural forgiveness and revenge, but revenge is related to forgiveness through an increase in the perceived remorse of the offender. The current study substantiates this effect, with empathy towards the offender, an established correlate of perceived remorse, being positively correlated with both behavioural forgiveness and revenge (Davis & Gold, 2011). Hence, perceived remorse as well as state empathy, in combination with restored just world beliefs, may act to explain the positive relationship between behavioural forgiveness and revenge.

Test-retest reliability of the new measure

The sixth and seventh hypotheses relate to the test-retest reliability of the behavioural forgiveness and revenge items. There were significant positive relationships between both behavioural forgiveness at time one and time two, as well as behavioural revenge at time one and time two. In line with Cicchetti's (1994) recommendations, the test-retest reliability for the behavioural forgiveness items was fair, and for behavioural revenge this relationship was poor. However, the new measure does not assess enduring traits, rather it assesses behaviours. Furthermore, all current definitions of forgiveness, behavioural or otherwise, rest on the concept of temporal change, meaning that forgiveness occurs over time; a change from one motivational, emotional, or behavioural state to another (McCullough et al., 2010). This should be considered when assessing the test-retest reliability of the new measure, and with this holistic perspective the correlations may be assessed as good.

Strengths and Limitations

Strengths

This study is one of the first of its kind to validate a self-report measure of behavioural forgiveness. In relation to preliminary research, specifically by Bradley et al. (2019), my study is the first to demonstrate temporal stability of the new behavioural measure, and assess the construct validity through the assessment of trait vengeance.

Existing self-report measures focus on emotions, motivations, and intentions to then make inferences about real-world behaviour, and current behavioural measures assess forgiveness through unrealistic lab-based behavioural paradigms. This study provides an improvement for both methods of measurement. In the context of self-report measures, assessing behaviours rather than intentions or motivations allows for clarity of measurement, and in line with the results of this study, a behavioural measure may be less sensitive to social-desirability biases. Further, there is a lower cognitive load for the participant, such that recall of performed behaviours (i.e., "I have given X compliments") may be easier for participants than reflection of motivation, intentions, or emotions (i.e., "I have given up my hurt and resentment."). In terms of current behavioural paradigms, this new measure provides participants an opportunity to reflect on real-world, hurtful transgressions in a way that is not feasible in the lab. This real-world reflection enhances the emotional response from the participants in comparison to lab-based transgressions, and as such paints a more authentic picture of forgiveness and revenge. Finally, the validation of the new behavioural measure has enhanced the nomological network of forgiveness, and provided future researchers with a new lens with which to look at interpersonal conflict and resolution.

Limitations

In spite of the substantial gap in the literature that this study has been able to fill, there are limitations to this study that must be addressed. Importantly, this measure utilised a yes/no dichotomous response option as opposed to a Likert-style response whereby 1 = never and 5 = always, or similar response options. Preston and Colman (2000) assessed the optimal number of response categories in rating scales and found that internal consistency increased significantly for scales with more response categories, up to seven, making seven the optimal. Matell and Jacoby (1972; as cited in Croasmun & Osttrom, 2011) found similar results in terms of internal consistency of a measure, however they also found no linear relationship between scale points and validity. Instead of genuine improvement in measurement, greater scale points may only increase internal consistency through systematic error, such that individual participants tend to consistently choose extreme options, or will never choose these options (Komorita & Graham, 1965).

The dichotomous response options did influence the analysis of model fit, specifically through an inflated SRMR value. Flora and Curran (2004) discussed the inherent violation of normality of dichotomous data and the implications of this, including inflation of the chi-squared statistic, underestimation of fit parameters, and downwardly biased standard error estimates. However, the dichotomous response option was intentional, in that the aim of the new behavioural measure was to assess real, performed behaviours, and attain the same objectivity that behavioural paradigms achieve (i.e., a behaviour was either performed, or it was not). Not only does this choice of response option strengthen the real-world validity of the measure, but it also overcomes mono-method biases, such that participants who tend to exclusively select extreme responses do not have inflated scores in comparison to their peers.

A second limitation of this study involves the data collected at time two, specifically, the large number of participants (*n* = 238) who could not recall the specific transgression they identified at time one. The implication of this is that generally, participants discussed very benign transgressions. As such, if participants were instead asked to recall more hurtful transgressions, or transgressions perpetrated by someone they did not have an ongoing relationship with, the same relationship that has been observed between forgiveness and revenge behaviours in this study may not be replicated. Strelan and Sutton (2011) found that just-world beliefs for the self were associated with forgiveness (i.e., the belief that overall, the events in one's life are just; Dalbert, 1999), and this relationship was moderated by transgression severity: such that, more benign transgressions resulted in a stronger relationship. When considering the aforementioned similar relationship between just world beliefs and empowerment (Strelan, 2018), it may be said that the relationship between forgiveness and revenge may also be moderated through transgression severity.

Implications of the Current Study

Theoretical Implications

These findings suggest that following a transgression, people can act in both a forgiving and vengeful way, which opposes existing literature. In fact, some scholars define forgiveness specifically as the inhibition of a desire for revenge (Aquino et al., 2003). However, this study challenges that idea, such that when we account specifically for performed behaviours, it may be possible to act both forgivingly and vengefully simultaneously. Further, a reduction in vengeful behaviours on its own did not result in an increase in forgiving ones. Thus, theoretical perspectives of forgiveness and revenge in an emotional and motivational framework do not necessarily align with real-world actions. This diverging definition may come as a by-product of the approach to measurement, whereby I measured performed behaviours in relation to a real transgression, rather than reported motivations or emotions. This study, in contrast to previous conceptualisations, proposes a constitutive definition of forgiveness; that is, rather than forgiveness being a change in emotional, motivational, or decisional states, forgiveness is a set of behaviours, as is revenge. With these constitutive definitions, it becomes possible for forgiveness and revenge to coexist.

Applied Implications

The central contribution of this study has been to validate the new behavioural measure of forgiveness and revenge. The creation of this new measure removes existing barriers to research, such that scholars can now conduct research surrounding behavioural forgiveness, form theories, and importantly, improve existing interventions targeting forgiveness. Forgiveness interventions aim to benefit victims' mental health, reduce state levels of anger, and ultimately promote forgiveness (Tao et al., 2020). Forgiveness interventions are of particular use in the criminal justice system, with revenge being a well-documented motive for criminal violence (Kivivuori et al., 2015). Further, forgiveness therapy has shown promising results in promoting psychological wellbeing in men within a maximum-security facility (Yu et al., 2021). A more holistic understanding of forgiveness and revenge in a real-world, behavioural sense may be crucial to the successful implementation of such interventions in a broader sense.

Future Research

There is a plethora of future research directions in the context of this study. Future research should continue to investigate the relationship between behavioural forgiveness and revenge, specifically through the conceptual lens of offender remorse, just world beliefs, and transgression severity. Moreover, the measure should be tested in the context of more clearly hurtful transgressions, to assess the replicability of the relationship between forgiveness and revenge behaviours.

Future research should also aim to demonstrate incremental validity of the new behavioural measure; that is, does the new behavioural measure predict unique variance relative to existing tests of forgiveness (Garb, 2003). In the context of forgiveness and revenge, important constructs to predict include relationship satisfaction, psychological well-being, and state empathy, and this can be achieved through hierarchical multiple linear regressions (Lichtenfeld et al., 2019). Further, Joo et al. (2019) discussed differing perceptions of forgiveness between Western and Eastern Asian cultures, suggesting that the behaviours that constitute forgiveness may be culturally bound. As such, the new behavioural measure should be administered to culturally diverse participants, to determine the cross-cultural relevance of each of the items, and the measure more broadly.

Conclusion

This study is one of the first of its kind to validate a behavioural self-report measure of forgiveness and revenge. In doing so, I have been able to fill a gap in the literature, address limitations of existing self-report measures and lab-based behavioural paradigms, and expand the nomological network of forgiveness. Not only does this measure allow researchers to assess concrete, performed behaviours rather than reported motivations or intentions, it also extends behavioural research outside of a lab setting, enabling research of real-life transgressions. The results of this study demonstrate that the new behavioural measure exhibits good construct validity, test-retest reliability, as well as the hypothesised two factor structure, indicative of forgiveness and revenge. Thus, the validation of this measure removes existing barriers to research and may facilitate enhanced quality of research in forgiveness science.

In contrast to the overwhelming consensus of the literature, this study, as well as preliminary studies into this measure, posits that when measured behaviourally, forgiveness and revenge can occur simultaneously. Further, revenge behaviours may even facilitate later forgiveness. This substantiates the need for a behavioural measure of forgiveness and revenge, in that there are unique considerations to real behaviours as opposed to motivations or intentions. This relationship between behavioural forgiveness and revenge provides a fascinating avenue for future research.

References

Aquino, K., Grover, S. L., Goldman, B., & Folger, R. (2003). When push doesn't come to shove: Interpersonal forgiveness in workplace relationships. *Journal of Management Inquiry*, *12*(3), 209–216. https://doi.org/10.1177/1056492603256337

Aragon, P. (2016). Empathy-motivated forgiveness: the influence of empathy, prior experience, and contextual factors in route to forgiveness of a transgressor. *International Journal of Psychology & Behavior Analysis, 2(114),* 114–121. https://doi.org/10.15344/2455-3867/2016/114

Bacon, F. (1920). Of revenge. In J. Hoops (Eds.), *The Essays of Francis Bacon* (pp. 19–21). Bremer Presse.

Bell, M. (2019). Forgiving the dead. *Social Philosophy and Policy*, *36*(1), 27–51. https://doi.org/10.1017/S0265052519000281

Berry, J., Worthington, E., O'Connor, L., Parrott, L., & Wade, N. (2005). Forgivingness, vengeful rumination, and affective traits. *Journal of Personality*, *73(1),* 183–225. https://doi.org/10.1111/j.1467-6494.2004.00308.x

Beyens, U., Yu, H., Han, T., Zhang, L., & Zhou, X. (2015). The strength of a remorseful heart: Psychological and neural basis of how apology emolliates reactive aggression and promotes forgiveness. *Frontiers in Psychology*, *6(1611).* https://doi.org/10.3389/fpsyg.2015.01611

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: a primer. *Frontiers in Public Health*, *6(149).* https://doi.org/10.3389/fpubh.2018.00149

Boon, S. D., & Yoshimura, S. M. (2020). Revenge as social interaction: Merging social psychological and interpersonal communication approaches to the study of vengeful behavior. *Social and Personality Psychology Compass*, *14*(9). https://doi.org/10.1111/spc3.12554

Bradley, T., Strelan, P., & Burns, N. (2019). *Closing the gap between intention and behaviour: A new measure of self-reported behavioural forgiveness.* Unpublished manuscript. School of Psychology, University of Adelaide.

Brown, R. P., Wohl, M. J. A., & Exline, J. J. (2008). Taking up offenses: Secondhand forgiveness and group identification. *Personality and Social Psychology Bulletin*, *34*(10), 1406–1419. https://doi.org/10.1177/0146167208321538

Carlisle, R. D., Tsang, J.-A., Ahmad, N. Y., Worthington Jr, E. L., Witvliet, C. V., & Wade, N. (2012). Do actions speak louder than words? Differential effects of apology and restitution on behavioral and self-report measures of forgiveness. *The Journal of Positive Psychology*, *7*(4), 294–305. https://doi.org/10.1080/17439760.2012.690444

Carlsmith, K. M., & Darley, J. M. (2008). Psychological aspects of retributive justice. *Advances in Experimental Social Psychology*, *40(1)*, 193–236. https://doi.org/https://doi.org/10.1016/S0065-2601(07)00004-4

Cavalcanti, T. M., de Holanda Coelho, G. L., Rezende, A. T., Vione, K. C., & Gouveia, V. V. (2019). Decisional and emotional forgiveness scales: Psychometric validity and correlates with personality and vengeance. *Applied Research in Quality of Life*, *14*(5), 1247–1264. https://doi.org/10.1007/s11482-018-9653-9

Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*, *6*(4), 284–290. https://doi.org/10.1037/1040-3590.6.4.284

Coke, J. S., Batson, C. D., & McDavis, K. (1978). Empathic mediation of helping: A two-stage model. *Journal of Personality and Social Psychology*, *36*(7), 752–766. https://doi.org/10.1037/0022-3514.36.7.752

Coughlin, S. S. (1990). Recall bias in epidemiologic studies. *Journal of Clinical Epidemiology*, *43*(1), 87–91. https://doi.org/10.1016/0895-4356(90)90060-3

Croasmun, J. T., & Ostrom, L. (2011) Using likert-type scales in the social sciences. *Journal of Adult Education, 40(1),* 19–22.

Dalbert, C. (1999). The world is more just for me than generally: About the Personal Belief in a Just World scale's validity. *Social Justice Research, 12(1)*, 79–98. https://doi.org/10.1023/A:1022091609047

Davis, D. E., Hook, J. N., Van Tongeren, D. R., DeBlaere, C., Rice, K. G., & Worthington Jr, E. L. (2015). Making a decision to forgive. *Journal of Counseling Psychology*, *62*(*2*), 280–288. https://doi.org/10.1037/cou0000054

Davis, J. R., & Gold, G. J. (2011). An examination of emotional empathy, attributions of stability, and the link between perceived remorse and forgiveness. *Personality and Individual Differences*, *50*(3), 392–397. https://doi.org/10.1016/j.paid.2010.10.031

de la Fuente-Anuncibay, R., González-Barbadillo, Á., Ortega-Sánchez, D., Ordóñez-Camblor, N., & Pizarro-Ruiz, J. P. (2021). Anger rumination and mindfulness: Mediating effects on forgiveness. *International Journal of Environmental Research and Public Health*, *18*(5), 2668. https://doi.org/10.3390/ijerph18052668

Donovan, L. A. N., & Priester, J. R. (2020). Exploring the psychological processes that underlie interpersonal forgiveness: Replication and extension of the model of motivated interpersonal forgiveness. *Frontiers in Psychology*, *11(2107)*. https://doi.org/10.3389/fpsyg.2020.02107

Dorn, K., Hook, J. N., Davis, D. E., Van Tongeren, D. R., & Worthington, E. L. (2014). Behavioral methods of assessing forgiveness. *The Journal of Positive Psychology*, *9*(1), 75–80. https://doi.org/10.1080/17439760.2013.844267

Exline, J. J., Baumeister, R. F., Bushman, B. J., Campbell, W. K., & Finkel, E. J. (2004). Too proud to let go: Narcissistic entitlement as a barrier to forgiveness. *Journal of Personality and Social Psychology*, *87*(6), 894–912. https://doi.org/10.1037/0022-3514.87.6.894

Exline, J. J., Worthington Jr, E. L., Hill, P., & McCullough, M. E. (2003). Forgiveness and justice: A research agenda for social and personality psychology. *Personality and Social Psychology Review*, *7*(4), 337–348. https://doi.org/10.1207/S15327957PSPR0704_06

Fernandez Capo, M., Recoder, S., Gómez-Benito, J., Gamiz, M., Gual, P., Díez, P., & Jr, E. (2017). Exploring the dimensionality of the TRIM-18 in the Spanish context. *Anales de Psicología*, *33(3)*, 548–555. https://doi.org/10.6018/analesps.33.2.264461

Fernández Capo, M., Fernández, S. R., Sanfeliu, M. G., Benito, J. G., & Worthington Jr, E. L. (2017). Measuring forgiveness: A systematic review. *European Psychologist*, *22*(4), 247–262. https://doi.org/10.1027/1016-9040/a000303

Field, A. (2013). *Discovering statistics using IBM SPSS statistics* (4th ed.). Sage.

Fincham, F., Jackson, H., & Beach, S. (2005). Transgression severity and forgiveness: Different moderators for objective and subjective severity. *Journal of Social and Clinical Psychology – Journal of Social and Clinical Psychology*, *24(6)*, 860–875. https://doi.org/10.1521/jscp.2005.24.6.860

Flora, D. B., & Curran, P. J. (2004). An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological Methods*, *9*(*4*), 466–491. https://doi.org/10.1037/1082-989X.9.4.466

Freedman, S., & Zarifkar, T. (2015). The psychology of interpersonal forgiveness and guidelines for forgiveness therapy: What therapists need to know to help their clients forgive. *Spirituality in Clinical Practice, 3(1)*, 45–58. https://doi.org/10.1037/scp0000087

Frijda, N. H. (1994). The lex talionis: On vengeance. In S. H. M. van Goozen, N. E. Van de Poll, & J. A. Sergeant (Eds.), *Emotions: Essays on emotion theory*. (pp. 263–289). Lawrence Erlbaum Associates, Inc.

Frise, N. R., & McMinn, M. R. (2010). Forgiveness and reconciliation: The differing perspectives of psychologists and Christian theologians. *Journal of Psychology and Theology*, *38*(2), 83–90. https://doi.org/10.1177/009164711003800202

Funk, F., McGeer, V., & Gollwitzer, M. (2014). Get the message: Punishment is satisfying if the transgressor responds to its communicative intent. *Personality and Social Psychology Bulletin*, *40*(*8*), 986–997. https://doi.org/10.1177/0146167214533130

Garb, H. N. (2003). Incremental validity and the assessment of psychopathology in adults. *Psychological assessment*, *15*(*4*), 508–520. https://doi.org/10.1037/1040-3590.15.4.508

Gassin, E. A., & Enright, R. D. (1995). The will to meaning in the process of foregiveness. *Journal of Psychology and Christianity*, *14*(*1*), 38–49.

Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review*, *102*(*1*), 4–27. https://doi.org/10.1037/0033-295X.102.1.4

Grobbink, L. H., Derksen, J. J. L., & van Marle, H. J. C. (2015). Revenge:An analysis of its psychological underpinnings. *International Journal of Offender Therapy and Comparative Criminology*, *59*(*8*), 892–907. https://doi.org/10.1177/0306624x13519963

Haen, C., & Weber, A. M. (2009). Beyond retribution: Working through revenge fantasies with traumatized young people. *The Arts in Psychotherapy*, *36*(*2*), 84–93. https://doi.org/https://doi.org/10.1016/j.aip.2009.01.005

Hart, C. M., Ritchie, T. D., Hepper, E. G., & Gebauer, J. E. (2015). The balanced inventory of desirable responding short form (BIDR-16). *SAGE Open*, *5*(*4*), 1–9. https://doi.org/10.1177/2158244015621113

Holmgren, M. R. (1993). Forgiveness and the intrinsic value of persons. *American Philosophical Quarterly*, *30*(*4*), 341–352. http://www.jstor.org/stable/20014472

Hu, L. t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(*1*), 1–55. https://doi.org/10.1080/10705519909540118

Ioannidou, F., & Konstantikaki, V. (2008). Empathy and emotional intelligence: What is it really about. *International Journal of Caring Sciences*, *1(3)*, 118–123.

Joo, M., Terzino, K. A., Cross, S. E., Yamaguchi, N., & Ohbuchi, K.-i. (2019). How does culture shape conceptions of forgiveness? evidence from japan and the united states. *Journal of Cross-Cultural Psychology*, *50*(5), 676–702. https://doi.org/10.1177/0022022119845502

Kaminer, D., Stein, D. J., Mbanga, I., & Zungu-Dirwayi, N. (2000). Forgiveness: toward an integration of theoretical models. *Psychiatry*, *63*(4), 344–357. https://doi.org/10.1080/00332747.2000.11024928

Karduz, F., & Sarıçam, H. (2018). The relationships between positivity, forgiveness, happiness, and revenge. *Revista Romaneasca pentru Educatie Multidimensionala*, *10(4)*, 1–22. https://doi.org/10.18662/rrem/68

Kivivuori, J., Savolainen, J., & Aaltonen, M. (2015). The revenge motive in delinquency: Prevalence and predictors. *Acta Sociologica*, *59(1)*, 69–84. https://doi.org/10.1177/0001699315607969

Kline, R. B. (2016). *Principles and practice of structural equation modeling* (4th ed.). The Guilford Press.

Komorita, S. S., & Graham, W. K. (1965). Number of scale points and the reliability of scales. *Educational and Psychological Measurement*, *25*(*4*), 987–995. https://doi.org/10.1177/001316446502500404

Kreitchmann, R. S., Abad, F. J., Ponsoda, V., Nieto, M. D., & Morillo, D. (2019). Controlling for response biases in self-report scales: forced-choice vs. psychometric modeling of likert items. *Frontiers in Psychology*, *10*(*2309*). https://doi.org/10.3389/fpsyg.2019.02309

Lawler-Row, K. A., Karremans, J. C., Scott, C., Edlis-Matityahou, M., & Edwards, L. (2008). Forgiveness, physiological reactivity and health: the role of anger. *International Journal of Psychophysiology*, *68*(*1*), 51–58. https://doi.org/10.1016/j.ijpsycho.2008.01.001

Lawler-Row, K. A., Scott, C. A., Raines, R. L., Edlis-Matityahou, M., & Moore, E. W. (2007). The varieties of forgiveness experience: Working toward a comprehensive definition of forgiveness. *Journal of Religion and Health*, *46*(*2*), 233–248. http://www.jstor.org/stable/27513006

Lichtenfeld, S., Maier, M. A., Buechner, V. L., & Fernández Capo, M. (2019). The Influence of decisional and emotional forgiveness on attributions. *Frontiers in Psychology*, *10*(*1425*). https://doi.org/10.3389/fpsyg.2019.01425

Ma, L., & Jiang, Y. (2020). Empathy mediates the relationship between motivations after transgression and forgiveness. *Frontiers in Psychology*, *11(1466)*. https://doi.org/10.3389/fpsyg.2020.01466

Macaskill, A., Maltby, J., & Day, L. (2002). Forgiveness of self and others and emotional empathy. *The Journal of Social Psychology*, *142*(*5*), 663–665. https://doi.org/10.1080/00224540209603925

Marsh, H. W., Hau, K.-T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling: A Multidisciplinary Journal*, *11*(*3*), 320–341. https://doi.org/10.1207/s15328007sem1103_2

Matell, M. S., & Jacoby, J. (1972). Is there an optimal number of alternatives for Likert-scale items? Effects of testing time and scale properties. *Journal of Applied Psychology*, *56(6)*, 506–509. https://doi.org/10.1037/h0033601

McCullough, M. E. (2001). Forgiveness: Who does it and how do they do it? *Current Directions in Psychological Science*, *10(6*), 194–197. https://doi.org/10.1111/1467-8721.00147

McCullough, M. E., Bono, G., & Root, L. M. (2007). Rumination, emotion, and forgiveness: three longitudinal studies. *Journal of Personality and Social Psychology*, *92*(*3*), 490–505. https://doi.org/10.1037/0022-3514.92.3.490

McCullough, M. E., Fincham, F. D., & Tsang, J.-A. (2003). Forgiveness, forbearance, and time: The temporal unfolding of transgression-related interpersonal motivations. *Journal of Personality and Social Psychology*, *84*(3), 540–557. https://doi.org/10.1037/0022-3514.84.3.540

McCullough, M. E., Luna, L. R., Berry, J. W., Tabak, B. A., & Bono, G. (2010). On the form and function of forgiving: modeling the time-forgiveness relationship and testing the valuable relationships hypothesis. *Emotion, 10*(*3*), 358–376. https://doi.org/10.1037/a0019349

McCullough, M. E., Pargament, K. I., & Thoresen, C. E. (2000). *Forgiveness: Theory, research, and practice*. Guilford Press.

McCullough, M. E., Rachal, K. C., Sandage, S. J., Worthington Jr, E. L., Brown, S. W., & Hight, T. L. (1998). Interpersonal forgiving in close relationships: II. Theoretical elaboration and measurement. *Journal of Personality and Social Psychology*, *75*(6), 1586–1603. https://doi.org/10.1037/0022-3514.75.6.1586

McCullough, M. E., Worthington Jr, E. L., & Rachal, K. C. (1997). Interpersonal forgiving in close relationships. *Journal of Personality and Social Psychology*, *73*(*2*), 321–336. https://doi.org/10.1037/0022-3514.73.2.321

Meierhenrich, J. (2008). Varieties of reconciliation. *Law & Social Inquiry*, *33*(*1*), 195–231. http://www.jstor.org/stable/20108753

Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Ann Card Anaesth*, *22*(*1*), 67–72. https://doi.org/10.4103/aca.ACA_157_18

Mróz, J., Kaleta, K., & Sołtys, E. (2022). Decision to forgive scale and emotional forgiveness scale in a polish sample. *Current Psychology*, *41*(*6*), 3443–3451. https://doi.org/10.1007/s12144-020-00838-6

O' Riordan, C. (2000). A forgiving strategy for the iterated prisoner's dilemma. *Journal of Artificial Societies and Social Simulation*, *3(4)*.

Pandey, S., & Elliott, W. (2010). Suppressor variables in social work research: Ways to identify in multiple regression models. *Journal of the Society for Social Work and Research*, *1*(*1*), 28–40. https://doi.org/10.5243/jsswr.2010.2

Preston, C. C., & Colman, A. M. (2000). Optimal number of response categories in rating scales: reliability, validity, discriminating power, and respondent preferences. *Acta Psychologica*, *104*(*1*), 1–15. https://doi.org/https://doi.org/10.1016/S0001-6918(99)00050-5

Ratka, A. (2018). Empathy and the development of affective skills. *American Journal of Pharmaceutical Education*, *82*(*10*), 1140–1143. https://doi.org/10.5688/ajpe7192

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(*2*), 1–36. https://doi.org/10.18637/jss.v048.i02

Rowe, J. O., Halling, S., Davies, E., Leifer, M., Powers, D., & Bronkhorst, J. V. (1989). The psychology of forgiving another. In R. S. Valle & S. Halling (Eds.), *Existential-phenomenological perspectives in psychology* (pp. 233–244). Springer.

Russell, L. (2020). The who, the what, and the how of forgiveness. *Philosophy Compass*, *15*(*3*). https://doi.org/10.1111/phc3.12656

Rye, M. S., Loiacono, D. M., Folck, C. D., Olszewski, B. T., Heim, T. A., & Madia, B. P. (2001). Evaluation of the psychometric properties of two forgiveness scales. *Current Psychology*, *20*(*3*), 260–277. https://doi.org/10.1007/s12144-001-1011-6

Sansone, R. A., & Sansone, L. A. (2012). Rumination: relationships with physical health. *Innovations in clinical neuroscience*, *9*(*2*), 29–34. https://pubmed.ncbi.nlm.nih.gov/22468242

Scheithauer, H., Alsaker, F., Wölfer, R., & Ruggieri, S. (2013). Cyberball: A reasonable paradigm for research in developmental science? *International Journal of Developmental Sciences*, *7*(*1*), 1–6. https://doi.org/10.3233/DEV-1300071

Schumann, K., & Ross, M. (2010). The benefits, costs, and paradox of revenge. *Social and Personality Psychology Compass*, *4*(*12*), 1193–1205. https://doi.org/https://doi.org/10.1111/j.1751-9004.2010.00322.x

Shi, D., Lee, T., & Maydeu-Olivares, A. (2019). Understanding the model size effect on SEM fit indices. *Educational and Psychological Measurement*, *79*(*2*), 310–334. https://doi.org/10.1177/0013164418783530

Shi, D., Maydeu-Olivares, A., & Rosseel, Y. (2020). Assessing fit in ordinal factor analysis models: SRMR vs. RMSEA. *Structural Equation Modeling: A Multidisciplinary Journal*, *27*(*1*), 1–15. https://doi.org/10.1080/10705511.2019.1611434

Shnabel, N., & Nadler, A. (2008). A needs-based model of reconciliation: satisfying the differential emotional needs of victim and perpetrator as a key to promoting reconciliation. *Journal of Personality and Social Psychology*, *94(1),* 116–132. https://doi.org/10.1037/0022-3514.94.1.116

Shnabel, N., & Nadler, A. (2010). A needs-based model of reconciliation: Perpetrators need acceptance and victims need empowerment to reconcile. In M. Mikulincer (Eds.), *Prosocial motives, emotions, and behavior: The better angels of our nature.* (pp. 409–429). American Psychological Association. https://doi.org/10.1037/12061-021

Spitzberg, B. H., Canary, D. J., & Cupach, W. R. (1994). A competence-based approach to the study of interpersonal conflict. *Communication Research*, *28(1),* 183–202. https://doi.org/10.1177/009365001028001003

Stackhouse, M. (2019). Trait forgiveness as a predictor of state forgiveness and positive work outcomes after victimization. *Personality and Individual Differences*, *149(1),* 209–213. https://doi.org/10.1016/j.paid.2019.06.006

Stillwell, A. M., Baumeister, R. F., & Del Priore, R. E. (2008). We're all victims here: Toward a psychology of revenge. *Basic and Applied Social Psychology*, *30*(*3*), 253–263. https://doi.org/10.1080/01973530802375094

Strelan, P. (2018). Justice and forgiveness in interpersonal relationships. *Current Directions in Psychological Science*, *27*(*1*), 20-24. https://doi.org/10.1177/0963721417734311

Strelan, P., & Sutton, R. M. (2011). When just-world beliefs promote and when they inhibit forgiveness. *Personality and Individual Differences*, *50*(*2*), 163–168. https://doi.org/https://doi.org/10.1016/j.paid.2010.09.019

Strelan, P., Van Prooijen, J.-W., & Gollwitzer, M. (2020). When transgressors intend to cause harm: The empowering effects of revenge and forgiveness on victim well-being. *British Journal of Social Psychology*, *59*(*2*), 447–469. https://doi.org/https://doi.org/10.1111/bjso.12357

Stuckless, N., & Goranson, R. (1992). The vengeance scale: Development of a measure of attitudes toward revenge. *Journal of Social Behavior & Personality*, *7*(1), 25–42.

Tabachnick, B. G., Fidell, L. S., & Ullman, J. B. (2007). *Using multivariate statistics* (5th Ed.). Pearson Boston.

Tao, L., Ji, M., Zhu, T., Fu, H., & Sun, R. (2020). A pilot study for forgiveness intervention in adolescents with high trait anger: Enhancing empathy and harmony. *Frontiers in Psychololy*, *11(569134)*. https://doi.org/10.3389/fpsyg.2020.569134

Thompson, L. Y., Snyder, C. R., Hoffman, L., Michael, S. T., Rasmussen, H. N., Billings, L. S., Heinze, L., Neufeld, J. E., Shorey, H. S., Roberts, J. C., & Roberts, D. E. (2005). Dispositional forgiveness of self, others, and situations. *Journal of Personality*, *73*(*2*), 313–360. https://doi.org/https://doi.org/10.1111/j.1467-6494.2005.00311.x

Ulloa, E. C., Hammett, J. F., Meda, N. A., & Rubalcaba, S. J. (2017). Empathy and romantic relationship quality among cohabitating couples: An actor–partner interdependence model. *The Family Journal*, *25*(*3*), 208–214. https://doi.org/10.1177/1066480717710644

Volf, M. (1999). The social meaning of reconciliation. *Transformation*, *16*(1), 7–12. http://www.jstor.org/stable/43052479

Waal, F., & Pokorny, J. (2005). Primate conflict and its relation to human forgiveness. In E. L. Worthington & N. G. Wade (Eds.), *Handbook of Forgiveness* (pp. 15–32). Routledge.

Whiteman, R. C., & Mangels, J. A. (2020). State and trait rumination effects on overt attention to reminders of errors in a challenging general knowledge retrieval task. *Frontiers in Psychology, 11(2904)*. https://doi.org/10.3389/fpsyg.2020.02094

Witvliet, C. V. O., Root Luna, L., Worthington, E. L., Jr., & Tsang, J. A. (2020). Apology and restitution: The psychophysiology of forgiveness after accountable relational repair responses. *Frontiers in Psychology*, *11*(*284*). https://doi.org/10.3389/fpsyg.2020.00284

Worthington, E. L. (2005). Initial questions about the art and science of forgiving. In E.L. Worthington & N.G. Wade (Eds.), *Handbook of Forgiveness* (pp.1–13). Routledge.

Worthington, E. L. (2006). *Forgiveness and reconciliation: Theory and application*. Routledge/Taylor & Francis Group.

Worthington, E. L., Hook, J. N., & Utsey, S. O. (2013). *Decisional and emotional forgiveness: Conceptualization and development of self-report measures.* Unpublished Manuscript. School of Psychology, Virginia Commonwealth University.

Worthington, E. L., Kurusu, T. A., Collins, W., Berry, J. W., Ripley, J. S., & Baier, S. N. (2000). Forgiving usually takes time: A lesson learned by studying interventions to promote forgiveness. *Journal of Psychology and Theology*, *28*(*1*), 3–20. https://doi.org/10.1177/009164710002800101

Worthington, E. L., Lavelock, C., vanOyen Witvliet, C., Rye, M. S., Tsang, J.-A., & Toussaint, L. (2015). Measures of forgiveness: Self-report, physiological, chemical, and behavioral indicators. In G. J. Boyle, D. H. Saklofske, & G. Matthews (Eds.), *Measures of Personality and Social Psychological Constructs* (pp. 474–502). Academic Press. https://doi.org/10.1016/B978-0-12-386915-9.00017-6

Ysseldyk, R., Matheson, K., & Anisman, H. (2007). Rumination: Bridging a gap between forgivingness, vengefulness, and psychological health. *Personality and Individual Differences*, *42*(*8*), 1573–1584. https://doi.org/10.1016/j.paid.2006.10.032

Yu, L., Gambaro, M., Song, J. Y., Teslik, M., Song, M., Komoski, M. C., Wollner, B., & Enright, R. D. (2021). Forgiveness therapy in a maximum-security correctional institution: A randomized clinical trial. *Clinical Psychology & Psychotherapy*, *28*(*6*), 1457–1471. https://doi.org/https://doi.org/10.1002/cpp.2583

Appendix 1: Preregistration Document

As Predicted:"Behavioural Forgiveness and Revenge: The University of Adelaide"

Created: 05/01/2022 05:44 PM (PT)

1) Have any data been collected for this study already?

No, no data have been collected for this study yet.

2) What's the main question being asked or hypothesis being tested in this study?

The main aim of this study is to validate a 20 item self-report scale of forgiveness and revenge behaviours. Specifically, we hypothesise the following:

H1) The new behavioural forgiveness measure will exhibit a two-factor structure, indicating forgiveness and revenge.

H2) Items 1-12 will load on factor 'forgiveness' and items 13-20 will load on factor 'revenge'.

H3) The new forgiveness behaviour measures will have a positive relationship with decisional forgiveness, emotional forgiveness, willingness to reconcile, state empathy and trait forgiveness but a negative relationship with rumination and trait vengeance.

H4) The new revenge behaviour measures will have a negative relationship with decisional forgiveness, emotional forgiveness, willingness to reconcile, state empathy and trait forgiveness but a positive relationship with rumination and trait vengeance.

H5) Decisional forgiveness, emotional forgiveness, willingness to reconcile, state empathy and trait forgiveness at time one will predict forgiving behaviours at both time one and time two.

H6) The new forgiveness behaviour measure at time one will be positively correlated with forgiveness behaviours at time two.

H7) The new revenge behaviour measure at time one will be positively correlated with revenge behaviours at time two. Further, no directional hypothesis is made on the relationship between forgiveness and revenge behaviours measures.

3) Describe the key dependent variable(s) specifying how they will be measured.

We will measure forgiveness and revenge behaviours on the new measure that we aim to validate. Participants will select indicate with 'yes' or 'no' whether they have performed a behaviour since the given transgression.

4) How many and which conditions will participants be assigned to?

This study will utilise a correlational design and therefore participants will not be assigned conditions.

We will measure decisional forgiveness on a 6-item questionnaire from Davis et al. (2015). Participants will rate their agreement on a 5-point Likert scale from (1 = strongly disagree) to (5 = strongly agree).

We will measure emotional forgiveness on a 7-item questionnaire from Worthington et al. (2007). Participants will rate their agreement on a 5-point Likert scale from (1 = strongly disagree) to (5 = strongly agree).

We will measure willingness to reconcile on an 8-item questionnaire from Shnabel et al. (2008). Participants will rate their agreement on a 5-point Likert-type scale from (1 = not at all) to (5 = very much).

We will measure trait forgiveness on a 10-item questionnaire from Berry et al. (2005). Participants will rate their agreement on a 5-point Likert scale from (1 = strongly disagree) to (5 = strongly agree).

We will measure trait revenge on a 20-item questionnaire from Stuckless & Goranson (1992). Participants will rate their agreement on a 7-point Likert scale from (1 = strongly disagree) to

(7 = strongly agree).

We will measure state empathy on a 5-item questionnaire from Coke, Bastian & McDavis (1978). Participants will rate their agreement on a 5-point Likert-type scale from (1 = not at all) to (7 = all the time).

We will measure state rumination on an 8-item questionnaire from McCullough, Bono & Root (2007). Participants will rate their agreement on a 6-point Likert-type scale from (0 = not at all true of me) to (5 = extremely true of me).

We will measure socially desirable responding using a 16-item questionnaire from Hart et al. (2015). Participants will rate their agreement on a 7-point Likert-type scale from (1 = not at all true of me) to (7 = extremely true of me).

5) Specify exactly which analyses you will conduct to examine the main question/hypothesis.

To assess the factor structure of the behavioural measure, we will conduct a CFA. Adequate model fit will be determined using the cut-off criteria suggested by Marsh et al. (2004). Comparative fit index (CFI) and Tucker-Lewis index (TLI)>.90, root-mean-square error of approximation (RMSEA)<.08, and standardized root mean square residual (SRMR)<.08 were considered to show adequate fit. CFI and TLI>.95, RMSEA<.06, and SRMR<.08 denoted excellent fit. If the CFA does not show adequate fit to the data we will begin iterative model modification (including allowing correlated item errors, item cross- loadings, and item removal). Should the CFA model prove too restrictive we will employ Exploratory Structural Equation Modelling (ESEM). The same fit criteria and model modification steps (if required) will be applied to the ESEM model. Associations between the new scales and outcome measures will be examined using a correlation matrix and regression analysis applied to manifest scale scores.

6) Describe exactly how outliers will be defined and handled, and your precise rule(s) for excluding observations.

We will exclude participants who i) do not complete the entire survey, ii) fail at least one of the two instructed attention check items (embedded in the decisional forgiveness and trait revenge scales), iii) fail re-captcha checks designed to test for bots, iv) describe transgressions that occurred more than 2 SDs above the mean time elapsed, v) take the survey in a time that is above or below 2 SDs from the mean, vi) at time 2 are no longer in a relationship with the partner they spoke about at time 1, vii) at time 2 have not had consistent contact with their partner since time 1 or viii) at time 2 cannot accurately recall the transgression they recounted at time 1

7) How many observations will be collected or what will determine sample size? No need to justify decision, but be precise about exactly how the number will be determined.

An a priori Monte Carlo simulation (1000 iterations) indicated that with a sample size of 550 and an effect size estimate (correlation between the two factors) of r = .16 (based on the outcome of EFA analysis in previous sample N = 306) that 95.9% of the simulations returned a significant association between the factors at a = 0.05 (i.e., power of 95.9%). For this series of simulations, the mean RMSEA = 0.007, mean SRMR = 0.023, denoting excellent model fit.

8) Anything else you would like to pre-register?

(e.g., secondary analyses, variables collected for exploratory purposes, unusual analyses

planned?)

Nothing else to pre-register.

Appendix 2: Table 5

Multiple Linear Regression predicting Forgiveness Behaviours at Time Two

Source	*b*	β	95% CI	*t*	*p*-value
Forgiveness Behaviours T1	.31	.10	[.12, .50]	3.26	<.01
Revenge Behaviours T1	-.05	.10	[-.26, .15]	-.53	.60
Revenge Behaviours T2	.60	.10	[.41, .81]	5.99	<.001
Decisional Forgiveness	-.02	.04	[-.09, .05]	-.52	.60
Emotional Forgiveness	.04	.04	[-.04, .12]	1.04	.30
Willingness to Reconcile	-.04	.03	[-.11, .02]	-1.26	.21
State Empathy	-.04	.03	[-.09, .02]	-1.36	.18
State Rumination	-.03	.02	[-.06, .00]	-1.80	.08
Trait Forgiveness	.01	.04	[-.07, .09]	.25	.80
Trait Revenge	-.02	.02	[-.05, .02]	-1.02	0.31
Impression Management	.02	.03	[-.04, .08]	.68	.50
Self-Deception	.03	.02	[-.03, .09]	1.13	.26
Self-Perceived Forgiveness	.77	.44	[-.11, 1.66]	1.74	.08

Note. R^2 = .49, ΔR^2 = .44

Appendix 3: Table 6

Multiple Linear Regression predicting Revenge Behaviours at Time Two

Source	*b*	β	95% CI	*t*	*p*-value
Revenge Behaviours T1	.16	.08	[.00, .33]	1.97	.05
Forgiveness Behaviours T1	.00	.08	[-.16, .16]	.00	1.00
Forgiveness Behaviours T2	.39	.07	[.26, .52]	5.99	< .0001
Decisional Forgiveness	-.01	.03	[-.07, .05]	-.37	.71
Emotional Forgiveness	.00	.03	[-.07, .06]	-.09	.93
Willingness to Reconcile	-.02	.03	[-.08, .03]	-.80	.43
State Empathy	.02	.02	[-.02, .07]	1.13	.26
State Rumination	.03	.01	[.01, .05]	2.59	< . 05
Trait Forgiveness	.00	.03	[-.06, .06]	.05	.96
Trait Revenge	.02	.01	[-.01, .04]	1.04	.30
Impression Management	.00	.02	[-.05, .04]	-.14	.89
Self-Deception	.00	.02	[-.05, .04]	-.16	.87
Self-Perceived Forgiveness	.02	.36	[-.70, .74]	.10	.96

Note. $R^2 = .44$, $\Delta R^2 = .37$