Social adversities and psychotic symptoms: A test of predictions derived from the social defeat hypothesis

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ABSTRACT

Based on the social defeat (SD) hypothesis, this study examines the postulate that various social adversities converge into one common factor, and whether this factor has an effect on psychotic symptoms while controlling for its effect on depression and anxiety. Competing hypotheses arguing for the reverse effect were also tested. The study was a cross-sectional survey in a community sample (N =2350) from Germany (n=786), Indonesia (n=844), and the United States (n=720). Confirmatory factor analysis (CFA) and path analysis with structural equation modeling were used to test the hypotheses. In the CFA two factors reflecting current and past experiences of SD could be identified with acceptable fit. Path analysis indicated acceptable fit for both SD and reverse models, and both the path from current SD to psychotic symptoms and the reverse one were significant, although the former was stronger than the latter. Interestingly, the current but not the past SD factor was significantly associated with psychotic symptoms. Overall, the results indicate that postulates derived from the SD hypothesis fit the data. However, longitudinal research is needed to further confirm the postulated directionality of the associations.

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1. Introduction

Recent findings from genome-wide association studies (Schizophrenia Working Group of the Psychiatric Genomics Consortium, 2014) suggest that the role of the environment on psychotic disorders may have been underestimated. Indeed, numerous environmental risk factors including migration, discrimination, trauma and urbanization have now been identified (van Os et al., 2010). To illustrate the possible significance of these factors, Kirkbride et al. (2010) estimated that up to 22% of new psychotic cases could be prevented if all factors associated with migration were identified and removed completely.

One theoretical framework that seems promising to elucidate the socio-environmental risk factors for psychosis is the social defeat (SD) hypothesis. Selten et al. (2013) argue that long-term exposure to experiences of SD leads to a sensitization of the mesolimbic dopamine system and is a common denominator of environmental risk factors for psychosis and other mental disorders. The negative experience of being excluded from the majority group, SD, is argued to be present in major environmental risk factors for psychosis, such as migration (Cantor-Graae and Selten,

2005) and childhood trauma (Read et al., 2005). Feeling socially defeated can also be present in other risk factors, such as having a minority sexual status (Gevonden et al., 2014), being bullied in childhood (Wolke et al., 2014), having a low socio-economic status (Boydell et al., 2013), experiencing discrimination (Janssen et al., 2003), having a small social network and low social support (Gayer-Anderson and Morgan, 2013), and being overly criticized by families or confidants (Cechnicki et al., 2013).

However, so far, the notion that apparently different risk factors reflect one type of experience as conceptualized by the SD hypothesis remains a theoretical assumption, yet to be formally tested. If this assumption is affirmed, the question is whether this type of experience is a predictor of psychosis and other mental disorders and whether the predictive value is generalizable across cultures.

Another issue is that competing hypotheses have argued for the reverse causation stating that social adversity (SA) results from psychosis. One of them is the social selection hypothesis proposed by Ødegård (1932) to explain the increased risk of psychosis among Norwegian-born migrants in the United States. Another is the social drift hypothesis put forward by Dohrenwend et al. (1992) who argued that people with psychosis gradually occupy a lower socio-economic status due to inability to hold employment. Although there is an increasing body of evidence rejecting the competing hypotheses (e.g. van der Ven et al., 2015), these hypotheses may still explain a proportion of the variance and need to

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be taken into account.

Finally, although Selten et al. (2013) did not explicitly differentiate experiences of SD in childhood and adulthood, these experiences may represent separate constructs (Stilo et al., 2013) that differ in their impact on pathology due to differences in the impact they have on brain development and distress (Fox et al., 2010; Taylor, 2010).

The present study tested several predictions derived from the SD hypothesis using path analysis in a large and heterogeneous population sample from three countries located on different continents. Specifically, reflecting the claims of the SD hypothesis that apparently different negative social experiences may load on a common factor, we hypothesized that negative social experiences that have been shown in previous studies to be associated with psychosis would load on a common factor. As some of these experiences date back to childhood and adolescence whereas others reflect ongoing present adversity, our specific hypothesis was that (a) childhood abuse and bullying victim experience in school would indicate a latent past SD factor, whereas present bullying victim experiences, ostracism, social undermining, a low level of social support, small networks, low socioeconomic status, minority status, and perceived discrimination would indicate a latent present SD factor. We also hypothesized that (b) there would be specific association of the past and current SD latent factors and psychotic symptomatology (combined positive and negative symptoms) that remain after controlling for their association with depression and anxiety; (c) the path that assumes SD to precede psychosis (as predicted by the SD hypothesis) would be stronger than the path that assumes the reverse (as predicted by the competing hypothesis), and (d) the pattern of results would be stable across countries.

2. Method

2.1. Participants and procedure

Participants from Germany, Indonesia, and the United States were recruited through Crowdflower and other websites (e.g. internet forums and social networking websites) to complete an anonymous 30-min online survey. Moreover, following the sampling method from the COMED study (Hanssen et al., 2006), we advertised our study in internet forums focused on mental disorders, and particularly schizophrenia, in order to secure sufficient variation reflecting the continuum of psychosis. Participants recruited from Crowdflower received 0.50 US$ following the median hourly wage in Amazon MTurk (Buhrmester et al., 2011). Participants recruited from other websites were not given compensation for reasons of data security. Previous studies have shown that collecting self-report data on mental health symptoms over the internet is reliable (e.g. Moritz et al., 2013) and that recruiting participants through crowdsourcing websites produces demographically heterogeneous samples (e.g. Shapiro et al., 2013). Only participants who agreed with the consent statements and indicated to be above 18 years of age were allowed to participate.

There were 2501 completed survey entries, of which 151 were excluded due to duplicate entries ($n = 98$), longstring (i.e. providing the same answer consecutively for 50 items, $n = 46$, Johnson, 2005), and inconsistent answers ($n = 7$). The final sample consisted of 2350 participants of whom 720 participants completed the English, 786 the German and 844 the Indonesian version of the survey.

2.2. Measures

Back-translation procedure and cultural adaption of measures

were conducted by native Germans, British and Indonesians according to guidelines (Schmitt and Eid, 2007). A complete description of the scale and scoring procedure is available from the corresponding author.

2.2.1. Social defeat measures

Bullying victim experience frequency in childhood in a school context and adulthood in a home and work context were measured with a bullying victimization questionnaire (Wolke and Sapouna, 2008). Each experience was measured by its frequency and duration. Total scores for childhood and adulthood bullying victim experiences ranged from zero to five.

Frequency of child abuse experience before the age of 16 was measured by a self-report questionnaire developed based on a semi-structured interview from the NEMESIS study (Janssen et al., 2004). Participants were asked if they ever experienced emotional, psychological, physical, or sexual abuse (yes or no) according to a given definition that was presented (e.g. emotional abuse: "This means for example that people at home didn't listen to you, that your problems were ignored, that you had the feeling of not being able to find any attention or support from the people in your house") and to rate the frequency of the experience on a 6-point Likert scale ($0 =$ never to $5 =$ very often).

Experiences of discrimination were assessed with the perceived discrimination measure from the NEMESIS study (Janssen et al., 2003), which includes a section on minority status and a section on perceived discrimination. Minority status was measured with five dichotomous items, which included having a minority sexual orientation, a physical disability, a visible physical condition (e.g. being obese), belonging to an ethnic minority group, and to a minority religion. The perceived discrimination section consisted of seven dichotomous items (age, sex, sexual orientation, physical disability, ethnic minority group, religion, visible physical condition). The sum score represents the degree of minority status (range 0–5) and perceived discrimination (range 0–7).

Frequency of current ostracism experiences was assessed with the Ostracism Experience Scale (Carter-Sowell, 2010). The questionnaire consists of eight items (e.g. In general, others leave me out of their group) that measure general ostracism over the past four weeks with a 7-point Likert scale ($1 =$ hardly ever to $7 =$ almost always). The scale has shown good validity and reliability (Carter-Sowell, 2010).

Social network and support were measured by the six items version of the Social Support Questionnaire (Sarason et al., 1987). Social network was measured by asking participants to list people whom they can rely on in relation to six different conditions (e.g. Who accepts you totally, including both your worst and your best points?). The maximum number of people that participants could list for each item was nine. Social support was measured by asking participants' satisfaction concerning the support they received (How satisfied are you with the overall support?) on a 6-point Likert scale ($1 =$ very dissatisfied to $6 =$ very satisfied).

Social undermining was assessed with the Social Undermining Scale (Vinokur and van Ryn, 1993), a five items scale that measures the frequency of negative interaction with a spouse or significant other over the past four weeks (e.g. How much does the spouse or significant other act in an unpleasant or angry manner toward you?) on a 5-point Likert scale ($1 =$ not at all to $5 =$ a great deal).

Socio-economic status was measured with a multidimensional index developed by Lampert and Kroll (2009). The index (ranges 3–21) is construed by summing the score of education (range 1–7), household income (range 1–7), and job position (range 1–7). The respective answer choices for education and household income were created based on the census categories published by statistical offices of Germany, Indonesia, and United States. The index