



Increased rates of social defeat and schizotypy in racial minorities

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ABSTRACT

This study examines the extent to which a measure of multidimensional schizotypy is associated with experiences of social defeat. Based on the social defeat hypothesis of psychosis, which suggests that chronic stressful experiences leading to social defeat increase risk for psychotic-like experiences, we expect that individual differences on a schizotypy measure would be explained by differences in social defeat. We hypothesized that racial and ethnic minorities would report higher rates of schizotypy relative to non-minorities and that social defeat would explain those differences. Participants included a community sample of English-speaking adults ages 18 and older, recruited from online social media platforms ($N = 501$; M age = 28.06). Demographic information was collected, as well as the Multidimensional Schizotypy Scale–Brief (Kwapil et al., 2018) and the Defeat Scale (Gilbert & Allan, 1998). Analyses revealed that social defeat and schizotypy scores are highly correlated. Examination of group differences revealed that racial and ethnic minorities reported higher rates of schizotypy and higher rates of social defeat than non-minorities. ANCOVA analyses revealed that, after controlling for social defeat scores, racial and ethnic status was no longer significantly associated with schizotypy scores.

1. Increased rates of social defeat in racial minorities

Social defeat, the experience of being excluded from a majority group, is associated with increased rates of psychiatric symptoms including anxiety (Baumeister & Tice, 1990; Leary, 1990), depression (Carvalho et al., 2013; Li, Zhao, & Yu, 2018; Slavich, Thornton, Torres, Monroe, & Gotlib, 2009), and psychotic symptoms (Selten, van der Ven, Rutten, & Cantor-Graae, 2013). Environmental stressors such as racism, discrimination (Berger & Samyay, 2014), bullying (Björkqvist, 2001), and childhood adversity (van Nierop et al., 2014) can result in the experience of social defeat. It has been proposed that the social defeat resulting from these chronic social stressors might lead to an increased risk for the development of psychotic disorders (Selten et al., 2013).

The concept of social defeat has been modeled in animals using the resident-intruder paradigm in which the resident animal shows dominance over the intruder (Tidey & Miczek, 1996). Chronic experiences of social defeat create stress and depressive-like symptoms in the defeated animal (Hollis & Kabbaj, 2014). Humans also experience social defeat, though the contexts are more complex than in animal models. Experiences that might result in social defeat in humans include migration, discrimination, bullying, urban up-bringing, and childhood trauma (Selten et al., 2013). The chronic nature of these defeating experiences is a central component of the social defeat hypothesis, which suggests that

in humans there is an increased sensitization of the mesolimbic dopamine system in response to these chronic stressors (Selten, Booij, Buwalda, & Meyer-Lindenberg, 2017), thus conferring risk for psychotic disorders.

Discrimination is one form of social defeat widely experienced by racial and ethnic minority groups. As a result of experiencing increased rates of discrimination, individuals who identify as members of the minority group are likely to experience higher rates of social defeat (Selten et al., 2013). Those belonging to a minority group may be more likely to experience discrimination and reduced social cohesion, and thus develop social defeat (Selten & Cantor-Graae, 2005; Van Os, Kenis, & Rutten, 2010), leading to psychotic-like symptoms. There is research to support this idea, with specific minority groups reporting higher levels of psychotic-like symptoms and experiences relative to non-minority groups (Tortelli et al., 2018). Relative to their peers, rates of serious mental illness (e.g. schizophrenia) are approximately two to three times higher in racial and ethnic minority youth in the United States (Bresnahan et al., 2007). Increased odds of psychotic disorders in racial and ethnic minority groups are well-established in the literature (Jongsma et al., 2020; Kirkbride et al., 2012; Selten, Van Der Ven, & Termorshuizen, 2020). Additional work on sub-threshold symptoms has found that there are higher rates of some psychosis dimensions, specifically grandiosity and delusions, in ethnic minority adolescents relative

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to majority adolescents (Eilbracht, Stevens, Wigman, van Dorsselaer, & Vollebergh, 2015).

Schizotypy is comprised of sub-threshold traits that confer a liability for the development of a psychotic disorder (Lenzenweger, 2018). This cluster of traits, including unusual patterns of thinking which are often accompanied by interpersonal difficulties, predicts the onset of schizophrenia spectrum disorders (Kwapil, Gross, Silvia, & Barrantes-Vidal, 2013). However, only a small minority of individuals with high levels of this trait will go on to develop a psychotic disorder. Consistent with a diathesis stress model, previous research has found that daily stressors in individuals with high levels of schizotypy result in an increase in psychotic-like symptoms (Kwapil, Brown, Silvia, Myin-Germeys, & Barrantes-Vidal, 2012). More specifically, an increase in social stress for individuals with high levels of negative and disorganized schizotypy resulted in an increase in psychotic-like experiences (Grant & Henning, 2020). These socially defeating experiences may confer risk for psychotic disorders (Selten et al., 2013). The aim of the present study is to examine the relationship between schizotypy and social defeat. Previous research has examined the relationship between social defeat and psychotic-like experiences in individuals at clinical risk for psychosis, finding that higher levels of social defeat were associated with greater paranoid appraisal of a virtual social situation (Valmaggia et al., 2015). Additional work has demonstrated a relationship between childhood adversity and trauma, which are types of social defeat, and schizotypy (e.g. Velikonja, Fisher, Mason, & Johnson, 2015). This work supports the idea that social defeat and schizotypy are related. However, previous work has not examined social defeat and schizotypy in racial and ethnic minorities. It is important to examine this relationship as it may provide additional information explaining higher rates of psychotic-like experiences in racial and ethnic minorities (Tortelli et al., 2018). Namely, the present study seeks to determine whether self-reported feelings of social defeat, as identified by the Defeat Scale, are associated with higher reports of schizotypal traits. Additionally, we examined the presence of schizotypy in racial minorities relative to non-minorities, and test whether social defeat accounts for differences in the risk of psychosis as measured through schizotypal traits. We hypothesize that higher rates of social defeat will be associated with higher reported schizotypy. Moreover, because of the discrimination experienced by racial minorities, we anticipated that racial minorities will report higher rates of social defeat, which will explain higher rates of self-reported schizotypy in this group relative to non-minorities.

2. Methods

2.1. Participants

Participants included a community sample recruited from online social media platforms including Reddit, Craigslist, and Facebook. Individuals 18 years and older were eligible to participate in this study. There were no other inclusion criteria. Participants were excluded from the data analysis if they did not complete the survey. This study was approved by the Internal Review Board (IRB) at Case Western Reserve University. Informed consent was attained for all participants. The authors assert that all procedures contributing to this work comply with the ethical standards of national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008.

2.2. Measures

To examine schizotypy, the Multidimensional Schizotypy Scale –Brief created by Kwapil, Gross, Silvia, Raulin, and Barrantes-Vidal (2018) was given to participants. The scale is made up of 38 items that assess for subtypes in schizotypy: 13 positive (e.g. “I believe that I could read other peoples' minds if I really tried”), 13 negative (e.g. “Throughout my life, very few things have been exciting or interesting to

me”), and 12 disorganized (e.g. “No matter how hard I try, I can't organize my thoughts”). Participants responded to the items as true or false. In this sample, internal consistency was $\alpha = 0.88$.

To examine social defeat, participants completed the Defeat Scale (Gilbert & Allan, 1998). This self-report measure includes 16 items pertaining to social standing and feelings of social loss or failure. Participants were asked to rate each item on a 5-point Likert scale. The Defeat Scale approximates social defeat by looking at how people feel about themselves in terms of their sense of “failed struggle and losing rank” (Gilbert & Allan, 1998, p. 589). In this sample, internal consistency was $\alpha = 0.82$.

2.3. Statistical analyses

All analyses were conducted using SPSS Statistics 27. Correlations were conducted to determine whether there was a relationship between schizotypal traits and experiences of social defeat. An analysis of covariance (ANCOVA) was done to test for group differences between racial minorities and non-minorities as well as to control for the effect of social defeat. Assumptions for running an ANCOVA were met. There was a linear relationship between schizotypy scores and social defeat scores for both racial minorities and non-minorities. Additionally, there was a homogeneity of regression slopes as the interaction term was not statistically significant, $F(1, 493) = 0.04, p = .84$. There was homogeneity of variances, as assessed by Levene's test of homogeneity of variance ($p = .14$). There were three outliers in the data, as assessed by standardized residuals ± 3.96 . These three outliers were kept in the data; importantly, when ANCOVA results are conducted without the outliers the results remain the same.

3. Results

Five-hundred and one participants took part in this study. Demographic information for the full sample can be found in Table 1 and information regarding each group in Table 2.

3.1. Correlation analyses

A correlation analysis was conducted to test the relationship between schizotypy and social defeat. As predicted, we found a significant positive correlation between levels of social defeat and schizotypy scores ($r = 0.61, p < .001$). In looking at the sub-scales of the MSS, we see significant positive correlations for positive symptom ($r = 0.56, p < .001$), negative symptom ($r = 0.44, p < .001$), and disorganized symptom scores ($r = 0.55, p < .001$).

Table 1
Demographic characteristics of full sample.

	N = 524
Mean age (S.D.)	28.17 (5.04)
Gender ^a	
Female (%)	225 (42.9)
Male (%)	250 (47.7)
Transgender (%)	31 (5.9)
Intersex (%)	15 (2.9)
Education ^b	
4-Year college degree (%)	305 (58.2)
Graduate degree (%)	30 (5.7)
Associate's degree (%)	16 (3.1)
Some college (%)	22 (4.2)
High school (%)	55 (10.5)
Some high school (%)	1 (0.2)
Middle school only (%)	1 (0.2)

^a 3 participants (0.6%) did not respond.

^b 94 participants (17.9%) did not respond.

Table 2
Demographic characteristics by group.

	Racial and ethnic minorities	Non-minorities	<i>t</i>
Variables	(<i>n</i> = 93)	(<i>n</i> = 431)	
Mean age (S.D.)	29.4 (3.75)	27.89 (5.27)	-2.61*
Race/ethnicity			
Black or African American (%)	49 (52.7)	-	
Native American/Alaskan (%)	22 (23.7)	-	
Asian (%)	16 (17.2)	-	
Hawaiian/Pacific Islander (%)	4 (4.3)	-	
Other (%)	2 (2.1)	-	

* $p < .001$.

3.2. Group differences

Racial minorities reported higher rates of schizotypy ($M = 22.20$, $SD = 6.59$) compared to non-minorities ($M = 18.71$, $SD = 7.00$) ($t = -4.35$, $p < .001$, $d = 0.504$). Higher scores of social defeat were found in racial minorities ($M = 31.37$, $SD = 7.46$) relative to non-minorities ($M = 26.16$, $SD = 9.71$) ($t = -4.82$, $p < .001$, $d = 0.558$).

ANCOVA analyses were used to assess if racial differences in schizotypy scores remained once covariates that differed across race (i.e., social defeat and age) were considered. After controlling for age ($F(1, 489) = 6.12$, $p = .014$, $\eta^2 = 0.01$), race remained significantly associated with schizotypy scores ($F(1, 489) = 17.46$, $p < .001$, $\eta^2 = 0.04$). However, after controlling for social defeat scores ($F(1, 494) = 275.45$, $p < .001$, $\eta^2 = 0.36$), racial status was no longer significantly associated with schizotypy scores ($F(1, 494) = 3.59$, $p = .06$, $\eta^2 = 0.03$). Though a small effect size, when we covary out social defeat scores, we note that the finding is no longer quite at the threshold of statistical significance.

4. Discussion

In this study, we extended prior work by demonstrating an association between self-reported experiences of social defeat and schizotypy. Our first hypothesis was confirmed: higher rates of schizotypy are associated with higher rates of social defeat. Also, as predicted, we found that racial minorities report higher rates of social defeat and schizotypy relative to non-minorities. Finally, we tested whether these increased rates of schizotypy could be explained by the higher levels of social defeat in our minority group. Though the effect was small, we found that social defeat does partially explain differences in schizotypy between our two groups. This finding is consistent with the social defeat hypothesis of schizophrenia. The observed greater rates of schizotypy in racial minorities relative to non-minorities are partly due to greater experiences of social defeat for racial minorities.

Our findings are consistent with previous research suggesting that experiences of social defeat are associated with psychotic-like experiences. We see a strong positive relationship between social defeat and schizotypy across our sample. This finding suggests that for people in the general population, experiences that lead to feelings of social defeat are also associated with increases in schizotypy. Moreover, we see that this relationship exists across the three subtypes, positive, negative, and disorganized, which indicates that it is not specific to one symptom type. It is noteworthy that the social defeat scale does not measure specific instances of social defeat (e.g. racial discrimination), thus we are unable to exactly pinpoint what type of socially defeating experiences are behind individuals' responses to statements like "I feel down and out" or "I feel like I have given up." However, previous research highlights the possibility that racial discrimination might be behind the social defeat experienced by our participants. For example, experiences of racial discrimination have been linked with sub-threshold psychotic-like symptoms in ethnic minority young adults (Anglin, Lighty, Greenspoon,

& Ellman, 2014). Additionally, in a large study looking at Latino, Asian, African-American, and Afro-Caribbean adults in the United States, researchers found that individuals who reported higher levels of perceived discrimination also reported higher levels of psychotic experiences (Oh, Yang, Anglin, & DeVlyder, 2014). In future research, we would like to include measures of specific socially defeating experiences, such as racial discrimination, so that we are better able to identify the types of experiences leading to these feelings of defeat.

Given the ongoing nature of certain socially defeating experiences such as discrimination, it is important to consider potential buffers to protect against its harmful effects. Work with animal models has shown that after a socially defeating experience, returning the defeated animal back to its social group buffers against the stress-induced outcomes (Isovich, Engelmann, Landgraf, & Fuchs, 2001). This finding suggests that social support may be protective against experiences of social defeat. Testing this hypothesis in people would be particularly important for understanding how to reduce the negative effects of social defeat on at-risk groups. There is previous work to back up this idea. For instance, work by Anglin, Liu, Espinosa, Tikhonov, and Ellman (2018) found that in racial and ethnic minorities who experience discrimination, having a positive ethnic identity could minimize the risk for psychopathology. Past research has also supported the role of social support and strong community ties as protective buffers for mood disorders among minorities (Shim et al., 2012). Future work should further expand upon these relationships to understand specific factors that may mediate the relationship between minority status and psychotic-like experiences, in addition to factors that may act as buffers (e.g. social support, resilience). Though we found a relationship between social defeat and schizotypy, the causal pathway is still not clear. There are several hypothesized pathways by which social defeat may increase risk for psychotic symptoms and experiences. Selten et al. (2013) argue that experiences of social defeat increase sensitization of the mesolimbic dopamine system. Additionally, Stowkowy and Addington (2012) argue that experiences of social defeat may lead to the development of negative schemas, which in turn result in attenuated positive symptoms. Finally, other research suggests that chronic experiences of discrimination, a type of social defeat, result in the types of neurobiological consequences associated with chronic stress (Berger & Sarnyai, 2014). Future research should test these possible pathways.

4.1. Limitations

In this study, looking at racial minority status as a monolithic category is a limitation. We were underpowered to detect differences among different racial groups, but future research should investigate differences across racial and ethnic lines, in addition to immigration status, to determine if schizotypy and its relationship with social defeat present differently among various subgroups. Additionally, this study is cross-sectional and thus causality cannot be determined. Though we expect that socially defeating experiences occur prior to psychotic-like experiences, we have not tested this relationship. It is possible that psychotic-like experiences increase the likelihood that someone will experience ostracism or exclusion from a majority group, as previous research has documented stigma and discrimination for individuals with schizophrenia spectrum disorders (Penn, Kohlmaier, & Corrigan, 2000). It is also possible that both of these directional relationships are present, with social defeat both contributing to and resulting from psychotic-like experiences.

Another limitation is a lack of evidence of invariance across cultures for the Defeat Scale and the MSS-B. It is possible that the meaning of scores may vary across individuals as a function of their culture or location. Given that the present study's sample is predominantly United States-born, and these measures were developed and validated in the United States, it is unlikely that this limitation impacts our results in a meaningful way.

Despite these limitations, our study demonstrates a significant

relationship between schizotypy and social defeat, suggesting that increased rates of self-reported subclinical psychosis traits are associated with higher levels of socially defeating experiences. Additionally, we found that racial minorities report higher rates of schizotypy relative to non-minorities and that social defeat partially accounts for the differences between these two groups. Taken together, these results provide evidence for an important association among minority status, schizotypy, and social defeat.

CRediT authorship contribution statement

Sarah Hope Lincoln, Ph.D.

Dr. Lincoln contributed to study development, design, data collection and analysis, and writing and reviewing the manuscript.

Taylor Johnson

Ms. Johnson contributed to study development, design, data collection and analysis, and writing and reviewing the manuscript.

Jill Laquidara

Ms. Laquidara contributed to study development, design, data collection and analysis, and writing and reviewing the manuscript.

Joshua Wilt, Ph.D.

Dr. Wilt contributed to data analysis and writing and reviewing the manuscript.

Rita Obeid, Ph.D.

Dr. Obeid contributed to writing and reviewing the manuscript.

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