The Association Between Mental Health Stigma and Face Emotion Recognition in Individuals at Risk for Psychosis

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Self-stigma has been associated with reduced accuracy of face emotion recognition in individuals at clinical high risk for psychosis (CHR). Stigma may also relate to slowing of performance during cognitive tasks for which a negative stereotype is relevant. This study aimed to investigate the association of mental illness stigma with face emotion recognition among CHR individuals. Participants were 143 CHR individuals identified using the Structured Interview for Psychosis-Risk Syndromes (SIPSs). Face emotion recognition was assessed using the Penn emotion recognition task (ER-40). Stigma was assessed using discrimination, stereotype awareness, and stereotype agreement subscales of the Mental Health Attitudes Interview for CHR. We tested associations of ER-40 accuracy and response times with these stigma variables, including the role of clinical and demographic factors. Racial/ethnic minoritized participants had higher attenuated positive symptoms than nonminoritized participants. Longer ER-40 response times were correlated with greater stereotype agreement ($r = .17$, $p = .045$) and discrimination ($r = .22$, $p = .012$). A regression model predicting ER-40 response times revealed an interaction of stereotype agreement with minoritized status ($p = .008$), with slower response times for minoritized participants as stereotype agreement increased. Greater disorganized symptoms and male gender also predicted longer response times. ER-40 accuracy was not associated with stigma. Overall, minoritized CHR individuals with greater internalized stigma took longer to identify face emotions. Future research is needed to assess whether slower response times are specific to social cues, and if internalized stigma interferes with performance in real-world social situations. Reducing stigma may be an important target for interventions that aim to improve social skills.

Keywords: social cognition, stereotype, prodrome, discrimination, race

Stigma may be psychologically harmful to people at clinical high risk (CHR) for psychosis, as this risk syndrome occurs during adolescence and young adulthood when individuals are forming identities (DeLuca, 2020; Yang et al., 2010). Stigma arises from the process of associating human differences with negative stereotypes and labeling and separating individuals with those differences (Link & Phelan, 2001). Stereotypes are learned constructs about groups in which a person rapidly organizes information and generates impressions about individuals based on group membership whether such information is accurate or not. Internalized stigma, or self-stigma, is the internalization of stereotypes, which arises from both an awareness of negative stereotypes (*stereotype awareness*) and application of those stereotypes to oneself (*stereotype agreement*). *Discrimination* is a behavioral response to a stereotype (Corrigan & Watson, 2002), which may occur at the individual level (e.g., rejecting someone because of their mental illness), structural level (e.g., lack of protections for people who are denied rental housing due to their mental illness), or through the stigmatized individuals themselves (e.g., failing to pursue a job promotion because one anticipates failure due to one's own mental illness).

CHR individuals experience significant self-stigma related to mental illness compared with youth with other mental health conditions (Colizzi et al., 2020; Yang et al., 2015), and report that psychiatric labels impact how they view themselves (Yang et al., 2019). Mental illness self-stigma tends to be higher among racial and ethnic minority groups compared with Whites (Misra et al., 2021). In CHR groups, racial and identity-based discrimination is higher among CHR compared with healthy controls (Saleem et al., 2014; Shaikh et al., 2016). Researchers have also found that race-based trauma is associated with attenuated psychotic experiences (Anglin et al., 2016, 2014; 2018) and emerging research has documented how minoritized CHR youth may have unique stigma and coping experiences (Ruiz et al., 2021). Both identity-based discrimination and mental illness stigma have predicted transition to psychosis among CHR individuals (Rüsch et al., 2015; Stowkowy et al., 2016). Individuals with CHR, particularly from minoritized racial and ethnic groups, contend with multiple stressors and cumulative stigma that may lead to various negative clinical and cognitive outcomes (Anglin et al., 2021; DeLuca et al., 2021).

Researchers have suggested that individual and contextual factors including stigma have likely exaggerated the cognitive impairment observed in individuals with schizophrenia (Moritz et al., 2020), which may also be true for the CHR population. Stigma may impact social cognitive processes such as face emotion recognition (FER), given that both are relevant in social situations and are characteristic of individuals with schizophrenia (Barkl et al., 2014; Kohler et al., 2010) and CHR (van Donkersgoed et al., 2015). Individuals with CHR show problems identifying threat-based emotions like fear (Amminger et al., 2012), and failure to distinguish fear and anger from neutral expressions has predicted transition to psychosis (Allott et al., 2014; Corcoran et al., 2015). In one of the first studies to evaluate mental illness stigma and FER in individuals with CHR, greater shame about symptoms was associated with poorer FER accuracy in identification of fearful faces, and misattribution of fear to nonfearful faces (Larsen et al., 2019). Individuals who feel stigmatized may also take longer to judge facial expressions, plausibly resulting in longer response times. FER response time have been related to poorer social functioning in CHR youth (Haining et al., 2020) and have predicted transition to psychosis

(Bilgrami et al., 2019), though have not yet been investigated in relation to stigma.

The goal of the present study was to investigate relationships of accuracy and response times during FER with discrimination, stereotype awareness, and stereotype agreement related to mental illness among individuals with CHR, including determining whether associations may be strongest among racial/ethnic minoritized individuals as they have multiple identities that may be the target of stereotypes and discrimination. We hypothesized that poorer accuracy and longer response times to identifying face emotions would be associated with these stigma constructs.

Method

Participants and Setting

Data were collected as part of a large prospective cohort study assessing stigma and its correlates in CHR conducted at Beth Israel Deaconess Medical Center (Boston, MA), Maine Medical Center Research Institute (Portland, ME), and New York State Psychiatric Institute (New York, NY) between November 2012 and December 2015. Present data are from study baseline. This study was approved by all sites' Institutional Review Boards.

Participants' ages 12–35 self-referred or were recruited from outreach efforts in response to media, public transportation, and online advertisements, as well as from schools, colleges, specialized clinics or other studies. Participants met criteria for a psychosis-risk syndrome using the Structured Interview for Psychosis Risk Syndrome (SIPS) Version 5.0 (Miller et al., 2003) with the exception of ten participants who met criteria based on negative symptoms subscale of the SIPS. Participants were excluded if they had a history of a psychotic disorder, imminent risk of self-harm or violence, any major medical or neurological disorder, or IQ less than 70.

Procedure

Adult participants provided written informed consent. Minors provided written assent and a parent or legal guardian provided written informed consent. Boston and Portland site consent forms discussed examples of symptoms that study participants may experience (e.g., suspiciousness) without using CHR or psychosis terminology, and the New York site consent forms indicated that participants had "a somewhat increased risk of psychosis." Participants who were not presently engaged with mental health treatment were given a referral to a specialized CHR clinic if desired.

Following consent, participants completed an SIPS interview. The SIPS was administered by masters' and doctoral level clinicians, and master level students, who were trained and certified by Yale SIPS trainers. SIPS ratings and classification were confirmed via consensus of all key study clinicians.

Study data were collected in the following order: (a) demographics; (b) Mental Health Attitudes Interview for CHR; and (c) ER-40. These assessments were typically administered over the course of different study visits and the time between assessments varied according to patient availability. There were no associations between the interassessment interval and our variables of interest.

Measures

Stigma

Discrimination, stereotype awareness, and stereotype agreement were assessed using subscales of the Mental Health Attitudes Interview for CHR administered by clinicians who received extensive training in administration (Table 1). This interview was adapted from stigma measures by Link et al. and adapted for CHR (Link et al., 1989; Yang et al., 2015). Discrimination (related to symptoms) consists of five items (e.g., "because I have had symptoms, people have treated me differently") rated on a 5-point Likert scale (1 = *Never*, 2 = *Seldom*, 3 = *Sometimes*, 4 = *Often*, 5 = *Very Often*). Stereotype awareness consists of 10 items (e.g., "most people believe that young people with emotional problems may be more dangerous"), and stereotype agreement consists of ten items (e.g., "I believe that young people with emotional problems may be more dangerous"), with items rated on a 4-point Likert scale (1 = *Strongly Disagree*, 2 = *Somewhat Disagree*, 3 = *Somewhat Agree*, 4 = *Strongly Agree*). Scores for each subscale were computed as the mean response across items.

FER

FER was assessed with the computerized Penn emotion recognition task (ER-40; Gur et al., 2002). The ER-40 randomly displays an image of a face expressing one of five emotions: happy, sad, anger, fear, and neutral. Participants select their choice among emotions listed on the screen using a computer mouse. There are 40 faces in total and four races are represented: Caucasian (21 faces), Black (11 faces), Hispanic (4 faces), and Asian (4 faces). Stimuli are balanced for gender, age, and ethnicity. This test yields a total accuracy score based on total percent of emotions correctly identified, and an accuracy score for each emotion category. The test also yields a total response time score based on median time to correctly identify all emotions in the task, and a median response time for each emotion category.

CHR Symptomatology

CHR symptoms were obtained from the structured interview for psychosis risk syndromes (SIPS; Miller et al., 2003), which yields scores for positive, negative, disorganized, and general symptoms, as well as a total score. Per SIPS criteria, symptoms could not be better accounted for by another psychiatric disorder.

Demographics

Age, gender, and racial/ethnic minoritized status were self-reported. We coded minoritized status as a binary variable indicating whether or not a participant held a racial or ethnic minority status (minoritized = participant self-identified as an ethnicity and race other than White and/or identified as Hispanic/Latino; nonminoritized = participant identified as White and non-Hispanic/Latino). The highest level of formal education completed by the participant's mother was used to rate socioeconomic status. IQ was measured using Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999) and attention was measured with the Continuous Performance Test-Identical Pairs (CPT-IP) version.

Analyses

Data from 143 participants were analyzed for the present study using SPSS version 27. Means and standard deviations were calculated for key study variables (stigma, ER-40, and SIPS/SOPS scores—positive, negative, disorganized, general), and Pearson correlations were computed among these variables. The threshold for statistical significance was set at $p < .05$. Significant correlations were entered into hierarchical linear regression models.

In Step 1, each ER-40 variable was entered as the outcome, and the stigma variable was entered as the predictor. In Step 2, we entered symptoms and sociodemographic variables (age, sex, racial/ethnic minoritized status), and in Step 3 we entered an interaction between minoritized status and the stigma variable of interest. We also tested whether this interaction would be affected by confounding effects of IQ, site, and maternal education (as a proxy for socioeconomic status). Lastly, we conducted an exploratory linear regression analysis to assess possible specificity of stigma relationships with individual ER-40 emotions (fear, anger, happy, sad, neutral) when entered simultaneously, as past work has found preliminary evidence for fear-specific effects (Larsen et al., 2019).

Results

Sample Characteristics

Consistent with most CHR cohorts, the sample comprised adolescents and early adults ($M_{age} = 19.1$; $SD = 4.2$) and was approximately two-thirds male and two-thirds White (Table 2). Mean IQ was in the average range ($M = 109.4$; $SD = 15.1$) and correlated with ER-40 response times ($r = .226$; $p = .008$). CPT-IP was not correlated with ER-40 response times ($r = -.023$; $p = .818$).

Means and standard deviations for key variables are presented in Table 3. ER-40 accuracy and response times were not correlated ($p = .70$). There were no significant differences in stigma variables

Table 1
Mental Health Attitudes Interview for CHR

Discrimination	Stereotype awareness/stereotype agreement
Because I have had symptoms … 1. People have treated me differently 2. People seem to be less comfortable with me 3. People hang out with me less 4. People are unfair to me 5. People are supportive of me 6. People are a little afraid of me	Stereotype Awareness: *Most people believe* that young people with emotional problems are … Stereotype Agreement: *I believe* that young people with emotional problems are … 1. Just as smart 2. May be more dangerous 3. Have themselves to blame 4. Can be trusted just as much 5. Will have these problems all their lives 6. Can do as well in school 7. Have trouble taking care of themselves 8. Are more creative 9. Are no different 10. Should be treated like everyone else

Note. CHR = clinical high risk for psychosis.

Table 2
Demographic Characteristics of the Sample (N = 143)

Demographic characteristic	M (SD)	Range
Age (years)	19.1 (4.2)	12–35
	N	%
Gender (M/F)	93/48	65.5/33.8
Maternal education (n = 136)		
Some high school	7	5.1
Completed high school	18	13.2
Some college/tech school	20	14.7
Completed college/tech school	57	41.9
Some graduate/professional school	2	1.5
Completed graduate/professional school	32	23.5
Race (n = 136)		
White (European)	89	65.4
Black	21	15.4
Interracial	14	10.3
Asian	6	4.4
Central/South American	4	2.9
American Indian	2	1.5
Ethnicity (Hispanic or Latino) (n = 137)	17	12.4
Racial/ethnic minoritized status (n = 137)		
Minoritized[a]	52	38.0
Non-minoritized[b]	85	62.0

Note. Number of participants are noted per variable given missing data.
[a] Participants who identified as a racial minority and/or Hispanic/Latino.
[b] Participants who identified as White and non-Hispanic/Latino.

and ER-40 variables between minoritized and nonminoritized participants. Regarding SIPS symptoms, minoritized participants had higher attenuated positive symptoms compared with nonminoritized participants, $t(135) = 2.5$, $p = .014$.

Relationships Between Symptoms, ER-40, and Stigma

SIPS/SOPS scores were not correlated with ER-40 accuracy. Higher disorganized symptoms were correlated with longer ER-40 response times ($r = .28$, $p = .001$).

Table 3
Means and Standard Deviations of Study Variables (N = 143)

Study variable	M (SD)
ER-40 response time (ms)	2078.50 (491.80)
ER-40 accuracy	33.14 (2.85)
Symptom discrimination	1.94 (0.92)
Stereotype awareness	2.56 (0.39)
Stereotype agreement	1.91 (0.39)
SIPS total	47.21 (14.22)
SIPS-negative	15.01 (6.52)
SIPS-positive[a]	13.73 (4.02)
SIPS-general	11.31 (4.16)
SIPS-disorganized	7.21 (3.79)

Note. Discrimination score ranges from 1 to 5, while stereotype awareness and stereotype agreement scores range from 1 to 4. SIPS = structured interview for psychosis risk syndromes; ER-40 = Penn emotion recognition task.
[a] Minoritized participants had higher attenuated positive symptoms than nonminoritized participants.

Greater stereotype awareness was correlated with higher positive ($r = .25$, $p = .003$), disorganized ($r = .34$, $p < .001$) and general ($r = .23$, $p = .008$) symptoms.

Greater stereotype agreement was correlated with higher disorganized symptoms ($r = .19$, $p = .027$).

Greater discrimination was correlated with higher negative ($r = .20$, $p = .023$), disorganized ($r = .30$, $p = .001$), and general ($r = .28$, $p = .001$) symptoms.

Relationships Between Stigma and ER-40 Accuracy and Response Times

There were no correlations between overall ER-40 accuracy and discrimination, stereotype awareness, or stereotype agreement ($ps > .36$).

ER-40 response time was significantly correlated with discrimination ($r = .22$, $p = .012$) and stereotype agreement ($r = .17$, $p = .045$; see Figure 1, panels A and B). There was no correlation between ER-40 response time and stereotype awareness ($p = .683$).

Regression models for stereotype agreement and discrimination predicting ER-40 response times are presented in Table 4. There was a minoritized status x stereotype agreement interaction (Table 4, Model A), with stereotype agreement predicting ER-40 response time only for minoritized individuals (Figure 1, panel C). Disorganized symptoms and gender were also significant predictors in the final model, with stereotype agreement predicting ER-40 response times for male participants with greater disorganized symptoms. The minoritized status x stereotype agreement interaction remained significant when adding site, IQ, and maternal education to the model, and none of these variables were significant predictors.

For the model predicting ER-40 response time from discrimination (Table 4, Model B), the minoritized status x discrimination interaction was not significant (Figure 1, panel D), and adding this term to the model in Step 3 did not produce an improvement in $R^2[\Delta R^2 = .000$ ($p = .806$)]. Discrimination remained a significant predictor of ER-40 response times when including sociodemographic variables in the model (Step 2), and disorganized symptoms and gender were also significant predictors in this model.

There were no significant independent effects for discrimination or stereotype agreement predicting individual emotions (anger, fear, sad, happy and neutral) in regression models (all $ps > .05$).

Discussion

This study investigated the relationship of face emotion recognition (FER) accuracy and response times with three stigma constructs—stereotype awareness, stereotype agreement, and discrimination related to mental health symptoms—among individuals with CHR. As hypothesized, we found a small but significant association between longer FER response times and greater stereotype agreement and discrimination. The relationship between FER response times and stereotype agreement was driven by minoritized participants. These findings remained significant even when accounting for possible confounding by symptoms, site, age, gender, maternal education, and IQ. We did not find relationships between FER accuracy and stigma as we had hypothesized and found in a previous study (Larsen et al., 2019).

Figure 1

Scatterplots of ER-40 Overall Response Times (RT) With Stereotype Agreement and Discrimination for Entire Sample (A and B), and Split by Minoritized Status (C and D)
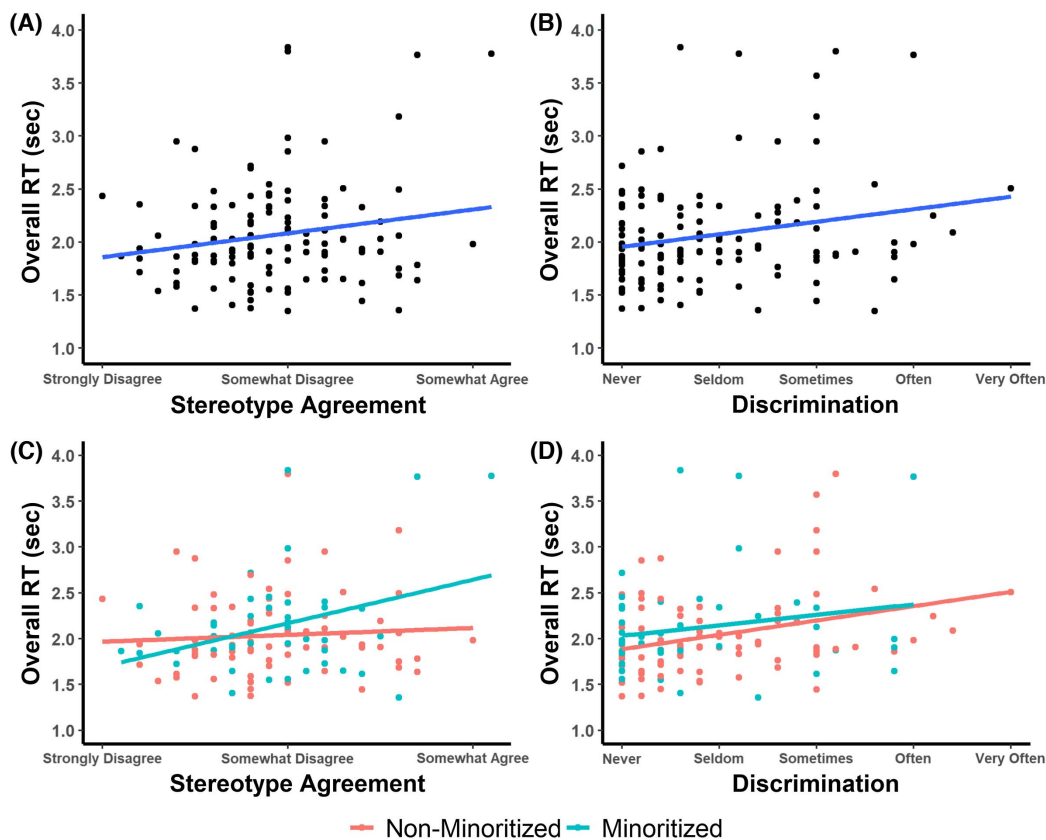
Note. ER-40 = emotion recognition task. See the online article for the color version of this figure.

The specificity of the ER-40 response time association with stereotype agreement to minoritized participants is consistent with work showing that being from a racial or ethnic minority group may worsen the negative effects of mental illness stigma (Misra et al., 2021), including in CHR individuals (Stowkowy et al., 2016). It is also important to note that minoritized participants in our study had higher attenuated positive symptoms (v. nonminoritized participants). Minoritized individuals experience significant stressors and systematic disadvantages, as well as disparities in early psychosis care (Jones et al., 2021; Oluwoye et al., 2021; Radua et al., 2018).

Individuals with CHR from minoritized groups have multiple social identities that are the target of stereotypes. Intersectional stigma (i.e., the convergence of multiple stigmatized identities in an individual) posits nuanced effects of stigma when considering multiple identity characteristics together rather than in isolation (Crenshaw, 1989; Pachankis et al., 2018; Turan et al., 2019). The combined impact of stereotypes from multiple fronts (racial/ethnic minoritized status and mental illness) can result in a "double disadvantage" (Oexle & Corrigan, 2018). Research has shown that subtle factors such as being asked to indicate race prior to an evaluation, or the race of the test administrator, can lead to poorer performance for minorities (Marx & Goff, 2005; Steele & Aronson,

1995). In addition, an "other-race effect" has been observed for the ER-40, in which Black individuals performed more poorly on this task than White individuals when viewing faces with a race other than their own (Pinkham et al., 2008). This "double disadvantage" may explain why only individuals from racial/ethnic minoritized groups with high internalized mental illness stigma had longer ER-40 response times.

Our findings suggest that mental illness stigma influenced participants' performance on a social cognitive task. These relations may occur by the same process in which experiences such as stereotype threat (Spencer et al., 2016; Steele & Aronson, 1995), stigma stress (Rüsch et al., 2009a, 2009b), and racial discrimination (Coogan et al., 2020; Keating et al., 2021) prompt a disruptive state of inefficient cognitive processing that undermines performance (Grant & Beck, 2009; Pennington et al., 2016). The mechanisms by which stigma impairs cognitive performance include distraction and loss of focus presumably due to increased stereotyped-related distraction (Cadinu et al., 2005), increased physiological arousal such as decreased heart rate variability (Croizet et al., 2004), increased skin conductance and blood pressure (Osborne, 2006), and increased anxiety (Spencer et al., 1999). The relationship between stigma and social cognitive processing is also supported by work showing that adverse experiences impact cognitive processing of

Table 4

Hierarchical Linear Regressions of ER-40 Overall Response Time on (A) Stereotype Agreement and (B) Discrimination

Model	Variable	Step 1 $\Delta R^2 = .021$ ($p = .112$) β	p	Step 2 $\Delta R^2 = .125$ ($p = .003$) β	p	Step 3 $\Delta R^2 = .051$ ($p = .008$) β	p
(A) Model from stereotype agreement	Stereotype agreement	.145	.112	.044	.630	−.144	.207
	Age			−.085	.327	−.084	.324
	Gender			.257	.006	.275	.003
	Disorganized symptoms			.175	.049	.178	.040
	Minoritized status			.127	.143	.122	.150
	Minoritized × Stereotype agreement					.291	.008

Model	Variable	Step 1 $\Delta R^2 = .078$ ($p = .002$) β	p	Step 2 $\Delta R^2 = .143$ ($p = .003$) β	p	Step 3 $\Delta R^2 = .007$ ($p = .318$) β	p
(B) Model from discrimination	Discrimination	.279	.002	.262	.005	.197	.083
	Age			−.025	.770	−.032	.704
	Gender			.285	<.001	.280	<.001
	Minoritized status			.163	.061	.176	.046
	Negative symptoms			−.109	.342	−.112	.330
	General symptoms			−.058	.615	−.053	.641
	Disorganized symptoms			.212	.043	.228	.031
	Minoritized × Discrimination					.106	.318

Note. ER-40 = emotion recognition task. For both models, dependent variable = ER-40 response time. All continuous predictors are mean-centered. Model (A) Adjusted R^2 values: Step 1 = .013, Step 2 = .109, Step 3 = .156. Model (B) Adjusted R^2 values: Step 1 = .070, Step 2 = .173, Step 3 = .173. Minoritized refers to the presence of a racial/ethnic minoritized status.

emotional stimuli in individuals with CHR (Tognin et al., 2020) and with evidence for overlap in the neural underpinnings of stigma and emotion detection (Clark et al., 2018).

When cognitive resources are being used for stigma-related processes, a person may fall behind during social interactions or misinterpret crucial social cues. For instance, individuals with schizophrenia exhibited poorer social skills during social interactions in which they were made to think that the other person was aware of their diagnosis compared with those who were told that others knew nothing about them (Henry et al., 2010). In addition, higher disorganized symptoms and male gender partially accounted for longer FER response times in this study, consistent with CHR research demonstrating more social deficits among males (Rietschel et al., 2017). The SIPS disorganized symptoms scale includes trouble with focus and attention, and poor attention may cause processing delays. It is possible that longer FER response times reflect a generalized deficit in processing speed, rather than a specific deficit in processing social cues, which may explain why FER accuracy was not related to stigma in this study. However, our measures of IQ and sustained attention, although not explicit measures of processing speed, were not related to ER-40 response times.

Stereotype awareness did not relate to FER in this study. Stereotype awareness is an observation, whereas stereotype agreement and discrimination are internalized aspects of stigma that can be targeted through treatment. Helpful interventions may include providing feedback on one's CHR status in a way that enhances the positive effects (e.g., relief, validation) of CHR labeling (Uttinger et al., 2018; Welsh & Tiffin, 2012), directly inquiring about the perceived impact of CHR labeling during feedback (Woodberry et al., 2021), and providing psychoeducation to increase understanding of the CHR condition (Herrera et al., 2021; McFarlane et al., 2012). Psychosocial interventions could also address stigma as a barrier to treatment engagement (Ben-David et al., 2019; Gronholm et al., 2017; He et al., 2020; Rusch et al., 2013). Another important implication of this work is that stigma may impact performance on standardized cognitive assessments in clinical and research settings (Moritz et al., 2020).

Future research should investigate the directionality and dynamics of these relationships using longitudinal and multimodal approaches. It would be important to measure the extent to which stigma is related to a generalized cognitive deficit in processing speed compared with a specific deficit in the timely processing of social cues. Racial and ethnic minority groups should be examined individually, and future studies should investigate one's stigma related to both racial identity and mental illness through self-report and qualitative methods. These relationships may be studied using psychophysiological measures (e.g., heart rate, skin conductance) and within the context of brain imaging (Clark et al., 2018; Todorov, 2012). It may be useful to include measures of stigma beyond self-report, such as the implicit association test (IAT) (Greenwald et al., 1998).

A limitation to this study is that we did not explicitly assess whether longer FER response times were accounted for by a generalized deficit in processing speed. We were unable to compare our sample to individuals with other psychiatric disorders or symptoms, or compare CHR subgroups, such as those who converted to psychosis. Furthermore, we did not have significant power to test

each individual minority group or assess participants' stigma related to their racial identity. There are likely different internalized stereotypes at play accounting for differing relationships between stereotype agreement and response time between racial/ethnic groups. Stigma measures used in this study rely on self-report and thus are susceptible to social desirability bias or selective recall.

Additional research is needed to investigate the social and cognitive implications of mental illness and race-based stigma for CHR individuals, in which symptoms suggest risk for a highly stigmatized mental illness and occur during a critical stage of identity development.

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