The Selfscreen-Prodrome as a short screening tool for pre-psychotic states

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ABSTRACT

Background: Early detection of psychosis is an important issue in current research. Early intervention helps to improve the outcome of the disorder. Therefore, a comprehensive examination in large populations, necessary as it might be, is economically almost not feasible. A screening via self-report is more practicable as it helps focus on individuals with high symptom loads.

Aim: To examine aspects of validity of the Selfscreen-Prodrome (SPro) as a new screening tool for prodromal states of psychosis in a military sample.

Method: 938 Swiss conscripts were assessed with the SPro, the Eppendorf Schizophrenia-Inventory (ESI) and the Symptom Checklist-90-Revised (SCL-90-R). Conscripts with potential psychosis-like pathology (T-transformed Severity Index of the SCL-90-R-subscales *Psychoticism* [PSYC] and *Paranoid Ideation* [PAR] ≥63) were compared with those not meeting the criteria of this condition (non-cases).

Results: Both groups (cases and non-cases) showed significant differences in their mean scores on SPro and ESI, although only the SPro had satisfactory effect sizes. In hierarchic logistic regression models the SPro turned out to be highly predictive for caseness while ESI scales were not significant. A cut-off score of ≥2 on the Spro subscale for psychotic risk (SPro-Psy-Risk) was found to identify caseness best with a sensitivity of 74% and a specificity of 61%.

Conclusion: The SPro has proven to be a valid and very economic screening tool for general and prodromal pathology in large populations.

Keywords: prodromes; psychosis; screening; early detection; self-rating; validation; general population

1. Introduction

In current research and practice there is a growing interest in identifying an incipient psychosis at a very early stage (prodrome), as early intervention can improve the course of the disorder (for review see Bota et al., 2008; Harrigan et al., 2003; Resch, 2008; Riecher-Rössler et al., 2006; Serretti et al., 2009). A psychotic disorder mostly announces itself years before the first episode, in the so-called prodromal state, with unspecific signs and functional impairment. A prodrome is defined by symptoms preceding the clinical manifestation of a disorder (Yung and McGorry, 1996a). Unspecific symptoms such as concentration and attention difficulties, sleep disturbances, depression, anxiety, derealization and depersonalization are reported as early signs/prodromes of the disorder (Loewy et al., 2005; Olsen and Rosenbaum, 2006; Riecher-Rössler et al., 2006). Even in early unspecific states, the disorder may lead to serious consequences for individuals concerned (Riecher-Rössler et al., 2006). With an onset mostly in adolescence and young adulthood, relevant developments and achievement of social roles often are impaired. Delayed diagnosis and treatment is associated with a worse long-term prognosis, which might be minimized by early detection and intervention (Riecher-Rössler et al., 2006; Harrigan et al., 2003; Larsen et al., 2001; McGorry, 2002; Norman et al., 2001; Pelosi et al., 2003). However, especially in low incidence disorders such as schizophrenia, early diagnosis with clinical examinations such as a structured face-to-face interview of the general population would be much too extensive. A possible strategy is a stepwise process with an initial pre-screening via self-report and subsequent focus on individuals with higher risk.

Individuals with psychotic disorders often show poor insight into their disease (McGorry and McConville, 2000). Therefore, it can be assumed that these individuals are not capable of reporting their symptoms properly. Furthermore, there is a strong body of evidence

for cognitive deficits in schizophrenia and even before the onset of psychosis (see e.g. Riecher-Rossler et al., 2009; Mesholam-Gately et al., 2009; Yung and McGorry, 1996b). Using a structured interview, Liraud et al. (2004) found high overlaps with self-reported positive and negative symptoms in acute psychotic patients. In self-reports in a community sample, Supina and Patten (2006) found lifetime prevalences of 0.9% of diagnosed schizophrenia or other psychoses, very similar to overall lifetime-rates of schizophrenic psychoses. Thus, it can be assumed that self-reports in individuals with psychosis are valid. Furthermore, individuals with prodromal states are usually not delusional and therefore should have enough insight into the illness to report their symptoms adequately (Lappin et al., 2007).

The challenge is to identify individuals who are at risk for psychosis as early as possible. In many cases, particularly in males, first onset occurs already before the age of twenty (Häfner et al., 1998b), so that early detection should start in late adolescence. The expense and effort of pre-selections via self-reports are disproportionately lower to extensive screening procedures using clinical interviews.

The *aim of this study* was to evaluate a newly developed screening tool based on self-ratings regarding its predictive validity for (pre-)psychotic experiences. We used the "Selfscreen-Prodrome" (SPro), a self-report questionnaire, designed for use as psychiatric screening instrument and originally developed in a study of early detection of psychosis (**F**rüh**E**rkennung von **PSY**chosen, **FEPSY**; Riecher-Rössler et al., 2007). In a first study the SPro turned out to be useful a) to separate mentally ill from healthy individuals, and b) to filter individuals with an at-risk mental state (ARMS) for psychosis from patients with other ICD-10-diagnoses for a further diagnostic process (Kammermann et al., 2009).

The specific aim of this study was to examine the diagnostic validity of the SPro in a general population sample and to compare its predictive validity to an already existing measure for psychosis, the "Eppendorf-Schizophrenia-Inventory" (ESI; Mass et al., 2000), which is a well-known tool for diagnosing psychosis as well as prepsychotic states. We hypothesized that the SPro is an adequate tool for predicting psychiatric caseness and is more specific and useful for identifying psychotic experiences than the ESI.

2. Methods

Switzerland has compulsory military service for all male citizens. This means, independently of whether or not a Swiss man finally serves in the army, he is obliged by law to attend military recruitment with psychological and medical examinations. These pre-military examinations are generally conducted when conscripts are between 18 and 22 years old. The data used in this study originate from the extensive examinations of all conscripts of Switzerland prior to basic military training. Our study is part of this more comprehensive research project, which has been described in detail previously (Vetter et al., 2009). The use of anonymized information in these studies was cleared by the Zurich State Ethical Committee (KEK) to fulfill all legal and data privacy protection exigencies.

Out of about 28,000 Swiss conscripts examined in 2002, 1,088 conscripts were randomly selected to complete additional paper-pencil-questionnaires containing the psychiatric screening-scales described below. Screening sessions were introduced and supervised by military test psychologists. Participants were informed twice, orally and with a fact sheet, about the research purpose of the psychometric testing. They had the choice to participate or not. Although everyone had to attend the test sessions with their platoon, they had the choice not to complete the questionnaire and to deposit empty papers at the end.

The study was conducted at the Medical Department of the Swiss Armed Forces in collaboration with the University of Zurich, Switzerland.

2.1. Sample

Of the initially selected 1,088 conscripts, 168 were excluded from the analysis for suspected malingering (Derogatis, 1977; for definition see SCL-90-R in the Instruments section below) and social desirability (Mass, 2001; for social desirability and survey motivation see ESI in the Instruments section below). Accordingly, 920 males with a mean age of 20.64 years (SD=0.97) were analyzed in this study.

2.2. Instruments

The **SPro** (Kammermann et al., 2009) is a self-report instrument (see appendix) that consists of 32 items concerning highly frequent prodromal symptoms and risk indicators of an incipient psychosis, based on literature. The instrument covers attenuated psychotic symptoms such as ideas of being persecuted and recent unspecific symptoms typical for the prodrome, such as concentration difficulties, increased sensitivity, depressed mood and incipient changes in perception. A recently decreased level of functioning in different social roles (Riecher-Rössler, 1999) was found to be an important predictor of incipient psychosis in the ABC-study (Häfner et al., 1998a). In individuals with increased vulnerability, consumption of illegal drugs can trigger psychotic symptoms or serve as coping strategy in early psychosis and is therefore as a risk indicator. Another indicator is a family history of mental disorders (Drewe et al., 2004). Questions are dichotomized and scored with 0 (“not true”) and 1 (“true”). Previous research has shown the SPro to perform sufficiently in a

clinical (Alpha=.90; Kammermann et al., 2009) and a conscript sample (Alpha=.89; Müller et al., 2009). In the present dataset the SPro has an Alpha of .87.

In a study comparing individuals with an at-risk mental state (ARMS), psychosis-(risk)-patients and healthy controls, six items of the SPro (depressive mood, concentration dysfunction, poor capacity, alteration of perception, to feel like being watched, affected or threatened, and mental disorders in kinship) were found highly predictive for identifying psychosis-(risk)-patients (Kammermann et al., 2009). Confirmed by discriminatory power analyses, these items were summarized to the subscale “risk for psychosis” (SPro-Psy-Risk; see appendix for specially marked items in the SPro-Total).

The **ESI** (Mass, 2001) is a clinical measure for self-experienced disturbances in cognitive, linguistic, sensomotoric and coenesthetic (body misperceptions) domains as found in pre-psychotic states, i.e. in subjects with prodromal or attenuated psychotic symptoms as well as in schizophrenia patients. The ESI contains 40 items whereof 34 are combined to four scales: *Attention and Speech Impairment* (AS), *Ideas of Reference* (IR), *Auditory Uncertainty* (AU), and *Deviant Perception* (DP). Moreover, the ESI contains a five-item *Frankness*-scale (FR; score>2) to control for socially desirable tendencies and one item (item 40; score=0) assessing general survey motivation. While AS represents a mediating vulnerability factor, IR, AU, and DP are assumed to provide reversible indicators of psychotic exacerbations (Mass et al., 2005). ESI-items provide a four-point response format from “strongly disagree” (0) through “strongly agree” (3), which are summarized to the mentioned subscale-scores.

The **SCL-90-R** (Derogatis, 1977) is a self-rating-scale for assessing general psychopathology and specific symptoms. The instrument is composed of 90 items, clustered into nine subscales: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation and Psychoticism.

Individual distress can be specified for every item by a five-point-Likert-scale from 0 (“not at all”) through 4 (“extremely”). In the current study the total-score (GSI = Global Severity Index) served as indicator of general psychological distress. Further, we used the “Paranoid Ideation” (PAR) and “Psychoticism” (PSYC) subscales to explore psychosis-like symptoms. The item number of the PAR-subscale (5 items) was weighted on PSYC (7 items), and then both were summed up to generate the relevant dimension “Psychotic Symptoms” (SCL-90-R-PS). In addition, for both general and psychotic symptoms the caseness definition of the checklist was used for separating individuals with elevated symptom levels from those with lower distress (Derogatis, 1977). Accordingly, individuals with scores ≥63 in the T-transformed GSI-score as well as in both T-transformed subscale-scores of PSYC and PAR are considered as cases. Respondents exceeding a T-score of 70 on the general number of positive symptoms (item-score>0) on the checklist were excluded for suspected simulation (Derogatis (1977).

In previous research the SCL-90-R was successfully used for detecting a disposition to psychosis (Henquet, et al., 2005) and as valid indicator of prodromal episodes (Jolley et al., 1989). The PSYC and PAR scales have been used previously for assessing psychotic experiences in a general population sample (van der Werf et al., 2007) and as predictor of subsequent psychotic states (Wilson et al., 1985). The SCL-90-R is described as standard measure for a susceptibility to psychosis (Henquet et al., 2008).

2.3. Statistical analyses

For sample description means and standard deviations are presented for all considered variables. Gender differences were analyzed using t-tests, and associations with age were tested by Pearson correlations.

Group differences were analyzed using t-tests with a significance-level of $p<0.005$. Effect sizes (Cohen's d) of group comparisons were provided as measures of external construct validity (Cohen, 1988). Associations between scale scores were tested by Pearson correlations.

Further, hierarchic logistic regression analyses were run for GSI-caseness and PARA-/PSYC-caseness. In both equations the ESI-subscales were controlled for initially, while the SPro (Total or Psy-Risk) was entered subsequently. This two-step approach provides evidence of the predictive power of the SPro. Odds ratio-estimates and 95%-confidence intervals were calculated. Next, receiver operating characteristic (ROC) analysis was used to assess the predictive validity of the SPro-Psy-Risk against PARA-/PSYC-caseness (Hsiao et al., 1989). The ROC-curve plots the true-positive against the false-positive rate for the different cut-points of the SPro. An adequate tradeoff between sensitivity and specificity and hence an optimal cut-off point indicating psychological distress was chosen.

Analyses were carried out using STATA 10 for Macintosh (StataCorp, 2007).

3. Results

Table 1 presents means (±SDs) of the SCL-90-R's GSI and PS, the SPro-Total and SPro-Psy-Risk as well as the ESI-subscales. Further, correlations of all measures analyzed in this study are shown. The high association of the SPro-Total with the SPro-Psy-Risk is artificial since the latter is a subscale of the SPro-Total. The same applies to the association between the GSI and PS. Very high associations are found for the intercorrelations of the ESI-subscales, indicating strong dependence. SPro-Total and SPro-Psy-Risk show high correlations with the GSI and moderate associations with the SCL-90-R-PS. ESI-scales also show moderate correlations with the SCL-90-R-PS but lower level coefficients than the SPro.

The SPro-scales are moderately associated with all ESI-subscales. Associations with age were not significant (data not shown).

-Insert Table 1-

From the study sample 6.00% met caseness-criteria for general distress, whereas 2.51% were considered as cases regarding psychotic symptoms (Table 2). Scores of SPro-Total, SPro-Psy-Risk and ESI-subscales were significantly higher for cases than non-cases (both definitions) ($p<0.001$). Effect-sizes revealed best differentiation on the basis of the SPro, while ESI-subscales turned out to be lower (Table 2).

-Insert Table 2-

To assess the predictive validity of the SPro, hierarchic logistic regressions were calculated (Table 3). In the first sequence the predictability of general psychopathology was tested with GSI-caseness as dependent variable (Table 3, left section). The first model (model 1) contains the ESI-scales as predictors only, while in a subsequent (model 2) the SPro-Total-score was added. In model 1 two ESI-scales (AS and IR) significantly predicted caseness (aORs: 1.75 and 2.10), whereas solely the SPro-Total showed significant influence on the outcome (aOR: 3.48) when added to the equation (model 2).

The second sequence aimed at the prediction of caseness regarding psychotic symptoms as determined by SCL-90-R-PARA/PSYC (Table 3, right section). The ESI-subscales failed to contribute to any of these models while both SPro-measures significantly

predicted caseness of psychotic symptoms after adjusting for ESI-measures (aORs: 2.68 and 2.01).

-Insert Table 3-

The ROC-curve was plotted for the SPro-Psy-Risk to predict caseness on SCL-90-R-PAR/PSYC (Figure 1). The area under the curve (AUC) was 0.74 (95% CI: 0.65-0.84), indicating the SPro-Psy-Risk to be a useful screening tool for being at risk for psychosis. With a cut-off of ≥2, a sensitivity of 73.91%, and a specificity of 61.40%, a positive predictive value of 4.70% and a negative predictive value of 98.90% was found. Altogether, 61.75% of the sample (overall accuracy) was classified correctly, 38.57% non-cases were falsely assigned as being mentally distressed, and 26.09% true cases were missed by the SPro-Psy-risk. Prevalence-rates of subjects having a SPro-Psy-Risk-score ≥2 were 39.57%, which is large compared to the proportion of cases on PARA/PSYC (2.51%). All diagnostic information is summarized in Table 4.

-Insert Figure 1-

-Insert Table 4-

4. Discussion

The current study analyzes psychopathology with special emphasis on prodromal symptoms in a general population sample of young men. There is a growing body of evidence of (pre-)

psychotic symptoms to be present not only in clinical, but also in general population samples (van Os et al., 2000; Rössler et al., 2007). Some of these individuals were found to have higher probabilities for a transition to clinical states of psychosis (Poulton, et al., 2000). Although up to a third of the general population were found to experience one or more (pre-) psychotic symptoms, only a fractional amount is more narrowly definable as “psychotic case” (Kendler et al., 1996; van Os et al., 2000).

The aim of the study was to evaluate a new economic self-report screening tool for assessing pre-psychotic symptoms (Selfscreen-Prodrome; SPro; Kammermann et al., 2009; Mueller et al., 2009). Therefore we defined caseness of psychotic distress as indicator for elevated stress levels. Similar prevalence as in the Dutch NEMESIS study were found (2.5% vs. 2.1%; van Os et al., 2000).

The SPro showed sufficient psychometric properties and was found superior to existing self-ratings such as ESI-scales, to detect and predict general and pre-psychotic distress. Both forms of the SPro were highly correlated with the GSI and showed similar coefficients with psychotic pathology and the ESI-scales. That was according to expectation since the SPro was originally developed for the purpose of identifying early states of emerging psychotis although it covers a broad range of psychiatric symptoms. Group comparisons generally revealed significantly higher mean scores for cases than for non-cases in the SPro as well in the ESI scales. However, the SPro showed much higher effect sizes than the ESI-subscales, whereas the latter hardly exceeded the threshold for sufficient statistical power. Moreover, results from hierarchic logistic regressions support the advantage of the SPro over the ESI. While the SPro significantly predicted caseness in the final models ESI-scales were not found to add any variance to these models. Initially two ESI-scales were slightly associated to GSI-caseness.

These findings are supported by the first study on the SPro (Kammermann et al., 2009). Here the SPro distinguished well between healthy controls and mentally-ill patients (based on the SPro-Total) and psychosis-(risk)-patients as well (based on the subscale SPro-Psy-Risk). Regarding the SPro-Psy-Risk the present study showed rather similar results in terms of the chosen cutoff (≥2) and only a marginally lower specificity (61% vs. 66%). However, the sensitivity was lower (74% vs. 85%), probably due to a less reliable criterion (SCL-90-R cutoff compared to clinical caseness).

Nevertheless, our results provide evidence for the diagnostic validity of the SPro as a screening tool for an increased risk of psychosis as a first step in the diagnostic process. However, caseness-rates (39.6%) derived from the SPro(-Psy-Risk) are higher than in the the PAR/PSYC-scales (2.5%). Screening via self-reports often overestimates the actual risk for subsequent psychosis. For example, Kendler et al. (1996) found that similarly high proportions (28.4%) of the cohort of the US-National-Comorbidity-Survey responded positively to probes, although less than 1% was actually diagnosed with psychotic illness. In a clinical re-interview Bak et al. (2005) found 40% false positives in a sample of subjects previously self-rated as high-risk, which is comparable to our study (38.6%). When screening for low prevalence disorders such as psychosis, the risk will always be overestimated in non-clinical samples (O'Toole, 2000; Bak et al., 2005; Kendler et al., 1996). However, this is by definition what is intended with a screening tool.

In *summary*, our findings suggest that the SPro is superior to the ESI in its diagnostic value on pre-psychotic states. Moreover, the SPro has the undeniable advantage of being a very short psychometric instrument (32 items), is easily scaled (0-/1-coded) and therefore much more economic than the ESI, especially when analyzing the subscale SPro-Psy-Risk (6

items). However, the results show that practicability and shortness involve decreased predictive performance.

There are some limitations of our study. First, psychiatric "caseness" was operationalized using SCL-90-R subscales. Information about subsequent transitions to psychosis was not available. However, our operationalization derives from several investigations in different populations (Derogatis, 1977) and has proven to be empirically valid (Elsenbruch et al., 2006; Haas et al., 1999). Furthermore, group-specific SPro- and ESI-scores reported in this study are highly comparable to previous studies, indicating an appropriate operationalization. Thus, caseness, especially that defined on psychotic dimensions, revealed similar ESI-scores as in schizophrenic samples (Mass et al., 2005; 2000; 2001). In clinical samples as well as in healthy controls Kammermann and colleagues (2009) found comparable group mean-scores as in our study groups for both SPro-measures.

Although further replication is needed, the results of our study suggest that the SPro could be used successfully as valid and economic screening tool for at-risk mental states for psychosis. Such assessment must not be seen as a substitute for detailed clinical examinations and diagnostic processes but as an initial step. This type of initial screening may be very cost- and time-effective in identifying individuals with elevated risk for developing psychotic disorders or suffering from psychotic disorder already, especially in large population samples. A follow-up SPro-study with large conscript samples using genuine information about later transitions to psychosis is currently in process.

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Table 1

Correlations between SPro (Total and Psy-Risk), ESI and SCL-90-R PS

	SPro-Total	SPro-Psy-Risk	ESI-AS	ESI-AU	ESI-IR	ESI-DP	SCL-90-R PS
SPro-Total (.22±.18)	-						
SPro-Psy-Risk (.24±.23)	0.82***	-					
ESI-AS (.46±.46)	0.48***	0.40***	-				
ESI-AU (.47±46)	0.39***	0.34***	0.73***	-			
ESI-IR (.35±.45)	0.43***	0.35***	0.71***	0.78***	-		
ESI-DP (.35±.42)	0.42***	0.36***	0.75***	0.80***	0.83***	-	
SCL-90-R PS (0.44 ±0.38)	0.52***	0.43***	0.33***	0.32***	0.39***	0.36***	-

*** p <0.001

SPro-Total: Selfscreen-Prodrome
SPro-Psy-Risk: Selfscreen-Prodrome subscale *Psychotic Risk*
ESI-AS: ESI subscale *Attention and Speech Impairment*
ESI-AU: ESI subscale *Auditory Uncertainty*
ESI-IR: ESI subscale *Ideas of Reference*
ESI-DP: ESI subscale *Deviant Perception*
SCL-90-R PS: Symptom-Checklist-90-Revised Psychotic Symptoms

Table 2

Comparisons of SPro (Total and Psy-Risk) and ESI scale scores of cases and non-cases regarding general and psychotic distress

		SPro-Total	SPro-Psy-risk	ESI-AS	ESI-AU	ESI-IR	ESI-DP
SCL-90-R Global Severity Index	Non-caseness (n=861, 94.00%)	6.69±5.39	1.35±1.31	4.37±4.43	3.60±3.60	2.28±3.02	3.03±3.70
	Caseness (n=55, 6.00%)	14.67±6.59	2.98±1.42	8.55±5.71	6.04±4.43	4.85±4.23	5.51±4.14
	p > | t |	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Effect size (Cohen's d)	1.33	1.19	0.82	0.60	0.70	0.63
SCL-90-R Psychotic Symptoms	Non-caseness (n=892)	6.99±5.64	1.41±1.36	4.54±4.59	3.69±3.65	2.38±3.09	3.11±3.75
	Caseness (n=23, 2.51%)	13.74±7.53	2.65±1.37	7.61±5.05	6.26±4.58	4.83±4.68	5.65±3.79
	p > | t |	<0.001	<0.001	=0.002	=0.001	<0.001	=0.001
	Effect size (Cohen's d)	1.01	0.91	0.64	0.62	0.62	0.67

Mean ± standard deviation
SPro-Total: Selfscreen-Prodrome
SPro-Psy-Risk: Selfscreen-Prodrome subscale *Psychotic Risk*
ESI-AS: ESI subscale *Attention and Speech Impairment*
ESI-AU: ESI subscale *Auditory Uncertainty*
ESI-IR: ESI subscale *Ideas of Reference*
ESI-DP: ESI subscale *Deviant Perception*
SCL-90-R PS: Symptom-Checklist-90-Revised Psychotic Symptoms
SCL-90-R GSI: Symptom-Checklist-90-Revised Global Severity Index

Table 3

Hierarchic logistic regression models for general psychopathology (caseness vs. non) and psychotic dimension (caseness vs. non)

	SCL-90-R GSI-caseness		SCl-90-R PARA/PSYC-caseness		
	Model 1	Model 2	Model 1	Model 2a	Model 2b
ESI-AS	**2.10 (1.39-3.18)**	1.45 (0.95-2.22) n.s.	1.20 (0.63-2.27) n.s.	0.91 (0.49-1.68) n.s.	1.02 (0.55-1.92) n.s.
ESI-AU	0.83 (0.50-1.38) n.s.	0.92 (0.54-1.54) n.s.	1.15 (0.55-2.37) n.s.	1.19 (0.58-2.47) n.s.	1.14 (0.57-2.28) n.s.
ESI-IR	**1.75 (1.08-2.83)**	1.59 (0.98-2.57) n.s.	1.53 (0.76-3.07) n.s.	1.36 (0.70-2.63) n.s.	1.42 (0.72-2.83) n.s.
ESI-DP	0.68 (0.40-1.15) n.s.	0.60 (0.35-1.05) n.s.	0.89 (.41-1.92) n.s.	0.83 (0.39-1.80) n.s.	0.89 (0.42-1.88) n.s.
SPro-Total		**3.48 (2.42-5.00)**		**2.68 (1.65-4.36)**	
SPro-Psy-risk	-	-			**2.01 (1.27-3.18)**

Independent variables are z-transformed.
Values are odds ratios with 95% confidence intervals
n.s.: non-significant $p > 0.05$
Values with $p \leq 0.05$ are printed in bold
SPro-Total: Selfscreen-Prodrome
SPro-Psy-Risk: Selfscreen-Prodrome subscale *Psychotic Risk*
ESI-AS: ESI subscale *Attention and Speech Impairment*
ESI-AU: ESI subscale *Auditory Uncertainty*
ESI-IR: ESI subscale *Ideas of Reference*
ESI-DP: ESI subscale *Deviant Perception*

Table 4

SPro-Psy-Risk: Results of the Receiver Operating Characteristic (ROC) on the PSYC-/PAR-definition of caseness and related diagnostic information

	SPro-Psy-Risk
AUC (95% confidence interval)	0.74 (0.65-0.84)
Cutoff point	≥ 2
Sensitivity	73.91%
Specificity	61.43%
Overall accuracy	61.75%
Positive predictive value	4.70%
Negative predictive value	98.90%
False positive rate	38.57%
False negative rate	26.09
Prevalence rate by cutoff	39.57%

AUC: Area under the curve

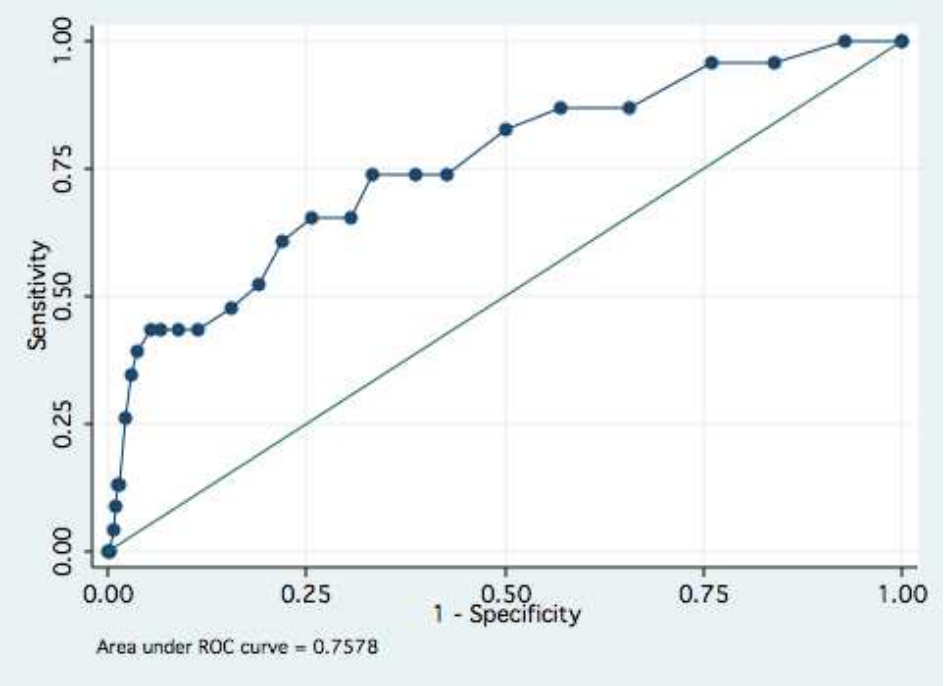

Figure 1

Receiver Operating Characteristic (ROC) curve for the SPro-Psy-Risk scores as predictor of psychotic caseness

"Selfscreen Prodrome"

Many people develop psychological problems during the course of their lives. Often, these problems are caused by stress and once the stress has passed, the problem will resolve. In some cases, however, a person's character and abilities can change to such an extent that he or she is "no longer the same person".
Please mark all permanent changes that you have experienced for the first time in the last few years.

		true	not true
1.	Increased sensitivity, more easily moved	☐	☐
2.	Over-sensitivity, more easily hurt or upset	☐	☐
3.	Irritability	☐	☐
4.	Being short-tempered	☐	☐
5.	Nervousness, feeling tense	☐	☐
6.	Disturbed sleep	☐	☐
7.	Lack of energy, drive, initiative or interest	☐	☐
8.	Suspiciousness	☐	☐
9.	Anxiety	☐	☐
10.	Feeling depressed	☐	☐
11.	Blunted emotions	☐	☐
12.	Pronounced mood swings	☐	☐
13.	Difficulties concentrating	☐	☐
14.	More easily distracted	☐	☐
15.	Lower level of resilience	☐	☐
16.	Changes in interests (e.g. unusual interest in religion and supernatural matters)	☐	☐
17.	Changes in perception (e.g. hearing, seeing, smelling or tasting unusual things)	☐	☐
18.	Relating events to oneself	☐	☐
19.	Feeling observed, harmed or threatened	☐	☐
20.	Feeling controlled or influenced by others	☐	☐
21.	Unusual difficulties with relationships	☐	☐
22.	Withdrawing from others, isolating oneself	☐	☐
23.	Changes in behaviour (e.g. loud soliloquy in public)	☐	☐
24.	Other people have mentioned changes in the way I speak (e.g. my speech has become difficult to understand)	☐	☐
25.	Marked decline in performance, possibly with difficulties at work or school	☐	☐
26.	Neglecting jobs and duties	☐	☐
27.	Professional decline	☐	☐
28.	Loss of job/dropping out of vocational training	☐	☐
29.	Increased problems with relationships (partner, family, work)	☐	☐
30.	Beginning to take drugs regularly (alcohol, cannabis, cocaine, opiates or tranquilizers)	☐	☐
31.	Previous psychiatric or psychological treatment	☐	☐
32.	Finally we would like to ask you some questions about your family. Are there any mental disorders in your family?		

Yes ☐
No ☐
I don't know ☐

Please check that you have answered all the questions and have not missed any!