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Anomalous self-experiences are strongly associated with negative symptoms in a clinical high-risk for psychosis sample

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ABSTRACT

Objective: Anomalous self-experiences (ASE) are considered as central features of the schizophrenia spectrum disorders and prodromal schizophrenia. We investigated total and single-item prevalence of these phenomena in a clinical high-risk (CHR) for psychosis sample, and associations with conventional psychosis-risk symptoms, present and childhood global/psychosocial functioning, and childhood trauma.
Methods: The sample ($n = 38$) included 31 CHR, according to ultra-high risk or cognitive basic symptoms (COGDIS) criteria, and seven with non-progressive attenuated positive symptoms. Psychopathological evaluations included the Examination of Anomalous Self-Experience (EASE), Structured Clinical Interview for Prodromal Syndromes (SIPS), Schizophrenia Proneness Instrument – Adult (SPI-A) (only the COGDIS-criteria), a diagnostic interview (SCID-I), Global Assessment of Functioning – Split version (S-GAF), Premorbid Adjustment Scale (PAS) and Childhood Trauma Questionnaire (CTQ).
Results: The mean total EASE score was in line with reports from other CHR samples, and was particularly enhanced in schizotypal personality disorder and in subjects fulfilling COGDIS-criteria. The four most frequent EASE-items were present in two-thirds or more of the participants. EASE total was significantly associated with negative and disorganization symptoms. A multiple regression analysis revealed that the level of negative symptoms explained most of the variance in EASE total.
Conclusions: These results corroborates other findings that anomalous self-experiences are frequent and important features in CHR conditions and in the schizophrenia spectrum. The strong associations with negative symptoms and cognitive disturbances (COGDIS) should be investigated in longitudinal studies to address causality, psychopathological pathways and schizophrenia spectrum specificity. The weaker correlation between EASE total and positive symptoms may partly be related to a restricted range of positive symptoms.

1. Introduction

Phenomenologically oriented perspectives focusing on characteristic subjective aspects of signs and symptoms have enriched our understanding of the psychopathology of schizophrenia spectrum disorders and prodromal conditions [1]. After the contemporary reintroduction of this perspective [2,3], a model was introduced claiming that the core pathogenic feature of schizophrenia is a self-disorder marked by structural distortions of subjectivity ("ipseity") and consciousness [4]. This self-disorder is also termed an *ipseity disturbance* or *basic self-disturbance* (BSD), and involves and articulates a range of mutually implicative *anomalous self-experiences* (ASE). These include a diminished sense of presence and existence, hyperreflexivity, diminished sense of agency and ownership to experiences and actions, feelings of unreality, and severe "common sense" disturbances [4,5]. This basic self-disturbance may further constitute a core psychopathological drive for the development of a full "Gestalt", comprising both positive, negative and disorganization symptoms in the schizophrenia spectrum and in prodromal states [4,6–8].

A semi-structured interview, the Examination of Anomalous Self-Experience (EASE), aims to specifically and comprehensively assess aspects of this self-disorder. Using EASE and related instruments, it has been demonstrated that ASE aggregate in the schizophrenia spectrum, including schizotypal and prodromal conditions [2,3,9–18], are frequent in clinical high-risk (CHR) states for psychosis, and predict conversion to schizophrenia spectrum disorders [19–24]. The CHR construct includes both "ultra-high risk" states and states characterized by "basic symptoms" high-risk criteria [25]. Basic self-disturbance has thus been

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suggested as a strong phenotypic trait marker of vulnerability for schizophrenia spectrum disorders [20,22,26].

Although there is considerable support for this phenotypic marker, the evidence from CHR studies needs to be expanded. Assessing the total prevalence of ASE, as well as the relative occurrence of specific ASE phenomena (single EASE-items) in CHR, may add to the evidence base regarding the early development and aggregation of these phenomena in CHR, and contribute to refine the methods for clinical risk assessment. To our knowledge, only one CHR study, with a small sample size ($n = 11$), have investigated and reported the occurrence of specific ASE [19], and further studies are needed.

There are also still few studies which have examined the relationships between ASE and symptoms/functioning in CHR. Raballo and co-workers found significant associations between the presence of such experiences and attenuated positive symptoms, as well as with cognitive or cognitive-perceptive basic symptoms. However, they did not examine the relationship between ASE and negative or other symptoms [21]. Koren and co-workers found significant associations between ASE and positive, negative and disorganization symptoms, but no correlation with a non-specific symptom scale, in a sample of 82 help-seeking adolescents. Correlations were not reported for the 24 CHR subjects in this sample [23]. A study by Comparelli and co-workers showed a significant correlation between ASE and global functioning in a group of 45 CHR subjects, as did the study by Raballo and co-workers [21,24]. However, the Comparelli study did not find significant correlations with positive, negative, disorganization and general symptoms (after Bonferroni correction). Koren's group found that social functioning, but not role functioning, was significantly more impaired in a combined "CHR and ASE syndrome" group than in a group assessed as not at risk, while a study by Nelson and co-workers did not find an association between total level of self-disturbances and psychosocial functioning in CHR [20,23]. To sum up, there is a lack of clarity about the relationship between ASE and different variants of symptom and functioning measures in CHR.

To increase our psychopathological understanding of self-disorders in the broad and diverse field of CHR conditions, there is also a need to investigate the role of background factors like childhood trauma and psychosocial functioning during childhood. Significant associations have been found between traumatic life events and ASE in a first episode schizophrenia sample (only females) [27], and in three studies on non-clinical samples [28–30], but this is not explored in CHR-studies. Associations between ASE and early psychosocial functioning are to our knowledge not examined in previous studies neither in CHR nor in other mental disorders and conditions.

In light of the lack of clarity of the relationships between ASE, other clinical characteristics and background factors in CHR, we set up a study to:

1. Investigate the total level of ASE, as well as the *relative occurrence of single EASE items*, in CHR and some intimately related conditions (with non-progressive attenuated psychotic symptoms).

2. Investigate in these conditions the associations between ASE and clinical characteristics (i.e. positive, negative, disorganization and general symptoms, and global functioning), and background factors (i.e. childhood trauma and psychosocial functioning during childhood).

2. Methods

2.1. Participants

The current study is part of the Norwegian Thematically Organized Psychosis (TOP) study, and was approved by a Regional Committee for Medical Research Ethics in Norway. The main target group was subjects between 15 and 30 years fulfilling CHR criteria. However, we also included subjects in the same age range with long-standing, non-progressive attenuated positive symptoms, i.e. not fulfilling CHR criteria with respect to a recent onset or progression [31]. Exclusion criteria were: present or previous psychotic disorder according to DSM-IV Axis I criteria (schizophrenia and other psychotic disorders), antipsychotic treatment (current or for ≥4 weeks lifetime, equivalent to a dose of ≥5 mg Olanzapin per day), organic cause for presentation, intellectual disability (IQ < 70), clearly substance-induced CHR-symptoms, and inability to speak Norwegian. Other non-psychotic comorbid DSM-IV disorders were not exclusionary, and some individuals had more than one diagnosis.

The sample was recruited from adult and child/adolescent outpatient clinics at Oslo University Hospital, Vestre Viken Hospital Trust and Akershus University Hospital. The participants were consecutively recruited from June 2012 to December 2015. The final sample comprised 38 patients.

2.2. Procedure and measures

Clinicians at the recruitment facilities were encouraged to refer patients to the study if they clinically suspected risk of psychosis. At first meeting, the patients were given information about the study, and a preliminary clinical screening was conducted. The patients participated in the study on the condition of an informed written consent (for 12 patients below 18 years the parents consented as well). The screening and all the clinical interviews were conducted by the first author, TGV. Interviews with the Structured Interview for Prodromal Syndromes (SIPS) [32,33] and the Examination of Anomalous Self-Experience (EASE) [34] were videotaped.

2.2.1. Clinical high-risk according to Criteria of Prodromal Syndromes

The SIPS was used to decide inclusion in the study, by formally assessing CHR status, as well as present or previous psychosis. The main target group was patients fulfilling the Criteria of Prodromal Syndromes in the SIPS. These criteria comprise three categories: 1) Attenuated Positive Symptom syndrome (APS), i.e. sub-threshold positive symptoms with onset or worsening of symptoms last year, 2) Brief Intermittent Psychotic Symptom syndrome (BIPS), i.e. recent, short lasting, spontaneously remitting episodes of psychotic symptoms, and 3) Genetic Risk and Deterioration syndrome (GRD), i.e. significant decline in functioning last year combined with schizotypal personality disorder or having a first-degree relative with psychotic disorder [32].

Additionally we included patients presenting with longstanding, non-progressive attenuated positive symptoms (a score from 3 to 5 on one or more positive symptoms on the Scale of Prodromal Symptoms (SOPS), with an onset more than one year ago and no worsening of these symptoms the last year). We included this group, to reflect 1) the very close phenomenological resemblance to the CHR group fulfilling the high-risk criteria in the SIPS, and 2) the naturalistic referencing in our study, to specialized outpatient units on the basis of a clinical suspicion of high risk for psychosis. TGV has been trained for SIPS by attending a course led by a Norwegian SIPS expert, TK Larsen. To establish inter-rater reliability, TGV scored nine SIPS case vignettes from the North American Prodrome Longitudinal Study (NAPLS) study [67], and compared these to the final scores from the NAPLS raters. The CHR-status agreement between TGV and these raters was 100%. Excellent reliability was found also with respect to the scores of positive symptoms. The single measure ICC was 0.95 with a 95% confidence interval from 0.82 to 0.99 (two-way mixed effects model, absolute agreement, calculated by SPSS version 25).

2.2.2. Assessment of severity of psychosis-risk symptoms

The Scale of Prodromal Symptoms (SOPS) was used to assess the severity of symptoms in four continuous subscales: *positive* (five symptoms), *negative* (six symptoms), *disorganization* (four symptoms) and *general* (four symptoms), ranging from 0 (= absent) to 6 (= psychotic/extreme) for each symptom. General symptoms include sleep disturbances, dysphoric mood, motor disturbances and impaired tolerance to normal stress. Level of severity of positive, negative, disorganization and

general symptoms was measured by summing the item scores in each subscale.

2.2.3. Assessment of anomalous self-experiences

Following SIPS, the patients were assessed for ASE with the Examination of Anomalous Self-Experience (EASE). The EASE is a symptom checklist for semi-structured phenomenological exploration of experiential anomalies, organized in the domains of disturbed stream of consciousness, self-awareness and presence, corporeality, self-demarcation and existential reorientation [34]. The EASE-items were scored according to a continuous 0–4 Likert scale, and later converted into dichotomous scores (1 = definitely present, all severity levels, and 0 = absent or questionably present). TGV has been trained by one of the authors of EASE, PM, and is a certified EASE rater. To investigate interrater reliability, he scored nine videotaped EASE-interviews from a study by Haug et al. [14] and compared EASE total scores to the scores of two raters: Haug and PM. Single measures ICC was 0.62 with a 95% confidence interval from 0.24 to 0.88, which indicated moderate reliability (two-way mixed effects model, absolute agreement) [35].

2.2.4. Clinical high-risk according to cognitive basic symptoms high-risk criteria

CHR status based on the criteria in the SIPS was supplemented with the cognitive basic symptoms criteria (COGDIS), as described in the Schizophrenia Proneness Instrument – Adult Version (SPI-A) [36]. The EASE was used as a proxy tool to explore the presence and severity of these criteria, however adhering strictly to the SPI-A descriptions. Seven of the nine symptoms comprising the COGDIS criteria overlap considerably with descriptions of EASE-items (EASE-items 1.1, 1.3, 1.4, 1.12.1, 1.12.2, 1.17 and 5.1) [34,36]. The two remaining symptoms (disturbance of receptive speech, disturbance of abstract thinking) were explored both as a part of SIPS/SOPS (particularly P5 Conceptual Disorganization and N5 Decreased Ideational Richness) and the EASE (particularly 2.12 Loss of Common Sense/Perplexity/Lack of Natural Evidence).

2.2.5. Diagnoses and present global functioning

Diagnoses were established using a full version of the Structured Clinical Interview for DSM-IV-Axis I disorders: SCID-I [37]. During the assessment period, TGV discussed diagnoses on a regular basis with PM and JIR, two experienced psychiatrists and researchers. TGV has attended the TOP study SCID-I training and reliability program. The SIPS checklist was applied for the DSM-IV diagnosis Schizotypal Personality Disorder. Present global functioning was assessed with Global Assessment of Functioning - Split version (S-GAF); a scale divided into a symptom and a function score, ranging from 0 (severe symptoms and dysfunction) to 100 (no symptoms, superior functioning) [38].

2.2.6. Childhood trauma and early psychosocial functioning

Childhood trauma was assessed using a Norwegian version of the Childhood Trauma Questionnaire, short form (CTQ-SF), which is a self-report inventory covering experiences of maltreatment before the age of 18 [39]. It comprises 28 items, yielding scores on 5 subscales of trauma: physical abuse, sexual abuse, emotional abuse, emotional neglect, and physical neglect [40]. Psychosocial functioning during childhood was assessed using the Premorbid Adjustment Scale (PAS), based on semi-structured interviews with the participants [41]. We used the childhood (0–11 years) scores from four domains (sociability and withdrawal, peer relationships, scholastic performance and adaption to school) in the analyses of this study.

2.3. Statistical analyses

All analyses were performed with the statistical package SPSS, version 25.0. All analyses including EASE total scores were based on the sum of dichotomous EASE scores on all the main items, sub-items excluded. Differences in total or subscale EASE, SOPS, GAF, CTQ and PAS scores between subgroups in the sample were analyzed using an independent samples *t*-test or the non-parametric alternative: the Mann-Whitney *U* test. Bivariate associations between EASE and continuous psychopathological variables were analyzed, either using Pearson correlation coefficient for normally distributed scores or Spearman rho correlation coefficient for scores on variables not normally distributed. Due to the restriction of range of SOPS positive symptoms in the included participants, the correlation with EASE total is expected to be an underestimation of the correlation in the help-seeking population in general [42]. We corrected for multiple comparisons, using Bonferroni adjustments, i.e. with a *p*-value of 0.004 as the level of statistical significance (calculated on the basis of comparisons with thirteen variables, 0.05/13 = 0.004). However, due to the exploratory nature of the study, we also report results significant according to nominal *p*-values ($p < .05$), and performed a standard linear multiple regression analysis based on these results. This regression analysis included EASE total as the dependent variable and four variables showing nominally significant associations with EASE total ($p < .05$, $r = 0.31$ to 0.66, medium to large effect sizes) in the bivariate correlation analyses as independent variables. Preliminary analyses were conducted to ensure no violations of normality, linearity, multicollinearity and homoscedasticity. The purpose of the regression analysis was to investigate the variance and predictive values of each of the independent variables included in the model.

3. Results

3.1. Risk criteria, demographics and clinical characteristics

The sample ($n = 38$) consisted of 31 subjects fulfilling CHR-criteria and seven defined as non-progressive attenuated positive symptom subjects. Among the 31 CHR subjects, 28 fulfilled criteria for an Attenuated Positive Symptom syndrome (APS), and three fulfilled the COGDIS-criteria only. Ten of the 28 APS subjects fulfilled COGDIS-criteria too, and one simultaneously fulfilled the Genetic Risk and Deterioration syndrome (GRD) criteria.

Table 1 presents demographic characteristics and primary diagnoses, EASE total, SOPS subscale and S-GAF scores for the 31 CHR and the 7 subjects with non-progressive positive symptoms subjects separately, and for all 38 combined. In addition to the sum of dichotomous EASE scores, we also presents the sum of EASE Likert scale scores (0–4) in Table 1, in order to compare the results with two other CHR-studies only reporting the sum of the EASE Likert scale scores [20,24]. Not unexpectedly, the CHR group was significantly younger than the non-progressive positive symptoms group, but did not differ significantly regarding years of education. The most common primary clinical diagnoses in the total sample were mood disorders (40%), followed by anxiety disorders (24%).

3.1.1. Total level of ASE (mean EASE total score)

In the full sample ($n = 38$), the mean EASE total score (sum of dichotomized scores) was 15.45 ± 8.31, and not significantly associated with any of the demographic variables (age, gender, country of birth, years of education, currently employed/at school, civil status). There were no significant differences between the CHR and the non-progressive positive symptoms group in EASE total scores (CHR: 15.65 ± 8.91, non-progressive: 14.57 ± 5.32; t (36) = −0.42, $p = .68$). With respect to DSM-IV diagnoses, schizotypal personality disorder was associated with the highest EASE total score ($n = 6$, mean EASE total: 22.00 ± 3.41), significantly and considerably higher than the remaining sample ($n = 32$, mean EASE total: 14.22 ± 8.40; t (36) = −3.82, $p = .001$).

In the CHR-group ($n = 31$), subjects fulfilling COGDIS criteria ($n = 13$) had significantly higher levels of EASE total scores (20.85 ± 8.05) compared to subjects not fulfilling these criteria ($n = 18$, EASE total: 11.89 ± 7.65, t (29) = 3.15, $p = .004$). The mean difference in EASE

Table 1
Sample demographics, diagnoses, SOPS subscale, EASE total and S-GAF scores.

	Total sample	CHR	Non-progressive symptoms
Number of patients	38	31	7
Demographics			
Mean age (years ± SD)	19.8 ± 3.4	19.0 ± 3.3	23.1 ± 3.7
Gender, Male, n (%)	24 (63)	18 (58)	6 (86)
Born in Norway, n (%)	34 (90)	27 (87)	7 (100)
Employed or studying, n (%)	20 (53)	17 (55)	3 (43)
Total years education	11.6	11.4	12.6
Married or cohabitant, n (%)	2 (5)	2 (6)	0 (0)
Diagnoses, n (%)			
Mood disorders	15 (40)	13 (42)	2 (29)
Anxiety disorders	9 (24)	7 (23)	2 (29)
Other Axis I disorders[a]	6 (16)	4 (13)	2 (29)
Schizotypal pers. dis.	6 (16)	5 (16)	1 (14)
No DSM-IV-TR diagnosis	2 (5)	2 (7)	0 (0)
EASE total score, dichotomized, mean ± SD	15.45 ± 8.31	15.65 ± 8.90	14.57 ± 5.32
EASE total score, Likert scale, mean ± SD	50.84 ± 26.91	52.00 ± 29.00	45.71 ± 14.96
SOPS positive, mean ± SD	10.13 ± 3.50	10.55 ± 3.61	8.29 ± 2.36
SOPS negative, mean ± SD	12.95 ± 6.92	13.00 ± 6.95	12.71 ± 7.30
SOPS disorg., mean ± SD	6.92 ± 3.27	6.94 ± 3.37	6.86 ± 3.02
SOPS general, mean ± SD	8.00 ± 3.47	8.16 ± 3.34	7.29 ± 4.23
GAF Split version, mean ± SD			
GAF symptom	52.79 ± 10.04	52.00 ± 12.56	56.06 ± 9.48
GAF function	55.76 ± 11.03	55.45 ± 10.96	57.14 ± 12.10

[a] Other Axis 1 disorders include Cannabis dependence (1), Dissociative disorder NOS (1) and Depersonalization disorder (4).

total score between the two groups was 8.96 (95% *CI*: 3.14–14.78, eta squared = 0.25). Even if removing the EASE-items directly overlapping with COGDIS-items, a marked effect remained, though somewhat smaller (t (29) = 2.34, $p = .026$, eta squared = 0.16).

3.2. The relative occurrence of single EASE items

Table 2 presents the 11 most frequent baseline EASE-items in the total sample, those present in >45% of the participants (45–82%). In the CHR group only ($N = 31$), exactly the same items were the most frequent. Although present in all subjects, item 2.13 Anxiety is not included in the table because it is a non-specific symptom, more loosely associated with the concept of basic self-disturbance. The four most frequent items were ruminations/obsessions (1.6), distorted first-person perspective (2.2), diminished presence (2.4), and derealization (2.5), each reported by 66–82% of the participants.

3.3. Associations between ASE, clinical characteristics and background factors

Scores on SOPS subscales, S-GAF, CTQ and PAS did not differ significantly between the CHR group and the non-progressive positive symptoms group. Hence, we present pairwise correlations between EASE total scores and these variables for the full sample. Higher EASE total scores were associated ($p < .05$) with higher SOPS positive (r = 0.31), SOPS negative (r = 0.66) and SOPS disorganization (r = 0.54) scores, as well as with a higher score on the CTQ subscale Emotional neglect ($r = 0.43$). After Bonferroni-correction ($p < .004$) only the association between EASE total and SOPS negative, and between EASE total and SOPS disorganization scores, retained statistical significance (Table 3). Neither present functioning (S-GAF) nor childhood functioning scores (PAS; 0–11 years) were significantly associated with EASE total. We were also interested in the same correlations, but limited to the 11 most frequent EASE items (listed in Table 2). Using the Bonferroni-adjusted *p*-value, the total score on "EASE Top11" was also significantly correlated with SOPS negative (r = 0.49, $p < .004$), but not with the other variables (Table 3).

Table 2
Top 11 EASE-items (present in ≥45% of the total sample, $n = 38$). Anxiety (2.13) excluded.

EASE-items	Item present, number of participants (%)
1.6 Ruminations, obsessions	31 (82)
2.2 Distorted first-person perspective	26 (68)
2.4 Diminished presence	25 (66)
2.5 Derealization	25 (66)
1.3 Thought pressure	23 (61)
2.1 Diminished sense of basic self	19 (50)
1.1 Thought interference	18 (47)
1.10 Inability to discriminate modalities of experience	18 (47)
2.6 Hyperreflectivity	18 (47)
3.7 Cenesthetic experiences	18 (47)
5.5 World feels as if not truly real	17 (45)

3.3.1. The strongest loadings on EASE

A standard multiple regression analysis was performed with EASE total as the dependent variable, and four variables significantly associated with EASE total, according to the nominal p-value ($p < .05$), as the independent variables, i.e. SOPS positive, SOPS negative, SOPS disorganization and CTQ Emotional Neglect. The total variance of the model including these variables explained 47.4% of the variance in the EASE total score (adjusted R Square). Only SOPS negative explained a significant amount of the variance in the model (beta = 0.701, $p < .01$).

To address the potential problem of spurious correlations, we repeated the correlation analysis regarding the association between SOPS negative and EASE total, removing certain overlapping symptoms and items from this analysis. This association however remained strong ($r = 0.58$, $p < .001$) even if we removed four EASE-items (1.11, 2.16, 2.17, 2.18) resembling the description of certain SOPS negative symptoms (particularly N1, N2 and N4) from the correlation analysis, as well as the one negative SOPS symptom which seemed to resemble the EASE descriptions of self-disturbances the most: N4 Experience of Emotions and Self (e.g. including loss of sense of self).

4. Discussion

In the present study, the mean EASE total score was in line with reports from other CHR samples [20,21,24]. The level was particularly enhanced in subjects fulfilling schizotypal personality disorder criteria and COGDIS criteria. The 11 most frequent items were present in >45% of the participants, including top four items, present in 66 to 82% of the participants. A multiple regression analysis revealed that SOPS negative

Table 3
Correlations between EASE total, EASE top11, SOPS subscales, GAF symptom, GAF function, CTQ and PAS childhood (0–11 yrs).

	SOPS Pos	SOPS Neg	SOPS Dis	SOPS Gen	GAF Sympt	GAF Funct	CTQ Phys. abuse	CTQ Sex. abuse	CTQ Em. abuse.	CTQ Em. negl	CTQ Phys. negl.	CTQ Total	PAS Childh.
EASE total	0.34*a	0.66**a	0.54**b	.28a	-.18a	-.30a	-.05b	.11b	.05b	0.43*b	.09b	.25b	.13a
EASE top11	.20a	0.49**a	0.32*b	.18a	-.06a	-.23a	.01b	-.12b	.12b	0.41*b	.05b	.28b	-.07a

a = Pearson two-tailed.
b = Spearman two-tailed.
* $p < .05$.
** $p < .004$ (Bonferroni-adjusted).

symptoms made by far the strongest statistically significant contribution to the variance in EASE total scores.

4.1. Level of ASE

The high level of ASE in subjects with DSM-IV schizotypal personality disorder is in line with results from other studies on schizotypal disorders (diagnosed according to ICD-10 or DSM-IV criteria) [11,16,18]. Although limited by the small number of these patients in our sample ($n = 6$), the results corroborates earlier findings that basic self-disturbance is highly characteristic of all schizophrenia spectrum conditions [10,12,14,15,18].

Subjects fulfilling COGDIS criteria in this and the CHR study by Raballo and co-workers [21] also had high levels of ASE. This indicates that cognitive disturbances typically constitute a core part of markedly self-disturbed individuals. The high EASE total scores are not explained by a simple overlap between COGDIS criteria and EASE-items, because the significant association remained when removing the directly overlapping EASE-items from the analyses. Assuming that ASE and conventional symptomatic manifestations may constitute interrelated aspects of a more comprehensive psychopathological Gestalt, constituting a self-disorder, the EASE assessment in CHR conditions may be of considerable clinical importance. The co-presence of cognitive disturbances and other disturbances in the basic sense of self may reflect a CHR-subgroup particularly vulnerable with respect to schizophrenia spectrum disorders, as both the COGDIS criteria and high levels of ASE have been demonstrated to be associated with an increased risk of these disorders [20,22,43]. In addition, assessing ASE may result in a more comprehensive clinical picture, and give rise to a more dynamic and integrated psychopathological understanding of the patient [5,44,45], also relevant for treatment.

The lack of difference in EASE total, SOPS subscales and S-GAF scores between those categorized as CHR versus the group with non-progressive positive symptoms probably reflects that all subjects were referred to the study on the basis of a clinically based suspicion of increased risk for psychosis. This is also supported by the fact that the most frequently reported EASE-items (Table 2) were identical for the two groups. Considering the medical history of the subjects with non-progressive symptoms, they had most probably fulfilled CHR criteria at an earlier stage, and may thus be conceptualized as non-remitting CHR subjects. In prospective CHR-studies, this relatively stable category is indeed quite common among non-converters to psychosis [46,47].

4.2. Profiles of ASE

The assessment of certain clusters of EASE-items may supplement and refine the methods for the assessment of risk for psychosis and schizophrenia spectrum disorders [23]. It might thus be clinically useful to start looking at EASE data in more detail, to explore profiles of ASE in risk cohorts. We therefore report the 11 most frequent baseline EASE-items (not including 2.13 Anxiety), all present in >45% of the subjects in Table 2. There are considerable overlaps with a CHR study by Davidsen [19]. Among the 13 most common EASE-items in that study, seven were among the most frequent items in our study (EASE-items 1.1, 1.3, 1.10, 2.1, 2.2, 2.4 and 3.7). In a study by Nordgaard and co-workers assessing 48 schizophrenia and schizotypal patients, six of the top 12 items (seven out of 13 if including 2.13 Anxiety) overlapped with our top items (EASE-items 1.3, 1.6, 2.6, 2.1, 2.5 and 3.7) [10]. Three of the top items in our study are among the top items in all three studies (EASE-items 1.3, 2.1, 3.7), and 10 of our top items are among the most frequent in *either* the Davidsen CHR study or the Nordgaard schizophrenia spectrum study [10,19]. Additionally, four of our top-11 items (1.3, 2.1, 2.2, 2.6) are also among the ten EASE-items suggested as most prototypically reflecting disorders of the basic self in a study by Koren and co-workers [23].

It is crucial to bear in mind that ASE are not discrete symptoms, but aspects of a phenomenological entirety, a Gestalt. Risk evaluation cannot be performed based on one or a few EASE-items, but must always take the full picture into consideration. Still, the preliminary impression from investigations till now indicates that certain clusters of EASE-items most prevalent in CHR might also be among the most prevalent in schizophrenia spectrum disorders. This is anyway in line with considering self-disorders as trait-like features, developing continuously from pre-psychosis to psychosis [44]. We may only speculate that a high prevalence of these EASE-items in CHR subjects may indicate a more schizophrenia spectrum-related risk-profile. Examples of this kind of continuous development of a disordered self has previously been demonstrated in an extensive naturalistic case study [48]. However, most CHR subjects do not develop psychosis, and it is off the mark to consider CHR conditions in general as "schizophrenia light" [25]. Hence, further investigations of the trait- or state character of ASE, and level of specificity for groups of EASE-items as risk markers, are still needed.

4.3. ASE and their relationship with symptoms, childhood trauma, present and early functioning

This study indicates that negative symptoms and cognitive disturbances (presence of COGDIS criteria) may be tightly interwoven with ASE in CHR and intimately related conditions. It could be argued that these strong associations are due to overlapping items in the scales used for assessing these symptoms and experiences, i.e. that they reflect spurious relationships. However, these associations remained strong and significant even after removing those items most obviously overlapping, implying that this is probably not a sufficient explanation. The results are moreover in line with the findings in a study on a diagnostically heterogeneous sample of 100 patients, including approximately two-thirds with schizophrenia spectrum disorders [11]. The strong correlation between scores on the eleven most frequent EASE-items in the sample (EASE Top11) and SOPS negative symptoms may point to a strong affinity between these symptoms, but further studies are needed to investigate whether these findings may generalize to CHR conditions. Of course, so far, we can neither conclude firmly that a basic self-disturbance is driving the development of other symptoms in our sample, given the purely correlational data.

After Bonferroni-correction, positive symptoms (SOPS positive) did not correlate significantly with ASE in this sample. However, it is important to keep in mind that the weaker correlation with positive symptoms may be due to the restricted range of positive symptoms in our

sample. This is a common problem in predictive validity studies where the criterion variable is restricted in range [42]. This may at least partly explain the stronger correlations between the SOPS positive symptoms and EASE total in the study by Raballo and co-workers [21]. This study included a help-seeking sample not restricted with respect to positive symptoms, consisting both of CHR- and other help-seeking subjects, and analyzed these correlations in the total sample. Possibly, differences between the studies also reflect other differences in sample characteristics, even if the participants share positive symptoms of varying severity. In the heterogeneous help-seeking population many subjects may share symptoms like suspiciousness or perceptual abnormalities, but these symptoms are trans-diagnostic phenomena involving a variety of psychopathological mechanisms [49–53], not necessarily including the operation of a basic self-disturbance in all subjects.

The strong association between negative symptoms and ASE is interesting in light of the conceptualization in early European continental psychiatric literature of a certain kind of "*autism*" as an essential feature or 'trouble générateur' of schizophrenia [44,54,55]. In this theoretical context, autism involves a "deficit in the basic, non-reflective attunement between the person and his world" [54,55] or a loss of "common sense" [56], and prototypically manifests in the negative syndrome of schizophrenia [4,56]. In more recent phenomenological theory, this core feature is assumed to be intimately related to diminished self-presence/self-affection and hyperreflexivity, and thus implies a self-disorder characterized by a basic self-disturbance [4,55]. Given the cross-sectional design, the present data cannot tell us if the negative and other symptoms in our sample are *caused* by this core feature. On the other hand, to ask whether "autism" or a basic self-disturbance causes other symptoms may not necessarily be an adequate question to ask. Some symptoms, e.g. anhedonia and blunted affect, may constitute more or less simultaneous symptomatic *expressions* of more primary pathogenic features, among which basic self-disturbance may be prominent [55]. Still, other symptoms may be more appropriately characterized as compensatory mental events (i.e. effects, like delusional ideas or social withdrawal), dealing with a more primary disturbance.

Although common in the schizophrenia spectrum, the co-presence of ASE and negative symptoms in our sample may not necessarily imply an impending schizophrenia spectrum disorder. Some of the subjects in this sample may have been characterized by a depersonalized condition outside of the schizophrenia spectrum, which may occur as a primary disorder (DSM-5 Depersonalization/Derealization disorder, four of the participants were diagnosed with this disorder) or as a secondary feature of e.g. depressive and anxiety disorders [57,58]. Depersonalized conditions are not only characterized by feelings of unrealness and detachment, but also by a diminished sense of agency and emotional numbing [59]. These experiences manifest as symptoms overlapping with several kinds of ASE as described in the EASE [60,61]. The emotional numbing include different degrees of attenuated emotional experience (even though commonly showing emotions), including lack of feelings of affection towards family and friends [62,63]. It cannot be precluded that emotionally numb subjects in the sample may have been assessed as having "negative" symptoms like SOPS N1 Social anhedonia and N4 Experience of emotions and the self. Descriptions of these SOPS symptoms seem to overlap with descriptions of emotional numbness, e.g. "Passively goes along with most social activities in a disinterested or mechanical way" (N1), "Sense of distance when talking to others…" (N4) and "Emotions disappearing, difficulty feeling happy or sad" (N4).

4.3.1. Childhood trauma

We found a link between the CTQ subscale Emotional neglect and ASE using a nominal *p*-value ($p < .05$), but this correlation was insignificant after Bonferroni-correction. Still, this finding is worth mentioning considering the exploratory nature of this study, and in light of other studies finding significant associations between the experience of traumatic events/childhood trauma and self-disturbances. These include three studies of non-clinical samples (total $n = 1992$) [28–30], as well as one study of patients with first episode schizophrenia (only in females, $n = 27$) [27]. Although limited by the cross-sectional design of these studies, these results are interesting in light of a recently revised version of the self-disorder/ipseity disturbance model of schizophrenia. The model postulates that in addition to primary, trait-like ASE, characterizing schizophrenia, secondary forms of basic self-disturbance may occur both in the schizophrenia spectrum and in certain depersonalized conditions outside of this spectrum. These secondary forms are considered to constitute short-term or long-term *reactions* to external adversities and trauma [64–66]. This model, and the preliminary results regarding associations between ASE and trauma variables, point to the need of longitudinal studies to investigate the interaction between these factors.

4.3.2. Present and childhood functioning

Neither present global functioning (S-GAF) nor childhood functioning (PAS) were significantly associated with ASE. The lack of a significant association with present functioning is in line with one CHR study (measuring functioning with the Social and Occupational Functioning Scale, SOFAS) [20], but in disagreement with two other CHR studies (using GAF, not the split version) [21,24]. However, the strong correlation ($p < .01$) between EASE total and some of the SOPS negative symptoms, including symptoms like N1 Social Anhedonia, N2 Avolition and N6 Occupational Functioning, actually points to aspects of functioning affected in a significant amount of the participants.

4.4. Limitations

It could be argued that the use of EASE as a proxy tool to investigate COGDIS is a dubious method. However, when assessing these criteria we strictly adhered to the descriptions of them in the SPI-A. Due to the young age of several of the participants, assessments did not include an evaluation of personality disorders, except from the SIPS checklist of DSM-IV schizotypal personality disorder. Another limitation is the moderate interrater reliability of videotaped EASE-interviews which was based on pre-study scoring from another study. This should be considered in the context of our running supervisory post-scoring discussions (with EASE author PM) of almost all EASE-interviews, throughout the study.

As already described, the cross-sectional design limits the kind of analyses possible to carry out, and does not provide grounds for causal inferences. The exploratory nature of the study with the relatively small number of participants, and the lack of a control group, also limits the feasibility of comparative analyses and the generalizability of the study. If we had included a comparison group of non-CHR patients, we could have been more confident in concluding that the differences in the strength of relationships between EASE total and the other variables are not statistical artefacts, e.g. due to a more restricted range of positive symptoms in the included CHR subjects.

5. Conclusions

This study corroborates other studies finding that ASE are frequent in CHR and in the schizophrenia spectrum. The finding that the total level of ASE was extra enhanced in subjects with cognitive disturbances (fulfilling COGDIS criteria), may point to a CHR-subgroup particularly vulnerable to schizophrenia spectrum disorders. The strong association with negative symptoms is not previously reported in a CHR-sample. This finding is interesting in light of early models of "autism" as the "trouble générateur" of the symptoms of schizophrenia, but the cross-sectional design implies that we cannot draw the conclusion that this "autism" or basic self-disturbance drives symptom development in the sample. Longitudinal studies in clinical samples are needed to

investigate associations between ASE and negative symptoms, and between ASE and cognitive disturbances, to further address questions of causality, psychopathological pathways and schizophrenia spectrum specificity. The weaker correlation between ASE and positive symptoms may at least partly be due to range restriction of positive symptoms. Hence, future studies should investigate this association in samples not limited by this kind of range restriction.

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