



Sticking fewer (or more) pins into a doll? The role of self-compassion in the relations between interpersonal goals and aggression

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Accepted: 12 October 2021

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Abstract

Through two studies that utilized pin counts in the voodoo doll aggression task, we tested how compassionate and self-image goals in relationships were associated with aggressive inclinations. Participants in Study 1 ($N=381$) recalled and wrote about an experience of being accepted or rejected and participants in Study 2 ($N=391$) imagined themselves in hypothetical scenarios of being rejected either by a romantic partner or a supervisor. Regardless of the type of event (Study 1) or rejecter (Study 2), compassionate goals were related to higher self-compassionate reactions that were in turn linked to lower aggressive inclinations, whereas self-image goals were associated with higher aggressive inclinations through lower self-compassionate reactions. Study 2 showed that nonzero-sum beliefs accounted for positive associations between compassionate goals and self-compassionate reactions. Considered together, our findings implied that people who pursue compassionate goals might hold nonzero-sum beliefs that their well-being is connected with those of others and, thus, might display self-compassionate reactions that are linked to lower aggressive inclinations.

Keywords Compassionate goals · Self-image goals · Self-compassion · Aggression · Nonzero-sum beliefs

Introduction

Research finds that, in social interactions, people sometimes behave aggressively toward others (Anderson & Bushman, 2002; DeWall et al., 2013; McCarthy & Elson, 2018). Empirical research and theories assume that social rejection often triggers such aggressive reactions (Chester & DeWall, 2017; Williams, 2007). Rejected people tend to behave aggressively to recover their sense of control (Williams, 2007) and manage negative emotions (Robertson et al., 2012). Unfortunately, such aggressive behavior negatively impacts the well-being of both the aggressive people and those around them. For example, when rejected people react aggressively, they are likely to be further rejected by others (Williams, 2007). Furthermore, those who are victimized by aggression tend to experience decreased well-being (Aquino & Thau, 2009; Geel et al., 2021).

Notably, cumulative evidence suggests that people differ in how aggressive they become toward others (Bushman et al., 2009; Chester et al., 2019; Robertson et al., 2012; Twenge et al., 2005). Previous research has shown that, while people who are sensitive to ego threats behave aggressively (Bushman et al., 2009), those who are reminded of social connections avoid aggression toward others even when experiencing social rejection (Twenge et al., 2005). In this study, we investigated whether and how two types of interpersonal goals—compassionate goals and self-image goals (Crocker & Canevello, 2008)—would be related to aggressive inclinations toward others. Furthermore, we focused on the emotion regulation strategy—self-compassion (Neff, 2011)—as a mediator between interpersonal goals and aggression, because emotion regulation is a key preventive factor for aggression (Robertson et al., 2012).

Interpersonal goals and aggression

According to the egosystem-ecosystem theory of social motivation (Crocker & Canevello, 2008, 2015), people are assumed to have two types of social motivation that consequently affect their behavior, thoughts, emotions, and well-being in relationships. People with ecosystem

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motivation consider relationships as a mutually connected system with others, and care for others as much as for the self (Crocker & Canevello, 2008, 2015). Therefore, these people are assumed to transcend their own benefits and be responsible for both one's and others' well-being in relationships. The ecosystem motivation is reflected and measured by compassionate goals to genuinely support and care for others (Crocker & Canevello, 2008; Niiya & Crocker, 2019). Empirical research shows that people who pursue compassionate goals generally create good relationships with others (Canevello & Crocker, 2010; Crocker & Canevello, 2008, 2015; Crocker et al., 2010). As such, people with compassionate goals tend to be responsive toward others' needs (Crocker et al., 2017), receive more support from others (Crocker & Canevello, 2008), and report fewer degrees of distress (Crocker et al., 2010). When expressing dissent, people with high compassionate goals tend to express their dissent clearly with the intention of not harming others (Niiya et al., 2021). Despite their efforts to improve relationships, people who pursue compassionate goals may be exploited by others (Crocker & Canevello, 2015). Nonetheless, as being reminded of social connections reduces aggression (Twenge et al., 2005), it is assumed that people motivated by compassionate goals would avoid aggressive reactions that lower others' well-being.

The ecosystem-ecosystem theory suggests that people with ecosystem motivation consider relationships as a means to meet their selfish needs and seek to maximize their benefits and minimize their costs in relationships (Crocker & Canevello, 2008, 2015). The ecosystem motivation is reflected and measured by self-image goals to appeal to their competence and avoid showing their weaknesses to others (Crocker & Canevello, 2008, 2015). Although people with self-image goals attempt to be kind to others, their underlying motive for kindness is to maintain and boost their positive self-image (Niiya & Crocker, 2019). Unfortunately, despite their best efforts to attain a positive self-view, research shows that people with high self-image goals often feel alone (Crocker & Canevello, 2008), perceive that other people are not responsive to them (Canevello & Crocker, 2010), and experience distress (Crocker et al., 2010). People who pursue self-image goals might act aggressively toward others to meet their own needs (Anderson & Bushman, 2002; Crocker & Canevello, 2015). For example, these people may portray themselves to be better than others by behaving aggressively toward them. Additionally, people motivated by self-image goals may act aggressively toward their rejectors because social rejection triggers aggression especially among people with a fragile and inflated view of the self (Bushman et al., 2009).

Self-compassion as a mediator between interpersonal goals and aggression

Compassionate and self-image goals can be indirectly related to aggression through a potential mediator that buffers against aggressive reactions. In line with previous research (Miyagawa et al., 2021), we proposed that self-compassion would be an emotion regulation strategy for aggression that people with compassionate goals effectively employ and those with self-image goals are poor at activating. Neff (2011) defined self-compassion as a tendency to care for one's self, which entails three inter-related facets: (a) self-kindness rather than self-criticism, (b) understanding one's experience as common humanity rather than feeling alone in it, and (c) being mindful of one's experience rather than being overwhelmed by negative emotions. Thus, Neff (2011) suggests that, when people activate a self-compassionate mindset, they tend to see their inner experiences from a clear and balanced perspective, consider them as something that everyone would go through, and direct kindness and warmth toward themselves without being self-judgmental, feeling alone, and overreacting to inner experiences.

Subsequently, people gain psychological benefits from employing self-compassion. For example, meta-analytic reviews show that people with high self-compassion feel less depressed and anxious (McBeth & Gumley, 2012) and are more satisfied with their lives (Zessin et al., 2015). A recent meta-analysis (Ewart et al., 2021) also suggests that self-compassion encourages people to actively cope with their adversities. Cumulative evidence revealed that people with high self-compassion self-reported less aggressive behavior in their daily lives (Fresnic & Borders, 2017) and fewer depressive feelings caused by social rejection (Koch, 2020), and were less likely to overestimate ego threats caused by failing at job interviews (Miyagawa & Taniguchi, 2018). Interestingly, research suggests that self-compassion is useful for maintaining harmonious relationships because it promotes an acceptance of partners' weaknesses (Zhang et al., 2019) and helps people find a compromise between their needs and others' needs when an interpersonal conflict occurs (Yarnell & Neff, 2013). These findings led us to assume that self-compassion may offer people the emotional stability to consider the detrimental consequences of aggression on their own well-being and relationship qualities; hence avoiding aggressive reactions toward others.

Miyagawa et al. (2021) found that, after recalling and describing their memories of being rejected by others, people with high compassionate goals were more likely to treat themselves compassionately and thus showed lower revenge intentions toward their rejectors. This result

supported the hypothesis that people motivated by compassionate goals practice self-compassion to cope with social pain and not to damage their interpersonal relationships. However, several issues remain unresolved. First, Miyagawa et al. (2021) only focused on compassionate goals; thus, it is unknown whether self-image goals are linked to aggression through self-compassion. Second, Miyagawa et al. (2021) did not empirically account for how interpersonal goals relate to self-compassion.

Interpersonal goals, nonzero-sum beliefs, self-compassion, and aggression

The egosystem-ecosystem theory of social motivation posits that compassionate and self-image goals shape the view of others in relation to the self, which consequently affects inner experiences (Canevello & Crocker, 2015). When people are motivated by compassionate goals to genuinely support others, they see others as collaborators to meet their own and others' needs and consider their relationships from a nonzero-sum perspective (Canevello & Crocker, 2015; Crocker et al., 2017). Specifically, Crocker et al. (2017) defined nonzero-sum beliefs as the beliefs that what is good for the self is also good for others in relationships and that problems in relationships can be resolved for the mutual benefit of the self and others. Thus, people who pursue compassionate goals try to do what is good for both the self and others. Conversely, when people are driven by self-image goals, they see others as competitors and view their relationships from a zero-sum perspective that when one gains benefits, others lose (Canevello & Crocker, 2015; Crocker et al., 2017). Thus, people with high self-image goals try to do what is good for themselves, even at the expense of others.

Crocker et al. (2017) provided initial evidence that nonzero-sum beliefs in relationships accounted for why compassionate goals promoted the quality of relationships. Specifically, the participants' compassionate goals toward their romantic partners positively predicted nonzero-sum beliefs in relationships. This, in turn, increased an optimistic view about resolving relationship issues and led to a better quality of relationship (Crocker et al., 2017). These results indicate that people's interpersonal goals tend to shape their view of relationships, which, in turn, affects their responses toward others.

We proposed that people who pursue compassionate goals would hold nonzero-sum beliefs and, thus, might employ self-compassion to prevent aggressive reactions toward others. When people pursue compassionate goals and hold nonzero-sum beliefs in relationships, they may believe that caring about themselves can also be beneficial to others' well-being and thus practice self-compassion in relationships. Indeed, previous research has found the positive associations between compassionate goals, nonzero-sum

beliefs, and self-compassion (Niiya et al., 2013). Conversely, we posited that people who pursue self-image goals would view relationships in a zero-sum way (i.e., low in nonzero-sum beliefs; Crocker et al., 2017) and be less likely to use self-compassion and more likely to be aggressive. People who pursue self-image goals want to appeal to their competence and avoid showing their weaknesses to others (Crocker & Canevello, 2008; Niiya & Crocker, 2019) and believe that, when one wins, the other loses (Crocker et al., 2017). This zero-sum perspective might make it difficult for people with high self-image goals to adopt self-compassion which involves the nonjudgmental acceptance of one's weaknesses (Neff, 2011).

Research overview

To extend previous research (Miyagawa et al., 2021) and test our proposal that interpersonal goals relate to aggressive reactions through nonzero-sum beliefs and self-compassion, we conducted two studies using different methodologies to elicit social pain (i.e., writing about personal events in section "Study 1" and imagining hypothetical scenarios in section "Study 2"). Across these two studies, we employed a well-validated paradigm that assesses aggressive inclinations: the voodoo doll aggression task (Chester & DeWall, 2017; Chester et al., 2019; DeWall et al., 2013; Slotter et al., 2012). Drawing on the empirical findings that people see a psychological similarity and connection between the image of something and the thing itself (Rozin et al., 1986), DeWall et al. (2013) propose that people project the characteristics of a person into the voodoo doll that mentally represents this person. Thus, stabbing the doll is considered a reflection of their desire to cause harm to this person; accordingly, the more pins people stick into the doll, the more aggressive they become toward the target (Chester & DeWall, 2017; Chester et al., 2019; DeWall et al., 2013; Slotter et al., 2012). DeWall et al. (2013) provided initial evidence for the validity of the voodoo doll aggression task by showing that a high number of pins was associated with dispositional aggression, self-reported intimate partner violence, and other laboratory-based behavioral measures of aggression such as noise blast. This task is applicable to various relationship partners, such as romantic partners, friends, and strangers, and it can be used in both laboratory experiments and online surveys (Chester & DeWall, 2017; Chester et al., 2019; DeWall et al., 2013; Slotter et al., 2012). This task allowed us to examine whether interpersonal goals were linked to an indicator of aggressive inclinations. Specifically, by using the voodoo doll aggression task, we could delve into whether people motivated by compassionate goals would be less aggressive toward others (i.e., sticking fewer pins into a voodoo doll). This would extend previous findings on the association between compassionate goals and

lower levels of self-reported revenge intention (Miyagawa et al., 2021).

Study 1

In “Study 1”, we aimed to replicate and extend previous research (Miyagawa et al., 2021) by adding the measure of self-image goals and the acceptance condition and using the voodoo doll aggression task. Specifically, we investigated whether compassionate and self-image goals related to aggressive inclinations through self-compassion and whether the type of event (rejection versus acceptance) moderated these associations. We used a writing task that asked participants to describe an autobiographical memory of being either rejected or accepted. Previous studies (Kimmel et al., 2021; Pfundmair et al., 2015) show that this methodology successfully elicits feelings of being rejected, similar to other experimental paradigms of social rejection, such as Cyberball (Williams, 2007).

We hypothesized that, regardless of the type of the relived event, high compassionate goals would be associated with fewer pins in the voodoo doll, whereas high self-image goals would be related to more pins, because these goals are not specific to damaged interpersonal relationships (Crocker & Canevello, 2015). We further expected that self-compassionate reactions regarding their relived events would mediate the associations between interpersonal goals and aggressive inclinations (Fig. 1). Specifically, people with high compassionate goals in the relationship with a person who accepted or rejected them would be more likely to show self-compassionate reactions regarding the participants’ relived experience and, thus, be less likely to stick pins into the voodoo doll that mentally represents that person. On the other hand, people with high self-image goals in their relationship with a person who accepted or rejected them would show less self-compassionate reactions and, thus, stick more pins into the voodoo doll.

Method

Participants

To determine a sufficient sample size, we conducted two power analyses based on previous research (Miyagawa et al., 2021). First, a power analysis for correlation coefficients revealed that 220 participants were required to detect a power of 0.80 with a significance level of 0.05 ($r=0.19$ between compassionate goals and self-compassion; Miyagawa et al., 2021). Second, we conducted a power analysis for the indirect effect of compassionate goals using the Monte Carlo power analysis simulation provided by Schoemann et al. (2017). We set a significance level of 0.05 and a

power of 0.80. We estimated the required sample size using the standard deviations of compassionate goals, self-compassion, and aggression, and their correlation coefficients reported by Miyagawa et al. (2021). This power analysis showed that 330 participants were required to detect the indirect effect of compassionate goals on aggression via self-compassion.

Based on these power analyses, we recruited 400 participants through Rakuten Insight, a web survey company with approximately 2.2 million registered monitors across Japan.¹ Specifically, registered monitors in their twenties to fifties were eligible to participate in this study. Data collection continued until 100 participants from each age group completed the web survey. From the initial 400 samples, data from 19 participants were excluded because they did not follow the writing instruction (e.g., writing about multiple experiences, or experiences of being accepted in the rejection condition). Thus, the final sample comprised 381 participants (190 men, 191 women. $M_{\text{age}} = 40.1$, $SD = 10.7$), which also met the guidelines for a sample size to reduce unstable correlation coefficients ($N = 250$; Schönbordt & Perugini, 2013).

Procedure

At the beginning of this study, participants read an informed consent form and agreed to participate in the study. First, participants were asked to recall a time when they were rejected or accepted by a specific individual within the last 5 years, and answer how close they had felt to the person before the event (1 = *not close at all* to 7 = *very close*). Next, participants completed a measure of compassionate and self-image goals in their relationship with the person.

Afterward, participants were randomly assigned to either the rejection ($N = 195$) or acceptance condition ($N = 186$), and were asked to write about their experiences. In the rejection condition, participants read the following instruction (Miyagawa et al., 2021): “Please look back on your life and bring to mind an experience of feeling rejected, for instance, a time when you were ignored or betrayed by others. If you have multiple experiences, please choose the most severe experience. Please describe such an event in the space provided below.” In the acceptance condition, participants read a similar instruction that differed by having participants recall their experience of being accepted by others.

Following this writing task, participants answered how rejected they had felt during the task and how compassionately they were treating themselves regarding a relived

¹ To remove double registration and impersonation registration, Rakuten Insight checks all the monitors and their registered information every month. Additionally, to increase the quality of panel data, the company conducts research using attention check items six times a year and removes dishonest responders (<https://insight.rakuten.co.jp/member/>).

experience. Finally, participants completed the voodoo doll aggression task (Chester & DeWall, 2017; Chester et al., 2019; DeWall et al., 2013; Slotter et al., 2012). At the end of the study, participants were debriefed and thanked for their efforts. This research was approved by the Institutional Review Board of the affiliated university of the first author. This survey also included additional measures for other studies that are not reported in this study.

Measures

Interpersonal goals Participants reported compassionate and self-image goals in their relationship with the person they recalled by using the Culturally Invariant Compassionate and Self-Image Goals Scale (Niiya & Crocker, 2019). Participants were instructed to indicate how much they wanted or tried to pursue various goals in their relationships with this person before the event happened on a 5-point scale ranging from 1 (*not at all*) to 5 (*very much*). Compassionate goals consisted of six items such as “Be supportive of others.” Self-image goals consisted of 12 items such as “Appear successful.” Following Niiya and Crocker (2019), we averaged the items of each subscale to create compassionate goals ($\alpha=0.89$) and self-image goals ($\alpha=0.90$).

Feeling rejected during the writing task Participants rated the two items, “I felt rejected during the writing task” and “I felt ignored during the writing task,” on a 5-point scale ranging from 1 (*disagree*) to 5 (*agree*), which we adapted from Pfundmair et al. (2015). We averaged these items to represent feeling rejected during the writing task ($\alpha=0.90$).

Self-compassionate reactions toward a relived experience Participants indicated how compassionately they were treating themselves regarding the event they recalled using the adapted version of the Self-Compassion Scale-Short Form (SCS-SF; Rae et al., 2011) on a 5-point scale ranging from 1 (*disagree*) to 5 (*agree*). We adapted items of the widely used SCS-SF to measure self-compassionate reactions toward a specific event. Example items were “Right now, I am giving myself the caring and tenderness I need” and “Right now, I am taking a balanced view of the experience I recalled.” After reverse-coding the items that represented low self-compassion, we averaged 12 items to compose self-compassionate reactions ($\alpha=0.70$).

Aggressive inclinations toward the person each participant recalled To assess the behavioral measure of aggression, we used the online version of the voodoo doll aggression task. Participants were presented with a picture of a human doll and asked to imagine the doll as the person they recalled. To increase the participants’ understanding of this task, we added to the picture of the doll a speech bubble that said,

“This is the person you are recalling.” Participants indicated the number of pins they wanted to stick into the doll from 0 to 51 pins (Chester & DeWall, 2017; Chester et al., 2019; DeWall et al., 2013).

Results

Descriptive statistics of study variables

Pin counts on the voodoo doll were positively skewed (skewness = 2.26), leptokurtic (kurtosis = 3.82), and zero-inflated (63.3%). Therefore, following the recommendation by Chester et al. (2019), we added 1 to this variable to ensure 0 was transformed, and then used base 10 logarithmic transformation.

Table 1 shows the mean scores and standard deviations of the study variables and the results of *t*-tests between conditions. Importantly, participants in the rejection condition felt more rejected than those in the acceptance condition, $t(379) = 18.12$, $p < 0.001$, $d = 1.85$, suggesting that the random assignment to the conditions was successful.

Correlations among variables

Table 2 presents the correlations in this study. Compassionate goals were negatively associated with pin counts whereas self-image goals were positively related to pin counts. Self-compassionate reactions correlated positively with compassionate goals and negatively with self-image goals and pin counts.

Testing the moderation effect of conditions

Following previous studies (Chester & DeWall, 2017; Chester et al., 2019), we used generalized linear modeling with a Poisson distribution and tested whether conditions moderated the associations between interpersonal goals, self-compassionate reactions, and log-transformed pin counts on the voodoo doll (Table 3). Conditions were effect coded as -1 (acceptance) and 1 (rejection). Self-compassion negatively predicted pin counts. Participants in the rejection condition chose more pins than those in the acceptance condition. Notably, we did not find the moderation effects of conditions on pin counts; therefore, we dropped conditions for a subsequent path model.²

² Entering feeling rejected and closeness into this regression did not change the results. Even when these two variables were entered, self-compassionate reactions were still negatively associated with pin counts, $B = -0.402$, $SE = 0.158$, $p = .011$. Conditions did not moderate the associations between interpersonal goals, self-compassionate reactions, and pin counts ($ps > .117$).

Table 1 Descriptive statistics of study variables in section “Study 1”

	Total			Acceptance condition		Rejection condition		<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	α	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Compassionate goals	.89	3.62	0.87	3.89	0.74	3.36	0.90	6.21	<.001	0.64
Self-image goals	.90	2.85	0.78	2.73	0.79	2.96	0.76	2.98	.003	0.31
Closeness	–	5.04	1.71	5.44	1.52	4.67	2.80	4.53	<.001	0.46
Feeling rejected	.90	2.56	1.42	1.56	0.88	3.50	1.17	18.12	<.001	1.85
Self-compassionate reactions	.70	3.39	0.57	3.56	0.53	3.23	0.56	5.89	<.001	0.60
Pin counts	–	0.38	0.59	0.23	0.44	0.52	0.67	5.07	<.001	0.52

Pin counts were log-transformed

Table 2 Correlations among study variables in section “Study 1”

	1	2	3	4	5	6
1. Conditions	–					
2. Compassionate goals	–.30***	–				
3. Self-image goals	.15**	.17**	–			
4. Closeness	–.23***	.49*** (0.51***)	–.06 (–.17**)	–		
5. Feeling rejected	.68***	–.17** (–.19***)	.11* (.14**)	–.19***	–	
6. Self-compassionate reactions	–.29***	.16** (.19***)	–.11* (–.15**)	.22***	–.42***	–
7. Pin counts	.25***	–.15** (–.18**)	.12* (.15**)	–.29***	.28***	–.26***

Conditions are coded as -1 (the acceptance condition) and 1 (the rejection condition). Pin counts were log-transformed. The correlations inside the parentheses in the compassionate goals (and self-image goals) columns are partial correlations controlling for self-image goals (compassionate goals, respectively)

*** $p < .001$

** $p < .01$

* $p < .05$

Indirect effects of interpersonal goals on aggressive inclinations through self-compassionate reactions

Figure 1 illustrates the path model. We tested the indirect effects of compassionate and self-image goals on log-transformed pin counts through self-compassionate reactions using a bias-corrected bootstrapping method (2000 replications). We considered the proposed indirect effects to be significant if zero was not included in the 95% confidence intervals (Preacher & Hayes, 2008). Supporting our hypotheses, self-compassionate responses significantly mediated the relationships between compassionate goals and pin counts, point estimate = -0.028 , $SE = 0.011$, 95% CI [-0.056 , -0.011], and between self-image goals and pin counts, point estimate = 0.024 , $SE = 0.010$, 95% CI [0.008 , 0.049].³

³ We conducted a post hoc power analysis of the mediation model using the Monte Carlo simulation (Zhang, 2014). We found that the sample size in see section “Study 1” provided a power of 0.93 to detect the indirect effect of compassionate goals on pin counts through self-compassionate reactions. On the other hand, the power to detect the indirect effect of self-image goals was 0.76 in the current sample.

Discussion

Our data showed that interpersonal goals were related to aggressive inclinations through self-compassion, regardless of the type of event, implying that participants with higher compassionate goals might practice self-compassion when recalling their personal events and, thus, be less inclined to aggression toward the person they recalled. Conversely, and as an extension of previous research (Miyagawa et al., 2021), the results imply that participants with higher self-image goals might be less likely to use self-compassion and thus become more aggressive toward their targets.

Although we found that interpersonal goals were related to aggressive inclinations through self-compassion, we did not investigate why people with high compassionate goals displayed self-compassionate reactions. In “Study 2”, we added nonzero-sum beliefs in relationships (Crocker et al., 2017) as an additional serial mediator in the associations between interpersonal goals, self-compassion, and aggressive inclinations.

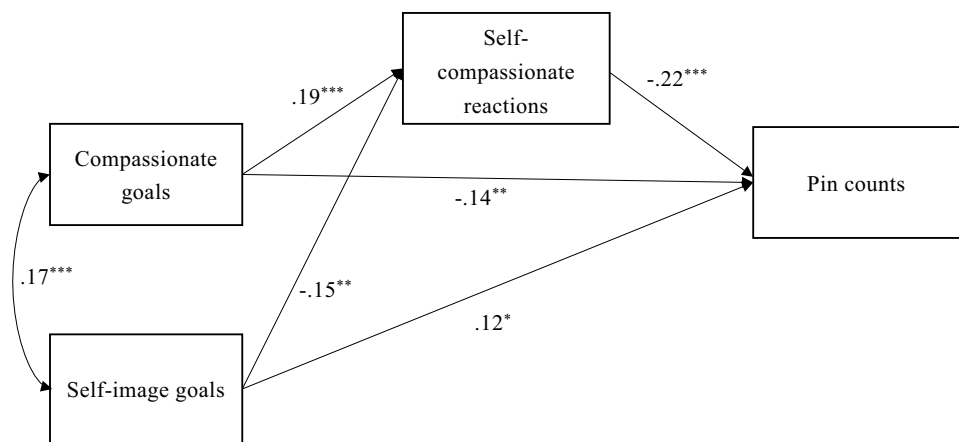
Table 3 Generalized liner model for predicting voodoo doll pin counts in section “Study 1”

	<i>B</i>	<i>SE</i>	<i>p</i>	VIF
Conditions	0.278	0.091	.002	1.227
Compassionate goals	−0.247	0.099	.013	1.227
Self-image goals	0.225	0.116	.053	1.104
Self-compassionate reactions	−0.533	0.150	<.001	1.118
Conditions by compassionate goals	0.157	0.100	.115	1.112
Conditions by self-image goals	−0.056	0.117	.631	1.077
Conditions by self-compassionate reactions	0.062	0.151	.683	1.025
<i>R</i> ²	.128		<.001	

Conditions are coded as the acceptance condition (−1) and the rejection condition (1). Pin counts were log-transformed

VIF variance inflation factor

Fig. 1 A path model of the relationships between interpersonal goals, self-compassionate reactions, and aggressive inclinations in section “Study 1”



Note. Standardized values are presented. Pin counts were log-transformed.

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

Study 2

In section “Study 2”, we aimed to replicate and extend “Study 1” by showing that nonzero-sum beliefs played a mediating role in the associations between interpersonal goals and self-compassion. Specifically, section “Study 2” hypothesized the following: (a) compassionate goals would relate to higher nonzero-sum beliefs, which in turn would be associated with higher self-compassionate reactions and then fewer pins in the voodoo doll, and (b) self-image goals would relate to lower nonzero-sum beliefs (i.e., higher zero-sum beliefs), which in turn would be linked to lower self-compassionate reactions and then more pins in the voodoo doll (Fig. 2).

We used vignettes about social rejection instead of having participants recall their experiences of being rejected. This vignette method allowed us to control the characteristics of personal experiences and see how individual differences in focal variables would be related to responses to common situations (Hughes & Huby, 2004; Lanza & Carifio, 1992).

We adapted two scenarios from Besser and Zeigler-Hill (2010), which differed in the source of social rejection: a romantic partner or a supervisor. We expected that the types of vignettes would not moderate the associations between interpersonal goals and aggressive inclinations.

Method

Participants

Study 2 recruited another 400 participants through the same web survey company (Rakuten Insight) as in section “Study 1”. Similar to section “Study 1”, registered monitors in their twenties to fifties were eligible to participate in this research. Data collection continued until 100 participants from each age group completed the web survey. The participants in section “Study 1” were not eligible to participate in see section “Study 2”. Data from nine participants were excluded because they reported that they could not imagine themselves experiencing a rejection scenario. Thus, the final

Table 4 Descriptive statistics of study variables in section “Study 2”

	Total			Romantic partner condition		Supervisor condition		<i>t</i>	<i>p</i>	Cohen's <i>d</i>
	α	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Compassionate goals	.83	3.73	0.61	3.72	0.64	3.75	0.58	0.62	.539	0.06
Self-image goals	.88	2.79	0.69	2.77	0.66	2.81	0.72	0.64	.520	0.07
Nonzero-sum beliefs	.71	3.30	0.57	3.28	0.54	3.32	0.60	0.69	.492	0.07
Feeling rejected	.80	2.78	0.74	2.86	0.75	2.71	0.72	1.98	.049	0.20
Self-compassionate reactions	.73	2.98	0.55	2.97	0.52	2.99	0.58	0.33	.743	0.03
Pin counts	–	0.88	0.69	0.83	0.70	0.93	0.68	1.49	.138	0.15

Pin counts were log-transformed

sample comprised 391 participants (191 men, 200 women. $M_{\text{age}} = 40.2$, $SD = 10.8$), which met the criterion of stable correlation estimates ($N = 250$; Schönborcht & Perugini, 2013).

Procedure

At the beginning of this study, participants read an informed consent form and agreed to participate in the study. First, they answered the scales of compassionate and self-image goals and nonzero-sum beliefs in everyday relationships. Next, they were randomly assigned to either the romantic partner ($N = 196$) or the supervisor condition ($N = 195$). Those in the romantic partner condition read a rejection scenario and imagined themselves experiencing this situation. The scenario went as follows: “You have committed to a romantic relationship with your partner for a year and you plan to get married. One day, you got into a fight with your partner. Your partner was so mad at you and talked to you loudly so that everyone around you could hear. Your partner clearly mentioned that your partner was annoyed at every action you took and that you were not an appropriate partner. In fact, your partner has been cheating on you for several weeks. Your partner said that your partner wanted to break up with you to date the new lover. Your partner went away after saying that your partner did not want to see you again.”

Correspondingly, those in the supervisor condition read a rejection scenario and imagined themselves experiencing this situation. It went as follows: “You work in a company, and you have tried your best to develop a new product for a year. You earnestly prepared for the presentation of this product in front of your supervisor, colleagues, and executives. After finishing your important presentation, your supervisor was so mad at you and complained loudly so that everyone could hear. Your supervisor said that your presentation was really bad and that you could not convey the appeal of the product at all. Your supervisor went away after saying that your supervisor did not want to see you again.”

Subsequently, participants reported how vividly they could imagine the scenario on a 5-point scale (1 = *not vividly at all*, 2 = *not vividly*, 3 = *somewhat vividly*, 4 = *vividly*, and 5 = *very vividly*), and those who chose 1 or 2 were excluded from the data analyses (Miyagawa & Taniguchi, 2018). Later, they answered the degrees of feeling rejected and self-compassionate reactions toward the rejection. Finally, they completed the voodoo doll aggression task (Chester & DeWall, 2017; Chester et al., 2019; DeWall et al., 2013; Slotter et al., 2012). At the end of this study, participants were debriefed and thanked for their efforts. This research was approved by the Institutional Review Board of the affiliated university of the first author. This survey also included additional measures for other studies that are not reported in this study.

Measures

Interpersonal goals in everyday relationships Participants reported compassionate and self-image goals in everyday relationships using the Culturally Invariant Compassionate and Self-Image Goals Scale (Niiya & Crocker, 2019). As in see section “Study 1”, we averaged the items of each subscale to create compassionate goals ($\alpha = 0.83$) and self-image goals ($\alpha = 0.88$).

Nonzero-sum beliefs in everyday relationships Participants completed a measure of nonzero-sum beliefs in everyday relationships (Crocker et al., 2017; Niiya et al., 2013). To comprehensively assess nonzero-sum beliefs, we combined five items from Crocker et al. (2017) with two additional items from Niiya et al. (2013). Participants indicated the degree to which they agreed with seven items in their everyday relationships on a 5-point scale ranging from 1 (*disagree*) to 5 (*agree*). Example items were “It is usually possible for both individuals to get what we need” and “It is usually possible to resolve disagreements in mutually beneficial ways.” After reverse-coding three

Table 5 Correlations among study variables in section “Study 2”

	1	2	3	4	5	6
1 Conditions	–					
2 Compassionate goals	.03	–				
3 Self-image goals	.03	.28***	–			
4 Nonzero-sum beliefs	.03	.32*** (.38***)	–.13** (–.25***)	–		
5 Feeling rejected	–.10*	.09† (.06)	.13* (.10*)	.00	–	
6 Self-compassionate reactions	.02	.19*** (.22***)	–.10† (–.16**)	.29***	–.30***	–
7 Pin counts	.08	–.02 (–.06)	.14** (.15**)	–.10*	.24***	–.24***

Conditions are coded as -1 (the romantic partner condition) and 1 (the supervisor condition). Pin counts were log-transformed. The correlations inside the parentheses in the compassionate goals (and self-image goals) columns are partial correlations controlling for self-image goals (compassionate goals, respectively)

*** $p < .001$

** $p < .01$

* $p < .05$

† $p < .10$

Table 6 Generalized liner model for predicting voodoo doll pin counts in section “Study 2”

	<i>B</i>	<i>SE</i>	<i>p</i>	VIF
Conditions	0.059	0.041	.156	1.003
Compassionate goals	–0.007	0.077	.926	1.326
Self-image goals	0.140	0.064	.028	1.190
Nonzero-sum beliefs	–0.060	0.084	.477	1.262
Self-compassionate reactions	–0.311	0.073	< .001	1.133
Conditions by compassionate goals	–0.079	0.077	.303	1.325
Conditions by self-image goals	–0.088	0.064	.165	1.189
Conditions by nonzero-sum beliefs	0.068	0.084	.418	1.261
Conditions by self-compassionate reactions	–0.071	0.072	.327	1.133
R^2	.064		< .001	

Conditions are coded as the romantic partner condition (–1) and the supervisor condition (1). Pin counts were log-transformed

VIF Variance Inflation Factor

items that represented zero-sum beliefs, we averaged the seven items to compose nonzero-sum beliefs ($\alpha = 0.71$).

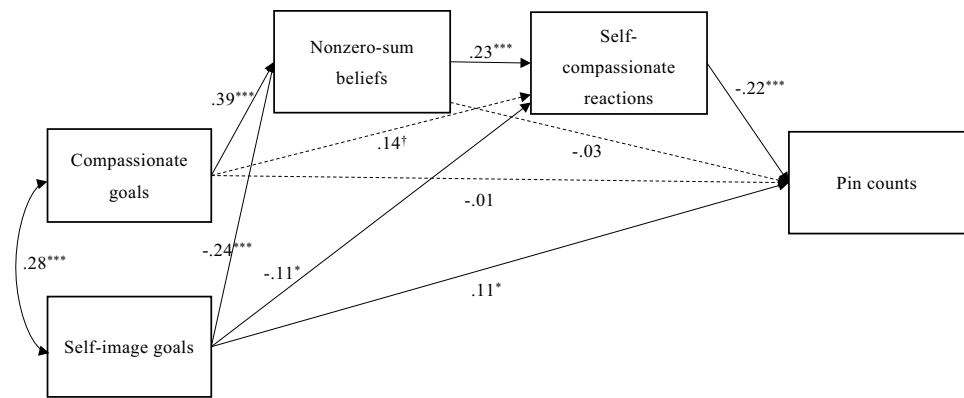
Feeling rejected in the scenario Participants indicated how strongly they would feel “rejected,” “ignored,” “hurt,” and “isolated” if they were to experience the scenario on a 4-point scale ranging from 1 (*I would not feel this emotion*) to 4 (*I would feel this emotion very strongly*). We computed the mean score of these four items as feeling rejected ($\alpha = 0.80$).

Self-compassionate reactions toward the scenario Participants indicated how compassionately they would treat themselves if they were to experience the scenario using the adapted version of the SCS-SF (Raes et al., 2011) on a 5-point scale ranging from 1 (*disagree*) to 5 (*agree*).

Example items were “I would give myself the caring and tenderness I need,” and “I would take a balanced view of the situation.” As in “Study 1”, we reverse-coded the items of low self-compassion and then averaged the 12 items to compose self-compassionate responses ($\alpha = 0.73$).

Aggressive inclinations toward the rejecter As in section “Study 1”, participants were presented with a picture of a human doll and asked to imagine the doll as the romantic partner or the supervisor who rejected them in the scenario. To increase the participants’ understanding of this task, we added to the picture of the doll a speech bubble that said, “This is the person you are imagining.” Participants indicated the number of pins they wanted to stick into the doll from 0 to 51 pins (Chester & DeWall, 2017; Chester et al., 2019; DeWall et al., 2013).

Fig. 2 A path model of the relationships between interpersonal goals, nonzero-sum beliefs, self-compassionate reactions, and aggressive inclinations in section “Study 2”



Note. Standardized values are presented. Pin counts were log-transformed.

*** $p < .001$, ** $p < .01$, * $p < .05$, † $p < .10$.

Results

Descriptive statistics of study variables

Pin counts on the voodoo doll task were positively skewed (skewness = 2.26), platykurtic (kurtosis = -1.05), and zero-inflated (31.7%). Therefore, as in section “Study 1”, we added 1 to this variable and then used the base 10 logarithmic transformation. Table 4 shows the descriptive statistics and the results of the t -tests between the conditions. A one-sample t -test showed that the participants’ feeling of rejection, averaged across scenarios ($M = 2.78$, $SD = 0.74$), was significantly higher than the midpoint of the scale (2.5), $t(390) = 7.57$, $p < 0.001$, $d = 0.38$.

Correlations among variables

Table 5 presents the correlations among the study variables. Compassionate goals were positively correlated with nonzero-sum beliefs and self-compassionate reactions. Conversely, self-image goals were negatively correlated with nonzero-sum beliefs and positively correlated with voodoo doll pin counts. Self-compassionate reactions correlated positively with nonzero-sum beliefs and negatively with pin counts.

Testing the moderation effect of conditions

Similar to section “Study 1”, we used generalized linear modeling with a Poisson distribution and tested whether conditions moderated the associations between interpersonal goals, nonzero-sum beliefs, self-compassionate reactions, and pin counts (Table 6). Conditions were effect coded as

- 1 (romantic partner) and 1 (supervisor). Self-compassionate reactions negatively predicted pin counts, whereas self-image goals positively predicted this variable. Notably, we did not find moderation effects of conditions on pin counts. Therefore, we dropped conditions for the subsequent path model.

Indirect effects of interpersonal goals on aggressive inclinations through nonzero-sum beliefs and self-compassionate reactions

Figure 2 depicts the path model in which interpersonal goals relate to aggressive behavior through nonzero-sum beliefs and self-compassionate reactions. We tested these indirect effects using a bias-corrected bootstrapping method (2000 replications).

We first tested whether nonzero-sum beliefs mediated the associations between interpersonal goals and self-compassionate reactions. We found a positive indirect effect of compassionate goals on self-compassionate reactions through higher nonzero-sum beliefs, point estimate = 0.081, $SE = 0.030$, 95% CI [0.032, 0.144]. Self-image goals were indirectly related to lower self-compassionate reactions through lower nonzero-sum beliefs, point estimate = -0.044, $SE = 0.015$, 95% CI [-0.081, -0.021].

Next, we tested the sequential mediation pathways in which interpersonal goals were associated with pin counts through both nonzero-sum beliefs and self-compassionate reactions. Supporting our hypotheses, we found a significant negative indirect effect of compassionate goals on pin counts through nonzero-sum beliefs and then self-compassionate reactions, point estimate = -0.022, $SE = 0.010$, 95% CI [-0.048, -0.008]. We also found a significant positive indirect effect of self-image goals on pin count through

these proposed sequential mediators, point estimate = 0.012, $SE = 0.005$, 95% CI [0.005, 0.026].⁴

Alternative models to test indirect effects of interpersonal goals on aggressive inclinations

We tested an alternative mediation model in which self-compassionate reactions preceded nonzero-sum beliefs. We did not find a serial mediation of compassionate goals on pin counts through self-compassionate reactions and then nonzero-sum beliefs, point estimate = -0.001, $SE = 0.003$, 95% CI [-0.009, 0.005]. Similar serial mediation of self-image goals was also nonsignificant, point estimate = 0.001, $SE = 0.002$, 95% CI [-0.003, 0.005].

We also examined an alternative model in which nonzero-sum beliefs and self-compassionate reactions were parallel mediators. In this model, we did not find that nonzero-sum beliefs mediated the associations between compassionate goals and pin counts, point estimate = -0.011, $SE = 0.027$, 95% CI [-0.065, 0.044], and self-image goals and pin counts, point estimate = 0.006, $SE = 0.014$, 95% CI [-0.022, 0.035].

Importantly, in both alternative models, self-compassionate reactions significantly mediated the relationships between compassionate goals and pin counts, point estimate = -0.058, $SE = 0.023$, 95% CI [-0.111, -0.022], and between self-image goals and pin counts, point estimate = 0.036, $SE = 0.015$, 95% CI [0.013, 0.073].

Discussion

“Study 2” employed a vignette method and replicated the findings of Study 1 that interpersonal goals were related to aggression through self-compassionate reactions. We found that compassionate goals were linked to higher self-compassionate reactions through higher nonzero-sum beliefs, whereas self-image goals were associated with lower self-compassionate reactions through lower nonzero-sum beliefs. The results also showed that both nonzero-sum beliefs and self-compassionate reactions sequentially mediated the associations between interpersonal goals and voodoo doll pin counts. Additionally, we did not find support for the serial mediation model in which self-compassionate reactions preceded nonzero-sum beliefs in the associations between interpersonal goals and pin counts. These results extended previous research (Miyagawa et al., 2021) and section “Study 1,

implying that people with high compassionate goals might believe that what is good for themselves is also good for others and, thus, practice self-compassion to regulate their aggressive behavior toward others.

General discussion

Across the two studies with different methodologies to induce social pain, we found that the interpersonal goals participants pursued were linked to aggressive inclinations toward others through self-compassion. In section “Study 1, which employed the writing task about personal events, the results showed that participants who had compassionate goals displayed self-compassionate reactions and were less inclined to be aggressive. Conversely, our findings implied that people who set self-image goals tended not to show self-compassionate reactions and were more aggressive toward others. In Study 2, which used hypothetical vignettes about social rejection, our data suggested that participants motivated by compassionate goals held nonzero-sum beliefs about relationships, which helped them display self-compassionate reactions that buffered against aggressive behavior toward their rejecter. On the other hand, the results implied that participants who pursued self-image goals held zero-sum beliefs (as indicated by low nonzero-sum beliefs) that prevented them from practicing self-compassion in times of social rejection.

In line with previous research that focused on various types of relationships (Crocker & Canevello, 2008; Crocker et al., 2010; Niiya et al., 2021), we found that interpersonal goals were related to aggressive inclinations regardless of the relationship with a person who displayed either rejection or acceptance in section “Study 1”, and with people in general in section “Study 2”. Specifically, regardless of the types of these relationships, compassionate goals were negatively associated with aggressive inclinations whereas self-image goals showed a negative association with aggressive inclinations. Therefore, the consequences of interpersonal goals might apply to a broader range of social relationships (Crocker & Canevello, 2015; Niiya et al., 2021).

Our results suggest that self-compassion is an effective emotional regulation strategy for controlling aggression that people with high compassionate goals may employ. When adopting self-compassion in relationships, these people may soothe their emotional states and see the consequences of aggressive acts on their relationships from a balanced perspective (Neff, 2011), which could prevent them from being aggressive toward others. Previous research has shown that self-compassion is negatively associated with self-reported aggression (Fresnics & Borders, 2017). Our two studies replicated and extended this finding by showing that self-compassion was negatively related to aggressive

⁴ We conducted a post hoc power analysis of the serial mediation model using the Monte Carlo simulation (Zhang, 2014). We found that the sample size in Study 2 provided a power of 0.91 to detect the serial indirect effect of compassionate goals on pin counts through nonzero-sum beliefs and then self-compassionate reactions. Similarly, this sample provided a power of 0.91 to detect the serial indirect effect of self-image goals.

inclinations (i.e., fewer pins in the voodoo doll that mentally represented a person that participants recalled or imagined). Furthermore, in line with Miyagawa et al. (2021), we showed that compassionate goals were positively related to self-compassion, which seemed to buffer against aggression. Importantly, whereas previous research (Miyagawa et al., 2021) relied on self-reported revenge intention, the current work measured aggressive inclinations using a well-known aggression paradigm (DeWall et al., 2013). Therefore, combined with the previous study (Miyagawa et al., 2021), interpersonal goals are related not only to self-reported revenge intention toward rejecters but also to the number of the pins stabbed into the voodoo doll that represents others.

We found that nonzero-sum beliefs mediated the associations between compassionate goals and self-compassion. The egosystem–ecosystem theory has suggested that nonzero-sum beliefs account for why compassionate goals relate to harmonious relationships (Canevello & Crocker, 2015; Crocker & Canevello, 2008, 2015; Niiya et al., 2013). Specifically, the theory posits that compassionate goals shape the views of relationships in nonzero-sum way, which orients people to do what is good for themselves and their partners (Canevello & Crocker, 2015). Empirical findings showed that when discussing relationship conflicts with their partner, people with high compassionate goals held nonzero-sum beliefs, and thus were optimistic about solving these conflicts (Crocker et al., 2017). Our work contributes to the literature by showing that compassionate goals relate to practicing self-compassion through nonzero-sum beliefs. People with high compassionate goals want to be supportive of others (Crocker & Canevello, 2008; Niiya & Crocker, 2019) and hold nonzero-sum beliefs that people’s needs and well-being are mutually connected (Crocker et al., 2017). Thus, they may think that caring for themselves is also beneficial for the well-being of others. For them, self-compassion can be seen as an effective strategy for their and others’ well-being (Yarnell & Neff, 2013; Zhang et al., 2019).

Our findings indicated that people who pursue self-image goals reacted aggressively toward others. The egosystem–ecosystem theory of social motivation suggests that people with self-image goals want to show their competence to others without revealing their weaknesses (Crocker & Canevello, 2008; Niiya & Crocker, 2019). They become less responsive to others because of their egocentric effort to appeal to their positive self-image, which in turn decreases their perceived responsiveness from others (Canevello & Crocker, 2010). People who pursue self-image goals might see a lack of responsiveness from others as a sign of rejection that threatens their positive self-view. As ego threat tends to fuel aggressive responses (Bushman et al., 2009; Williams, 2007), people with higher self-image goals might become more aggressive toward others. Furthermore, in see section “Study 1”, we found that self-image goals were

related to aggressive reactions regardless of the acceptance or rejection condition. This implies that people who pursue self-image goals might be aggressive toward people who accept them. Therefore, people with high self-image goals might show instrumental aggression (Anderson & Bushman, 2002) to display their superiority and power over others. Future research could benefit from examining the underlying motives of people with self-image goals to become aggressive toward others.

Our studies showed that low self-compassion partly accounted for the positive association between self-image goals and aggression. When people are motivated by self-image goals, their primary goal in relationships is to meet their own needs, such as the validation of the positive self and a positive evaluation by others, at the expense of others (Crocker & Canevello, 2008, 2015; Crocker et al., 2017). Such attitudes reflect the view of relationships in a zero-sum or win-or-lose way (Canevello & Crocker, 2015), which may make it difficult to employ self-compassion characterized by nonjudgmental self-acceptance and understanding the equality between self and others as human beings (Neff, 2011). Consequently, people with higher self-image goals may not adequately regulate their aggressive actions.

Limitations and future directions

Although our work consistently showed the associations between interpersonal goals, self-compassion, and aggression across the two studies, the results should be interpreted with caution because of the following limitations. First, the cross-sectional design does not allow a firm causal conclusion about the associations among the study variables. Although we investigated our mediation pathways based on the theoretical models of interpersonal goals (Crocker & Canevello, 2008, 2015) and self-compassion (Neff, 2011), further work should directly test the causal or temporal influences of interpersonal goals on aggression using an experimental method and a longitudinal design.

Second, whereas the sample sizes in our two studies provided a high power to detect the indirect effect of compassionate goals on aggressive inclinations, the power to detect the indirect effect of self-image goals was underpowered in section “Study 1”. Therefore, the results regarding self-image goals in section “Study 1” could be a false positive. However, we consider that this probability is relatively low, given that we found a positive association between self-image goals and aggressive inclinations across studies. Nonetheless, future work should replicate the indirect effect of self-image goals in see section “Study 1” using a larger sample. Additionally, future work could benefit from examining our model in more diverse samples. In the current study, we did not measure social class demographics and sexual orientation. Research has shown that sexual and

gender minorities and people with low socioeconomic status tend to experience stigma-based rejection and report negative outcomes, such as depletion of self-control (Inzlicht et al., 2006; Wong et al., 2019). Importantly, it is assumed that self-compassion buffers against stigma-based rejection because it provides emotion regulation (see Wong et al., 2019, for review). Therefore, although we expect that our model might extend to stigma-based rejection, more research is required to examine how sexual orientation and socioeconomic status would affect the relationships between interpersonal goals, self-compassion, and aggression.

Third, we relied solely on the voodoo doll aggression task to measure aggressive inclinations (Chester & DeWall, 2017; Chester et al., 2019; DeWall et al., 2013). There is a debate on whether this aggression paradigm accurately measures aggression, because it is unclear to what extent participants believe that inserting pins into a doll that represents another person causes actual harm to the intended target (McCarthy & Elson, 2018). While people are unlikely to think stabbing the doll causes actual pain to the target, they may think that something bad happens to the target because of the psychological connection between the image of something and the thing itself (DeWall et al., 2013; Rozin et al., 1986). Therefore, it is reasonable to assume that more pins reflect higher aggressive inclinations toward the target (Chester & DeWall, 2017; Chester et al., 2019; DeWall et al., 2013). Nonetheless, caution should be exercised regarding the generalizability of our findings given that pin counts cannot fully represent the diversity of human aggression in everyday life (McCarthy & Elson, 2018). Future work should extend our results by using other lab-based aggression paradigms as well as a daily diary design.

Fourth, demand characteristics might have affected the results (McCarthy & Elson, 2018). For example, participants might have conformed to act aggressively when a picture of a doll and pins were presented. Although we cannot fully rule out this possibility, if this had been the case, participants would have reported large numbers of pins to stab the voodoo doll and the zero-inflation of pin counts would have not been presented (DeWall et al., 2013). In fact, across the two studies, we found that pin counts were zero-inflated, which is in line with previous research (Chester & DeWall, 2017; Chester et al., 2019; DeWall et al., 2013; Slotter et al., 2012). Thus, we do not think that demand characteristics undermine our findings. Nonetheless, future research should directly examine the motives behind aggressive reactions (see McCarthy & Elson, 2018).

Finally, our results were based on reactions toward relived and hypothetical events; thus, future studies should extend our findings using the paradigms that produce in-vivo social rejection, such as Cyberball (Williams, 2007).

Despite these limitations, our work is worthwhile showing that interpersonal goals are related to self-compassion

and aggressive inclinations in participants' personal events (see section "Study 1") and hypothetical scenarios (see section "Study 2"), which provides an empirical foundation upon which future studies build.

Conclusion

Aggression tends to exacerbate interpersonal well-being for both those who behave aggressively and those who are victimized (Aquino & Thau, 2009; Geel et al., 2021; Williams, 2007). Our work has found that interpersonal goals relate to aggressive inclinations through nonzero-sum beliefs and self-compassion. We suggest that people motivated by compassionate goals hold nonzero-sum beliefs and thus practice self-compassion to regulate their aggressive behavior, whereas people motivated by self-image goals act aggressively, partly because of low nonzero-sum beliefs (i.e., high zero-sum beliefs) and low self-compassion.

Funding Our work was funded by JSPS KAKENHI Grant Number 20K14147.

Data availability The datasets for this study are available on request to the corresponding author.

Declarations

Conflict of interest The authors declare that they have no conflict of interest with any of the findings published in this manuscript.

Ethical approval This research has been approved by the Institutional Review Board of the affiliated university of the first author. All procedures performed in this study involving human participants were in accordance with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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