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Be kind to yourself: the effects of a mindful self-compassion journal on health behaviour and the mediating role of behavioural resistance — a randomised controlled trial

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Abstract

This paper sought to investigate the effects of engaging in a daily mindful self-compassion journal for one week on health behaviour, compared to general journaling, mediated by behavioural resistance, i.e., the extent of disliking health behaviour. The sample was compromised of 83 international women ageing 18 years and above of which 45 were included in the analyses. The study utilised a mixed experimental design with the between-subjects factor journaling condition (intervention versus active control) and the within-subjects factor time (baseline versus post-intervention versus follow-up). Across the whole sample, health behaviour improved over time (large effect); immediately post-intervention, and the improvements were maintained at a four-week follow-up. Health behaviour was not different between groups, and keeping a mindful self-compassion journal did not increase health behaviour compared to general journaling at both time-points. Findings of an additional analysis suggest a positive moderate association between mindful self-compassion and health behaviour partly mediated by lower behavioural resistance. The results of this study suggest that a brief mindful self-compassion and general journal may be equally effective in improving health behaviour. However, the positive effect on health behaviour may also be attributable to external circumstances (e.g., COVID-19). Despite the lack of causal evidence, the present study suggests that highly self-compassionate women experience lower levels of resistance towards health-promoting and higher levels of resistance towards unhealthy behaviour, which, in turn, is associated with increased health behaviour.

Keywords: mindful self-compassion; journaling intervention; health behaviour; self-regulatory success; behavioural resistance; health promotion

Be kind to yourself: the effects of a mindful self-compassion journal on health behaviour and the mediating role of behavioural resistance — a randomised controlled trial

Working out regularly, going to bed before midnight, enjoying a glass of wine rather than the whole bottle, and please no more chocolatey afternoon snacks — many of us seek to live healthier and more balanced lives. Why do some struggle to succeed at behaviours to maintain, attain, or regain good health and prevent illness while others seem to sail through? This paper considers the causal role of mindful self-compassion to explain differences in health behaviour and to investigate the mediating role of behavioural resistance.

Good intentions alone do not suffice to live healthy and balanced lives, but an individual's self-regulation and self-control predict health behaviour and outcomes (Sniehotta et al., 2005). Self-regulation describes human efforts to alter their thoughts, feelings, desires, and actions in line with personally relevant goals (de Ridder & de Wit, 2006). Self-control tends to be defined under the umbrella term of self-regulation, explicitly referring to one's immediate ability to steer behaviour towards the desired end state (Gillebaart, 2018). The latter especially comes into play to resolve self-control dilemmas, defined as conflicts between short-term temptations (e.g., eating a chocolate bar) and long-term goals (e.g., losing weight; Gillebaart, 2018). In practical terms, self-regulation may reflect following and monitoring a healthier diet. At the same time, self-control makes sure that we do not finish the entire chocolate bar that lies on the table. As both processes are intertwined on the pathway to self-regulatory success, findings on self-regulation and self-control are of relevance to this paper.

Early research in the field of health psychology has been concerned with explaining instances of self-regulatory failure. For instance, the Strength Model conceptualises self-control as the effortful inhibition of impulsive responses and as a general resource similar to a muscle: exerting self-control results in its depletion and weakens the resource for subsequent self-control dilemmas, domain-independently (Baumeister et al., 1998). To illustrate, people snacked more after watching a funny video while trying not to laugh (suppression of their natural response) versus maintaining their natural response (Sellahewa & Mullan, 2015). Additionally, repeatedly overcoming one's impulsive and predominant responses over time may strengthen the resource across domains (Baumeister et al., 1998). For example, smokers

that avoided sweets or practised handgrip stamina for two weeks succeeded more at quitting smoking than those who practised alternative tasks that did not require self-control (Muraven, 2010). Nevertheless, there are mixed findings on the strength of self-control training effects, and it is unclear if repeatedly overriding dominant responses is the primary causal mechanism that improves self-control over time (Friese et al., 2017).

Moreover, observing that people rather effortlessly resolve a variety of subsequent self-control dilemmas across different life-domains (e.g., health and performance; Duckworth & Seligman, 2005; Tangney et al., 2004), undermines the notion that self-regulatory success is largely reliant on an exhaustible resource (i.e., effortful self-control). Therefore, it has been highlighted that self-regulatory failure and self-regulatory success are not explained by inverse processes, i.e., successful exertion of self-control versus the lack thereof. Rather, self-regulatory failure may be partly related to a lack of effortful self-control, but effortful use of self-control might not be a necessary pre-condition of self-regulatory success (Kroese, 2019). Unravelling the underlying processes of self-regulatory success in health behaviour, a recent line of research focused on effortless or smart situational and cognitive strategies. These may include avoiding the cookie aisle in the supermarket or being fully present in a conversation to ignore the wine bottle on the table (Duckworth et al., 2016). Another current line of research concerns the role of beneficial habits in the area of nutrition and exercise (Adriaanse et al., 2014; Galla & Duckworth, 2015; Gillebaart & Adriaanse, 2017; Gillebaart & de Ridder, 2015). Overall, it was found that excellent self-regulators experience fewer self-control dilemmas rather than being better at resolving an arising conflict between immediate gratification and long-term goals.

The observation that excellent self-regulators experience fewer self-control dilemmas is in line with the finding that the positive association between self-control and healthy eating was mediated by lower behavioural resistance (Gillebaart & Kroese, 2020), defined as the extent to which goal-directed behaviours are perceived as tedious or frustrating to perform (Blunt & Pychyl, 2000). People high on self-control made healthier food choices partly because they perceived healthy eating as less unpleasant (Gillebaart & Kroese, 2020). Similarly, aversive bedtime routines may predict bedtime procrastination: the more people disliked bedtime behaviours, the less they went to bed at their intended times (Nauts et al., 2016). Bedtime procrastinators may, hence, not feel like brushing their teeth or stopping an

enjoyable activity such as watching a movie, for instance. While the former works as a form of positive punishment, in this example, the latter is analogous to negative punishment, both decreasing future behavioural engagement (Kroese et al., 2016b).

Building on work by Neff (2003), Phillips and Hine (2019), and Sirois et al. (2015), we propose that mindful self-compassion may promote health behaviour through the pathway of behavioural resistance. Mindful self-compassion is rooted in Buddhism and reflects people's tendency of extending compassion for others to themselves in instances of perceived inadequacy, failure, or general suffering (Neff, 2003). Specifically, there are three components of mindful self-compassion. The first one is self-kindness, meaning that people take kind, accepting, and non-judgmental stances towards themselves, in contrast to self-judgment. Secondly, mindful self-compassion involves common humanity, people's understanding that they are not the only one to suffer, rather than isolating their experience. The third component is mindfulness, defined as taking a balanced approach to negative emotions that neither suppresses nor exaggerates one's feelings (Neff, 2003).

Besides a large body of research on the mental health benefits of mindful self-compassion (MacBeth & Gumley, 2012; Zessin et al., 2015), its association with physical health behaviour, such as decreased levels of bedtime procrastination (Sirois et al., 2019) and problematic alcohol use (Miron et al., 2014), has gotten increased research attention during the past decade. A meta-analysis of 15 correlational studies revealed a positive association between mindful self-compassion and the engagement in a variety of health behaviours, including healthy eating and physical exercise, with a small overall effect size (Sirois et al., 2015). A more recent meta-analysis of 94 studies also found a weak positive association between mindful self-compassion and health behaviour, as well as physical health outcomes (Phillips & Hine, 2019). Moreover, assessing the effectiveness of mindful self-compassion interventions (19 studies), yielded an overall medium effect on health behaviour and a small effect on physical health outcomes (Phillips & Hine, 2019).

The causal relationship between mindful self-compassion and health behaviour has been established for a variety of interventions and health behaviours in clinical and non-clinical trials. For instance, after following a ten-week workplace health intervention with psychoeducation on mindful self-compassion, participants of a pilot study consumed less dietary sugar and fat and engaged in more sportive leisure activities (Horan & Taylor, 2018).

Moreover, phrasing instructions in a mindfully self-compassionate versus a neutral manner reduced distress and candy consumption in satiated female college students who were dieting, suggesting that mindful self-compassion decreases overeating (Adams & Leary, 2007). Moreover, engaging in self-compassionate self-talk and mental imagery for three weeks reduced daily cigarette smoking more rapidly than self-monitoring (Kelly et al., 2010).

The positive association between mindful self-compassion and health behaviour may result from a sense of 'emotional safety' that allows people to recognise and change maladaptive health-related cognition and behaviour (Neff, 2003). More precisely, adaptive emotions namely decreased negative affect, and increased positive affect were found to partly underlie the association between mindful self-compassion and health behaviour (Sirois et al., 2015). Considering that negative affective states have been found to drain self-regulatory resources (Baumeister & Heatherton, 1996), mindful self-compassion may buffer against rumination over health behaviour, such as breaking one's diet. In turn, this may free up cognitive and emotional resources for self-regulation (Sirois et al., 2015). Increased positive affect may facilitate health behaviour through facilitating goal striving in the pursuit of health-relevant goals (Aspinwall, 1998; Neff et al., 2007; Sirois et al., 2015).

Another underlying explanation of the effect stems from the notion that highly self-compassionate people high on mindful self-compassion may engage in health behaviour because they desire to treat themselves and their bodies kindly (Neff, 2003). For instance, self-compassion was positively related to intrinsic motivation to exercise as well as to lower degrees of external motivation and obligatory exercise behaviour in women. Highly self-compassionate women also characterised sports as fun and valued its benefits (Magnus et al., 2010), suggesting low behavioural resistance. Moreover, self-compassion was found to decrease the effects of masculine norm adherence on self-disclosure resistance and perceived counselling stigma in young men (Heath et al., 2017).

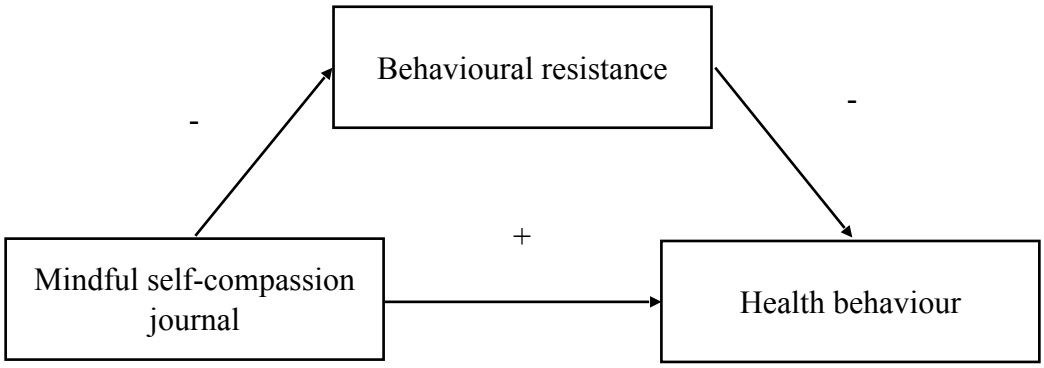
Although these findings suggest a negative association between mindful self-compassion and behavioural resistance towards health behaviour, to the author's best knowledge, the role of behavioural resistance as a mediator of the effect of mindful self-compassion on health behaviour is yet to be investigated. Taking evidence on the association between behavioural resistance and health behaviour (Gillebaart & Kroese, 2020; Nauts et al., 2016) into account, we propose the following: increasing mindful self-compassion may

increase the liking of health-promoting behaviours (e.g., eating healthy meals), and reduce the liking of unhealthy behaviours (e.g., unhealthy snacking). In turn, lower levels of behavioural resistance towards health-promoting behaviour and higher behavioural resistance towards unhealthy behaviours may improve health behaviour overall.

Furthermore, mindful self-compassion interventions in the domain of health promotion tend to be comprehensive, include different elements, and run over multiple weeks (e.g., Horan & Taylor, 2018; Kelly et al., 2010). The investigation of the effects of brief, more convenient interventions, such as the mindful self-compassion journal (Neff, 2011), tested in the mental health domain (Smeets et al., 2014), remains an open area for research. This journal instructs people to process negative experiences in a mindful self-compassionate manner, i.e., focusing mindfulness, common humanity, and self-kindness. Therefore, the first aim of this research is to investigate the effect of engaging in a daily mindful self-compassion journal for one week on health behaviour compared to an active control group. We hypothesise that a mindful self-compassion journal will improve health behaviour immediately post-intervention and at a four-week follow-up compared to general journaling (about positive or negative incidences). The second aim of this research is to investigate behavioural resistance as a potential mediator of the effect. We hypothesise that lower behavioural resistance partly explains the positive effect of a mindful self-compassion journal on health behaviour (**Figure 1**). This study is conducted on a non-male sample to reduce potential dropout. This is because men may keep diaries less often and consistently (Thompson, 1982), and tend to less readily engage in self-disclosure than women (Blier & Blier-Wilson, 1989).

Figure 1

Proposed mediation model linking the engagement in a mindful self-compassion journal and health behaviour through behavioural resistance



Method

Participants

A power analysis was conducted using G*Power to determine the minimum sample size (Faul et al., 2014). For aim 1, a power analysis based on a two-by-three repeated-measures ANOVA (within-between interaction) and power of .8, an alpha level of .05, and a medium effect[1] size yielded a minimum of 24 participants in total. For aim 2, a power analysis based on a multiple linear regression (fixed model, single regression coefficients) and power of .8, an alpha level of .05 and a medium effect size yielded a minimum of 43 participants.

Selection of participants. The sampling population included international adults (female, non-binary gender) ageing 18 years and above. Except for the age (above 18 years old) and gender restriction (non-male), there was no criteria-based selection. The study was advertised across different faculties of Utrecht University and on social media networks (Instagram, Facebook, and WhatsApp). Prospective participants signed up through a QR code or website link, directing them to the survey. The study was also listed on the SONA system of Utrecht University for student participant recruitment. Here, interested students could see the researcher's email address, contact them for further information and receive the sign-up web link and QR code. Apart from Utrecht University study participation credits for first-year students, no compensation was provided, but participants could enter a lottery and win one of two vouchers worth 20 euros respectively. Participants who did not fill in the surveys within 48 hours post-intervention or within 96 hours at follow-up were excluded from the analysis.

A total of 83 participants were recruited. 77 participants (92,77%) completed the baseline questionnaire and were sent daily journaling reminders, as well as the post-intervention and follow-up questionnaires. The remaining 6 participants partly completed the baseline questionnaire and were recorded as partial data. 55 participants (partly) completed the post-intervention questionnaire within 48 hours, indicating a post-intervention dropout rate of 33,73%. 53 participants (partly) completed, and one participant partly completed the follow-up questionnaire within 96 hours, indicating a 33,73% dropout rate at follow-up. 45 participants completed all three questionnaires and were included in the analysis. 25

[1] Based on a meta-analysis of mindful self-compassion interventions on health behaviour (Phillips & Hine, 2019).

participants were in the intervention group, and 20 participants were in the control group. Participant characteristics are presented in **Table 1**. Because intervention adherence was non-normally distributed, a Mann-Whitney U test was run to determine if there were differences in age between the intervention and control group. Distributions of age for intervention and control group were similar, as assessed by visual inspection. Age was not significantly different between intervention (*Mdn* = 22) and control group (*Mdn* = 22), $U = 248.5$, $z = .45$, $p = .650$

Table 1

Demographics

	Total (*n* = 45)	Intervention (*n* = 25)	Control (n = 20)
Gender			
Females	45 (100)	25 (100)	20 (100)
Other			
Age in years, *M (SD)*	24.00 (8.20)	24.00 (8.20)	21.95 (2.08)
Missing	3	2	1
Nationality			
Dutch	20 (44.4)	10 (40.0)	10 (50.0)
German	16 (35.6)	10 (40.0)	6 (30.0)
Other	7 (15.4)	3 (12.0)	4 (20.0)
Missing	2 (4.4)	2 (8.0)	
Occupational status			
High School			
University	36 (86.7)	20 (80.0)	19 (95.0)
PhD			
Working full-time	2 (4.4)	2 (8.0)	
Working part-time	8 (17.8)	5 (20.0)	3 (15.0)
Home-making	1 (2.2)	1 (4.0)	

	Total (n = 45)	Intervention (n = 25)	Control (n = 20)
Retired			
Unemployed	1 (2.2)	1 (4.0)	
Other	1 (2.2)	1 (4.0)	
Not indicated			

N (*%*) presented unless otherwise noted.

Design and procedure

The study adhered to the ethical guidelines of the Faculty of Social and Behavioural Sciences of Utrecht University. To investigate the effect of a mindful self-compassion journal on health behaviour compared to general journaling, a mixed experimental design was used with the between-subjects factor journaling condition (intervention versus control) and the within-subjects factor time (baseline versus post-intervention versus follow-up). The dependent variable was health behaviour, and the proposed mediator was behavioural resistance. Both variables were measured at three time points, i.e., at baseline, immediately after the one-week intervention period, and at a four-week follow-up.

A web link or QR code directed participants to the first online survey which enabled study sign-up. The software used for the survey was Qualtrics (Provo, UT, 2018). At first, participants were asked to read the information letter and informed consent form (Appendix A). If participants indicated informed consent, they were asked for their email address[2] and proceeded to the baseline questionnaire. In the last part of the survey, participants were randomly assigned to the intervention or active control condition. Throughout the intervention period, all participants were reminded daily by email to engage in journaling. On the last day of the intervention period as well as four weeks after the journal period, participants received emails with links to the post-intervention and follow-up questionnaires, respectively and asked to complete them within the subsequent 24 hours. If participants did not complete them within this time frame, they received a second reminder, repeating the

[2] Collecting participants' contact information facilitated matching the data from all three surveys to the same participant, respectively, reaching out to participants for journal reminders, post-intervention and follow-up questionnaires, as well as to contact the lottery winners. Personal data was anonymised for matching purposes in each data file and stored separately from raw data in a secured file.

request to complete the questionnaire within the subsequent 24 hours. After completing the follow-up questionnaire, participants were debriefed (Appendix B). At the end of the surveying period, two lottery winners were randomly chosen and contacted by email to receive their vouchers.

Materials

The administered survey contained items measuring demographics, health behaviour, behavioural resistance, as well as mindful self-compassion and took approximately 15 minutes to complete. Additionally, the baseline survey contained journaling instructions, and the post-intervention survey contained an item on intervention adherence. Before testing, a pilot study was run with five respondents in order to assess and improve the wording clarity of the items (Van Teijlingen & Hundley, 2002).

Instructions. The experimental group was educated about mindful self-compassion and instructed to keep a mindful self-compassion journal for seven days (Appendix C). The method and information provided were based on the book "The Proven Power of being kind to yourself" by Kristin Neff (2011). The active control group received no information about mindful self-compassion, but instructions to write about experiences and feelings (positive and/or negative; Appendix C). To ensure understanding of the intervention, both groups received multiple-choice questions upon reading the instructions and could only complete the survey upon correct answering.

Demographics. The demographic section consisted of four items assessing participants age, gender, nationality, and occupational status (Appendix D).

Health behaviour. Health behaviour was measured through an 18-item questionnaire measured on a five-point scale with varying ranges, such as *less than once a week, once a week, on 2 to 3 days a week, on 4 to 5 days a week, (almost) daily* (Appendix D). Six health behaviours (physical exercise, healthy eating, overeating, bedtime procrastination, alcohol drinking, cigarette smoking) were included with three items, respectively. Alcohol drinking was assessed based on the three-item AUDIT-C Questionnaire (Bush et al., 1998) that reliably identifies patients who are hazardous drinkers or have active alcohol use disorders (Bradley et al., 2003). For the other five health behaviours, appropriate three-item scales were unavailable. To reduce participant strain and increase the feasibility of the study, we chose three items from more exhaustive scales, respectively: the measure of healthy eating was

based on the 12-item Wellness Behaviour Inventory (WBI; Sirois, 2001), the measure of overeating was based on the 18-item Eating Loss of Control Scale (Blomquist et al., 2014), the measure of physical exercise was based on the 27-item International Physical Activity Questionnaire (IPAQ; Craig et al., 2003), the measure of bedtime procrastination was based on a 9-item scale developed by Kroese et al. (2016a), and the measure of smoking was based on the twelve-item Cigarette Dependence Scale (Etter et al., 2003). To avoid order effects, the items were displayed in a randomised order. Eleven items were reverse coded so that higher scores indicate higher levels of health behaviour (more engagement in health-promoting behaviour, less engagement in unhealthy behaviour), and lower scores indicate lower levels of health behaviour (less engagement in health-promoting behaviour, more engagement in unhealthy behaviour). The scale had an acceptable level of internal consistency (Nunnally, 1978), as determined by a Cronbach's alpha[3] of α = .73 at baseline, α = .78 post-intervention, and α = .77 at follow-up. Sub scale internal consistencies will be made available upon request.

Behavioural resistance. Behavioural resistance towards the six health behaviours was assessed by means of a self-report questionnaire consisting of 18-items, responded to on a five-point Likert scale with the following range: *strongly disagree, somewhat disagree, neither agree/nor disagree, somewhat agree, strongly agree* (Appendix D). The items were based on a behavioural resistance scale developed by Gillebaart and Kroese (2020) and adapted to the respective behaviour. To avoid order effects, the items were displayed in a randomised order. Nine items were reverse coded so that higher scores indicate more behavioural resistance towards health behaviour, and lower scores indicate less behavioural resistance towards health behaviour. The scale had an acceptable to good level of internal consistency (Nunnally, 1978), as determined by Cronbach's alpha[4] values of α = .70 at baseline, α = .74 post-intervention, and α = .83 at follow-up. Sub scale internal consistencies will be made available upon request.

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[3] Cronbach's alpha values are reported over the largest possible sample of genuine participants, i.e., prior to exclusion due to delayed responses and case-wise deletion due to partial responding (n = 83 at baseline, n = 67 post-intervention, n = 57 at follow-up).

[4] Cronbach's alpha values are reported over the largest possible sample of genuine participants, i.e., prior to exclusion due to delayed responses and case-wise deletion due to partial responding (n = 82 at baseline, n = 67 post-intervention, n = 57 at follow-up).

Mindful self-compassion. Mindful self-compassion was measured using the Self-Compassion Scale Short-Form (SCS-SF; Raes et al., 2011; Appendix D). The scale consisted of 12 items that were responded to on a five-point Likert scale with the following range: *almost never, not very often, sometimes, very often, almost always*. It encompasses six sub scales consisting of two items, respectively: self-kindness (item 2 and 6), self-judgment (11, 12), common humanity (5, 10), isolation (4,8), mindfulness (3, 7), and over-identification (1, 9). To avoid order effects, the items were displayed in a randomised order. Six items, namely the sub scales self-judgment, isolation, and over-identification, were recoded so that higher scores indicate higher mindful self-compassion levels, and lower scores indicate lower mindful self-compassion levels. The scale had a good to excellent level of internal consistency (Nunnally, 1978), as determined by a Cronbach's alpha[5] value of $\alpha = .87$ at baseline, $\alpha = .87$ post-intervention, and $\alpha = .91$ at follow-up.

Intervention adherence. In order to control for the impact of adherence on intervention effectiveness (Tagalidou et al., 2019), participants were asked to indicate how consistently they engaged in journaling on an eight-point Likert scale ranging from *never* to *every day* at the end of the post-intervention questionnaire (Appendix D).

Data Analysis Plan

The statistical program used for data analysis was SPSS 26 (IBM Corp, 2019). Firstly, a two-by-three repeated-measures ANOVA was performed to assess the immediate and long-term effects of the mindful self-compassion journal on health behaviour compared to general journaling. Secondly, to test if behavioural resistances mediates the effect of a mindful self-compassion journal on health-behaviour, a mediation analysis would be performed using Model 4 in the PROCESS macro by Hayes (2017).

Results

Preliminary data analysis

The first aim was to investigate the effect of keeping a daily mindful self-compassion journal for one week on health behaviour, immediately post-intervention as well as at a four-week follow-up, compared to general journaling. Prior to running the analysis, assumptions

[5] Cronbach's alpha values are reported over the largest possible sample of genuine participants, i.e., prior to exclusion due to delayed responses and case-wise deletion due to partial responding ($n = 81$ at baseline, $n = 67$ post-intervention, $n = 57$ at follow-up).

were checked. Outliers were assessed by inspection of a box plot for values greater than 1.5 box-lengths from the edge of the box. There were two outliers at baseline (intervention group), one outlier post-intervention (control group), and two outliers at follow-up (control group). These outliers could not be attributed to measurement or coding error and did not indicate unusual responses, respectively, which is why they were kept in the analysis. Moreover, scores were normally distributed, as assessed by Shapiro-Wilk's test ($p > .05$). There was homogeneity of variances, as assessed by Levene's test of homogeneity of variance ($p > .05$), and homogeneity of covariances, as assessed by Box's test of equality of covariance matrices ($p = .914$). Mauchly's test of sphericity indicated that the assumption of sphericity was met for the two-way interaction, $\chi^2(2) = 1.542$, $p = .463$.

Intervention adherence mean scores were $M = 6.81$ ($SD = 1.35$) in the total sample, $M = 6.50$ ($SD = 1.47$) in the intervention group ($n = 24$), and $M = 7.14$ ($SD = 1.15$) in the control group ($n = 19$). Because intervention adherence was non-normally distributed, a Mann-Whitney U test was run to determine if there were differences in intervention adherence scores between the intervention and control group. Distributions of the intervention adherence scores for the intervention and control group were dissimilar, as assessed by visual inspection. Intervention adherence scores were not significantly different between the intervention group (mean rank = 20.52) and the active control group (mean rank = 25.11), $U = 188$, $z = -1.25$, $p = .212$. This is why intervention adherence was not included as a control variable in the analysis.

Effects of a mindful self-compassion intervention on health behaviour

A two-by-three repeated measures ANOVA was conducted to test if group (mindful self-compassion versus control journal) had a positive effect on health behaviour. Descriptives of key variables are presented in **Table 2**.

Table 2.

Means and standard deviations of health behaviour at baseline, post-intervention, and at follow-up

Health behaviour	T1 (baseline)	T2 (post-intervention)	T3 (follow-up)
Total group (*n* = 45)			
Physical activity	2.66 (0.84)	2.89 (0.87)	2.87 (0.97)
Healthy eating	4.08 (0.66)	4.10 (0.61)	4.13 (0.60)
Overeating (r)	3.85 (0.72)	4.07 (0.82)	4.13 (0.66)
Bedtime procrastination (r)	3.07 (0.94)	3.16 (1.04)	3.21 (1.07)
Alcohol drinking (r)	3.23 (0.71)	3.65 (0.74)	3.61 (0.65)
Smoking (r)	4.61 (0.84)	4.61 (0.84)	4.64 (0.78)
Total	3.58 (0.36)	3.75 (0.46)	3.77 (0.40)
Intervention group (*n* = 25)			
Physical activity	2.75 (0.75)	3.01 (0.86)	3.00 (1.00)
Healthy eating	4.28 (0.50)	4.23 (0.52)	4.16 (0.54)
Overeating (r)	3.91 (0.74)	4.11 (0.94)	4.09 (0.73)
Bedtime procrastination (r)	2.99 (1.05)	3.11 (1.12)	3.16 (1.09)
Alcohol drinking (r)	3.21 (0.61)	3.73 (0.63)	3.53 (0.62)
Smoking (r)	4.59 (0.81)	4.57 (0.83)	4.67 (0.71)
Total	3.62 (0.33)	3.79 (0.47)	3.77 (0.39)
Control group (*n* = 20)			
Physical activity	2.55 (0.94)	2.73 (0.89)	2.70 (0.94)
Healthy eating	3.83(0.75)	3.93 (0.67)	4.08 (0.68)
Overeating (r)	3.78 (0.71)	4.02 (0.65)	4.18 (0.58)
Bedtime procrastination (r)	3.18 (0.81)	3.23 (0.96)	3.28 (1.06)
Alcohol drinking (r)	3.25 (0.84)	3.55 (0.86)	3.70 (0.69)
Smoking (r)	4.63 (0.90)	4.65 (0.88)	4.62 (0.87)

Health behaviour	T1 (baseline)	T2 (post-intervention)	T3 (follow-up)
Total	3.54 (0.40)	3.69 (0.45)	3.76 (0.41)

Note. M (SD) presented. All items were measured on a five-point scale.
Note. The six behavioural constructs assessed were combined in one scale; higher total mean scores indicate more self-reported engagement in health behaviour, and lower scores indicate less self-reported engagement in health behaviour. Hence, higher sub scale scores on health-promoting behaviour (healthy eating, physical exercise) indicate high self-reported engagement in the respective behaviour, while high sub scale scores on unhealthy behaviours (r; overeating, bedtime procrastination, alcohol drinking, cigarette smoking) indicate low engagement in the respective behaviour and vice versa.

The results of the two-by-three repeated measures ANOVA showed that there was a significant effect of time on health behaviour across groups, $F(2, 86) = 9.55$, $p < .001$, partial $\eta^2 = .182$. More precisely, time elicited an increase in health behaviour from baseline ($M = 3.58$, $SD = 0.36$) to one-week post-intervention ($M = 3.75$, $SD = 0.46$) that reached statistical significance, $F(1, 43) = 11.34$, $p < .01$, partial $\eta^2 = .21$. Similarly, time elicited an increase in health behaviour from baseline ($M = 3.58$, $SD = 0.36$) to four weeks follow-up ($M = 3.77$, $SD = 0.40$) that reached statistical significance, $F(1, 43) = 19.97$, $p < .001$, partial $\eta^2 = .317$. Post hoc analysis with the Bonferroni adjustment revealed a slight increase in health behaviour from one-week post-intervention ($M = 3.75$, $SD = 0.46$) to four weeks follow-up ($M = 3.77$, $SD = 0.40$), that did not reach statistical significance, $p = 1.000$. Moreover, there was no statistically significant difference in health behaviour between the two groups across all three time points $F(1, 43) = 0.35$, $p = .558$, partial $\eta^2 = .008$. There was no statistically significant interaction between the intervention and time on health behaviour, $F(2, 86) = 0.44$, $p = .644$, partial $\eta^2 = .014$.

Additional analysis

Due to the absence of an effect of the mindful self-compassion intervention on health behaviour compared to an active control group, a mediation of the effect by behavioural resistance (aim 2) was not investigated. Instead, an additional analysis of the baseline scores was conducted. The aim was to explore the association between mindful self-compassion and health behaviour, mediated by behavioural resistance.

Because we only considered baseline data, a larger part of the original sample was available for the present analysis. From the total baseline sample of 83 participants, 81 participants completed all relevant items and were included in the analysis. The mean age in

years was *M* = 23.43 (*SD* = 6.153, *n* missing = 2). The sample was largely made up of German (*n* = 29, 35.8%) and Dutch (*n* = 28, 34.6%) participants. The majority (*n* = 66, 81,5%) indicated that they were University students, followed by 16 participants (19.8%) holding part-time job positions. Descriptives of key variables are presented in **Table 3**. Correlations between the relevant variables are displayed in **Table 4.**

Table 3

Means and standard deviations of mindful self-compassion, behavioural resistance, and health behaviour measured at baseline

Scale	T1 (baseline, *n* = 81)
Health behaviour	
Physical activity	2.88 (0.89)
Healthy eating	4.10 (0.70)
Overeating (r)	3.88 (0.79)
Bedtime procrastination (r)	3.17 (0.98)
Alcohol drinking (r)	3.38 (0.80)
Smoking (r)	4.57 (0.85)
Total	3.66 (0.44)
Behavioural resistance	
Physical activity	1.78 (0.87)
Healthy eating	1.48 (0.66)
Overeating (r)	2.42 (0.84)
Bedtime behaviour	2.23 (1.00)
Alcohol drinking (r)	3.05 (1.16)
Smoking (r)	2.03 (1.04)
Total	2.17 (0.45)
Mindful self-compassion	
Self-kindness	3.21 (0.80)

Scale	T1 (baseline, *n* = 81)
Self-judgment (r)	2.94 (1.03)
Common humanity	3.33 (0.88)
Isolation (r)	2.89 (0.97)
Mindfulness	3.66 (0.77)
Over-identification (r)	2.81 (0.90)
Total	3.15 (0.65)

Note. M (SD) presented. All items were measured on a five-point scale.
Note. The six behavioural constructs assessed were combined in one scale; higher total mean scores indicate more self-reported engagement in health behaviour, and lower scores indicate less self-reported engagement in health behaviour. Hence, higher sub scale scores on health-promoting behaviour (healthy eating, physical exercise) indicate high self-reported engagement in the respective behaviour, while high sub scale scores on unhealthy behaviours (r; overeating, bedtime procrastination, alcohol drinking, cigarette smoking) indicate low engagement in the respective behaviour and vice versa.
Note. The six constructs assessing behavioural resistance towards the measured health behaviour were combined in one scale; higher mean scores indicate more behavioural resistance towards health behaviour, while lower mean scores indicate less behavioural resistance towards health behaviour. Hence, higher sub scale scores on behavioural resistance towards health-promoting behaviour (healthy eating, physical exercise) indicate high behavioural resistance, while high sub scale scores on behavioural resistance towards unhealthy behaviours (r; overeating, bedtime procrastination, alcohol drinking, cigarette smoking) indicate low behavioural resistance and vice versa.
Note. The six constructs assessing mindful self-compassion constitute the total scale; higher mean scores indicate higher levels of mindful self-compassion, while lower mean scores indicate lower levels of mindful self-compassion.

Table 4

Pearson correlations between health behaviour, mindful self-compassion, and behavioural resistance at baseline

	1	2	3
1. Health behaviour	1	.50***	-.66***
2. Mindful self-compassion	.50***	1	-.30**
3. Behavioural resistance	-.66**	-.30**	1

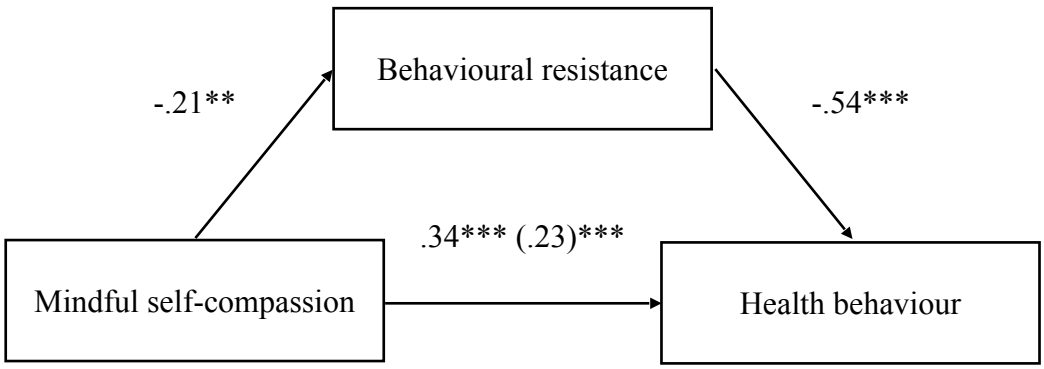
** Correlation is significant at the .01 level (2-tailed). *** Correlation is significant at the .01 level (2-tailed).

A mediation analysis was conducted using Hayes (2017) PROCESS macro with 5,000 bootstrap samples per analysis. The outcome variable was health behaviour, the predictor variable was mindful self-compassion, and the mediator variable was behavioural resistance. Prior to the analysis, assumptions were checked. There was independence of residuals, as assessed by a Durbin-Watson statistic of 1.55. There was linearity as assessed by partial regression plots and a plot of studentized residuals against the predicted values. There was homoscedasticity, as assessed by visual inspection of a plot of studentized residuals versus unstandardised predicted values. There was no evidence of multicollinearity, as assessed by tolerance values greater than .1. There was one studentized deleted residual greater than ±3 standard deviations, yet, as its inspection did not suggest coding error or an unusual response, the outlier was kept. Moreover, there were no leverage values greater than .2 and values for Cook's distance above 1, suggesting that the outlier did not skew the data. Lastly, the assumption of normality was met, as assessed by a Q-Q Plot.

Mediation pathways are depicted in **Figure 2**. The indirect effect of mindful self-compassion on health behaviour through behavioural resistance was estimated at .11 (CI 95% [.04: .20]). The confidence interval did not contain zero. Therefore, this mediation pathway was significant. Mindful self-compassion predicted lower levels of behavioural resistance, which in turn predicted higher levels of health behaviour.

Figure 2

Mediation of the relationship between mindful self-compassion and health behaviour by behavioural resistance



Note. Bootstrapped unstandardised regression coefficients for the relationship between mindful self-compassion and health behaviour as mediated by behavioural resistance. The bootstrapped unstandardised regression

coefficient between mindful self-compassion and health behaviour, controlling for behavioural resistance as a mediator, is in parentheses.
**p < .01, *** p < .001

The percent mediation (P_m) was calculated by means of dividing the regression coefficient of the indirect effect by the regression coefficient of the total effect. A mediation proportion of 32,35 % was calculated. Hence, it was found that behavioural resistance partly mediated the relationship between mindful self-compassion and health behaviour.

Discussion

The present study sought to investigate whether a mindful self-compassion journal may improve women's health behaviour compared to general journaling (aim 1) and if the effect of a mindful self-compassion journal can be partly explained by lower behavioural resistance (aim 2). More precisely, we expected that a combined decrease of behavioural resistance towards health-promoting behaviour and increase of behavioural resistance towards unhealthy behaviour partly underlie the health-promoting effects of mindful self-compassion.

The results (aim 1) suggest that both immediately after and four weeks after the journaling period, compared to the baseline scores, there were large improvements in health behaviour across both groups (Cohen, 1988). However, when comparing follow-up to post-intervention scores, improvements were not significant. Moreover, health behaviour was not different between the mindful self-compassion group and the active control group across all three time points, i.e., baseline, post-intervention, and follow-up. In contrast to the hypothesised positive intervention effect, the mindful self-compassion journal was not superior to general journaling in improving health behaviour, both immediately post-intervention and at a four-week follow-up.

The lack of health-promoting effects of engaging in a daily mindful self-compassion journal for one week compared to general journaling seems to contradict a recent meta-analysis finding a medium positive effect of mindful self-compassion interventions on health behaviour on average (Phillips & Hine, 2019). However, differences in study design (i.e., not all of the analysed studies included a control group, or in used different comparison conditions) may account for an observed heterogeneity of effects (Phillips & Hine, 2019). More precisely, the present study used an active control group to ensure that all participants had the same expectation of improvement (single-blinded) and to isolate the mindful self-

compassion component, instead of investigating mindful self-compassion in combination with journaling. Comparing a mindful self-compassion journaling intervention to a waitlist, instead of an active control group, might have yielded more substantial effects. Another reason for the lack of observed effects may be the short duration and low intensity of the mindful self-compassion journal, despite a good intervention adherence (five to six of seven days on average). Single-session mindful self-compassion interventions have been found to not increase physical health and health behaviour, in contrast to multi-session interventions with programs running for more than twelve weeks yielding the largest effects (Phillips & Hine, 2019). Similarly, effective mindful self-compassion interventions included several, more complex components, such as psychoeducation and individual coaching (Phillips & Hine, 2019). It may be that a brief journaling intervention may stimulate people to reflect in a mindful self-compassionate manner but does not provide instructions on how to apply mindful self-compassion during instances of negative emotion or self-judgment.

Furthermore, the improvement of health behaviour over time across groups observed in the present study may be explained in two different ways. On the one hand, it suggests that keeping a daily mindful self-compassion journal (about negative incidences) or general journal for one week (about positive or negative incidences) were equally effective in improving women's health behaviour immediately post-intervention and that these effects were maintained at a four-week follow-up. For instance, during the intervention week, both techniques may have increased adaptive emotions, found to aid the self-regulation of health behaviour (Aspinwall, 1998; Baumeister & Heatherton, 1996). More precisely, taking a mindful self-compassionate stance on negative experiences, generally writing about one's positive experiences, as well as sharing negative feelings through expressive writing have been found to improve people's affective states (Lepore et al., 2002; Sirois et al., 2015). However, if participants of the active control group merely elaborated, rather than reflected, on negative experiences, they might have experienced rumination (Joormann, 2006), associated with self-regulatory failure (Baumeister & Heatherton, 1996). Because we did not assess the manner (e.g., ruminative versus reflective) and the valence (positive versus negative) of the described experiences, inferences about the potential mediating role of adaptive emotions are to be interpreted with caution. Another possible underlying mechanism of the health-promoting effects in the whole sample is that writing down daily experiences — no matter if positive or negative — increases people's overall awareness of their well-being and behaviour (Boud, 2001). Although to date, general effects on health behaviour have not

been investigated, students that journaled about their academic procrastination, became more attentive of this behaviour and its negative consequences, motivated to overcome it, and planned to take appropriate steps (Hensley & Munn, 2020). These effects of journaling may explain why the long-term health-promoting effects: participants might have made small changes (e.g., replacing the chocolate bar with an apple) that ended up having lasting effects on health behaviour.

On the other hand, the immediate and long-term effects observed in the whole sample in the present study may also be attributable to external conditions. For instance, one shall not disregard potential effects resulting from the COVID-19 pandemic. In most European countries, restaurants, bars, and nights clubs were closed from briefly after the beginning of the surveying period onwards, and meeting people from different households was regulated to prevent a rapid spread of the pandemic. Intuitively, more home-cooking, fewer night outs, more time for physical exercise, and sleep may have stimulated people to behave in healthier ways. However, a recent study on the effects of the COVID-19 lockdown found that international adults behaved in less healthy ways. More precisely, self-reported sedentary behaviour increased from five to eight hours a day, and physical activity (vigorous, moderate, and walking) decreased since the start of the lockdown. Moreover, although binge-drinking decreased, more unhealthy and uncontrolled eating were reported (Ammar et al., 2020). A recent survey by the Dutch nutrition centre found that especially women and highly educated people under 30 — representative of the sample of the present study — reported having eaten fewer healthy meals and more unhealthy snacks since the start of the COVID-19 lockdown (Voedingscentrum, 2020). Drawing on the positive association between distress and poor diet and alcohol consumption, fear during the global pandemic — in addition to the state of confinement — may underlie the negative effects of COVID-19 on health behaviour (Naja & Hamadeh, 2020). These findings seem to contradict the increase of health behaviour observed in the present study. However, whether or not the health-promoting effects of time in the present study can be attributed to the COVID-19 lockdown, personal characteristics may affect the strength and direction the lockdown on health behaviour. The present sample voluntarily participated in a study on improving health behaviour and completed all three surveys, which may reflect a general motivation in optimising their health. It may thus be that the participating women appraised COVID-19 as an opportunity for behaving in healthier ways. Hence, compared to their usual health behaviour, as indicated in the baseline survey,

the health behaviour during the intervention and follow-up period may have been affected by such external conditions.

Because the mindful self-compassion intervention did not affect women's health behaviour compared to general journaling, we did not test behavioural resistance as a potential mediator. Instead, an exploratory analysis of the baseline scores yielded a positive, moderate association (Cohen, 1988) between mindful self-compassion and health behaviour, partly mediated by lower behavioural resistance. More precisely, this association suggests that people with higher levels of mindful self-compassion experience lower levels of resistance towards health-promoting and higher levels of resistance towards unhealthy behaviour, which, in turn, is associated with improved health behaviour.

This additional finding made an essential contribution to research unravelling the association between mindful self-compassion and health behaviour. While previous studies have focussed on the benefits of adaptive emotions for effortful self-regulation of health behaviour (Neff, 2003; Sirois et al., 2015), the present findings suggest an effortless mechanism to underlie one-third of the positive association. Highly self-compassionate women may engage in more health-promoting behaviours such as healthy eating, partly because they perceive lower levels of behavioural resistance, i.e., they like the behaviours more. Vice versa, highly self-compassionate women may engage in less unhealthy behaviours, partly because they perceive lower levels of behavioural resistance, i.e., they like the behaviours less. Drawing on the notion that mindful self-compassion stimulates the desire to treat one's bodies and selves kindly (Neff, 2003), it may be that highly self-compassionate women are drawn to behaviours with that positively affect their health while resisting behaviours that negatively affect their health.

Although these additional findings are in line with the causal mechanism we sought to investigate in this study (**Figure 1**), it is important to highlight their cross-sectional nature. Causal inferences are based on prior research (e.g., Gillebaart & Kroese, 2020; Phillips & Hine, 2019), yet to be interpreted with caution. Although behavioural resistance is found to be a predictor rather than a result of health behaviour (Gillebaart & Kroese, 2020), pathways may be bi-directional; for instance, non-smokers may perceive the smell of cigarettes unpleasant because they are not used to it (Grieder et al., 2019). Moreover, sports and diet have been found to have mental health benefits (Gore et al., 2001), whereas the effects on mindful self-compassion are yet to be tested. Despite a lack of effects of a mindful self-compassion intervention on health behaviour of present intervention compared to general

journaling, the correlational evidence on the pathway suggests that interventions of longer duration and intensity may stimulate health behaviour through the pathway of behavioural resistance. Hence, future research employing longer and more complex interventions is needed to establish causality of the findings.

The findings of this study have to be seen in the light of additional limitations. Firstly, the sample only included women and, due to the use of convenience sampling (Brewis, 2014), primarily consisted of German and Dutch students, representative of the social environment of the researching student. Therefore, future research is necessary to investigate whether the obtained results will hold in more diverse samples. Regarding gender differences, men have been found to score higher on mindful self-compassionate than women (Sirois et al., 2015), but there is no evidence that gender moderates the association between mindful self-compassion and health behaviour. Moreover, cultural differences may moderate the effect of mindful self-compassion on resistance towards health behaviour. More precisely, in addition to comparing collectivist to individualist cultures, the positive relationship may be stronger when treating oneself with kindness is a salient cultural value. To illustrate, Thai students scored higher on the mindful self-compassion sub construct self-kindness than US American and Taiwanese students (Neff et al., 2008). This is in line with the observation that mindful self-compassion is largely similar to Buddhism practised in Thailand, while its main difference to Buddhism practised in Taiwan is that the latter encompasses shame and judgment as means to self-improvement (Jones, 1999).

Another limitation of the present study is that health behaviour, behavioural resistance, and mindful self-compassion were assessed through explicit measures. Firstly, poor introspection may have, therefore, biased the results which means reporting of what is in line with one's self-concept, for instance, rather than actual attitudes, affect, and behaviour (Demetriou et al., 2014). Secondly, explicit measures are susceptible to social desirability bias, defined as over-reporting of capacities deemed desirable while under-reporting of capacities deemed undesirable (Brewis, 2014). Social desirability bias tends to be especially pronounced in participants that know the researcher (Brewis, 2014), as it was likely the case in the present sample. This is why we recommend future research to use behavioural observation of health behaviour, as well as implicit measures, such as the implicit association test (IAT; Greenwald et al., 1998), to assess behavioural resistance and mindful self-compassion more objectively.

Furthermore, the utilised scale to assess health behaviour may have poor ecological validity and reliability because it has been created utilising three items from existing scales respectively (e.g., Eating Loss of Control Scale; Blomquist et al., 2014) rather than an existing general health behaviour scale with adequate psychometric properties (e.g., WBI; Sirois, 2001). Although this allowed for the inclusion of positive and negative as well as initiatory and inhibitory health behaviour (de Ridder et al., 2011) and acceptable internal consistency was observed (Nunnally, 1978), findings are to be interpreted and compared to existing research with caution.

Lastly, a limitation of this study is that it did not take a differentiated approach regarding the analysis of individual health behaviours. The included health behaviours were not examined individually because of the limited scope of the research project and the, in part, low internal consistencies of the respective subscales. Based on the inspection of the descriptives of the scores in the mindful self-compassion group directly after the journaling week, an upward trend in self-reported physical activity, and a downward trend in overeating, alcohol drinking, and bedtime procrastination can be noted, in line with the initial prediction. In contrast, self-reported healthy eating slightly decreased, and smoking levels slightly increased immediately post-intervention, contrasting our initial prediction. Although not statistically tested, and, therefore, tentatively interpretable, these differences in tendencies call for future research assessing different behaviours, rather than measuring health behaviour as an overall construct.

The present findings give rise to additional avenues of future research. Firstly, one may investigate if the specific type of behaviour moderates the effect of mindful self-compassion on behavioural resistance. For instance, one may assess potential effects of health-promoting (e.g., engaging in physical exercise) versus unhealthy behaviour (e.g., smoking cigarettes) as well as initiatory (e.g., cooking a healthy meal) versus inhibitory (e.g., not eating a whole chocolate bar) behaviour (de Ridder et al., 2011).

Secondly, future research may extend our proposed model by assessing the appreciation of desired health outcomes as an additional mediator. Behavioural resistance may be unrelated to the appreciation of a focal goal; for instance, people may dread going to the gym, while being enthusiastic about becoming physically fit (Gillebaart & Kroese, 2020). In contrast, mindful self-compassion has been associated with intrinsic motivation to pursue health-relevant goals (Magnus et al., 2010). Based on the notion that mindful self-compassion stimulates a desire to be kind to oneself (Neff, 2003), mindful self-compassion may explain

the potential overlap between behavioural resistance and the appreciation of desired health outcomes.

In sum, this study found that a brief mindful self-compassion intervention did not improve women's health behaviour compared to an active control group suggesting that brief mindful self-compassion interventions of short duration and intensity are not superior to general journaling in increasing health behaviour. Health behaviour did improve in the whole sample immediately post-intervention, and the improvements were maintained at a four-week follow-up. However, it is unclear to what extent the effects stem from prior engagement in a journaling intervention or external circumstances (e.g., COVID-19). An additional analysis of the baseline scores revealed a positive association between mindful self-compassion and health behaviour, mediated by lower behavioural resistance. This suggests that people with higher levels of mindful self-compassion experience lower levels of resistance towards health-promoting and higher levels of resistance towards unhealthy behaviour, in turn, is associated with improved health behaviour. These findings add to prior research unravelling the association between mindful self-compassion and health behaviour and suggest that an effortless mechanism partly underlies the association. To establish the causality of these findings, future research may replicate this study using a longer, more complex mindful self-compassion intervention.

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Appendices

Appendix A. Information letter and informed consent form

Title of the study: Journaling and health behaviour

Utrecht, 08 March 2020

Introduction

With this letter, we would like to invite you to participate in the research project. The purpose of this study is to investigate the effects of journaling on different kinds of health behaviour. The target group includes adults that are 18 years old or older and identify as female or QT+.

Design of the study

At sign-up, you are asked to fill out a computer-based questionnaire (Qualtrics) about your engagement in and thoughts about different health-related behaviours. The questionnaire will approximately take 15 minutes. Upon completion of the questionnaire, you will receive instructions to keep a journal over the course of one week. You will engage in journaling once a day for approximately 10 minutes. Directly after this period, you will complete a second computer-based questionnaire that takes approximately 15 minutes. Three weeks after sign-up, you will complete a third computer-based questionnaire that takes approximately 15 minutes. Before starting the questionnaire, written consent for participation will be asked. Following your participation (after the third questionnaire), you will be debriefed, which will include clarifying information about the study. All data will be collected from March 6th to May 15th.

Compensation

You may either earn 3 PPU credits or enter a lottery and make a chance of winning one of two online vouchers worth 20 EUR each.

Confidentiality of data processing

Information that is collected in the framework of this study is strictly confidential. All data will be processed in a coded way and stored in an anonymous form. This study requires us to

collect some of your personal data (email, age, gender, occupational status, nationality). We need this data in order to be able to answer the research question properly or to be able to contact you for follow-up questionnaires. This personal data will be stored in a different, secured file than the research data itself (the so-called raw data). Personal data will be stored until the end of the surveying period (15th of May 2020). Raw data will be stored for at least 10 years. This is in accordance with the guidelines provided by the VSNU Association of Universities in the Netherlands. Please refer to the website of the Authority for Personal Data: https://autoriteitpersoonsgegevens.nl/nl/onderwerpen/avg-europese-privacywetgeving, for more information about privacy. Data can only be accessed by researchers involved in the project.

Voluntary participation

Participation in this research is completely voluntary and non-binding. This means that at any time, without giving any reason, you can decide to terminate participation in the research. Data collected up until the point of termination may be utilised.

Coordination

This research is coordinated by Anna Bosshard (MSc student Social, Health and Organisational Psychology).

Contact and complaints

If you have any questions or comments about the study, please contact Dr Floor Kroese (F.M.Kroese@uu.nl). If you have an official complaint about the study, you can send an email to the complaints officer at klachtenfunctionaris-fetcsocwet@uu.nl.

If, after reading this information letter, you decide to take part in the research, I would kindly ask you to indicate it below. If you do not consent, you will be directed to the end of the survey.

With kind regards,

Anna Bosshard

MSc student Social, Health and Organisational Psychology, Utrecht University

Appendix B. Debriefing letter

Thank you for taking the time to participate in this study.

The first aim of this study was to investigate if keeping a mindful self-compassion journal over the course of one week positively affects a variety of health behaviours in an adult, non-male population. According to Neff (2004), mindful self-compassion is the tendency to take kind, accepting, and non-judgmental stances towards oneself when facing difficulty or failure, responding mindfully to negative emotions, and understanding that one is not the only one to suffer.

The second aim was to investigate if behavioural resistance, i.e. how much people like/dislike a certain behaviour partly explains the effects of a mindful self-compassion journal on health behaviours (physical exercise, healthy eating, overeating, bedtime procrastination, alcohol consumption, cigarette smoking). Next to a short demographic section, participants' self-compassion, health behaviour, as well as behavioural resistance towards those behaviours before, immediately after, and four weeks after keeping the journal were measured to discover potential short and long-term effects.

To ensure that we won't report effects that are due to passed time, filling out the questionnaires, or generally reviewing one's day in written form, we randomly split up the participants across two groups. While the experimental group was instructed to keep a mindful self-compassion journal, the other, so-called "active control group" was instructed to write about their day more generally over the course of one week.

Importantly, we withheld the research focus on the effects of mindful self-compassion journaling: we advertised the study as investigating general journaling effects and did not tell participants if they were assigned to the experimental or control condition, respectively. We used this form of deception to prevent participants' expectations of the relative benefits or

drawbacks of mindful self-compassion and general journaling would affect their answers.

If you were part of the control group and engaged in general journaling, we would also like to give you the chance to be introduced to the mindful self-compassion journaling method by Kirsten Neff. We will send you an informative sheet by email once you have finalized this survey.

Following this letter, you will be able to sign up for SONA credit compensation and/or enter the voucher lottery. Once the data collection method has ended (April 15th), the two winners will be notified.

If participation in the survey has raised questions about your own (psychological) well-being and you need professional help, you can contact a student psychologist. They can be reached via the following contact form (https://students.uu.nl/en/schedule-an-appointment-with-student-psychologist). If you are not affiliated with Utrecht University and have similar questions in response to the topics from this research, please contact your GP.

Please send me an email (a.bosshard@students.uu.nl) if you have any further questions concerning mindful self-compassion, the journaling method, the current study, or compensation in the form of UU SONA credits.
Thanks again for your participation.

Kind regards,
Anna Bosshard
MSc student Social, Health and Organisational Psychology

Appendix C. Journaling instructions

Thanks a lot for filling out the questionnaire. Next, you will receive instructions on the journal that you will keep during the upcoming week. Please read the instructions carefully and at your own time. To check your understanding, we included some reading questions following the instructions.

D.1 Journaling instructions and reading questions (active control group)

Try keeping a daily journal for one week. Journaling is an effective way to express emotions and has been found to enhance both mental and physical well-being. At some point during the evening when you have a few quiet moments, review the day's events. In your journal, write down anything that you experienced and/or felt during the day. These may include positive and negative incidences. We recommend spending at least ten minutes and writing at least half an A4 page.

Q1 When will I engage in journal writing during the upcoming week?

Once a day, in the morning.

Once a day, in the evening.

Twice a day, in the evening and in the morning.

Q2 What will I focus on in my journal during the upcoming week?

Anything that I experienced and/or felt during the day.

Positive experiences only.

Negative experiences only.

D.2 Mindful self-compassion journal and reading questions (intervention group)

Try keeping a daily self-compassion journal for one week. Journaling is an effective way to express emotions and has been found to enhance both mental and physical well-being. At some point during the evening when you have a few quiet moments, review the day's events. In your journal, write down anything that you felt bad about, anything you judged yourself for, or any difficult experience that caused you pain.

For instance, perhaps you got angry at a waitress at lunch because she took forever to bring the check. You made a rude comment and stormed off without leaving a tip. Afterwards, you felt ashamed and embarrassed.

Q1 What will I focus on in my journal during the upcoming week?

Both positive and negative experiences.

Anything that I felt bad about, anything I judged myself for, or any difficult experience that caused me pain.

Anything that I felt positive about or that gave me joy.

Q2 When will I engage in journal writing during the upcoming week?

Once a day, in the morning.

Once a day, in the evening.

Twice a day, in the evening and the morning.

We recommend spending at least ten minutes and writing at least half an A4 page. For each event, you will use mindfulness, a sense of common humanity, and self-kindness to process the event in a more self-compassionate way. In the following, we will explain these concepts step by step.

Mindfulness

This will mainly involve bringing awareness to the painful emotions that arose due to your self-judgment or difficult circumstances. Write about how you felt: sad, ashamed, frightened, stressed, and so on. As you write, try to be accepting and non-judgmental of your experience, not belittling it nor making it overly dramatic. *For example, "I was frustrated because she was being so slow. I got angry, overreacted, and felt foolish afterwards."*

Q3 What does it mean to review the day's events mindfully?

Bringing awareness to the painful emotions in an accepting and non-judgmental way.

Dramatising the painful emotion that I experienced.

Identifying the painful emotion and trying to change it.

Common Humanity

Write down how your experience was connected to the larger human experience. This might include acknowledging that being human means being imperfect and that all people have these sorts of painful experiences. *For example, "Everyone overreacts sometimes, it's only human."*

You might also want to think about the various causes and conditions underlying the painful event. *"My frustration was exacerbated by the fact that I was late for my doctor's appointment across town and there was a lot of traffic that day. If the circumstances had been different my reaction probably would have been different."*

Q4 What does it mean that experiences are connected to the larger human experience (common humanity)?

Acknowledging the situational rather than personal factors causing a negative experience.

Acknowledging that negative experiences happen to everyone.

Both of the above.

Self-kindness

Write yourself some kind, understanding, words of comfort. Let yourself know that you care about yourself, adopting a gentle, reassuring tone. For example, *"It's okay. You messed up but it wasn't the end of the world. I understand how frustrated you were and you just lost it. Maybe you can try being extra patient and generous to any wait-staff this week."*

Q5 What does self-kindness refer to?

Highlighting that I did not do anything wrong.

Reassuring myself what good of a person I am.

Comforting myself by adopting a gentle, reassuring tone.

Practicing the three components of self-compassion with this writing exercise will help organize your thoughts and emotions, while helping to encode them in your memory. If you keep a journal regularly, your self-compassion practice will become even stronger and translate more easily into daily life.

Appendix D. Sections of the online survey

Section A. Demographics

1. What is your age? _____

2. What gender do you identify with?

    Female

    Male[6]

    Other, please specify. _____

3. What is your nationality? _____
4. Please indicate what best describes your current occupational status (selecting multiple options possible).

    High school student

    Professional education/training

    University (of Applied Sciences) student (Bachelor, Master)

    PhD student

    Working full-time (including self-employment and internships)

    Working part-time (including self-employment and internships)

    Homemaking

    Retired

    Unemployed

    Other, please specify. _____

Section D. Health behaviour

In the following, you will answer questions on your usual engagement in a variety of health behaviours based on the past month.[7] Please read the questions and options carefully before answering.

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[6] Because the study focussed on non-males, participants indicating male gender were directed to the end of the survey.

[7] The presented instructions and items measuring health behaviour are taken from the baseline questionnaire. While the item content was identical across baseline, post-intervention, and follow-up questionnaires, item phrasing was adapted to the timeframe of relevance, respectively. In the post-intervention questionnaire, instructions were phrased as follows: "In the following, you will answer questions on your engagement in a variety of health behaviours over the past week.". A sample item from the post-intervention questionnaire is: "During the past week, how often have you gone to bed at the time that you intended?". In the follow-up questionnaire, instructions were phrased as follows: "In the following, you will answer questions on your engagement in a variety of health behaviours over the past month." A sample item from the follow-up questionnaire is: "During the past month, how often have you approximately gone to bed at the time that you intended?".

1. Based on the past month, how often do you usually engage in vigorous physical activities like heavy lifting, aerobics, or fast bicycling for at least 30 minutes?

    Less than once a week

    Once a week

    On 2 to 3 days a week

    On 4 to 5 days a week

    (Almost) daily

2. Based on the past month, how often do you usually engage in moderate physical activities like carrying light loads or biking at a regular pace for at least 30 minutes? Do not include walking.

    Less than once a week

    Once a week

    On 2 to 3 days a week

    On 4 to 5 days a week

    (Almost) daily

3. Based on the past month, how often do you usually walk for at least 30 minutes at a time?

    Less than once a week

    Once a week

    On 2 to 3 days a week

    On 4 to 5 days a week

    (Almost) daily

4. Based on the past month, how often do you usually eat healthy, balanced meals?

    Less than once a week

    Once a week

    On 2 to 3 days a week

    On 4 to 5 days a week

    (Almost) daily

5. Based on the past month, how often do you usually eat fresh fruits and/or vegetables?

    Less than once a week

    Once a week

On 2 to 3 days a week

On 4 to 5 days a week

(Almost) daily

6. Based on the past month, how often do you usually eat junk foods, such as crisps, sweets, or French fries? (r)

   Less than once a week

   Once a week

   On 2 to 3 days a week

   On 4 to 5 days a week

   (Almost) daily

7. Based on the past month, how many times do you usually eat until you feel uncomfortably full? (r)

   Less than once a week

   Once a week

   On 2 to 3 days a week

   On 4 to 5 days a week

   (Almost) daily

8. Based on the past month, how many times do you usually feel out of control and eat an unusually large amount of food (e.g. eating two full meals) in a short period of time (1–2 hours)? (r)

   Less than once a week

   Once a week

   On 2 to 3 days a week

   On 4 to 5 days a week

   (Almost) daily

9. Based on the past month, how many times do you usually give in to an impulse to eat even though you are not hungry? (r)

   Less than once a week

   Once a week

   On 2 to 3 days a week

   On 4 to 5 days a week

(Almost) daily

10. Based on the past month, how often do you usually go to bed at the time that you intended?

    Less than once a week

    Once a week

    On 2 to 3 days a week

    On 4 to 5 days a week

    (Almost) daily

11. Based on the past month, please indicate how well the following statement describes you: "I have an easy time quitting other activities in the evening when it is time to go to bed."

    Does not describe me

    Describes me slightly well

    Describes me moderately well

    Describes me very well

    Describes me extremely well

12. Based on the past month, how often do you usually go to bed later than you would have liked to? (r)

    Less than once a week

    Once a week

    On 2 to 3 days a week

    On 4 to 5 days a week

    (Almost) daily

13. Based on the past month, how often do you usually have alcoholic drinks?[8] (r)

    Less than once a week

    Once a week

    On 2 to 3 days a week

    On 4 or more days a week

[8] Items 13 to 15 were displayed only to participants who indicated “Yes. I (occasionally) do.” (versus “No, I don’t.”) to the following item: “Do you (occasionally) have alcoholic drinks?”.

14. Based on the past month, how many standard drinks containing alcohol do you usually have on a drinking occasion? (r)

    1 to 2 drinks

    3 to 4 drinks

    5 to 6 drinks

    7 drinks or more

15. Based on the past month, how often do you usually have six drinks or more on one occasion? (r)

    Never

    Less than once a week

    Once a week

    Twice a week or more

16. Based on the past month, on how many days do you usually smoke cigarettes?[9] (r)

    Once a week or less

    On two to three days a week

    On four to six days a week

    Daily

17. Based on the past month, how many cigarettes do you smoke a day on average? (r)

    Less than one cigarette a day

    One to five cigarettes per day

    About one-half pack per day

    One pack per day or more

18. Based on the past month, please indicate how well the following statement describes you: "After a few hours without smoking, I feel an irresistible urge to smoke." (r)

    Does not describe me

    Describes me slightly well

    Describes me moderately well

    Describes me very well

[9] Items 16 to 18 were displayed only to participants who indicated “Yes. I (occasionally) do.” (versus “No, I don’t.”) to the following item: “Do you (occasionally) smoke cigarettes?”.

Section C. Mindful self-compassion (SELF-COMPASSION SCALE–Short Form; SCS–SF)
Please indicate how often you behave in the stated manner. Please read each statement carefully before answering.

Frequency of behaviour was indicated on a 5-point Likert scale with the following range: almost never, not very often, sometimes, very often, almost always.

1. When I fail at something important to me, I become consumed by feelings of inadequacy. (r)
2. I try to be understanding and patient towards those aspects of my personality I don't like.
3. When something painful happens, I try to take a balanced view of the situation.
4. When I'm feeling down, I tend to feel like most other people are probably happier than I am. (r)
5. I try to see my failures as part of the human condition.
6. When I'm going through a very hard time, I give myself the caring and tenderness I need.
7. When something upsets me I try to keep my emotions in balance.
8. When I fail at something important to me, I tend to feel alone in my failure. (r)
9. When I'm feeling down, I tend to obsess and fixate on everything that is wrong. (r)
10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
11. I'm disapproving and judgmental about my flaws and inadequacies. (r)
12. I'm intolerant and impatient towards those aspects of my personality I don't like. (r)

Section D: Behavioural Resistance
Please indicate your level of agreements with the following statements. Please read each statement carefully before answering

Level of agreement was indicated on a 5-point Likert scale with the following range: strongly disagree, somewhat disagree, neither agree/nor disagree, somewhat agree, strongly agree.

1. Being physically active/working out is something that I find pleasurable. (r)
2. I enjoy being physically active/working out. (r)
3. If I'm honest, being physically active/working is something I'd rather not do.
4. Eating healthy meals and snacks is something that I find pleasurable. (r)
5. I enjoy eating healthy meals and snacks. (r)
6. If I'm honest, eating healthy meals and snacks is something I'd rather not do.
7. Stuffing myself with food is something I find pleasurable.
8. I enjoy eating more than what satisfies my appetite.
9. Eating over my appetite tends to put me off. (r)
10. Getting ready for bed in the evening is something I find pleasurable. (r)
11. I enjoy getting ready for bed. (r)
12. If I'm honest, getting ready for bed is something I'd rather not do.
13. Getting drunk is something that I find pleasurable.
14. I enjoy getting drunk.
15. If I'm honest, getting drunk is something I'd rather not do. (r)
16. Smoking cigarettes is something that I find pleasurable.
17. I enjoy smoking cigarettes.
18. Smoking cigarettes tends to put me off. (r)

An additional item to measure intervention adherence (post-intervention questionnaire only)
How many days did you engage in journal writing for around 10 minutes during the past week?

Never

Once

On two days

On three days

On four days

On five days

On six days

Every day