

## **Core Schemas in Youth at Clinical High Risk for Psychosis**

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**Background:** Schema Theory proposes that the development of maladaptive schemas are based on a combination of memories, emotions and cognitions regarding oneself and one's relationship to others. A cognitive model of psychosis suggests that schemas are crucial to the development and persistence of psychosis. Little is known about the impact that schemas may have on those considered to be at clinical high risk (CHR) of developing psychosis. **Aims:** To investigate schemas over time in a large sample of CHR individuals and healthy controls. **Method:** Sample included 765 CHR participants and 280 healthy controls. Schemas were assessed at baseline, 6 and 12 months using the Brief Core Schema Scale (BCSS). Baseline schemas were compared to 2-year clinical outcome. **Results:** CHR participants evidenced stable and more maladaptive schemas over time compared to controls. Schemas at initial contact did not vary amongst the different clinical outcome groups at 2 years although all CHR outcome groups evidenced significantly worse schemas than healthy controls. Although there were no differences on baseline schemas between those who later transitioned to psychosis compared to those who did not, those who transitioned to psychosis had more maladaptive negative self-schemas at the time of transition. Associations between negative schemas were positively correlated with earlier abuse and bullying. **Conclusions:** These findings demonstrate a need for interventions that aim to improve maladaptive schemas

among the CHR population. Therapies targeting self-esteem, as well as schema therapy may be important work for future studies.

*Keywords:* Clinical high risk, psychosis, schemas, beliefs, NAPLS

## Introduction

A cognitive model of psychosis proposes that pre-existing beliefs about the self and others may play a role in the development and persistence of psychosis, and that these effects have been observed over and above depressed or anxious mood (Garety, Bebbington, Fowler, Freeman and Kuipers, 2007). Such pre-existing beliefs about the self are known as schematic beliefs or schemas. Young and colleagues “Schema Theory” states that early maladaptive schemas are created based on a combination of memories, emotions and cognitions regarding oneself and one’s relationship to others. They propose that early maladaptive schemas develop in childhood when an environment does not meet the needs of the child due to experiences such as abuse, neglect, hostility or criticism (Young, Klosko and Weishaar, 2003). The emergence of interest in schemas and psychosis originally derived from a non-clinical sample that showed that there were strong associations between negative schemas about self and others and levels of paranoia (Fowler et al., 2006). More recently, it has been demonstrated that, after controlling for depression, patients with schizophrenia evidence significantly more maladaptive schemas compared to healthy controls (Bortolon, Capdevielle, Boulenger, Gely-Nargeot and Raffard, 2013).

If, indeed, schemas play a role in the development of psychosis, examining schemas in those who are known to be at clinical high risk (CHR) of developing psychosis (Addington and Heinssen, 2011) could offer new insights. However, little is known about the role of schemas in young people at CHR. One study investigated a sample of undergraduate students with elevated schizotypy scores and found that positive schizotypy was associated with negative schemas, and negative schizotypy was associated with diminished positive schemas (Barrantes-Vidal et al., 2013). A second study found that maladaptive schemas appear to be evident in those seeking help for psychosis across various clinical groups (i.e. first episode of psychosis patients, CHR participants and help seeking controls) when compared to individuals who only endorse minimal schizotypal experiences (Taylor et al., 2013). Lastly, in a small study with CHR individuals, it was demonstrated that maladaptive schemas mediated the role between experiencing social defeat and more severe attenuated positive symptoms (Stowkowy and Addington, 2012).

The aims of this study are: first, to examine schemas in a large sample of CHR individuals both longitudinally and in comparison to healthy controls; second, to determine if there is an association between early childhood trauma and schemas; third, to assess, in a sub-sample, whether schemas at initial contact are related to later clinical outcome.

We hypothesize that: (1) CHR participants will evidence significantly more maladaptive schemas compared to controls; (2) schemas will be stable over time; and (3) maladaptive schemas within the CHR group will be related to a history of trauma. Our exploratory hypothesis is that those who go on to develop psychosis may have more maladaptive schemas.

## Method

### *Sample*

The sample consisted of 765 CHR participants (436 male, 329 female) and 280 healthy controls (141 male, 139 female). All participants were recruited as part of the NIMH funded North American Prodrome Longitudinal Study 2 (NAPLS 2) and were drawn from the participating NAPLS2 sites (Emory University, Harvard University, University of Calgary, University of California at Los Angeles, University of California at San Diego, University of North Carolina, Yale University, and Zucker Hillside Hospital). The NAPLS2 project was established to investigate predictors and mechanisms of conversion to psychosis. All participants were help-seeking individuals referred from various sources, including health care agencies, educators, and self-referrals. Potential participants would undergo a telephone screen and then, if applicable, be invited to attend an in-person evaluation. Further description of ascertainment methods has been well described in detail elsewhere (Addington et al., 2012). All CHR participants met the Criteria of Prodromal Syndromes (COPS) using the Structured Interview for Prodromal Syndromes (SIPS) (McGlashan, Walsh and Woods, 2010). Participants were excluded if they met criteria for any current or lifetime axis I psychotic disorder, IQ less than 70, or past or current history of a clinically significant central nervous system disorder. In addition, control participants were also excluded if they had a first degree relative with a current or past psychotic disorder.

A subsample of individuals (556 CHR, 246 healthy controls) who had completed the final 2-year assessment of the NAPLS project by December 2013 were included in order to examine the association of initial schemas to later clinical outcome. This sub-sample included 71 participants (48 male, 23 female) who had transitioned to psychosis, three of whom transitioned several months after the 2-year follow-up.

### *Measures*

The Structured Interview for Prodromal Syndromes (SIPS) and the Scale for Assessment of Prodromal Symptoms (SOPS) (McGlashan et al., 2010) were used to determine criteria for a prodromal syndrome and to determine severity of attenuated positive symptoms. The Brief Core Schema Scale (BCSS) (Fowler et al., 2006), a self-report scale, was used to assess negative and positive schemas. The BCSS has 24 items concerning beliefs about the self and others that are assessed on a 5-point rating scale. Four scores are obtained: negative-self, positive-self, negative-others, and positive-others, each with a range of 0 to 24 (a higher score on the negative items indicates more maladaptive schemas, whereas a higher score on the positive items indicates less maladaptive schemas). This scale has been demonstrated to be valid in a CHR population (Addington and Tran, 2009). Additional clinical measures included the Calgary Depression Scale for Schizophrenia (Addington, Addington and Maticka-Tyndale, 1993; Addington, Shah, Liu and Addington, 2014) and an adapted version of the Childhood Trauma and Abuse Scale (Janssen et al., 2004). This scale enquires about trauma and abuse before the age of 16. Respondents answer yes or no to ever experiencing any of the following before age 16: psychological or physical bullying, emotional, physical, psychological or sexual abuse.

Clinical status at the 2-year follow-up was determined in the following way: 1) healthy control (does not meet criteria for prodromal risk syndrome); 2) remission (scores of 2 or less

on the five positive symptoms on the SOPS scale); 3) symptomatic (not currently meeting criteria for a prodromal risk syndrome but having ratings of 3–5 on any one of the five positive symptoms on the SOPS); 4) prodromal progression (currently meeting criteria for one of the at risk syndromes; APSS; the emergence or worsening of non-psychotic level disturbances in thought content, thought processes or perceptual abnormalities over the past year, GRD; either a first degree relative with a psychotic disorder or the subject having schizotypal personality disorder (SPD) plus at least a 30% drop in functioning on the General Assessment of Functioning (GAF) scale in the past 12 months, BIPS; the emergence of at least one psychotic symptom that is too brief to meet criteria for a psychotic disorder and 5) psychotic (currently meeting criteria for a psychotic disorder or evidencing scores of 6 on one or more positive symptoms of the SOPS).

### *Procedures*

The study was approved by Institutional Review Boards at all eight sites participating in NAPLS. Participants provided informed consent or assent (parental informed consent for minors). Participants were assigned a clinical rater who conducted semi-structured interviews. Raters were experienced research clinicians who demonstrated adequate reliability at routine reliability checks. Gold standard post-training agreement on determining the prodromal diagnoses was excellent ( $\kappa = 0.90$ ). Follow up assessments were conducted at 6 and 12 months after baseline. If an individual transitioned to psychosis, an additional assessment was completed.

### *Statistical analyses*

Baseline demographics were compared between CHR and control groups using the Student *t*-test for continuous variables and chi-square tests for categorical variables. To account for any missing data and intra-participant correlation over time, mixed effects models for longitudinal data were used to compare the difference for the BCSS total scores (negative-self, negative-others, positive-self, positive-others) between CHR and control groups at baseline, 6-month follow-up, and 12-month follow-up. Spearman's correlation coefficients were calculated to determine the correlation between schemas and the clinical variables of positive symptoms, negative symptoms, depression, and trauma. The five groups based on 2-year clinical status (1 -healthy control; 2 - remission; 3 - symptomatic; 4 – prodromal, and 5 - psychotic) were compared on baseline schemas using a one-way ANOVA. The *t*-test for two independent samples was used to determine the differences in baseline schemas between those who transitioned to psychosis and those who did not transition to psychosis by 2 years. Lastly, the *t*-test for two independent samples was also used to determine the differences between the schemas of those at the time of transition to psychosis and the schemas at the 2-year assessment of those who did not transition.

## **Results**

Demographic characteristics are summarized in [Table 1](#). Control participants were slightly older and had significantly more years of education than CHR participants. CHR females reported significantly more negative schemas about the self and negative schemas about others

**Table 1.** Demographic characteristics

Variable	Controls <i>n</i> = 280	CHR <i>n</i> = 765	Test statistic	Effect size
	<i>Mean (SD)</i>		<i>t</i>	<i>d</i>
Age in years	19.65 (4.67)	18.47 (4.24)	3.68*	0.26
Years of education	12.68 (3.58)	11.30 (2.82)	5.84*	0.43
	Number (%)		$\chi^2$	Cramer's V
Sex:				
Male	141 (50.4%)	436 (57.0%)	3.65	0.06
Female	139 (49.6%)	329 (43.0%)		
Race:				
First Nations	4 (1.4%)	13 (1.7%)	4.96	0.07
Asian	30 (10.7%)	55 (7.2%)		
Black	49 (17.5%)	118 (15.4%)		
Latin America/Middle East/White	167 (59.6%)	478 (62.6%)		
Native Hawaiian or Pacific Islander	1 (0.4%)	3 (0.4%)		
Interracial	29 (10.4%)	97 (12.7%)		
Marital status:				
Single never married	266 (95.0%)	721 (94.9%)	0.01	0.003
Other	14 (5.0%)	39 (5.1%)		
Currently working				
Yes	129 (46.1%)	190 (25.1%)	42.38 *	0.20
No	151 (53.9%)	568 (74.9%)		
Currently enrolled as a student				
Yes	227 (81.1%)	626 (82.5%)	0.28	0.02
No	53 (18.9%)	133 (17.5%)		

\* $p < 0.01$ 

than CHR males (mean = 7.24,  $SD = 5.85$  vs. mean = 5.74,  $SD = 5.23$ ,  $t = -3.80$ ,  $p < .0001$ , and mean = 8.67,  $SD = 6.37$  vs. mean = 7.38,  $SD = 5.94$ ,  $t = -3.05$ ,  $p < .01$ , respectively). There were no differences in negative schemas between males and females in the healthy control group. Males and females did not differ in positive schemas for either controls or CHR participants.

Our longitudinal analysis in the mixed effects model was based on  $N = 714$  CHR and  $N = 273$  healthy controls. There were no differences in baseline schemas between those who were lost to follow-up and those who remained. Since the groups differed significantly on depression as rated by CDSS (baseline;  $t = -26.56$ ,  $p < .0001$ ; 6 months;  $t = -17.32$ ,  $p < .0001$ ; 12 months;  $t = -14.36$ ,  $p < .0001$ ) we controlled for depression at each time point in the mixed effects model. There were no within group differences in schemas overtime for either the control or CHR groups. As displayed in Table 2 the groups differed on both negative and positive schemas at each time point.

Results of the Spearman's correlations in the CHR group are presented in Table 3. As in previous studies, depression was highly correlated with schemas and was controlled for in the correlations between schemas and trauma. Only 676 of the CHR participants had trauma data. A Bonferroni correction was also applied and thus only those correlations with a  $p$  value greater than 0.0001 were considered to be significant. Negative-self schemas were

**Table 2.** Comparisons between control and prodromal group at baseline, 6 months and 12 months

BCSS	Baseline				6-months				12- months			
	M* (SE)	<i>t</i>	<i>p</i>	95% C.I.	M* (SE)	<i>t</i>	<i>p</i>	95% C.I.	M* (SE)	<i>t</i>	<i>p</i>	95% C.I.
Negative self	- 3.5 (0.43)	- 8.19	<.0001	- 4.72, - 2.28	- 2.83 (0.46)	- 6.1	<.0001	- 4.16, - 1.51	- 2.90 (0.47)	- 6.18	<.0001	- 4.24, - 1.56
Negative others	- 3.18 (0.62)	- 5.14	<.0001	- 4.95, - 1.41	- 2.10 (0.67)	- 3.13	.02	- 4.02, - 0.18	- 2.21 (0.68)	- 3.25	.02	- 4.15, - 0.27
Positive self	3.61 (0.62)	5.85	<.0001	1.85, 5.37	4.77 (0.67)	7.13	<.0001	2.86, 6.68	3.59 (0.68)	5.3	<.0001	1.66, 5.23
Positive others	2.72 (0.61)	4.48	<.0001	0.99, 4.46	2.90 (0.66)	4.39	<.0001	1.01, 4.79	2.77 (0.67)	4.15	<.0001	0.86, 4.68

Notes: BCSS = Brief Core Schema Scale; C.I. = confidence interval;

M\* = represents the least squares means estimated by the generalized linear mixed models

**Table 3.** Correlations between schemas, symptoms and trauma

Measure	Negative self <i>N</i> = 676	Negative others <i>N</i> = 676	Positive self <i>N</i> = 676	Positive others <i>N</i> = 676
	Pearson <i>r</i>			
CDSS	<b>0.60*</b>	<b>0.29*</b>	<b>-0.42*</b>	<b>-0.21*</b>
<i>After controlling for depression (baseline CDSS scores)</i>				
SOPS -P	0.12	<b>0.23*</b>	0.07	-0.06
SOPS -N	0.04	0.03	-0.11	-0.07
Physical bullying	0.08	0.12	-0.02	-0.09
Psych. bullying	0.11	<b>0.17*</b>	-0.11	-0.07
Emotional neglect	0.10	0.07	-0.01	-0.09
Psych. abuse	<b>0.16*</b>	0.08	-0.03	-0.07
Physical abuse	<b>0.13*</b>	0.08	-0.03	-0.07
Sexual abuse	0.05	0.09	-0.02	-0.12

Notes: \**p* < .001 [EPS] after applying the Bonferroni correction;

CDSS = Calgary Depression Scale for Schizophrenia; SOPS-P = SOPS Total Positive Symptoms, SOPS-N = SOPS Total Negative Symptoms, Psych. = Psychological

**Table 4.** Current clinical status of groups at 2-year assessment and baseline schemas

Two-year assessment	Baseline schemas					<i>F</i> Value
	Healthy controls ( <i>N</i> = 135)	Remission ( <i>N</i> = 86)	Symptomatic ( <i>N</i> = 77)	Prodromal progression ( <i>N</i> = 57)	Psychotic ( <i>N</i> = 66)	
	Mean ( <i>SD</i> )					
Negative self	0.61 (1.49) <sup>a</sup>	5.83 (5.78)	6.10 (5.15)	7.86 (5.95)	6.86 (5.85)	37.69*
Negative others	2.65 (3.80) <sup>a</sup>	7.26 (6.06)	9.03 (6.12)	7.92 (6.02)	7.95 (5.43)	24.40*
Positive self	17.89 (4.45) <sup>a</sup>	11.38 (5.72)	11.36 (5.76)	7.93 (6.02)	10.92 (6.59)	36.99*
Positive others	14.41 (4.34) <sup>a</sup>	10.19 (5.79)	9.52 (5.26)	8.86 (4.88)	10.12 (5.46)	20.14*

Notes: \**p* < .0001; a = significantly different from all other groups

positively correlated with psychological abuse and physical abuse. Negative-other schemas were positively correlated with psychological bullying and total positive symptoms. There were no correlations between trauma and positive schemas.

The subsample of individuals that had completed a 2-year assessment and also had data on baseline schemas consisted of *N* = 66 individuals who transitioned to psychosis, *N* = 220 who did not and *N* = 135 healthy controls. An examination of the differences in baseline schemas among the different clinical outcome groups at 24 months revealed that all of the CHR groups differed from controls but did not differ from one another (see Table 4). There were no differences in baseline schemas between those who transitioned to psychosis and those who did not transition for both negative and positive schemas.

Fifty-five of those who made the transition to psychosis had completed the schema questionnaire at the time of transition to psychosis. The schemas of those who transitioned to psychosis (*N* = 55) were compared to the 2-year schemas of those who did not (*N* = 204).



Those who transitioned to psychosis reported significantly more negative-self schemas (mean = 5.78,  $SD = 5.89$ ) compared to the schemas at the two-year assessment of those who did not transition (mean = 3.80,  $SD = 4.61$ ;  $t = -2.31$ ,  $p < 0.05$ ).

## Discussion

As hypothesized, across all time points CHR individuals evidenced more maladaptive schemas compared to controls. This remained after controlling for levels of depression, which provides further support that these schemas are operating over and above depressed mood (Garety et al., 2007). Not only did the CHR individuals endorse more maladaptive schemas such as “I am unloved”, “I am worthless” but they also reported fewer positive schemas (i.e. “I am talented”, “I am valuable”, “I am good”) relative to the healthy controls. This is consistent with results of the UK study (Taylor et al., 2013). Additionally, as hypothesized, schemas remained stable over time for both CHR individuals and controls.

Symptoms were not typically correlated to schemas with the one exception being a correlation between more severe attenuated psychotic symptoms and more maladaptive schemas about others. With respect to early trauma, as hypothesized, CHR individuals who reported experiencing increased childhood psychological and physical abuse endorsed more negative schemas about the self and those CHR individuals who reported experiencing childhood psychological bullying endorsed more negative beliefs about others. This might suggest that childhood bullying is contributing to the development of negative schemas about others (i.e. “other people are bad”, “other people are hostile”, “other people are unforgiving”). On the other hand, these might also manifest as a result of more severe attenuated positive symptoms. For example, if one feels more suspicious of others they might also believe that they are “unworthy”. This research is correlational and as such is limited in terms of understanding directionality of this finding, but as our measure of trauma is reported before the age of 16, it may be reasonable to suggest the trauma may have occurred first, at least for some participants. This offers support for the Schema Theory, as well as a further emphasis on prevention. Intervening earlier and attempting to address issues such as bullying continues to be an important area that should be considered.

At the 2-year outcome, healthy controls evidenced less negative schemas and more positive schemas compared to every other clinical group (i.e. remission, symptomatic, prodromal and psychotic). Interestingly, this suggests that for those at CHR maladaptive schemas may be operating independently, despite improvement in or complete remission of attenuated symptoms. While there were no differences in baseline schemas between those who later transitioned to psychosis and those who did not, there were differences between schemas at the time of transition to psychosis and schemas at the 2-year assessment of those who did not transition. Those who transitioned evidenced more negative-self schemas (i.e. “I am unloved”, or “I am worthless”). This suggests that although schemas appeared to be stable over time in this CHR group and typically more maladaptive than healthy controls, in fact those individuals who transition to psychosis, at least during the time of transition to psychosis, began to feel worse about themselves. Therefore, the instability of these core schemas during the transition to psychosis might be an important area to review in future research.

There are limitations to our study. It is possible that although we did control for depression there are other variables contributing to our findings for which we did not control. Our measure of trauma did not provide details on the onset, frequency or duration of trauma.

The strengths of our study are that, unlike previous research, we had a large sample of CHR individuals and healthy controls. We also investigated schemas over time and included findings on both negative and positive schemas. This is also the first study to our knowledge that has looked at schemas in a CHR population and their relation to transition to psychosis.

In conclusion, this study found that CHR individuals evidence significantly more maladaptive schemas compared to controls, and that these are relatively consistent over time. There appears to be a worsening of these schemas for individuals at the time of transition to psychosis. Taken together, these findings may provide further evidence that therapies targeting self-esteem may be an important intervention for this population. Additionally, Schema Therapy, developed by Young and colleagues (Young et al., 2003), is a broad integrative model that incorporates aspects of cognitive behavioural therapy (CBT) and other psychodynamic models, and aims to improve coping styles that may have manifested due to these maladaptive schemas. It has four main concepts (i.e. early maladaptive schemas, coping styles, schema domains and schema modes) with early maladaptive schemas being central to the model. ST has shown promising findings when used throughout various psychopathologies (Masley, Gillanders, Simpson and Taylor, 2012) and may also provide a possible intervention. Determining the best or most appropriate treatment is a question for future research; nonetheless, it is clear that maladaptive schemas play a role in psychosis and should be considered in both clinical and research settings.

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