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Sense of coherence and substance use: Examining mutual influences



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ABSTRACT

Sense of coherence (SOC) is conceptualized as a mutable orientation to life, but has often been found a stable attribute of individual differences. While several studies have documented the relationship between SOC and substance use, nothing is known about mutual influences between both variables over time in adolescence. The present study examines whether changes in SOC predict changes in substance use, or whether changes in substance use predict changes in SOC. A longitudinal cross-lagged panel design was used to inspect SOC and self-reported frequency of substance use of tobacco, alcohol, and cannabis over the course of ten years. Participants were 318 German adolescents aged 14–15 at the beginning of the study. Structural equation modeling indicated a single significant negative path from SOC to later cannabis use as well as one significant positive path from cannabis use to SOC. Despite a general association – high SOC corresponds to less substance use – SOC overall develops independently from substance use.

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1. Introduction

Sense of coherence (SOC) is the core aspect of Antonovsky's salutogenic theory and is conceptualized as a general resistance resource that promotes health (Antonovsky, 1987, 1998). In this theory, health is not understood merely as an on/off state, but as a continuum between health and disease. A stronger SOC should enable people to move towards the health-end of this continuum.

According to Antonovsky, SOC represents a general "orientation-to-life". It protects people's health in the face of adversities like critical life events and stress. Theoretically, three major factors constitute SOC: comprehensibility, that is, an individual's perception that situations and events are structured and clear; manageability, that is, an individual's belief that she has the necessary skills to deal with the challenges of life; and meaningfulness, that is, an individual's belief that the demands and challenges of life are worthy of investment and engagement.

The positive influence of a SOC has been described numerous times. For example, SOC has been linked to positive mental health and health-related behavioral outcomes (Eriksson & Lindström, 2006; Togari, Yamazaki, Takayama, Yamaki, & Nakayama, 2008), general psychological well-being (Nilsson, Leppert, Simonsson, & Starrin, 2010), depression (Haukkala et al., 2013), and anxiety

(Moksnes, Espnes, & Haugan, 2013). SOC has also received increasing attention regarding the development of adolescent health issues (Rivera, García-Moya, Moreno, & Ramos, 2013). Concerning substance use, high SOC was shown to predict reduced tobacco use and lesser consumption of alcohol (Mattila et al., 2011) as well as less alcohol-related behavioral problems (Nilsson, Starrin, Simonsson, & Leppert, 2007). This is especially important, as early and high-frequent consumption has been associated with the development of later problematic consumption styles (Behrendt, Wittchen, Höfler, Lieb, & Beesdo, 2009).

Antonovsky (1987) described the development of SOC as a dynamic process up to the age of 30 that is supposedly influenced by external factors. Adolescence is seen as a particularly important developmental phase for the development of SOC, and SOC is expected to be mutable and fluctuant at this age. As such, SOC can be seen as part of an individual's ontogenesis characterized by several developmental tasks (Havighurst, 1972; Hurrelmann & Quenzel, 2012). It has been documented that the use of psychoactive substances is an important aspect of adolescent health behavior (Silbereisen, Noack, & Reitzle, 1987; Young et al., 2002) and, as such, could also be considered a developmental task, for instance, an individual's quest for autonomy from the (adult or peer) mainstream, achieving peer-group acceptance, or the development of coping strategies (Hurrelmann & Quenzel, 2012). SOC might either be a protective factor for these tasks, yet it might as well be the result of successful coping.

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The mutability and flexibility of SOC has received increasing attention in recent years. Several studies have documented a surprising stability of SOC and a high test-retest reliability in adulthood (Feldt, Leskinen, Kinnunen, & Mauno, 2000; Feldt, Leskinen, Kinnunen, & Ruoppila, 2003). In younger ages, SOC has also been shown to be rather stable, even through adolescence (Honkinen et al., 2008). Similarly, SOC has been found not only to be a predictor, but also an outcome of health. Longitudinally, psychological symptoms at the age of three (as reported by parents) predicted lower SOC scores 15 years later at age 18 (Honkinen et al., 2009). Theoretically, this association is astonishing, but it is not possible to control for the level of SOC at such an early age. Contrasting these results on stability, SOC has been shown to increase after positive life events, such as recovery from major depression (Skärsäter et al., 2009), social intervention for unemployed people (Vastamäki, Moser, & Paul, 2009), therapeutic intervention (Weissbecker et al., 2002), and even after clinical rehabilitation from cannabis abuse (Lundqvist, 1995). Consequently, SOC has been shown to decrease after negative life events (Lövhheim, Graneheim, Jonsén, Strandberg, & Lundman, 2013).

Given the astounding documented mutability of SOC, the following research aims to examine mutual influences between SOC and substance use of tobacco, alcohol, and cannabis. While the importance of SOC regarding substance use has been documented before, no study has focused on mutual influences, that is, whether a change in one variable can predict a change in the other variable at a later time. If SOC were truly flexible and considerably developed during adolescence and early adulthood, one would expect an increase in health-benefitting behavior: less substance use as SOC increases. Similarly, if SOC depended on experiences made during adolescence (in this case with psychoactive substances), we would expect SOC to be predicted over time by previous levels of substance use. To answer this question rigorously, a cross-lagged panel design (structural equation modeling) is required.

2. Methods

2.1. Study sample

The following research is part of a ten-year-longitudinal study of drug use patterns (RISA)¹ conducted in the south of Germany from 2003 to 2012. The study comprised 14 data collection events. Participants were 318 students (164 female; 51.6% and 154 male; 48.4%) with a mean age of 14 at the beginning of the study. 65.4% of the participants ($n = 208$) grew up in a traditional family, which was defined as living with both biological parents up to the age of 18 years. Level of education was also balanced across the three-tier German school system.

While there was noticeable sample attrition ($n = 134$; 42.1%) over the course of ten years, participant dropout was comparable to other studies on adolescents' development (Honkinen et al., 2009). There were some signs of systematic dropout. In comparison to participants remaining in the study until the end, those who dropped out consumed moderately more tobacco at age 14–15, $M_s = 3.59$ vs. 2.70 ($SD_s = 2.49$ vs. 2.11), $t(248.14) = 3.30$, $p = .001$, Cohen's $d = 0.39$, and more cannabis, $M_s = 1.49$ vs. 1.26 ($SD_s = 1.00$ vs. 0.70), $t(214.03) = 2.27$, $p = .024$, $d = 0.27$.

2.2. Measures

2.2.1. SOC-13: Sense of coherence

SOC was measured using an abbreviated German 13-item adaptation of Antonovsky's original Orientation to Life questionnaire

with five-point rating scales (most of the time ranging from 0 = very rarely to 4 = very often) (Abel, Kohlmann, & Noack, 1995). For comparability with a later authoritative German version developed by Schumacher and colleagues (Schumacher, Gunzelmann, & Brähler, 2000), scores were rescaled to a seven-point rating scale format using a linear transformation.² The scale 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?"). Replicating the three-factor structure of the SOC scale has been empirically challenging (Klepp, Mastekaasa, Sørensen, Sandanger, & Kleiner, 2007; Zimprich, Allemand, & Hornung, 2006). As Antonovsky (1987) stressed the holistic nature of the SOC scale and recommended not to use subscale scores, a sum score is commonly used. In our sample, Cronbach's Alpha of the scale increased from .80 to .92 over the course of ten years.

2.2.2. Substance use frequency

The substance use scale was adapted from the national survey on drug use among adolescents (BZgA, 2004). It is similar to the brief self-report drug use frequency measure provided by O'Farrell, Fals-Stewart and Murphy (2003). 6-month-substance use frequency was measured using a single item question: "How often have you used this substance in the last 6 months?" Answers were given separately for tobacco, alcohol, and cannabis on seven-point scales with the following options: (1) "not used in last 6 months", (2) "1–2 times in the last 6 months", (3) "3–5 times in the last 6 months", (4) "1–3 times a month", (5) "1–2 times a week", (6) "several times a week", and (7) "several times a day".

2.3. Statistical analysis

We used SPSS 21 for descriptive data analyses and Mplus 5.21 (Muthén & Muthén, 1998–2007) for Structural Equation Modeling (SEM). With SEM (Kline, 2011) multiple relationships among several variables in a model can be inspected concurrently. Specifically, the cross-lagged panel design allows to model unique predictive influence across time. It estimates the associations and mutual influences among the variables. Hence it allows estimating the development of psychological factors over time while controlling for interindividual differences in previous behavior. The main focus is on the diagonal (longitudinal) paths from one type of variable to another type of variable at the next time point. Vertical (cross-sectional) paths between variables, and horizontal (autocorrelative longitudinal) paths within a variable are merely used for controlling statistical covariation. Yet, the diagonal, cross-lagged paths represent partial regressions that indicate the unique predictive influence of a variable at a given time.

SEM involves the estimation of variances of variables as well as of covariances between variables (Kline, 2011). This approach usually requires larger samples as the number of variables included in a model increases. Due to sample attrition after ten years, we had to reduce the number of model parameters to be estimated and therefore aggregated data over time by computing mean scores. The RISA study included 14 data collection events. In the first four cases we aggregated three data collection events to single data points (T0, T1, T2, T3), whereas the last data point (T4) comprised only two data collection events. The five data points over the course of the ten-year study represented age 14–15 (T0), age

¹ The study was approved by the ethics committee of the University Hospital Heidelberg (No. 218/2005).

² The rescaled values resemble the norms published by Schumacher et al. (2000) who reported a SOC sum score of $M = 67.31$ ($SD = 12.09$) for men and $M = 64.52$ ($SD = 11.61$) for women spanning a wider age range from 18 to 40.

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