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**THEORY OF MIND, SOCIAL RELATIONSHIP PERCEPTION AND STIGMA
EXPERIENCES IN INDIVIDUALS AT CLINICAL HIGH-RISK FOR
PSYCHOSIS**

by

Francesca M. Crump

A Thesis

Submitted to the
Department of Psychology
College of Science and Mathematics
For the defense of the degree of
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at
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Abstract

Francesca M. Crump

THEORY OF MIND, SOCIAL RELATIONSHIP PERCEPTION AND STIGMA
EXPERIENCES IN INDIVIDUALS AT CLINICAL HIGH-RISK FOR PSYCHOSIS
2020-2021

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Master of Arts in Clinical Psychology

The clinical high-risk (CHR) state for psychosis has been established in order to prevent the transition to full psychosis; however, demonstrates a high false positive rate (Fusar-Poli et al., 2012). Consequently, many CHR individuals may face increased labeling and symptom-related stigmatization through accessing early intervention services (Yang et al., 2015). As a result, CHR individuals may employ negative coping responses (Link et al., 1989) and exhibit increased social preoccupation in order to help conceal their mental health status (Link et al., 2015), which may hinder social cognitive ability and have lasting impacts on social functioning. This study aimed to delineate potential mechanisms by which social cognition, stigma and social functioning are related in 173 individuals labeled as CHR. Pearson correlations, mediation and moderated-mediation analyses were performed. Theory of Mind (ToM) and social relationship perception both differentially related to labeling and symptom stigma. Labeling secrecy and symptom discrimination mediated the relationship between ToM and social functioning and endorsement of a non-psychotic impact status moderated the relationship between ToM and labeling discrimination, which may indicate the presence of stigma resistance. This study offers a nuanced view of stigma processes as related to social cognition and social functioning, which could improve CHR intervention specificity.

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Chapter 1

Introduction

Schizophrenia is a debilitating disorder that carries a large public health burden (McGlashan, Walsh, & Woods, 2010). Because of this, there has been a recent shift to focus on the risk period before the onset of full-blown psychosis in order to employ early identification and intervention strategies to forestall worsening symptoms and improve quality of life (Miller et al., 2003). Individuals who experience attenuated psychotic symptoms, such as unusual thought content, neurotic and mood-related symptoms, and changes in behavior, such as increased social withdrawal, are identified and classified as clinical high-risk for psychosis (CHR; Yung & McGorry, 1996; Miller et al., 2003; McGlashan, Walsh, & Woods, 2010). These subthreshold psychotic symptoms are similar to the hallmark signs of schizophrenia. CHR individuals oftentimes exhibit attenuated positive, negative, or disorganized symptoms; however, remain mostly insightful to their experiences, meaning they do not endorse full conviction for their symptomatology. They typically are able to question how true their symptoms are and tend to exhibit reduced belief that their unusual experiences are real as compared to individuals with full-blown psychosis (Lappin et al., 2007). These attenuated symptoms are commonly assessed by The Structured Interview for Psychosis-Risk Syndromes and the Scale of Psychosis-Risk Symptoms (SIPS/SOPS), which includes a structured clinical assessment of functioning, family history of psychosis, schizotypal personality disorder checklist, and positive, negative, disorganized and general symptoms scored from 1-6. Any symptom cluster scored within the 3-5 range indicates attenuation while a score of 6 demonstrates full psychosis (Miller et al., 2003; McGlashan, Walsh & Woods, 2014).

While the SIPS/SOPS has strengthened the field's ability to accurately predict if a person is at-risk for developing a psychotic disorder, research has shown that approximately 70-80% of individuals who are identified as CHR will not go on to develop psychosis (Fusar-Poli et al., 2012; Ciarleglio et al., 2019). Due to this high false positive rate, most individuals who receive psychosis prevention services may be unduly exposed to the negative effects of treatment, including stigma associated with the initiation of early intervention (Yang et al., 2010; Corcoran, 2016). Because schizophrenia-related disorders are among the most highly stigmatized mental health conditions (Room et al., 2001), stigma associated with being diagnosed as CHR may have significant impacts on self-esteem (Yang et al., 2019; Anglin et al., 2014), which may impede social functioning (Lysaker, Roe & Yanos, 2007). Although some individuals who undergo this early identification process feel positive emotions associated with labeling, such as relief, many also tend to adopt a negative self-view, thus deeply affecting identity (Corcoran, 2016).

Modified Labeling Theory (Link et al., 1989) has been used to conceptualize the stigma associated with psychiatric labeling, including in CHR populations (Yang et al., 2019; Yang et al., 2015; Rusch et al., 2014). This theory posits that as individuals are socialized in society, they develop beliefs about how individuals with mental health problems are treated by the community, which are often based on negative stereotypes. As mental health consumers, individuals may adopt these beliefs (Livingston & Boyd, 2010) and expect to be discriminated against and devalued based on their mental health status (Link et al., 1989). Accordingly, they may employ coping responses such as secrecy, withdrawal, and education tactics (i.e., educating others about mental health problems, both positively and negatively) based on the level of internalization of these

stereotypes, which could have vastly negative consequences for social network ties, occupational opportunities, and self-esteem. (Link et al., 1989). Individuals identified as CHR may experience discrimination from others or feel shameful about themselves as a result of this labeling process, which may lead to increased stigma stress that could exacerbate their current symptomatology (Link et al., 1989) and potentially hasten their transition to full-blown psychosis (Rusch et al., 2015).

In addition to experiencing stigma associated with being labeled as CHR (i.e., labeling stigma), individuals may also experience stigma associated with psychosis-risk symptoms (i.e., symptom stigma). Recent research has shown a differential impact of stigma based on labeling processes and symptom experiences in individuals identified as CHR (Yang et al., 2015). More specifically, CHR individuals may feel shame associated with exhibiting unusual behavior and symptomatology, which could lead to experiences of being stigmatized when interacting with others in the community. Thus, at-risk populations may confront stigmatizing exchanges that may negatively affect their sense of self, which stem from expressing these symptoms within their social circles. Therefore, it is crucial to consider both labeling and symptom stigma processes when evaluating the experience of individuals identified as CHR.

Extending the Modified Labeling Theory (Link et al., 1989), symbolic interaction stigma (Link et al., 2015) includes an additional component of anticipated negative reactions from others based on personal worry of rejection that is facilitated by the discrimination and devaluation process described above, which may occur regardless of internalization of stereotypes. Individuals with mental health conditions could not only lose social network ties and face structural and personal discrimination from both labeling and symptom stigma (Yang et al., 2015; Yang et al., 2019) but also experience

an increased cognitive load due to preoccupation with how others might negatively evaluate or react to them (Link et al., 2015). This anticipated rejection has been found to predict increased instances of social withdrawal in individuals diagnosed with schizophrenia-spectrum disorders. Symbolic interaction stigma emphasizes that internalization of stigma is not necessary in order for this process to occur; however, it is possible that individuals will experience internalized stigma in tandem with this process. Thus, individuals identified as CHR may rehearse social interactions or become hypervigilant of negative reactions from others (Stryker 1980; Link et al., 2015) as a result of experiencing labeling and/or symptom stigma, which could decrease performance in social situations (Link et al., 2015; Farina et al., 1971).

Social cognition is required in order to accurately perceive and effectively participate in social interactions. Although there is mixed evidence (Gill et al., 2016), research generally suggests that individuals identified as CHR may have deficits in social cognition as their symptoms worsen (Green et al., 2011; Lee et al., 2015). Meaningful social exchanges typically require intact emotion processing (e.g., facial emotion identification), Theory of Mind (ToM), and social relationship perception; however, these areas of social cognition are typically impaired across the schizophrenia spectrum with deficits that may begin in the at-risk period (Green et al., 2011; Lee et al., 2015; Thompson et al., 2012). These areas of social cognition require the ability to differentiate emotions from the self and others. More specifically, ToM and social relationship perception also involve the capability to make inferences about other's current feelings or future behaviors. This emotional attribution process is key for appropriate social functioning (Glenthøj et al., 2016). Accordingly, research shows that CHR individuals tend to have worse social skills when they exhibit poor social cognition (Glenthøj et al.,

2016). Because stigma has been conceptualized as a social cognitive process (Corrigan & Watson, 2002; Cunningham & Luksted, 2017), it is conceivable that labeling and symptom stigma may also have important implications for social cognitive performance due to repeated stigma exposure and the potential for increased preoccupation with anticipated rejection, thus potentially increasing cognitive load.

The literature examining the relationship between stigma and social cognition is scarce and to date, there is only one study that has investigated this association directly (Larsen et al., 2019). Prior work has shown that individuals identified as CHR who experience shame due to their psychosis-risk symptoms (i.e., symptom stigma) tend to have worse facial emotion recognition abilities. More specifically, these individuals exhibit poorer accuracy when identifying fearful facial expressions and increased misattribution of fear in non-fearful faces (Larsen et al., 2019). Based on prior evidence of an association between increased stigma and poorer facial emotion recognition (Larsen et al., 2019) and because ToM and social relationship perception abilities require the capacity to differentiate between the mental states of the self and others (Green et al., 2011), there may also be a connection between ToM and social relationship perception accuracy and experiences of stigma.

The aim of this research study is to explore the relationship between ToM, social relationship perception and stigma from a subset of a large dataset that includes individuals identified and labeled as CHR. Due to the paucity of research on the association between social cognition and stigma, the aims and hypotheses of this study are largely based on prior stigma work (Link et al., 1989; Link et al., 2015) that does not specifically include CHR samples. Our overarching question guiding this research study is: What is the relationship between stigma and social cognition in CHR?

In order to answer the above question, we recognize that two divergent pathways may exist.

1. CHR individuals who exhibit *higher* stigma may tend to demonstrate *worse* social cognitive performance due to increased stigma exposure in the community coupled with increased cognitive load from anticipated rejection.

2. CHR individuals who exhibit *higher* stigma may tend to demonstrate *better* social cognition, which is based on the supposition that it might be necessary that individuals have some level of intact social cognition in order to correctly perceive stigmatizing interactions in general.

According to symbolic interaction stigma (Link et al., 2015), both scenarios are plausible. CHR individuals may be subject to more encounters of stigma in the community due to expression of symptoms. Furthermore, this increased experience of stigma coupled with increased preoccupation of anticipated rejection may negatively impact social cognitive performance due to cognitive load difficulties. Alternatively, CHR individuals may experience more stigma in the community; however, their increased preoccupation with anticipated rejection may enhance social cognitive performance due to repetitive social rehearsal that could lead to improved social learning (Link et al., 2015).

Drawing from prior literature (Larsen et al., 2019), we expect that symptom stigma (e.g., shame due to mental health symptoms) may be related to ToM and social relationship perception performance; however, labeling stigma will also be examined. This study also assessed if being labeled with a psychotic or non-psychotic risk status (e.g., risk for anxiety or depression vs. psychosis-risk) had a differential impact on self-view. Because psychosis-related conditions are among the most highly stigmatized

mental health conditions (Room et al., 2001), a “most impacted” variable was measured in order to capture if being labeled as CHR was salient to individuals participating in the early identification and intervention process. This information is particularly useful to help elucidate potential mechanisms specific to at-risk stigma and the labeling process and may help inform early intervention tactics aimed at reducing the effect of stigma stress in the future. Due to how novel this at-risk designation is and the lack of understanding surrounding the impacts of a psychosis-risk label, thoughtful approaches to conceptualizing stigma-related risk diagnoses are imperative. Therefore, including a “most impacted” status variable is highly valuable to help distinguish any potential differential impacts of stigma processes. In order to operationalize this response, CHR individuals were asked to indicate which risk status (i.e., psychosis-risk or non-psychosis-risk) had the biggest impact on how they viewed themselves as part of the larger stigma interview. This approach aims to elicit and distinguish between the levels of stigma held regarding psychosis-related and non-psychosis-related labeling processes and helps to better elucidate potential differences between diagnostic-specific stigma. With this in mind, our research questions are:

1. How does ToM and social relationship perception relate to symptom and labeling stigma?
2. What is the relationship between ToM, social relationship perception, labeling and symptom stigma and social functioning?
3. What is the relationship between ToM, social relationship perception, labeling and symptom stigma and social functioning based on “most impacted” status?

Because of an abundance of literature demonstrating that psychosis-related disorders tend to be associated with increased levels of stigma (Jenkins & Carpenter-

Song, 2008; Lien et al., 2015; Yang et al., 2013), we expect that the endorsement of a psychosis-risk status as having a higher impact on self-view through the “most impacted” variable may be associated with higher levels of stigma than non-psychotic risk endorsement. Thus, a psychosis-risk “most impacted” status may moderate the relationship between social cognition and stigma. Overall, we aim to compare a mediation model (figure 1) to a moderated-mediation model (figure 2) where symptom and labeling-related stigma serve as a mediator between social cognition and social functioning with the “most impacted” status moderating the effect of social cognition on stigma.

Figure 1

Mediation Model

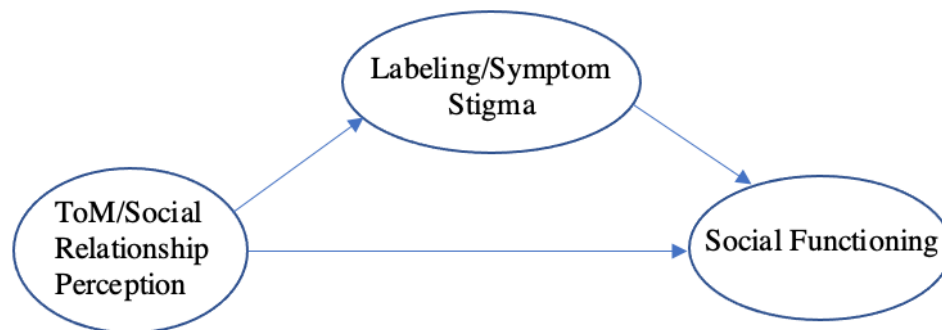
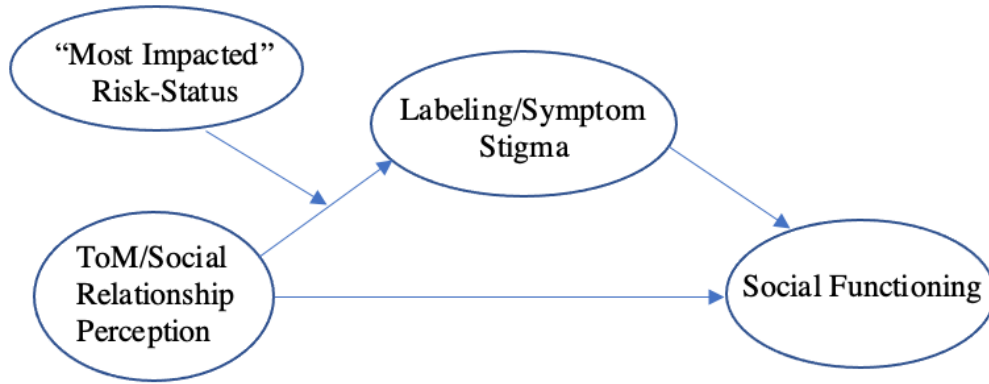


Figure 2

Moderated-Mediation Model



Chapter 2

Method

Recruitment Procedures

173 CHR participants were recruited between November 2012 and December 2015 as part of a multi-site study at Beth Israel Deaconess Medical Center/Harvard Medical School, Maine Medical Center, and New York State Psychiatric Institute. CHR individuals were self-referred in response to media, online advertisements and public transportation or recruited by outreach efforts conducted per site. Participants were told that they would be compensated \$50 for study completion. Inclusion criteria were: 1) age 12-35 years old; 2) met criteria for one or more of three CHR syndromes as per the SIPS (Miller et al., 2003); 3) capacity to give informed consent or assent. Exclusion criteria included: 1) past or present history of a psychotic disorder; 2) risk of harm to self or others; 3) major medical or neurological disorder; 4) IQ<70.

Written informed consent was provided by adult participants while minors gave written assent with parental/guardian written informed consent. All consent forms described potential CHR symptoms; however, the New York site specifically indicated that participants were at “a somewhat increased risk of psychosis.” This study received approval from all corresponding sites’ IRBs and all participants were given referrals to mental health treatment if not already receiving services.

Study Procedures

This study is part of a larger study that took approximately four to five hours to complete. Participants were given the option to break up the interview into smaller sessions and were given opportunities to rest as needed. CHR individuals were compensated once all study measures were complete. Although site clinicians were not

instructed to give uniform psychosis-risk feedback, they provided information to participants on their level of psychosis-risk based on standard practice with this population. Variations in feedback are common across CHR clinics and research settings and are based on clinical judgment that takes into account individual factors such as presenting concerns and questions, symptom severity, insight, language capacity, cultural values and norms. CHR individuals were told that their attenuated psychotic symptoms may worsen and that they were at a higher risk of developing psychosis as compared to their peers. Additionally, CHR individuals were informed that being at-risk is different than actually having a psychotic disorder.

CHR symptoms and functioning were assessed through clinician interview while all other measures were assessed by self-report or via interview with a BA-level research assistant specifically trained in administering these assessments. The interview took place at each study site's medical campus in a private room reserved for the study. Licensed clinicians were available for CHR participants during the interviews in the event of psychological distress.

Measures

Stigma Interview. The stigma interview was developed based on the Modified Labeling Theory (Link et al., 1989). Participants were asked about their perceptions of being at-risk for five conditions: “depression,” “anxiety,” “bipolar,” “psychosis,” and “schizophrenia.” CHR individuals were then asked which condition had the biggest impact on how they think of themselves. With this self-identified condition in mind, they were asked to answer specific stigma-related questions pertaining to both the label and symptoms of the condition including concepts of stereotype awareness, which refers to the awareness of negative and positive stereotypes about people with mental illness

(labeling: $\alpha=.70$), stereotype agreement, which encapsulates how much the participant agrees with stereotypes regarding mental illness (labeling: $\alpha=.68$), positive (labeling: $\alpha=.84$; symptoms: $\alpha=.65$) and negative emotions, such as relief and shame associated with experiencing symptoms or the labeling process (labeling: $\alpha=.60$; symptoms: $\alpha=.74$), secrecy, which refers to the attempt to conceal details about their mental illness (labeling: $\alpha=.60$; symptoms: $\alpha=.63$), experienced discrimination, which includes being treated differently by others due to their mental health problems (labeling: $\alpha=.84$), and experienced support (Yang et al., 2015).

Social Cognition Measures. Social relationship perception was assessed by the Relationships Across Domains (RAD-15; Sergi et al., 2009) questionnaire. The RAD-15 aims to assess the ability to understand social relationships and make inferences about future behavior based on 15 vignettes given about a male-female dyad. The content of vignettes is based on relational models theory, which asserts that social behavior is governed by four relational models (communal sharing, authority ranking, market pricing and equality matching) across domains of social life (e.g., social decision-making, moral judgment, material transactions, etc.; Green et al., 2011). Participants were asked to use the information presented about each dyad to determine whether behaviors described in three statements are likely to occur or not by indicating “yes” or “no.” The RAD-15 contains a total of 45 items and performance was calculated based on the total number of correct responses. The RAD-15 has been validated for schizophrenia and has good internal consistency, good group separation and has been shown to have associations to functioning (Green et al., 2011).

Theory of Mind was assessed by The Awareness of Social Inference Test (TASIT; McDonald et al., 2006). The TASIT provides information about difficulties with

interpreting complex social phenomena in clinical populations. The TASIT consists of 16 video-taped scenes meant to assess emotion recognition, the ability to interpret literal (sincerity and lies) and non-literal (sarcasm) conversational remarks and the ability to make judgments about the speakers' thoughts, feelings, and intentions. Participants were presented with a video-taped vignette, each lasting anywhere from 15-60 seconds, and then asked to answer 4 forced-choice (yes/no) questions. Performance was determined by total correct responses and ranged from 0 to 64. The task has been shown to have good psychometric properties when used as a clinical test of social perception and is reliable for repeat administration (McDonald et al., 2006). Studies have also shown adequate group discrimination between chronic schizophrenia and controls using the TASIT (Green et al., 2011).

CHR Symptoms. The Structured Interview for Psychosis-Risk Syndromes (SIPS; Miller et al., 2003; McGlashan, Walsh, & Woods, 2010c) was used to assess positive (five items), negative (six items), disorganized (four items) and general (four items) symptoms. Each symptom was rated on a scale from 0 to 6, with a 6 indicating full-blown psychosis. The attenuated range includes scores between 3 and 5. Participants must have scored at least a 3 on any symptom subscale but not exceed a score of 5 to be considered CHR (Miller et al., 2003).

Comorbid Diagnoses. The Structured Clinical Interview for DSM-IV Axis-I Disorders, Patient Edition (SCID-I/P; First et al., 2002) was administered to assess comorbid diagnoses present in CHR participants. This was completed through clinician interview at each study site.

Social Functioning. The Global Functioning: Social Scale (Cornblatt et al., 2007) was used to capture participants' social involvement with peers, intimate partners, and

relatives. This scale assesses current level, lowest level and highest level of functioning in the past year ranging from 1 (poor functioning) to 10 (superior functioning).

IQ. The Wechsler Abbreviated Scale of Intelligence (WASI; Saklofske, Caravan & Schwartz, 2000) was used to assess IQ. The Vocabulary and Matrix Reasoning subtests were used to calculate total IQ, and CHR Individuals must have scored at least a 70 to be considered eligible for the study.

Chapter 3

Analyses

We first obtained descriptive statistics and visually inspected both univariate and bivariate relationships for our variables of interest (demographics, labeling and symptom stigma subscales, TASIT, RAD-15, “most impacted” status variable, and social functioning scores). Only complete cases were examined. We then underwent the following analyses to answer our research questions, which are detailed below:

1. How does ToM and social relationship perception relate to symptom and labeling stigma?
 - a. We performed Pearson Correlations between ToM (TASIT), social relationship perception (RAD-15), labeling and symptom stigma subscales (stereotype awareness, stereotype agreement, positive emotions, negative emotions [shame], secrecy, experienced discrimination, experienced support).
2. What is the relationship between ToM, social relationship perception, labeling and symptom stigma and social functioning?
 - a. We performed a mediation analysis using the “mediate” package (Kosuke et al., 2010) in R Software (R Core Team, 2019). Models were entered based on Figure 1 by first assessing if there was a significant relationship between social cognition and social functioning. Once the main effect was examined, we analyzed the indirect effect of the mediator (labeling and symptom stigma) on the main effect.

3. What is the relationship between ToM, social relationship perception, labeling and symptom stigma and social functioning based on “most impacted” status?
 - a. We performed a moderated-mediation analysis (Figure 2) using Hayes PROCESS Macro (Version 3.5.3; Hayes, 2017) for SPSS Statistics (Version 27; IBM Corp, 2017). We examined any main effects, followed by any interaction effects first. We examined the indirect effect of the mediator (labeling and symptom stigma) on the main effect while considering the moderator (“most impacted” status). Hayes’ model 7 was used for analysis.

Covariates, including age, gender, race and ethnicity, and mother’s highest level of education, which served as a proxy for socio-economic status, were entered into both the mediation and moderated-mediation models.

Chapter 4

Results

Sample Characteristics

The sample was primarily young ($M=18.64$, $SD=4.278$), white (66%) and male (>65%). The majority of participants were unemployed students; however, almost 1/3 of subjects currently held some type of employment at the time of interview. Almost half of CHR participants were still in high school (48.2%) while just over 1/3 of subjects completed high school as their highest educational status. Most were single and never married. The majority of CHR participants' mothers completed high school or went on to pursue higher education through college or graduate school. Almost half of participants were from Massachusetts (Harvard site, 47.9%), followed by Maine (31.9%) and New York City (Columbia site, 20.2%).

In terms of clinical symptoms (Table 2), just under half of CHR individuals were diagnosed with a comorbid depressive disorder, approximately 42% had an anxiety disorder, and less than 10% were diagnosed with a bipolar disorder. Additionally, most individuals did not endorse a psychosis-risk "most impacted" status. Overall, CHR individuals tended to perform well on both the TASIT and RAD-15, which is to be expected based on research that shows that CHR individuals perform intermediately between healthy controls and first episode psychosis populations on social cognitive tasks (Lee et al., 2015).

Table 1*Sample Characteristics*

Participants (n=173*) <i>*n<173 indicates missing data</i>	N (%), M (SD)
Gender (Male) (n=167)	109 (65.3%)
Age (n=168)	18.65 (4.28)
Site (total recruitment)	
Harvard	83 (47.9%)
Maine	52 (31.9%)
Columbia	38 (20.2%)
Race (n=162)	
First Nations	3 (1.9%)
Asian	7 (4.3%)
Black	23 (14.2%)
White	107 (66%)
Interracial	15 (9.3%)
Other	7 (4.3%)
Ethnicity (n=166)	
Hispanic	22 (13.3%)
Marital Status (n=166)	
Single, never married	159 (95.8%)
Employment (n=164)	
Full-time	10 (6.1%)
Part-time	39 (23.8%)
Unemployed	115 (70.1%)
Enrolled in School (n=163)	
Yes	127 (77.9%)
Highest Education (n=164)	
Grade School	79 (48.2%)
High School	59 (36%)
College	20 (12.2%)
Graduate School	3 (1.8%)
Technical School	3 (1.8%)
Mother' Highest Education (n=161)	
No Schooling	1 (0.6%)
Some High School	8 (5.0%)
High School	23 (14.3%)
Some College or Technical School	24 (14.9%)
College or Technical School	64 (39.8%)
Some or Completed Graduate School	41 (25.5%)

Table 2*Clinical Characteristics*

Participants (n=173*) <i>*n<173 indicates missing data</i>	Participants N (%), M (SD)
Stigma Subscales	Labeling, Symptom
Stereotype Awareness (n=150)	43.65 (6.81)
Stereotype Agreement (n=151)	19.16 (3.87)
Negative Emotions (Shame) (n=150)	6.39 (2.47), 6.94 (2.45)
Positive Emotions (n=150)	8.79 (3.01), 7.10 (2.89)
Secrecy (n=150)	2.24 (1.62), 1.62 (1.14)
Experienced Discrimination (n=148)	9.76 (4.79), 9.90 (4.81)
Experienced Support (n=150)	3.22 (1.18), 3.02 (1.18)
Most Impacted Status (n=152)	
Psychosis-Risk	43 (28.3%)
SIPS Score	
Positive (n=166)	13.54 (4.03)
Negative (n=157)	15.03 (6.36)
Disorganized (n=156)	7.05 (3.70)
General (n=154)	11.32 (4.11)
Comorbid Diagnoses (n=166)	
Depression	78 (47.0%)
Anxiety	70 (42.2%)
Bipolar (I & II)	16 (9.6%)
TASIT (n=140)	52.67 (6.45)
RAD-15 (n=134)	32.74 (4.80)
Current Social Functioning (n=155)	5.83 (1.49)

Bivariate Relationships

Pearson correlations were performed between stigma subscales and social cognition tasks in order to delineate bivariate associations (Table 2). The TASIT total score was significantly associated with labeling secrecy ($r=-0.202$, $p<0.05$) and experienced discrimination ($r=-0.205$, $p<0.05$). The TASIT total score was also negatively associated with positive emotions related to symptoms ($r=-0.211$, $p<0.05$).

The RAD-15 total score was positively associated with stereotype agreement ($r=0.242$, $p<0.01$) and negatively associated with positive emotions related to symptoms ($r=-0.214$, $p<0.05$). Additionally, TASIT and RAD-15 total scores were highly positively associated with one another ($r=0.467$, $p<0.001$). Degrees of freedom for all correlations was 114.

Table 3

Pearson Correlations

Social Cognition Task	Stigma Subscale	P value	r
TASIT	Secrecy*	0.029	-0.202
	Experienced Discrimination*	0.028	-0.205
	Positive Emotions**	0.023	-0.211
	RAD-15	<.001	0.467
RAD-15	Stereotype Agreement*	0.009	0.242
	Positive Emotions**	0.021	-0.214
	TASIT	<.001	0.467

Note. * = Labeling stigma ** = Symptom stigma

These results indicate that increased ToM accuracy was associated with decreased labeling secrecy, decreased experiences of labeling-related discrimination and less positive emotions about their symptoms. Additionally, these findings demonstrate that CHR individuals who scored higher on the RAD-15 had fewer positive emotions about their symptoms and tended to have higher levels of stereotype agreement about their label as compared to those with lower RAD-15 scores. As presented in Table 2, the TASIT and RAD-15 total scores were highly correlated with one another.

Mediation Analysis

No significant effects were found when the RAD-15 total score was included in the model; however, several significant findings were observed when the TASIT total

score was incorporated. Due to the nature of multi-site data, clustering effects were also examined by computing an intraclass correlation (ICC) for all relevant variables. All ICCs were zero or near zero, which indicates that clustering by site was not likely present for the variables of interest. Data was also visually inspected by site to further determine if there were any clustering effects apparent.

Labeling Secrecy

The Baron & Kenny (1986) method of mediation analysis was utilized, and data was run in R Software (R Core Team, 2019) with the “mediate” package (Kosuke et al., 2010). The effect of ToM on social functioning was fully mediated by secrecy associated with labeling. As Figure 3 depicts, the regression coefficient between the TASIT total score and social functioning ($p=0.032$) and the regression coefficient between labeling secrecy and social functioning ($p=0.005$) was significant. The indirect effect was $(-0.064) * (-0.039) = 0.002$. Bootstrapping procedures were performed to test the significance of the indirect effect. Unstandardized indirect effects were calculated for each of the 1,000 bootstrapped samples and a 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. The bootstrapped unstandardized indirect effect was 0.002 with a 95% confidence interval ranging from 0.0007 and 0.020. Therefore, the indirect effect was statistically significant ($p<0.05$). The model presented below (Figure 3) includes all covariates (gender, race and ethnicity, and mother’s highest level of education).

Figure 3

Mediation Model for ToM and Labeling Secrecy



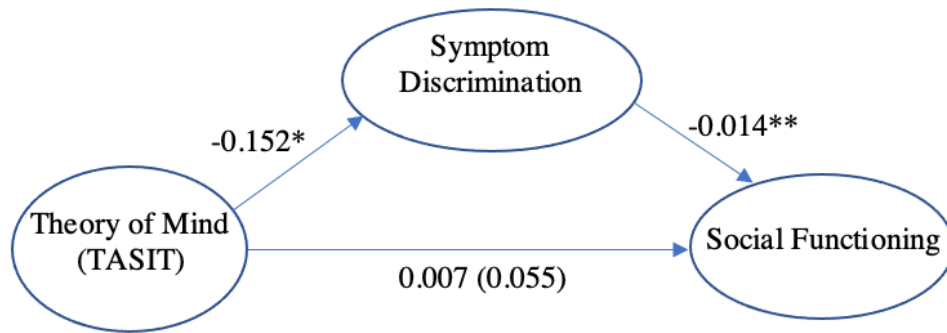
Symptom Discrimination

The Baron & Kenny (1986) method of mediation was used for analysis in R Software (R Core Team, 2019) with the “mediate” package (Kosuke et al., 2010). The effect of ToM on social functioning was fully mediated by experienced discrimination associated with symptoms. As Figure 4 demonstrates, the regression coefficient between the TASIT total score and social functioning showed trend significance ($p=0.055$). Trend significance levels were accepted for further analysis in order to delineate potential mediators in this relatively small sample for analysis. The regression coefficient between symptom discrimination and social functioning ($p=0.003$) was significant. The indirect effect was $(-0.152) * (-0.014) = 0.002$. Bootstrapping procedures were performed to test the significance of the indirect effect. Unstandardized indirect effects were calculated for each of the 1,000 bootstrapped samples and a 95% confidence interval was computed by determining the indirect effects at the 2.5th and 97.5th percentiles. The bootstrapped unstandardized indirect effect was 0.002 with a 95% confidence interval ranging from 0.0005 and 0.020. Therefore, the indirect effect was statistically significant ($p<0.05$). The

model presented below (Figure 4) includes all covariates (gender, race and ethnicity, and mother's highest level of education).

Figure 4

Mediation Model for ToM and Symptom Discrimination



Moderated Mediation Analysis

Hayes PROCESS Macro (Version 3.5.3; Hayes, 2017) for SPSS Statistics (Version 27; IBM Corp, 2017) was utilized to analyze the proposed moderated-mediation model (Figure 2). The outcome variable (Y) was included as current Social Functioning score, the predictor variable (X) was incorporated as ToM and RAD-15 accuracy separately, the mediator (M) was entered as labeling and stigma variables and the moderator (W) was comprised of the “most impacted” variable. For this analysis, the “most impacted” variable was reduced from a 5-factor categorical variable to a 2-factor binary variable in order to address our specific research question associated with psychosis-related risk and to prevent unequal groups. The binary variable was entered as non-psychotic (i.e., depression, anxiety and bipolar-risk) vs. psychosis-risk (i.e., psychosis and schizophrenia) “most impacted” status to determine if a moderating effect

was present. Appropriate variables were mean centered before analysis to prevent multicollinearity. ICCs were computed for all relevant variables. All ICCs were zero or near zero, indicating that clustering by site was not present for the variables of interest.

When the RAD-15 total score was entered into the model, no significant effects were found; however, when the TASIT total score was included, findings were significant.

Labeling Discrimination

There was a significant negative effect (-.238) of ToM on experienced discrimination due to labeling ($p < .01$). Additionally, a significant interaction was observed when considering “most impacted” status whereby the “most impacted” variable moderated the relationship between ToM and labeling discrimination (Figure 5; $p < .05$). There was a significant negative main effect of the mediator (experienced discrimination due to labeling) on current social functioning ($p < .05$) while a positive trend main effect between ToM and current social functioning scores ($p = .066$) was found. Tests of the indirect effect at -1 SD and 1 SD of the moderating variable were performed with a 95% bias corrected confidence interval and 5,000 bootstrapped samples. The indirect effects of ToM on current Social Functioning at psychotic vs. non-psychotic “most impacted” status varied. Significant effects were found when impact status included individuals who endorsed non-psychosis-risk ($p < .05$ with LLCI = 0.003 and ULCI = 0.041). Non-significant effects were observed when considering psychosis-risk impact status ($p > .05$ with LLCI = -0.29 and ULCI = 0.007). The Index of Moderated Mediation for “most impacted” status had an unstandardized coefficient of -0.031 with a LLCI = -0.060 and ULCI = -0.001, which indicates that the overall moderated-mediation model was supported and is depicted below (Figure 6).

Figure 5

Moderation of “Most Impacted Status” on ToM and Labeling Discrimination

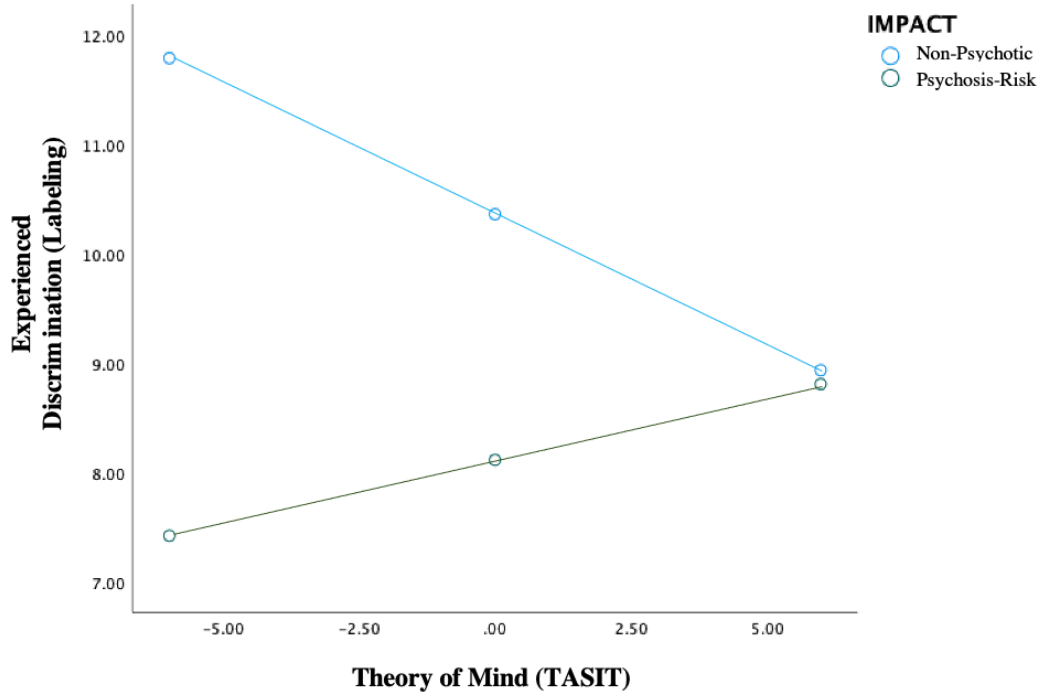
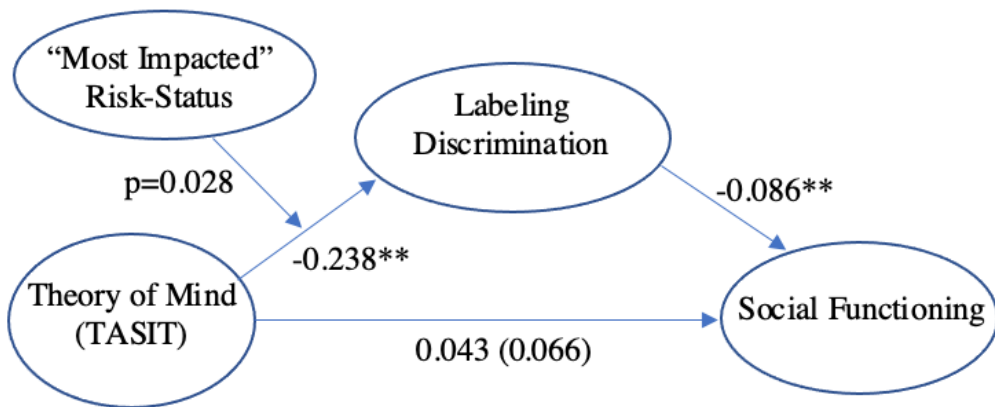


Figure 6

Moderated-Mediation for ToM and Labeling Discrimination



Chapter 5

Discussion

When considering the two divergent proposed pathways, Pathway 1 seems plausible due to the majority of negative relationships observed between social cognition and stigma. Pathway 1 anticipated that CHR individuals would exhibit higher stigma coupled with worse social cognitive performance. Interestingly, ToM was the only significant marker of social cognitive performance when considering this negative relationship with the exception of positive emotions due to symptoms, which was also related to social relationship perception. More specifically, ToM accuracy was associated with less labeling secrecy and decreased experienced discrimination due to labeling. Although ToM and social relationship perception were each differentially related to stigma, they were highly correlated with one another. This finding suggests that although these constructs are related to the broader characterization of social cognition, they may vary in their specific relationships with stigma and indicates that distinctive processes might occur.

When mediation and moderated-mediation models were tested, only ToM was a significant predictor of current social functioning. Taken together, secrecy due to labeling and experienced discrimination due to symptoms both mediated the relationship between ToM and social functioning. In all scenarios, increased ToM performance was associated with better social functioning, which can be expected based on the idea that individuals may exhibit better social skills when their ToM is intact (Glenthøj et al., 2016). However, this positive association was mediated by decreased stigma (i.e., labeling secrecy and symptom discrimination). Converse to Pathway 1, this suggests that individuals who have higher ToM and better social functioning tend to have *less* stigma. More specifically,

these individuals tend to be less secretive about their label and experience less discrimination due to their symptoms. This finding aligns with the concept of stigma resistance whereby stigmatized individuals may consciously reject being devalued and discriminated against as mental health consumers (Thoits & Link, 2015). They are able to refute negative stereotypes ascribed to their mental health status through acts of challenging, which refers to being in opposition of other people's negative perceptions and unjust actions toward individuals with mental illness, and deflecting, which consists of conceptualizing others' maltreatment as not applicable and irrelevant to the self (Thoits & Link, 2015).

Information pertaining to ways to promote stigma resistance is crucial for early intervention programs, such as those for CHR populations. For individuals seeking preventative treatment from psychosis-risk clinics, there is a heightened potential to experience the pervasive effects of stigma on self-identity, which can have lasting effects on real-world outcomes, such as social functioning (Lysaker, Roe & Yanos, 2007). While the directionality can be interpreted based on those who exhibit stigma resistance, it can also be interpreted based on the opposing direction. Individuals with less intact ToM and decreased social functioning tend to exhibit *more* stigma. Therefore, the information extrapolated from the mediation model serves as a key clinical implication whereby clinicians may develop interventions that could potentially decrease stigma while simultaneously improving other outcomes, such as ToM and social functioning.

While stigma interventions for serious mental illness, such as schizophrenia, exist (Tsang et al., 2016), to date, there is only one specifically designed for CHR and stigma, which is primarily a family-based psychoeducational intervention (McFarlane et al., 2012). This dearth in direct clinical applicability could guide future development of

stigma interventions in CHR populations. Specifically, early intervention programs may consider incorporating ways to improve ToM and social functioning, which could also include integrating psychoeducational tools and more targeted evidence-based interventions, such as cognitive-behavioral strategies, that aim to decrease secrecy and the impact of discriminatory experiences associated with their label and symptoms in order to promote stigma resistance. It is especially important to consider that while improving social cognitive ability would be a positive outcome, this improvement could also be associated with decreased positive emotions about their CHR experiences. Both labeling and symptom-related stigma were negatively associated with ToM and social relationship perception, which indicates that individuals with intact social cognition tend to feel less positively about both their label and symptoms associated with their mental health problems. Therefore, it is crucial for specialized programs to consider this potential negative consequence on self-view through increasing social cognition accuracy by striking a well-informed, delicate balance in order to achieve improvements in both stigma and social cognitive domains. Additionally, although the results did not show a stark differentiation between symptom and labeling-related stigma, this specific delineation is still important to consider when tailoring clinical interventions in order to increase specificity and applicability to CHR populations.

For bivariate associations, all significant stigma subscales (labeling secrecy, labeling discrimination and positive emotions about symptoms) exhibited negative directionality and similar magnitude, with the exception of stereotype agreement. A moderately positive correlation was found between stereotype agreement and social relationship perception accuracy, which indicates that CHR individuals who agree with stereotypes associated with their mental health label tend to be more accurate when

judging social relationships. This association could be present because of the suggestion included in Pathway 2, which incorporates the proposed idea that a certain level of intact social perception must be present in order to correctly perceive potentially stigmatizing interactions. Additionally, these individuals may also be more well-versed in interpreting social relationship scenarios due to increased social rehearsal stemming from higher stereotype agreement. CHR individuals who tend to exhibit more stereotype agreement may be more concerned with how others may perceive them in social interactions, which may influence their desired level of social mastery in order to conceal their stigmatized status. These individuals may also aspire to obtain more social relationship knowledge in an attempt to more accurately perform in social interactions, so their stigmatized status remains unknown. This is a possible outcome that stems from the idea that increased experiences of stigma could lead to increased preoccupation with social behavior and increased coping responses, as posited by symbolic interaction stigma and Modified Labeling Theory (Link et al., 1989; Link, Phelan & Yang, 2015).

Moderated mediation analyses showed that the “most impacted” status was established as a moderator for the model; however, significance was found for individuals who endorsed a non-psychotic risk status instead of a psychosis-risk status. Contrary to our hypothesis, this non-psychotic risk endorsement strengthened the negative relationship between ToM and experienced discrimination due to their label. This may have occurred for several reasons. Firstly, most CHR individuals also tend to experience comorbid mood disorders (Fusar-Poli et al., 2014; Salokangas et al., 2012). In a meta-analysis of 509 CHR individuals, researchers found that approximately 41% of individuals were diagnosed with a depressive disorder and 15% were diagnosed with an anxiety disorder (Fusar-Poli et al., 2014). This comorbidity was also demonstrated in our

sample where just under half of all CHR participants were also diagnosed with depression, approximately 42% were diagnosed with anxiety and almost 10% were diagnosed with a comorbid bipolar disorder. Therefore, CHR individuals could have experienced stigma related to being labeled with these diagnoses prior to their CHR designation, which may have influenced their “most impacted” status endorsement.

Secondly, because CHR individuals tend to initiate their first contact with a mental health provider due to symptoms unrelated to psychosis, this psychosis-risk label may not be the most impacted status by the time they are in specialized treatment. In a manuscript reported elsewhere (Li et al., in preparation) that documented the first concerning symptoms that brought this specific CHR sample into mental health treatment, only about 7% of individuals reported psychosis-related symptomatology. Interestingly, almost 40% of individuals indicated that their first concerning symptoms were affective in nature, such as anxiety, moodiness or trouble controlling emotions. This further bolsters the idea that non-psychosis-related symptoms may, in fact, be more salient to CHR individuals because it underscores their lived experience. Subthreshold psychotic symptoms may not be present enough to cause significant distress; however, experiencing clinical depression or anxiety on a daily basis may leave more lasting impressions on self-view due to the heightened prevalence of symptoms in everyday life.

Finally, although this non-psychotic risk endorsement finding was surprising due to the insurmountable evidence that demonstrates psychosis as being one of the most highly stigmatized conditions (Room et al., 2001), it is also hopeful. Perhaps early interventions programs are adequately targeting the labeling-related effects of psychosis-risk, which demonstrates a highly positive effect of specialized treatment in relation to stigma. Employing targeted resources to combat the deleterious effects of stigma for

psychosis-risk is highly important. Overall, these results indicate that individuals who endorse a psychosis-risk status as most impactful in how they view themselves do not tend to exhibit any more stigma than those who endorse a non-psychotic risk status. This implies that CHR clinics are particularly beneficial for individuals who may otherwise be stigmatized due to psychosis-related labeling and expression of symptoms. However, more nuanced ways to decrease stigma while increasing performance in key areas of functioning, such as social cognition and social functioning, are presented to help further improve and tailor specialized services.

Limitations

Although these findings are highly clinically relevant and informative, several limitations exist. First, even though this sample of CHR individuals is considered large due to the difficulties often present in the recruitment of this population, it is relatively small for statistical analyses. Second, this analysis was done as part of a larger study that did not solely focus on social cognition and social functioning. Therefore, the number and specificity of assessments for these constructs was limited. Third, it was not determined when this sample had their first contact with mental health services, which could have influenced their individual experiences and trajectories of stigma. At the point of interview, CHR individuals could have had a varied timepoint from which they first began treatment, whether it was solely for psychosis-risk presentations or other comorbid conditions. Furthermore, this sample was primarily white and male. Therefore, results should be interpreted cautiously when applying them to culturally diverse populations.

Future research should aim to address these limitations by attempting to recruit a larger sample that is highly powered to detect more significant effects, including a variety of well-established social cognition and social functioning assessments specifically

normed for CHR populations, and collecting information about initial contact with mental health providers. Additionally, because levels of stigmatization tend to vary cross-culturally (Krendl & Pescosolido, 2020), it is also important to consider ways to incorporate culturally relevant adaptations of stigma into clinical interventions. Recruiting more diverse CHR samples is key to better understanding how other social disparities, such as race and sexual identity statuses, may further influence the overall impact of mental health stigma and experiences of discrimination. Addressing these limitations could further provide crucial information to specialized treatment programs, which could potentially have real-world implications that aim to reduce stigma stress, improve outcomes, and possibly help to prevent the progression to full psychosis.

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