

Racial discrimination is associated with distressing subthreshold positive psychotic symptoms among US urban ethnic minority young adults

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Abstract

Background Racial discrimination is related to depression, anxiety, and severe psychological distress, and evidence drawn from studies emanating from the United Kingdom and The Netherlands suggest racial discrimination is also related to clinical psychosis and subthreshold psychotic symptoms in racial and ethnic minority (REM) populations. The present study sought to determine the association between racial discrimination experiences and attenuated positive psychotic symptoms (APPS) in a United States (US) urban, predominantly immigrant and REM young adult population.

Methods A cohort of 650 young adults was administered a self-report inventory for psychosis risk [i.e., Prodromal Questionnaire (PQ)], and the Experiences of Discrimination Questionnaire. The PQ allowed the dimensional assessment of APPS, as well as the categorical assessment of a potentially “high risk” group (i.e., 8 or more APPS endorsed as distressing), the latter of which was based on previous validation studies using the structured interview for prodromal syndromes. The relations between self-reported racial discrimination and APPS, and racial

discrimination and “high” distressing positive PQ endorsement were determined, while accounting for anxiety and depression symptoms.

Results Racial discrimination was significantly associated with APPS and with significantly higher odds of endorsing eight or more distressing APPS, even after adjusting for anxiety and depression symptoms.

Conclusion The present study provides preliminary evidence that racial discrimination among US ethnic minorities may be associated with APPS, as well as potentially higher risk for psychosis.

Keywords Discrimination · Psychosis · Ethnic minority · Subthreshold psychotic symptoms · High risk · Distress

Introduction

Chronic, unpredictable, and uncontrollable sources of stress associated with racial discrimination may have profound negative health outcomes [1, 2]. Racial discrimination, which consists of unfair treatment or negative attitudes on the basis of racial group membership by dominant group members [3, 4], can exceed an individual’s coping resources [5, 6] and increase the physiological stress response. Indeed, using experimental laboratory methods, Pascoe and Richman [5] have found perceived discrimination is associated with a wide range of heightened physiological stress responses, including elevated blood pressure and increased cortisol secretions [7]. Accordingly, numerous studies have demonstrated racial discrimination negatively impacts mental health functioning [2, 5, 8–11]. Specifically, exposure to racial discrimination is associated with depression [3, 12–16], anxiety [17], and general psychological distress [18–21].

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Moreover, a meta-analysis of the influence of racial discrimination on health [5] found that the negative mental health impact cuts across racial and ethnic groups.

While racial discrimination has been examined extensively in the United States (US), few US studies have examined its relationship to psychosis (but see Saleem et al. [22]). Yet research emanating primarily from the United Kingdom (UK) and the Netherlands suggests perceptions of racial discrimination are related to psychotic disorders and severity of psychotic symptoms in clinical populations; and psychotic symptoms in general, non-help-seeking populations [23–27]. For example, Cooper et al. [23] found perceived disadvantage explained part of the relationship between being a Black immigrant and having a higher risk for psychosis in the UK. Likewise, perceived discrimination was associated with psychosis in ethnic minority groups in the Netherlands [26], and specifically with delusional ideation [28].

While examining perceptions of racial discrimination among clinical populations with psychosis is an important endeavor, it is difficult to ascertain to what extent being an ethnic minority in the mental health system contributes to the association, as there are well documented racial disparities in mental health treatment systems (e.g., higher rates of compulsory admissions among racial minorities [1, 29]; more aggressive psychopharmacological treatment among African Americans [30]). Examining the association between racial discrimination and psychotic symptoms in a non-treatment-seeking sample addresses this issue and allows for the opportunity to determine whether racial discrimination may be a risk factor for developing psychotic phenomenology. Karlsen and colleagues [24] examined this association in a general population racial and ethnic minority (REM) UK sample. Results indicated that verbal abuse, physical assault and workplace racial discrimination were associated with self-reported psychotic symptoms consistent with higher risk for psychosis.

It is not known the extent to which these findings replicate in REM populations in the US, as there are racial historical and social differences in the US [31], and strong justified concerns about racially biased psychotic misdiagnoses in African Americans [32–34] have tempered such empirical inquiries. Yet prominent social psychological theoretical perspectives [35–38] suggest that contemporary forms of racial discrimination tend to be subtle yet aversive, engendering a climate of distrust among ethnic minority recipients of such discrimination. The literature suggests that racial discrimination contributes to anxiety and depression associated with contemporary forms of racial discrimination in non-clinical populations [39], but it is less clear if discrimination is associated with the suspiciousness and altered perceptions consistent with attenuated positive psychotic symptoms (APPS).

These brief, subthreshold psychotic symptoms (i.e., perceptual disturbances rather than overt hallucinations) are fairly common in the general population [40, 41]; median prevalence = 8 % [41]. For certain individuals these symptoms may predict the development of a clinical psychotic disorder [42, 43], especially when there is significant accompanying distress, and when the symptoms are experienced over an extended period of time [44]. Some ethnic minorities who exhibit these symptoms without a clinical psychotic disorder experience a significant psychological burden despite the lack of a clinical psychotic diagnosis [45] and endorsement of a significant number of symptoms could be indicative of clinical high risk for psychotic disorders [46, 47].

Aim

The present study sought to determine if self-reported experiences of racial discrimination were associated with APPS, and with “high” endorsement of distressing APPS in an urban, predominantly immigrant and REM undergraduate US sample of young adults. The predominantly REM college sample was chosen: (1) to enhance the ability to examine the subclinical portion of the psychotic spectrum during a developmental period that captures the greatest risk for clinical psychosis, and (2) to capture the experience of a group in which racial discrimination is particularly relevant. Given findings demonstrating racial discrimination’s association with anxiety and depression symptoms, and that both symptoms commonly occur prior to the onset of psychosis [48–50] and are associated with psychotic symptoms in the general population [51], we covary these symptoms in adjusted analyses. It is hypothesized that: (1) racial discrimination will be positively associated with APPS and with the probability of being categorized as a “high” endorser of distressing APPS, and (2) this relationship will exist even after controlling for anxiety and depression symptoms. Given previous studies that found racial discrimination’s association with subthreshold psychotic symptoms was specific to delusional ideation [28] and negative thinking [22], we explored whether racial discrimination’s association with APPS occurred within APPS subdomains.

Methods

Sample

Participants were obtained from a large urban public university system in the Northeast with a high proportion of ethnic minorities and immigrants. Undergraduate students from several disciplines who were enrolled in psychology

classes were recruited through an online participant recruitment website for a study titled “Social Stressors and Unusual Experiences”. Inclusion criteria outlined on the recruitment web page specified all individuals aged 18–27, who either self-identified as Black/African American/of African descent or as a 1st or 2nd generation immigrant were eligible to participate in the study. The inclusion criteria based on age and minority status were set to maximize recruitment of young ethnic minority adults possessing characteristics that have been implicated in psychosis risk [52]. A total of 650 participants completed a battery of self-report questionnaires in a research lab on a computer in groups of 4–6 people, and completion time ranged from 30 min to 1 h. Data for 6 participants were excluded from analyses, 3 due to poor English proficiency, and 3 who were significantly past the age cutoff of 27 (e.g., age 42), resulting in a final sample of 644 participants. The protocol was approved by the Institutional Review Board of the university and written informed consent was obtained from all participants prior to enrollment. All participants received course credit for their participation in the study.

Measures

To assess APPS, participants completed the Prodromal Questionnaire-Likert (PQ-Likert) [46, 53], which is a 92-item self-report measure of subthreshold psychotic symptoms experienced in the absence of alcohol, drugs, and other medications, over the last month. The measure has been validated against semi-structured interviews that assess emerging and frank psychosis, such as the structured interview for prodromal symptoms [54]. Respondents indicate whether experiences endorsed were distressing. The item ratings sum to form four major subscale scores, one of which is based on positive symptoms. There is also a ‘Yes/No’ item that asks respondents whether they have received or sought mental health care services for emotional difficulties within the past month. Positive symptoms have the best predictive value for distinguishing a clinically high risk or psychotic clinical syndrome from no syndrome [46, 47]. Using the scoring method derived from the clinical validation study, Loewy et al. [53] found eight or more positive distressing symptom items resulted in the identification of 2 % of the undergraduate sample, a proportion more consistent with the prevalence of psychotic disorders in the general population [46].

For the purpose of the present study, three dependent PQ variables were created: (1) a dimensional score of number of APPS endorsed; (2) a three-level categorical variable that captured high (8 or more positive distressing symptoms), medium (5–7 positive distressing symptoms), and low (4 or fewer positive distressing symptoms) levels of

endorsement; and (3) a dichotomous variable that compared high vs. low levels of endorsement. The low level of PQ endorsement was based on the mean number of positive distressing symptoms (APPS-distress) endorsed in our sample (3.6). We sought to test whether our hypotheses were supported in the full range of APPS, including more potentially clinically relevant symptoms. Even though we use the same “high” cutoff used in previous validation studies [46], we cannot say whether the high scorers in the present sample are truly at high clinical risk for psychosis, as this cutoff has only been associated with clinical high risk in clinical samples. We can, however, state that the group reporting 8+ distressing APPS is reporting considerable distress in the psychotic spectrum, which addresses our research question. For exploratory purposes, positive PQ items were separated into the following four categories and Cronbach’s alphas were estimated to confirm the internal consistency of these four domains: (1) cognitive disorganization (six items: $\alpha = 0.73$); (2) unusual thinking (17 items: $\alpha = 0.77$); (3) perceptual abnormalities (14 items: $\alpha = 0.75$); and (4) paranoia/suspiciousness (six items: $\alpha = 0.80$).

Self-reported Experiences of Discrimination (EOD) were determined using the EOD instrument [55], which captures both the number of different situations in which respondents experienced discrimination due to race, ethnicity, or color, and the frequency of such occurrences. The nine situations assessed include: school, getting a job, work, getting housing, getting medical care, getting service in a store, getting credit or a loan, on the street, and from the police or in the courts. For each situation endorsed, respondents indicate the relative frequency on a three-point scale with the following indicators: once, 1; two–three times, 2; four or more times, 3. The nine situations are tallied into a total racial discriminatory domain score (range 0–9), and the frequency of occurrences for all nine situations is summed into a total score (0–27). The measure has been psychometrically validated in a study of African American, Latino, and White working class adult participants (age range 25–64), showing good reliability and validity [55].

Symptoms of depression were evaluated with the 10-item brief version of The Center for Epidemiologic Studies Depression Scale (CES-D) [56, 57], which ascertained the presence and severity of depressive symptoms that occurred over the past week. Responses were summed to obtain total scores with higher scores indicative of more pervasive depressive symptoms. The range of scores is 0–30 and scores equal to or >10 are thought to represent significant depressive symptomatology [58]. The CES-D is reliable across clinical and non-clinical ethnically diverse samples [56, 59] and has demonstrated concurrent and construct validity [56].

The State–Trait Anxiety Inventory–Trait Form–Anxiety Subscale (STAI–trait) [60] was used to assess symptoms of anxiety, using a version that contained only items that loaded highly on an anxiety factor and excluded items that loaded predominantly on a depression factor, so as to provide a purer measure of generalized anxiety [61]. The seven items were scored on a Likert-type scale (not at all, 1; somewhat, 2; moderately so, 3; and very much so, 4) that required participants to rate how frequently they feel a particular anxiety symptom. Potential scores range 7–28, and individuals with a clinical diagnosis of an anxiety disorder typically score greater than or equal to 16 [61]. The STAI–trait has good construct [62] and convergent [63] validity, as well as test–retest reliability [64].

Sociodemographic data were obtained on the sample. Self-identified race and ethnicity was assessed using a question in which participants were told to “choose one category that best captures how you see yourself,” and given several options. These answers were grouped into four categories for the present analyses: (1) Black (includes those born in USA, Africa, and Caribbean/West Indies); (2) Hispanic/Latino; (3) Asian/Pacific Islander; and (4) other (includes Native Americans, White/Caucasian, Biracial, and Middle Eastern). Immigrant status was assessed using two Yes/No questions: (1) ‘Were you born outside of the US?’ and (2) ‘Were both of your parents born inside the US?’ Respondents who indicated No to question 1 and Yes to question 2 were categorized as non-immigrant; Yes to question 1 as first generation immigrant; and No to question 1 and No to question 2 as second generation immigrant. The other sociodemographic variables included: gender, age (years), and family household income (*z* score). Family income was grouped into six categories: (1) <20,000; (2) 20–40,000; (3) 40–60,000; (4) 60–80,000; (5) 80–100,000; and >100,000, which were treated continuously.

Statistical analyses

Bivariate relationships between continuous total and sub-domain APPS scores and other continuous measures were assessed using Spearman’s rho correlation. Chi-square analyses were used to examine bivariate relationships between distressing APPS (APPS–distress) level of endorsement (i.e., low, medium, high) and other categorical measures. Multiple linear regression models were conducted to determine whether increasing levels of racial discrimination were associated with increasing numbers of APPS in adjusted analyses. Binary logistic regression analyses determined whether racial discrimination related to an increased likelihood of being categorized with high APPS–distress compared to low levels in adjusted analyses. We adjusted for sociodemographic variables and clinical

(anxiety and depression) symptoms in the linear and logistic regression models.

Results

Sample characteristics

Participant demographic information is presented in Table 1. The majority of respondents were first or second generation immigrants and females constituted a higher proportion of the sample. REM group categories were sufficiently represented, with Blacks, Asians, and Hispanics each comprising at least 25 % of the sample. Ages ranged 18–29 years with most participants near the age of 20. The mean family income level for the sample was closest to the \$40–60,000 range category (i.e., 2.80).

Attenuated positive psychotic symptoms

Mean APPS scores are presented for the total sample and by demographic variables in Table 1. There was no significant racial/ethnic, gender, or immigrant status mean differences in total number of APPS. Likewise, high, medium, and low APPS–distress endorsement levels did not significantly differ by gender, racial/ethnic group, or immigrant status group. Income was not significantly related to APPS or levels of APPS–distress. Age was significantly negatively related to APPS, with younger participants more likely to endorse APPS, but was not related to APPS–distress level (Table 2).

The majority of the sample (94.4 %) endorsed at least one of the 45 APPS items and the most commonly endorsed type was within the realm of unusual thought content (88.5 %), with the least within the realms of paranoia/suspiciousness and perceptual disturbance (both 67.9 %). Cognitive disorganization was endorsed by 81.7 % of the sample. The mean number of APPS endorsed by participants in the sample was 10 and the highest number 40. A substantially smaller portion of the sample (67.4 %) indicated they were distressed by at least one APPS. The mean number of distressing APPS endorsed in the sample was between 3 and 4 symptoms, and the highest number of APPS–distress endorsed was 26. Of the four positive symptom categories, cognitive disorganization was the most prevalent symptom category associated with distress, with 48.6 % of participants reporting distress associated with at least one of the six symptoms in this category. Symptoms related to unusual thinking had the next highest prevalence, with 43.9 % reporting distress. Distressing paranoia and perceptual symptoms had the lowest prevalence of the four categories (39.8 and 37.9 %, respectively). APPS, APPS–distress, and their respective

Table 1 Sample characteristics for total sample and by categorization of distressing APPS level

	Total N = 644	APPS-distress level, N (%)			APPS mean (SD)
		Low N = 454 (70.5 %)	Medium N = 75 (11.6 %)	High N = 115 (17.9 %)	
Race					
Black	210 (32.8)	146 (32.3)	26 (34.7)	38 (33.3)	10.41 (7.95)
Asian	176 (27.5)	122 (27.0)	22 (29.3)	32 (28.1)	10.15 (8.00)
Hispanic	155 (24.2)	111 (24.6)	16 (21.3)	28 (24.6)	9.61 (6.94)
Other	100 (15.6)	73 (16.2)	11 (14.7)	16 (14.0)	9.28 (8.27)
		$\chi^2(6, 641) = 0.865$			$F(2,637) = 0.056$
Female	426 (66.5)	300 (66.4)	50 (66.7)	76 (66.7)	9.72 (7.61)
Male	215 (33.5)	152 (33.6)	25 (33.3)	38 (33.3)	10.47 (8.09)
		$\chi^2(2, 641) = 0.01$			$t(639) = 1.15$
Immigrant status					
First generation	296 (46.3)	205 (45.5)	41 (54.7)	50 (43.9)	9.95 (8.00)
Second generation	292 (45.6)	214 (47.5)	26 (34.7)	52 (45.6)	9.95 (7.60)
Non-immigrant	52 (8.1)	32 (7.1)	8 (10.7)	12 (10.5)	10.33 (7.66)
		$\chi^2(4, 640) = 5.65$			$F(2,637) = 0.056$
Sought/received counseling	37 (5.8)	18 (4.0)	6 (8 %)	13 (11.4)	14.19 (8.94)
		$\chi^2(2, 639) = 9.90$			
		Mean (SD)			
Age	19.9 (2.11)	20.0 (2.18)	19.47 (1.83)	19.9 (1.98)	
Family income	2.8 (1.57)	2.8 (1.58)	2.41 (1.59)	2.6 (1.50)	

APPS-distress = total number of distressing attenuated positive psychotic symptoms. Bold indicates significant statistical tests at $p < 0.0001$

Table 2 Study variable means (SD) by categorization of distressing APPS level

	Total N = 644	APPS-distress level			Statistical F test
		Mean (SD)			
		Low	Medium	High	
Discrimination domains	1.7 (1.60)	1.5 (1.53)	1.8 (1.56)	2.3 (1.71)	$F(2,641) = 12.47$
Discrimination frequency	3.0 (3.37)	2.6 (3.14)	3.56 (3.49)	4.4 (3.76)	$F(2,641) = 13.62$
Depression symptoms	7.8 (4.87)	6.2 (3.94)	10.19 (4.23)	12.3 (5.24)	$F(2,635) = 104.97$
Anxiety symptoms	6.4 (4.04)	5.1 (3.22)	8.28 (3.40)	10.2 (4.44)	$F(2,638) = 110.33$
APPS	9.99 (7.84)	6.61 (5.31)	14.24 (6.06)	20.59 (6.32)	$F(2,641) = 311.25$
APPS-distress	3.6 (4.54)	1.2 (1.35)	5.89 (0.86)	11.7 (3.83)	$F(2,641) = 1,338.61$

APPS-distress = scale of the total number of distressing attenuated positive psychotic symptoms. Bold indicates significant statistical tests at $p < 0.0001$

subdomains were all positively related to depression and anxiety symptoms (see Table 3 for details).

Racial discrimination

Mean scores (SD) for racial discrimination and clinical scale variables are presented in Table 2. Seventy percent of the sample endorsed discrimination in at least one domain. The most commonly endorsed domain of discrimination was in the street or in a public setting, which was endorsed by 43.9 % of subjects, followed by at school, where 35.6 % of participants reported

experiencing discrimination. The least endorsed domains were getting credit or loans (2.2 %), getting housing (3.3 %), and getting medical care (4.3 %). Demographically, Blacks reported significantly higher levels of racial discrimination than groups in the “Other” category (mean difference = 0.67, 95 % CI = 0.18–1.17) and age was positively related to degree of racial discrimination ($r = 0.08, p < 0.05$) with older participants reporting more discriminatory experiences. Self-reported experiences of racial discrimination were also significantly related to anxiety ($r = 0.15, p < 0.001$) and depression ($r = 0.18, p < 0.001$) symptoms.

Table 3 Spearman's rho correlation coefficients for APPS and APPS-distress continuous measure scores with clinical symptom measures, measures of discrimination, age, and income

	Discrimination domains**	Discrimination frequency**	Anxiety**	Depression**	Age	Income
APPS	0.242	0.249	0.474	0.453	-0.157**	-0.055
APPS subdomains unusual thinking	0.197	0.204	0.440	0.417	-0.145**	-0.062
Cognitive disorganization	0.229	0.234	0.466	0.434	-0.133*	-0.052
Perceptual abnormalities	0.199	0.196	0.330	0.294	-0.107*	-0.040
Paranoia/suspiciousness	0.204	0.210	0.368	0.399	-0.139**	-0.025
APPS-distress	0.207	0.220	0.534	0.549	-0.114*	-0.057
APPS-distress subdomains unusual thinking	0.148	0.161	0.463	0.463	-0.068	-0.045
Cognitive disorganization	0.184	0.192	0.467	0.465	-0.080 ⁺	-0.048
Perceptual abnormalities	0.198	0.198	0.365	0.360	-0.063	-0.076
Paranoia/suspiciousness	0.157	0.178	0.398	0.468	-0.097 ⁺	-0.047

APPS-distress = scale of the total number of distressing attenuated positive psychotic symptoms

⁺ $p < 0.05$; * $p < 0.01$; ** $p < 0.001$ (two-tailed)

Bivariate relationships between main study variables

The hypothesis that racial discrimination would be positively related to APPS total and subdomain scores was supported (Table 3). Increasing domains and greater frequency of racially discriminating experiences were both related to increasing numbers of total APPS and APPS across all four subdomains (i.e., cognitive disorganization, unusual thinking, altered perceptions, and paranoia/suspiciousness). This same pattern of association emerged for racial discrimination and APPS-distress, with distressing subdomains of APPS (Table 2).

The hypothesis that racial discrimination would be greater in the group with high levels of APPS-distress was also supported (Table 2). Tukey's post hoc test revealed that there were significant differences in racial discrimination between the high and low APPS-distress groups (mean difference = -0.80, 95 % CI -1.18 to -0.41, $p < 0.0001$), but not between the medium group and the two other groups. Figure 1 displays the percent of participants who endorsed each of the nine domains of racial discrimination by high and low APPS-distress levels. High and low APPS-distress levels were significantly different within the following four discriminatory domains: in the street or in public [$\chi^2(1, 569) = 12.08, p < 0.001$], getting service in a restaurant [$\chi^2(1, 568) = 10.18, p < 0.01$], getting housing [$\chi^2(1, 565) = 11.45, p < 0.01$], and getting hired or getting a job [$\chi^2(1, 568) = 13.35, p < 0.01$]. The high APPS-distress category individuals had significantly higher mean scores on the anxiety (5.1 unit mean difference) and depression (6.1 unit mean difference) symptom scales compared to the low APPS-distress category.

Linear regression (APPS) and logistic regression (APPS-distress high vs. low level)

The hypothesis that racial discrimination would be associated with APPS in regression analyses adjusted for depression and anxiety symptoms was supported (Table 4). Specifically, the more domains in which respondents reported experiencing discrimination, the greater the number of APPS endorsed, and this relation remained significant in models adjusting for age, race/ethnicity, income, and anxiety and depression symptoms (see Table 4).

Results from binary logistic regression analyses comparing high vs. low APPS-distress levels are also presented in Table 4. Self-reported experiences of racial discrimination were associated with increased odds of being in the high APPS-distress level category compared to the low APPS-distress level in adjusted analyses. Depression and anxiety scale scores were significant contributors to the likelihood of high APPS-distress level endorsement, but the odds ratio [OR = 1.29 (1.10, 1.51)] for racial discrimination remained significant in that adjusted model.

Discussion

The present study is the first conducted in the US to demonstrate a relationship between self-reported experiences of racial discrimination and APPS and high levels of APPS-distress in a non-treatment-seeking, multi-ethnic sample. Further, the associations remain after controlling for generalized anxiety and depressive symptoms, suggesting that our results account for variance that is not

Fig. 1 Proportion of high and low APPS-distress endorsers reporting discrimination by discrimination domain

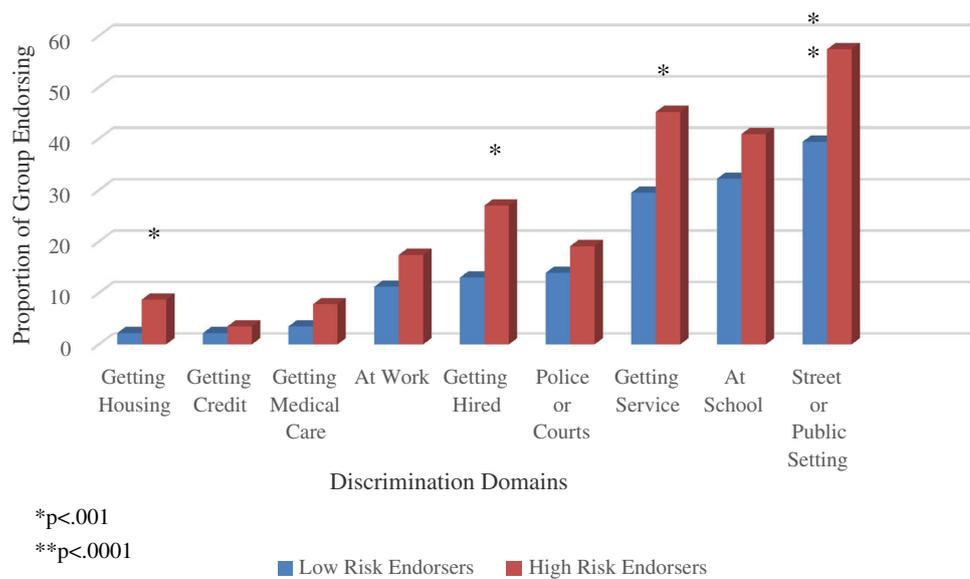


Table 4 Logistic regression predicting high endorsement status and linear regression of APPS dimensional scale

	High vs. low APPS-distress <i>N</i> = 569	APPS dimensional <i>N</i> = 644	
	OR (95 % CI)	<i>b</i> (se)	<i>B</i>
Discrimination	1.41 (1.23, 1.60)	1.218 (.193)	0.25
Race			
Asian vs. Black	1.01 (0.58, 1.76)	-0.337 (0.79)	-0.02
Hispanic vs. Black	0.99 (0.56, 1.78)	-0.631 (0.82)	-0.04
Other vs. Black	1.04 (0.53, 2.04)	-0.332 (0.93)	-0.02
Gender	1.07 (0.64, 1.58)	0.600 (0.639)	0.04
Age	0.92 (0.82, 1.02)	-0.599 (0.15)	-0.16
Income	0.82 (0.66, 1.03)	-0.569 (0.31)	-0.07
Discrimination ^a	1.29 (1.10, 1.51)	0.674 (0.17)	0.14
Anxiety Scale	1.29 (1.18, 1.40)	0.598 (0.09)	0.31
Depression Scale	1.18 (1.10, 1.25)	0.378 (0.07)	0.24

^a Adjusted for race/ethnicity, gender, age, and income. Bold indicates significant ORs or beta coefficients at *p* < 0.001

captured by general mood and anxiety symptoms associated with APPS and discrimination. The present study also found that self-reported experiences of racial discrimination was not specific to any domain of APPS, but rather was associated with all examined categories, including cognitive disorganization, unusual thinking, perceptual abnormalities, and paranoia/suspiciousness. The present results are consistent with much of the literature conducted in the UK and Netherlands that find racial discrimination is higher among ethnic minority individuals in the community who report psychotic symptoms [24, 28]. The present study extends this work by demonstrating racial

discrimination’s contribution to APPS and high APPS-distress level, as well as the finding that perceived racial discrimination is not restricted to increases in just paranoia, but is associated with all domains of APPS. The latter is important because of concerns that “cultural mistrust” [65], a construct discussed largely in relation to African Americans who may approach interracial encounters with normative caution due to a unique legacy of oppression, tends to be more strongly related to the milder end of the paranoia continuum than the pathological end [66].

A high proportion (70 %) of our sample reported racial discrimination, and the most commonly and frequently reported occurred on the street in a public setting, in obtaining service, and at school. Similarly, using the same discrimination measure in the present study, Krieger et al. [55] found that 66.7 % of their Black subsample reported racial discrimination in at least one domain suggesting that even though our population was generally younger than the norming sample population, reported levels of discrimination were comparable. Those reporting high APPS-distress were more likely than low endorsers to report experiences of racial discrimination in all domains; but the domains that were statistically different were: on the street in a public setting, in obtaining service, getting housing, and in getting hired for a job. These types of situations are central to an individual’s livelihood and sense of safety and security. It is possible that experiencing unfair treatment within these areas because of race can create stress responses that have enduring effects. Experiencing discriminatory treatment in public could also feel humiliating and degrading. Repeated discriminatory encounters of these varieties could lead to a chronic sense of feeling socially defeated; a feeling that has been implicated in psychosis [67]. Specifically, Selten and Cantor-Graae [67]

proposed that the chronic experience of social defeat, defined as assuming “a subordinate position or ‘outsider status’ (p. 101) could be a risk factor for developing schizophrenia. They cite a series of animal experiments whereby exposure to social defeat stress leads to chronic dopaminergic hyperactivity in the mesocorticolimbic system, which if paralleled in humans could enhance the risk of psychotic phenomenology. Future studies should examine possible mediators of the relation between racial discrimination and APPS such as social defeat and perceived stress.

It is also possible that persons endorsing racial discrimination in the present study experienced the type of aversive racism discussed by Dovidio and colleagues [38]. Specifically, they have demonstrated that racial biases tend to be relayed implicitly to ethnic minority recipients (e.g., non-verbal behavior, tone) and that the combination of high implicit racial bias coupled with low explicit racial bias creates a “mixed message” in intergroup interactions that may be confusing to ethnic minority recipients. Repeated contradictory encounters of this nature could wear on the security and confidence in one’s perceptions and sensibilities, as racism characterized by this “mixed message” is more likely to engender mistrust and self-doubt [68]. Future studies can examine the degree to which persons who self-report experiences of racial discrimination associated with APPS experienced this “mixed message.”

Due to the cross-sectional nature of these data, it is also plausible that individuals who endorsed a high number of APPS-distress (e.g., suspiciousness, odd thinking) could be more likely to behave in ways that increase their probability of being judged and treated unfairly. In previous experimental vignette studies conducted in the population used in the present study, results indicated that reading vignettes that included subtle signs of psychosis led to responses from study participants that were stigmatizing, even when there was no label provided for the vignettes [69–71]. While the proportion of those at risk for psychosis in our population was likely fairly low, those in the APPS-distress group were endorsing a number of psychological symptoms and some findings suggest college students with severe mental disorders were treated differently by their peers because of their mental disorders [72]. Our discrimination measure did not directly assess discrimination due to visible signs of mental illness, which is an aspect of discrimination that should be explicitly assessed in future studies.

Participants with high APPS-distress levels as well as increasing numbers of APPS in general were also more likely to report clinically significant depressive symptoms and high anxiety symptoms; the latter is commonly exhibited during the prodromal and prodromal periods of psychosis [48, 73, 74], with 30–40 % of individuals in the

prodrome diagnosed with a comorbid anxiety disorder or an elevated number of anxiety symptoms [49, 75]. This speaks to the interdependence of these symptoms which makes it difficult to truly parse apart positive symptom endorsement from depression and anxiety symptoms. Even though we are not able to definitely indicate whether this group of high endorsers in the present study is at clinical high risk for psychosis, they are experiencing a number of clinically meaningful psychological symptoms, which is further evidenced by these individuals being significantly more likely than low APPS-distress endorsers to have sought or received counseling services (Table 1).

Limitations and conclusions

The present study must be considered with some limitations in mind. Even though more comprehensive diagnostic assessments would have enhanced the clinical understanding of the high APPS-distress level group, the present study comprises an important initial step in establishing associations between discrimination and the greater psychosis phenotype in the US. Our supported hypotheses suggest examining possible mediating factors for racial discrimination’s association with APPS will enhance the degree to which underlying psychological processes are identified (e.g., aversive racism and social defeat). Relatedly, even though cultural mistrust likely does not fully explain racial discrimination’s association with APPS across all the assessed subdomains (e.g., given that findings were not restricted to potentially related areas, such as suspiciousness), future studies should explicitly attempt to parse out the variance of culturally appropriate expressions of behavior and thoughts from APPS, such as cultural mistrust.

Even though the present study makes use of a college sample, which is inherently subject to selection biases, the present sample may be less vulnerable to the selection biases characteristic of “traditional” college samples of highly selective and more privileged youth. The public university system population from which the sample was obtained tends to draw immigrant and REM working class youth across the New York State Tri-State area [76]. Further, the sample is somewhat ideal for exploring the proposed associations, as we captured a diverse sample in the most probable developmental period for assessing APPS that may be high risk, while averting the confounds of clinical populations (e.g., confounds associated with the clinician’s illusion [77]). That said, our sample was still a non-random sample of self-selected participants, and it is possible that these individuals were attracted to the title of the study, “Social Stressors and Unusual Experiences,” for unmeasured reasons.

A significantly higher proportion of the present college sample (18 %) endorsed 8+ APPS as distressing compared to Loewy et al. [53] undergraduate sample (2 %). This discrepancy in the proportion of high PQ scorers may be predominantly accounted for by differences in demographic characteristics between the two samples, particularly, oversampling of varied racial and ethnic minorities in the current sample and having a sample with lower socioeconomic status compared to the Loewy study. Still, our percentages suggest the likelihood that the high PQ group represents a high number of individuals who are not at risk for psychosis. Most importantly, the high PQ endorsement group may actually represent individuals who could be at risk for other psychological problems that do not result in a psychotic disorder, but include APPS as possible sequelae to the disorder profile. Nonetheless, the findings may have relevance to the phenomenology of the psychotic spectrum, as the high-APPS level group experienced a number of clinically-meaningful psychological symptoms and risk of conversion after 1 year has been found to be 3.5 times higher in those who experience APPS in general, non-help-seeking populations [78]. The present study represents a development in the controversial discussion of ethnicity and psychosis in the US. Regardless of diagnosis, researchers and clinicians need a better understanding of the scope of APPS in REM populations.

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Conflict of interest On behalf of all authors, the corresponding author states no conflicts of interest exist.

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