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Perceived Goal Instrumentality is Associated with Forgiveness:

A Test of the Valuable Relationships Hypothesis

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Abstract

Three autobiographical studies tested the valuable relationships hypothesis of forgiveness. Although previous studies revealed that relationship value predicts interpersonal forgiveness, the measure of relationship value may be conflated with affective assessments of the relationship with the transgressor, which might have caused a criterion contamination problem. Therefore, we assessed the goal-related instrumentality of the transgressor (i.e., how useful the transgressor is for helping the victim to achieve his/her goals in fitness-relevant domains). Three studies, one involving a Japanese student sample (Study 1), a second involving Japanese community sample (Study 2), and a third involving U.S. community sample (Study 3), convergently showed that perceived goal instrumentality, as well as a latent relationship value variable estimated from multiple measures of relationship value, are associated with forgiveness. Moreover, this association could be explained in part by the intermediate association of perceived goal instrumentality with empathy both in Japan and the U.S.

Keywords: Forgiveness, Valuable Relationships Hypothesis, Relationship Value, Goal Instrumentality, Exploitation Risk, Empathy

Perceived Goal Instrumentality is Associated with Forgiveness: A Test of the Valuable Relationships Hypothesis

1. Introduction

Interpersonal conflicts occur within close relationships over even trivial issues. For example, roommates may quarrel over the volume of music, or romantic partners may disagree on where to spend the evening. However, these relationships are often too valuable to lose over such relatively minor conflicts. The same holds true for other primates whose fitness relies heavily on cooperative partnerships with other individuals. Accordingly, de Waal and Aureli (1997) proposed the *valuable relationships hypothesis*, which posits that primates are equipped with evolved psychological mechanisms to settle conflicts over relatively minor resources to repair endangered valuable relationships. In other words, the hypothesis presumes that the ultimate cause of primate appeasement/reassurance gestures and conciliatory tendencies is these behaviors' function to maintain valuable relationships. In fact, it has been shown that primates more readily reconcile with their valuable partners than non-valuable partners after conflicts (see Aureli & de Waal, 2000; de Waal & Aureli, 2000; de Waal, 2000, for reviews). Recently, this adaptationist approach to reconciliation has been applied to help explain some dynamics of human reconciliation (McCullough, 2008; McCullough, Kurzban, & Tabak, 2013).

The central prediction of the valuable relationships hypothesis is that people are more willing to reconcile with valuable partners than with less valuable ones (see Petersen, Sell, Tooby, & Cosmides, 2012, for the similar prediction in the context of criminal justice). In a prospective longitudinal study, McCullough, Luna, Berry, Tabak, and Bono (2010) found that victims tend to forgive their transgressors when they perceive the relationship as valuable (see also McCullough, Pedersen, Tabak, & Carter, 2014). Burnette, McCullough, Van Tongeren, and

Davis (2012) not only conceptually replicated this relationship value–forgiveness association, but also found that this association is moderated by the perception of (future) exploitation risk. That is, victims tend not to forgive even valuable partners if they perceive that the partner is likely to exploit them again. Testing the hypothesis from the transgressors' perspective, Ohtsubo and Yagi (2015) found that participants were more eager to reconcile with their valuable partners. The eagerness was operationalized as their willingness to incur some cost in apologizing to their victim, which is known to make an apology appear more sincere in the eyes of a victim (Ohtsubo & Watanabe, 2009; Ohtsubo et al., 2012; Ohtsubo et al., 2018).

1.1. Operationalization of relationship value

The aforementioned findings indicate that people are more motivated to reconcile with valuable partners. However, relationship value measured in previous studies often included relatively subjective evaluations of a target relationship that might share some affective components with the outcome variable (i.e., forgiveness). For example, the following items were used to measure relationship value in Burnette et al.'s (2012) studies: "He/she is worthless to me" (reverse coded); "I feel like our interests and personalities are very compatible." Forgiveness was also measured by items that address affective reactions to the transgressor (e.g., "I am trying to keep as much distance between us as possible"; "I am finding it difficult to act warmly toward him/her"). Thus, the observed association between relationship value and forgiveness might be due in part to criterion contamination (e.g., a general aversion to saying affectively negative things about other people). Therefore, replications of the relationship value–forgiveness association using a less affectively laden measure of relationship value are desirable.

To counteract this criterion contamination problem, Ohtsubo and Yagi (2015) employed a different operationalization of relationship value that was designed to minimize affective

evaluation of a target relationship. In particular, they operationalized relationship value as participants' perceptions of the utility or instrumentality of a relationship (see Fitzsimons & Shah, 2008, for a definition of the goal instrumentality of relationship partners). In short, their measure generates a metric of how instrumental a specific person is perceived to be by averaging how much of a help or hindrance that individual is perceived to be for achieving one's goals across fitness-relevant domains of life, such as jobs (status), romantic relationships (reproduction), and interpersonal relationships (coalitions). The present research attempts to replicate Burnette et al.'s (2012) and McCullough et al.'s (2010, 2014) results using this perceived goal instrumentality measure of relationship value. We predicted that a measure of relationship value that is based on the perceived instrumentality of the transgressor to the fulfillment of important life goals will be associated with forgiveness of the transgressor.

1.2. Role of empathy

Although the work presented here attempts to dissociate affective aspects from the measurement of relationship value, we do not mean to suggest that the proximate cause of human reconciliation is entirely a "cold" deliberative process. In other words, we do not posit that the relationship value–forgiveness association can be fully accounted for by one's deliberate attempt to continue a valuable relationship based on explicit cost–benefit calculations (cf. Worthington, Witvliet, Pietrini, & Miller, 2007). In contrast, we consider that emotions play a pivotal role in commitment to mutually beneficial relationships. Testing the effect of goal instrumentality from the transgressor's perspective, Nelissen (2014) showed that people tend to feel stronger guilt when they offended a partner who is more instrumental for them to attain a certain goal than a partner who is less instrumental. Likewise, Ohtsubo and Yagi (2015) showed that an increased sense of guilt mediates the goal instrumentality–costly apology association.

Empathy for the transgressor is known to be an important proximate cause of forgiveness (e.g., McCullough et al., 1998; McCullough, Worthington, & Rachal, 1997; see also Fehr, Gelfand, & Nag, 2010, for a meta-analytic review). Extrapolating from the goal instrumentality–guilt association to the forgiveness context, we predict that a victim who finds the transgressor more instrumental is more likely to feel empathy for the transgressor. There is suggestive empirical evidence for this prediction. In a series of experiments examining the effect of goal instrumentality on relationship evaluations, Fitzsimons and Shah (2008) manipulated accessibility of a particular goal (e.g., academic achievement) in their participants and assessed the participants' evaluations of two real friends: one was instrumental for them to achieve the primed goal and the other was neutral. Fitzsimons and Shah showed that the experimentally heightened accessibility of a particular goal increased perceived closeness to the instrumental, but not neutral, friend. Because other studies have shown also that closeness facilitates empathy (e.g., Beeney, Franklin, Levy, & Adams, 2011; Meyer et al., 2013), it is plausible that goal instrumentality promotes empathy as well. Therefore, we predict that empathy engendered by perceived goal instrumentality promotes forgiveness. Notice, however, that this prediction does not *logically* follow from the valuable relationships hypothesis because the ultimate cause does not specify which proximate cause (e.g., cognition, empathy, or other emotions) in fact evolved to serve the function. Thus, the test of this prediction is considered as a novel *empirical* extension of the previous research on the valuable relationships hypothesis (Burnette et al., 2012; McCullough et al., 2010, 2014).

1.3. Secondary purposes

There were two secondary purposes of this study. First, this study aimed at testing the cross-cultural replicability of Burnette et al.'s (2012) finding of an interaction between relationship

value and perceived exploitation risk that suggests that people are prone to forgiving a valuable transgressor insofar as they anticipate that he/she is unlikely to exploit them again. Although Burnette et al. replicated this interaction effect in two studies, both studies were conducted in the United States. To our knowledge, no cross-cultural replications have been reported. Furthermore, no studies have yet tested whether the association between perceived goal instrumentality and forgiveness, if present, is similarly moderated by perceived exploitation risk.

Second, because we included multiple measures of relationship value in all three studies, for an exploratory purpose, we estimated the latent factor underlying the variously operationalized relationship value measures and then used that latent variable to test the relationship value–forgiveness association. Recall that we purposefully eliminated affectively-laden components of relationship value from our measure of goal instrumentality. Therefore, it is worthy to investigate whether both non-affective and affective measures of relationship value reflect an underlying latent construct, and whether this latent factor predicts forgiveness.

In sum, across a series of three autobiographical studies we tested two predictions which regard an ultimate cause and a proximate cause of human forgiveness, respectively. (i) Perceived goal instrumentality is associated with forgiveness. And, (ii) the association between perceived goal instrumentality and forgiveness is mediated by empathy. In addition, this study addressed two secondary research questions. (iii) Is the relationship value × exploitation risk interaction replicable in Japan and with the perceived goal instrumentality measure? And, (iv) does a latent relationship value construct underlie various measures of relationship value, and predict variance in forgiveness?

2. Study 1: Survey with a student sample from Japan

2.1. Method

2.1.1. Participants

In Ohtsubo and Yagi's (2015) study, the perceived goal instrumentality–apology correlation was approximately .20, and we expected the perceived goal instrumentality–forgiveness correlation to be of a similar magnitude. However, to hedge against Type II error (if the true effect size turned out to be substantially smaller than $r = .20$), we calculated the desired sample size to ensure a power of .80 for a correlation of .18. This power analysis yielded a sample size of 240. Therefore, we decided to collect at least 250 participants in each of the three studies.

A total of 332 Japanese students from two large Japanese universities participated in Study 1. The sample included 13 high school students who were auditing a university lecture. In total, 52 participants were excluded from data analyses because they did not follow the transgression-eliciting instructions (see subsection 2.1.2). The specific reasons were as follows: no transgression reported (36), the transgressor was a relative (5), the participant reported an incident involving multiple transgressors (5), the transgressor was a stranger (4), and the transgression did not occur within the past year (2). The remaining sample consisted of 280 Japanese students (118 women; 3 unspecified sex) who ranged in age from 17 to 23 years old ($M = 19.78$, $SD = 0.99$).

2.1.2. Procedure and materials

Participants completed the questionnaire either in small group sessions or in mass testing sessions. All materials for this study were administered in Japanese.

Participants first recalled and briefly transcribed a recent incident in which they were harmed (either physically, financially, or emotionally), betrayed, or otherwise wronged by a non-relative. They were instructed not to recall an incident involving a total stranger. To assure that participants described an incident with an appropriate transgressor, they indicated their

relationship type (e.g., friend, classmate, romantic partner) at the time of the transgression. Participants also rated their level of anger at the time of transgression with three items: "How angry were you at the transgressor?"; "How much did you want to avoid seeing the transgressor?"; "How much did you want to retaliate against the transgressor?" (1 = *not at all* to 5 = *very much*). Then, participants rated their pre-transgression feeling of closeness to the transgressor using the Inclusion of Other in the Self (IOS) Scale (Aron, Aron, & Smollan, 1992). The anger and closeness scores were included as control variables.

Our primary measure of relationship value (i.e., perceived goal instrumentality) originates from Ohtsubo and Yagi's (2015) research. Participants were asked to rate the instrumentality of their transgressor, just prior to the transgression, using a 7-point scale (−3 to +3; four labels were provided for −3 [*an extreme hindrance*], −1 [*somewhat of hindrance*], +1 [*somewhat of a help*], and +3 [*an extreme help*]). Specifically, they rated how much of a help or hindrance their transgressor was, *before* the time of incident, for achieving goals in the following six domains of life: studies at university, club and sports activities, finding a job or continuing education, interpersonal relationships, part-time work, and other important goals. Participants were allowed to choose "non-applicable" for any items that did not relate to them, in which case the item was removed from the calculation of the participant's mean score on this measure.

It is known that transgressors' conciliatory gestures facilitate forgiveness (Tabak, McCullough, Luna, Bono, & Berry, 2012) and victims' rumination about a particular transgression hinders forgiveness (McCullough, Bono, & Root, 2007), so we assessed post-event transgressor conciliation and rumination as control variables. Participants reported whether their transgressor exhibited six conciliatory gestures (apologized, treated [or offered to treat] you to lunch or a snack, explained why it happened, bought you a gift, expressed shame/embarrassment,

and repaired [or try to repair] the harm/damage). We counted the number of "yes" responses to these six items, and used this as the transgressor (conciliatory) reaction score. We measured rumination about the transgression with the seven-item intrusion subscale of Horowitz, Wilner, and Alvarez's (1979) Impact of Event scale. Sample items included "I had waves of strong feelings about it," and "Any reminder brought back feelings about it." The rumination items were rated on a 4-point scale (0 = *never* to 3 = *often*). This scale was translated into Japanese by the authors using the back-translation method.

We measured empathy using five items, rated on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*), adapted from Batson, Duncan, Ackerman, Buckley, and Birch (1981). Example items are: "I feel empathy towards him/her," and "I have warm feelings toward him/her." These empathy items were mixed with the 10 items of Burnette et al.'s (2012) Relationship Value and Exploitation Risk (RVEX) scale. Sample items of exploitation risk include "I feel threatened by him/her" and "I feel like he/she might do something bad to me again" (see the Introduction for sample items of relationship value). The RVEX was translated into Japanese by the authors using the back-translation method.

To measure forgiveness, we used the 18-item Transgression Related Interpersonal Motivations Inventory (TRIM; McCullough et al., 2010) using a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). Sample items include "I'll make him/her pay," "I am avoiding him/her," and "Even though his/her actions hurt me, I have goodwill for him/her." The Japanese version was adapted from Ohtsubo, Yamaura, and Yagi's (2015) study. The TRIM includes measures of revenge and avoidance motivations, both of which decline as one forgives a transgressor, as well as benevolence motivations. Although the TRIM yields a single metric of unforgiveness, we reverse-coded the score in our analyses, such that higher TRIM scores

indicate greater forgiveness.

Although we additionally assessed participants' current feeling of closeness and perceived goal instrumentality, we did not include these data in the subsequent analyses because they were irrelevant to the present purpose. As these scores are available at the Open Science Framework (https://osf.io/tr569/), interested readers can analyze by themselves.

2.1.3. Latent relationship value factor

To extract the latent factor scores, using the lavaan package in R (Rosseel, 2012), we fit a latent relationship value model using two indicators (i.e., the goal instrumentality and RVEX relationship value measures). In order to globally identify the latent relationship value model, the factor loadings of the indicators were constrained to be equal and the factor variance was set to unity. Although the model fit poorly ($\chi^2(1) = 51.75$, $p < .001$, CFI = .264, RMSEA = .426), the purpose of this model was only to extract factor scores for use in preliminary analyses. In addition, Forster et al. (unpublished manuscript) recently took the latent factor approach to conceptualize forgiveness. It is thus interesting to include latent forgiveness in our analyses and examine the relationship value–forgiveness association at the latent factor level, and examine whether latent relationship value predicts latent forgiveness. We conducted a series of such exploratory analyses for the three studies. We report the results in the Supplementary Materials.

2.2. Results

2.2.1. Descriptive Statistics and the Relationship Value × Forgiveness Correlation

Descriptive statistics of variables of interest (means, standard deviations, Cronbach's α coefficients, and correlations among the variables) are summarized in Table 1. As can be seen in Table 1, perceived goal instrumentality and RVEX relationship value were moderately correlated, $r_{277} = .47$, $p < .001$, 95% CI [.37, .56] (the p-value was adjusted for multiple

comparisons by the Holm method), consistent with the idea that they might share common construct variance but different sources of method variance. In addition, perceived goal instrumentality was significantly correlated with forgiveness, $r_{277} = .44$, $p < .001$, 95% CI [.34, .53] (p-value adjusted by the Holm method). Confirming our assumption that perceived goal instrumentality is less affectively laden than RVEX relationship value, the zero-order correlation of perceived goal instrumentality and empathy (.37) is significantly smaller than the zero-order correlation between RVEX relationship value and empathy (.75), $t(276) = 9.29$, $p < .001$ by Hotelling's test for correlated correlations.

2.2.2. Is the relationship value–forgiveness association explained by confounding variables?

We examined whether perceived goal instrumentality, RVEX relationship value, and latent relationship value predict forgiveness even after controlling for potential confounding variables: closeness (labeled as "IOS" in Tables 1 and 2), anger at the transgressor, transgressor reaction, and sex (coded as male = 1 and female = 2). We did not include rumination as a control variable because it was not significantly correlated with perceived goal instrumentality. A series of multiple regression analyses indicated that perceived goal instrumentality, RVEX relationship value, and latent relationship value were significantly associated with forgiveness ($\beta = .30$, $p < .001$, 95% CI [.20, .39] for perceived goal instrumentality; $\beta = .65$, $p < .001$, 95% CI [.56, .75] for RVEX relationship value; and $\beta = .43$, $p < .001$, 95% CI [.34, .53] for latent relationship value) even after controlling for the potential confounds (Table 2; see also Table S1 for 95% CIs of the regression coefficients).

2.2.3. Is the relationship value–forgiveness association mediated by empathy?

To test whether the association of relationship value with forgiveness is mediated by empathy, we first examined the zero-order correlations among our three main variables. As shown in Table

1, perceived goal instrumentality was significantly correlated with forgiveness (r_{277} = .44, p < .001, 95% CI [.34, .53]) and empathy (r_{277} = .37, p < .001, 95% CI [.27, .47]), and empathy was significantly correlated with forgiveness (r_{277} = .61, p < .001, 95% CI [.53, .68]). As shown in Figure 1a, once the association of empathy with forgiveness was statistically controlled for, the association between perceived goal instrumentality and forgiveness decreased from .44 to .24 (p < .001). This result is consistent with partial mediation, which we confirmed using the bootstrapping procedure with 10,000 samples. The estimated indirect effect was .20, 95% CI [.13, .26]. We next calculated the percent of the total effect accounted for by the indirect effect (i.e., percent mediation or P_M). In this case, P_M was .44, indicating that 44% of the effect of perceived goal instrumentality on forgiveness was accounted for by empathy.

We explored the robustness of the mediation by empathy using the RVEX relationship value and latent relationship value as predictor variables. Although we observed a similar pattern for the RVEX relationship value (indirect effect = .08, see Figure S1a in the Supplementary Materials), the 95% CI of the indirect effect [−.008, .17] included 0. Partial mediation was observed for the latent measure of relationship value, however (Figure S4a in the Supplementary Materials): The association between relationship value measured as a latent trait and forgiveness decreased from .59 to .37 (p < .001; P_M = .37). The indirect effect was .22, 95% CI [.15, .29]. Thus, the partial mediation by empathy between relationship value and forgiveness seems robust across different operationalizations (although it failed to reach the conventional significance level when RVEX relationship value was used).

2.2.4. Does exploitation risk moderate the relationship value–forgiveness association?

To test the cross-cultural replicability of Burnette et al.'s (2012) finding that perceived exploitation risk moderates the effect of relationship value on forgiveness, we conducted a

multiple regression analysis whereby forgiveness was predicted from perceived goal instrumentality and exploitation risk as well as their interaction term. Although the effects of perceived goal instrumentality and exploitation risk were both significant (β = .39, $p < .001$, 95% CI [.28, .50] for perceived goal instrumentality; β = −.26, $p < .001$, 95% CI [−.37, −.16] for exploitation risk), contrary to Burnette et al.'s results, the interaction effect was not significant, β = −.02, $p = .746$, 95% CI [−.12, .09]. Figure 2a displays the effect of exploitation risk at two levels of perceived goal instrumentality (1*SD* ± mean) to visually verify the non-significant interaction (Cohen & Cohen, 1983). We also confirmed the non-significant interaction effect for different operationalizations of relationship value (see Table S4 in the Supplementary Materials).

2.3. Study 1 Discussion

Study 1 confirmed two of our primary predictions. Relationship value operationalized as perceived goal instrumentality was positively associated with forgiveness, and this perceived goal instrumentality–forgiveness association was partially mediated by empathy. The same pattern emerged regardless of how relationship value was operationalized (but partial mediation by empathy for RVEX relationship value failed to reach the conventional level of statistical significance). Although one might suspect that goal instrumentality facilitates a "cold" deliberative process rather than heartfelt forgiveness, the results showed that goal instrumentality is associated with an emotional reaction (i.e., empathy) toward the transgressor. Contrary to past research (Burnette et al., 2012), however, the effect of relationship value on forgiveness was not moderated by exploitation risk. One limitation of Study 1 was its reliance on a student sample. Therefore, we conducted Study 2 to determine whether the results obtained in Study 1 can be generalized to a sample with greater demographic heterogeneity.

3. Study 2: Online survey with a community sample from Japan

3.1. Method

3.1.1. Participants

A sample of 554 Japanese community-based participants were recruited through an online survey service provided by Cross Marketing Inc., Japan. However, 59 participants were excluded from data analyses for the following reasons: no transgression was reported (35), the transgressor was a relative (17), the transgressor was a stranger (3), the participant was the transgressor (1), and the transgression did not occur within the past year (1). In addition, two participants whose transgressor was deceased at the time of the study were excluded. Although this criterion was not included in the instructions, we discarded them because the death of a transgressor may have unexpected effects on forgiveness. The remaining sample consisted of 495 Japanese adults (224 females) who ranged in age from 20 to 60 years old (M = 38.06, SD = 10.55).

3.1.2. Procedure and materials

Study 2 was conducted online. All materials for this study were administered in Japanese. The materials in Study 2 were identical to those used in Study 1 with exceptions outlined below. We tailored our primary measure of perceived goal instrumentality from Study 1 for use with an adult community sample. Thus, we measured perceived goal instrumentality as it pertains to the following eight domains of life: work, part-time jobs, hobbies, volunteer activities, interpersonal relationships, romantic relationships, family relationships, and other important goals.

Furthermore, we included one additional control variable related to forgiveness, a measure of the perceived intention of the transgressor, and two additional variables related to relationship value: “rank relationship value” which involved a single question regarding transgressor utility (i.e., “Compared to all other people, how useful, overall, was transgressor was at the time of the transgression?”) measured on 10-point scale (from “the transgressor was in

the bottom 10 percentile" = 1 to "the transgressor was in the top 10 percentile" = 10). We also included a measure of the Welfare Tradeoff Ratio (WTR). WTR is defined as the willingness to sacrifice one's own welfare for the sake of a particular other (Tooby, Cosmides, Sell, Lieberman, & Sznycer, 2008). In this study, as in Smith, Pedersen, Forster, McCullough, and Lieberman (2017), we measured participants' WTRs for their transgressors by assessing their hypothetical willingness to make descending levels of monetary sacrifices for the transgressor (Rachlin & Jones, 2007). Because some participants' responses were inconsistent with the operationalization of this construct (e.g., they reported willingness to make some large sacrifice, but were unwilling to make smaller sacrifices), the sample size of the analyses involving WTR (n = 353) was smaller than the sample size of other analyses (see the Supplementary Materials for more details of the operationalization of WTR).

As in Study 1, we factor analyzed our measures of relationship value in order to use participants' latent relationship value scores as a predictor in analyses. After confirming that only one eigenvalue (1.87) of the correlation matrix of the four measures exceeded 1, we conducted a confirmatory factor analysis specifying a one-factor solution. The solution fit the data well ($\chi^2(2) = 0.19$, $p = .91$; CFI = 1.00; RMSEA = .000, 90% CI = [0.000, 0.043], $p = .960$; SRMR = 0.005), with the single factor explaining 31.6% of the variance and indicator loadings ranging from .32 to .78. Factor scores were saved for use in other analyses.

3.2. Results

3.2.1. Descriptive statistics and relationship value × forgiveness correlation

Descriptive statistics of variables of interest (means, standard deviations, Cronbach's α coefficients, and correlations among the variables) are summarized in Table 3. We first confirmed the mutual correlations among the four measures of relationship value (i.e., perceived

goal instrumentality, RVEX relationship value, rank relationship value, and WTR): Perceived goal instrumentality was significantly correlated with RVEX relationship value ($r_{493} = .36$, $p < .001$, 95% CI [.28, .44]) and rank relationship value ($r_{493} = .24$, $p < .001$, 95% CI [.16, .32]), but only marginally with WTR ($r_{351} = .15$, $p = .071$, 95% CI [.05, .25]) after adjusting the *p*-values for multiple comparisons by the Holm method. RVEX relationship value was significantly correlated with rank relationship value ($r_{493} = .42$, $p < .001$, 95% CI [.34, .49]) and WTR ($r_{351} = .25$, $p < .001$, 95% CI [.15, .34]). Finally, rank relationship value was significantly correlated with WTR ($r_{351} = .20$, $p = .004$, 95% CI [.10, .30]). These moderate correlations among the four relationship value measures are consistent with the assumption that the four measures shared common construct variance, while also possessing different sources of method variance.

We then examined whether the four measures of relationship value were correlated with forgiveness, and whether perceived goal instrumentality, rank relationship value, and WTR were less "emotional" than RVEX relationship value. Perceived goal instrumentality was significantly correlated with forgiveness, $r_{493} = .35$, $p < .001$, 95% CI [.27, .42] after adjustment for multiple comparisons by the Holm method. In addition, the correlations between forgiveness and RVEX relationship value ($r_{493} = .68$, $p < .001$, 95% CI [.63, .72]), rank relationship value ($r_{493} = .35$, $p < .001$, 95% CI [.27, .42]), and WTR ($r_{351} = .28$, $p < .001$, 95% CI [.18, .37]) were also significant after adjustment by the Holm method. The perceived goal instrumentality–empathy correlation (.22) was significantly smaller than the RVEX relationship value–empathy correlation (.73), $t(492) = 14.66$, $p < .001$ by Hotelling's test for correlated correlations. In addition, the rank relationship value–empathy correlation (.34) and the WTR–empathy correlation (.28) were also significantly smaller than the RVEX relationship value–empathy

correlation, $t(492) = 11.82$, $p < .001$ for rank relationship value and $t(350) = 10.27$, $p < .001$ for WTR.

3.2.2. Is the relationship value–forgiveness association explained by confounding variables?

As shown in Table 2 (see also Table S2 for 95% CIs for regression coefficients), a multiple regression analysis revealed that perceived goal instrumentality significantly predicted forgiveness ($\beta = .16$, $p < .001$, 95% CI [.09, .23]) after controlling for potential confounds (i.e., sex, closeness, anger at the transgressor, transgressor reaction). In addition, comparable multiple regression analyses with RVEX relationship value, rank relationship value, and latent relationship value as the independent variable also revealed significant associations with forgiveness ($\beta = .50$, $p < .001$, 95% CI [.44, .57] for RVEX relationship value; $\beta = .19$, $p < .001$, 95% CI [.12, .26] for rank relationship value; and $\beta = .49$, $p < .001$, 95% CI [.41, .57] for latent relationship value; however, WTR was not significant in the comparable regression analysis ($\beta = .07$, $p = .111$, 95% CI [−.02, .15]).

3.2.3. Is the relationship value–forgiveness association mediated by empathy?

To test the predicted mediation effect, we first examined the zero-order correlations among our three main variables. As shown in Table 3, perceived goal instrumentality was significantly correlated with forgiveness ($r_{493} = .35$, $p < .001$, 95% CI [.27, .42]) and empathy ($r_{493} = .22$, $p < .001$, 95% CI [.13, .30]), and empathy was significantly correlated with forgiveness ($r_{493} = .62$, $p < .001$, 95% CI [.56, .70]). As shown in Figure 1b, once the effect of empathy on forgiveness was statistically controlled, the association between perceived goal instrumentality and forgiveness decreased from .35 to .23 (both $p < .001$; $P_M = .35$). The indirect effect based on the bootstrapping procedure (10,000 samples) was .12, 95% CI [.06, .19].

We examined whether this partial mediation is replicable with the three other measures of

relationship value and latent relationship value. The association between RVEX relationship value and forgiveness decreased from .68 to .49 (both $p < .001$; $P_M = .28$). The indirect effect was .19, 95% CI [.11, .27] (see Figure S1b in the Supplementary Materials). The association between rank relationship value and forgiveness decreased from .35 to .16 (both $p < .001$; $P_M = .55$). The indirect effect was .19, 95% CI [.14, .25] (see Figure S2a in the Supplementary Materials). Although the association between WTR and forgiveness was not significant after controlling for potential confounding variables in a multiple regression analysis (Table 2), because the bivariate correlation between WTR and forgiveness was significant (Table 3), we conducted a comparable mediation analysis. The association between WTR and forgiveness decreased from .29 ($p < .001$) to .10 ($p = .020$; $P_M = .64$). The indirect effect was .19, 95% CI [.12, .27] (see Figure S3a in the Supplementary Materials). The association between latent relationship value and forgiveness decreased from .73 to .45 (both $p < .001$; $P_M = .37$). The indirect effect was .27, 95% CI [.19, .36] (see Figure S4b in the Supplementary Materials). Therefore, regardless of the type of measure of relationship value, empathy appeared to mediate the relationship value–forgiveness association.

3.2.4. Does exploitation risk moderate the relationship value–forgiveness link?

As in Study 1, we conducted a multiple regression analysis involving the interaction between perceived goal instrumentality and exploitation risk. Although perceived goal instrumentality and exploitation risk were significant predictors of forgiveness ($\beta = .30$, $p < .001$, 95% CI [.21, .39] for perceived goal instrumentality; $\beta = -.16$, $p < .001$, 95% CI [−.25, −.08] for exploitation risk), their interaction was not ($\beta = .02$, $p = .599$, 95% CI [−.06, .11]). Figure 2b visually confirms the lack of interaction. We also confirmed the non-significant interaction using different operationalizations of relationship value (see Table S4 in the Supplementary Materials).

Thus, Study 2 again failed to replicate the previously reported interactive effect of the relationship value × exploitation risk on forgiveness (Burnette et al., 2012), here with a community sample of Japanese adults and two additional measures of relationship value.

3.3. Study 2 Discussion

Study 2 confirmed the goal instrumentality–forgiveness association and the mediation by empathy with a Japanese online sample. Study 2 also expanded upon Study 1 by including two additional measures of relationship value: rank relationship value and WTR. Although the association between WTR and forgiveness was weaker, the general patterns were replicated. The relationship value × exploitation risk interaction was not replicated with any measures among the Japanese online sample. To corroborate these results, we conducted Study 3 (a cross-cultural replication of Study 2) using an online sample from the United States.

4. Study 3: Online survey with a community sample from the U.S.

4.1. Method

A total of 497 U.S. users of Amazon's Mechanical Turk participated in this study. However, 49 participants were excluded from data analyses for the following reasons: the transgression did not occur within the past year (22), no transgression was reported (7), the transgressor was a relative (6), the participant completed the study more than once (6), no transgressor was specified (3), the transgressor was a stranger (3), the participant was the transgressor (1), and the transgressor was deceased at the time of the study (1). The remaining sample consisted of 448 U.S. adults (212 women) who ranged in age from 18 to 70 years old (M = 32.96, SD = 9.95). Participants were rewarded 1.00 US dollar.

The procedure for Study 3 was identical to Study 2. All materials used in Study 2 (except the measures originally developed in English) were translated into English, and administered in

Study 3. The materials of Study 3 were thus identical to those of Study 2. For the same reason as with Study 2, the number of useable data points for WTR (n = 356) in Study 3 was less than the overall sample size.

As in Study 2, we conducted a factor analysis using the four measures of relationship value (composite goal instrumentality relationship value, composite RVEX relationship value, rank relationship value, and WTR). Due to missing values in the four relationship value measures, the sample size of latent relationship value analyses was slightly smaller than other analyses (n=352). Eigenvalues of a correlation matrix of the four measures yielded one eigenvalue greater than one (1.93), with a one-factor solution fitting the data well ($\chi^2(2) = 2.00$, p = .367; CFI = 1.00; RMSEA = .002, 90% CI = [0.000, 0.106], p = .627; SRMR = 0.016), explaining 31.6% of the variance. Indicator loadings ranged from .45 to .63. As in Studies 1 and 2, we saved factor scores for use in other analyses.

4.2. Results

4.2.1. Descriptive statistics and the relationship value × forgiveness correlation

Descriptive statistics of variables of interest (means, standard deviations, Cronbach's α coefficients, and correlations among the variables) are summarized in Table 4. As in Study 2, the four measures of relationship value (i.e., perceived goal instrumentality, RVEX relationship value, rank relationship value, and WTR) were significantly and moderately intercorrelated: Perceived goal instrumentality was significantly correlated with RVEX relationship value (r_{441} = .26, p < .001, 95% CI [.17, .35]), rank relationship value (r_{441} = .28, p < .001, 95% CI [.19, .36]), and WTR (r_{354} = .39, p < .001, 95% CI [.30, .48]) after adjusting the p-values for multiple comparisons by the Holm method. RVEX relationship value was significantly correlated with rank relationship value (r_{446} = .21, p < .001, 95% CI [.12, .30]) and WTR (r_{354}

= .32, $p < .001$, 95% CI [.22, .41]). Finally, rank relationship value was significantly correlated with WTR ($r_{354} = .32$, $p < .001$, 95% CI [.22, .41]).

We then examined whether the four measures of relationship value were correlated with forgiveness, and whether perceived goal instrumentality, rank relationship value, and WTR were less "emotional" than RVEX relationship value. Perceived goal instrumentality was significantly correlated with forgiveness, $r_{441} = .24$, $p < .001$, 95% CI [.15, .32] after adjustment for multiple comparisons by the Holm method. In addition, the correlations between forgiveness and RVEX relationship value ($r_{446} = .81$, $p < .001$, 95% CI [.77, .84]), rank relationship value ($r_{441} = .15$, $p = .040$, 95% CI [.06, .24]), and WTR ($r_{354} = .25$, $p < .001$, 95% CI[.15, .34]) were also significant after adjustment by the Holm method. The perceived goal instrumentality–empathy correlation (.22) was significantly smaller than the RVEX relationship value–empathy correlation (.83), $t(445) = 18.96$, $p < .001$, by Hotelling's test for correlated correlations. The rank relationship value–empathy correlation (.20) and the WTR–empathy correlation (.35) were also significantly smaller than the RVEX relationship value–empathy correlation, $t(445) = 20.59$, $p < .001$ for rank relationship value and $t(353) = 13.90$, $p < .001$ for WTR.

4.2.2. Is the relationship value–forgiveness association explained by confounding variables?

As shown in Table 2 (see Table S3 for 95% CIs for regression coefficients), a multiple regression analysis revealed that perceived goal instrumentality is significantly associated with forgiveness ($\beta = .13$, $p = .001$; 95% CI [.05, .20]) after controlling for potential confounds (i.e., sex, closeness, anger at the transgressor, transgressor reaction). In addition, comparable multiple regression analyses showed that the effect of RVEX relationship value on forgiveness was significant ($\beta = .69$, $p = .001$; 95% CI [.63, .75]), as was the effect of latent relationship value ($\beta = .26$, $p < .001$; 95% CI [.16, .35]). However, rank relationship value was not significantly

associated with forgiveness (β = −.0002, *ns*, 95% CI [−.08, .08]), nor was WTR (β = .08, *ns*, 95% CI [−.02, .18]).

4.2.3. Is the Relationship Value–Forgiveness Association Mediated by Empathy?

As shown in Table 4, perceived goal instrumentality was significantly correlated with forgiveness (r_{441} = .24, p < .001, 95% CI [.15, .32]) and empathy (r_{441} = .22, p < .001, 95% CI [.13, .30]), and empathy was significantly correlated with forgiveness (r_{446} = .73, p < .001, 95% CI [.68, .77]). As shown in Figure 1c, once the effect of empathy on forgiveness was statistically controlled, the association between perceived goal instrumentality and forgiveness decreased from .24 to .08 (p = .011; P_M = .65). The indirect effect based on the bootstrapping procedure with 10,000 samples was .15, 95% CI [.09, .22].

We then examined whether this partial mediation is replicable with the three other measures of relationship value and the latent relationship value scores (although rank relationship value and WTR were not significant predictors of forgiveness in the multiple regression analyses reported in Table 2). The association between RVEX relationship value and forgiveness decreased from .81 to .65 (both p < .001; P_M = .19). The indirect effect was .16, 95% CI [.07, .25] (see Figure S1c in the Supplementary Materials). The association between rank relationship value and forgiveness decreased from .15 (p = .002) to .002 (*ns*). The indirect effect was .15, 95% CI [.08, .22] (see Figure S2b in the Supplementary Materials). The association between WTR and forgiveness decreased from .26 (p < .001) to −.02 (*ns*). The indirect effect was .28, 95% CI [.19, .36] (see Figure S3b in the Supplementary Materials). Finally, the association between the latent measure of relationship value and forgiveness decreased from .48 (p < .001) to .11 (p = .011; P_M = .23). The indirect effect was .37, 95% CI [.29, .46] (see Figure S4c in the Supplementary Materials). Therefore, the partial mediation was replicated by the

measure of perceived goal instrumentality, RVEX relationship value, and latent relationship value, while the apparent effects of rank relationship value and WTR were fully mediated by empathy.

4.2.4. Does Exploitation Risk Moderate the Relationship Value–Forgiveness Association?

We conducted a multiple regression analysis involving the interaction between perceived goal instrumentality and exploitation risk. In Study 3, replicating Burnette et al.'s (2012) results, not only perceived goal instrumentality (β = .22, $p < .001$, 95% CI [.13, .30]) and exploitation risk (β = −.38, $p < .001$, 95% CI [−.46, −.29]) but also their interaction was significant (β = −.11, $p = .007$, 95% CI [−.20, −.03]). Figure 2c visually confirms the interaction effect. Simple slope analyses indicated the effect of goal instrumentality was significant at both high ($b = .08$, $p = .037$) and low ($b = .24$, $p < .001$) levels of perceived exploitation risk.

We confirmed the significant interaction effect using the RVEX relationship value (β = −.07, $p = .005$, 95% CI [−.12, −.02]; see Table S4 in the Supplementary Materials for more details of the regression coefficients). Simple slope analyses indicated that the effect of RVEX relationship value was significant at the high ($b = .50$, $p < .001$) and low ($b = .61$, $p < .001$) levels of exploitation risk. Latent relationship value replicated this effect (β = −.12, $p = .01$, 95% CI [−.21, −.03] for their interaction; see also Table S4), with simple slopes analyses indicating that the effect of the latent measure of relationship value was significant at the high ($b = .34$, $p < .001$) and low ($b = .56$, $p < .001$) levels of exploitation risk. However, the interaction effect was not significant when rank relationship value and WTR were used as the measure of relationship value in the multiple regression analysis (see Table S4). In sum, when the relationship value × exploitation risk interaction effect was significant (i.e., when goal instrumentality, RVEX relationship value and latent relationship value were analyzed), the

association of relationship value and forgiveness was stronger at low levels of, as compared to high levels of, exploitation risk.

4.3. Study 3 Discussion

As in Studies 1 and 2, perceived goal instrumentality was significantly associated with forgiveness, and the association appeared to be mediated by empathy. The comparable pattern was found when RVEX relationship value and latent relationship value were analyzed. In addition, a relationship value × exploitation risk interaction effect on forgiveness, which was not replicated in Japan (Studies 1 and 2), was replicated in the U.S. for two of our four measures of relationship value, and for the latent relationship value scores. The reason why rank relationship value and WTR failed to confirm the predictions in the U.S. community sample is not clear from the present study.

5. General discussion

Three autobiographical recall studies convergently showed that perceived goal instrumentality (a less affectively laden operationalization of relationship value) is associated with forgiveness in Japan (Studies 1 and 2) and the U.S. (Study 3). The three studies also showed that the association of perceived goal instrumentality with forgiveness is plausibly mediated by empathy for one's transgressor. Comparable evidence for the relationship value–forgiveness association and mediation by empathy were also found when other operationalizations of relationship value, such as RVEX relationship value and latent relationship value, were analyzed. Although this pattern was less evident when a single-item measure of relationship value (i.e., rank relationship value) and willingness to sacrifice one's welfare for one's partner (i.e., WTR) were analyzed, the valuable relationships hypothesis was consistently supported in two countries with at least two different measures of relationship value and a latent variable approach. Therefore, the present

research provides additional evidence for the valuable relationships hypothesis. It appears that irrespective of how relationship value is measured, it is a reliable predictor of human forgiveness.

Our secondary purpose was to cross-culturally replicate a previously observed relationship value × exploitation risk interaction effect on forgiveness: Burnette et al. (2012) found that U.S. participants were most forgiving of their transgressors when relationship valuable is high *and* perceived exploitation risk is low. We failed to replicate this interaction in Japan, but we successfully replicated it in the U.S. on two of four measures and when using a latent variable to represent relationship value. Although we do not have any definitive explanation for this unexpected cultural difference, we suspect that the emphasis on ingroup harmony in collectivistic cultures might be partly responsible for this unexpected result (Triandis, Bontempo, Villareal, Asai, & Lucca, 1988). Notice that the cultural difference was due to Japanese participants' greater tendency to forgive valuable—but possibly exploitative—transgressors. Despite the exploitation risk, it is likely that these valuable others are ingroup members. Thus, participants might have forgiven their potentially exploitative transgressors because of peer/societal pressures to maintain ingroup harmony (Kadima Kadiangandu, Mullet, & Vinsonneau, 2001; Suwartono, Prawasti, & Mullet, 2007).

Although the three studies provide clear evidence for the valuable relationships hypothesis, there are some limitations in the present research. First, our approach to measuring relationship value (i.e., as goal-related instrumentality) may not cover the construct in its entirety. Consider, for example, that allies are valuable not only for their usefulness in helping us achieve our goals; they are also useful as a source of social support in times of need (Cronk et al., 2017). None of the measures we used in the present studies assayed for whether one's

transgressor had ever provided costly support during a time of need, which points to an interesting opportunity for future research.

Second, the three reported studies were autobiographical recall studies, so they may have been subject to memory biases. For example, one might underestimate pre-conflict relationship value if one has not yet fully forgiven their transgressor. Likewise, had participants already forgiven their transgressors, they might overestimate how valuable their transgressors were at the time of the transgression. Such distorted patterns of recall could inflate the observed correlation between pre-conflict relationship value and the current level of forgiveness. To eliminate the issues associated with memory biases, longitudinal studies involving participants who recently experienced some interpersonal transgression are needed (see McCullough et al., 2010, 2014, as examples of such longitudinal studies).

Third, although a series of mediation analyses generally confirmed the prediction that the relationship value–forgiveness association is mediated by empathy, the significant result of the mediation analysis does not prove the mediational role of empathy (Fielder, Schott, & Meiser, 2011). Experimental studies, in which perceived goal instrumentality is experimentally heightened in a treatment group (e.g., Nelissen, 2014), are required to firmly confirm the validity of the mediation hypothesis. Such experimental research is also required to confirm the hypothesized causation from relationship value to forgiveness. Fourth, we did not observe the consistent patterns when the single-item measure of relationship value (i.e., rank relationship value) and the measure of willingness to sacrifice one's welfare for the sake of a particular other (i.e., WTR) were analyzed, especially in Study 3. Further studies are needed to validate the usefulness of these measures. Finally, although this research included four different measures of relationship value, it relied on one measure of forgiveness. We need conceptual replications

including different measures of forgiveness to confirm the robustness of our findings. Despite these limitations, the present research clearly suggests that human forgiveness at least partially reflects the operation of psychological adaptations that act to preserve valuable interpersonal relationships.

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Table 1

Descriptive Statistics (the Number of Observations, Means, Standard Deviations), Cronbach's α Coefficients (in Parentheses in the Diagonal Cells), and Correlation Coefficients of Variables of Interest (Study 1)

	N	mean	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Forgiveness	279	3.46	0.71	(.89)	.44***	.61***	−.36***	.24***	−.56***	.17*	.76***	−.34***
2. Instrumentality	280	0.32	0.85		(.78)	.37***	−.15	.24***	−.21**	.24**	.47***	−.20*
3. Empathy	279	2.5	0.89			(.83)	−.01	.36***	−.43***	.35***	.75***	.09
4. Rumination	280	1.07	0.78				(.91)	.17[a]	.40***	.04	−.18*	.33***
5. IOS	280	3.66	1.77					- -	.00	.30***	.40***	−.08
6. Anger	280	3.27	0.99						(.71)	−.07	−.47***	.24**
7. Reaction	275	1.47	1.52							- -	.31***	−.03
8. RV (RVEX)	279	3.01	0.99								(.87)	−.15[a]
9. ER (RVEX)	279	2.29	0.78									(.70)

"Instrumentality" "RV," and "ER" designate perceived goal instrumentality, relationship value, and exploitation risk, respectively.

[a] < .10, * < .05, ** < .01, *** < .001 (The *p*-values reported in this table were adjusted by the Holm method).

Table 2

Multiple Regression Analyses Predicting Forgiveness from Sex, Closeness, Anger, and Transgressor Reaction, One of the Four Measures of Relationship Value, and Latent Relationship Value.

	Study 1		Study 2		Study 3	
	β	SE	β	SE	β	SE
Perceived Goal Instrumentality	.30***	.048	.16***	.036	.13**	.038
Sex (male = 1, female = 2)	.07	.046	−.01	.034	.05	.037
Closeness (IOS)	.16*	.049	.19***	.036	−.01	.040
Anger at the Transgression	−.49***	.047	−.49***	.036	−.51***	.037
Transgressor Reaction	.03	.049	.11**	.036	.28***	.039
RVEX Relationship Value	.65***	.048	.50***	.034	.69***	.032
Sex (male = 1, female = 2)	.04	.038	.02	029	−.00	.026
Closeness (IOS)	−.01	.043	.11***	.031	−.06*	.027
Anger at the Transgression	−.25***	.044	−.37***	.031	−.25***	.029
Transgressor Reaction	−.04	.041	.00	.031	.06*	.029
Rank Relationship Value	- -	- -	.19***	.035	.00	.039
Sex (male = 1, female = 2)	- -	- -	−.02	.034	.05	.037
Closeness (IOS)	- -	- -	.18***	.036	.02	.039
Anger at the Transgression	- -	- -	−.49***	.035	−.53***	.038
Transgressor Reaction	- -	- -	.11**	.036	.29***	.039
Welfare Tradeoff Ratio (WTR)	- -	- -	.07	.041	.08	.049
Sex (male = 1, female = 2)	- -	- -	−.01	.041	.05	.042
Closeness (IOS)	- -	- -	.19***	.047	−.01	.048
Anger at the Transgression	- -	- -	−.58***	.044	−.56***	.044
Transgressor Reaction	- -	- -	.18***	.046	.31***	.046

(*Table 2 cont'd*)

(*Table 2 cont'd*)

Latent Relationship Value	.43***	.048	.49***	.042	.26***	.048
Sex (male = 1, female = 2)	.07	.043	.00	.034	.06	.039
Closeness (IOS)	.10	.047	.07^{+}	.037	−.09	.045
Anger at the Transgression	−.41***	.045	−.38***	.037	−.46***	.042
Transgressor Reaction	.00	.046	.03	.037	.26***	.042

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

The 95% CIs are reported in the Supplementary Materials (Tables S1, S2, and S3 for Studies 1, 2, and 3, respectively).

Table 3

Descriptive Statistics (the Number of Observations, Means, Standard Deviations), Cronbach's α Coefficients (in Parentheses in the Diagonal Cells), and Correlation Coefficients of Variables of Interest (Study 2)

	N	mean	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Forgiveness	495	2.71	0.74	(.88)	.35***	.62***	−.23***	.34***	−.58***	.28***	.68***	−.25***	.35***	−.31***	.28***
2. Instrumentality	495	−0.22	1.11		(.90)	.22***	−.08	.24***	−.25***	.22***	.36***	−.29***	.24***	−.18**	.15[a]
3. Empathy	495	2.16	0.98			(.88)	−.06	.23***	−.39***	.32***	.73***	.09	.34***	−.23***	.28***
4. Rumination	495	2.79	0.8				(.92)	.03	.37***	−.02	−.01	.32***	−.02	.15*	−.06
5. IOS	495	2.41	1.78					- -	−.17**	.26***	.33***	−.11	.23***	−.04	.16[a]
6. Anger	495	3.85	0.93						(.70)	−.18**	−.37***	.22***	−.19***	.37***	−.28***
7. Reaction	495	0.8	1.4							- -	.37***	−.03	.20***	−.09	.17*
8. RV (RVEX)	495	2.38	0.97								(.80)	−.06	.42***	−.27***	.25***
9. ER (RVEX)	495	3.01	1.03									(.82)	−.04	.16**	−.07
10. Rank RV	495	4.65	3.31										- -	−.13[a]	.20**
11. Intention	495	1.82	1.31											- -	−.10
12. WTR	353	0.23	0.41												- -

"Instrumentality" "RV," and "ER" designate perceived goal instrumentality, relationship value, and exploitation risk, respectively.

[a] < .10, * < .05, ** < .01, *** < .001 (The *p*-values reported in this table were adjusted by the Holm method).

Table 4

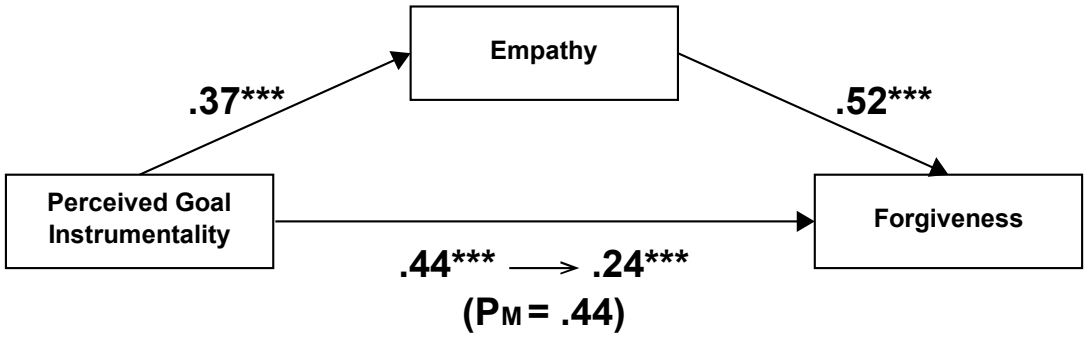
Descriptive Statistics (the Number of Observations, Means, Standard Deviations), Cronbach's α Coefficients (in Parentheses in the Diagonal Cells), and Correlation Coefficients of Variables of Interest (Study 3)

	N	mean	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Forgiveness	448	2.94	0.83	(.90)	.24***	.73***	−.29***	.11	−.55***	.35***	.81***	−.38***	.15*	−.11	.25***
2. Instrumentality	443	0.13	1.12		(.87)	.22***	−.06	.25***	−.15*	.14[a]	.26***	−.11	.28***	−.08	.39***
3. Empathy	448	2.26	1.09			(.89)	−.09	.18**	−.45***	.37***	.83***	−.10	.20***	.00	.35***
4. Rumination	448	2.59	0.73				(.89)	.20***	.38***	.07	−.08	.40***	.08	.19**	.20**
5. IOS	448	3.95	1.74					- -	.00	.30***	.22***	−.01	.21***	.19**	.46***
6. Anger	448	3.57	0.9						(.65)	−.10	−.43***	.29***	−.17*	.24***	−.19**
7. Reaction	448	1.6	1.69							- -	.41***	−.08	.20***	.11	.25***
8. RV (RVEX)	448	2.42	1.14								(.88)	-.12	.21***	−.07	.32***
9. ER (RVEX)	448	2.83	0.99									(.77)	−.02	.16*	−.04
10. Rank RV	448	5.73	2.95										- -	−.02	.32***
11. Intention	448	1.47	1.00											- -	.01
12. WTR	356	0.59	0.41												- -

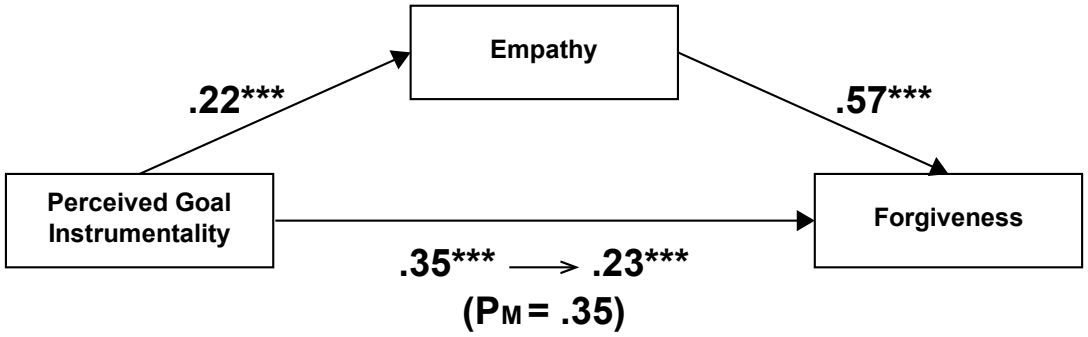
"Instrumentality" "RV," and "ER" designate perceived goal instrumentality, relationship value, and exploitation risk, respectively.

[a] < .10, * < .05, ** < .01, *** < .001 (The *p*-values reported in this table were adjusted by the Holm method).

(a) Study 1



(b) Study 2



(c) Study 3

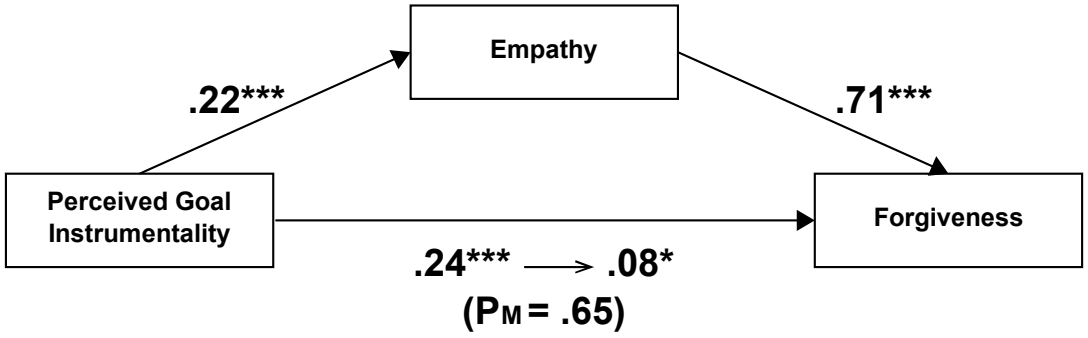


Figure 1. Empathy partially mediates the association between perceived goal instrumentality and forgiveness in (a) Study 1, (b) Study 2, and (c) Study 3. Values listed in the path diagram represent standardized regression coefficients (β).
* < .05, *** < .001.

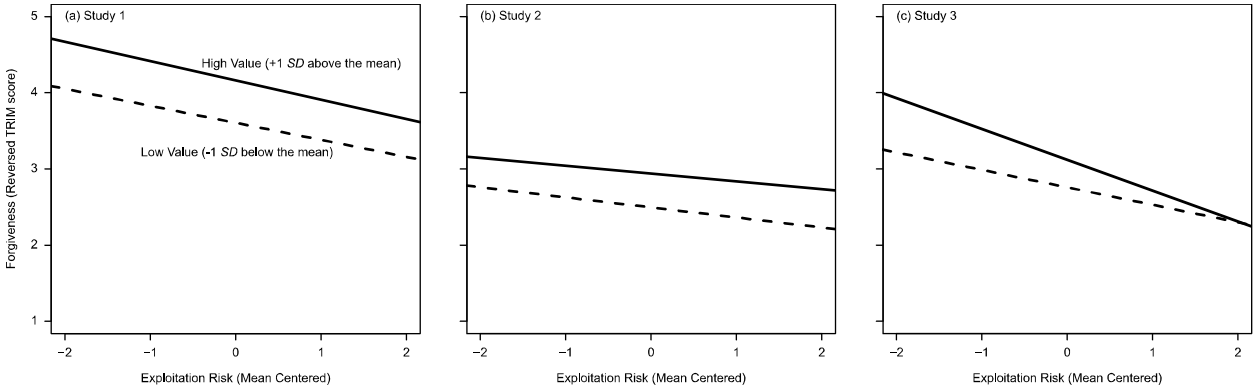


Figure 2. Regression lines predicting forgiveness from exploitation risk at the two levels of perceived goal instrumentality (1 *SD* above and below the mean).

Supplementary Materials

Perceived Goal Instrumentality is Associated with Forgiveness: A Test of the Valuable Relationships Hypothesis

This supplementary document include supplementary analyses, tables, and figures. In the main text, Table 1 does not include 95% CIs of regression coefficients. Tables S1, S2, and S3 report 95% CIs for Studies 1, 2, and 3, respectively. Figure 1 shows that empathy mediates the association of "perceived goal instrumentality" and forgiveness. We replaced perceived goal instrumentality by other measures of relationship value: RVEX relationship value (Figure S1), rank relationship value (Figure S2), welfare tradeoff ratio (Figure S3), and latent relationship value (Figure S4). Table S4 reports the results of a series of regression analyses testing the relationship value × exploitation risk interaction. These supplementary tables and figures are followed by supplementary information and analyses. We report the operationalization of the Welfare Tradeoff Ratio (WTR) and why it was impossible for us to calculate WTR scores for inconsistent responses. We conducted exploratory analyses of the effect of relationship type on the relationship value–forgiveness association. We also analyzed the data from three studies to test whether latent variable analyses yield the same patterns as reported in the main text.

Table S1

Multiple Regression Coefficients with 95% CIs (Study 1)

			95% Confidence Interval	
	β		Lower	Upper
Perceived Goal Instrumentality	.30	***	.200	.391
Sex (male = 1, female = 2)	.07		−.020	.161
Closeness (IOS)	.16	*	.061	.254
Anger at the Transgression	−.49	***	−.579	−.394
Transgressor Reaction	.03		−.065	.127
RVEX Relationship Value	.65	***	.557	.748
Sex (male = 1, female = 2)	.04		−.038	.111
Closeness (IOS)	−.01		−.095	.075
Anger at the Transgression	−.25	***	−.335	−.163
Transgressor Reaction	−.04		−.116	.043
Latent Relationship Value	.43	***	.338	.529
Sex (male = 1, female = 2)	.07		−.019	.150
Closeness (IOS)	.10	*	.007	.192
Anger at the Transgression	−.41	***	−.502	−.324
Transgressor Reaction	−.00		−.093	.088

* < .05, ** < .01, *** < .001.

Table S2

Multiple Regression Coefficients with 95% CIs (Study 2)

			95% Confidence Interval	
	β		Lower	Upper
Perceived Goal Instrumentality	.16	***	.089	.231
Sex (male = 1, female = 2)	−.01		−.077	.057
Closeness (IOS)	.19	***	.117	.258
Anger at the Transgression	−.49	***	−.558	−.418
Transgressor Reaction	.11	**	.040	.182
RVEX Relationship Value	.50	***	.438	.571
Sex (male = 1, female = 2)	.02		−.038	.076
Closeness (IOS)	.11	***	.045	.166
Anger at the Transgression	−.37	***	−.435	−.313
Transgressor Reaction	.00		−.059	.064
Rank Relationship Value	.19	***	.123	.262
Sex (male = 1, female = 2)	−.02		−.083	.050
Closeness (IOS)	.18	***	.110	.250
Anger at the Transgression	−.49	***	−.561	−.424
Transgressor Reaction	.11	**	.040	.180
Welfare Tradeoff Ratio (WTR)	.07		−.016	.154
Sex (male = 1, female = 2)	−.01		−.091	.072
Closeness (IOS)	.19	***	.100	.284
Anger at the Transgression	−.58	***	−.670	−.497
Transgressor Reaction	.18	***	.090	.269
Latent Relationship Value	.49	***	.424	.594
Sex (male = 1, female = 2)	.00		−.066	.071
Closeness (IOS)	.07	+	.000	.160
Anger at the Transgression	−.38	***	−.484	−.328
Transgressor Reaction	.04		−.040	.120

+ < .10, * < .05, ** < .01, *** < .001.

Table S3

Multiple Regression Coefficients with 95% CIs (Study 3)

			95% Confidence Interval	
	β		Lower	Upper
Perceived Goal Instrumentality	.13	**	.052	.203
Sex (male = 1, female = 2)	.05		−.020	.125
Closeness (IOS)	−.01		−.093	.063
Anger at the Transgression	−.51	***	−.587	−.440
Transgressor Reaction	.28	***	.209	.361
RVEX Relationship Value	.69	***	.626	.751
Sex (male = 1, female = 2)	−.00		−.055	.047
Closeness (IOS)	−.06	*	−.116	−.009
Anger at the Transgression	−.25	***	−.307	−.193
Transgressor Reaction	.06	*	.004	.118
Rank Relationship Value	.00		−.076	.076
Sex (male = 1, female = 2)	.05		−.027	.119
Closeness (IOS)	.02		−.056	.098
Anger at the Transgression	−.53	***	−.603	−.455
Transgressor Reaction	.29	***	.213	.368
Welfare Tradeoff Ratio (WTR)	.08		−.016	.176
Sex (male = 1, female = 2)	.05		−.031	.134
Closeness (IOS)	−.01		−.103	.087
Anger at the Transgression	−.56	***	−.644	−.471
Transgressor Reaction	.31	***	.223	.402
Latent Relationship Value	.26	***	.168	.366
Sex (male = 1, female = 2)	.06		−.019	.141
Closeness (IOS)	−.09		−.176	.008
Anger at the Transgression	−.46	***	−.549	−.403
Transgressor Reaction	.26	***	.182	.358

* < .05, ** < .01, *** < .001.

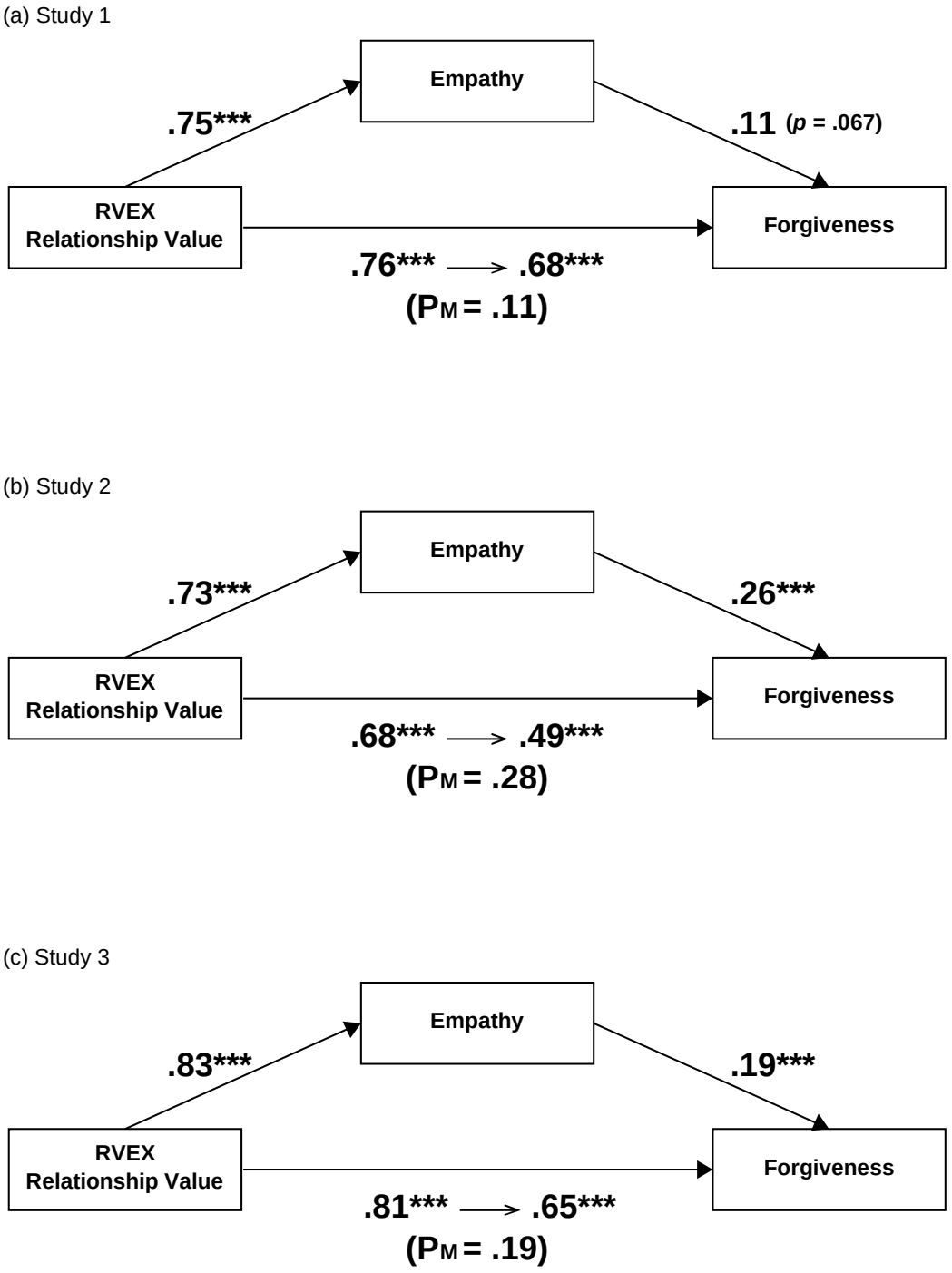


Figure S1
Empathy partially mediates the association between RVEX relationship value and forgiveness in (a) Study 1, (b) Study 2, and (c) Study 3. Values listed in the path diagram represent standardized regression coefficients (β).
*** < .001.

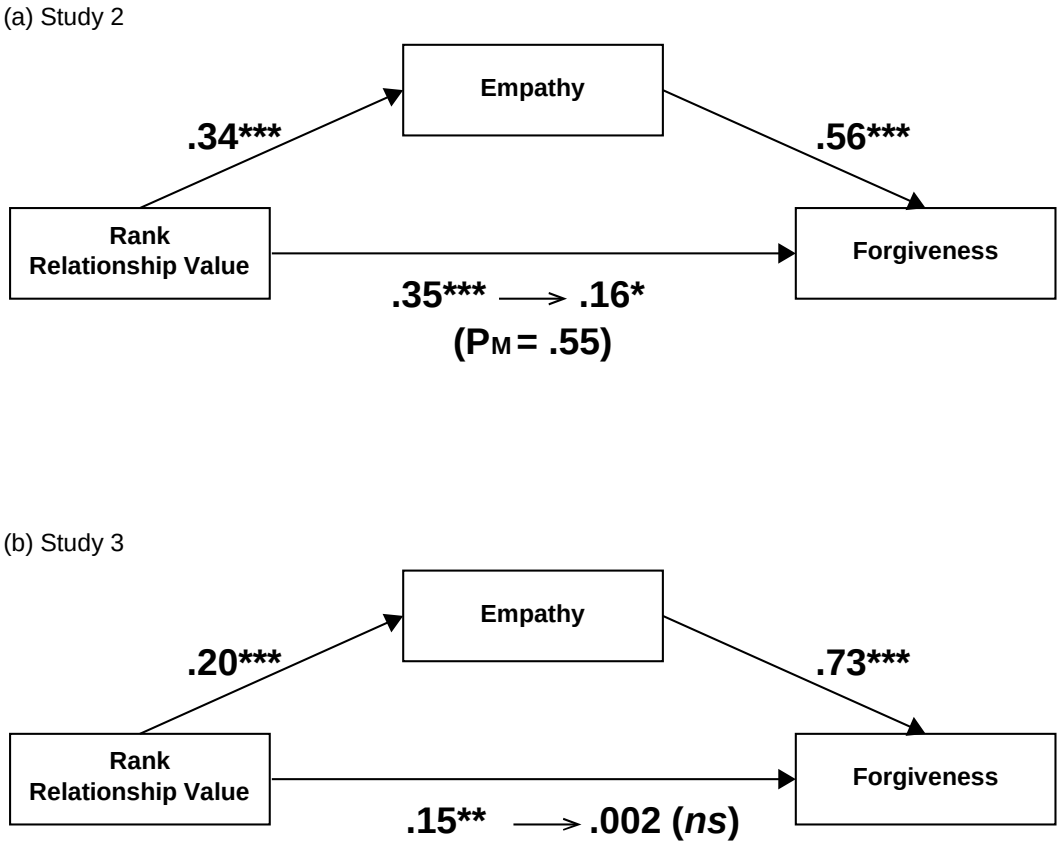


Figure S2
Empathy partially mediates the association between rank relationship value and forgiveness in (a) Study 2, but it fully mediates the association in (b) Study 3. Values listed in the path diagram represent standardized regression coefficients (β).
* < .05, ** < .01, *** < .001.

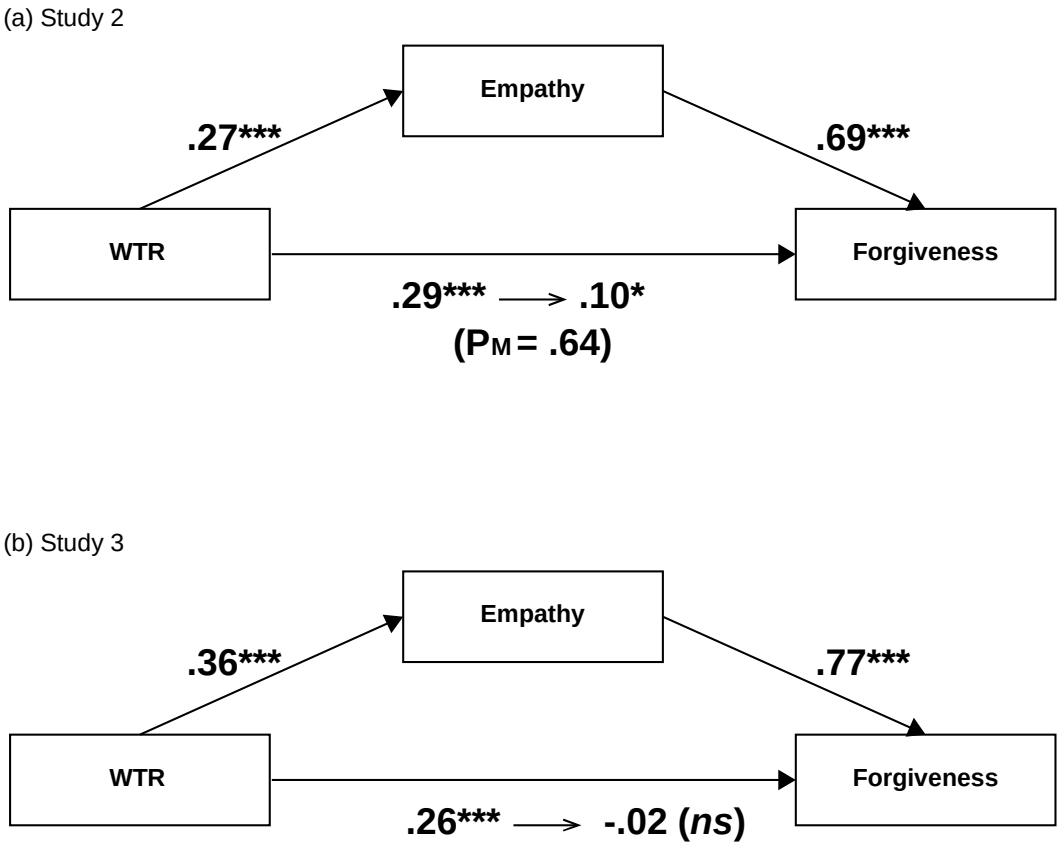


Figure S3
Empathy partially mediates the association between WTR and forgiveness in (a) Study 2, but it fully mediates the association in (b) Study 3. Values listed in the path diagram represent standardized regression coefficients (β).
*** < .001.

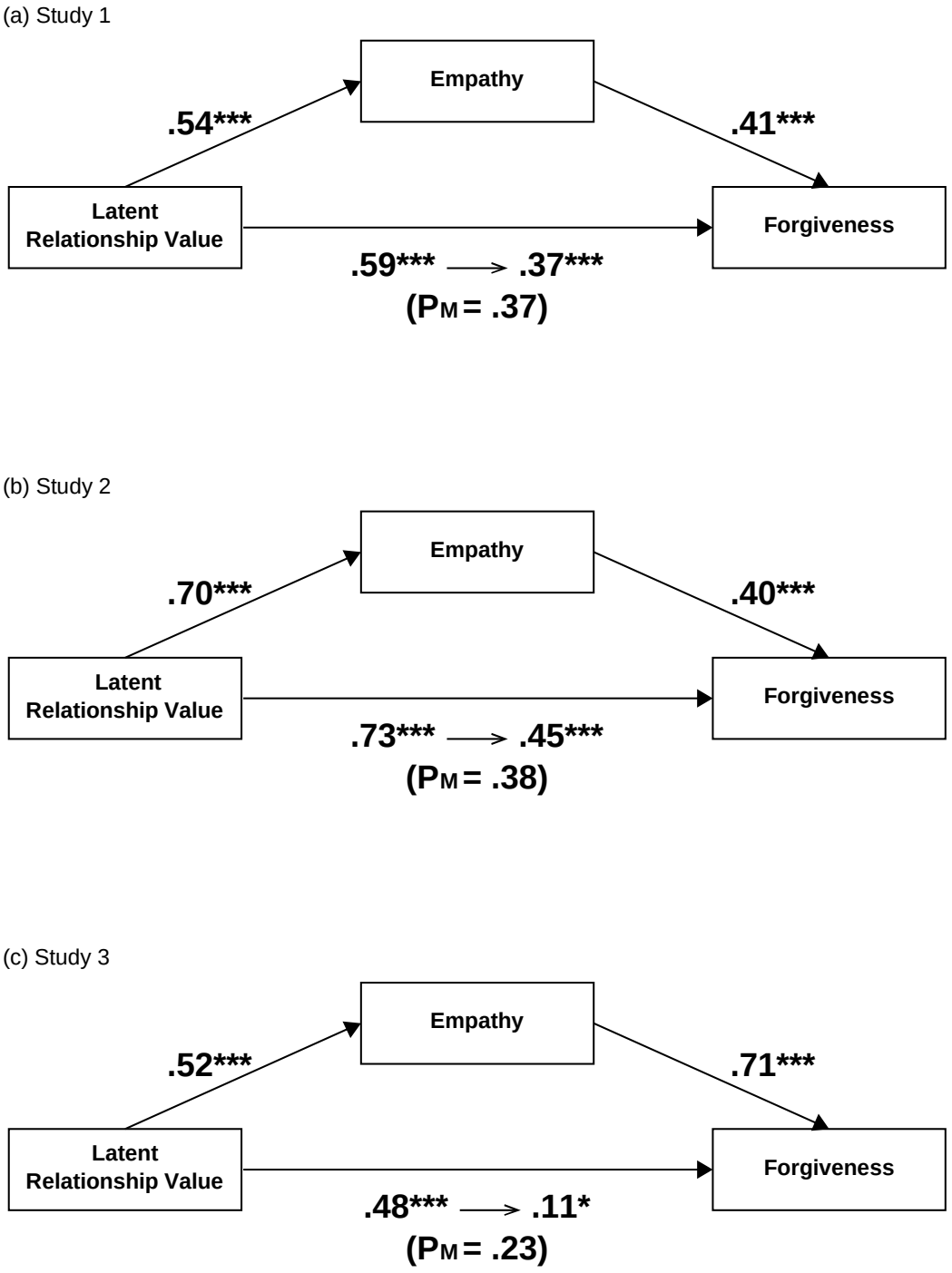


Figure S4
Empathy partially mediates the association between latent relationship value and forgiveness in (a) Study 1, (b) Study 2, and (c) Study 3. Values listed in the path diagram represent standardized regression coefficients (β).
* < .05, *** < .001.

Table S4

Tests of the Relationship Value × Exploitation Risk Interaction

			95% Confidence Interval	
	β		Lower	Upper
Study 1				
RVEX Relationship Value	.73	***	.65	.80
Exploitation Risk	−.22	***	−.30	−.15
RVEX RV × ER Interaction	.04		−.04	.11
Latent Relationship Value	.56	***	.46	.65
Exploitation Risk	−.22	***	−.32	−.13
Latent RV × ER Interaction	.05		−.15	.04
Study 2				
RVEX Relationship Value	.67	***	.60	.73
Exploitation Risk	−.22	***	−.29	−.16
RVEX RV × ER Interaction	−.04		−.10	.03
Rank Relationship Value	.34	***	.26	.42
Exploitation Risk	−.23	***	−.31	−.15
Rank RV × ER Interaction	.01		−.02	.14
WTR	.27	***	.17	.38
Exploitation Risk	−.23	***	−.33	−.13
WTR × ER Interaction	−.02		−.13	.08
Latent Relationship Value	.71	***	.63	.78
Exploitation Risk	−.13	***	−.21	−.05
Latent RV × ER Interaction	−.01		−.09	.07
Study 3				
RVEX Relationship Value	.76	***	.71	.81
Exploitation Risk	−30.	***	−.35	−.25
RVEX RV × ER Interaction	−.07	**	−.12	−.02
Rank Relationship Value	.14	**	.05	.22
Exploitation Risk	−.38	***	−.47	−.29
Rank RV × ER Interaction	−.01		−.10	.07
WTR	.24	**	.15	.34
Exploitation Risk	−.40	***	−.49	−.30
WTR × ER Interaction	−.04		−.14	.06
Latent Relationship Value	.44	***	.35	.53
Exploitation Risk	−.36	***	−.46	−.27
Latent RV × ER Interaction	−.12	*	−.21	−.03

* < .05, ** < .01, *** < .001.

Welfare Tradeoff Ratio (WTR)

The idea behind the WTR measure used in this study was originally developed by Rachlin and Jones (2007). The idea is similar to delay discounting, which has been extensively studied in behavioral economics. Delay discounting refers to the phenomenon that people tend to prefer a small but immediate reward (e.g., immediate $50) to a delayed but larger reward (e.g., $100 one year from now). In typical delay discounting tasks, participants make a series of choices from pairs of alternatives (e.g., immediate $10 vs. delayed $100, immediate $20 vs. delayed $100 ... immediate $90 vs. delayed $100). Researchers usually check the switch point (e.g., a participant who chooses the delayed $100 when the immediate reward was smaller than $50, but switches to the smaller reward once it reaches and exceeds $50) to determine each participant's level of delay discounting.

In a similar vein, a social discounting task devised by Rachlin and Jones asks participants to make a series of choices over two alternatives: giving oneself different levels of a small reward vs. giving a partner a fixed amount of a greater reward (e.g., giving $10 to oneself vs. giving $100 to the partner, giving $20 to oneself vs. giving $100 to the partner ... giving $90 to oneself vs. giving $100 to the partner). To understand how this task is relevant to relationship value, imagine two hypothetical participants: The first participant is willing to forgo up to $80 to give $100 to the partner. The second participant is only willing to forgo $10 to give $100 to the partner (in other words, the second participant will impose a $100 loss on the partner to obtain $20 or any other greater level of rewards). It is obvious that the first participant values his/her partner's welfare more than the second participant. This conceptualization requires (a) that participants start the task by choosing to give greater rewards to the partner, and (b) make only one or zero switch points to determine each participant's valuation of their partner's welfare (or

how much each participant discounts the partner's welfare).

In sum, inconsistent responses to the WTR measure (i.e., responses including more than one switch point) are not easily subsumed into the conceptual framework of WTR. Accordingly, these inconsistent responses were excluded from the data analyses (as in Smith et al., 2017).

Relationship Type and Goal Instrumentality–Forgiveness Correlation

In the three studies, we asked participants to specify their relationship with the transgressor. In Study 1, we provided three response categories (i.e., friend, romantic partner, others). In Study 2, there were seven response categories (i.e., friend, romantic partner, spouse, equal level coworker, superordinate coworker, subordinate coworker, others). In Study 3, there were five response categories (i.e., friend, romantic partner, spouse, coworker, others). We re-categorized the relationships into friendship, romantic relationships (including spouse in Studies 2 and 3), and coworkers (including equal level, superordinate, and subordinate coworkers in Study 2). The correlations between relationship value (goal instrumentality and RVEX relationship value) and forgiveness separately calculated for each relationship category are summarized in Table S5. As can be seen in Table S5, among community samples both in Japan (Study 2) and in the U.S. (Study 3), the goal instrumentality–forgiveness correlation for friendship became nearly zero, and non-significant.

To explore this unexpected effect of relationship type on the goal instrumentality–forgiveness correlation, we tabulated the mean goal instrumentality (*SD*) as a function of relationship type in Table S6. In Study 1 (a Japanese student sample), there were no significant differences in either goal instrumentality or forgiveness across the two relationship categories (i.e., friend vs. romantic partner): $t(197) = 1.40$, *ns* for goal instrumentality and $t(196) = 0.02$, *ns* for forgiveness. In Study 2 (a Japanese community sample), a series of one-way ANOVA showed that the effect of relationship type was significant for goal instrumentality, $F(2, 447) = 5.69$, $p = .004$, $\eta^2 = .024$, and for forgiveness $F(2, 447) = 14.78$, $p < .001$, $\eta^2 = .062$. Tukey's HSD test indicated that participants perceived goal instrumentality was higher for their friends than for their romantic partners ($p = .031$) and coworkers ($p = .003$), whereas they were forgiving

their friends ($p = .007$) and romantic partners ($p < .001$) more than their coworkers. A similar pattern was observed in Study 3 (a U.S. community sample). The main effect of relationship type was significant for goal instrumentality, $F(2, 409) = 4.88$, $p = .008$, $\eta^2 = .023$, and for forgiveness, $F(2, 405) = 5.69$, $p = .004$, $\eta^2 = .024$. Tukey's HSD revealed that participants perceived goal instrumentality was higher for their friends that for their romantic partner and coworkers (both ps $< .001$). Participants were more forgiving of their romantic partners than their coworkers ($p = .006$). However, unlike in Study 2, participants were not significantly more forgiving of their friends than their coworkers.

In addition to the above differences among means, it is noteworthy that the *variance* in the goal instrumentality of friends was smaller than the variance in goal instrumentality of romantic partners and coworkers in Studies 2 and 3: The variance in goal instrumentality of friends was significantly smaller than that of romantic partners ($p < .001$) and coworkers ($p = .040$) in Study 2; The variance in goal instrumentality of friends was significantly smaller than that of romantic partners ($p < .001$) but not of coworkers ($p = .427$) in Study 3. In sum, in community samples, friends were associated with high goal instrumentality with small variance. This might reflect the more voluntary nature of friendship. If you find a particular friend less instrumental and annoying due to his/her transgressions, you can easily dissolve the relationship.

The above pattern suggests the presence of some peculiarity in the goal instrumentality operationalization of relationship value, especially when it is applied to community samples. Nevertheless, it is important to note that when the RVEX relationship value operationalization was used, the relationship value–forgiveness correlations remained significant among friends. The possible peculiarity in the goal instrumentality measure must be more closely scrutinized before it is used in future studies.

Table S5

Relationship Value (Goal Instrumentality and RVEX Relationship Value)× Forgiveness Correlation as a Function of Relationship Type

		Friend	Romantic Partner	Coworker
Study 1	*n*	148	51	
	Goal Instrumentality	.47 ***	.46 ***	
	RVEX Relationship Value	.76 ***	.89 ***	
Study 2	*n*	91	108	251
	Goal Instrumentality	.06	.43 ***	.32 ***
	RVEX Relationship Value	.54 ***	.71 ***	.65 ***
Study 3	*n*	193	143	76
	Goal Instrumentality	.10	.33 ***	.36 **
	RVEX Relationship Value	.81 ***	.82 ***	.78 ***

Table S6

Mean (SD) Goal Instrumentality and Forgiveness as a Function of Relationship Type

		Friend		Romantic Partner		Coworker	
		M	(*SD*)	*M*	(*SD*)	*M*	(*SD*)
Study 1	Goal Instrumentality	0.43	(0.75)	0.24	(1.09)		
	Forgiveness	3.51	(0.70)	3.51	(0.73)		
Study 2	Goal Instrumentality	0.13	(0.85)	−0.25	(1.26)	−0.30	(1.05)
	Forgiveness	2.83	(0.64)	2.99	(0.76)	2.57	(0.71)
Study 3	Goal Instrumentality	0.52	(0.92)	−0.04	(1.21)	−0.29	(1.03)
	Forgiveness	2.96	(0.85)	3.13	(0.84)	2.76	(0.74)

Analyses of Latent Variables

In addition to the analyses reported in the main text, we took a latent variable approach to data analyses. Although the separate measures of relationship value were sufficiently distinct across the three studies, it is plausible that the common variance shared by the different measures of relationship value are due to an unobservable relationship value construct (Borsboom, Mellenbergh, & van Heerden, 2004). Therefore, we treated the goal instrumentality, RVEX relationship value, rank relationship value, and Welfare Tradeoff Ratio measures as indicators caused by latent relationship value in order to conduct analyses using latent relationship value scores as a predictor in analyses (only the goal instrumentality and RVEX relationship value measures were available for Study 1). Recent research indicates that the TRIM may also be best conceptualized as a bifactor model, wherein a single dimension running from benevolence to malevolence underlies forgiveness (Forster et al., 2019). In this section of the Supplementary Materials, we report the exploratory results of the latent factor approach to the relationship value–forgiveness association.

Study 1

Having addressed key questions regarding the link between relationship value, empathy, and forgiveness in the main text, we sought to determine (a) if a single latent variable underlies RVEX and goal instrumentality relationship, and (b) if latent relationship value predicts latent forgiveness. To address these questions, we modeled relationship value (i.e., independent variable) and forgiveness (i.e., dependent variable) using bifactor models. Bifactor models are a special class of multidimensional models that decompose the general variance due to an unobservable trait (e.g., intelligence) from domain-specific variance (e.g., math and verbal

abilities). In bifactor modeling, item indicators load onto two latent variables: a general factor that captures the common variance across correlated factors, and group factors that captures domain-specific variance of each item (Reise, 2012). Bifactor models have a number of desirable properties, including the ability to partition variance in item scores into a general factor, domain-specific factors, and error, and modeling the effects of different measurement techniques on item scores (Reise, Moore, & Haviland, 2010). However, bifactor models obtained from single-level sampling designs—such as the design of Studies 1-3 in this paper—are known to be unstable (Eid, Geiser, Koch, & Heene, 2017). A subclass of bifactor models, termed bifactor (S-1) models, can ameliorate technical and conceptual problems in single-level samples. In bifactor (S-1) modeling, one of *k* domains serves as a "gold standard" reference factor with no group factors, and *k*-1 domains serve as the group factors. In addition to solving anomalous problems, the reference factor also serves to give interpretable meaning to the general factor (Eid et al., 2017).

We adopted a two-step approach to model specification and estimation (Kline, 2015). In step one, we fit bifactor (S-1) measurement models of the latent relationship value measures and the translation-related interpersonal motivations (TRIM) scale items. Although in the main text, we treated the TRIM scale as a single-construct measure (this approach is justified based on the results from the bifactor (S-1) model analyses; see Forster et al., 2019), it consists of three sub-domains: revenge motivation, avoidance motivation, and benevolence motivation. After establishing that the models have good fit, we proceeded to fit the measurement models to a structural equation model. Diagonally weighted least squares (DWLS) estimation method was used for the estimation of all models, as this method provides more accurate model fit when the latent variable has ordinal indicators (Li, 2016), as was the case for the indicators in our models.

First, we fitted a bifactor (S-1) measurement model for the RVEX and goal instrumentality relationship value items. Items from the goal instrumentality relationship value scale were specified as the reference factor, such that goal instrumentality items loaded solely on the general factor while RVEX items loaded onto both the general factor and a group factor. We selected goal instrumentality relationship value as the grouping factor rather than RVEX relationship value because (we believe) perceptions of a relationship partner's goal instrumentality better captures relationship value, and is relatively free from the criterion contamination problem discussed in the Introduction section of the main text. Due to missing data on some indicators, the sample size for this analysis was slightly smaller (n = 240) than in analyses reported in the main text. The model had excellent fit ($\chi^2(39) = 47.80$, $p = .158$; CFI =0.998; RMSEA = 0.031, 90% CI = [0.000, 0.057], $p = .871$; SRMR = 0.043). These results are the first evidence suggesting that a single dimension of relationship value underlies both the affective and goal-oriented components of relationship value.

We then examined whether a bifactor (S-1) measurement model fits the TRIM scale. Following the recent bifactor (S-1) model of forgiveness construct (Forster et al., 2019), we designated the reference domain of the general factor using items from the avoidance scale, such that the items on the avoidance scale loaded solely on the general factor, while items from benevolence and revenge scales loaded on both the general factor and scale-specific group factors. Due to missing data on some of the indicators, the sample size for the analysis was slightly smaller than the sample size of the regression analyses (n = 271). The bifactor (S-1) measurement model had excellent fit ($\chi^2(123) = 242.02$, $p < .001$; CFI =0.995; RMSEA = 0.060, 90% CI = [0.049, 0.071], $p = .072$; SRMR = 0.054). Surprisingly (but as in Forster et al., 2019), the revenge and benevolence group factors were negatively correlated ($r = -.283$, $p < .001$),

despite items on the revenge scale being reverse scored. In general, though, these results replicated research showing that a single dimension of forgiveness underlies TRIM scores (Forster et al., 2019).

Having established that the bifactor (S-1) measurement models provided a good fit for both latent relationship value and forgiveness, we proceeded to fit a structural equation model by regressing the general factor of forgiveness on the general factor of relationship value. The sample size was slightly smaller than the previous analyses (n = 234) due to missingness in the predictors. The model had adequate fit ($\chi^2(328) = 701.337$, $p < .001$; CFI =0.991; RMSEA = 0.070; 90% CI = [0.063, 0.077], $p < .001$; SRMR = 0.068). The general factor of relationship value positively predicted the general factor of forgiveness (b = 1.53, se = 0.160, $p < .001$). 70% of the variance in the general factor of forgiveness was explained by the general factor of relationship value (R^2 = 0.699). These results suggest that, after partitioning method variance from relationship value and forgiveness, relationship value is the predominant predictor of forgiveness.

Study 2

Unlike Study 1, Study 2 included two additional measures of relationship value: rank relationship value and welfare tradeoff ratios (WTR). Although four unique measures of relationship value allowed us to test more stringent hypotheses about the latent structure of relationship value, WTR and rank relationship value could not be modelled as group factors in a bifactor (S-1) model, as the two measures each had only a single indicator. Rather than using a bifactor (S-1) model, then, we opted for a single-factor model of latent relationship value with four indicators. In this alternative model specification, we parceled the five items on the RVEX

relationship value scale and the six items on the goal instrumentality relationship value scale, respectively, to form composite indicators. The indicators in our final model, then, consisted of WTR, rank relationship value, composite RVEX relationship value, and composite goal instrumentality relationship value.

As in Study 1, we fit a bifactor (S-1) model to the TRIM data. Model fit was acceptable ($\chi^2(123) = 520.32$, $p < .001$; CFI = .994; RMSEA = .081, 90% CI = [0.074, 0.088], $p < .001$; SRMR = 0.059). Unlike in Study 1, the revenge and benevolence group factors were uncorrelated with one another ($r = .009$, $p = .846$). Using the four-indicator model of relationship value, we regressed latent relationship value on the general factor of forgiveness in a structural equation model. The model had acceptable fit ($\chi^2(194) = 491.66$, $p < .001$; CFI = .995; RMSEA = .066, 90% CI = [0.059, 0.073], $p < .001$; SRMR = 0.061). The revenge group factor was uncorrelated with the benevolence group factor and latent relationship value (ps > .155), but the benevolence group factor and latent relationship value were highly correlated ($r = 0.76$, $p < .001$). Most importantly, latent relationship value significantly predicted the general factor of forgiveness ($b = 1.306$, $se = 0.157$, $p < .001$). Moreover, the majority of variance in the general factor of forgiveness (56.6%) was explained by latent relationship value. Study 2 again demonstrated that diverse measures of interpersonal value reflect a common latent relationship value construct, and that variation in latent relationship value is linked to variation in forgiveness.

Study 3

As in Study 2, we employed the single-factor model of latent relationship value with four indicators. TRIM scores were fitted by a bifactor (S-1) model. The model had acceptable fit

($\chi^2(123) = 354.91$, $p < .001$; CFI = .997; RMSEA = .065, 90% CI = [0.057, 0.073], $p = .001$; SRMR = 0.052), and the revenge and benevolence group factors were moderately correlated with one another in the expected direction ($r = 0.262$, $p < .001$).

We proceeded to fit a structural equation model that regressed the general factor of forgiveness on latent relationship value. The model had acceptable fit ($\chi^2(194) = 479.22$, $p < .001$; CFI = .996; RMSEA = .065, 90% CI = [0.057, 0.072], $p = .001$; SRMR = 0.065). The revenge group factor was moderately correlated with benevolence ($r = 0.431$, $p < .001$) and latent relationship value ($r = 0.369$, $p < .001$), and benevolence was highly correlated with latent relationship value ($r = 0.526$, $p < .001$). Latent relationship value significantly predicted the general factor of forgiveness ($b = 0.794$, $se = 0.138$, $p < .001$), with variance in latent relationship value explaining 49.5% of the variance in the general factor of forgiveness.

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