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Is it good to be good? Dispositional compassion and health behaviors

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Abstract

Background: Despite dispositional compassions' documented importance for a range of health-related outcomes, its role in predicting health behaviors remains unclear.

Purpose: This study examined the associations between dispositional compassion and three domains of health behavior, including physical activity, alcohol use, and smoking.

Methods: The participants ($N=1279-1913$) were from the Finnish population-based Young Finns study. We collected self-reports of compassion in 1997 and 2011 and health behaviors in 2001, 2007, and 2011. In addition, an objective pedometer measure of physical activity was collected in 2011. Linear and logistic regression models were fitted to estimate the cross-sectional and longitudinal associations between compassion and the health behavior outcomes.

Results: In cross-sectional analysis, compassion was associated with having never smoked and a reduced likelihood of at-risk alcohol use and binge drinking. There was no robust association between compassion and physical activity. In longitudinal analyses over a 14-year period, the associations remained for at-risk alcohol use and binge drinking.

Conclusions: Dispositional compassion may have a protective effect against unhealthy behaviors, especially excessive alcohol consumption.

Keywords: compassion, health behaviors, smoking, alcohol consumption, physical activity

Is it good to be good?

Dispositional compassion and health behaviors

Health risk behaviors cause considerable morbidity and premature mortality worldwide [1]. In attempts to explain why people engage in such behaviors despite knowing the risks involved, personality dispositions have received a significant amount of interest in the literature. A body of research suggests that personality traits can help to differentiate those who do from those who do not engage in such behaviors [2–6]. However, much previous work has almost exclusively focused on the Five-Factor Model traits, whereas other personality dispositions that may be central to health behavior remain less examined. One of these potentially relevant traits is compassion, a disposition that has thus far received no attention in the health behavior research despite its documented importance for a wide range of health-related outcomes, including reduced stress and better mental health [7–11]. In the present study, we examined how dispositional compassion is associated with three domains of health behavior, namely, physical activity, alcohol use, and smoking.

Physical inactivity, smoking, and excessive alcohol use are among the leading behavioral chronic disease risk factors [12,13]. Changes in these risk factors are known to be closely associated with slowing of the progression of diseases and even delaying or preventing their onset [14,15]. Improved understanding of personality characteristics associated with health risk behaviors may help public health professionals to develop more successful prevention strategies. Furthermore, the burden posed by health-damaging behaviors might also be alleviated by cultivating personality characteristics associated with more favorable (or the absence of poor) health practices.

Compassion is a personality disposition [16] characterized by feeling concern for the suffering of others coupled with a desire to alleviate that suffering [17]. It is both conceptually and neurologically [18] distinguished from empathy, a trait that involves sharing the feelings of others and, in unpleasant situations, may lead to empathetic distress or even disengagement with those who suffer [19]. Previous studies have associated compassion with several favorable outcomes, such as positive affect, self-esteem, happiness, life-satisfaction, marital adjustment, lower suicidality, and reduced risk of depression [10,11,18,20–22]. Despite the relevance of compassion to health and well-being, the extent to which it contributes to health behaviors remains to be elucidated.

Being compassionate might discourage poor health behaviors by enhancing a person's social environment, as compassion is considered to strengthen social connectivity and build harmonious relationships [23,24]. Moreover, compassion is hypothesized to suppress individual stress reactions [25]. Experiencing compassion has been recently shown to be accompanied by heightened parasympathetic activity in the autonomic nervous system (namely, in the vagus nerve) [26], potentially supporting greater emotion regulation and better coping under stressful situations [27]. This is particularly noteworthy because individuals under stress are more inclined to neglect health-promoting behaviors and engage in poor health behaviors [28–30]. Some evidence from animals suggests that vagal activity is, in turn, associated with the release of oxytocin [31], a hormone that potentially inhibits physiological stress responses [32]. The latest evidence from humans also points to increases in this calming hormone as a result of experiencing empathic concern, a state that involves compassion [33].

To sum, previous work has associated compassion with a positive social environment and reduced stress reactivity, both of which likely contribute to favorable health behaviors or discourage health risk behaviors. Nonetheless, to what extent compassion predicts such behaviors remains unclear. In the current study, we examine compassion's associations with several indicators of health behavior in the domains of physical activity, alcohol use, and smoking in both cross-sectional and longitudinal designs. Keeping with previous findings on the beneficial role of compassion for health and well-being outcomes, we expect that higher compassion is associated with favorable health behaviors, such as higher level of physical activity, avoiding smoking, and refraining from excessive alcohol use. Put differently, we hypothesize that compassionate individuals are not inclined to engage in health risk behaviors.

Methods

Participants and Procedure

Data for the present study were drawn from the Cardiovascular Risk in Young Finns study (CRYFS; [34]). The CRYFS is a population-based study following randomly selected individuals from six age cohorts. The participants were 3—18 years old at the baseline in 1980 ($N=3596$). For this study, data from four time points were used: from 1997 (when the participants were 20—35 years old), 2001, 2007, and 2011 (when the participants were 34—49 years old). The analytic sample size ranged from 1279 to 1913, depending on the analysis. The study was approved by local ethics committees and conducted in accordance with the Helsinki declaration. Written informed consent was obtained from the participants.

Measures

Dispositional compassion. Dispositional compassion was measured in 1997 and 2011 using Cloninger's Temperament and Character Inventory (TCI) [35]. Compassion (versus revengefulness) is a subscale of the TCI character dimension of cooperativeness. The scale consists of 10 items (e.g., "I hate to see anyone suffer", "It gives me pleasure to help others, even if they have treated me badly") that are rated on a 5-point scale ranging from 1 (*absolutely false*) to 5 (*absolutely true*). Cronbach's alphas for the scale ranged from 0.86 to 0.87 and the test-retest correlation across the 14 year period was 0.59. The measure has demonstrated good construct validity as determined by its positive association with social warmth, sociability, and positive emotions, and inverse associations with hostility, anger, aggression, and narcissistic disorder [36–38].

Health behaviors. Three domains of self-reported health behavior were assessed in 2001, 2007, and 2011: physical activity, smoking, and alcohol use. Physical activity (PA) was measured with five items reflecting the intensity of PA, the frequency of vigorous PA, hours spent engaged in vigorous PA, the average duration of a PA session, and participation in an organized PA. The responses to the items were coded into three categories: 1=low; 2=moderate; 3=high, and a PA index score was calculated by summing the scores. The index scores ranged from 5 to 15, with higher values reflecting greater PA. Cronbach's alphas for the scale ranged from 0.73 to 0.76. The coding of the items and the validity of the PA index has been described in detail elsewhere [39]. We additionally included pedometer-determined physical activity data from 2011 for participants with at least four recorded days of daily steps [40]. The correlation between total daily steps and PA index has been previously reported to be 0.25 [41]. A binary variable was created in which belonging to the lowest PA index score tertile and taking <5000 steps/day was defined as

inactivity [42]. This measure of inactivity and the self-reported PA index score were moderately inversely correlated ($r=-.32$).

Based on reports of current smoking status, participants were categorized as non-smokers (not smoking or smoking <1 cigarette/day) and smokers (≥ 1 cigarettes a day). We also created a binary variable for having never smoked for those reporting having never smoked any form of tobacco products.

Alcohol use was assessed by asking participants to report their consumption of 1/3 liter bottles of beer or cider, glasses (12 centiliters) of wine, and shots (4 centiliters) of liquor or strong alcohol during the last week. These amounts are comparable to approximately 12 grams of alcohol (i.e., 1 unit). The amounts were summed and divided by seven to determine average daily alcohol consumption, and a binary at-risk alcohol use variable based on the Finnish Current Care Guidelines [43] was constructed. According to the guidelines, women consuming more than 1 unit and men consuming more than 2 units of alcohol a day are considered to have a moderate risk of health problems. We also constructed an indicator for binge drinking based on reports on the frequency of consuming at least 6 units of alcohol in a single session. Binge drinking was defined as consuming at least 6 units of alcohol in a single session more frequently than once a month [44].

Covariates. The covariates included participant age, sex, and socioeconomic status (SES). SES was determined in 2007 and 2011 via two indices that were standardized and summed together: 1) total years of education and 2) yearly income level, assessed with a 13-point scale ranging from 1 ($\leq 5\,000\text{€}$) to 13 ($\geq 60\,000\text{€}$). Because health behaviors tend to cluster together [45], we also mutually adjusted the behaviors for each other.

Statistical Analyses

Linear and logistic regression models were used to examine the associations of compassion with PA, alcohol use, and smoking. We first ran an unadjusted model (Model 1). In the second model (Model 2), we adjusted for age, sex, and SES. In the third, fully adjusted model, we additionally carried out mutual adjustment for each of the other indicators of health behavior by using the PA index score, smoking status, and at-risk alcohol use as additional covariates (Model 3). Specifically, alcohol use measures were adjusted for smoking status and PA, smoking status was adjusted for alcohol use and PA, and PA was adjusted for smoking status and alcohol use. Odds ratios (OR's) and their 95% confidence intervals (CI's) were calculated for all health behavior indicators, with the exception of the continuous PA index score, for which standardized betas were calculated.

We first investigated the cross-sectional associations between compassion and health behaviors using data from 2011. The cross-sectional analyses were followed by prospective examinations, in which we used data on compassion from 1997 and health behaviors from 2001, 2007, and 2011 to examine the prospective association between compassion and later health behavior outcomes. Only those health behavior indicators that were associated with compassion in the cross-sectional design were included in the prospective analyses. Whenever applicable, we used time-varying covariates and applied mixed effects modeling to take into account the within-person correlation between repeated outcome measurements over time. Multiple imputation with chained equations [46] was used to examine the potential impact of missingness in predictor variables on the findings. As a supplementary analysis, we also tested the sensitivity of our prospective results to inclusion of two traits closely related to compassion, namely, dispositional empathy and the Big Five trait Agreeableness, a facet of personality that gauges an individual's emotional

affiliation for others and concern for their welfare [47]. We additionally evaluated the role of social support as a potential mechanism linking compassion and health behaviors. Statistical analyses were performed using reg, logistic, ologit, xtlogit, xtologit, and xtmixed procedures in Stata 13 software (Stata Corp, College Station, TX).

Results

Cross-sectional analyses

Table 1 summarizes demographics and descriptive characteristics of the sample in 2011. At this time point, 8% of participants were physically inactive, 12% were smokers, 53% had never smoked, 14% were at-risk drinkers, and 22% were binge drinkers. **Table 2** shows the unadjusted and adjusted results of the cross-sectional compassion-health behavior analyses. In the unadjusted model, compassion was associated with higher PA index score and reduced odds of smoking, at-risk alcohol use, and binge drinking, and increased odds of having never smoked. After adjustment for age, sex, and SES, the associations remained significant only for having never smoked (OR 1.42), at-risk alcohol use (OR 0.62), and binge drinking (OR 0.58). After further mutual adjustment for each of the other indicators of health behavior, the association with having never smoked slightly attenuated (OR 1.36), whereas the associations with alcohol use remained unaffected. Using imputed data and modeling alcohol use as a non-binary variable led to similar results (Supplementary Table 1).

Tables 1 and 2

Prospective analyses

Based on the cross-sectional associations, having never smoked and drinking behaviors were selected for prospective analyses (**Table 3**). Compassion in 1997

predicted higher odds of having never smoked in 2011, but only in the unadjusted model. With regard to repeated, prospective measures of alcohol use, compassion in 1997 was associated with reduced odds of future at-risk alcohol use and binge drinking (for binary outcomes, ORs 0.45 to 0.62 for the fully adjusted models; essentially similar findings with non-binary outcome variables). The effects of compassion were consistent over time and with age, i.e., the rate of change in alcohol use was not dependent on compassion, and no sex interactions were observed ($p > .05$). **Figure 1** presents alcohol use behaviors over time by low and high levels (± 1 SD) of compassion.

The results from imputed data and with additional adjustments for empathy, Agreeableness, or social support are presented in Supplementary Table 2. Missingness in predictors did not appear to substantially impact our results because analyses with imputed data yielded similar findings. Adjusting for dispositional empathy or social support had practically no effect on the associations between compassion and alcohol use. Taking into account the Big Five trait agreeableness, the associations were attenuated but remained statistically significant for binge drinking (OR 0.73).

Table 3

Figure 1

Discussion

The present study examined cross-sectional and longitudinal associations between dispositional compassion and health behaviors. A key finding was that

individuals scoring higher on compassion are less likely to engage in unhealthy alcohol use behaviors, even when compassion and alcohol use are assessed more than a decade apart. While higher compassion also appeared to be associated with having never smoked, there was no association between compassion and physical activity. Our results point to the protective role of compassion against specific health risk behaviors, particularly excessive alcohol consumption.

In cross-sectional analyses, as expected, compassion was associated with an increased likelihood of having never smoked and reduced likelihood of at-risk or binge drinking. The association with having never smoked was not retained in prospective analyses (apart from the unadjusted model). This indicates that although compassionate individuals may be more inclined never to start smoking, compassion in young adulthood is not predictive of subsequent smoking behavior much later in life. In prospective analyses, the effects of compassion remained in predicting the reduced likelihood of unhealthy alcohol-related behaviors as measured up to 14 years later. Compassion was a unique predictor of binge drinking over and above the effects of dispositional empathy or the Big Five trait Agreeableness.

Overall, the associations between compassion and alcohol-related behaviors might be explained by the soothing effects of compassion that may decrease individuals' need to use alcohol as a coping strategy for stress. It is also possible that the reduced negative affect associated with compassion [21] makes compassionate individuals less likely to engage in unhealthy drinking patterns. It is, however, also possible that compassion is not the source of the observed differences in health behavior. Rather, it could be that individuals with lower stress reactivity or better emotion regulation have both higher dispositional compassion and more favorable health behaviors.

To our knowledge, this is the first study to examine health behaviors in association with dispositional compassion. A major strength of this study is that we explored the associations in both cross-sectional and prospective designs. Unlike much previous work on health behaviors, we used pedometer-determined physical activity data in addition to self-reports. However, the current findings need to be considered within some limitations. The main limitation is that we relied on self-report measures of compassion, smoking, and alcohol use. It is possible that people scoring high on compassion have a tendency to present a favorable image of themselves, which could have inflated the associations. Furthermore, although we adjusted for several potential confounders, we cannot exclude possible residual confounding due to unknown and unmeasured factors. Another limitation is that the compassion scale we used has not been validated against other measures of compassion. However, there is no golden standard available for the assessment of dispositional compassion or a well-validated measure developed exclusively for its assessment [17,48,49]. Finally, the study population consists only of Finnish individuals, limiting the generalizability of our findings to other populations. The prevalence of alcohol dependence in Finland is high compared to, for example, the EU average [50], and cultures with healthier alcohol consumption patterns may demonstrate a different relationship between compassion and alcohol use.

The observed effect sizes were below the minimum effect size representing a practically significant effect [51]. Therefore, rather substantial increases in compassion might be required to observe a meaningful change in health behaviors. It should also be noted, that although interventions focusing on the cultivation of compassion have found moderate effect sizes for a short-term increase in compassion [48], whether the increase is sustained after the intervention remains

unclear. Nevertheless, cultivating compassion may prove to be a useful supplementary tool for public health and preventive medicine as part of a larger treatment or intervention plan, even if it is not the primary target of health behavior interventions. Interventions that increase compassion (e.g., mindfulness-based training) are relatively inexpensive to introduce and can be implemented also in populations that are harder to reach in healthcare settings [52]. These interventions typically aim to increase not only compassion towards others but also self-compassion and mindfulness, both of which have been recently linked to beneficial health behaviors [53–55]. In addition to interventions that increase compassion in adulthood, programs that enhance the characteristics of the childhood environment (e.g., the quality of the parent-child relationship) may be useful in promoting compassion [56]. Furthermore, a positive rearing environment may also prevent health risk behaviors in the offspring in adulthood [57].

Taken together, our findings suggest that dispositional compassion supports avoiding risky health behaviors particularly with regard to excessive alcohol use, but to some degree, also in terms of smoking initiation. These results have promising implications for both researchers and practitioners who are interested in promoting healthy lifestyle and preventing substance abuse. In addition to the documented direct benefits of compassion for individual health and well-being, compassion training might also influence health indirectly by reducing the health burden of smoking and alcohol consumption.

In addition to personality dispositions, environmental factors such as social networks and social support influence health behavior, but these environmental factors also interact with individual characteristics [58]. Contributing factors for health behaviors are, therefore, multifaceted and socially embedded. Although our findings

suggest that increased social support is not driving the association between compassion and alcohol use, further studies that cover a broader range of social influences and investigate the mechanisms responsible for the link between compassion and health behavior outcomes are warranted. In addition to social influences, emotion regulation and stress responses are other potentially important factors through which compassion may influence health-related behavior. Future studies on, for example, the effects of compassion on dietary habits could also provide further insights into how being compassionate might support healthy lifestyle choices.

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Table 1. Demographics and descriptive statistics for the study variables in 2011

Variable		n (%)	mean	sd	min	max
Sex						
	female	760 (58%)				
	male	548 (42%)				
Age			42.96	5.04	34	49
Income			7.26	3.01	1	13
Years of education			15.52	3.56	9	30
Compassion			3.77	0.59	1.1	5
Physical activity index score			9.04	1.87	5	15
Inactive						
	yes	84 (8%)				
	no	959 (92%)				
Smoker						
	yes	162 (12%)				
	no	1146 (88%)				
Never smoked						
	yes	691 (53%)				
	no	617 (47%)				
At-risk drinking						
	yes	181 (14%)				
	no	1127 (86%)				
Binge drinking						
	yes	291 (22%)				
	no	1017 (78%)				

Note. *Income* was assessed with a 13-point scale. *Inactive*: Taking <5000 steps/day and belonging to the lowest physical activity index score tertile. *Smoker*: Smoking at least 1 cigarette/day. *At-risk drinking*: Consuming more than 1 (women) or 2 (men) units of alcohol a day. *Binge drinking*: Drinking at least 6 units of alcohol in a single session more frequently than once a month.

Table 2. Cross-sectional associations between compassion and health behaviors

	Physical activity PA index score		Smoking		Alcohol use	
	Inactive OR	Smoker OR	Never smoked OR	At-risk use OR	Binge drinking OR	
Model 1	0.20* [0.03,0.36]	1.02 [0.69,1.50]	0.74* [0.58,0.95]	1.55*** [1.30,1.85]	0.60*** [0.48,0.77]	0.51*** [0.41,0.62]
Model 2	0.13 [-0.04,0.30]	1.10 [0.74,1.63]	0.86 [0.66,1.12]	1.42*** [1.18,1.71]	0.62*** [0.48,0.80]	0.58*** [0.46,0.72]
Model 3	0.11 [-0.06,0.28]	1.13 [0.76,1.69]	0.89 [0.68,1.17]	1.36** [1.11,1.66]	0.64*** [0.49,0.83]	0.58*** [0.46,0.73]

Note. $N=1313-1437$, except for the outcome inactive, for which $N=1047-1098$. 95% confidence intervals in brackets. Model 1: no adjustments. Model 2: adjusted for age, sex, and SES. Model 3: additionally mutually adjusted for the other indicators of health behavior.

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

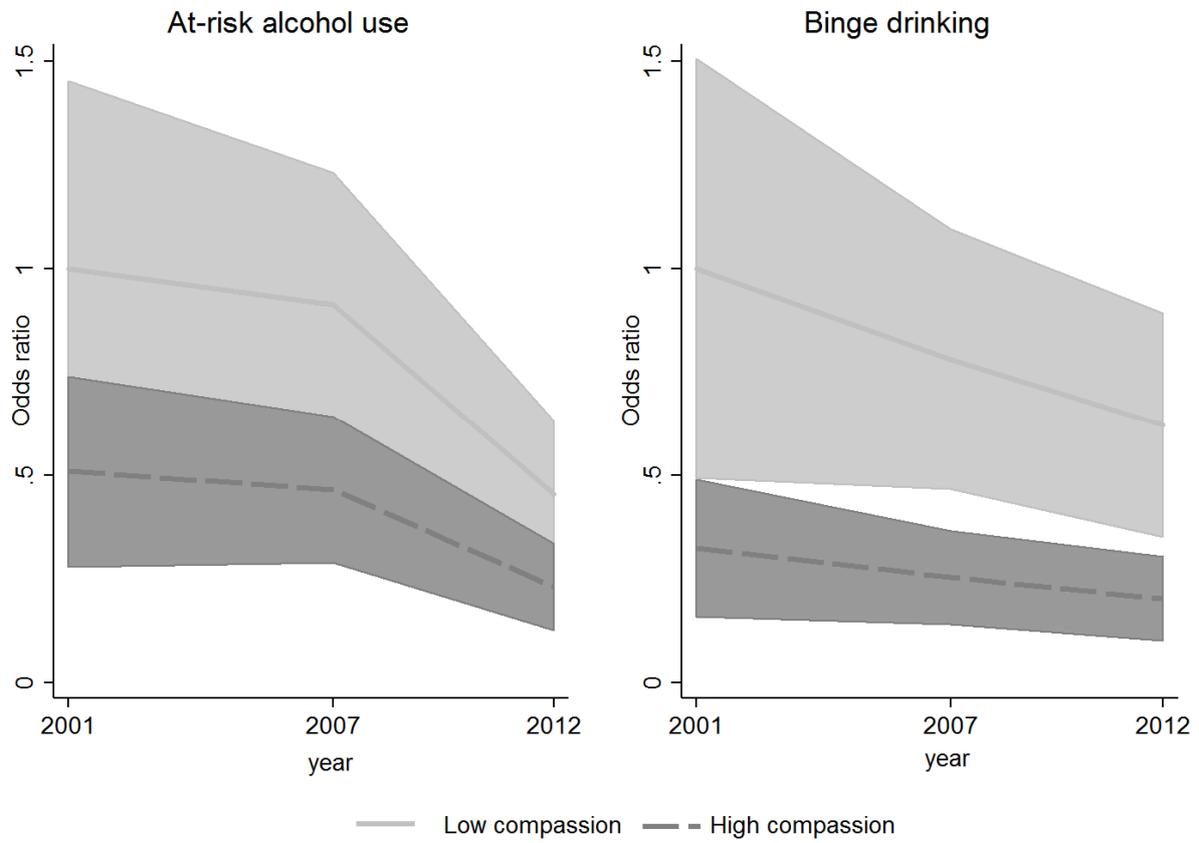


Figure 1. Predicted odds ratios and 95% CIs of alcohol use related behaviors in 2001 (reference category), 2007, and 2011 by low and high levels (± 1 SD) of compassion in 1997. Adjusted for age, sex, SES, physical activity, and smoking status.

Table 3. Compassion (1997) predicting having never smoked (2011) and alcohol related health behaviors (2001, 2007, and 2011)

	Smoking	Alcohol use (binary outcomes)		Alcohol use (non-binary outcomes)	
	Never smoked	At-risk use	Binge drinking	Drinks/d ay	Frequency of binge drinking
	OR	OR	OR	β	OR
Model 1	1.24** [1.06,1.45]	0.66*** [0.52,0.84]	0.38*** [0.29,0.51]	-0.10*** [-0.13,-0.06]	0.41*** [0.32,0.52]
Model 2	1.15 [0.98,1.36]	0.63*** [0.48,0.82]	0.45*** [0.33,0.61]	-0.08*** [-0.11,-0.04]	0.48*** [0.38,0.62]
Model 3	1.08 [0.91,1.29]	0.62*** [0.48,0.81]	0.45*** [0.33,0.61]	-0.08*** [-0.11,-0.04]	0.50*** [0.39,0.64]

$N=1279-1392$ (smoking), $N=1612-1913$ (alcohol use). 95% confidence intervals in brackets. Model 1: no adjustments. Model 2: adjusted for age, sex, and SES. Model 3: additionally mutually adjusted for other indicators of health behavior. All covariates for the smoking outcome were time-invariant, whereas the models for alcohol use have the following time-varying covariates: SES (measured in 2007 and 2012, with values from 2007 copied to 2001); smoking status (2001, 2007, and 2011); and physical activity (2001, 2007, and 2011). Frequency of binge drinking was modelled with ordered logistic regression. The response options were 1) seldom or never; 2) 2-6 times a year; 3) once a month; 4) 2-3 times a month; 5) once a week; and 6) at least twice a week.

* $p<0.05$, ** $p<0.01$, *** $p<0.001$