Can the Big Five explain the criterion validity of Sense of Coherence for mental health, life satisfaction, and personal distress?

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Can the Big Five explain the criterion validity of Sense of Coherence for mental health, life satisfaction, and personal distress?

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Abstract

Objective: Several studies have demonstrated a strong overlap in variance between the salutogenic construct Sense of Coherence (SOC) and the Big Five personality traits, yet the unique contributions of these overlapping constructs remain debated. Specifically, the statistical association between SOC and neuroticism has been taken as evidence for SOC representing a fundamental personality trait in disguise. The present research explored the incremental validity when predicting crucial psychological outcomes: mental health, satisfaction with life, and psychological distress.
Method: Participants ($N = 1842$; 1574 female, 268 male, age 15–77 years), who completed an online survey, answered health-relevant questionnaires (SCL-K-9, SWLS, IRI-PD).
Results: Multiple regression analysis showed that the Big Five can explain 40% of the observed variance in SOC. However, when using all variables as predictors of mental health, satisfaction with life, and personal distress, SOC showed substantial incremental validity over the Big Five traits.
Conclusion: Despite overlapping variance, the importance of salutogenesis beyond the Five Factor Model can be demonstrated specifically for health outcomes. Differences in criterion validity and incremental validity of SOC imply that SOC cannot be equated with reversed neuroticism.

Keywords: Sense of Coherence, Neuroticism, Big Five personality factors, Incremental validity, Mental health, Life satisfaction

1. Introduction

Sense of Coherence (SOC) is the core concept of Antonovsky's salutogenic theory. It is a general resistance resource that promotes resilience and health (Antonovsky, 1987, 1998). Three factors are thought to underlie SOC: *comprehensibility*, an individual's perception that situations and events are structured and clear; *manageability*, an individual's belief of having the necessary skills to deal with life challenges; and *meaningfulness*, the conviction that the demands and challenges of life are worthy of investment and engagement. SOC is conceptualized as a general "orientation-to-life", rather than a fundamental personality trait. It supposedly protects one's health in the face of critical and stressful life events, yet can only develop by coping with adverse events in childhood, adolescence, and young adulthood.

Converging with theoretical expectations, SOC has strong associations with health and health-related behavior (Eriksson & Lindström, 2006; Togari, Yamazaki, Takayama, Yamaki, & Nakayama, 2008). Specifically, it has been shown to predict psychological well-being (Nilsson, Leppert, Simonsson, & Starrin, 2010), depression (Eriksson, Lindström, & Lilja, 2007; Haukkala et al., 2013), and anxiety (Moksnes, Espnes, & Haugan, 2013). SOC appears to be a psychological resource of resilience. But whether SOC is a genuine construct of theoretical importance has been questioned, because fundamental personality factors—such as the Big Five personality factors (McCrae & Costa, 1987)—are prime candidates for achieving predictive validity in these domains, and, as we will see, particularly neuroticism shows strong agreement with SOC.

The present contribution addresses the uniqueness of SOC. We will first explore the relationships among SOC and the Big Five. Second, we will test the strength of the associations each competing construct has with mental health and related variables such as personal distress (as part of empathy) and life satisfaction.

1.1. Disentangling construct overlap between Sense of Coherence and neuroticism

The uniqueness of SOC as a construct can be challenged by the view that the Big Five traits explain substantial amounts of SOC variance. This view stands in contrast to Antonovsky's (1987) theory, which implies that SOC is not a temperamental personality trait, but rather a general "orientation to life", which develops under highly individual-specific life challenges. Hence, SOC should be rather malleable, acquired during adolescence, develop into

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adulthood, only to reach stability around the age of 30 (Antonovsky, 1987). Assuming temporal instability of SOC among young people has promoted the view that SOC cannot be a reasonable predictor of mental health; not in the long run. In the face of predictive validity, SOC might better be explained by personality traits that stabilize its variance. Researchers critical of SOC contend that it could be a mere correlate of other traits, or a byproduct of mental health, rather than a causal factor (e.g., Geyer, 1997).

Several empirical findings are in line with such a SOC-critical view. First, SOC resembles emotional stability (Gibson & Cook, 1996) as evident in strong negative associations with neuroticism (r = -.85 to -.56; Feldt, Metsäpelto, Kinnunen, & Pulkkinen, 2007; Hochwälder, 2012). The statistical association puts the distinctiveness of SOC as a construct into question, because emotional stability, or (reversed) neuroticism, has a sound biological basis (Haas, Omura, Constable, & Canli, 2007; Norris, Larsen, & Cacioppo, 2007), including genetic foundations (Rettew et al., 2006; Wray, Birley, Sullivan, Visscher, & Martin, 2007). Second, SOC can be measured surprisingly well among children as young as only 12 years old (Honkinen, Suominen, Rautava, Hakanen, & Kalimo, 2006). This is compatible with temperamental aspects that emerge during early childhood (Edmonds, Goldberg, Hampson, & Barckley, 2013). Third, although initially expected to be fluctuating at young age (Antonovsky, 1987), SOC is relatively stable not only among adults, but also among adolescents over the course of at least 5 years (Feldt, Leskinen, Kinnunen, & Mauno, 2000; Feldt, Leskinen, Kinnunen, & Ruoppila, 2003; Grevenstein, Bluemke, Nagy, Wippermann, & Kroeninger-Jungaberle, 2014; Hakanen, Feldt, & Leskinen, 2007). This is reminiscent of traits that show rather stable characteristics (Wray et al., 2007). Fourth, like SOC, neuroticism is useful for predicting mental and physical health outcomes (Costa & McCrae, 1987; Gale, Booth, Mõttus, Kuh, & Deary, 2013; Grav, Stordal, Romild, & Hellzen, 2012; Lahey, 2009; Williams, O'Brien, & Colder, 2004).

Finally, there is considerable variance overlap between SOC and other Big Five personality traits (Costa & McCrae, 2009). Apart from the strong negative associations with neuroticism (N), small positive correlations have been reported with extraversion (E), agreeableness (A), and conscientiousness (C) (Feldt et al., 2007; Hochwälder, 2012). People's SOC scores might reflect the interplay of these basic traits, which explain up to 40% of SOC variance (Hochwälder, 2012) and challenge SOC as a theoretically genuine concept.

A conclusive answer can only be reached by letting the constructs compete against each other and inspect shared and unique components when predicting relevant criteria (Judge, Erez, Bono, & Thoresen, 2002). Any lack of predictive validity of SOC above and beyond the Big Five traits for relevant criteria would be in line with the idea that SOC reflects neuroticism in disguise, or forms a broader index of fundamental personality traits. On a theoretical note, *if* unique predictive validity existed, the relative contributions of the most important personality factors in etiopathogenesis and salutogenesis might be disentangled. This could advance our understanding of personality and health-related aspects. In line with Antonovsky's theory, we expected empirical support for the unique value of SOC.

1.2. Validation criteria: mental health, personal distress, and life satisfaction

In the light of the patterns above, we expected SOC to be associated with *mental health*. Though N might predict mental health, SOC was expected to show incremental validity.

Traditionally, empathy was considered a positive aspect of mental health too. It has been found to be negatively related to psychological disorders such as depression (Schreiter, Pijnenborg, & aan het Rot, 2013) and schizophrenia (Smith et al., 2012). A prominent model by Davis (1980, 1983) distinguishes four dimensions, one of them being *personal distress (PD)*—a person's disposition to feel uncomfortable when faced with emotionally challenging social situations. Not only have the dimensions of empathy been associated with the Big Five, but specifically PD was closely related to N (Lee, 2009; Mooradian, Davis, & Matzler, 2011). Given that SOC buffers against the distress experienced during life challenges, PD qualifies as a criterion to which both SOC and N might contribute to. SOC's incremental validity for predicting PD above and beyond N (and other Big Five traits) would strengthen the salutogenic view.

Satisfaction with life has long been identified as an aspect of mental and physical health (Headey, Kelley, & Wearing, 1993; Strine, Chapman, Balluz, Moriarty, & Mokdad, 2008). In line with prior research, we expected SOC to be associated with life satisfaction (Pallant & Lae, 2002). Incremental validity of SOC over N would, again, show that there is a unique source of variance that cannot be attributed to N (or other Big Five traits).

Taken together, our research not only re-investigated the relationships between SOC and the Big Five traits; we simultaneously inspected criterion validity with regard to the aforementioned health-related variables. Only if it can empirically be shown that SOC possesses incremental validity over classic personality traits, one can argue that SOC covers unique aspects, constituting an important, and valid, construct of its own.

2. Methods

2.1. Procedure and participants

The data were collected as part of a study on personality and health-related variables, which also explored relationships with nutrition and vegetarianism/veganism, so participants also reported on eating habits not considered here. Participants took an online survey advertised at social media sites (e.g., Facebook) and announced via local university e-mail lists. Participants were informed about the study goals, that participation was completely voluntary, and that they could drop out any time. Only complete responders' data were analyzed. On separate webpages participants encountered (a fixed order of) questionnaires as detailed below. After thanking participants, they could partake in a lottery of vouchers (25€).

The final sample included 1842 individuals (M_{age} = 28.11 years, SD = 9.22; n = 4 did not indicate age). According to levels of education, sampling was relatively proportional to recent educational trends in Germany, with 18.3% basic schooling, 45.6% high school degrees, or 36.1% university entrance level (one participant did not provide any information). The sample was less balanced in terms of genders, n = 1574 female (85.5%) and n = 268 male (14.5%). Given the scope of the study, self-selection may explain the disproportionately high number of females. Consequently, we controlled for participants' sex in addition to age and level of education.

2.2. Measures

2.2.1. SOC-13: Sense of Coherence

The German, previously validated, 13-item adaptation of Antonovsky's original orientation to life scale (Schumacher, Gunzelmann, & Brähler, 2000a; Schumacher, Wilz, Gunzelmann, & Brähler, 2000b) includes four meaningfulness items (e.g., "Do you have the feeling that you don't really care about what goes on around you?"), five comprehensibility items (e.g., "Has it happened in the past that you were surprised by the behavior of

people whom you thought you knew well?") and four manageability items (e.g., "Has it happened that people whom you counted on disappointed you?"). Answers were provided on 7-point rating scales (mostly labeled from 1 = ''very rarely'' to 7 = ''very often''). Assuming interval scale level, we computed mean scores (Cronbach's α= .83).

2.2.2. BFI-25: Big Five

We assessed basic traits with the German 25-item Big Five Inventory (Gerlitz & Schupp, 2005), an abbreviated version of the original BFI by John, Donahue, and Kentle (1991). Each dimension is reflected by five items, each starting with the introduction "I see myself as someone who...", for instance, "gets nervous easily" (N), "is talkative" (E), "is inventive" (O), "is considerate and kind to almost everyone" (A), and "does a thorough job" (C). Answers were given on 7-point rating scales ranging from 1 = "no, do not agree at all" to 7 = "yes, totally agree". Mean scores were computed for the each trait. The scale reliabilities in our sample were mostly satisfactory to good, with α = .79, .85, .83, .68, and .79 for N, E, O, A, C, respectively.[1]

2.2.3. SCL-K-9: mental health

Psychological symptoms during the last 7 days were assessed with the Symptom Checklist-K-9 (SCL-K-9; Klaghofer & Brähler, 2001). This brief 9-item version of the seminal SCL-90-R by Derogatis and Fitzpatrick (2004) captures a wide range psychopathological symptoms, such as depression (e.g., "In the last seven days, how much did you suffer from a feeling that you had to worry too much?"). Answers were provided on 5-point scales (0 = "symptom not present"; 4 = "experienced distress induced by the symptom very high"). The mean score was aggregated across items to form a mental health index (α = .85).

2.2.4. SWLS: satisfaction with life

The Satisfaction With Life Scale (SWLS) is a succinct 5-item measure of a global judgment of satisfaction with one's own life (Diener, Emmons, Larsen, & Griffin, 1985). The scale is known to be a reliable and valid measure across diverse samples (Diener, Inglehart, & Tay, 2013). A German adaptation was provided by Glaesmer, Grande, Braehler, and Roth (2011). Items include "In most ways my life is close to my ideal" and "I am satisfied with my life". Participants' scores on 7-point scales (1 = "strongly disagree"; 7 = "strongly agree") were aggregated to a scale mean (α = .88).

2.2.5. IRI: personal distress

We used a German 16-item adaptation of the Interpersonal Reactivity Index (IRI), the Saarbrücker Persönlichkeitsfragebogen by Paulus (2009). Based on the original work by Davis (1980, 1983), the IRI is one of the most popular measures of empathy. It assesses four distinct dimensions of empathy with four items for each dimension. Of primary concern here is the subscale personal distress (PD; e.g. "I feel helpless when I am in an emotionally charged situation"). Answers were given on 5-point frequency scales (1 = "never"; 5 = "always"). The PD subscale mean formed the criterion (α = .72).

2.3. Statistical analysis

Using SPSS 21, we initially replicated Hochwälder's (2012) approach to decompose SOC via multiple regression analysis into variance reflected in the Big Five traits. Then we predicted each criterion variable in separate multiple regression analyses on the basis of all the Big Five traits plus SOC. Due to the large sample size, even small regression weights were likely to be significant at α = .05. To not capitalize on random covariation, we considered only predictors with $|\beta| > .10$—arguably an artificial cut-off. Finally, we checked for interactions with participant sex. Multicollinearity was not an issue according to the tolerance measure and the variance inflation factor, all *VIFs* < 1.72.

3. Results

3.1. Initial data analysis

In our sample, women scored significantly higher than men on N, E, C, and A, but not SOC (Table 1).[2] They reported significantly higher PD scores than men, but at the same time they had higher SWLS scores. The zero-order correlations among the study variables confirmed that SOC and N were closely related, yet not identical (Table 2). Also, SOC correlated with all three criteria, but so did N. The question of construct uniqueness cannot be decided on the basis of mere correlations.

3.2. SOC from the perspective of the Big Five

In a multiple regression analysis, controlling for the statistically significant covariates age ($\beta = .09$) and education ($\beta = .11$), SOC was significantly related to N ($\beta = -.40$), E ($\beta = .18$), C ($\beta = .22$), and A ($\beta = .18$), though not to sex ($\beta = -.02$) and openness ($\beta = -.02$); multiple-R^2 = .42, $F(8,1828) = 164.94$, $p < .001$. These findings mirrored the general finding reported by Hochwälder (2012), namely that the Big Five alone can explain 40% of the SOC-variance ($\beta_N = -.41, \beta_E = .19, \beta_O = .01, \beta_C = .23, \beta_A = .18$), $F(5,1836) = 245.12$, $p < .001$. The previously noted overlap among the constructs, specifically the strong association of SOC with N, and the small associations with E, C, and A, was confirmed in our German sample.

Note that the relationships SOC has with the secondary Big Five factors among Germans are not identical to the ones found among Swedes (Hochwälder, 2012). Different from what Hochwälder found, A was as strongly related to SOC as E among Germans. In his study, E and C were significant predictors only for women, not for men. Furthermore, O emerged as a significant predictor in Sweden only after partialling out variance of control variables, but different ones for men and women. While the relationship between SOC and N appeared to be replicable, relationships with the remaining Big Five traits appeared to be volatile across different genders already within the Swedish culture, and they do not replicate easily across different cultures.

3.3. Incremental validity of SOC over and beyond the Big Five

We examined the incremental validity while hierarchically regressing three criteria related to mental health—SCL, SWLS, and PD—on control variables in the first step, Big Five traits in the second step, and SOC in a third step (Table 3). Despite being statistically significant by virtue of high precision in the large sample, some factors hardly contributed uniquely ($|\beta| \leqslant .10$), so we dropped them in simplified models in a final step. The demographic variables mostly had negligible associations at the initial step, yet the Big Five explained 29%, 19%, and 32% of variance of

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[1] The moderate reliability of A may be of concern to some readers. Yet in a sample of almost 700 Swedes, A did not explain SOC variance at all after controlling for other traits (Hochwälder, 2012). Also, our large sample size would be sufficient to detect even traces of a relationship, making up for the moderate scale reliability.

[2] Surprisingly, SOC sum scores ($M = 57.00$, $SD = 11.56$) were significantly lower ($d = .71$) than the values previously reported ($M = 65.19$, $SD = 11.60$; Schumacher et al., 2000), calling for proper standardization with normative samples in Germany.

Table 1

Sample characteristics and gender difference tests for study variables.

	Total (N = 1842) M (SD)	Men (n = 268) M (SD)	Women (n = 1574) M (SD)	t (df)	p	d
Sense of Coherence (SOC)	4.38 (0.89)	4.38 (0.82)	4.39 (0.90)	0.13 (385.28)	.900	0.01
Neuroticism (N)	4.46 (1.11)	4.02 (1.05)	4.53 (1.13)	7.09 (1840)	<.001	0.33***
Extraversion (E)	4.17 (1.23)	3.96 (1.20)	4.20 (1.23)	2.95 (1840)	.003	0.14**
Openness (O)	5.41 (1.05)	5.36 (1.00)	5.41 (1.06)	0.70 (1840)	.481	0.03
Conscientiousness (C)	5.04 (1.08)	4.65 (1.02)	5.10 (1.08)	6.36 (1840)	<.001	0.30***
Agreeableness (A)	5.21 (0.95)	5.02 (0.89)	5.24 (0.96)	3.54 (1840)	<.001	0.17***
Mental health (SCL-K-9)	2.20 (0.78)	2.11 (0.72)	2.22 (0.79)	2.23 (1840)	.026	0.10*
Life satisfaction (SWLS)	4.66 (1.33)	4.49 (1.29)	4.68 (1.33)	2.24 (1840)	.025	0.10*
IRI personal distress (PD)	11.51 (2.89)	10.41 (2.62)	11.70 (2.90)	7.31 (387.03)	<.001	0.47***

Note: Men and women differ significantly at *$p < .05$, **$p < .01$, ***$p < .001$, corrected for unequal variances, with *d* as Cohen's effect size.

Table 2

Correlations of mean scores of focal study variables.

	Age	Sex	Edu	SOC	N	E	O	C	A	SCL	SWLS
Age	–										
Sex	.04	–									
Education (Edu)	-.06*	.03	–								
Sense of Coherence (SOC)	.16**	.00	.14**	–							
Neuroticism (N)	-.10**	-.16**	-.05*	-.52**	–						
Extraversion (E)	.05*	-.07**	.02	.32**	-.26**	–					
Openness (O)	.01	-.02	.04	.07**	-.03	.19**	–				
Conscientiousness (C)	.11**	-.15**	.03	.33**	-.12**	.06*	.07**	–			
Agreeableness (A)	.01	-.08**	-.01	.30**	-.14**	.07**	.11**	.21**	–		
Mental health (SCL-K-9)	-.18**	-.05*	-12**	-.70**	.51**	-.23**	.00	-.28**	-.16**	–	
Life satisfaction (SWLS)	-.05	-.05*	.14**	.63**	-.31**	.27**	.05*	.25**	.19**	-.47**	–
Personal distress (PD)	-.09**	-.16**	-.05*	-.53**	.54**	-.31**	-.08**	-.20**	-.12**	.50**	-.27**

Note: Correlations are significant at *$p < .05$, **$p < .01$, ***$p < .001$.

Table 3

Prediction of study criteria by Big Five personality factors and SOC in multiple regression analysis.

	Models for mental health (SCL-K-9)				Models for life satisfaction (SWLS)				Models for personal distress (IRI-PD)			
	$\beta_{Step 1}$	$\beta_{Step 2}$	$\beta_{Step 3}$	$\beta_{Step 4}$	$\beta_{Step 1}$	$\beta_{Step 2}$	$\beta_{Step 3}$	$\beta_{Step 4}$	$\beta_{Step 1}$	$\beta_{Step 2}$	$\beta_{Step 3}$	$\beta_{Step 4}$
Step 1: Demographic variables												
Age	-.18***	-.11***	-.06**	–	-.03	-.09***	-.15***	-.15***	-.09***	-.01	.02	–
Sex	-.04	-.02	-.02	–	-.06*	-.04	-.03	–	-.15***	-.12***	-.12***	-.12***
Education	-.12***	-.09***	-.03	–	.14***	.12***	.05*	–	-.05*	-.02	.02	–
Step 2: Personality variables												
Neuroticism (N)		.43***	.20***	.20***		-.23***	.02	–		.44***	.32***	.31***
Extraversion (E)		-.10***	.00	–		.20***	.09***	–		-.19***	-.13***	-.14***
Openness (O)		.06**	.05**	–		-.03	-.01	–		-.02	-.02	–
Conscientiousness (C)		-.20***	-.07***	–		.20***	.06**	–		-.14***	-.07***	–
Agreeableness (A)		-.06**	.04*	–		.11***	.00	–		-.02	.04*	–
Step 3: Sense of Coherence												
Sense of Coherence (SOC)			-.58***	-.60***			.62***	.66***			-.32***	-.33***
Model summary												
Model F	30.92***	117.57***	234.85***	1793.20***	14.68**	62.61**	156.28**	669.72**	21.30**	122.71***	140.24***	308.04***
df	3, 1833	8, 1828	9, 1827	1, 1835	3, 1833	8, 1828	9, 1827	2, 1834	3, 1833	8, 1828	9, 1827	4, 1837
R^2	.05	.34	.54	.52	.02	.21	.44	.42	.03	.35	.41	.40
ΔR^2		.29	.20	-.02		.19	.23	-.02		.32	.06	-.01

Note: Beta weights are significant at *$p < .05$, **$p < .01$, ***$p < .001$.

the criteria at the second step. SOC additionally accounted for 20%, 23%, and 6% of the variance above and beyond the Big Five at the third step. Similar advantages of SOC over N had existed at the zero-order level when SOC correlated numerically higher with SCL and SWLS than N; however, the regression models are better suited to test the relative increments in the presence of confounders such as the other Big Five and demographic variables.

Both the correlational analyses and the full models are consistent with what is captured in the simplified models: SOC was a significant predictor of each criterion. In terms of the unique value attributed to the predictors, (a) SOC and N contributed about equally when predicting PD; (b) SOC was a stronger predictor of SCL than N; and (c) in the case of SWLS, N did not predict variance at all, only SOC did. Typically, SOC and N together explained about 40–50% of criterion variance. Notably, SOC offered clear-cut improvements despite competing against four other fundamental personality traits and control variables. Notwithstanding that the relative strength depended on the type of criterion, the pattern substantiates the incremental validity of SOC over N in the domain of health and well-being.

When adding the interactions between the personality factors including SOC and sex at a conventional level of α = .05, two significant interactions with sex emerged (one SOC × sex interaction for SCL, β= .21, p = .05; one E × sex interaction for PD, β = -.17, p = .013). However, none of these interactions was significant after adopting a rather liberal Bonferroni-corrected significance level for the 15 predictors of each criterion variable (α* = α/15 ≈ .003). Anyway, none of these unpredicted and negligible interaction terms (ΔR^2 < .003) altered our conclusions about the relative merits of N and SOC as predictors.

For a stricter test, we ran multi-group analyses in AMOS to compare the regression models for men and women. The regression weights were not significantly different, with the only notable exception being that E was a stronger predictor of PD for men than women. Both groups yielded—within error margins—identical regression parameters, so none of the conclusions about the relative merits of SOC and N depended on participant sex. To preclude any effects due to unequal sample sizes, we reran the analyses on a randomly drawn third from the female sample (alternatively two thirds), yet results were not affected by sample size. The regression models were free from any undue impact of participant sex.

4. Discussion

The goal of our study was to re-examine the relationship between Sense of Coherence (SOC) and the Big Five personality traits. While replicating substantial overlapping variance among them, we showed incremental validity for mental health outcomes such as psychological symptoms (SCL), satisfaction with life (SWLS), and personal distress (PD). Not only do our results confirm a considerable similarity between SOC and N, we also found small positive associations with E, C, and A. Despite shared variance, SOC had substantial incremental validity over all of the Big Five traits, underscoring the applicability of SOC as a useful predictor for health outcomes. If SOC did not represent anything more than the opposite of N—so the argument goes—it could not have been of much use, especially when trying to predict beyond what the Big Five traits are already capable of. Yet, as already observed by Hochwälder (2012), "SOC describes additional aspects in people that are not captured by the Big Five personality factors" (p. 594).

On the basis of shared variance and the mere assumption of SOC being a changing global orientation (while personality factors are rather stable) it has been argued that it is more likely that personality influences SOC rather than the other way around (Hochwälder, 2012). While we concur with the conclusion in a very strict sense, one must be careful not to misjudge SOC as a construct, as if SOC represented *nothing else* than a very specific constellation of various personality factors. Given the emerging literature (Grevenstein et al., 2014), the premise of the argument—malleability of SOC—might already be flawed, hence the argument should better not be continued. Our contribution goes beyond previous research by showing that SOC has uniqueness not captured by broad personality traits—variance that still is related to mental health. The accumulating evidence lends some credibility to the importance of salutogenic processes, though not necessarily to the idea of SOC as malleable construct as conceived of by Antonovsky (1987).

4.1. Limitations and future research

The present research was based on a large-scale online study, which covered aspects of nutrition and vegetarianism/veganism too. Even though we have used established measures, validity in the context of an online study is partly unclear; still the measures exhibited good reliability. A gender-balanced sample would have had more statistical power to reveal any differences between subgroups if they existed; still the male sample size was not underpowered to detect statistical associations. All the available evidence from split analyses or random subsampling pointed to similarly strong relationships for both genders.

One shortcoming of the present research is the lack of longitudinal data. It is impossible to infer on the basis of our study design—and never was intended—whether SOC and the Big Five are more likely to be causal factors or whether they emerge as mere covariates of health-related aspects. Despite Antonovsky's conception of SOC as a malleable "orientation to life", rather than a personality trait, SOC has been found to be a stable attribute of individual differences, not easily shaped by outside factors (Grevenstein et al., 2014; Honkinen et al., 2008). Our cross-sectional study offers a mere snapshot of the variable relationships. Future studies should examine whether SOC has long-term incremental validity beyond the Big Five traits. To nourish our understanding of the contribution of salutogenesis and personality to mental health, a direct cross-cultural comparison is also advised, if only to better understand the differences between Swedes and Germans.

4.2. Conclusion

Focusing on the boundary conditions and reflecting on the choice of criteria, while establishing incremental validity of salutogenic and personality factors, are important additions to the personality research agenda. We showed that SOC is correlated with Big Five factors, but not redundant. Although the Big Five explain almost half of the variance, SOC possesses incremental validity in the domain of health. The origin of this uniqueness awaits further empirical clarification.

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