ORIGINAL PAPER

Stress Perception and Coping as Mediators of the Link Between Self-Compassion and Affective Well-being? Evidence From Two Longitudinal Studies

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Abstract

Objectives A growing body of research has already demonstrated the link between self-compassion and improved affective well-being and mental health. Initial findings have indicated that effective stress processing might be a mechanism underlying the beneficial effects of self-compassion on mental health outcomes. However, studies are still quite limited as they have mostly been cross-sectional and often included specific samples only. Thus, this research examines perceived stress and coping as two key mechanisms underlying the relation between self-compassion and affective well-being longitudinally in two different samples.

Method In two longitudinal studies with three measurement waves each, we assessed self-compassion, perceived stress, engagement and disengagement coping, and affective well-being. Study 1 analyzed a student sample ($n = 684$) across 12 weeks. Study 2 followed a population-based sample ($n = 2934$) across a 4-month period.

Results Cross-lagged panel analyses indicated that perceived stress mediated the link between self-compassion and affective well-being in both longitudinal studies. Engagement coping responses mediated this link in Study 2. Disengagement coping responses did not act as mediators in both studies.

Conclusions Our work helps to better understand the processes underlying the link between self-compassion and well-being. Self-compassion might facilitate effective stress responses in terms of less perceived stress and more salutary coping responses, which in turn might help to enhance affective well-being.

Preregistration All hypotheses were preregistered (as well as design, and analyses for the second Study) online at the Open Science Framework before starting with data collection (see preregistration at: https://osf.io/fhm9q/?view_only=577dd62d2f5548d59ccf703ee1d0d0a6).

People show remarkable individual differences in how they handle demanding or threatening situations. These differences have fundamental consequences for their affective well-being (AWB, i.e., the presence of positive affect as well as the absence of negative affect, Diener, 1984; Lazarus & Folkman, 1986). Over the last two decades, self-compassion (SC) has gained increasing attention in positive psychology research regarding its impact on affective well-being (Zessin et al., 2015). SC is considered a healthy stance towards the self as it entails comforting oneself in difficult times with warmth, balanced awareness, and a sense of interconnectedness (Neff, 2003a, b). SC is often described as a self-caring attitude encompassing three main positive facets, with each having a negative counterpart: (1) self-kindness (vs. self-judgment), which means to be understanding and accepting towards one's shortcomings and mistakes and encountering oneself in times of failure and suffering with sympathy, patience, and care; (2)

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common humanity (vs. isolation), which entails seeing one's experiences as part of the shared human experience and keeping in mind that all humans are imperfect and make mistakes; (3) mindfulness (vs. over-identification), which involves holding negative mental states in balanced awareness (Neff, 2003b).

A recent meta-analysis by Zessin et al. (2015) provided evidence for the positive effects of SC on a variety of well-being outcomes such as satisfaction with life, affect, and happiness. More specifically, the results also demonstrated positive effects of SC on AWB (in terms of more positive and less negative affect) of small to medium effect size. Although positive effects of SC on AWB are well-established and health programs working with SC are currently booming in our society, the underlying mechanisms through which SC has salutary effects on AWB have been rarely investigated yet (Zessin et al., 2015). In terms of beneficial processes related to higher AWB, research widely demonstrated that adaptive responses to stressful circumstances, such as lower stress perception and more salutary coping, are crucial (Lazarus & Folkman, 1986).

Referring to the transactional model of stress and coping (Lazarus, 1966), the amount of perceived stress results not only from a situation itself but also from how demanding an individual appraises a particular event. Individual appraisals are proposed to mediate the relationship between situational conditions and affective well-being (Lazarus & Folkman, 1984). According to Lazarus and Folkman (1986), appraisal processes can be differentiated into primary and secondary appraisals. Primary appraisal refers to the individual's evaluation of a situation as a potential threat to his or her well-being. In secondary appraisal, the emphasis is placed on the evaluation of one's resources and opportunities in order to deal with the stressful situation. Other than the terms primary and secondary suggest, Lazarus and Folkman (1986) emphasized that the appraisal processes do not occur chronologically; instead, they are reciprocal. Thus, this work also does not separate these processes in the following and uses the term stress perception. Stress perception depends on the adaptive resources available to an individual. With sufficient personal resources (such as optimism and compassion), potential threats are perceived as more controllable, leading to a decreased experience of stress and more affective well-being (Gross, 2007; Lazarus & Folkman, 1986). Such resources are linked to affective well-being in appraising stressful events (Lazarus & Folkman, 1986; Schwarzer, 1998). SC might function as such a personal resource impacting stress appraisal processes and thus positively influencing one's AWB (Li et al., 2019; Zessin et al., 2015). For example, individuals high in SC perceive weakness in demanding situations as less threatening when considering it in the light of a shared human experience (Neff & Dahm, 2015). In addition, several studies have

demonstrated that individuals high in SC experience lower amounts of stress (e.g., Brion et al., 2014; Ewert et al., 2022; Homan & Sirois, 2017) and perceive more control in stressful circumstances (Chishima et al., 2018). Moreover, recent literature emphasizes that SC is also a skill; it can be learned and improved by interventions (for a review, see Neff, 2023). Intervention studies showed that an increase in SC was followed by a decrease in perceived stress, thus indicating that there may be a causal relation from SC to perceived stress (e.g., Gard et al., 2012; Neff & Germer, 2013). Research has also demonstrated that SC can help to experience distressing social events as less stressful, which comes along with higher AWB (Ewert et al., 2018; Krieger et al., 2013). Thus, more self-compassionate individuals seem to appraise stressors as less negative and threatening, and, in turn, experience higher AWB.

Coping responses constitute a second key component in Lazarus' (1966) stress model. Coping is defined as "the cognitive and behavioral efforts made to master, tolerate, or reduce external and internal demands and conflicts among them" (Lazarus & Folkman, 1984, p. 233). More salutary coping responses, i.e., coping that usually results in more adaptive long-term solutions for an individual's mental health, are another pathway that might explain the link between SC and AWB. SC entails a non-judgmental stance towards challenging experiences which can foster the ability to accept the conditions just as they are (Neff et al., 2005) instead of avoiding or getting worked up on one's suffering feelings and failures (e.g., Fresnics & Borders, 2016; Krieger et al., 2013). Thus, individuals high in SC might be less likely to deny or catastrophize stressful situations because they experience difficulties as an integral part of life (Neff, 2003b). In addition, as SC encompasses a caring rather than a harsh judgmental stance towards the self in times of distress, people with higher SC might view threatening situations with a more objective stance instead of over-identifying with them, which might facilitate engaging in more positive reframing (e.g., Rubin et al., 2012; Sirois et al., 2015).

Indeed, research has already shown that a more self-compassionate stance towards one's own fallibilities impacts the choice of coping strategies (Gilbert & Procter, 2006). Early on, the results indicated that self-compassionate individuals respond to stressful situations more adaptively meaning they engage in more engagement and less disengagement strategies (for a review, see Allen & Leary, 2010). In terms of the long-term consequences of coping strategies for an individual's functionality, engagement coping strategies are viewed as healthy as they involve efforts to deal with the stressor or associated emotions actively. Therefore, they account for more sustainable long-term solutions to demanding or challenging circumstances. In contrast, disengagement coping strategies share attempts

to evade from stressors or accompanying emotions and are generally seen as rather dysfunctional in the long run (Carver & Connor-Smith, 2010; Compas et al., 2017; Connor-Smith et al., 2000). Over the last decade, research on SC and coping has grown immensely (e.g., Ewert et al., 2018; Gillanders et al., 2015; Homan & Sirois, 2017; Sirois et al., 2015). Findings were summarized in a recently published meta-analysis, which demonstrated positive relations of SC with engagement coping responses (such as positive reframing, acceptance, and active coping) and negative relations of SC with disengagement coping responses (such as denial, behavioral disengagement, and self-blame) (Ewert et al., 2021).

The theoretical considerations and empirical studies reported so far suggest that perceived stress and coping responses are interesting candidates when searching for the underlying processes behind the salutary effects of SC on AWB. More recently, empirical research has actually started to design studies that included the variables necessary to investigate mediation effects. These studies identified less perceived stress (e.g., Ewert et al, 2018, 2022; Li et al., 2019) and healthier coping in demanding situations (e.g., Ewert et al., 2018; Homan & Sirois, 2017; Sirois et al., 2015) as mediators in the link between SC and AWB. In particular, less perceived stress was demonstrated to be a mediator between SC and affective well-being under the condition of a socio-evaluative stressor in the laboratory (Ewert et al., 2018) and across different circumstances in daily life when investigating intraindividual differences (Ewert et al., 2022). Additionally, initial studies (mostly with clinical samples and/or cross-sectional designs) indicated that certain coping strategies might be mediators between SC and AWB: For instance, effects of SC on negative affect were mediated by lower levels of denial while dealing with a social-evaluative stressor (Ewert et al., 2018). Evidence on the mediating role of coping in the link between SC and symptom severity points into a similar direction: For example, disengagement coping (more precisely: cognitive and behavioral disengagement) was shown to be a mediator in the link between SC and symptom severity in patients with major depression (Krieger et al., 2013). Furthermore, SC was connected with lower self-blame and less disengagement coping which, in turn, were associated with less posttraumatic symptoms such as negative emotions among survivors of a sexual assault (Hamrick & Owens, 2019). Moreover, in terms of engagement coping strategies, acceptance and problem-focused coping mediated the association between SC and the amount of anxiety and depressive symptoms in chronic pain sufferers (Costa & Pinto-Gouveia, 2013). Taken together, self-compassionate individuals appear to react more adaptively to difficult situations in terms of their stress appraisals and coping, which in turn, might lead to higher AWB (e.g., Arch et al., 2014; Ewert et al., 2018; Sirois et al., 2015).

Summing up, research has suggested that both stress perception and coping responses might be processes underlying the link between SC and AWB. However, past studies have been limited in three ways: Most of them used cross-sectional designs that have been criticized for not being sufficient for investigating mediation effects (e.g., Cole & Maxwell, 2003; Selig & Preacher, 2009). Second, many studies have focused on specific clinical samples (e.g., Gillanders et al., 2015; Sirois et al., 2015), limiting the generalizability of the findings to the general population. Third, a key consideration missing from most previous studies is whether both perceived stress and coping mediate the relation between SC and AWB when considered simultaneously, thus controlling for their overlap. We conducted two longitudinal studies giving consideration to all three issues.

Building on the rationale of the stress model (Lazarus, 1966) as well as theoretical considerations and empirical research in the field of SC, the following hypotheses were derived: We hypothesized that trait SC predicts less perceived stress, greater use of engagement coping, and reduced use of disengagement coping strategies. In addition, we hypothesized that perceived stress and disengagement coping responses are negatively linked to AWB, whereas engagement coping is positively connected with AWB. Based on that, we hypothesized that perceived stress and coping responses mediate the relation between SC and AWB (see also Fig. 1). To test our hypotheses, we used a short-term three-wave longitudinal design and conducted autoregressive cross-lagged analyses in two studies. The three-wave autoregressive cross-lagged design is especially helpful with testing mediation hypotheses (Cole & Maxwell, 2003). In Study 1, we tested our hypotheses in a student sample. Study 2 was conducted to test whether our findings could be generalized to a population-based sample. All hypotheses were preregistered at the Open Science Framework for Study 2 (see at: https://osf.io/fhm9q/?view_only=577dd62d2f5548d59ccf703ee1d0d0a6).

Study 1

Method

Participants

Seven hundred twenty-one individuals initially participated in the survey via an electronic platform. As 37 of them either just opened the study link or only filled out the first page (demographic variables) of the survey, these individuals were excluded from further data analyses. This resulted in an actual dataset of 684 participants at Time 1 with a mean age of $M = 27.91$ years
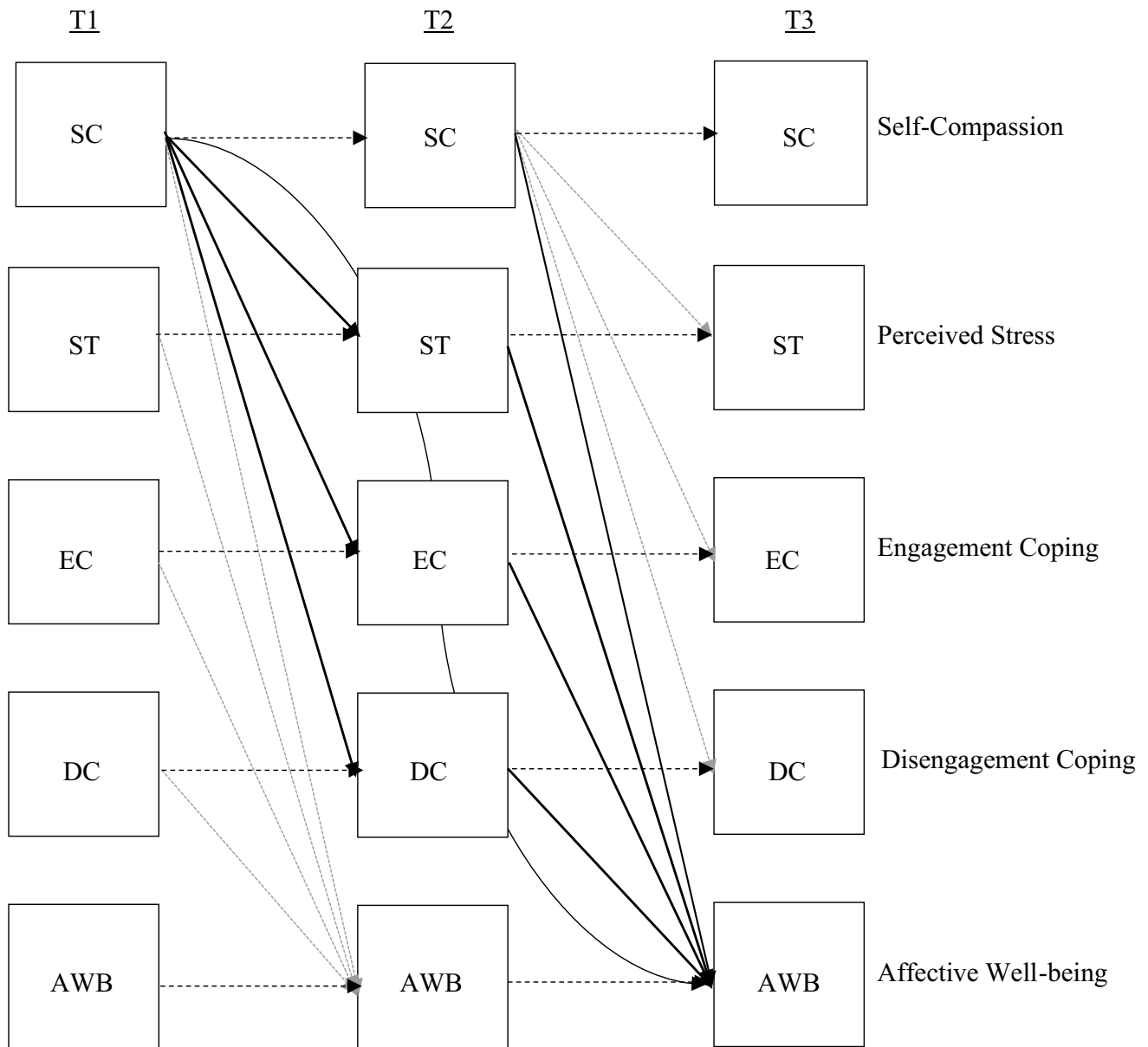
Fig. 1 Three-wave cross-lagged model for time-lagged effects between self-compassion (SC), perceived stress (ST), engagement coping (EC), disengagement coping (DC), and affective well-being (AWB). Dashed lines indicate stability paths among the same construct, whereby bold solid lines represent cross-lagged paths interesting for our mediation model. Additionally, gray dotted lines represent cross-lagged paths which were also integrated in our model. Autoregressive paths from Time 1 (T1) to (Time 3) T3, error variables, and covariances were omitted from the diagram

($SD = 9.98$; range $= 18$–81). Table 1 shows additional descriptive information about the sample for Time 1, Time 2, as well as for Time 3. We targeted a maximum number of participants per time point. According to Fritz and MacKinnon (2007), when effect estimates are small (as can be expected in the present case referring to Chishima et al. (2018) and Ewert et al. (2022) in which paths coefficients ranged from 0.1 to 0.3), 462 participants are required to detect indirect effects with 0.8 power using bias-corrected bootstrapping. Given that we used the full information maximum likelihood (FIML) approach to deal with missing data (see section "Study 1, Data Analyses"), we judged a sample size of 684 participants at Time 1 as sufficient to achieve a statistical power of at least 0.8 for our main analyses.

Table 1 Demographic information and sample size across the measurement waves (Study 1 and Study 2)

	Sample size	Mean age	Number and percentage of females	Educational background
Study 1				
Time 1	684	27.91 ($SD = 9.98$)	496 (72.5)	Students: $n = 463$ (67.7%) University degree: $n = 206$ (30.1%)
Time 2	516	27.88 ($SD = 10.07$)	384 (74.4)	Students: $n = 357$ (69.2%) University degree: $n = 155$ (30.0%)
Time 3	397	27.98 ($SD = 9.98$)	287 (74.8)	Students: $n = 271$ (67.7%) University degree: $n = 127$ (32.0%)
Study 2				
Time 1	2765	52.75 ($SD = 13.08$)	1315 (47.6)	Students: $n = 137$ (5%) University degree: $n = 945$ (34.2%) College or vocational training: $n = 1594$ (57%)
Time 2	2710	52.72 ($SD = 13.08$)	1281 (48.0)	Students: $n = 132$ (4.9%) University degree: $n = 937$ (34.6%) College or vocational training: $n = 1596$ (58.9%)
Time 3	2668	51.71 ($SD = 13.06$)	1304 (48.1)	Students: $n = 133$ (5%) University degree: $n = 930$ (34.9%) College or vocational training: $n = 1592$ (59.7%)

Procedures

We conducted a longitudinal online study with 3 assessments with an interval of 6 weeks between each survey. Participants completed several self-report measures to assess SC, perceived stress, coping styles, as well as positive and negative affect. All measures were assessed on all three occasions. Study 1 was part of a larger study which also included further variables. For an overview of other questionnaires, see supplementary materials. All participants were recruited via the participant pool of cognitive sciences at an urban university in Germany and in class announcements. Additionally, flyers were placed at urban meditation centers, yoga schools, fitness studios, super markets, and at public canteens. In return for participation, 10 monetary gift cards were raffled among all participants. Moreover, students received study participation credit. In addition, individual feedback on several variables (e.g., the Big Five and self-compassion) measured in the questionnaire was provided after the last wave to motivate individuals to participate in all waves up to the end of the study. All participants gave their informed consent prior to the participation.

Measures

Self-Compassion SC was measured with the standardized German version of the Self-Compassion Scale (SCS-D; Hupfeld & Ruffieux, 2011; Neff, 2003a). The scale encompasses 26 items and 6 subscales. These subscales are self-kindness (e.g., "I try to be understanding and patient towards those aspects of my personality I don't like"), self-judgment (e.g., "I am disapproving and judgmental about my own flaws and inadequacies"), common humanity (e.g., "I try to see my failings as part of the human condition"), isolation (e.g., "When I think about my inadequacies it tends to make me feel more separate and cut off from the rest of the world"), mindfulness (e.g., "When something painful happens I try to take a balanced view of the situation"), and over-identification (e.g., "When something upsets me I get carried away with my feelings"). The items are rated on a 5-point Likert scale ranging from (1) *almost never* to (5) *almost always*. In order to compute the total score, items referring to uncompassionate behavior (self-judgment, isolation, and over-identification) scales were reverse-coded, subscale means were calculated by averaging the item responses of each scale, and finally, a grand mean was computed from the 6 subscale means. Higher scores indicated more SC.

Perceived Stress As an indicator for stress appraisals, the standardized German version of the 10-item Perceived Stress Scale (PSS-10; Cohen et al., 1983; Klein et al., 2016) was used. Participants reported the degree to which they have appraised situations as unpredictable, uncontrollable, and overstraining in the past month, rated on a 5-point Likert scale ranging from (0) *never* to (4) *very often* (e.g., "In the last month, how often have you been angered because of things that were outside of your control?"). To form a scale score for perceived stress, items were summed up and averaged.

Coping To assess engagement and disengagement coping, the standardized German adaptation of the Brief COPE (Carver, 1997; Knoll et al., 2005) was used. The Brief COPE assesses 14 different coping strategies measured by a scale with 2 items each, resulting in a total of 28 items. In the current study, the Brief COPE was used in a retrospective dispositional format by asking the participants how they have been dealing with stressful situations over the last month. Items were rated on a 4-point Likert scale from (1) *not at all* to (4) *very much*. For the purpose of the current study, only 6 strategies were considered for further analysis which have often been used in past research to form engagement and disengagement coping composite scores (Deisinger et al., 1996; Lyne & Roger, 2000) and which were also related to SC meta-analytically (Ewert et al., 2021). Scale scores were computed by summing up the 2 items of each scale. Higher values indicate more habitual use of the coping strategy. In order to create a composite score for the variable engagement coping, the means of the following scales were averaged: active coping (e.g., "I've been concentrating my efforts on doing something about the situation I'm in"), positive reframing (e.g., "I've been looking for something good in what is happening"), and acceptance (e.g., "I've been learning to live with it"). Similarly, the scales for denial (e.g., "I've been refusing to believe that it has happened"), behavioral disengagement (e.g., "I've been giving up the attempt to cope."), and self-blame (e.g., "I've been criticizing myself") were averaged to compute a composite score for disengagement coping.

Affective Well-being We assessed two components of AWB, positive and negative affect, with the standardized German version of the 20-item Positive and Negative Affect Schedule (PANAS; Krohne et al., 1996; Watson et al., 1989). The 2 affect dimensions are measured by 10 items each. The Positive Affect scale measures the extent to which the participant experienced enthusiasm, activeness, and alertness (e.g., interested, proud, determined), while the Negative Affect Scale assesses distress and aversive mood states (e.g., irritable, guilty, scared). In the current study, participants were asked to rate on a 5-point scale from (1) *very slightly* to (5) *very much* the extent to which they experience each mood state in general. Scale scores are computed by averaging item responses. Higher values indicate more experience of positive and less experience of negative affect. All item responses were summed up and averaged to compute a scale score of AWB. Before, items of negative affect were inverted.

Data Analyses

Associations between the variables were tested by Pearson correlations. To test our hypotheses, we implemented a cross-lagged panel model (CLPM) for longitudinal data using Mplus (Muthén & Muthén, 2017) and explored whether each effect was significant at $p < 0.05$. The three-wave autoregressive cross-lagged design can be used to examine how constructs are related to each other over time while simultaneously controlling for the stability of the investigated constructs over time (Kline, 2015). According to Selig and Preacher (2009, p. 147), the CLPM "allows time for causes to have their effects, supports stronger inference about the direction of causation in comparison to models using cross-sectional data and reduces the probable parameter bias that arises when using cross-sectional data." Overviews of the use of the CLPM for mediation analyses are given by Cole and Maxwell (2003) as well as MacKinnon (2008). To explore the mediation hypotheses, we examined whether each indirect effect was significant ($p < 0.05$) and explored the 95% confidence intervals of each effect in this mode by using 5000 samples with a bias-corrected approach (Preacher & Hayes, 2008). We additionally reported 90% confidence intervals if the value zero was included in the 95% confidence interval for directional hypotheses. At first, a missing value analysis was performed with all items of each scale for both studies showing that missings were randomly distributed (MCAR-Test of Study 1: $\chi^2(14,849) = 4502.33$, $p = 0.99$; MCAR-Test of Study 2: $\chi^2(148,097) = 19,058.17$, $p = 0.99$). Thus, as a missing data estimation approach for structural equation modeling, we used full information maximum likelihood (FIML). It has been demonstrated that FIML estimation in structural equation modeling usually results in the most reliable results comparing to multiple imputation techniques when dealing with missing data (Allison, 2012). All available data can be used by this approach by approximating an individual likelihood function for every participant built on all existing variables (Enders & Bandalos, 2001).

The CLPM in Fig. 1 shows that SC was used as the independent variable, perceived stress, engagement coping, and disengagement coping were used as parallel mediator variables, and AWB was used as the criterion variable. While controlling for their autoregressive effects, cross-lagged paths ran from SC at Time 1 to perceived stress

and coping responses at Time 2, and to AWB at Time 2 and Time 3 as well as from SC at Time 2 to perceived stress, coping responses, and affective well-being at Time 3. In addition, we implemented cross-lagged paths from perceived stress and both coping styles at Time 1 to AWB at Time 2, and from perceived stress and coping responses at Time 2 to AWB at Time 3. For reasons of parsimony, we followed the guidelines given by Zyphur et al. (2020) and treated autoregressive paths from Time 1 to Time 2 as equivalent to autoregressive paths from Time 2 to Time 3 for the each variable. If fit indices were insufficient, we also reported model results in which we treated autoregressive paths between time points as nonequivalent (Zyphur et al., 2020). Three indirect paths were relevant for our mediation hypothesis: The one from SC at Time 1 to AWB at Time 3 through perceived stress at Time 2, as well as the two paths from SC at Time 1 to AWB at Time 3 through engagement and disengagement coping responses at Time 2. Figure 1 illustrates the corresponding autoregressive paths as well as the cross-lagged paths established in the cross-lagged panel model. The data file for Study 1 as well as the input files of the Mplus-Syntax for the model analysis of Study 1 are presented in supplementary materials.

Based on recommended guidelines, several indicators of fit were used to evaluate our path model. We reported chi-square statistics (χ^2), the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean squared residual (SRMR). Good fit indices are indicated by values equal or greater than 0.95 for CFI, and equal or less than 0.05 for RMSEA and SRMR, whereas an acceptable fit is assumed by values greater than or equal to 0.90 for CFI and less than or equal to 0.08 for RMSEA and SRMR (Little, 2013). Since chi-square tests are sensitive to sample-size and often provide significant results (Marsh et al., 2004), the other applied goodness-of-fit indices are more reliable in this context and were preferred to examine the goodness-of-fit in both studies. In case of insufficient model fit, we checked suggested modification indices and, if theoretically reasonable, implemented additional substantive paths. The recommended minimum for a MI is 3.84 (Whittaker, 2012); therefore, we modified the model by integrating the suggested parameters with the largest MI values > 3.84. Inclusion of extra parameters ended when the last parameter with the respective highest MI which was required to approach acceptable fit indices was integrated. This resulted in five modifications to the original model for Study 2.

Results and Brief Discussion

Pearson correlations, descriptive statistics (mean, *SD*), and internal consistencies for all variables are presented in Table 2. All correlations were in anticipated directions.

As expected, almost all correlations between SC and the other variables at all three times of the measurement showed medium to strong associations (Cohen, 1988), whereas associations between engagement and disengagement coping were rather small.

To examine our hypotheses, we tested the indirect effects between SC at Time 1 as the independent variable; stress, engagement coping, and disengagement coping at Time 2 as mediator variables controlling for each other; and AWB at Time 3 as the criterion variable. We had hypothesized that trait SC would predict less perceived stress, greater use of engagement coping, and reduced use of disengagement coping. We had also hypothesized that perceived stress, engagement, and disengagement coping would mediate the relations between SC and AWB.

Fit statistics for our model showed good to excellent fit to the data ($\chi^2(52) = 120.961$, $p < 0.001$, RMSEA = 0.042, 95%CI = [0.032, 0.051], SRMR = 0.052, CFI = 0.984). No post hoc model adjustments were made based on modification indices in Study 1. All autoregressive paths were highly significant (all *p*-values < 0.001). With two exceptions, the cross-lagged effects between all relevant variables were significant, indicating a negative relation between SC at Time 1 and perceived stress ($B = -0.221$, $SE = 0.069$; $p < 0.01$, 95%CI = [−0.359, −0.091]) and disengagement coping responses ($B = -0.013$, $SE = 0.005$; $p < 0.01$, 95%CI = [−0.023, −0.004]) at Time 2, and a positive relation with engagement coping at Time 2 ($B = 0.030$, $SE = 0.006$; $p < 0.001$, 95%CI = [0.018, 0.043]). Furthermore, the cross-lagged effects between perceived stress at Time 2 and AWB at Time 3 were negative and significant ($B = -0.011$, $SE = 0.004$; $p < 0.01$, 95%CI = [−0.019, −0.003]). However, the cross-lagged effects between coping responses at Time 2 and AWB at Time 3 were not significant (engagement coping: $B = -0.017$, $SE = 0.036$; $p = 0.636$, 95%CI = [−0.089, 0.055]; disengagement coping: $B = 0.019$, $SE = 0.045$; $p = 0.677$, 95%CI = [−0.069, 0.108]). The indirect effect of SC at Time 1 on AWB at Time 3 via perceived stress at Time 2 was significant, while the indirect effects via engagement and disengagement coping responses at Time 2 were not significant. Table 3 presents an overview of indirect effect estimates. For effect estimates of all autoregressive and additional cross-lagged paths which were implemented in our model, refer to the supplementary materials. To increase comparability to the results of Study 2, we also provided model results where the autoregressive paths from Time 1 to Time 2 were not restricted to be equal to the autoregressive paths from Time 2 to Time 3 (see at supplementary materials). Effect estimates and fit indices were comparable to results of our original model which are presented in this manuscript.

The findings of Study 1 provided initial support for our hypotheses. SC predicted lower perceived stress. Moreover,

Table 2 Pearson correlations, means, standard deviations, and reliabilities of all variables assessed in Study 1

Variables	1	2	3	4	5	6	7	8
1. SC T1	(0.93)							
2. SC T2	**0.85**	(0.93)						
3. SC T3	**0.82**	**0.90**	(0.94)					
4. ST T1	**− 0.51**	**− 0.53**	**− 0.52**	(0.87)				
5. ST T2	**− 0.44**	**− 0.58**	**− 0.53**	**0.66**	(0.87)			
6. ST T3	**− 0.45**	**− 0.56**	**− 0.60**	**0.62**	**0.69**	(0.89)		
7. EC T1	**0.47**	**0.52**	**0.52**	**− 0.45**	**− 0.31**	**− 0.31**	(0.73)	
8. EC T2	**0.47**	**0.53**	**0.53**	**− 0.35**	**− 0.45**	**− 0.43**	**0.57**	(0.75)
9. EC T3	**0.40**	**0.55**	**0.55**	**− 0.28**	**− 0.33**	**− 0.39**	**0.57**	**0.63**
10. DC T1	**− 0.41**	**− 0.49**	**− 0.42**	**0.46**	**0.35**	**0.35**	**− 0.31**	**− 0.24**
11. DC T2	**− 0.34**	**− 0.47**	**− 0.42**	**0.43**	**0.45**	**0.39**	**− 0.21**	**− 0.26**
12. DC T3	**− 0.37**	**− 0.47**	**− 0.49**	**0.33**	**0.44**	**0.51**	**− 0.19**	**− 0.26**
13. AWB T1	**0.42**	**0.49**	**0.48**	**− 0.59**	**− 0.45**	**− 0.42**	**0.41**	**0.37**
14. AWB T2	**0.40**	**0.50**	**0.45**	**− 0.48**	**− 0.54**	**− 0.46**	**0.38**	**0.44**
15. AWB T3	**0.42**	**0.47**	**0.43**	**− 0.48**	**− 0.49**	**− 0.56**	**0.38**	**0.37**
M	18.12	18.10	18.31	19.67	18.85	18.80	2.60	2.60
SD	3.39	3.88	3.99	6.47	6.51	6.95	0.58	0.56

Variables	9	10	11	12	13	14	15
1. SC T1							
2. SC T2							
3. SC T3							
4. ST T1							
5. ST T2							
6. ST T3							
7. EC T1							
8. EC T2							
9. EC T3	(0.77)						
10. DC T1	**− 0.17**	(0.70)					
11. DC T2	**− 0.19**	**0.54**	(0.72)				
12. DC T3	**− 0.23**	**0.45**	**0.60**	(0.72)			
13. AWB T1	**0.34**	**− 0.41**	**− 0.39**	**− 0.35**	(0.89)		
14. AWB T2	**0.35**	**− 0.34**	**− 0.43**	**− 0.39**	**0.84**	(0.89)	
15. AWB T3	**0.44**	**− 0.30**	**− 0.37**	**− 0.41**	**0.82**	**0.87**	(0.89)
M	2.57	1.76	1.76	1.70	3.52	3.55	3.60
SD	0.55	0.47	0.48	0.46	0.59	0.61	0.60

Notes. Cronbach's alphas are provided in parentheses on the diagonal; *SC* self-compassion, *ST* stress, *EC* engagement coping, *DC* disengagement coping, *AWB* affective well-being. Bold correlations are significant, $p < 0.01$

results indicated that individuals higher in SC made greater use of engagement coping strategies and lower use of disengagement coping strategies. The mediation hypothesis could only partially be supported. As predicted, the effects of SC on AWB were mediated by perceived stress. However, since engagement and disengagement coping responses were not significantly related to AWB in the cross-lagged model, these variables were not mediators in this sample.

Study 2

Study 1 was limited in terms of generalizability due to the fact that most of the participants were young, female, and highly educated individuals. To overcome this methodological issue, Study 2 was conducted to examine the relations between SC, perceived stress, coping responses, and AWB in a representative population-based sample. We preregistered our hypotheses, design, and analyses online

Table 3 Indirect effects of self-compassion on affective well-being via perceived stress and coping (Study 1)

	Estimate	Standard error	95% CI
SC-T1→ST-T2→AWB-T3	0.002*	0.001	[0.001, 0.005]
SC-T1→EC-T2→AWB-T3	−0.001	0.001	[−0.003, 0.002]
SC-T1→DC-T2→AWB-T3	<0.001	0.001	[−0.002, 0.001]

Notes. CI confidence interval, *SC* self-compassion, *ST* stress, *EC* engagement coping, *DC* disengagement coping, *AWB* affective well-being. **$p < 0.05$

at the Open Science Framework before starting with data collection (see preregistration at: https://osf.io/fhm9q/?view_only=577dd62d2f5548d59ccf703ee1d0d0a6). We had originally preregistered the hypothesis whether the effects of SC on perceived stress and coping held when controlling for the effects of neuroticism for the GESIS data (Study 2). However, due to panel time restrictions, we could not include neuroticism in Study 2. For more information, see supplementary materials. As we had to apply for integrating our items into the regular GESIS panel, the scales for all constructs had to be either shortened (e.g., items with the highest factor loadings were selected from the original scale) to fit into the panel guidelines or, if available, common short versions of the original scales such as the Self-Compassion Scale-Short (Hupfeld & Ruffieux, 2011) had to be used.

Method

Participants

In total, 3148 individuals participated in at least one of the three relevant waves of the GESIS Panel, 214 of them did not participate in the part of the panel our questionnaires of interest were implemented in. Thus, in total, the final sample included 2934 participants with a mean age of $M = 52.76$ years ($SD = 13.07$; range = 23–74). Descriptive information for all three time points is presented in Table 1.

Procedures

We used data from a probability-based panel operated by GESIS (GESIS Panel), which collects survey data from a German-speaking population aged between 18 and 70 years permanently residing in Germany (Bosnjak et al., 2018). To compensate for non-coverage among non-internet users and to include all persons not willing to participate in online surveys into the panel, each bimonthly GESIS Panel data collection wave is administered in two self-administered (mixed) survey modes, namely (1) an online mode through web-based surveys and (2) an off-line mode through paper-and-pencil surveys sent via postal mail.

The present study design was submitted to the GESIS Panel, peer-reviewed, and received a 5-min slot per requested panel wave, in which external studies were scheduled besides the regular 2-month questionnaire. We collected our variables of interest in 3 waves from August to December 2018 (waves fd, fe, ff) with a 2-month interval between each wave. All variables relevant to our hypotheses were measured at each of the three waves. Some measures needed to be shortened (e.g., SC) to suit the conditions of the GESIS Panel (limitation of 5 min for each wave).

Measures

Self-Compassion SC was measured with the adapted German version of the Self-Compassion Scale-Short (SCS-D-Short; Hupfeld & Ruffieux, 2011; Neff, 2003a). This version consists of 12 items of the original 26-item SCS. The measure includes 6 subscales consisting of 2 items for each scale: Responses are given on a 5-point Likert scale ranging from (1) *almost never* to (5) *almost always*. Due to panel concerns referring to the overall comprehensibility in a sample, the wording of some of the items were slightly changed from the original version. In order to compute the total score, a grand mean was computed from the 6 subscale means. Higher scores indicated higher trait SC.

Perceived Stress As an indicator for perceived stress, the German version of the 10-item Perceived Stress Scale (PSS-10; Cohen et al., 1983; Klein et al., 2016) was used. We implemented 5 of the 10 items from the original version, which had the highest factor loadings in the validation paper of the German version of the Perceived Stress Scale (Klein et al., 2016). Participants reported the degree to which they had appraised situations as unpredictable, uncontrollable, and overstraining in the past month (e.g., "Relating to the last two months, how often have you been upset because of something that happened unexpectedly?"). To form a scale score for perceived stress, the 5 items were summed up and averaged.

Coping As in Study 1, engagement and disengagement coping were measured with the German adaptation of the Brief COPE (Carver, 1997; Knoll et al., 2005). Due to the restricted number of items that could be implemented in the panel, we included four of the six strategies used in Study 1: positive reframing, acceptance, denial, and behavioral disengagement and asked participants if they had used these strategies over the last 2 months. To create a composite index score for the variable engagement coping, the means of the positive reframing and the acceptance scale were averaged.

The means of denial and behavioral disengagement were averaged to form a composite score for disengagement coping.

Affective Well-being AWB was assessed with a 10-item short form (Thompson, 2016) of the standardized version of the 20-item Positive and Negative Affect Schedule (PANAS; Krohne et al., 1996; Watson et al., 1989). The 2 dimensions, positive (e.g., active, inspired, alert) and negative affect (e.g., upset, hostile, shamed), were measured by 5 items each. Items of negative affect were inverted and then averaged, and finally all item responses were summed up and averaged to compute the scale score of AWB.

Data Analyses

We used the same data analytic strategy as in Study 1. Due to strict provisions of German data protection law, we cannot make the data of Study 2 publicly available. However, the data are available from the probability-Based Mixed-Mode Access GESIS Panel (for requests, please contact info@gesis.org). Furthermore, the input files (Mplus-Syntax) for all model analyses of Study 1 and Study 2 can be found in supplementary materials. In contrast to Study 1 and in line with guidelines of recent research in dealing with insufficient model fit (Zyphur et al., 2020), the autoregressive paths from Time 1 to Time 2 were not restricted to be equal to the autoregressive paths from Time 2 to Time 3. Nevertheless, to increase comparability and transparency of our results, we also provided tables with results of the model of this sample in which autoregressive paths were restricted to be equal in the supplementary materials. However, due to the unsatisfying fit indices for this model, results should not be interpreted.

Results and Brief Discussion

In Table 4, intercorrelations, descriptive statistics (mean, *SD*), and internal consistencies for all variables can be found. All correlation coefficients were in the predicted directions. Comparable to Study 1, engagement and disengagement were uncorrelated.

As in Study 1, to investigate the effect of SC (Time 1) on AWB (Time 3) via stress regulation processes (Time 2), a cross-lagged model was implemented. Without including modification indices, our model fit indices were not acceptable in this case. Hence, we followed the suggestion of modification indices and decided to apply additional autoregressive paths from T1 to T3 and treat the autoregressive paths from T1 to T2 as nonequivalent to the paths from T2 to T3. Our model showed acceptable to very good fit indices ($\chi^2(45) = 775.402$, $p < 0.001$, RMSEA = 0.074, 95%CI = [0.068, 0.081], SRMR = 0.073, CFI = 0.950). All autoregressive paths were highly significant (all *p*-values < 0.001).

The cross-lagged effects between SC at Time 1 and perceived stress at Time 2 ($B = -1.290$, $SE = 0.292$; $p < 0.001$, 95%CI = [−1.881, −0.730]) as well as engagement coping responses at Time 2 ($B = 0.432$, $SE = 0.058$; $p < 0.001$, 95%CI = [0.315, 0.545]) were significant. By contrast, the cross-lagged coefficient between SC at Time 1 and disengagement coping responses ($B = -0.080$, $SE = 0.056$; $p = 0.154$, 95%CI = [−0.187, 0.034]) at Time 2 was not significant. In addition, cross-lagged effects between perceived stress at Time 2 and AWB at Time 3 ($B = -0.021$, $SE = 0.003$; $p < 0.001$, 95%CI = [−0.026, −0.014]) and between disengagement coping responses at Time 2 and AWB at Time 3 ($B = -0.036$, $SE = 0.014$; $p < 0.01$, 95%CI = [−0.063, −0.010]) were negative and significant, whereas engagement coping at Time 2 and AWB at Time 3 were only positively associated at the 90%CI ($B = 0.030$, $SE = 0.018$; $p = 0.092$, 90%CI = [0.002, 0.059]). Effect estimates of all autoregressive and additional cross-lagged paths that were implemented in our model are presented in the supplementary materials.

To investigate whether the relation between SC (Time 1) and AWB (Time 3) was mediated by a healthier stress regulation in terms of less perceived stress and more salutary coping responses (Time 2), we explored each indirect effect (Table 5). The indirect effect of SC on AWB via perceived stress was significant (95%CI). For the indirect effect via engagement coping, the 90% CI did not include zero. The indirect effect for disengagement coping was not significant.

Study 2 was conducted to replicate and generalize the findings of Study 1 by exploring the relation between SC, stress processing, and AWB in a representative population-based sample. We found that more self-compassionate individuals perceived less stress over a 2-month period. They also reported greater use of engagement coping, although, unlike in Study 1, they did not demonstrate reduced use of disengagement coping responses. Replicating Study 1, we found that lower levels of perceived stress mediated the effects of SC on AWB. In line with our hypotheses, we found that engagement coping also acted as a mediator. In sum, our results showed that a more effective stress regulation (i.e., lower levels of perceived stress and greater use of engagement coping) explains why individuals with higher levels of SC experienced higher levels of AWB.

General Discussion

The aim of the present research was to identify psychological processes accountable for the positive association between SC and AWB. We investigated the role of perceived stress and coping as possible mediators of this link in two longitudinal studies. Supporting our first hypothesis, SC significantly predicted less perceived stress in both

Table 4 Pearson correlations, means, standard deviations, and reliabilities of all variables assessed in Study 2

Variables	1	2	3	4	5	6	7	8
1. SC T1	(0.76)							
2. SC T2	**0.58**	(0.79)						
3. SC T3	**0.55**	**0.61**	(0.79)					
4. ST T1	**−0.21**	**−0.24**	**−0.23**	(0.81)				
5. ST T2	**−0.21**	**−0.24**	**−0.21**	**0.71**	(0.81)			
6. ST T3	**−0.19**	**−0.24**	**−0.25**	**0.68**	**0.71**	(0.81)		
7. EC T1	**0.34**	**0.35**	**0.34**	**−0.23**	**−0.18**	**−0.18**	(0.68)	
8. EC T2	**0.31**	**0.41**	**0.33**	**−0.20**	**−0.22**	**−0.20**	**0.50**	(0.67)
9. EC T3	**0.27**	**0.35**	**0.39**	**−0.16**	**−0.16**	**−0.21**	**0.48**	**0.50**
10. DC T1	−0.01	−0.06	**−0.10**	**0.46**	**0.37**	**0.28**	0.03	−0.05
11. DC T2	−0.03	−0.03	−0.07	**0.43**	**0.31**	**0.31**	−0.02	0.02
12. DC T3	−0.04	**−0.08**	**−0.11**	**0.33**	**0.34**	**0.39**	−0.06	−0.06
13. AWB T1	**0.27**	**0.26**	**0.27**	**−0.64**	**−0.55**	**−0.56**	**0.27**	**0.26**
14. AWB T2	**0.27**	**0.30**	**0.29**	**−0.56**	**−0.62**	**−0.59**	**0.24**	**0.29**
15. AWBT3	**0.23**	**0.27**	**0.32**	**−0.57**	**−0.55**	**−0.67**	**0.23**	**0.25**
M	3.02	3.02	3.04	12.85	12.87	12.50	2.81	2.79
SD	0.17	0.18	0.17	3.23	3.31	3.25	0.48	0.49

Variables	9	10	11	12	13	14	15
1. SC T1							
2. SC T2							
3. SC T3							
4. ST T1							
5. ST T2							
6. ST T3							
7. EC T1							
8. EC T2							
9. EC T3	(0.68)						
10. DC T1	−0.02	(0.72)					
11. DC T2	−0.03	**0.56**	(0.70)				
12. DC T3	0.02	**0.55**	**0.55**	(0.76)			
13. AWB T1	**0.20**	**−0.36**	**−0.32**	**−0.36**	(0.76)		
14. AWB T2	**0.21**	**−0.31**	**−0.35**	**−0.37**	**0.74**	(0.78)	
15. AWBT3	**0.24**	**−0.31**	**−0.31**	**−0.39**	**0.73**	**0.76**	(0.77)
M	2.80	1.87	1.82	1.83	3.80	3.80	3.84
SD	0.49	0.55	0.53	0.56	0.49	0.49	0.49

Notes. Cronbach's alphas are provided in parentheses on the diagonal; *SC* self-compassion, *ST* stress, *EC* engagement coping, *DC* disengagement coping, *AWB* affective well-being; bold correlations are significant, $p < 0.01$

studies, which is in line with previous research (e.g., Neff & Pommier, 2013; Sbarra et al., 2012; Sirois et al., 2015). Referring to the transactional model of stress (Lazarus, 1966), SC seems to provide a framework that enables individuals to perceive situations in a less threatening manner and/or to strengthen their perception that they are able to cope with the situational demands. These findings are in line with previous research (Gilbert, 2005) which also suggested that having a more self-compassionate attitude especially helps to diminish perceiving harm and distress and, thus, maintain positive emotions.

In addition, SC predicted greater use of engagement coping in both studies, which is in line with previous literature (e.g., Ewert et al., 2018; Gillanders et al., 2015; Sirois et al., 2015). Our hypothesis that SC predicts disengagement coping responses was only partially supported; however, in Study 1, SC predicted disengagement coping over a 6-week period, which is in line with our hypotheses and the current literature (e.g., Chishima et al., 2018; Sirois et al., 2015). Thus, self-compassionate individuals appeared to engage less in strategies that are dysfunctional for their AWB in the

Table 5 Indirect effects of self-compassion on affective well-being via perceived stress and coping (Study 2)

	Estimate	Standard error	95% CI
SC-T1→ST-T2→AWB-T3	0.027***	0.007	[0.028, 0.063]
SC-T1→EC-T2→AWB-T3	0.013+	0.008	[−0.001, 0.029]
SC-T1→DC-T2→AWB-T3	0.003	0.002	[−0.001, 0.009]

Notes. *CI* confidence interval, *SC* self-compassion, *ST* perceived stress, *EC* engagement coping, *DC* disengagement coping, *AWB* affective well-being

***$p < 0.001$; +significant at the 90% CI: $p < .010$, 90% CI = [0.001, 0.026]

long run, such as trying to act as if the stressor were not real, neglecting it, and attributing the distressing situation as one's own fault. In the cross-lagged model in Study 2 however, SC at Time 1 showed no significant association with disengagement coping 2 months later. An explanation might be that the scales had to be shortened in Study 2 and, therefore may have tapped into aspects of disengagement coping that are less relevant for the link between SC and disengagement coping (Ewert et al., 2021).

Grounded in the transactional stress theory (Lazarus & Folkman, 1984), one of the central aims of this work was to investigate if perceived stress and coping might work as mechanisms underlying the link between SC and AWB. In both studies, the positive link between SC and AWB was consistently mediated through more benign stress appraisals. However, referring to coping as a mediator of the link between SC and AWB, the results were more mixed. Disengagement coping did not emerge as a mediator between SC and AWB in either study. For engagement coping, some supporting evidence for mediation was found, but only in Study 2. Clearly, these results need to be replicated, and further research is needed to explain the differences between the two studies. One explanation for the inconsistencies concerning coping responses might be that some coping strategies that were not measured in our studies are more relevant for the mediational link between SC and AWB. Disengagement coping responses such as worry and rumination that have emerged from different theoretical backgrounds showed a strong connection with SC (for a review see, Ewert et al., 2021), and were already found to be consistent mediators between SC and affect in past research (e.g., Fresnics & Borders, 2016; Raes, 2010). However, past studies exploring coping as underlying process in the connection of SC and AWB were mainly cross-sectional, thus it is still unclear if these effects could be demonstrated in other designs such as longitudinal or experimental studies. One could assume that especially coping strategies such

as acceptance and positive reframing which are helpful to regulate emotions in an adaptive way (Compas et al., 2017) might clearly be relevant mediators in the relation between SC and affective well-being. Focusing on dealing with one's emotions instead of trying to change the stressful situation itself might be especially helpful among people who have to deal with noncontrollable circumstances (e.g., a chronic disease).

Taken together, healthier stress perception stood out as the most robust mediator of the link between self-compassion and affective well-being over time (Ewert et al., 2022). These results are consistent with Gilbert's (2005) general suggestion that individuals with high levels of SC find it easier to feel safe and secure in challenging situations which, in turn, protects them from harmful and distressing emotions. However, as this assumption is rather speculative, this should also be investigated in further research. To sum up, more self-compassionate individuals may be able to experience demanding situations in a calmer and more accepting way preventing them from negative feelings and facilitating positive emotions right from the onset without the need of any further coping responses.

Limitations and Future Research

One notable strength of our work is its three-wave autoregressive cross-lagged design, which is a good approach for the investigation of effects over time of one construct on another and the other way around, while at the same time controlling for the stability of the examined constructs over time (Kline, 2015). Such designs are especially helpful with exploring some of the questions and misconceptions that sometimes emerge in longitudinal tests of mediational models. Thus, it decreases the possible parameter biases that can arise when working with cross-sectional data (Cole & Maxwell, 2003). Moreover, we tested our hypotheses in two different samples, one of which was a population-representative sample. By that, we could generalize and replicate our findings. In addition, we preregistered our hypotheses and the design of Study 2. Nevertheless, there are some limitations in both studies which we intend to address in the following.

First, our correlational study design limits the ability to draw causal conclusions. Our longitudinal design and CLPM are an improvement compared to the majority of past studies that used cross-sectional designs. But still, our designs are non-experimental; thus, third variables might account for the effects or different causal directions might be possible. For example, the broaden-and-build theory of positive emotions (Fredrickson, 2001) posits that experiences of positive affect might broaden people's ability to cope, which in turn serves to build their enduring personal resources such as SC. So

far, there have been only a few studies using experimental designs to investigate the causal relation between SC and coping, focusing only on the strategy of rumination (Johnson & O'Brien, 2013; Odou & Brinker, 2013, 2014). Thus, further research should investigate the assumed direction of causality by using self-compassion interventions in the long term and experimental manipulations in the short term (e.g., Finlay-Jones, 2017; Germer & Neff, 2013; Smeets et al., 2014) and design studies building on different theoretical backgrounds that could be tested against each other.

Second, despite the fact that we used a population-representative sample, the generalizability of our results might still be limited due to the fact that data were collected in a culture with a Western perspective on the investigated relations only. Due to differences in stress regulation, the links between self-compassion, stress processing, and affective well-being might vary between Western and Eastern cultures (Oyserman et al., 2002). Thus, future studies should investigate whether our results can also be replicated in Eastern cultures.

Third, due to the time limit given by the GESIS Panel for external studies, measures of all variables had to be shortened. These abbreviated versions of the scales might thus reflect only an insufficient amount of the whole content of the assessed constructs and might lower the comparability of our two studies. Consequently, further studies should use the full version of measures assessing the relation among all variables to replicate our findings. Moreover, we were only able to include a subset of engagement and disengagement coping strategies in both studies. Including further coping strategies as potential mediators between SC and AWB might shed more light on the underlying processes. Nevertheless, this work focused only on coping responses with a longstanding research tradition (Carver et al., 1989). Although all included strategies were associated with SC in several studies to some degree, it might be worthwhile to especially investigate strategies from more recent research approaches (such as rumination and worry) as mediators because these are highly associated with SC (for a review, see Ewert et al., 2021).

Another point to mention is that retrospective scales were used. The responses to items concerning global evaluations might be influenced by temporary factors, such as transitory mood and situational variables (see for an overview Pavot et al., 2018). Therefore, further studies should investigate the research questions using methods such as experience sampling that reduce memory bias (Larson & Csikszentmihalyi, 2014). Using a daily assessment method would also provide insights into whether the trait associations investigated in the current two studies can be transferred to the state level of the variables and to the within-person effects of momentary SC on stress processing and AWB. In line with this, a recent study demonstrated significant intraindividual connections between SC on a specific occasion and the use of disengagement coping responses (Ewert et al., 2022). Furthermore, disengagement coping mediated the relation between momentary SC and AWB (Ewert et al., 2022). Interestingly, coping was operationalized by the same scales as in the present study, which speaks against the assumption that the unexpected findings are due to the operationalization of coping. Instead, these relations might depend on contextual factors such as how different stressful circumstances are perceived by an individual. Thus, we assume that SC has a highly relevant state component unfolding its salutary effects on stress processing and AWB especially at the intraindividual level which should be further examined in additional research.

Another limitation of our study design might be that the time between the three measurement waves was rather short, which might have contributed to higher autoregressive paths. Therefore, less variance remains to be explained by the cross-lagged paths. This is important for the relation between coping and AWB, which was significant when only correlations were considered but was non-significant in our cross-lagged model. Furthermore, the response frames of the questionnaires ("in the last month") do not perfectly correspond with the intervals between time points which might have influenced our results. We did this to stick to the original versions of the scales whenever possible (e.g., the Perceived Stress Scale is validated with "in the past month") while at the same time lowering the possibility of high influence of autoregressive paths through slightly longer time frames. However, given that the time frame of 1 month can be expected to be perceived by participants more as a rough guide rather than a strict specification, influences can be expected to be negligible.

In addition, future studies should investigate possible moderator variables such as the type of stressor which might moderate the link of SC and AWB through stress processing. For example, the link between SC and AWB might be mediated by disengagement coping responses only in uncontrollable situations such as a life-threatening illness or a traumatic experience. Moreover, situational factors and individual differences in accessing tools that facilitate self-compassion, such as experiences with meditation or self-compassion exercises might be promising candidates to be investigated in future research.

Last but not least, with the exception of Chishima et al. (2018), all studies examining the link between SC and stress appraisals have measured the latter exclusively in a unidimensional way (mostly as perceived stress). However, this approach does not take into account that there might be differences in the relation between SC and primary vs. secondary appraisals. For example, on the one hand, SC could lead to perceive a stressor as less threatening right from the onset (primary appraisal), on the other hand, if a situation

has already been assessed as stressful, more SC could help an individual perceive higher controllability of that stressful situation through perceiving more resources that help dealing with that threatening situation (secondary appraisals). Thus, SC might diminish the perceived threat, which in turn, could result in engaging in both more problem-focused and more disengagement coping (Chishima et al., 2018). However, more research is needed in order to understand the precise relation between SC and stress appraisals and coping responses.

To conclude, the findings of both studies are promising in showing that SC has salutary effects AWB through stress processing reflected in perceived stress. Summarizing the findings of the two studies, it can be assumed that the predominant way through which a self-compassionate attitude unfolds its protective effect on AWB is appraising situations as less stressful. There was also some preliminary evidence that coping with stressful situations in a more salutary way has some role in the relation between SC and AWB. However, the mediating role may depend on specific coping responses, which should be explored in future research. We hope that this work gives a better understanding of stress perception and coping responses as processes underlying the link between SC and AWB.

Declarations

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