



Research report

Disentangling Sense of Coherence and Resilience in case of multiple traumas



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ABSTRACT

Background: Depressive and anxiety disorders (DAD) are a major public health problem. Trauma endured during childhood is known to increase the risk of DAD in adulthood. We investigate the hypothesis that Sense of Coherence (SOC) is a mediator between childhood trauma and depressive and anxious symptoms (DAD) in adulthood. We also explore the nature (personality trait or aptitude) of SOC and attempt to disentangle the concepts of resilience and SOC.

Method: Former hidden children (FHC), the Jewish youths who spent World War II in various hideaway shelters across Nazi-occupied Europe, were compared with a control group. In each group we measured the presence of multiple traumas, the resilience with the Resilience Scale for Adults, the DAD with the Hopkins Symptoms Checklist and the SOC with the SOC-13 self-report questionnaire. We tested a mediated moderation model with childhood Trauma as the predictor; Adulthood trauma as the moderator; SOC as the mediator; and DAD as the outcome variable.

Results: Results were consistent with a sensitization model of DAD partially mediated by SOC. A first component of SOC was similar to an aptitude and another part of SOC was more similar to a personality trait.

Limitations: We are unable to differentiate if the sensitization process is a consequence of the nature of the trauma endured by FHC (long-standing exposure to extreme external events) or a consequence of the fact that this first trauma occurred during childhood.

Conclusion: Our results could account for the controversial debate regarding the life time stability of SOC.

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1. Introduction

Depressive and anxiety disorders (DAD) have become a major public health problem in Western countries. For example, in the USA, lifetime prevalences of DAD are 28.8% and 20.8%, respectively (<http://www.nimh.nih.gov/index.shtml>). Therefore, an accurate understanding of the risk and protective factors influencing the occurrence of DAD is of crucial importance for both medical and economic reasons.

Trauma endured during childhood is known to increase the risk of DAD in adulthood (Terr, 1991; Wingo et al., 2010). Moreover, given that 34% of men and 25% of women in the general population have experienced two or more traumatic events during their lifetime,

understanding how people cope with multiple traumas is of particular interest (Kessler et al., 1995). Many studies converge to a sensitization model (Breslau et al., 1999; Green et al., 2000; Sullivan et al., 2009), which implies a reduction in resistance to additional stress following previous exposure to trauma.

Several scholars underlined the link between multiple traumas and DAD (Follette et al., 1996; Suliman et al., 2009). Both teams of researchers showed that DAD positively correlates with the number of traumatic experiences. However, several questions remain unanswered: do humans possess skills that might help them cope with trauma? Are these skills personality traits or aptitudes? In other words, can these skills be trained by therapeutic interventions or impaired by negative life events? Answering these questions may bring several clinical implications. On the one hand, training or restoring aptitudes appear to be relevant for therapy sessions. On the other hand, modifying personality traits, which are considered to be stable after a time of maturation (McAdams and Pals, 2006), seems less feasible.

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Assessing the way people cope with trauma can be done by several theoretical ways. However, two major concepts of adaptation to stress or trauma emerge from the literature: Sense of Coherence (SOC) (Antonovsky, 1987) and resilience (Werner et al., 1971).

Both health and stress researches initially considered the stress factors as problematic negative events in the people's life. In contrast, Antonovsky (1987) stated that disease and stress are challenges, that they occur everywhere and all the time and that it was surprising that organisms were able to survive with this constant mass exposure. His conclusion was that chaos and stress were part of life and natural conditions. Therefore, the interesting question was: how can we survive in spite of all this? The fundamental contribution of Antonovsky was to raise the philosophical "salutogenic" question of what creates health and to search for the "origin of health" rather than to look for the causes of disease in the pathogenic direction (for a review, see Lindström and Eriksson, 2006). According to this salutogenic theory, health is seen as a movement in a continuum on an axis between total ill health (dis-ease) and total health (ease) (Eriksson and Lindström, 2011; Lindström and Eriksson, 2005). As underlined by Eriksson et al. (2007), Antonovsky formulated the movement towards good health in terms of general resistance resources (GRRs) and SOC. A GRR is a physical, biochemical, artifactual-material, cognitive, emotional, valued-attitudinal, inter-personal-relational or macro socio cultural characteristic of an individual, primary group, subculture or society that is effective in avoiding and/or combating a wide variety of stressors (Antonovsky, 1987). SOC is as a global orientation to view the world and the individual environment as comprehensible, manageable and meaningful, claiming that the way people view their life as a positive influence on their health (Eriksson and Lindström, 2005). SOC is a resource that enables people to manage tension, to identify and mobilize the GRRs to promote effective coping by finding specific solutions to specific problems.

The link between SOC and DAD is well known. Eriksson and Lindström (2005, 2011) emphasized a negative correlation between SOC and DAD; more specifically, in the case of stressful life events, high levels of SOC predict fewer DAD occurrences than do low levels. Nilsson et al. (2010) emphasized the link between SOC and well-being, showing that higher level of SOC concurred with high level of well-being. Braun-Lewensohn and Sagy (2014) show a negative relationship between SOC, anger, psychological distress, and anxiety among a population of exposed to missiles attacks. Braun-Lewensohn et al. (2011) emphasized that SOC was a mediator between trauma and DAD.

However, a theoretical debate surrounds the concept of SOC and relates to deciding whether SOC is a personality trait or an aptitude. Initially, Antonovsky (1987) conceptualized SOC as a life orientation that develops through maturation and life experience and becomes stable once having grown strong. But, according to Antonovsky, if SOC does not grow strong, it does not stabilize.

Several scholars (Eriksson and Lindström, 2011; Feldt et al., 2000; Kivimäki et al., 2000) report a stable level of SOC over time. Later, Feldt et al., (2007) provided evidence that SOC correlates strongly and negatively with the Big Five Neuroticism personality trait ($r = -.85$) and therefore considered SOC to be similar to a personality trait. In the study of Smith and Meyers (1997), the magnitude of correlations between SOC and other personality measures suggested that all of the variables seemed to be measuring the same core construct.

In contrast, according to several researchers, the level of SOC either increases (Larsson and Kallenberg, 1996; Nilsson et al., 2010; Smith et al., 2003) or decreases (Nilsson et al., 2003) in older individuals. SOC also gets worse following the accumulation of health problems (Caap-Ahlgren and Dehlin, 2004; Nilsson et al., 2003). SOC could also be

altered by negative life events (Braun-Lewensohn and Sagy, 2010; Snekkevik et al., 2003; Schnyder et al., 2000; Volanen et al., 2007). Considering this, these authors suggest that SOC is not merely a proxy measure of a personality trait, but rather a partially independent, general measure of a person's worldview, related to an aptitude.

Resilience is the second major concept of coping strategies against adversity. It is defined as the process of adapting to significant sources of stress or trauma. The link between resilience and DAD is also well established. For example, resilience correlates negatively with DAD and predicts fewer DAD following stressful life events (Friborg et al., 2006; Hjemdal et al., 2006; Pietrzak et al., 2010; Roy et al., 2007; Wingo et al., 2010). Wingo et al. (2010) highlighted the moderating effect exerted by resilience on the relationship between childhood trauma and depressive symptoms in adulthood.

In a recent paper, Fossion et al. (2013) addressed the sensitization mechanism described above. This sensitization phenomenon occurs when people are facing multiple traumas with at least one previous trauma that overwhelmed their adaptation skills (Breslau et al., 1999; Fossion et al., 2014; Green et al., 2000; Sullivan et al., 2009). Fossion et al. (2013) link multiple traumas and DAD, by proposing a model based on the concept of resilience. They showed that the relationship between multiple traumas and DAD was mediated by resilience: facing multiple traumas damaged the ability to be resilient, which in turn resulted in a higher level of DAD.

A current debate addresses the possible overlap between SOC and resilience (Eriksson and Lindström, 2011; Lindström and Eriksson, 2006). Lindström and Eriksson (2006) emphasized that SOC and resilience are two concepts with theoretical and empirical overlaps, suggesting that they could represent two sides of the same coin. But more recent researches (Eriksson and Lindström, 2011) show that they are two different concepts, both contributing to a good health development. Similarly, Lundman et al. (2010) underline that resilience describes what facilitates people bouncing back after negative experiences, while SOC describes what facilitates people moving towards the mental health end of a health (ease)-disease continuum.

If resilience and SOC are similar concepts, then the sensitization mechanism that we showed for resilience would be observed for SOC. Following this perspective, SOC would enhance coping for traumatic events but could be eroded by traumatic events. At the opposite, if SOC is a personality trait, this mechanism should not be observed, as SOC should be stable over time, even when multiple traumas occur.

In sum, the present paper aims to (a) test the hypothesis that SOC is a relevant explanation of the sensitization mechanism (Hypothesis 1), (b) further explore the nature (personality trait or aptitude) of SOC, and (c) disentangle the concepts of resilience and SOC.

2. Methods

2.1. Participants

The work described in this article has been carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans. All participants provided informed consent after the procedure had been fully explained. To approach the question of multiple traumas, we choose a homogenous first trauma during childhood and measured the occurrence of secondary traumas later in the participant's lifetime. The impact of the first trauma during childhood was assessed in a sample of former hidden children (FHC). FHC were the Jewish youths who spent World War II (WWII) in various hideaway shelters across Nazi-occupied Europe. The wartime circumstances of Nazi persecution included the traumas of (a) forced separation from family and friends, many of whom were killed (Krell, 1993); (b) poor caretaking; (c) impairment in

development; and (d) a return to a hostile and anti-Semitic environment after WWII (Valent, 1988).

We recruited voluntary participants in Belgium through an announcement in the Belgian Bulletin of the Hidden Children (www.servicesocialjuif.be). All of the participants lived independently in the community and were Jewish, born between 1931 and 1942, and had been hidden during WWII. We enrolled all volunteers who fit the above criteria. The study sample consisted of 65 participants, including 25 women (38.5%) and 40 men (61.5%). The participants' ages ranged from 65 to 80 years (mean=73.28; SD=3.74).

FHC were compared with non-Jewish subjects born in Belgium to parents who were also born in Belgium and who had lived in Belgium as children during WWII. Given the consistent association between resilience, male gender and level of education (Bonanno et al., 2007), these two demographic variables were counterbalanced across the two groups. Comparison participants were recruited through the senior citizen department of a borough in Brussels and consisted of 65 participants, including 25 women (38.5%) and 40 men (61.5%). Their ages ranged from 67 to 82 years (mean=74.17; SD=4.03). All participants provided written informed consent after the procedure had been fully explained.

We asked the FHC participants to complete a semi-structured interview that was conducted in 1- to 1.5-h face-to-face recorded sessions. We inquired about their experiences during WWII. The interviews also explored the quality of care taking that the FHC received during WWII. All participants completed a survey consisting of a demographic questionnaire, which asked participants to specify their marital status, family status and the highest level of education that they had attained. We also investigated whether participants faced during adulthood one (or several) of the 13 situations listed in the Traumatic Events Questionnaire (Vrana and Lauterbach, 1994). None of the participants in the comparison group reported childhood trauma, particularly in relation to WWII, and none of the FHC participants reported childhood trauma other than traumas related, directly or indirectly, to WWII. Finally, the participants completed the Sense of Coherence Scale, the Resilience Scale for Adults (RSA), the Hopkins Symptoms Checklist (HSC).

2.2. Instruments

All instruments were written in French. All participants were either native French speakers or had spoken French since childhood.

2.2.1. 13-Item SOC scale

The SOC scale is an abbreviated 13-item version ($\alpha=.79$) of the SOC-29 self-report questionnaire, which measures SOC construct. This questionnaire uses a 7-point, semantic and differential scale with a positive attribute at one endpoint and a negative attribute at the other endpoint. This scale has been used in numerous countries and is highly reliable. The French version of the SOC scale has satisfactory reliability as well as convergent and discriminant validity (Gana and Garnier, 2001).

2.2.2. Resilience Scale for Adults (RSA)

The RSA (Hjemdal et al., 2001) is a 33-item self-report scale that measures protective resilience factors in adults (Friborg et al., 2005). The RSA employs a 7-point semantic differential scale (1–7). Each item has a positive attribute at one end and a negative attribute at the other end. Half of the items are reverse-scored to reduce acquiescence biases. The RSA is reliable and valid (Friborg et al., 2003, 2005, 2006, 2009; Friborg and Hjemdal, 2004; Windle et al., 2011). The French version of the RSA has satisfactory reliability and cross-cultural validity in French-speaking Belgian samples (Hjemdal et al., 2011). The RSA has a 6-factor solution (Friborg et al., 2005, 2006), and the factors are

as follows: *Perception of self*, 6 items ($\alpha=.77$) measuring confidence in self-abilities; *Planned future*, 4 items ($\alpha=.73$) measuring ability to plan ahead; *Social competence*, 6 items ($\alpha=.68$) measuring the level of social warmth and flexibility; *Family cohesion*, 6 items ($\alpha=.75$) measuring the degree to which values are shared or disagreed upon within the participant's family; *Social resources*, 7 items ($\alpha=.76$) measuring the availability of social support; and *Structured style*, 4 items ($\alpha=.48$) measuring participant preference for having and following routines.

2.2.3. Hopkins Symptom Check List-25 (HSC)

To assess the prevalence of DAD, we used the HSC (Derogatis et al., 1974), which is a brief, 25-item version of the Symptom Check List (Derogatis et al., 1973; Derogatis, 1983). This self-report questionnaire rates the presence of depression and anxiety symptoms using a 4-point scale that ranges from 1 ("not at all") to 4 ("very much"). This scale contains 15 depression items and 10 anxiety items. The HSC is highly reliable ($\alpha=.93$) and is a valid diagnostic screening tool even across cultures. The French version of the HSC has been validated by previous studies (Bean et al., 2007; Pichot et al., 1989).

3. Results

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) 20. Analyses were two-tailed. The FHC and the comparison group were similar with regard to socio-demographic, family and adulthood cumulative adversity data (all *t*-tests and chi-square tests were not significant). Descriptive statistics are reported in Table 1. Moreover, in order to evaluate the homogeneity of the trauma that FHC endured, we checked that its severity, evaluated by the quality of caretaking during WWII and by the fact that FHC were hidden with their parents or not, did not influence neither SOC, nor Resilience nor HSC. All *t*-tests were not significant.

To test our hypothesis that sensitization is explained by SOC, we needed a mediated moderation model, as shown in Fig. 1 (Muller et al., 2005). Correlation between SOC and HSC is significant, $r=-.63$, $p<.001$. In our mediated moderation model, FHC trauma is considered to be the predictor (IV); adulthood trauma is the moderator; SOC is the mediator; and HSC is the outcome variable (DV). Both the IV and the mediator are centered; as the predictor and the moderator are categorical, they have been coded as $-.5$ ("Ctrl" for predictor and "absence of adulthood trauma" for moderator) and $.5$ ("FHC" for predictor and "presence of adulthood trauma" for moderator). Showing that the effect of FHC trauma on HSC is moderated by adulthood trauma and that this moderation is mediated by SOC requires three steps (see Table 2):

The first step (Formula 1) shows a significant interaction of the predictor \times moderator on the outcome variable.

The second step shows a significant interaction (predictor \times moderator) on the mediator (Formula 2).

Table 1

Descriptive statistics: *M*(SD), for DVs measures: Hopkins Symptoms Checklist, Resilience and Sense of Coherence.

	FHC group		Control group	
	No later trauma (<i>N</i> =19)	Later trauma (<i>N</i> =44)	No later trauma (<i>N</i> =21)	Later trauma (<i>N</i> =44)
HSC	36.32 (7.85)	46.93 (14.52)	34.62 (6.98)	34.59 (7.15)
SOC	68.37 (11.09)	63.55 (12.33)	71.90 (9.30)	70.07 (9.26)
RES	178.37 (21.70)	162.98 (24.46)	181.48 (25.74)	174.14 (22.64)

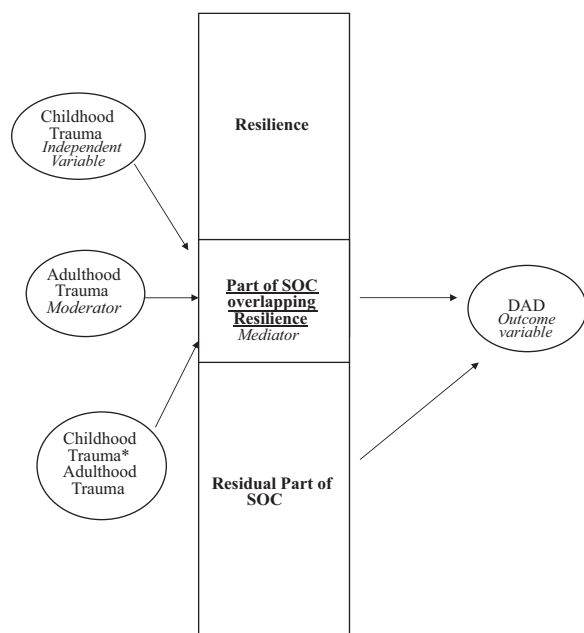


Fig. 1. Mediated moderation model and partial overlap between SOC and Resiliency.

Table 2
Mediated moderations with FHC as predictor (Y), presence of multiple trauma as moderator (Mo), SOC as mediator (Me) and HSC as outcome variable (X).

	Y + Mo + YMo = X Formula 1	Y + Mo + YMo = Me Formula 2	Y + Mo + YMo + Me + MeMo = X Formula 3
Predictor (Y)	$\beta_{11} = .30^{**}$	$\beta_{21} = -.23^*$	$\beta_{31} = .15^*$
Moderator (Mo)	$\beta_{12} = .21^{**}$	$\beta_{22} = -.14$	$\beta_{32} = .14^*$
Y × Mo	$\beta_{13} = .23^{**}$	$\beta_{23} = -.07$	$\beta_{33} = .18^*$
Mediator (Me)			$\beta_{34} = -.48^{***}$
Me × Mo			$\beta_{35} = -.19^{**}$

* $p < .05$.

** $p < .01$.

*** $p < .001$.

The third step considers the effect of five IVs on the outcome variable (Formula 3): (a) predictor; (b) moderator; (c) predictor × moderator; (d) mediator; (e) predictor × mediator.

For a moderation to be mediated, there has to be a significant interaction (predictor × moderator) in step 1 (Formula 1) that becomes non-significant in step 3 (Formula 3). This loss of significance is equal to the sum of two products: $\beta_{13} - \beta_{33} = \beta_{21}\beta_{35} + \beta_{23}\beta_{34}$. One of the two products on the right side must be significant.

As we can see in Table 2, there is a partial mediation: the interaction between the predictor and the moderator is significant in Formula 1 and becomes less significant in Formula 3, while the predictor ($\beta_{21} = -.23^*$) yields a significant effect on the mediator, and the interaction between the mediator and the moderator ($\beta_{35} = -.19^{**}$) yields a significant effect on the outcome variable. Therefore, the significant indirect effect is $(-.23) \times (-.19) = .044$.

A correlation between Resilience and SOC was observed, $r = .68$, $p < .001$, confirming the idea that resilience and SOC are closely related concepts. However, to disentangle the variables, we regressed Resilience (IV) on SOC (DV) and saved the residuals as a new variable. This resulting variable is thus the part of SOC that is independent from Resilience. We then used these residuals in

the mediated moderation model: neither FHC, nor Multiple Traumas nor the Interaction term predicted the residual SOC (all betas were non-significant). However, the residual variable still predicted DAD ($\beta = -.20$, $p = .02$). This significant prediction suggests that the part of SOC that is independent from Resilience predicts DAD but is not visibly influenced by traumas.

4. Discussion

Our main hypothesis concerned the role of SOC in explaining the sensitization process of multiple traumas. We observed that a childhood trauma seems to sensitize individuals. When other trauma occurs later in their lifetimes, they are then more prone to develop DAD. Our results suggest that this sensitization is partially explained by a weakening of their SOC, which is consistent with our hypothesis.

In Section 1, two other questions were emphasized: the possible link between SOC and resilience, and whether the nature of SOC is closer to an aptitude or to a personality trait. Concerning the first question, a strong correlation was indeed observed between SOC and resilience, suggesting a partial overlap of these two concepts.

Concerning the second question, we separated the part of SOC that overlaps with Resilience from the SOC's residuals. This residual was not implicated in the sensitization process, as it was not influenced by childhood trauma or multiple traumas. Nevertheless, this residual still predicted the level of DAD. This finding suggests that SOC may be a twofold concept. On the one hand, a first component of SOC appears to be similar to the concept of resilience: an aptitude that mediates the relationship between multiple traumas and DAD and that can be altered by negative life events. On the other hand, another part of SOC seems to be more stable and similar to a personality trait that is not influenced by life events.

This study has some limitations that must be considered when interpreting its results. First, our participants were all volunteers and might represent an atypical population. Given that our study assessed FHC who were living independently in the community and who were not seeking treatment, our sample is likely to reflect the healthiest of the survivors.

Second, all data on childhood trauma are retrospective. But in order to operationalize multiple traumas, it is impossible to using longitudinal designs, for evident reasons. However, we were particularly careful in selecting a sample with a long lasting homogenous childhood trauma (FHC). Besides, as stated in Section 2, answering previous studies results regarding potentially influencing variables, FHC sample and control group were homogenous regarding gender and education minimizing the risks of sample bias.

Third, our measures of SOC, RSA and HSC are cross-sectional. This means that directions of causality between these variables could be questionable and that correlations could be spuriously high. However, many previous researches (Antonovsky, 1987; Breslau et al., 1999; Eriksson and Lindström, 2005; Green et al., 2000; Sullivan et al., 2009) provide strong theoretical reasons to consider that the causality is oriented from SOC to HSC and not the opposite. Moreover, when disentangling SOC from RSA, in our statistical analyses, we worked with residues from the regression of RSA on SOC, which is with the uncorrelated part of SOC that is independent from RSA.

Our results have several theoretical implications. First, present results could account for the controversial debate regarding the stability of SOC discussed in Section 1. Results tend to confirm Antonovski's views on GRRs. Some GRRs are societal, such as childhood living conditions, education, occupation, working circumstances and social supports. Other GRRs are more psychological, such as parental values, child-centered parenting, emotional closeness with parents, and secure attachment. From our results, it is conceivable that the flexible component of SOC could result from more societal GRRs, ultimately shaped by social life and life

events. On the contrary, the residual component of SOC could result from more psychological GRRs such as a secure attachment that FHCs built with their parents during the prewar years.

Second, there are clinical applications, as results suggest that the flexible part of SOC could be partly restored by therapeutic interventions as shown by Weissbecker et al. (2002) and by Vastamäki et al. (2009). The results propose promoting positive emotions, emotional self-control, appropriate coping strategies and GRRs such as money, knowledge, self-esteem, social support and cultural stability (Lindström and Eriksson, 2006; Hart et al., 2006; Lundman et al., 2010). Our results underline the necessity of specifically reinforcing the flexible part of SOC during therapy sessions with patients who have experienced multiple traumas.

Third, the severity of the trauma endured by FHC, evaluated by the quality of caretaking during WWII and by the fact that FHC were hidden with their parent or not, did not significantly influence resilience. It may be that the FHC comprehended their situation during WWII as a global and undifferentiated trauma whose core was the feeling of helplessness rather than the material conditions surrounding them. Therefore, we hypothesized that the level of helplessness (not measured in the present study) resulting from a childhood trauma might be at the origin of the sensitization process. It would be interesting to test whether our assertion holds true in future research.

Fourth, according to Terr (1991), there are two types of traumas: Type I trauma results from an unanticipated single event and does not give rise to the personality problems that characterize type II trauma. Type II trauma results from long-standing or repeated exposure to extreme external events and can lead to profound character changes. In the present study, our group of FHC was exposed to a type II trauma during childhood. Therefore, we are unable to differentiate whether the sensitization process that we noted is a consequence of the nature of the first trauma or a consequence of the fact that this first trauma occurred during childhood. Further studies should investigate the different combinations of trauma types, the respective contribution of the type of the first trauma (Type I vs. Type II) and the impact of the time of its occurrence (Childhood vs. Adulthood) on the sensitization process.

5. Conclusions

Notwithstanding some limitations, implications of our study are relevant both theoretically and clinically. On the one hand, our data illustrate the effects of multiple traumas on SOC and DAD and better specify the nature of SOC. On the other hand, our data suggest the need for clinicians to bolster specific SOC skills in therapy sessions.

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Conflict of interest

All authors declare that they have no conflicts of interest.

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