# Self-compassion to decrease performance anxiety in climbers: A randomized control trial

Psychology & Philosophy

# Self-compassion to decrease performance anxiety in climbers: A randomized control trial

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**Abstract:** In climbing, anxiety may impair performance. Using an evolutionary approach, we hypothesized that athletes who treat themselves with self-compassion activate their contentment and soothing system and thus reduce their performance anxiety. A two-week randomized control trial was used to investigate the effect of self-compassion on somatic and cognitive anxiety. We compared two groups (intervention and waiting list) on two dates. Sixty climbers ($_{age} = 27.95$, $SD_{age} = 8.57$) completed the pre- and post-assessment. The intervention consisted of a psychoeducational leaflet and five self-compassionate writing tasks. In the posttest, the self-compassion intervention group showed increased self-compassion ($F = 4.33$, $. = .04$, $\eta.. = 0.07$) and decreased somatic performance anxiety ($F = 6.24$, $. = .02$, $\eta.. = 0.10$) compared to the waiting list control group. We found no changes in cognitive performance anxiety. The results suggest that self-compassion could be considered as a possible intervention to reduce physical symptoms of performance anxiety.

## Introduction

In sport climbing, the focus is not on climbing a summit, but on climbing short routes in a technically correct manner as quickly as possible. Climbing performance depends heavily on technical ability and strength, but psychological variables also play an important role (Giles et al., 2014). These variables include attention (Garrido-Palomino et al., 2020), self-efficacy (Llewellyn et al., 2008), and goal orientation (Sarrazin et al., 2002). A further factor for climbing performance is anxiety (Hardy & Hutchinson, 2007). Anxiety is an interesting factor in climbing because it is actually a natural reaction to altitude: even when climbers are secured, the body can react with anxiety at high altitudes due to an evolutionary fear of falling (Jackson & Cormack, 2007). In competitive sports, fear of performing badly may also cause anxiety (Ford et al., 2017). In this study, we investigate how a certain way of dealing with oneself, namely self-compassion, affects climbers' performance anxiety.

Anxiety can be considered both as a state and a trait (Hanton et al., 2002; Spielberger, 1966) and has two basic manifestations, namely somatic and cognitive anxiety. Somatic anxiety refers to physiological reactions, such as an increased pulse or sweaty hands and cognitive anxiety includes worries and thoughts about unwanted outcomes (Smith et al., 2006). Anxiety can worsen climbing performance (Hardy & Hutchinson, 2007), with some researchers suggesting that anxiety impairs athletic performance by leading to an internal focus of attention,

while others suggest that anxiety impairs performance by leading to increased distractibility (Hill et al., 2010; Oudejans et al., 2011). Results of a meta-analysis covering a wide range of sports demonstrate that both cognitive and somatic anxiety show a weakly negative correlation with athletic performance (Craft et al., 2003).

However, more anxiety is not always associated with poorer performance. Both the Yerkes-Dodson Law (Yerkes & Dodson, 1908) and the catastrophic model of competition anxiety (Hardy & Parfitt, 1991) imply that a certain amount of anxiety is helpful for athletic performance and is only an impediment to performance above a certain level. The Individual Zones of Optimal Function model (IZOF) makes a similar statement by postulating that certain athletes prefer higher levels of arousal to show their best performance (Hanin, 2000). The interpretation of anxiety is also a factor, with elite athletes reporting the same level of anxiety as non-elite athletes, but interpreting it as being more facilitative to performance (Jones et al., 1994). This is in line with empirical data, which show that for some climbers somatic anxiety is associated with better performance (Sanchez et al., 2010). Nevertheless, for other climbers anxiety can be an impediment to performance (Hardy & Hutchinson, 2007) and methods for reducing anxiety are therefore a potential resource for these athletes. Furthermore, since performance anxiety is associated with lower self-esteem (Smith et al., 1990), a reduction may also make sense from the viewpoint of individual well-being.

Performance-inhibiting anxiety in climbing can be seen as an overreaction of our threat and protection system. Using an evolutionary approach, Gilbert (2009; 2010) postulates three basic affect regulation systems that are common to all mammals. The first is the threat and protection system, which evolved to deal with threats. It activates survival mechanisms, motivates movement toward safety, and is closely associated with emotions like anger, disgust, shame – and anxiety, including its cognitive and somatic manifestations. Anxiety arises when we perceive a situation as a potential threat to our goals or ourselves and are unsure whether we can defend against the threat (Berking, 2010). The second, the drive and excitement system, motivates the pursuit of rewards or resources like food, success, or power; it is associated with feelings of excitement and pleasure. Finally, the third, the contentment and soothing system, relieves stress and activates empathy and compassion; it is associated with peace, calm and quiescence. In healthy individuals, these three systems can alternate quickly in response to different situations. While these systems evolved to help our species survive, they are not always helpful in modern contexts. In competitive sports, the threat and protection system can be particularly problematic, because athletic performance does not usually benefit from the *fight, flight, or freeze reaction* triggered by this system; instead, it requires inner calm and concentration. This seems especially true for climbers.

When the threat and protection system is over activated, kindness, compassion and support from others is supposed to downregulate

the threat and protection system through the calming influence of the contentment and soothing system (Gilbert, 2010). Examples of this calming effect include a frightened child who turns to their parents for comfort or a player who seeks support from teammates before a difficult athletic task. Gilbert (2009; 2014) postulates that kindness and compassion towards oneself can have exactly the same soothing and calming function and can bring these emotional systems back into balance. This claim is empirically supported by research showing that compassion towards oneself is associated with heightened parasympathetic activity (Stellar et al., 2015) and less unproductive repetitive thinking such as worrying (Raes, 2010). We therefore assume that climbers who treat themselves with kindness and support can activate their contentment and soothing system and thus reduce their somatic and cognitive performance anxiety.

A kind, supportive attitude towards oneself is called self-compassion. Self-compassion has three facets: self-kindness, common humanity, and mindfulness (Neff, 2003a; 2003b). Self-kindness means treating oneself with kindness and understanding (even when feeling inadequate), wishing for one's own well-being, and adopting an accepting, non-judgmental attitude toward oneself rather than engaging in harsh self-criticism or judgment. Common humanity refers to an awareness that unpleasant experiences are shared by all human beings rather than feeling unique and isolated after a failure. Mindfulness is a conscious awareness of one's own suffering, including psychological pain, and taking a balanced approach to negative experiences so that painful feelings are neither avoided nor dramatized.

Among athletes, self-compassion is associated with better well-being (Ferguson et al., 2014; 2015) and less anxious reactions to remembered sport-specific setbacks (Reis et al., 2015). In addition, a self-compassion intervention with woman athletes lead to better emotional handling of sport-specific failures and lower levels of maladaptive cognitive processes in the form of concerns over mistakes and rumination over past failures (Mosewich et al., 2013). Data from a meta-analysis including randomized controlled studies with non-athlete samples show that self-compassion interventions have a moderate effect on reducing anxiety (Kirby, 2017). Overall, current research suggests that self-compassion could reduce athletes' performance anxiety. To our knowledge, however, this has not yet been empirically investigated.

The aim of our study was to examine whether self-compassion is a possible resource for climbers who are interested in learning how to better cope with performance anxiety. More specifically, we explored the question of whether a self-compassion intervention might lead to less performance anxiety in such climbers. We hypothesized that our intervention would lead to more self-compassion and less cognitive and somatic performance anxiety.

# Methods

*Study design*

The present study used a two-week randomized controlled trial (RCT) design to investigate the effect of self-compassion on cognitive and somatic performance anxiety in a group of climbers. The study used two groups, a self-compassion intervention (SCI) and a waiting list control group (WL). Participants were evaluated twice (pretest, posttest). The primary outcomes of the trial were somatic and cognitive performance anxiety. Changes in self-compassion provided the manipulation check for the intervention. We predicted that, at posttest, the SCI group would show higher levels of self-compassion and lower levels of somatic and cognitive performance anxiety than the waiting list control group (WL).

*Participants and allocation*

In Mosewich et al. (2013), the intervention had a strong effect on self-compassion. Based on this, our minimum sample size was calculated using G*Power version 3.1 ($\alpha$ = 0.05, 1 – $\beta$ = 0.8; Faul et al., 2007). We assumed a large effect size (Cohen's f = 0.40) for our trial. This calculation indicated that 26 participants per group (52 total participants) were needed to detect significant effects.

We recruited 69 climbers from climbing clubs and the Swiss Alpine Club and by hanging posters in climbing halls and through word of mouth. The call for participation was explicitly directed at climbers who wanted to address their performance anxiety and learn to better handle such feelings. Eligibility was limited to adults (i.e., 18 years or older) who engage in climbing at least once a week. Participants were informed that an e-mail address would be required to send the information and link all the data together. At the same time, the participants were made aware of the possibility of using an anonymous e-mail address, which does not allow any conclusions to be drawn about the name. Potential participants were invited to contact the authors via email; they then received a link to an online survey (pretest). After the pretest, the participants (stratified by gender) were randomly assigned to either the SCI or WL group. They were then informed which group they had been assigned to. All participants provided written informed consent before participation in the study. The data set was made completely anonymous before analysis. The study was approved by the Institutional Review Board.

Participants who dropped out (n = 9, four males from the SCI group and two males and three females from the WL) did not complete the posttest questionnaire and were not included in the analysis. Sixty climbers were included in the analysis (mage = 27.95, SDage = 8.57; male/female = 21/39, 35% male; .weeklytraininhours = 4.78, SD = 3.04; .yearsclimbingexperience = 9.58, SD = 8.18).

*Measures*

Self-compassion was assessed using the total scale of the 12-item Short Form of the Self-Compassion Scale (SCS-SF, Raes et al., 2011). Items were rated on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). We used the German version of the SCS-SF. The total score of this test has shown good construct validity and high internal consistency (Cronbach's α = .91) and retest reliability (*rtt* = .92) in a community sample (Hupfeld & Ruffieux, 2011). The total SCS-SF score (SCTOT) is obtained by reverse scoring the negative items and then computing the mean for all 12 items. In our sample, Cronbach's α was .86. There is an ongoing debate about the factor structure of the Self-Compassion Scale (Muris & Otgaar, 2020; Neff, 2020). Some empirical data point towards a two-factor solution, with one factor that includes all the positive facets of self-compassion and a second factor that includes all the negative facets (Brenner et al., 2017; Coroiu et al., 2018). Therefore, we also analyzed two subscales. For the first subscale (SCPOS, Cronbach's α = .78), we calculated the mean of the six items addressing positive facets (self-kindness, common humanity, and mindfulness). For the second subscale (SCNEG, Cronbach's α = .87), we calculated the mean of the six items addressing negative facets (self-judgment, isolation, and over identification). An example item for SCPOS is: "When I'm going through a very hard time, I give myself the caring and tenderness I need." An example item for SCNEG is: "I'm disapproving and judgmental about my own flaws and inadequacies." SCPOS and SCNEG correlated only slightly at pretest (n = 60, r = -.35, p < .01), indicating sufficient independence.

Climbers' somatic performance anxiety (SOMA) and cognitive performance anxiety (COGA) were assessed using the respective subscales of a slightly modified version of the German-language Competition Anxiety Inventory Trait (CAI-T, Brand et al., 2009)[1]. In the instructions, we changed the phrase "before competition" to "before climbing". We also reworded two items: "I am worried about performing more poorly than usual" was changed to "I am worried about *climbing* more poorly than usual" and "I am worried about whether I will reach my goal" was changed to "I am worried about whether I will complete *the climbing route/the climb*." Brand and colleagues (2009) developed the CAI-T based on the Sport Anxiety Scale (Smith et al., 1990) and provided psychometric support for the measure and its use in sport. SOMA and COGA were obtained by computing the mean for the four items of each scale (Cronbach's α SOMA = .86; Cronbach's α COGA = .64). Items were answered using a four-point Likert scale (1 = not at all, 4 = very much). An example item for SOMA is: "Before climbing, I feel tense in my stomach". An example item for COGA is: "Before climbing, I have self-doubts".

### Self-compassion intervention

The self-compassion intervention consisted of a psychoeducational component and five writing tasks. The psychoeducational component was a leaflet describing the three affect regulation systems (Gilbert, 2009; 2010) and their roles in climbing. A definition of self-compassion was given according to Neff (2003b, i.e., self-kindness, common humanity, and mindfulness). The leaflet also explained that self-compassion activates the soothing system and thus may deactivate the threat and protection system.

The five writing tasks were based on Leary et al. (2007), and were the same Mosewich et al. (2013) used in their intervention study. In the first task, participants wrote about the most significant setback they had faced in climbing over the past year. They were asked to describe the events leading up to the setback, who was there, what happened, and their thoughts and actions during the setback. In the second, third, and fourth writing tasks, participants were asked to apply common humanity, self-kindness, and mindfulness, respectively, to the setback described in the first task. In the fifth task, participants applied the skills used in tasks two to four to a more recent climbing experience. This time, they were asked to describe a demanding climbing experience from the previous week.

The psychoeducational leaflet and the writing tasks were sent to the participants via e-mail. One day after the pretest, the participants received the psychoeducational leaflet. Two days later, they received the first writing task. Writing tasks were sent every two days. Three days after the last task, participants received the link to the online posttest. In total, the intervention lasted 14 days. WL participants were also asked to complete the posttest 14 days after they received the pretest. After they completed the online survey, WL participants received all the information (the psychoeducational leaflet and the instructions for the writing tasks) in a single e-mail. German versions of the leaflet and the writing tasks are available as supplementary material to this article.

### Statistical analysis

We used analyses of covariance (ANCOVA) to compare differences in the posttest scores of performance anxiety and self-compassion by group (SCI and WL) controlling for pretest scores (de Boer et al., 2015). Significance tests were conducted with an alpha level of 0.05, and effect sizes are presented as the partial eta-square ($\eta_p^2$). $\eta_p^2$ values of 0.01 are considered a small effect, $\eta_p^2$ values of 0.06 or higher are considered a medium effect, and $\eta_p^2$ values of 0.14 or higher are considered a large effect (Cohen, 1992; Richardson, 2011). The analyses did not differ using both an intention-to-treat and a per-protocol strategy. The per-protocol analysis is presented considering all athletes with posttest data.

# Results

## Preliminary analysis

At pretest, there were no significant differences between dropouts (n = 9) and athletes included in the analysis in self-compassion (t = 0.23, p = .82, d = 0.08), somatic anxiety (t = 1.14, p = .26, d = 0.46), cognitive anxiety (t = 1.22, p = .23, d = 0.44), age (t = 0.58, p = .57, d = 0.23), or gender (t = 1.83, p = .07, d = 0.65). Sixty climbers (n = 30 per group) completed the pre- and post-assessment and were included in the analysis. A CONSORT study flow diagram is shown in Figure 1. The SCI ($M_{age}$ = 28.17, SD = 7.65; male/female = 9/21, 30% male; $M_{weeklytraininhours}$ = 5.37, SD = 3.43; $M_{yearsclimbingexperience}$ = 9.83, SD = 7.20) did not differ from the WL ($M_{age}$ = 27.73, SD = 9.52; male/female = 12/18, 40% male; $M_{weeklytraininhours}$ = 4.20, SD = 2.52; $M_{yearsclimbingexperience}$ = 9.33, SD = 9.17) in age, gender, weekly hours of training, or years of climbing experience (ts < 1.50, ps > .14, ds < 0.39). Furthermore, the groups did not differ in self-compassion (t = 1.55, p = .13, d = 0.40), somatic performance anxiety (t = 1.36, p = .18, d = 0.38), or cognitive performance anxiety (t = 1.17, p = .25, d = 0.30) at pretest. These data confirm that the groups were comparable at baseline, although analyzing pretest differences in pre–post designs has been criticized as unnecessary (de Boer et al., 2015).

## Main analysis

Table 1 shows the ANCOVA results for self-compassion and performance anxiety by group, controlled for pretest scores. SCTOT and SCPOS show that the SCI group improved at posttest relative to the WL group (ps < .05, $\eta_p^2$ = 0.07 and 0.08, respectively). However, no group differences were observed for SCNEG at posttest ($\eta_p^2$ = .03). The SCI group's SOMA decreased at posttest relative to the WL group (p < .05, $\eta_p^2$ = .10). No group differences were observed for COGA at posttest ($\eta_p^2$ = 0.03).

### Table 1

Group differences across time for self-compassion and performance anxiety (mean (SD)).

| Variable | SC Intervention ($n$ = 30) | | Waitlist Control ($n$ = 30) | | ANCOVA | | |
|---|---|---|---|---|---|---|---|
| | Pre–Test | Post–Test | Pre–Test | Post–Test | F | p | ηp2 |
| SCTOT | 3.23 (0.48) | 3.44 (0.51) | 3.02 (0.55) | 3.07 (0.66) | 4.33 | .04 | 0.07 |
| SCPOS | 3.21 (0.47) | 3.47 (0.50) | 3.07 (0.53) | 3.12 (0.68) | 4.76 | .03 | 0.08 |
| SCNEG | 2.76 (0.65) | 2.60 (0.72) | 3.03 (0.84) | 2.99 (0.89) | 1.51 | .22 | 0.03 |
| SOMA | 1.91 (0.64) | 1.68 (0.48) | 2.16 (0.78) | 2.08 (0.67) | 6.24 | .02 | 0.10 |
| COGA | 2.41 (0.49) | 2.18 (0.52) | 2.58 (0.61) | 2.48 (0.74) | 1.78 | .19 | 0.03 |

*Note.* SCTOT = self–compassion total score, SCPOS = self–compassion positive, SCNEG = self–compassion negative, SOMA = somatic anxiety, COGA = cognitive anxiety

## Discussion

This study investigated the effect of a self-compassion intervention on performance anxiety in climbers. The intervention comprised psychoeducation and several self-compassion writing tasks. All information and tasks were e-mailed to participants over a period of two weeks. The intervention passes the manipulation check, which means that it led to an increase in self-compassion. Furthermore, the intervention led to a decrease in somatic but not in cognitive performance anxiety.

As expected, we observed an increase in self-compassion. This increase was mainly due to a strengthening of the positive facets of self-compassion rather than to a decrease in its negative facets. Our intervention was designed to encourage kind, attentive ways of dealing with oneself. Attitudes opposed to self-compassion, such as harsh self-criticism, were not specifically addressed in the intervention, and this is reflected in the results. The results of this study imply that the distinction between the positive and negative facets of self-compassion could make sense, as they only weakly correlated and that they were influenced differently by the intervention.

Our intervention is comparable to earlier self-compassion interventions with athletes (Mosewich et al., 2013), which also included psychoeducation and writing tasks. However, in our study, the effects of the intervention on self-compassion were slightly smaller than in the previous study. This could be because Mosewich et al. (2013) explicitly recruited athletes who described themselves as highly self-critical and therefore had more potential for improvement. Our study shows that even athletes who do not describe themselves as self-critical can increase

their self-compassion with a relatively short intervention, even one administered exclusively via e-mail.

We found that somatic performance anxiety, such as an increased pulse or sweaty hands, decreased in the intervention group compared to the control group. One possible explanation for this result is that self-compassion activates the emotional contentment and soothing system, mitigating the physical effects of the threat and protection system (Gilbert, 2009). Self-compassion could therefore be an alternative intervention that sports psychologists could consider to help athletes reduce physiological arousal, in addition to classical relaxation methods such as autogenic training and progressive muscle relaxation (Acharya & Morris, 2014).

Contrary to our expectations, the intervention had no observable effect on cognitive performance anxiety. To reduce cognitive performance anxiety, it is probably necessary to use an intervention that places more emphasis on cognitive processes. Such an intervention might focus more on the mindfulness aspect of self-compassion. In our intervention, mindfulness was not a primary focus (i.e., we did not introduce a meditation exercise or another exercise that fosters cognitive diffusion). Mindfulness seems to be useful to better deal with maladaptive cognitive processes. In fact, research shows that mindfulness interventions with athletes decrease their performance worries and negative thoughts (Röthlin et al., 2020) as well as their cognitive performance anxiety (Mehrsafar et al., 2019). In addition mindfulness seems to buffer the performance-impeding influence of cognitive anxiety (Röthlin et al., 2016).

Our study is an important first step in investigating the effect of self-compassion on performance anxiety. However, it also has certain limitations. Since we did not include an active control group, we cannot determine whether the changes we observed were due to a placebo effect. Nor can we identify which parts of our intervention (psychoeducation and the writing tasks) contributed to the outcome or to what extent. Since we did not include a follow-up measurement, we do not know anything about the long-term effects of our intervention. Future research should therefore include an active control group and follow-up measures. Such research could investigate the differences between interventions that focus on changing the positive or negative facets of self-compassion. Further research could also consider potential moderators of self-compassion interventions such as fear of self-compassion (Gilbert et al., 2011). Finally, to complement the data from our self-reported trait measures, future research on the effect of self-compassion on performance anxiety should include state measures and physiological markers of anxiety such as heart rate or cortisol levels (Frenkel et al., 2018).

The study results suggest that our self-compassion intervention could be a potential resource for climbers who wish to reduce somatic but not cognitive anxiety. The results indicate that self-compassion might be helpful for athletes, not only to improve well-being and help them cope with setbacks, but also to reduce physical symptoms of anxiety.
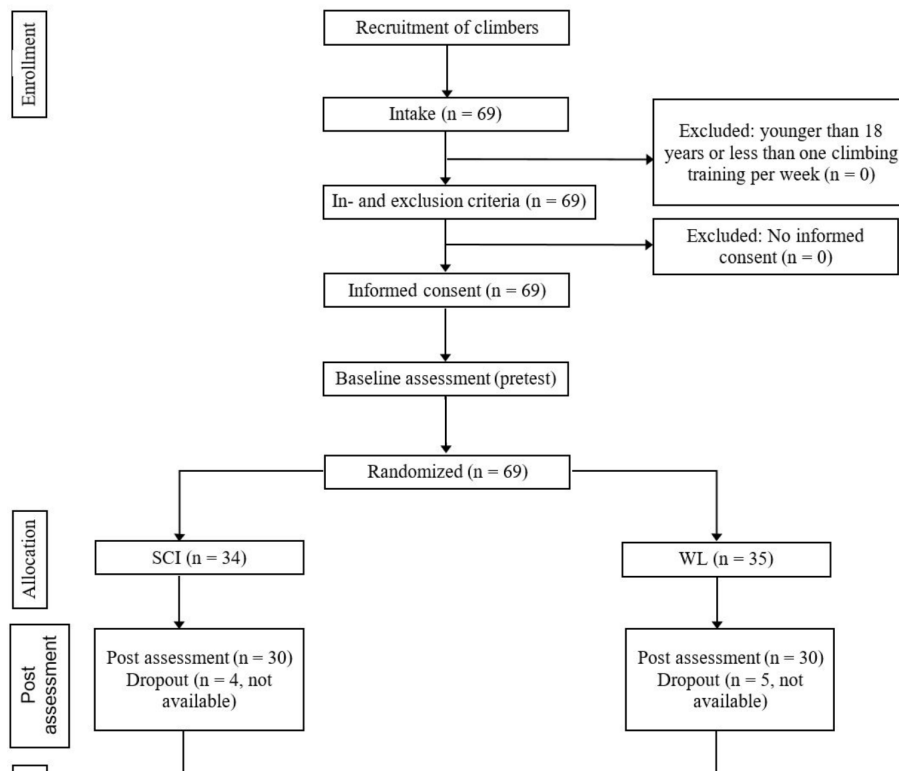
**Figure 1**

CONSORT study diagram for participant recruitment, allocation and analysis.

## Acknowledgments

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## Notes

1    The CAI-T consists of three subscales (somatic performance anxiety, cognitive performance anxiety and concentration disruption). We did not use the concentration disruption subscale in our study, because we were primarily interested in the effect of self-compassion on somatic and cognitive anxiety.