



Can Self-compassion Promote Gratitude and Prosocial Behavior in Adolescents? A 3-Year Longitudinal Study from China

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Abstract

Objectives Self-compassion refers to a positive and healthy self-attitude in times of distress and life difficulties. Abundant research has shown that self-compassion robustly contributes to adolescents' psychological well-being. Recent research has begun to discuss the interpersonal and social benefits of self-compassion. This study examined whether and how self-compassion would be longitudinally associated with two significant other-oriented constructs: gratitude and prosocial behavior.

Methods Using a three-wave longitudinal design, a large sample of Chinese adolescents (Time 3, $N = 1026$; $M_{\text{age}} = 14.41$, $SD_{\text{age}} = 0.59$) was measured annually at three time points. We employed both a cross-lagged panel model (CLPM) and a random intercepts cross-lagged panel model (RI-CLPM) to investigate the longitudinal associations between self-compassion, gratitude, and prosocial behavior at both between-person and within-person levels.

Results Both the CLPM and RI-CLPM suggested that self-compassion positively predicted gratitude and prosocial behavior over time. The CLPM indicated that gratitude and prosocial behavior were bidirectionally related to each other at the between-person level, while the RI-CLPM did not find a significant longitudinal association between them at the within-person level. Also at the between-person level, the CLPM further suggested that gratitude mediated the longitudinal relation between self-compassion and prosocial behavior, while prosocial behavior mediated the relationship between self-compassion and gratitude.

Conclusions This study enriches understanding of the adaptive functions of self-compassion for adolescents' social development. Self-compassion is not selfish but rather enhances feelings of gratitude toward other people and promotes the development of prosocial behavior.

Keywords Self-compassion · Gratitude · Prosocial behavior · Adolescents · Positive development

Self-compassion refers to a healthy and positive attitude toward the self, involving treating oneself with love and understanding in times of suffering, personal inadequacies, and life difficulties (Neff 2003). Self-compassion is conceptualized as comprising three interrelated components: self-kindness, common humanity, and mindfulness. Self-kindness refers to being caring, gentle, and accepting toward oneself rather than

being harshly self-judgmental; common humanity involves recognizing personal shortcomings and difficulties as part of a larger human experience, rather than viewing them as isolating; mindfulness is the tendency to be aware of painful thoughts and feelings in a balanced way, without over-identifying with them (Neff 2003). Since personal and environmental changes dramatically taking place during adolescence, cultivating positive strengths like self-compassion might be critical for adolescents to ameliorate multiple potential stressors (Bluth et al. 2017). Previous research has largely demonstrated that self-compassion is a strong protective factor for adolescents against maladaptive outcomes derived from social pressures and stressful environments, e.g., bullying (Chu et al. 2018). For instance, self-compassion has been shown to attenuate the association between academic burnout and depression (Kyeong 2013). There is abundant evidence that self-compassion robustly contributes to multiple indicators of psychological and emotional well-being for adolescents (Bluth et al. 2017). A recent meta-analytic study

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revealed that self-compassion was strongly beneficial to adolescents' psychological well-being: in particular, it showed a large effect size ($r = -.55$) for the relationship between self-compassion and emotional distress (Marsh et al. 2018).

In addition to the psychological benefits of self-compassion, there is increasing research interest in investigating the social benefits of self-compassion, for instance by testing the relationship between self-compassion and other-oriented constructs such as empathy (Neff and Pommier 2013). However, two significant other-oriented social indicators of adolescents have yet to receive the attention they deserve. One is prosocial behavior, which refers to the actions undertaken to benefit other people (Eisenberg et al. 2006); the other is gratitude, which refers to the positive perception of having benefited from other people's actions (Emmons and McCullough 2003). Both gratitude and prosocial behavior play significant roles in building adolescents' social relationships, and have great impacts on adolescents' positive growth (Tian et al. 2015; Yang et al. 2017). Given that self-compassion involves the sense of heartfulness toward the self, while gratitude and prosocial behavior involve heartfulness in the process of interpersonal interaction (i.e., *appreciating* and *giving* kindness) (Voci et al. 2019), it is worth investigating whether such heartfulness toward the self could transfer to heartfulness toward others.

Rooted in the perspective of Buddhist psychology, self-compassion is not self-focused; rather, it eliminates the boundaries between self and others, which generates a sense of connection (Neff and Seppälä 2016). A growing body of research has shown that self-compassion might strengthen interpersonal and social functions, such as the sense of community (Akin and Akin 2015), perceived social support (Alizadeh et al. 2018), general trust, and relatedness (Yang et al. 2019), which are beneficial for developing prosocial behavior. Besides, being able to hold one's suffering in compassionate awareness facilitates the ability to extend compassion to other people (Neff and Pommier 2013). With a sense of common humanity, self-compassionate individuals are more likely to recognize that all humans inevitably experience sufferings (Neff 2003). Therefore, not only the self but also others deserve to be treated gently. In line with this reasoning, self-compassion might foster prosocial behavior, which is characterized by showing compassion and kindness toward others. Indeed, several cross-sectional studies have demonstrated a positive link between self-compassion and prosocial behavior. For instance, Neff and Pommier (2013) showed that self-compassion was associated with greater perspective taking, empathic concern, and altruism among community adults and meditators. Similarly, Yang et al. (2019) reported that self-compassion was positively related to prosocial behavior in a sample of Chinese senior middle school students. Experimentally, laboratory-induced self-compassion has been found to predict greater willingness to help others in need (Welp and Brown

2014) and to increase participants' real helping behavior in a shelf-collapse incident (Lindsay and Creswell 2014).

While several studies have suggested a positive link between self-compassion and prosocial behavior, the findings are still inconclusive. For instance, in a recent study of Australian adolescents, self-compassion was cross-sectionally associated with peer-rated prosocial behavior but did not predict the development of prosocial behavior over time (Marshall et al. 2020). However, the non-significant longitudinal link might be due to use of a peer-nomination approach with only one item measuring prosocial behavior (i.e., helping). Adolescents' prosocial behavior has been well-demonstrated to include diverse actions, including a wide range of different forms of other-oriented behaviors (Yang et al. 2016a). As the peer-nomination approach might limit the observation of adolescents' prosocial behavior toward different targets (e.g., family and strangers) (Padilla-Walker et al. 2015), the longitudinal association between self-compassion and adolescents' prosocial behavior needs to be examined using a more comprehensive measure of prosocial behavior based on self-report.

Unlike prosocial behavior, relatively limited attention has been paid to uncovering the association between self-compassion and gratitude. As an other-oriented indicator, gratitude is defined as a positive response to recognizing that one has benefited from others' goodwill (McCullough et al. 2002). Researchers have proposed that gratitude is part of a wider life orientation toward noticing and appreciating positives in the world (Wood et al. 2010). For instance, previous research has found that seemingly commonplace matters like waking up in the morning and exposure to natural beauty can produce feelings of gratitude (Emmons and McCullough 2003). Individuals with higher self-compassion are more likely to embrace and appreciate what is good both internally and externally, which may elevate their opportunities to experience gratitude (Neff 2011). The tendency to be non-judgmental and open has been linked to higher gratitude, as it might increase appreciation of ourselves and satisfaction with our lives (Goldstein 2011; Yang et al. 2016b). In addition, the sense of common humanity reminds people of the contribution of all that has helped to shape them, which may also generate a grateful feeling toward their experiences (Neff 2011).

Besides, the qualities of mindfulness allow for calm observations of one's negative emotions without being overwhelmed by painful feelings, which increases the possibility of noticing and appreciating the positive aspects of life (Emmons and Stern 2013; Kabat-Zinn 1994). For instance, individuals who are mindful tend to recognize that conflict with another person teaches them to be more patient, and thus view that other person in a more grateful manner (Swickert et al. 2019). Therefore, even when individuals face difficult life

circumstances, self-compassion can promote an objective perspective and the adoption of positive reframing strategy, which helps them to notice the bright sides of adverse experiences. In line with this reasoning, a few cross-sectional studies indicated that self-compassion was positively associated with dispositional gratitude (Breen et al. 2010; Neff et al. 2018). An interventional study also found that adolescents who completed a mindful self-compassion intervention showed an increase in gratitude (Bluth and Eisenlohr-Moul 2017). However, limited research has investigated the longitudinal association between self-compassion and the development of gratitude.

Gratitude involves recognizing and appreciating others' kindness, while prosocial behavior involves giving and providing kindness toward others. What is the relationship between these two other-oriented indicators? According to moral affect theory, gratitude has specific moral functions in driving individuals' prosocial behavior (McCullough et al. 2001). Numerous cross-sectional and experimental studies have consistently found that gratitude is related to prosocial behavior among both adults and adolescents (Tian et al. 2015; Tsang and Martin 2019). Besides, gratitude has been largely demonstrated to longitudinally predict the development of adolescents' prosocial behavior (e.g., Froh et al. 2010). A recent meta-analysis revealed a moderate positive association ($r = .37$) between gratitude and prosocial behavior (Ma et al. 2017). On the other hand, cumulative evidence suggested that prosocial behavior could initiate a positive developmental cascade of personal characteristics such as gratitude (Padilla-Walker et al. 2020). For instance, a recent longitudinal study indicated that prosocial behavior toward strangers and family members predicted an increase in gratitude among US adolescents (Padilla-Walker et al. 2020). Also, a 4-year longitudinal study indicated a positive reciprocal relationship between gratitude and prosocial behavior (Bono et al. 2017). Accordingly, there might be a positive and bidirectional association between gratitude and prosocial behavior in adolescents.

The present study investigated whether and how self-compassion would be longitudinally associated with two significant other-oriented social indicators (i.e., gratitude and prosocial behavior) in Chinese adolescents, using a three-wave longitudinal study with annual assessments. We hypothesized that self-compassion would predict the development of gratitude and prosocial behavior, and that gratitude might be reciprocally associated with prosocial behavior. We also hypothesized that gratitude might explain the influence of self-compassion on prosocial behavior, and that prosocial behavior could mediate the association between self-compassion and gratitude.

Method

Participants

The participants were drawn from a larger sample of adolescents who were participating in a longitudinal project on emotional and social development. At Time 1 (T1, winter 2017), a total of 1525 Chinese adolescents in the 7th grade were recruited from five middle schools (50.75% boys, 46.30% girls, 2.95% did not report gender; $M_{\text{age}} = 12.47$, $SD_{\text{age}} = 0.69$). We asked whether the adolescents had siblings at T1 (49.77% were the only child, 40.33% had at least one sibling, and 9.90% did not report this information). Of those who participated at T1, 1262 completed the same measures a year later (T2, 8th grade, 82.75% of T1 sample), and then 1026 completed the same measures another year later (T3, 9th grade, 81.29% of T2 sample, 67.28% of T1 sample; 40.84% boys, 47.08% girls, 12.08% did not report gender; $M_{\text{age}} = 14.41$, $SD_{\text{age}} = 0.59$). Attrition analyses were conducted to examine whether the 1026 retained adolescents differed from those who dropped out at T3. Results showed that those who were missing at T3 reported lower levels of self-compassion ($p = .004$) at T1 and were more likely to be boys ($p < .001$). However, no significant differences for gratitude ($p = .07$) and prosocial behavior ($p = .22$) were found.

Procedures

This study was approved by the Ethics Committee of Beijing Normal University. All adolescents participated voluntarily with their and their parents' informed consent. At each time point, adolescents were group-tested in quiet classrooms and completed a set of questionnaires. Upon completion, the participants were debriefed and given small gifts for their participation.

Measures

Self-compassion Self-compassion was measured through the Chinese version of the Self-Compassion Scale–Short Form (SCS–SF; Raes et al. 2011; Chen et al. 2011). This scale comprises 12 items measuring three positive components and their negative counterparts. Participants rated each item (e.g., “I’m tolerant of my own flaws and inadequacies”) on a 5-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*). As suggested by previous research, an overall score of self-compassion was computed by reversing the items measuring negative counterparts and then averaging all the items (Raes et al. 2011).

Gratitude Gratitude was measured using the six-item Gratitude Questionnaire (GQ-6; McCullough et al. 2002). Adopting a translation–back-translation procedure (Brislin

1970), we invited two English-major graduates with a background in psychology to translate and back-translate the GQ-6. Participants were asked to respond to each item (e.g., “I am grateful to a wide variety of people”) using a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). An average score was calculated with reverse coding of two items, and a higher score indicates a stronger feeling of gratitude in daily life.

Prosocial Behavior Prosocial behavior was measured through a validated Prosocial Behavior Scale for Adolescents (PBSA: Yang et al. 2016a). This scale contains 15 items measuring adolescents’ prosocial behavior in daily life, including trait prosociality, altruistic behavior, relational behavior, and behavior benefiting public welfare (e.g., “I like participating in social activities for public good”). Participants were asked to rate each item on a 7-point Likert scale ranging from 1 (*definitely does not apply to me*) to 7 (*definitely applies to me*). The average score of the 15 items was calculated, with a higher score indicating a higher level of prosocial behavior.

Social Desirability Since self-reported prosocial behavior might be affected by the social desirability tendency, we measured and controlled for social desirability. Participants completed the 13-item Marlowe-Crowne Social Desirability Scale (Reynolds 1982) at T1. The scale demonstrated adequate internal consistency for dichotomous items ($\alpha = 0.64$; e.g., “I have never deliberately said something that hurt someone’s feelings”).

Data Analyses

Descriptive statistics, correlations, and other preliminary analyses of key variables were analyzed using SPSS 20.0. The longitudinal associations between self-compassion, gratitude, and prosocial behavior were tested through both a traditional cross-lagged panel model (CLPM) and a random intercepts cross-lagged panel model (RI-CLPM) in Mplus 8.3, and full information maximum likelihood estimation (FIML) was used to deal with missing data (2.71%). The traditional CLPM is used to examine the prospective effect of individual differences in one concept on the change in individual differences in the other concept (Orth et al. 2020). This approach has been mainly and extensively used in previous developmental studies, so the results of the CLPM can be directly compared to previous research. Specifically, the cross-lagged effect captured by the CLPM indicates the longitudinal effect of between-person differences in one construct on the change in between-person differences in another construct (e.g., whether adolescents who score higher on self-compassion relative to others might also score higher on gratitude and prosocial behavior over time). The RI-CLPM extends the CLPM by distinguishing the between-person effects

and within-person effects (Hamaker et al. 2015). In the RI-CLPM, the stable, trait-like, time-invariant component of each construct is captured by the random intercept, and the cross-lagged effect indicates whether the temporary deviation from the trait level in one construct has a longitudinal effect on change (increase/decrease) in the temporary deviation from the trait level in another construct (Orth et al. 2020). For instance, it will show whether adolescents who score higher than usual on self-compassion (around their trait level) might subsequently score higher on gratitude and prosocial behavior.

Age and gender were controlled for in the models, and social desirability was also controlled for when estimating prosocial behavior. The significance of potential mediation effects was tested using a bootstrapping procedure (1000 bootstrap samples): the given sample size was randomly resampled 1000 times with replacement, and then 1000 estimations of the mediation effect were calculated. When the 95% confidence interval (CI) did not include 0, the mediation effect was significant.

Results

Preliminary Analyses

Table 1 presents the descriptive statistics, bivariate correlations, and internal consistencies for the key variables. Cronbach’s alpha coefficients ranged from .74 to .95, showing good reliabilities for all the measures. All key variables were significantly correlated with each other, as expected. All the correlation coefficients were above .19, and the post hoc power analysis using G*Power revealed that the large sample ($N = 1026$) and the effect size of $r = .19$ provided sufficient power (around 100%) to detect key findings, using an alpha level of 0.05.

We conducted a series of repeated-measures analyses of variance (ANOVAs) on self-compassion, gratitude, and prosocial behavior, respectively, with gender as a between-subjects variable and measurement time (T1, T2, and T3) as a repeated-measure variable. For self-compassion, we found no significant main effect of gender ($M_{\text{boys}} = 3.24$, $M_{\text{girls}} = 3.22$, $F(1, 947) = 0.40$, $p = .53$), and no significant interaction between time and gender ($F(2, 1894) = 0.14$, $p = .87$). However, the effect of time was significant ($F(2, 1894) = 22.53$, $p < .001$). Pairwise comparisons revealed that self-compassion decreased over time ($T1 > T2 > T3$, $ps < .01$). For gratitude, we found significant main effects of gender ($F(1, 947) = 26.17$, $p < .001$) and time ($F(2, 1894) = 18.24$, $p < .001$), and a significant interaction between time and gender ($F(2, 1894) = 3.29$, $p = .04$). Specifically, girls reported a higher level of gratitude than boys ($M_{\text{boys}} = 5.21$, $M_{\text{girls}} = 5.54$), and gratitude decreased over time ($T1 > T2 > T3$, ps

Table 1 Descriptive statistics, correlations, and the internal consistencies for key variables

	<i>M</i> (<i>SD</i>)	α	Time 1			Time 2			Time 3		
			1	2	3	4	5	6	7	8	9
Time 1											
1. Self-compassion	3.29 (0.61)	.74	—								
2. Gratitude	5.47 (1.25)	.88	.40***	—							
3. Prosocial behavior	5.39 (1.13)	.94	.45***	.62***	—						
Time 2											
4. Self-compassion	3.22 (0.59)	.76	.52***	.24***	.26***	—					
5. Gratitude	5.35 (1.24)	.89	.30***	.52***	.42***	.46***	—				
6. Prosocial behavior	5.30 (1.11)	.95	.32***	.43***	.58***	.41***	.59***	—			
Time 3											
7. Self-compassion	3.17 (0.58)	.75	.48***	.19***	.19***	.57***	.27***	.26***	—		
8. Gratitude	5.26 (1.26)	.90	.24***	.46***	.38***	.33***	.53***	.43***	.38***	—	
9. Prosocial behavior	5.24 (1.07)	.94	.29***	.37***	.48***	.35***	.44***	.57***	.37***	.61***	—

Note: *** $p < .001$

< .01) for both boys and girls but more significantly for the former. For prosocial behavior, we found no significant interaction between time and gender ($F(2, 1778) = 0.92, p = .40$), but the main effects of time ($F(2, 1778) = 15.16, p < .001$) and gender ($F(1, 889) = 17.02, p < .001$) were significant. Specifically, girls reported higher levels of prosocial behavior ($M_{\text{boys}} = 5.19, M_{\text{girls}} = 5.44$), and prosocial behavior decreased over time ($T1 > T2 > T3, ps < .05$) for both boys and girls.

We also tested whether adolescents being the only child or having siblings might be associated with levels of and changes in self-compassion, gratitude, and prosocial behavior. A series of repeated-measures ANOVAs revealed no significant interaction effects of sibling status and time on self-compassion, gratitude, or prosocial behavior ($ps > .05$), but participants who were the only child reported relatively higher levels of self-compassion ($M_{\text{only child}} = 3.26, M_{\text{sibling}} = 3.16, F(1, 872) = 8.80, p = .003$), gratitude ($M_{\text{only child}} = 5.51, M_{\text{sibling}} = 5.22, F(1, 871) = 17.60, p < .001$), and prosocial behavior ($M_{\text{only child}} = 5.42, M_{\text{sibling}} = 5.18, F(1, 840) = 15.50, p < .001$) than those who had siblings.

Measurement Equivalence

We first tested the measurement invariance of self-compassion, gratitude, and prosocial behavior measures across time. Since the measures of self-compassion and prosocial behavior were multidimensional, the combination scores of three self-compassion components were used as three indicators for the latent variable of self-compassion (Joeng and Turner 2015), and the four subscale scores of the PBSA were used as four observed indicators for the latent variable of prosocial behavior (Yang et al. 2016b). The six items in GQ-6 were used to create the latent variable of gratitude.

A series of sequentially more constrained models were estimated and compared to test the measurement invariance. In the first model (M1: configural invariance), all parameters were freely estimated across time points. In the second model (M2: metric invariance), we then constrained the factor loadings at all time points to be equal. In the third model (M3: scalar invariance), we then further constrained the intercepts to equality at all three time points. Configural invariance was estimated by the model fits of unconstrained M1; metric invariance was tested by comparing M2 with M1; scalar invariance was evaluated by comparing M3 with M2. Given that chi-square values are sensitive to large samples, we considered a decrease in CFI $\leq .01$ and an increase in RMSEA $\leq .015$ as indicators of non-invariance (Cheung and Rensvold 2002). As reported in Table 2, the results suggest that measurement equivalence was reached at a strong level (scalar invariance). Therefore, we used M3 in subsequent cross-lagged model analysis.

Between-Person Effects: CLPM

We used the traditional CLPM to examine the cross-lagged paths among self-compassion, gratitude, and prosocial behavior while also estimating the stability in variables (i.e., the autoregressive paths) and the within-time correlations between variables at the *between-person* level. We first conducted the test of equivalence of paths across time points; the results suggest that the unconstrained model did not improve significantly on the constrained model ($\Delta\text{CFI} < .001, \Delta\text{RMSEA} < .001$). Thus, all the paths were constrained to be equal across time points (Mackinnon and Sherry 2012). The model showed good fit to the data: $\chi^2(787) = 2718.49, p < .001, \text{CFI} = .934, \text{RMSEA} = .049, \text{SRMR} = .071$. As shown in

Table 2 Fit statistics for measurement model and tests of measurement invariance

Model	χ^2	df	CFI	RMSEA	RMSEA [90% CI]	SRMR	Δ CFI	Δ RMSEA
M1: configural invariance	1880.449	627	.956	.044	[.042, .046]	.043	—	—
M2: metric invariance	1922.779	647	.955	.044	[.042, .046]	.046	-.001	0
M3: scalar invariance	2173.574	673	.948	.047	[.044, .049]	.050	-.007	+0.003

Fig. 1, self-compassion longitudinally predicted increases in gratitude and prosocial behavior. We also noticed a bidirectional relation between gratitude and prosocial behavior: the indirect effect of gratitude (T2) in the relationship between self-compassion (T1) and prosocial behavior (T3) was significant (indirect effect = .015, 95% CI [.001, .030]), while the mediation effect of prosocial behavior (T2) in the relationship between self-compassion (T1) and gratitude (T3) was also significant (indirect effect = .028, 95% CI [.010, .049]).

Within-Person Effects: RI-CLPM

We used the RI-CLPM to examine the cross-lagged paths among self-compassion, gratitude, and prosocial behavior while also estimating autoregressive paths and within-time correlations between the variables at the *within-person* level, after estimating and partialling out the random intercept factors (between-person stability in the three constructs over time). All the paths were constrained to be equal across time points because the unconstrained model did not improve significantly on the constrained model (Δ CFI < .001, Δ RMSEA < .001). The model showed acceptable fit to the data: $\chi^2(814) = 3562.16$, $p < .001$, CFI = .903, RMSEA = .058, SRMR = .066. We found that the random intercepts of self-compassion,

gratitude, and prosocial behavior were all positively correlated with each other. After partialling out between-person stability, the within-person paths from self-compassion to gratitude and prosocial behavior were positive and significant, but no significant within-person cross-lagged effect between gratitude and prosocial behavior was found (Fig. 2).

Discussion

The main finding was that self-compassion positively and longitudinally predicted prosocial behavior in Chinese adolescents, at both between- and within-person levels. As indicated by the CLPM, adolescents who scored higher on self-compassion subsequently demonstrated higher levels of prosocial behavior; as indicated by the RI-CLPM, the temporary fluctuations in self-compassion (around an individual's trait level) also exerted a positive effect on the development of prosocial behavior (also around trait level). These results were consistent with previous findings that self-compassion was positively linked to other-focused constructs, including compassion, perspective taking, empathetic concern toward others, altruism, intention to help, and prosocial behavior (e.g., Neff and Pommier 2013; Yang et al. 2019).

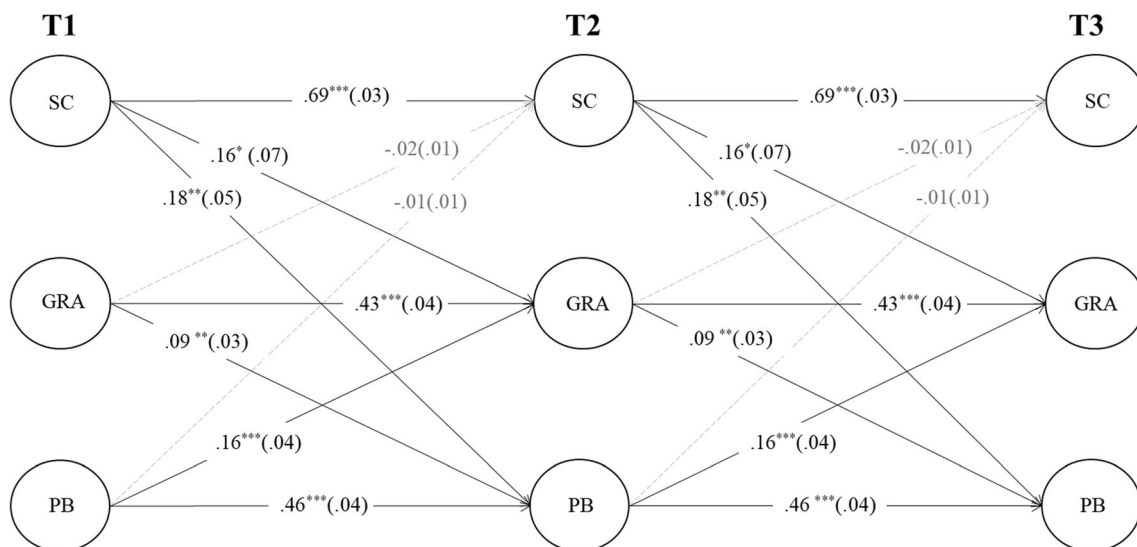


Fig. 1 Traditional CLPM depicting the longitudinal associations among self-compassion, gratitude, and prosocial behavior. SC = latent variable of self-compassion; GRA = latent variable of gratitude; PB = latent variable of prosocial behavior. Gray dashed lines and the gray numbers

represent the non-significant paths. Within-time correlations and the effects of controlled variables were estimated but were not shown in the figure for parsimony. Unstandardized coefficients and (SE) were reported

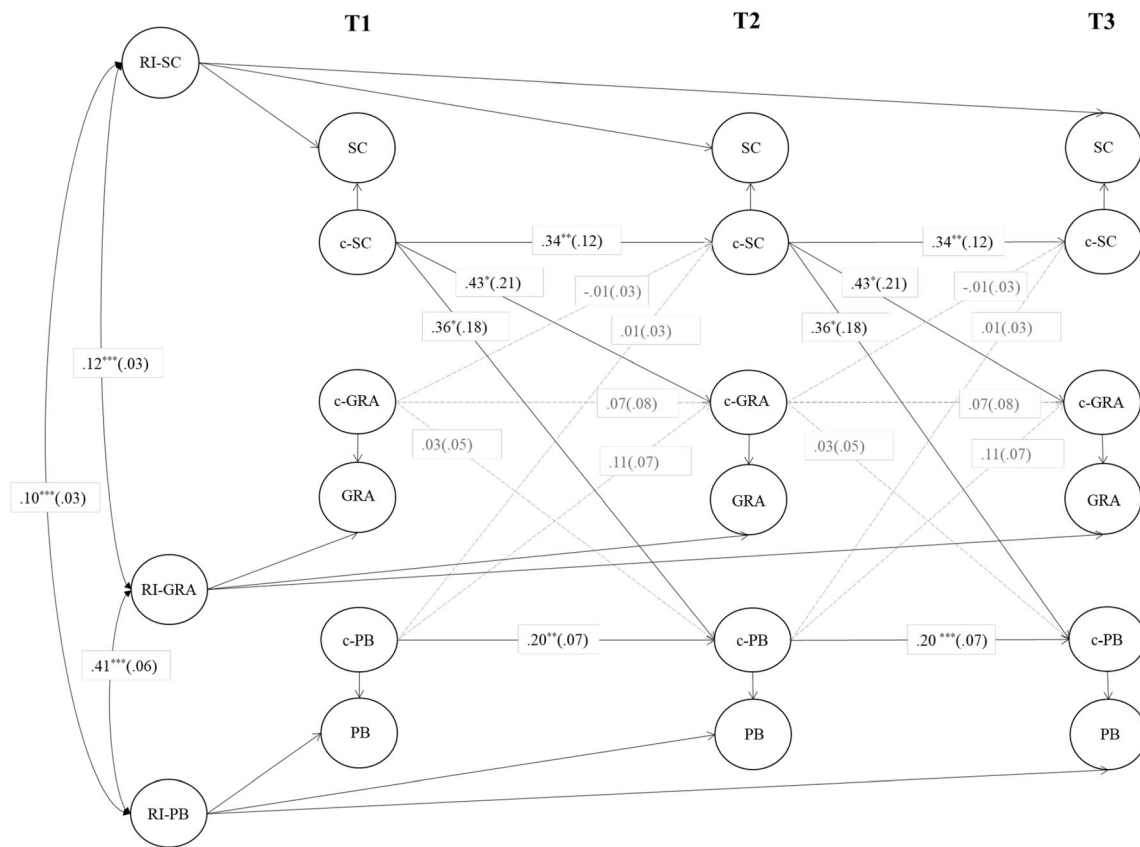


Fig. 2 The RI-CLPM depicting the longitudinal associations among self-compassion, gratitude, and prosocial behavior. SC = latent variable of self-compassion; GRA = latent variable of gratitude; PB = latent variable of prosocial behavior; c-SC, c-GRA, c-PB = within-person level variables; RI-SC, RI-GRA, RI-PB = between-person level factors (random intercepts). Gray dashed lines and the gray numbers represent the non-

significant paths. Within-time correlations and the effects of controlled variables were estimated but were not shown in the figure for parsimony. Unstandardized coefficients and (SE) were reported. The approach to estimating RI-CLPM refers to https://www.researchgate.net/publication/328095575_How_to_run_a_multiple_indicator_RI-CLPM_in_Mplus

However, in the prior study to have tested the longitudinal relationship between self-compassion and prosocial behavior among adolescents, self-compassion failed to predict an increase in peer-nominated prosocial behavior across time in Australian adolescents (Marshall et al. 2020). As adolescents’ prosocial behavior may take distinct forms, which partially accounts for the individual differences in prosocial responding (Carlo et al. 2010), exclusive focus on peer-nominated helping behavior may limit the observation of adolescents’ prosocial behavior. The current study used a more comprehensive measure of self-reported prosocial behavior, incorporating diverse forms of prosocial behavior (e.g., helping, making friends, and keeping promises) toward different targets (e.g., peers, parents, teachers, and public welfare) (Yang et al. 2016a). In addition, potential cultural differences in adolescents’ self and social development might be another reason for the inconsistent findings. Chinese culture might value the virtue of dedication to society by prioritizing the needs of other people over the self, which would encourage self-compassionate Chinese adolescents to extend the kindness toward oneself out to other people. The inconsistent findings imply that more

longitudinal research is needed to test how self-compassion influences the development of prosocial behavior in diverse cultural settings.

Another important finding was that self-compassion significantly predicted the development of gratitude at both between- and within-person levels. Adolescents who are kind and reassuring toward themselves thereby generate positive feelings of contentment and connectedness (Gilbert 2010), and consequently become more focused on what is valuable and fulfilling in life and better appreciate how the living world shapes them. We found that adolescents who perceived higher self-compassion than usual experienced a subsequent increase in gratitude. The findings were consistent with previous cross-sectional studies of adult samples reporting a positive association between self-compassion and gratitude (Booker and Dunsmore 2019; Neff et al. 2018). Our results also partly support previous claims that self-compassion facilitates adaptive cognitive processes when facing unpleasant events (i.e., positive reframing, acceptance, presence of and search for meaning), which might elevate individuals’ appreciation of life (Phillips and Ferguson 2012; Wong and Yeung 2017).

Regarding the association between gratitude and prosocial behavior, the findings did not converge between the CLPM and RI-CLPM. The CLPM suggested a bidirectional and positive longitudinal relation between gratitude and prosocial behavior, which was consistent with previous longitudinal studies (e.g., Bono et al. 2017). That is, adolescents who were more grateful than others developed more prosocial behavior (Froh et al. 2010), while adolescents who performed more prosocial behavior reported greater levels of gratitude over time (Padilla-Walker et al. 2020). In addition, mediation testing showed that gratitude explained the positive relationship between self-compassion and prosocial behavior, suggesting that recognizing others' kindness (gratitude) might explain why adolescents who are kind to themselves (self-compassion) may pass/transfer such kindness toward others (prosocial behavior). We also found that the positive relationship between self-compassion and gratitude was explained by prosocial behavior, indicating that self-compassionate adolescents demonstrated more prosocial behavior, which enhanced their awareness of others in need and cultivated self-transcending emotions and strengthened characteristics such as gratitude. However, the RI-CLPM did not support any dynamic relations between gratitude and prosocial behavior. This suggests that, during adolescence, gratitude and prosocial behavior are mainly related at a between-person (trait) level, rather than in a transactional and dynamic manner.

In addition, we found that adolescents' self-compassion, gratitude, and prosocial behavior decreased over time from 7th grade to 9th grade. The scores and decreasing trend of self-compassion were similar to the patterns found for the same age group in a previous cross-sectional study (Bluth et al. 2017). They found that self-compassion decreased more significantly for girls than boys, but we did not find the interaction between time and gender on self-compassion. As self-consciousness heightened and the ability to think abstractly increased, adolescents are more likely to compare themselves with their peers and thus may engage in self-doubt and self-criticism, which could hinder the development of self-compassion (Bluth and Blanton 2015). Given that self-compassion is not only beneficial for adolescents' emotional well-being but also helpful for social functioning, it is critical to help them establish such a positive strength during this particular stage. Additional work could further examine whether self-compassion practice is a plausible intervention that enhances not only emotional well-being but also social development.

Limitations and Future Research

The present study had several limitations. First, although we found that gratitude mediated the association between self-

compassion and prosocial behavior, and prosocial behavior mediated the relationship between self-compassion and gratitude in the CLPM, we could not fully elucidate the underlying mechanism of these relationships. It is important for future research to examine other potential mediators, such as trust and social connectedness (e.g., Yang et al. 2019). Second, the current research relied on the self-report measures. Although we measured and controlled for social desirability, multi-informant and behavioral data might enhance the reliability and validity of measures in future studies. Third, we did not measure adolescents' mindfulness, which is closely related to self-compassion and may also affect adolescents' prosocial behavior (Donald et al. 2019). Future research could incorporate both self-compassion and mindfulness to elucidate the potential distinct roles of these two constructs in social development.

self-compassion is best understood as a holistic construct (Neff et al. 2018), we also performed supplementary analyses of how sub-components of self-compassion relate to gratitude and prosocial behavior. The SCS-SF, which we used in this study, has been recommended for analysis of overall self-compassion, rather than separate sub-components (Neff 2016). Thus, we call for future studies to measure and test the roles of sub-components of self-compassion using the full-length version of this measure. Finally, some coefficients in our model were relatively small. However, it should be considered that we controlled for stability effects (i.e., autoregressive effects) as well as the correlations among the variables within each wave (Adachi and Willoughby 2015). Therefore, small effects in cross-lagged models can nonetheless be meaningful.

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Author Contribution YY conceived and designed this study, analyzed the data, and wrote the manuscript. XK revised the manuscript critically. ZG collaborated with collecting data and revising the manuscript. YK was the principle investigator of the project and revised the paper critically. All authors approved the final version of the manuscript for submission.

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Declarations

Ethical Approval All the research procedures were approved by the Institutional Review Board at Beijing Normal University.

Conflict of Interest The authors declare no competing interests.

Informed Consent Informed consent was obtained from all individual participants.

References

- Adachi, P., & Willoughby, T. (2015). Interpreting effect sizes when controlling for stability effects in longitudinal autoregressive models: implications for psychological science. *European Journal of Developmental Psychology, 12*(1), 116–128. <https://doi.org/10.1080/17405629.2014.963549>.
- Akın, U., & Akın, A. (2015). Examining the predictive role of self-compassion on sense of community in Turkish adolescents. *Social Indicators Research, 123*(1), 29–38. <https://doi.org/10.1007/s11205-014-0724-5>.
- Alizadeh, S., Khanahmadi, S., Vedadhir, A., & Barjasteh, S. (2018). The relationship between resilience with self-compassion, social support and sense of belonging in women with breast cancer. *Asian Pacific Journal of Cancer Prevention, 19*(9), 2469–2474. <https://doi.org/10.22034/APJCP.2018.19.9.2469>.
- Bluth, K., & Blanton, P. W. (2015). The influence of self-compassion on emotional well-being among early and older adolescent males and females. *The Journal of Positive Psychology, 10*(3), 219–230. <https://doi.org/10.1080/17439760.2014.936967>.
- Bluth, K., & Eisenlohr-Moul, T. A. (2017). Response to a mindful self-compassion intervention in teens: a within-person association of mindfulness, self-compassion, and emotional well-being outcomes. *Journal of Adolescence, 57*, 108–118. <https://doi.org/10.1016/j.adolescence.2017.04.001>.
- Bluth, K., Campo, R. A., Futch, W. S., & Gaylord, S. A. (2017). Age and gender differences in the associations of self-compassion and emotional well-being in a large adolescent sample. *Journal of Youth and Adolescence, 46*, 840–853. <https://doi.org/10.1007/s10964-016-0567-2>.
- Bono, G., Froh, J. J., Disabato, D., Blalock, D., McKnight, P., & Bausert, S. (2017). Gratitude's role in adolescent antisocial and prosocial behavior: a 4-year longitudinal investigation. *The Journal of Positive Psychology, 14*(2), 230–243. <https://doi.org/10.1080/17439760.2017.1402078>.
- Booker, J. A., & Dunsmore, J. C. (2019). Testing direct and indirect ties of self-compassion with subjective well-being. *Journal of Happiness Studies, 20*(5), 1563–1585. <https://doi.org/10.1007/s10902-018-0011-2>.
- Breen, W. E., Kashdan, T. B., Lenser, M. L., & Fincham, F. D. (2010). Gratitude and forgiveness: convergence and divergence on self-report and informant ratings. *Personality and Individual Differences, 49*(8), 932–937. <https://doi.org/10.1016/j.paid.2010.07.033>.
- Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology, 1*(3), 185–216. <https://doi.org/10.1177/135910457000100301>.
- Carlo, G., Knight, G. P., McGinley, M., Zamboanga, B. L., & Jarvis, L. H. (2010). The multidimensionality of prosocial behaviors and evidence of measurement equivalence in Mexican American and European American early adolescents. *Journal of Research on Adolescence, 20*(2), 334–358. <https://doi.org/10.1111/j.1532-7795.2010.00637.x>.
- Chen, J., Yan, L., & Zhou, L. (2011). Reliability and validity of Chinese version of Self-Compassion Scale. *Chinese Journal of Clinical Psychology, 19*(6), 734–736.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*, 233–255. https://doi.org/10.1207/S15328007SEM0902_5.
- Chu, X. W., Fan, C. Y., Liu, Q. Q., & Zhou, Z. K. (2018). Cyberbullying victimization and symptoms of depression and anxiety among Chinese adolescents: examining hopelessness as a mediator and self-compassion as a moderator. *Computers in Human Behavior, 86*, 377–386. <https://doi.org/10.1016/j.chb.2018.04.039>.
- Donald, J. N., Sahdra, B. K., Van Zanden, B., Duineveld, J. J., Atkins, P. W., Marshall, S. L., & Ciarrochi, J. (2019). Does your mindfulness benefit others? A systematic review and meta-analysis of the link between mindfulness and prosocial behaviour. *British Journal of Psychology, 110*(1), 101–125. <https://doi.org/10.1111/bjop.12338>.
- Eisenberg, N., Fabes, R. A., & Spinrad, T. L. (2006). Prosocial development. In W. Damon, R. M. Lerner, & N. Eisenberg (Eds.), *Handbook of child psychology, Vol. 3: Social, emotional, and personality development* (6th ed., pp. 646–718). New York, NY: Wiley.
- Emmons, R. A., & McCullough, M. E. (2003). Counting blessings versus burdens: an experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology, 84*, 377–389. <https://doi.org/10.1037/0022-3514.84.2.377>.
- Emmons, R. A., & Stern, R. (2013). Gratitude as a psychotherapeutic intervention. *Journal of Clinical Psychology, 69*(8), 846–855. <https://doi.org/10.1002/jclp.22020>.
- Froh, J. J., Bono, G., & Emmons, R. (2010). Being grateful is beyond good manners: gratitude and motivation to contribute to society among early adolescents. *Motivation and Emotion, 34*(2), 144–157. <https://doi.org/10.1007/s11031-010-9163-z>.
- Gilbert, P. (2010). *Compassion focused therapy: distinctive features*. New York, NY: Routledge/Taylor & Francis Group.
- Goldstein, J. (2011). Here, now, aware. In B. Boyce (Ed.), *The mindfulness revolution* (pp. 21–27). Boston: Shambhala.
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. (2015). A critique of the cross-lagged panel model. *Psychological Methods, 20*(1), 102–116. <https://doi.org/10.1037/a0038889>.
- Joeng, J. R., & Turner, S. L. (2015). Mediators between self-criticism and depression: fear of compassion, self-compassion, and importance to others. *Journal of Counseling Psychology, 62*(3), 453–463. <https://doi.org/10.1037/cou0000071>.
- Kabat-Zinn, J. (1994). *Wherever you go there you are: mindfulness meditation for everyday life*. New York, NY: Hachette Books.
- Kyeong, L. W. (2013). Self-compassion as a moderator of the relationship between academic burn-out and psychological health in Korean cyber university students. *Personality and Individual Differences, 54*(8), 899–902. <https://doi.org/10.1016/j.paid.2013.01.001>.
- Lindsay, E. K., & Creswell, J. D. (2014). Helping the self help others: self-affirmation increases self-compassion and pro-social behaviors. *Frontiers in Psychology, 5*, 421. <https://doi.org/10.3389/fpsyg.2014.00421>.
- Ma, L. K., Tunney, R. J., & Ferguson, E. (2017). Does gratitude enhance prosociality? A meta-analytic review. *Psychological Bulletin, 143*(6), 601–635. <https://doi.org/10.1037/bul0000103>.
- Mackinnon, S. P., & Sherry, S. B. (2012). Perfectionistic self-presentation mediates the relationship between perfectionistic concerns and subjective well-being: a three-wave longitudinal study. *Personality and Individual Differences, 53*(1), 22–28. <https://doi.org/10.1016/j.paid.2012.02.010>.
- Marsh, I. C., Chan, S. W., & MacBeth, A. (2018). Self-compassion and psychological distress in adolescents—a meta-analysis. *Mindfulness, 9*(4), 1011–1027. <https://doi.org/10.1007/s12671-017-0850-7>.
- Marshall, S. L., Ciarrochi, J., Parker, P. D., & Sahdra, B. K. (2020). Is self-compassion selfish? The development of self-compassion, empathy, and prosocial behavior in adolescence. *Journal of Research on Adolescence, 30*, 472–484. <https://doi.org/10.1111/jora.12492>.
- McCullough, M. E., Kilpatrick, S. D., Emmons, R. A., & Larson, D. B. (2001). Is gratitude a moral affect? *Psychological Bulletin, 127*(2), 249–266. <https://doi.org/10.1037/0033-2909.127.2.249>.

- McCullough, M. E., Emmons, R. A., & Tsang, J. A. (2002). The grateful disposition: a conceptual and empirical topography. *Journal of Personality and Social Psychology*, 82(1), 112–127. <https://doi.org/10.1037/0022-3514.82.1.112>.
- Neff, K. D. (2003). Self-compassion: an alternative conceptualization of a healthy attitude toward oneself. *Self and Identity*, 2, 85–102. <https://doi.org/10.1080/15298860309032>.
- Neff, K. D. (2011). Self-compassion, self-esteem, and well-being. *Social and Personality Psychology Compass*, 5(1), 1–12. <https://doi.org/10.1111/j.1751-9004.2010.00330.x>.
- Neff, K. D. (2016). The self-compassion scale is a valid and theoretically coherent measure of self-compassion. *Mindfulness*, 7(1), 264–274. <https://doi.org/10.1007/s12671-015-0479-3>.
- Neff, K. D., & Pommier, E. (2013). The relationship between self-compassion and other-focused concern among college undergraduates, community adults, and practicing meditators. *Self and Identity*, 12(2), 160–176. <https://doi.org/10.1080/15298868.2011.649546>.
- Neff, K., & Seppälä, E. (2016). Compassion, well-being, and the hypoegoic self. In M. R. Leary & K. W. Brown (Eds.), *The Oxford handbook of hypo-egoic phenomena* (pp. 189–202). Oxford University Press.
- Neff, K. D., Long, P., Knox, M., Davidson, O., Kuchar, A., Costigan, A., Williamson, Z., Rohleder, N., Tóth-Király, I., & Breines, J. (2018). The forest and the trees: examining the association of self-compassion and its positive and negative components with psychological functioning. *Self and Identity*, 17(6), 627–645. <https://doi.org/10.1080/15298868.2018.1436587>.
- Orth, U., Clark, D. A., Donnellan, M. B., & Robins, R. W. (2020). Testing prospective effects in longitudinal research: comparing seven competing cross-lagged models. *Journal of Personality and Social Psychology*. Advance online publication. <https://doi.org/10.1037/pspp0000358>.
- Padilla-Walker, L. M., Dyer, W. J., Yorgason, J. B., Fraser, A. M., & Coyne, S. M. (2015). Adolescents' prosocial behavior toward family, friends, and strangers: a person-centered approach. *Journal of Research on Adolescence*, 25(1), 135–150. <https://doi.org/10.1111/jora.12102>.
- Padilla-Walker, L. M., Millett, M. A., & Memmott-Elison, M. K. (2020). Can helping others strengthen teens? Character strengths as mediators between prosocial behavior and adolescents' internalizing symptoms. *Journal of Adolescence*, 79, 70–80. <https://doi.org/10.1016/j.adolescence.2020.01.001>.
- Phillips, W. J., & Ferguson, S. J. (2012). Self-compassion: a resource for positive aging. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 68(4), 529–539. <https://doi.org/10.1093/geronb/gbs091>.
- Raes, F., Pommier, E., Neff, K. D., & Van Gucht, D. (2011). Construction and factorial validation of a short form of the self-compassion scale. *Clinical Psychology & Psychotherapy*, 18(3), 250–255. <https://doi.org/10.1002/cpp.702>.
- Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology*, 38(1), 119–125. [https://doi.org/10.1002/1097-4679\(198201\)38:1<119::AID-JCLP2270380118>3.0.CO;2-I](https://doi.org/10.1002/1097-4679(198201)38:1<119::AID-JCLP2270380118>3.0.CO;2-I).
- Swickert, R., Bailey, E., Hittner, J., Spector, A., Benson-Townsend, B., & Silver, N. C. (2019). The mediational roles of gratitude and perceived support in explaining the relationship between mindfulness and mood. *Journal of Happiness Studies*, 20(3), 815–828. <https://doi.org/10.1007/s10902-017-9952-0>.
- Tian, L., Du, M., & Huebner, E. S. (2015). The effect of gratitude on elementary school students' subjective well-being in schools: the mediating role of prosocial behavior. *Social Indicators Research*, 122(3), 887–904. <https://doi.org/10.1007/s11205-014-0712-9>.
- Tsang, J. A., & Martin, S. R. (2019). Four experiments on the relational dynamics and prosocial consequences of gratitude. *The Journal of Positive Psychology*, 14(2), 188–205. <https://doi.org/10.1080/17439760.2017.1388435>.
- Voci, A., Veneziani, C. A., & Fuochi, G. (2019). Relating mindfulness, heartfulness, and psychological well-being: the role of self-compassion and gratitude. *Mindfulness*, 10(2), 339–351. <https://doi.org/10.1007/s12671-018-0978-0>.
- Welp, L. R., & Brown, C. M. (2014). Self-compassion, empathy, and helping intentions. *The Journal of Positive Psychology*, 9(1), 54–65. <https://doi.org/10.1080/17439760.2013.831465>.
- Wong, C. C. Y., & Yeung, N. C. (2017). Self-compassion and posttraumatic growth: cognitive processes as mediators. *Mindfulness*, 8(4), 1078–1087. <https://doi.org/10.1007/s12671-017-0683-4>.
- Wood, A. M., Froh, J. J., & Geraghty, A. W. (2010). Gratitude and well-being: a review and theoretical integration. *Clinical Psychology Review*, 30(7), 890–905.
- Yang, Y., Zhang, M., & Kou, Y. (2016a). 青少年亲社会行为量表的编制与维度的再验证[The revalidation and development of the prosocial behavior scale for adolescent]. *中国社会心理学评论*, 10, 135–150.
- Yang, Y., Zhang, M., & Kou, Y. (2016b). Self-compassion and life satisfaction: the mediating role of hope. *Personality and Individual Differences*, 98, 91–95. <https://doi.org/10.1016/j.paid.2016.03.086>.
- Yang, Y., Li, P., Fu, X., & Kou, Y. (2017). Orientations to happiness and subjective well-being in Chinese adolescents: the roles of prosocial behavior and Internet addictive behavior. *Journal of Happiness Studies*, 18(6), 1747–1762. <https://doi.org/10.1007/s10902-016-9794-1>.
- Yang, Y., Guo, Z., Kou, Y., & Liu, B. (2019). Linking self-compassion and prosocial behavior in adolescents: the mediating roles of relatedness and trust. *Child Indicators Research*, 12(6), 2035–2049. <https://doi.org/10.1007/s12187-019-9623-2>.

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