

Supplemental Materials

Be a Hero, Be Your Own Best Friend: A Self-Compassion-Based PsyCap Intervention

Improves PhD Students' Well-being

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1. Overview of the Intervention Schedule

We used a Randomized Controlled Design to test for the effects of the interventions, whereby we compared the intervention groups against a wait-list control group that did not receive any training at the time of data collection. In Table S1 we provide an overview of the intervention schedule for all the groups. The intervention groups participated in the training interventions in April 2021 while the wait-list control group received the training intervention in September 2021.

Table S1

Intervention Schedule

	Pre-intervention questionnaire	Intervention period		Post-intervention questionnaire	Follow-up questionnaire
		Week 1	Week 2-Week 5	Week 6	Week 18
		Workshop	Home-practice		
PsyCap-only	2 nd April				
Group 1		12 th April	19 th April – 16 th May	17 th May	9 th August
Group 2		19 th April	26 th April – 23 rd May	24 th May	16 th August
PsyCap + SC	2 nd April				
Group 1		26 th April	3 rd May – 30 th May	31 st May	23 rd August
Group 2		28 th April	3 rd May – 30 th May	31 st May	23 rd August
Control	2 nd April				
Group 1		15 th Sept.	27 th Sept – 24 th Oct	24 th May	16 th August
Group 2		22 nd Sept.	27 th Sept – 24 th Oct	24 th May	16 th August

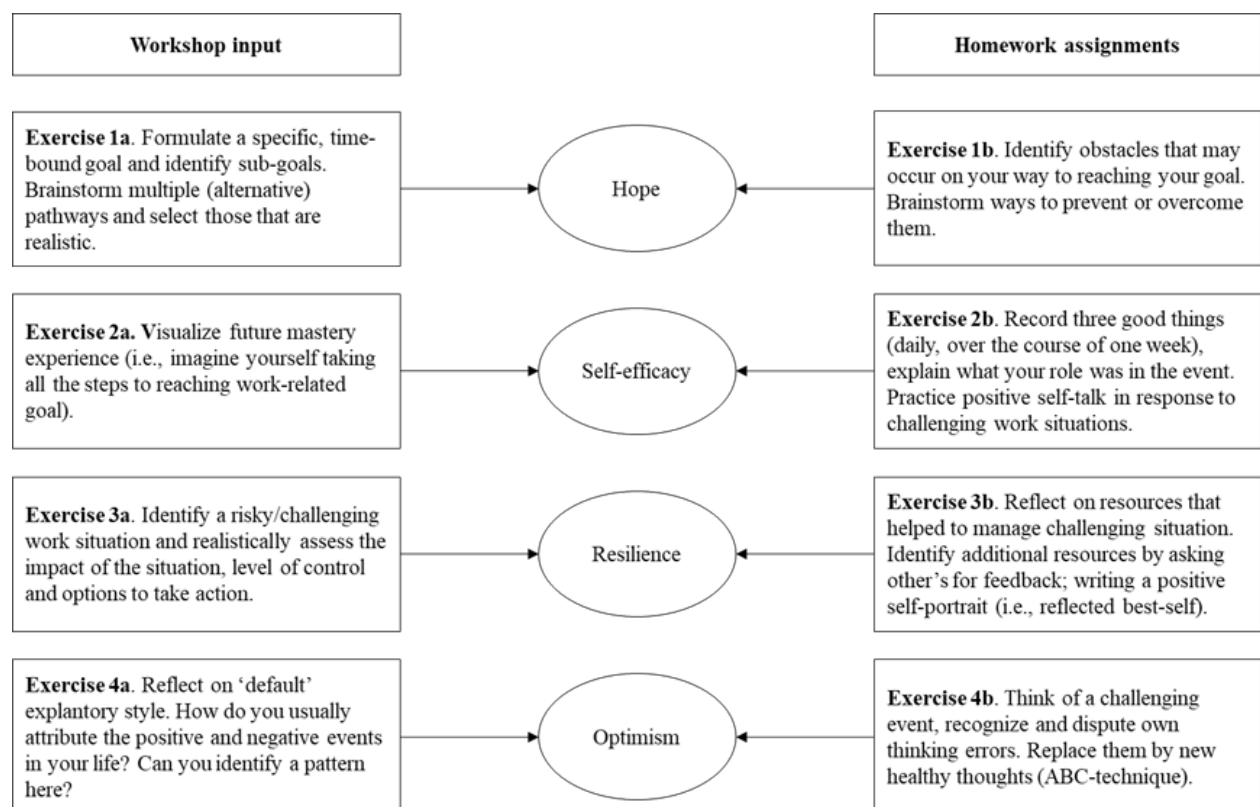
Note. PsyCap + SC = self-compassion-based PsyCap group

2. Overview of the Workshop and Homework Exercises

The interventions consisted of a workshop and a four-week period of home-practice. During the workshop and home-practice participants were asked to perform several exercises. As can be seen in Figure S1, for every PsyCap component there was a workshop exercise and a corresponding homework assignment. Below you can find a detailed description of the exercises in both intervention groups.

Figure S1

Training Input for PsyCap Development



Hope Development

The development of hope focused on 1) setting personally meaningful and challenging goals and 2) reaching those goals by identifying multiple paths and by anticipating obstacles. In the workshop, participants were first asked to identify a work-related goal. The trainer explained the importance of using an approach framework with their

goals (i.e., formulating goals as something they want to achieve instead of avoid). Also, participants were asked to add a realistic deadline to their goal. Next, participants were asked to break down their goal into smaller, more achievable sub-goals. Subsequently, participants identified multiple pathways (i.e., alternative routes) to their (sub-)goals. Finally, participants were instructed to realistically assess and discuss the pathways and drop those that were not suited. For the homework assignment, participants were asked to brainstorm potential obstacles to their goals. Subsequently, participants identified ways to overcome them.

Self-Compassion Add-On.

Participants in the self-compassion-based PsyCap group were explicitly asked to use self-compassion when practicing with strategies to build PsyCap hope. Specifically, participants were asked to choose a goal that is moderately challenging instead of focusing on a goal that is hard to achieve. Also, participants were asked to view obstacles as a common human experience connecting them to others rather than isolating them.

Self-efficacy Development

Based on the work of Albert Bandura (1977) participants learned four different strategies to boost self-efficacy: 1) mastery experiences, 2) observational learning, 3) social persuasion and 4) psychological and physiological well-being. In the workshop, participants first practiced with building imaginary task mastery through a guided visualization exercise. Participants were asked to imagine themselves being successful in reaching the goal they had defined as part of the hope development.

For the homework assignment, participants first recalled past mastery experiences. Specifically, participants wrote down three things that went well with regard to work each day, over the course of one week. This exercise, often referred to as *three good things* (Seligman et al., 2005, Guo et al., 2020) was adapted by additionally asking participants to describe their own role in bringing about the positive event. Second, tapping into the strategy

of using verbal persuasion to develop self-efficacy, participants practiced at home with written positive self-talk (Shantz & Latham, 2012). Participants were asked to respond to five vignettes (adapted from Flanagan & Symonds, 2021) that described a work-related challenge and were designed to elicit difficult emotions, such as nervousity or frustration. For example, participants were confronted with the scenario of *presenting in front of many people* or *getting stuck when working on a difficult task*. Participants were asked to respond to each vignette by ‘turning on’ their positive inner voice. Additionally, participants were instructed to use second-person pronouns (e.g., “you”, “your”) instead of first-person pronouns (e.g., “I”, “mine”) as a means to facilitate positive self-regulation processes (e.g., self-distancing; Kross et al., 2014). Following, participants discussed the vignettes with their buddies and reflected on how their self-talk statements differed from those of their peers. Finally, participants identified additional work challenges and generated self-talk statements.

Self-Compassion Add-On.

Participants in the self-compassion-based PsyCap group were encouraged to watch out for self-judging thoughts, when doing the *three good things* practice. For example, when failing to do the exercise regularly, participants might get angry at themselves or might call themselves lazy. Participants were instructed to avoid self-judgment and respond in a self-compassionate way instead. With regard to the positive self-talk practice, participants were asked to actively integrate aspects of common humanity, mindfulness, and self-kindness into their positive self-talk statements. For example, a self-compassionate response to the scenario of *getting stuck when working on a difficult task* may look like: “I’m having a really hard time right now, it’s ok, everybody gets stuck on a work task some time. It’s ok to feel frustrated and upset right now. I can still be kind to myself and focus on things that did go well.”

Resilience Development

To build participants' resilience, the training focused on two aspects: 1) realistic assessment of a challenging situation and 2) activation of own resources. The training input was divided over several steps participants executed during the workshop. In the first step, participants identified a risky (i.e., threatening) work situation. In step two, participants were asked to record their initial reaction in response to the event. Finally, in step three, participants assessed the real impact of the situation, reflected on their level of control and identified courses of action which helped participants to reduce the perceived risk to a manageable level.

Following, as a homework assignment, participants were instructed to identify resources they had utilized in order to deal with the situation described. To stimulate the activation of additional resources, such as strengths, participants also completed a *Reflected Best-Self exercise* (Roberts et al., 2005). Participants were instructed to ask others (e.g., family members, friends, colleagues) for feedback on their own strengths. Based on the feedback, participants wrote a positive self-portrait (i.e., a summary) about themselves. Participants were instructed to collect feedback from at least three persons before writing the self-portrait.

Self-Compassion Add-On.

Participants in the self-compassion-based PsyCap group were encouraged to use self-compassion as a tool when confronted with difficult situations. For example, participants were instructed to use mindfulness, that is to step back and pause, when confronted with a situation that was threatening or challenging. Participants learned that by adopting a distanced perspective, they would be more likely to view the situation in terms of its real impact and to identify suitable courses of action. Additionally, participants were instructed to include options for self-care: "What can I do to make me feel better in this situation?"

Optimism Development

To develop participants' optimism, participants were introduced to Seligman's (1998) work on explanatory styles. During the workshop, participants watched a demonstration in which the first author deployed an optimistic style (i.e., focusing on external, temporary and situation-specific causes) and a pessimistic style (i.e., focusing on personal, permanent and pervasive causes) in response to a negative event (i.e., paper rejection). Participants were then asked to apply both styles to a positive event (i.e., paper acceptance). The exercise was designed to help participants gain an understanding of both styles and to reflect on their own use of explanatory styles. Participants realized that it is not beneficial to rigidly use an optimistic explanatory style but to flexibly chose the style that best fits the reality of the situation; a capacity the trainer referred to as flexible, realistic optimism.

Next, the trainer explained that individuals can be limited in their capacity to be flexible because of their tendency to use default explanations. This information was used in the homework assignment, that aimed to challenge participants' default style, by making participants practice with Albert Ellis' ABC-technique (Ellis, 2004). In step one of the assignment, participants learned to identify own irrational thoughts (e.g., "I must not fail") that determine their emotional and behavioral reaction in response to an event. In the next step, participants were instructed to challenge their irrational thoughts and replace them by more rational thoughts (e.g., "Failing is part of the process").

Self-Compassion Add-On.

Participants in the self-compassion-based PsyCap group were asked to watch out for self-defeating behavior when practicing with the ABC-technique. Participants were instructed to not beat themselves up when detecting own irrational thoughts (e.g., "That's why I'm such a loser, I'm always putting myself down"). Instead, participants were asked to be kind and compassionate when recognizing their inner critical voice.

3. Results of Between-Group Differences at Baseline

To rule out the possibility that the intervention groups and wait-list control group differed meaningfully at baseline, we compared the groups on demographics and PhD-characteristics. Chi-square analyses indicated that the groups did not differ in terms of whether participants' lived with others, had children living in the household, worked full- or part-time, or received funding, $\chi^2(2, N = 117) \leq 3.38, ps \geq .184$. While having a partner was not independent of group¹, $\chi^2(2, 110) = 7.64, p = .022$, Cramer's $V = .26$, it was not associated with personal resources, or well-being measures, $F_s \leq 1.23, ps \geq .270$, and as such we did not control for it. Gender was not equally distributed across groups², $\chi^2(2, 112) = 10.18, p = .006$, Cramer's $V = .30$ and associated with support seeking, $F(1, 110) = 4.33, p < .001, \eta_p^2 = .114$ such that women showed higher levels of support seeking ($M = 2.99, SD = 0.57$) than did men ($M = 2.57, SD = 0.52$). Therefore, we reran analyses on instrumental support, while controlling for gender. Similarly, faculty affiliation differed across groups³, $\chi^2(8, 115) = 16.78^4, p = .033$, Cramer's $V = .25$ and was associated with support seeking, $F(4, 110) = 2.78, p = .030, \eta_p^2 = .092$ such that PhD students from the Humanities tended to report more support seeking ($M = 3.11, SD = 0.59$) than PhD students from the Natural Sciences ($M = 2.71, SD = 0.56$), although this difference was only marginally significant, $p = .062$. We reran analyses on support seeking, while controlling for faculty affiliation. Because the results including these control variables did not differ from the results without these controls, we report the analyses without control variables in the paper, and present the results including the control variables here (see Section 3).

¹ Post-hoc tests using adjusted residuals did not indicate any significant differences between expected and observed values in any of the cells.

² Post-hoc tests using adjusted residuals indicated that there were more men and less women in the PsyCap-only group and less men and more women in the self-compassion-based PsyCap group than would be expected under H_0 .

³ Post-hoc tests using adjusted residuals indicated that there were more PhD students from the Faculty of Sciences in the PsyCap-only group than would be expected under H_0 .

⁴ Because more than 20% of the cells had expected count less than 5, Likelihood-ratio chi-square was used instead of the Pearson qui-square.

4. Results for Instrumental Support Seeking With Control Variables

Given that both gender and faculty association were found to be related to our outcome variable instrumental support seeking, we reran all analyses pertaining to this outcome⁵, while controlling for gender and faculty association, respectively. Specifically, we included gender and faculty association when testing whether the PsyCap-only intervention led to improvements in support seeking compared to pre-intervention (H2a) and the control group (H2b). Likewise, we included the controls to determine whether the self-compassion-based PsyCap intervention improved support seeking compared to pre-intervention, control group and PsyCap-only group (H4a-c).

We used linear mixed models in SPSS to assess if the result for instrumental support seeking at post-intervention would remain the same when controlling for gender and faculty affiliation, respectively. When controlling for gender, the results indicated that the PsyCap-only group did not show any increases in support seeking at post-intervention compared to pre-intervention, $t(208.89) = -0.89, p = .377, 95\% \text{ CI } [-0.197, 0.075]$ or compared to the control group, $t(163.84) = -0.19, p = .846, 95\% \text{ CI } [-0.261, 0.214]$. Also when controlling for faculty affiliation, there was no increase in support seeking at post-intervention compared to pre-intervention, $t(209.85) = -0.89, p = .377, 95\% \text{ CI } [-0.196, 0.075]$ or compared to the control group, $t(161.28) = 0.27, p = .786, 95\% \text{ CI } [-0.207, 0.274]$. When controlling for gender, the self-compassion-based PsyCap group showed improvements in support seeking compared to pre-intervention, $t(208.89) = -4.01, p < .001, 95\% \text{ CI } [-0.454, -0.155]$, the control group, $t(164.52) = -2.32, p = .022, 95\% \text{ CI } [-0.543, -0.044]$ and the PsyCap-only group, $t(161.48) = -2.04, p = .043, 95\% \text{ CI } [-0.532, -0.008]$. Likewise, when controlling for

⁵ For the sake of completeness, we also reran analyses for our other outcomes controlling for gender. The findings remained largely the same except that the difference in psychological capital at T2 between the self-compassion-based-PsyCap group and the control group was no longer significant ($p = .051$) and the increase in positive affect after the self-compassion-based PsyCap intervention which was now significant, $p = .013$. Similarly, results remained the same when controlling for faculty affiliation except that the increase in positive affect reported after the self-compassion-based PsyCap intervention was now significant, $p = .013$.

faculty affiliation, we found improvements in support seeking compared to pre-intervention, $t(209.85) = -4.02, p < .001, 95\% \text{ CI } [-0.454, -0.155]$, the control group, $t(164.86) = -2.39, p = .018, 95\% \text{ CI } [-0.547, -0.052]$ and the PsyCap-only group, $t(161.01) = -2.51, p = .013, 95\% \text{ CI } [-0.594, -0.071]$. Therefore, the results for instrumental support seeking with inclusion of controls remained unchanged when compared to the results without controls.

5. Maintained (and Delayed) Intervention Effects on Key Outcome Variables

We wanted to explore whether the intervention effects were maintained at follow-up three months later, and whether there were any delayed effects. Below we report the differences in personal resources and the proximal well-being outcome measures from pre-intervention (T1) to follow-up (T3) for the PsyCap-only group (Table S2) and the self-compassion-based PsyCap group (Table S3). Figure S2 shows the change in outcomes over time across all three groups.

With regard to the PsyCap-only group, it was found that the increase in psychological capital could be sustained to follow-up. Likewise, the unexpected increase in self-compassion that was observed after the intervention was sustained to follow-up. In terms of well-being outcomes, we found that the reduction in work pressure was sustained to follow-up.

Additionally, there was a delayed effect on positive affect, that is positive affect increased from pre-intervention to follow-up.

In the self-compassion-based PsyCap the increase in self-compassion that was found at post-intervention was not sustained to follow-up and there was no change in psychological capital from pre-intervention to follow-up. In terms of well-being outcomes, it was found that effects on work pressure and support seeking⁶ were sustained to follow-up.

Regarding between-group differences at follow-up, analyses showed that participants in the self-compassion-based PsyCap group had lower levels of work pressure compared to

⁶ We also tested if the result for instrumental support seeking at follow-up would remain the same when controlling for gender and faculty affiliation. When controlling for gender, the PsyCap-only group did not report any changes in support seeking at follow-up compared to pre-intervention, $t(209.89) = -0.49, p = .625, 95\% \text{ CI } [-0.173, 0.104]$ or control group, $t(179.58) = 0.25, p = .804, 95\% \text{ CI } [-0.214, 0.276]$. Also when controlling for faculty affiliation, there was no difference in support seeking at follow-up compared to pre-intervention, $t(210.83) = -0.50, p = .615, 95\% \text{ CI } [-0.173, 0.103]$, or control group, $t(176.21) = 0.71, p = .477, 95\% \text{ CI } [-0.158, 0.337]$. When controlling for gender, the self-compassion-based PsyCap group showed increases in support seeking at follow-up compared to pre-intervention, $t(210.72) = -3.47, p < .001, 95\% \text{ CI } [-0.428, -0.118]$ but not to the control group, $t(182.15) = -1.79, p = .075, 95\% \text{ CI } [-0.492, 0.024]$ or the PsyCap-only group, $t(169.79) = -1.97, p = .051, 95\% \text{ CI } [-0.531, -0.001]$, although the results were marginally significant. When controlling for faculty affiliation, the self-compassion-based PsyCap group showed increases in support seeking at follow-up compared to pre-intervention, $t(211.62) = -3.46, p < .001, 95\% \text{ CI } [-0.427, -0.117]$ and the PsyCap-only group, $t(169.06) = -2.42, p = .016, 95\% \text{ CI } [-0.591, -0.060]$ but not to the control group, $t(183.68) = -1.82, p = .071, 95\% \text{ CI } [-0.493, 0.020]$.

the control group and higher levels of support seeking compared to both the control group and the PsyCap-only group (see Table S4).

Table S2

Means, Standard Deviations, and Pairwise Comparisons (T1 Versus T3) of all Key Variables in the PsyCap-Only Group

Measure	T1		T3		$F(1,36)$	p	η_p^2	95% CI	
	M	SD	M	SD				LL	UL
Personal resources									
Psychological capital	3.81	0.59	4.01	0.60	5.89	.020	.141	.032	.358
Self-compassion	2.80	0.76	3.12	0.64	6.45	.016	.152	.064	.575
Outcome variables									
Positive affect	2.84	0.67	3.09	0.64	7.52	.009	.173	.063	.423
Work pressure	5.06	0.77	4.61	0.82	10.39	.003	.224	-.749	-.170
Support seeking	2.74	0.67	2.77	0.58	.18	.672	.005	-.127	.194

Note. $N = 37$; CI = confidence interval; LL = lower limit; UL = upper limit. Significant findings are highlighted in bold.

Table S3

Means, Standard Deviations, and Pairwise Comparisons (T1 Versus T3) of all Key Variables in the Self-Compassion-Based PsyCap Group

Measure	T1		T3		$F(1,29)$	p	η_p^2	95% CI	
	M	SD	M	SD				LL	UL
Personal resources									
Psychological capital ⁷	3.93	0.61	4.12	0.70	2.28	.143	.078	-.068	.446
Self-compassion ⁸	3.01	0.76	3.27	0.85	2.59	.119	.088	-.073	.609
Outcome variables									
Positive affect	3.09	0.66	3.26	0.59	2.33	.138	.077	-.059	.404
Work pressure	4.87	0.93	4.29	1.06	12.54	.001	.309	-.917	-.245
Support seeking	2.94	0.60	3.18	0.51	8.51	.007	.233	.072	.411

Note. $N = 29$; CI = confidence interval; LL = lower limit; UL = upper limit. Significant findings are highlighted in bold.

⁷ Based on $n = 28$, resulting in $df1 = 1$ and $df2 = 27$.

⁸ Based on $n = 28$, resulting in $df1 = 1$ and $df2 = 27$.

Table S4

Means, Standard Deviations, and Between-group Pairwise Comparisons of all Key Variables at Follow-up

Measures	Control		PsyCap-only		PsyCap + SC		<i>t</i> (98)	<i>p</i>	<i>d</i>	95% CI	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				<i>LL</i>	<i>UL</i>
Personal resources											
	3.92	0.64	4.01	0.60	4.13	0.69					
Psychological capital T3	X		X				.54	.591	0.13	-.219	.382
	X				X		1.29	.199	0.31	-.111	.528
			X		X		.80	.428	0.20	-.189	.443
	3.01	0.77	3.12	0.64	3.27	0.85					
Self-compassion T3	X		X				.61	.547	0.15	-.245	.459
	X				X		1.36	.177	0.32	-.119	.638
			X		X		.81	.421	0.20	-.222	.526
Outcome variables											
	3.01	0.64	3.09	0.64	3.26	0.59					
Positive affect T3	X		X				.52	.608	0.11	-.217	.369
	X				X		1.58	.116	0.40	-.063	.561
			X		X		1.11	.268	0.28	-.135	.481
	4.76	0.91	4.61	0.82	4.29	1.06					
Work pressure T3	X		X				-.70	.485	0.18	-.587	.281
	X				X		-2.00	.048	0.47	-.929	-.004
			X		X		-1.36	.176	0.33	-.770	.143
	2.91	0.40	2.77	0.58	3.18	0.51					
Support seeking T3	X		X				-1.15	.253	0.27	-.373	.099
	X				X		2.16	.033	0.60	.023	.525
			X		X		3.28	.001	0.75	.162	.659

Note. Groups that contain an X are included in the pairwise group comparison. For example, the first comparison compares the control group and the PsyCap-only group. Significant findings are highlighted in bold. *Df* for comparisons including self-compassion at T3 = 97.

6. Wait-List Control Group: Changes Over Time

For comparison purposes, we assessed whether participants in the control group reported any changes in the key outcome variables over time. Since the group did not undergo any intervention, we would expect no changes from pre-intervention (T1) to post-intervention (T2) and from pre-intervention to follow-up (T3). To test for this, we ran a series of pairwise comparisons in which we compared T1 and T2 measures (see Table S5) and T1 and T3 measures (see Table S6). In line with our assumptions, participants in the control group did not report any changes to either their personal resources or their proximal well-being outcome measures from pre-intervention to post-intervention and from pre-intervention to follow-up. See Table S5 and Table S6 for all means, and the results of the pairwise comparisons.

Table S5

Means, Standard Deviations, and Pairwise Comparisons (T1 Versus T2) of all Key Variables in the Wait-List Control Group

Measure	T1		T2		$F(1,43)$	p	η_p^2	95% CI	
	M	SD	M	SD				LL	UL
Personal resources									
Psychological capital	3.80	0.61	3.80	0.69	.00	.956	.000	-.133	.126
Self-compassion	2.90	0.74	2.94	0.72	.16	.688	.004	-.151	.227
Outcome variables									
Positive affect	3.00	0.66	2.83	0.63	3.50	.068	.075	-.339	.013
Work pressure	5.01	0.98	4.97	0.95	.12	.732	.003	-.263	.187
Support seeking	2.85	0.50	2.87	0.50	.06	.815	.001	-.129	.163

Note. $N = 44$; CI = confidence interval; LL = lower limit; UL = upper limit

Table S6

Means, Standard Deviations, and Pairwise Comparisons (T1 Versus T3) of all Key Variables in the Wait-List Control Group

Measure	T1		T3		$F(1,34)$	p	η_p^2	95% CI	
	M	SD	M	SD				LL	UL
Personal resources									
Psychological capital	3.85	0.56	3.93	0.64	.92	.345	.026	-.083	.230
Self-compassion	2.90	0.78	3.01	0.77	.79	.381	.023	-.148	.376
Outcome variables									
Positive affect	2.94	0.66	3.01	0.64	.52	.478	.015	-.131	.274
Work pressure	4.96	0.96	4.76	0.91	1.72	.199	.048	-.510	.110
Support seeking	2.85	0.48	2.91	0.40	.49	.491	.014	-.103	.210

Note. $N = 35$; CI = confidence interval; LL = lower limit; UL = upper limit.

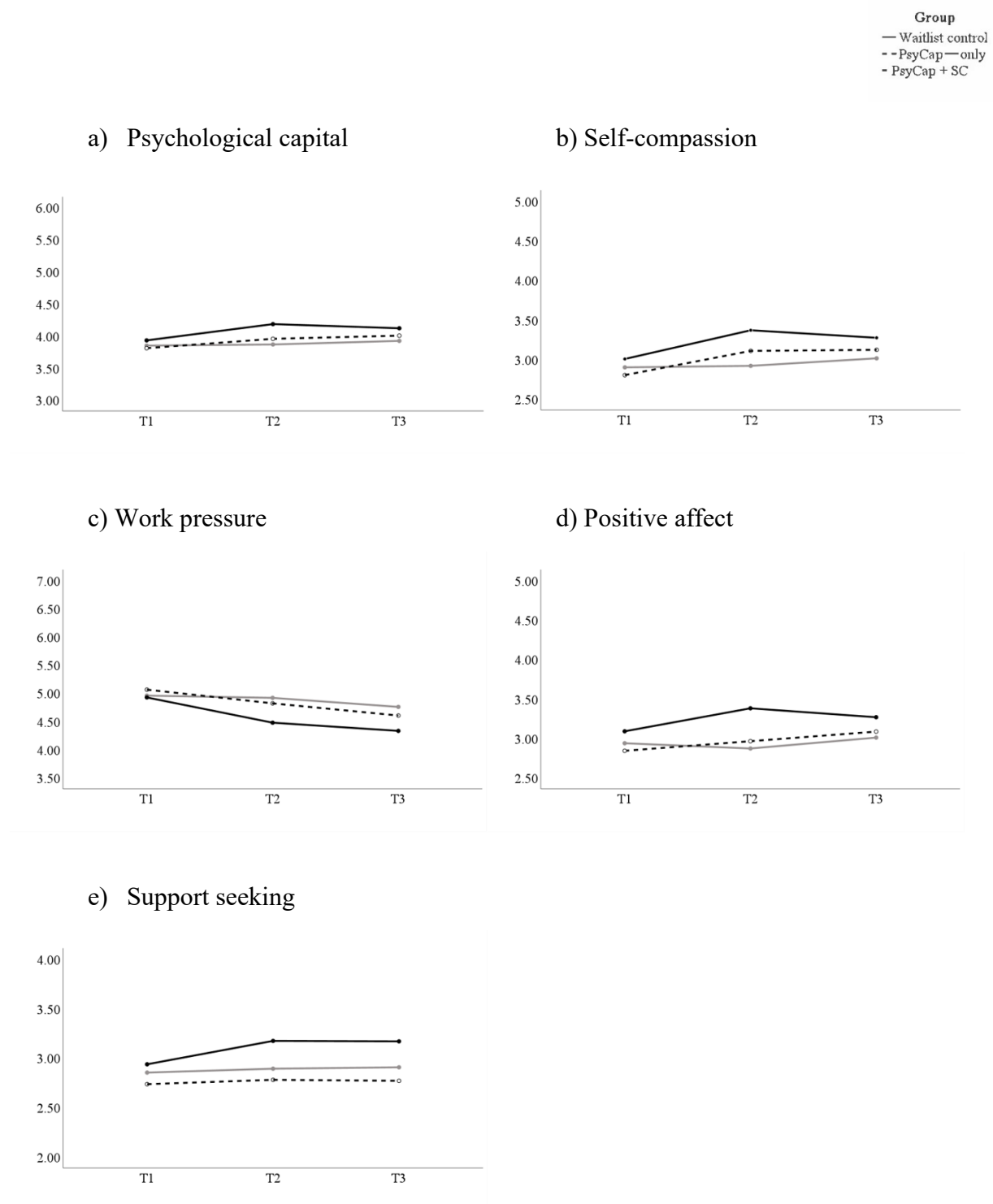
7. Results of Intervention Effects Across Timepoints and Groups

We exploratively conducted a two-way mixed ANOVA with time (pre-intervention vs. post-intervention vs. follow-up) as the within-subjects factor and intervention (PsyCap-only group vs. self-compassion-based PsyCap group vs. wait-list control group) as the between-subjects factor to examine if participants' psychological capital, self-compassion, and proximal well-being changed across time and between groups (see also Figure S2). The analysis revealed a main effect of time on psychological capital, $F(2, 194) = 5.71, p = .004, \eta_p^2 = .056$, self-compassion, $F(1.95, 189.23) = 6.55, p = .002, \eta_p^2 = .063$, positive affect, $F(2, 194) = 4.19, p = .017, \eta_p^2 = .041$, work pressure, $F(1.91, 184.98) = 14.10, p < .001, \eta_p^2 = .127$, and support seeking, $F(2, 194) = 4.16, p = .017, \eta_p^2 = .041$. Because sphericity was violated for self-compassion ($p = .037$) and work pressure ($p = .011$) and Greenhouse-Geisser values were larger than .75, we reported Huynh-Feldt corrected results for these two outcome measures. Bonferroni-adjusted post-hoc tests comparing outcome levels (averaged over groups) indicated that psychological capital increased from pre-intervention to post-intervention, $p = .016$, and from pre-intervention to follow-up, $p = .016$. Also, there was an increase in self-compassion from pre-intervention to post-intervention, $p = .010$, and from pre-intervention to follow-up, $p = .013$. With regard to proximal outcomes, we found an increase in positive affect from pre-intervention to follow-up, $p = .018$, a decrease in work pressure from pre-intervention to post-intervention, $p = .002$ and from pre-intervention to follow-up, $p < .001$ and an increase in support seeking from pre-intervention to post-intervention, $p = .036$. The analysis indicated a main effect of group on support seeking, $F(2, 97) = 3.72, p = .028, \eta_p^2 = .071$, indicating that, across groups, participants differed in the extent to which they sought instrumental support on average across all time periods. Tukey-adjusted pairwise comparisons indicated that participants in the self-compassion-based PsyCap group had higher levels of support seeking than participants in the PsyCap-only

group ($p = .021$). There was no main effect of group on psychological capital, $F(2, 97) = 1.11, p = .334, \eta_p^2 = .022$, self-compassion, $F(2, 97) = 1.65, p = .197, \eta_p^2 = .033$, positive affect, $F(2, 97) = 2.81, p = .065, \eta_p^2 = .055$, or work pressure, $F(2, 97) = 1.34, p = .267, \eta_p^2 = .027$. Also, there was no interaction between the effects of time and group on psychological capital, $F(4, 194) = 1.00, p = .410, \eta_p^2 = .020$, self-compassion, $F(3.90, 189.23) = 1.12, p = .346, \eta_p^2 = .023$, positive affect, $F(4, 194) = 1.86, p = .119, \eta_p^2 = .037$, work pressure, $F(3.81, 184.98) = 1.43, p = .228, \eta_p^2 = .029$, and support seeking, $F(4, 194) = 1.40, p = .236, \eta_p^2 = .028$.

Figure S2

Means of Key Study and Outcome Variables at all Three Measurement Times



Note. SC = Self-compassion. The presented y-axes range from the half point of the scale to the end point of the scale.

8. Results of Exploratory Mediation Analyses

In an exploratory fashion, we conducted a mediation analysis to assess the indirect effects of the interventions on self-compassion and psychological capital.

Self-Compassion as a Mediator of Psychological Capital

In line with our theorizing that self-compassion should help to build psychological capital, we tested whether the self-compassion-based PsyCap intervention (compared to the control group) increased self-compassion at T2, which in turn increased psychological capital at T3. Given that the PsyCap-only intervention also led to increases in self-compassion, we examined if the PsyCap-only intervention had an indirect effect on psychological capital at T3 via self-compassion at T2. We used an ANCOVA design (Valente & MacKinnon, 2017), which examines the mediated effect of the intervention (dummy-coded with the control group being the reference category) on the T3 outcome through a mediator measured at T2 while adjusting for the mediator and outcome measure at T1. For the analyses, we used Hayes' PROCESS macro for SPSS, model 4 (Hayes, 2012) with 5000 bootstrapped samples. The results for the direct and indirect effects are shown in Table S7.

The results showed that the self-compassion-based PsyCap intervention had a positive effect on self-compassion at T2. That is, after the intervention, self-compassion was higher in the self-compassion-based PsyCap group than the control group. Moreover, the coefficient for self-compassion (T2) on psychological capital (T3) was positive. Finally, the indirect effect was significant, indicating that the self-compassion-based PsyCap intervention led to an increase in self-compassion after the intervention which, in turn, led to an increase in psychological capital at follow-up. We did not find evidence for an indirect effect of the PsyCap-only intervention (when compared to the control group) on psychological capital via self-compassion. Likewise, there was no indirect effect on self-compassion via psychological capital.

Table S7

Direct and Indirect Effects of the Interventions on Psychological Capital and Self-Compassion

	Psychological Capital T3
Direct effects	
PsyCap-only Intervention	0.02 (-0.19; 0.23)
Self-compassion-based PsyCap Intervention	-0.01 (-0.24; 0.22)
Indirect effects	
PsyCap-only intervention → Self-compassion T2 → Psychological capital T3	0.09 (-0.02; 0.22)
Self-compassion-based PsyCap Intervention → Self-compassion T2 → Psychological capital T3	0.16 (0.03; 0.32)

Note. The 95% confidence intervals are reported in parentheses. Results are based on 5000

bootstrap samples. Significant effects ($p < .05$) are indicated in bold.

9. Intervention Effects on Additional Outcome Variables

In addition to our main study variables, we explored the impact of the interventions on other relevant outcomes⁹. Specifically, to allow for comparison with prior research (Lupşa et al., 2020) we examined intervention effects on distal work-related well-being outcomes (i.e., work engagement, emotional exhaustion) and the performance outcome task accomplishment. Additionally, because PsyCap is highly relevant for goal achievement, we explored the impact of the interventions on goal-related outcomes (i.e., goal effort and goal proximity). Below we first provide an overview of the measures. Subsequently, we report between-group differences in these variables at pre-intervention (Table S8), and immediate and sustained intervention effects, that is differences from pre-intervention to post-intervention (Table S8) and from pre-intervention to follow-up (Table S9). Differences in outcomes between groups at post-intervention and follow-up are reported in Table S8 and Table S9, respectively. Table S10 presents an overview of all contrast coefficients.

Measures of Additional Outcome Variables

Work Engagement was assessed with a nine-item scale used by Cornér (2020) to capture PhD students' work engagement. An example item is: "When I conduct my doctoral research, I feel that I am bursting with energy" (1 = *strongly disagree*, 7 = *strongly agree*).

Emotional Exhaustion was measured using the four-item scale developed by Pyhältö et al. (2009) which assessed PhD-related exhaustion. An example items is: "I am stressed out by the workload, deadlines and competition in my doctoral studies" (1 = *strongly disagree*, 7 = *strongly agree*).

Perceived Task Accomplishment was assessed with four items developed by Sonnentag et al. (2018). We adapted the items slightly. An example item is "Last month, I

⁹ We measured several other variables pertaining to work characteristics (i.e., publication pressure, work-home conflict, learning opportunities), loneliness, and proactive career behaviors, however these showed no significant findings. The full results for these additional exploratory variables can be requested from the authors.

have accomplished what I had intended to do” (1 = *strongly disagree*, 7 = *strongly agree*).

Goal effort refers to how much effort participants made toward reaching their goals and was also assessed with a single item: “How much effort have you made toward achieving this goal? (1 = *not at all*, 7 = *very much*).

Goal proximity refers to how close participants were to attain their goals and was assessed with a single item: “In your opinion, how close are you to attaining this goal?” (1 = *not at all*, 7 = *very close*). Both items¹⁰ were adapted from Louro et al. (2007).

Between-Group Differences at Pre-Intervention

To check for group equivalence, we compared the three groups on all additional outcome variables at pre-intervention. We conducted a multivariate ANOVA to test whether the groups differed in distal well-being outcomes (i.e., work engagement, emotional exhaustion), task accomplishment and goal-related outcomes (i.e., goal effort, goal proximity). All means and standard deviations for the above variables at pre-intervention can be found in Table S8. The analysis indicated that there was no main effect of group on work engagement, $F(2, 109) = 1.72, p = .184, \eta_p^2 = .031$, emotional exhaustion, $F(2, 109) = 1.49, p = .231, \eta_p^2 = .027$, task accomplishment, $F(2, 109) = 0.28, p = .755, \eta_p^2 = .005$, goal effort, $F(2, 109) = 0.11, p = .899, \eta_p^2 = .002$, or goal proximity, $F(2, 109) = 1.08, p = .343, \eta_p^2 = .019$. Therefore, the three groups seemed to be equivalent prior to the intervention in terms of their (distal) well-being as well as their goal-related behaviors.

Immediate and Sustained Intervention Effects

We conducted several pairwise comparisons to examine if the interventions led to any changes in additional variables across time and groups. Specifically, we tested for changes

¹⁰ We selected the items that, in our view, best represented the concept. Goal effort was originally assessed with three items: “How much effort have you made today toward achieving this goal?”, “Today, to what extent were you self-disciplined in pursuing this goal?” and “How hard did you work today toward this goal?”. Originally, goal proximity was assessed with two items: “In your opinion, how close are you to attaining your weight-loss goal?” and “How large is the distance between your current weight and target weight?” (1 = small, 7 = large [reversed scored]).

from pre-intervention post-intervention and from pre-intervention to follow-up¹¹. Table S8 shows the results of the pairwise comparisons testing for changes from pre-intervention (T1) to post-intervention (T2) and pairwise comparisons testing for differences between groups at post-intervention. Table S9 shows the results of the pairwise comparisons testing for changes from pre-intervention to follow-up (T3) and pairwise comparisons testing for differences between groups at follow-up. There were no changes in the distal well-being outcomes, work engagement and emotional exhaustion, from pre-intervention to post-intervention or from pre-intervention to follow-up for either of the intervention groups. With regard to task accomplishment, there was a delayed effect found of the intervention on task accomplishment in the self-compassion-based PsyCap group, meaning that the increase in task accomplishment only became significant at follow-up.

With regard to the goal-related outcomes goal effort and goal proximity, we found that the PsyCap-only intervention led to an increase in goal proximity which was sustained to follow-up. Additionally, there was a delayed effect on goal effort, that is goal effort increased from pre-intervention to follow-up. In the self-compassion-based PsyCap group goal effort and goal proximity increased from pre-intervention to post-intervention. These changes were sustained to follow-up.

With regard to differences between groups, we found that at post-intervention, the self-compassion-based PsyCap group showed higher levels of goal effort and goal proximity than the control group. There were no between-group differences at follow-up.

Taking everything together, both interventions seem to be effective in increasing additional work outcomes beyond the proximal well-being measures that we focused on in this study. Specifically, the interventions seem to increase the effort that people put into

¹¹ In the control group there were no significant changes in the additional outcome variables from pre-intervention to post-intervention and from pre-intervention to follow-up, except for an increase in goal proximity from pre-intervention to follow-up.

reaching their goals¹² as well as their ability to achieve these goals, that is to get closer to their goals. Additionally, the self-compassion-based PsyCap intervention appears to increase perceived task accomplishment three months after the intervention.

¹² Goals were related to four themes: (1) writing and publishing (e.g., “write a strong paper”, “publish my second paper”), (2) planning and organizing skills (e.g., “meet deadlines”, “focus on what is important”), (3) the overall scientific process including literature review, data collection and analyses (“finish the pilot test”, “collect and analyze additional qualitative data”) and (4) self-care and well-being (e.g., “learn to deal with stress”, “overcome fear of failure”). Remaining goals related to collaborations (“start the project with partners”), funding (“get a longer scholarship to work with less stress for funding”) career planning (“planning future job prospects”), evaluations (“pass the evaluation”) and other topics.

Table S8

Means and Standard Deviations for Additional Outcome Variables at Pre- and Post-Intervention

		Wait-list control (<i>N</i> = 42-44)		PsyCap-only (<i>N</i> = 36-39)		PsyCap + SC (<i>N</i> = 32)	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Additional outcomes							
Work engagement	T1	4.83 _a	1.03	4.53 _a	1.24	5.05 _a	0.97
	T2	4.81 _a	1.08	4.64 _a	1.08	4.88 _a	1.28
Emotional exhaustion	T1	4.71 _a	1.08	4.42 _a	1.07	4.31 _a	1.14
	T2	4.77 _a	1.10	4.53 _a	0.96	4.43 _a	0.80
Task accomplishment	T1	3.99 _a	1.21	3.84 _a	1.30	4.05 _a	1.35
	T2	4.07 _a	1.39	4.26 _a	1.22	4.47 _a	1.33
Goal effort	T1	4.48 _a	1.71	4.36 _a	2.03	4.28_a	1.75
	T2	4.67 _a	1.96	4.92 _{ab}	1.59	5.50_b	1.52
Goal proximity	T1	4.07 _a	1.58	3.58_a	1.68	3.87_a	1.50
	T2	4.38 _a	1.96	4.56_{ab}	1.63	5.28_b	1.42

Note. *N* = 110-115. Significant contrasts (two-tailed, $p < .05$) testing the difference between

T1 and T2 are indicated in bold. Significant contrasts testing differences across conditions are indicated by different subscripts. Means and standard deviations for both T1 and T2 are calculated based on the T2 sample. The reported means and standard deviations correspond to the values given for the within-tests.

Table S9

Means and Standard Deviations for Additional Outcome Variables at Pre-Intervention and Follow-up

		Wait-list control (<i>N</i> = 33-35)		PsyCap-only (<i>N</i> = 36-37)		PsyCap + SC (<i>N</i> = 29)	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Additional outcomes							
Work engagement	T1	4.84 _a	1.04	4.62 _a	1.22	5.12 _a	0.90
	T3	4.83 _a	1.08	4.53 _a	1.27	5.08 _a	1.03
Emotional exhaustion	T1	4.68 _a	1.13	4.37 _a	1.09	4.34 _a	1.17
	T3	4.48 _a	1.10	4.20 _a	1.04	4.10 _a	0.92
Task accomplishment	T1	4.02 _a	1.09	3.87 _a	1.32	4.07_a	1.36
	T3	4.27 _a	1.26	4.28 _a	1.21	4.63_a	1.27
Goal effort	T1	4.48 _a	1.73	4.42_a	2.05	4.41_a	1.70
	T3	5.18 _a	1.70	5.36_a	1.27	5.38_a	1.50
Goal proximity	T1	4.12_a	1.65	3.53_a	1.70	4.03_a	1.43
	T3	5.33_a	1.65	5.08_a	1.56	5.48_a	1.75

Note. *N* = 99-101. Significant contrasts (two-tailed, $p < .05$) testing the difference between T1

and T3 variables within a condition are indicated in bold. Different subscripts within rows

indicate significant pairwise comparisons between conditions on those variables. Means and

standard deviations for both T1 and T3 are calculated based on the T3 sample. The reported

means and standard deviations correspond to the values given for the within-tests.

Table S10*Contrast Coefficients for the Multiple Contrast Tests Pertaining to the Exploratory Analyses*

NR	Variable	Comparison	PsyCap-only			PsyCap + SC			Control		
			T1	T2	T3	T1	T2	T3	T1	T2	T3
Contrast coefficients											
1	PsyCap	Within-group	-1	0	1	-	-	-	-	-	-
2		Between-groups	-	-	1	-	-	0	-	-	-1
3	PA, WP, SS	Within-group	-1	0	1	-	-	-	-	-	-
4		Between-groups	-	-	1	-	-	0	-	-	-1
5		Within-group	-	-	-	-1	0	1	-	-	-
6	PsyCap, SC	Between-groups	-	-	0	-	-	1	-	-	-1
7		Between-groups	-	-	-1	-	-	1	-	-	0
8		Within-group	-	-	-	-1	0	1	-	-	-
9	PA, WP, SS	Between-groups	-	-	0	-	-	1	-	-	-1
10		Between-groups	-	-	-1	-	-	1	-	-	0
11	WE, EX, TA, GE, GP	Within-group	-1	1	0	-	-	-	-	-	-
12		Between-groups	-	1	-	-	0	-	-	-1	-
13		Within-group	-	-	-	-1	1	0	-	-	-
14	WE, EX, TA, GE, GP	Between-groups	-	0	-	-	1	-	-	-1	-
15		Between-groups	-	-1	-	-	1	-	-	0	-
16	WE, EX, TA, GE, GP	Within-group	-1	0	1	-	-	-	-	-	-
17		Between-groups	-	-	1	-	-	0	-	-	-1
18		Within-group	-	-	-	-1	0	1	-	-	-
19	WE, EX, TA, GE, GP	Between-groups	-	-	0	-	-	1	-	-	-1
20		Between-groups	-	-	-1	-	-	1	-	-	0

Note. SC = self-compassion; NR = number of planned contrasts; PA = positive affect, WP = work pressure, SS = support seeking, WE = work engagement; EX = emotional exhaustion; TA = task accomplishment; GE = goal effort; GP = goal proximity.

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