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Risk factors at the low end of the psychosis continuum: Much the same as at the upper end?

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ABSTRACT

We investigated risk factors for subclinical symptoms of psychosis, and focused on two psychosis dimensions previously identified in the Zurich Study, namely "schizophrenia nuclear symptoms" and "schizotypal signs". We examined the data from 9814 Swiss conscripts from 2003. The psychosis symptom dimensions were derived from the Symptom-Checklist-90-R (SCL-90-R), and were regressed on a broad range of known risk factors for psychosis. Risk factors typically assigned to schizophrenia and other psychotic disorders – cannabis use, childhood adversity, reading and writing difficulties, attention deficit hyperactivity disorder (ADHD), psychiatric disorders and addiction in parents and the extended family – are relevant also at subclinical levels. Our analyses suggested that specific risk factors may be assigned to distinct psychosis dimensions, as previously determined in an analysis from the Zurich Study. If there are different pathways to psychosis characterized by specific symptom dimensions and risk factors, they mostly co-exist and interact at different symptom load levels.

1. Introduction

In recent years, epidemiologic research on risk factors for psychotic disorders has experienced a new development. Incidence of psychotic disorders has been shown to vary not only by sex, but also by a series of trivial or ubiquitous factors such as urban or rural upbringing, ethnicity, and migration (Van Os, 2004). Other risk factors in connection with psychotic disorders have also come into focus, including childhood adversity (Bebbington et al., 2004; Bak et al., 2005) and substance use, and in particular, cannabis use (Arseneault et al., 2002; Van Os et al., 2002; Fergusson et al., 2003; Zammit and Lewis, 2004; Fergusson et al., 2005; Henquet et al., 2005; Moore et al., 2007). The challenges here derive from the fact that these are all common risk factors with serious leverage effects despite presumably low risk enhancement.

An additional challenge has emerged from the continuum concept of psychotic disorders (Eaton et al., 1991; Kendler et al., 1996; Van Os et al., 2000; Johns and Van Os, 2001; Johns et al., 2004; Hanssen et al., 2005): population surveys have commonly yielded prevalence rates of psychotic symptoms which are distinctly higher than clinician-assessed psychotic disorders, which means that most people who experience psychotic symptoms during their life do not develop a psychotic disorder (Van Os et al., 2009). As demonstrated from the longitudinal data of the Zurich Study, there are subgroups of people with persistent enhanced symptom-load, though at subclinical levels. In addition, there are subgroups with a decline of these levels. Persistent high or moderate symptom frequencies have a serious impact on the lives of afflicted individuals. Common consequences include conflicts with partners and other loved ones, problems at the workplace, unemployment, financial problems, and lastly, legal problems (Rössler et al., 2007).

From a methodological perspective, research focusing on low or moderate subclinical symptom load levels has several advantages as compared to research based on clinical psychotic disorders:

- fewer comorbid disorders, and thus less biased effects;
- less interference with antipsychotic and other drugs, which may modify symptoms and outcomes;
- use of larger samples, which permits a better assessment of less frequent risk factors and pathogenetic mechanisms, as well as better statistical modeling opportunities;
- and easier accessibility to participants, thus enabling population based studies.

In this study we examined moderate psychotic symptoms reported by nearly 10,000 young Swiss conscripts in 2003. In particular, we focused on broadly discussed risk factors for psychotic

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disorders such as substance use, childhood adversity, and history of mental disorders in parents and relatives (Maki et al., 2005; Wicks et al., 2005). Firstly, we hypothesized that we would find similar risk factors, at low and moderate symptom load levels, to those that we had identified in a previous study (Rössler et al., 2007) at moderate and elevated symptom load levels. The reasoning is similar such as in most other psychiatric and somatic diseases: a better understanding of initial stages and subclinical symptoms is a clue to improving pathogenetic models. In fact, a great part of pathological processes and associated risk factors seems to take effect both above and below the diagnostic thresholds. Secondly, we aimed to differentiate the risk factors according to two psychosis dimensions; one representing thought alienation and hallucinations ("schizophrenia nuclear symptoms" dimension corresponding to the Schneiderian first rank symptoms), and the other comprising social and interpersonal deficiencies, ideas of reference, suspiciousness and paranoid ideation (representing a "schizotypal signs" dimension). According to the results of our previous study (Rössler et al., 2007) and theoretical considerations (Andreasen, 2000) we hypothesized that different risk factors and etiologies may lead to heterogeneous psychotic syndromes.

2. Methods

The sample comprises conscripts who were expected to enter the Swiss army in 2003. A similar methodological approach has been demonstrated previously by the Athens Study of Psychosis Proneness and Incidence of Schizophrenia (ASPIS) study, which examined conscripts of the Greek Air Force (Stefanis et al., 2002). Since the Swiss army is a civil army, all young men are expected to appear at the conscription, and to complete among others a psychiatric screening questionnaire. The Swiss Armed Forces introduced an all-new recruitment procedure for conscripts and female volunteers in stages during 2003. We initially identified a group of 14,157 individuals (out of 24,292 conscripts and 123 female volunteers from 2003) who attended the new recruitment procedure. After the exclusion of female volunteers, and of incomplete or erroneous records due to technical teething problems, there were 12,523 records remaining. Furthermore, we restricted the sample to male conscripts aged 18–20, and hence excluded younger and older conscripts ($N = 11{,}905$).

In the next and final step we excluded all persons with a high risk of possessing a psychiatric disorder. The criteria for the exclusion relied on the Symptom-Checklist-90-R (SCL-90-R) caseness definition (Derogatis, 1983). The criteria for exclusion aimed originally at potential malingerers, who often represent a serious problem in conscription screenings. Since malingering is a major source of systematical bias, we decided to discard all persons fulfilling the exclusion criteria, even at the cost of losing non-malingerers from the sample, and consequentially lowering the statistical power of our analyses. We thus omitted an additional 2091 data records from the analysis. Finally, 9814 records were left.

The psychiatric screening of the Swiss conscription procedure included several questionnaires and checklists, among them also the SCL-90-R (Derogatis, 1977). Similarly to the SCL-90-R applied in the Zurich Study (Angst et al., 1984), the time period covered in the screening of the Swiss conscripts is 4 weeks rather than usual 7 days. Further questionnaires assessed information on psychopathological symptoms, substance use, and other behavioral problems of the conscripts, mental and school problems in childhood and youth, mental disorders of parents and relatives, and finally, additional demographic information. After 2003 the selection of questionnaire items was reduced. All information relied on self-reporting by the conscripts.

The 90 items of the SCL-90-R are grouped along nine symptom dimensions reflecting one somatic, and eight psychiatric symptom dimensions. The subjects respond to a five-point Likert scale of distress covering the categories "not at all" (0), "a little bit" (1), "moderately" (2), "quite a bit" (3) and "extremely" (4). The SCL-90-R has shown good internal consistency and test–retest reliability (Derogatis and Cleary, 1977; Derogatis and Melisaratos, 1983; Hafkenscheid, 1993; Schmitz et al., 2000). However, the factor structure

Table 1
Descriptive analyses and correlations between putative risk factors and the schizophrenia nuclear symptoms subscale/the schizotypal signs subscale.

Variables	Categories	Frequencies	Schizophrenia nuclear symptoms subscale		Schizotypal signs subscale	
			Means	Correlations[a]	Means	Correlations[b]
Hashish, cannabis	Monthly/weakly/daily vs.	2150	0.209	0.05***	0.522	0.14***
	less frequently/never	7623	0.173		0.401	
Ecstasy (last 12 months)	Yes	210	0.199	n.s.	0.487	n.s.
	No	9563	0.180		0.426	
Speed (last 12 months)	Yes	178	0.192	n.s.	0.511	0.03**
	No	9595	0.181		0.426	
Cocaine (last 12 months)	Yes	202	0.172	n.s.	0.496	0.03**
	No	9571	0.181		0.426	
Cigarette smoker	Yes	4456	0.188	n.s.	0.449	0.06***
	No	5317	0.174		0.410	
Alcohol consumption	Weakly/daily vs. less	2745		0.04***		0.06***
	frequently/never	7031				
Difficulties in reading/writing	Yes	474	0.239	0.05***	0.466	n.s.
	No	9332	0.178		0.426	
Restless and fidgety in school	Yes	1831	0.223	0.07***	0.520	0.12***
	No	7975	0.171		0.407	
Childhood adversity (0–5)[c]				0.05***,[d]		0.14***,[e]
Previous mental problem[f]	Yes	1475	0.208	0.06***	0.592	0.19***
	No	8339	0.168		0.399	
Schizophrenia in family or relatives	Yes	605	0.239	0.05***	0.502	0.08***
	No	9205	0.177		0.414	
Depression/suicide in family or relatives	Yes	1803	0.219	0.06***	0.526	0.13***
	No	8011	0.173		0.406	
Addiction in family or relatives	Yes	1788	0.212	0.08***	0.513	0.14***
(alcohol or other substances)	No	8026	0.165		0.397	
Anxiety or obsessive–compulsive	Yes	550	0.202	0.04***	0.519	0.08***
disorder in family or relatives	No	9264	0.173		0.413	
Education	High school	2349	0.175	n.s.	0.444	0.05***
	Other	7465	0.173		0.410	

[a] Point–biserial correlations.
[b] Point–biserial correlations.
[c] Sum of 5 items: lived for a period or longer with one parent or separated from parents/ beaten in childhood/ teased for deformity/ parent disabled/ parent had severe physical disease.
[d] Spearman's r (rank correlation coefficient).
[e] Spearman's r (rank correlation coefficient).
[f] Psychiatric or psychological treatment or suicide thoughts or attempt.
*** Significance level < 0.001.
** Significance level < 0.01.