



The relationship between racial discrimination and substance use: Does locus of control help explain risk?

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ABSTRACT

Introduction: Exposure to racial discrimination has been consistently linked with risk for substance use. However, outside of externalizing and affect-based factors, few other mechanisms have been examined. One potential candidate is locus of control, a learning processes that involves the degree to which one attributes rewards as resulting from their own control (internal locus of control) versus outside control (external locus of control). There is evidence that exposure to stressors is associated with locus of control, with a separate body of literature linking locus of control with substance use. Thus, it is plausible that locus of control may be a mechanism underlying the relationship between racial discrimination and substance use.

Methods: The current study investigated this pathway among 503 racial/ethnic minority adults aged 18–35 who completed an online questionnaire including measures on racial discrimination related stress, locus of control, and substance use.

Results: Results indicated a significant indirect effect between racial discrimination related stress, two external domains of locus of control (i.e., powerful others and chance), and substance use. A significant indirect effect was not found for internal locus of control.

Conclusion: These findings expand our understanding on potential mechanisms that underlie the racial discrimination-substance use risk pathway among racial/ethnic minority adults, which may in turn provide important targets for substance use intervention programming.

1. Introduction

Racial discrimination has been identified as an important stressor and risk factor for numerous negative health outcomes among minority populations, including risk for anxiety and depression, along with physiological structural and functional changes impacting illness onset, progression and severity (Williams & Mohammed, 2009; Boynton et al., 2014; Haller & Chassin, 2014). Of note, one behavioral health outcome that has also garnered attention is the association between racial discrimination and substance use (Pascoe & Smart Richman, 2009; Ouimette et al., 2010; Rodriguez-Seijas et al., 2015). A direct effect of racial discrimination on substance use has been established through longitudinal designs suggesting that substance use may be a coping behavior in response to the discrimination exposure (Gibbons et al., 2012; Steele, 2016; Carter et al., 2019). Therefore, researchers have turned to examining underlying mechanisms that help explain this relationship, with evidence to suggest an indirect effect of racial

discrimination through externalizing factors, such as impulsivity (Rodriguez-Seijas et al., 2015) and internalizing factors, such as depressive symptoms (Benner et al., 2018; Sanders-Phillips et al., 2014; Zapolski et al., 2016). However, few studies have examined other potential mechanisms within the risk pathway between racial discrimination and substance use.

1.1. Locus of control

One potential candidate is locus of control, first conceptualized by Rotter (1966) as a learning process that involves the degree to which an individual attributes rewards as resulting from their own control (internal locus of control) versus outside control, such as based on luck, fate, other people, or unknown factors (external locus of control). Lefcourt (1976) further noted that within this conceptualization, locus of control was thought to be a unidimensional trait, with an individual having either a relatively internal or external locus of control. However,

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research has suggested that locus of control is multidimensional, and that internal and external locus of control should be measured separately (Reid & Ware, 1974). In turn, Levenson (1973) created a measure for locus of control that consists of three domains; one internal domain for individuals who attribute control to themselves, and two external domains for individuals who attribute control to others perceived as more powerful and chance or fate (referred to as powerful others and chance locus of control). Yet, it is important to note that much of the research examining external locus of control has used a combined higher-order factor rather than examining associations based on the separate external locus of control domains (Trevino & Ernst, 2012; Ryon & Gleason, 2014; Omani Samani et al., 2017).

1.2. Racial discrimination and locus of control

Although some researchers have conceptualized locus of control to be a stable trait (e.g., Lefcourt, 1976), other researchers have also suggested that locus of control can exhibit state-like characteristics, depending on context (Keeton et al., 2008). Several studies have in turn documented the effect of general stress exposure, such as number of daily hassles, on levels of locus of control (Ryon & Gleason, 2014) as well as the impact of more targeted stressors, such as discrimination (Ruggiero & Taylor, 1997). For example, research has found associations between experiencing racial discrimination and reporting higher levels of external locus of control (Broman et al., 2000; Moradi & Hasan, 2004; Moradi & Risco, 2006; Trevino & Ernst, 2012). However, this work is limited, with much of the existing research solely examining the relationship between racial discrimination and external locus of control, therefore additional research is needed particularly examining the association between racial discrimination and internal locus of control, as well as examination of the two separate external locus of control domains (i.e., powerful others and chance) versus a global externalizing orientation.

1.3. Locus of control and health outcomes

In addition to the effect of stressors on locus of control, locus of control has also been shown to have an independent and direct effect on health outcomes, and generally, internal locus of control has been associated with better health outcomes, such as lower risk for depressive symptoms compared to external (Gale et al., 2008; Omani Samani et al., 2017). Locus of control is also associated with behavioral outcomes, such as substance use and related problems, which are more prevalent among those with high external locus of control (Haynes & Ayliffe, 1991; Soravia et al., 2015) and low internal locus of control (Sheffer et al., 2012). On the other hand, greater internal locus of control has been negatively associated with intent to use substances among adolescents (Coman et al., 2014) and has been positively associated with more time abstaining from alcohol use (Blagojević-Damašek et al., 2012). Yet, it should be noted that although internal locus of control has been suggested to be a protective factor against risk for substance use, there are some studies who have found contradictory evidence with internal locus of control associated with greater substance use risk (Goss & Morosko, 1970; Ersche et al., 2012). It is postulated that this contradictory finding may be due to individuals with high internal locus of control believing that they have more control over their use, preventing them from seeking help (Conell-Price & Jamison, 2015). However, more research is warranted.

1.4. Current study

Given evidence of an association between locus of control and racial discrimination and substance use, it is plausible that locus of control may be an important mechanism within the relationship between racial discrimination and substance use among racial/ethnic minority adults. However, to date, no known study has examined this specific indirect

pathway. The current study aimed to examine the indirect effect of racial discrimination related stress through internal and external locus of control on substance use. We will examine two separate domains of external locus of control, powerful others and chance. Specifically, we hypothesize that stress related to racial discrimination will also be associated with lower levels of internal locus of control which will be associated with more substance use. Additionally, we hypothesize that stress related to racial discrimination will be associated with higher levels of both domains of external locus of control (i.e., powerful others and chance) which will be associated with more substance use. These findings extend our understanding of locus of control and how specific control beliefs may be associated with experiencing racial discrimination and substance use. Particularly, it may be important to separate the external domains to have a better understanding on how each type of cognition is related to substance use as a consequence of racial discrimination related stress. If hypotheses are confirmed in that each type of locus of control is related to racial discrimination stress and substance use, this can provide support for examining these pathways within longitudinal designs and signal to the potential importance of including perceived lack of control within substance use interventions for racial/ethnic minority adults.

2. Material and methods

2.1. Participants and setting

Participants were recruited using two methods: (1) 302 participants were drawn from a parent study examining stress and health outcomes among adults, in which an online survey was administered to students in an introductory to psychology course at a large midwestern university during Fall 2018 through Spring 2020; (2) 373 participants were recruited through Amazon Mechanical Turk (MTurk), comparable to other routes of online recruitment (Buhrmester et al., 2016). Participants were eligible to participate in the study if they were between the ages 18–35, able to read in English, and self-identified as belonging to at least one or more of the racial/ethnic minority categories.

A total of 675 individuals participated in the current study, however 168 participants were removed from analyses due to missing data on variables of interest (99 participants did answer any items), and 6 participants were removed from analysis due to low numbers of individuals who selected gender categories other than male or female (2 transgender male, and 4 selected other) bringing the final sample size to 501 (see Fig. 1). The majority of participants identified as African American/Black (41.4%), non-Hispanic (76.5%), female, (59.2%), enrolled in college (63.4%), resided in Indiana (51.7%), and the average age was 23.76 (SD = 5.78). See Table 1 for final sample demographics.

2.2. Procedures

After obtaining IRB approval, participants completed an online questionnaire aimed at examining various health, behavioral, and trauma-related variables among adults aged 18–35. Participants provided informed consent through Qualtrics after reviewing the study information sheet and were only provided access to the survey/questionnaire if they provided informed consent. The study took approximately 45 min to complete. Participants recruited through the introductory psychology course received course credit for completing the study, while participants recruited through MTurk were compensated with \$2.50 through their MTurk account.

2.3. Measures

Demographics. Participants were asked to describe their age, gender, current college enrollment status, state of residence, and race/ethnicity. Participants were allowed to indicate more than one racial category, with only participants who identified as belonging to at least one racial/

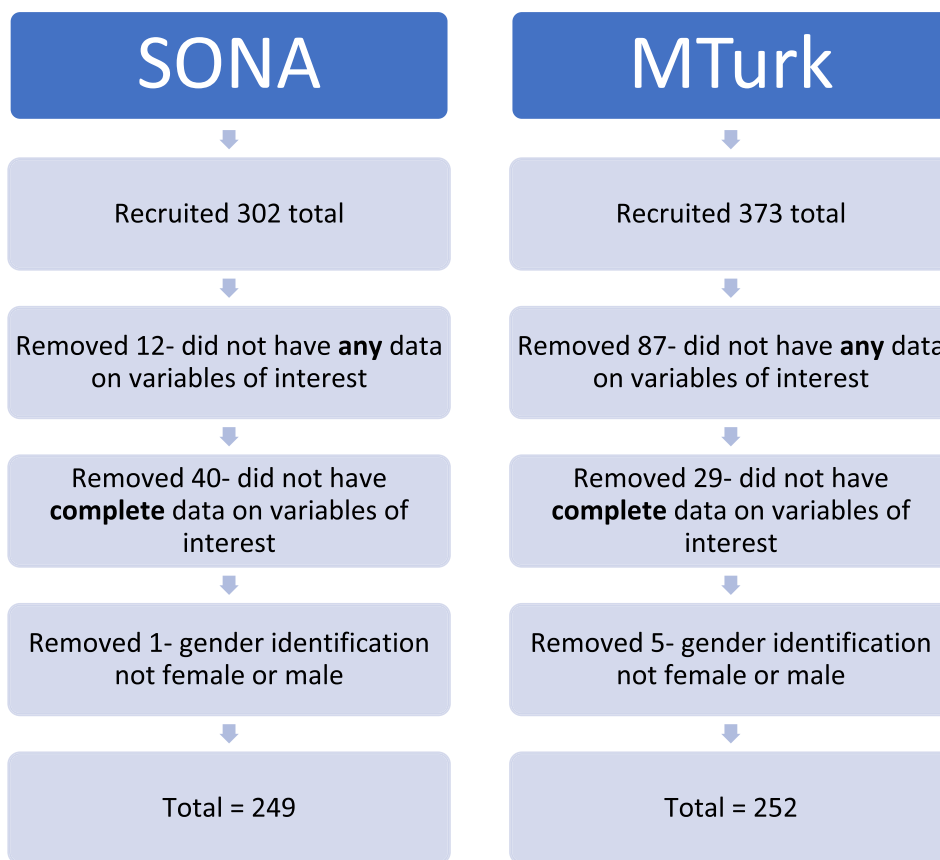


Fig. 1. Final Sample Flow Chart.

Table 1
Sample Demographic.

Demographics	Final Sample (N = 501)	Removed Sample (N = 69)
Age	(M = 23.75; SD = 5.79)	(M = 24.49; SD = 6.15)
Gender		
Female	298 (59.5%)	29 (42%)
Male	203 (40.5%)	40 (58%)
Race/Ethnicity		
Hispanic/Latino	105 (23.3%)	11 (15.9%)
African American/Black	143 (41.4%)	32 (46.4%)
Asian American/Pacific Islander	124 (35.9%)	10 (14.5%)
Biracial/Multiracial	56 (16.2%)	12 (17.4%)
Other	15 (4.3%)	1 (1.4%)
Native American, Eskimo/Alaskan	7 (2.0%)	3 (4.3%)
Enrolled in College	319 (63.7%)	53 (76.8%)
Resides in Indiana	260 (51.8%)	40 (58%)

ethnic minority category being included in the current study. Additionally, any participant who identified with more than one racial group were placed in the biracial/multiracial category.

Racial Discrimination. The Index of Race-Related Stress-Brief Version (IRRS-B; Utsey, 1999) was used to measure the multidimensional experience of racial discrimination, focusing on race-related stress experienced in daily life. The IRRS-B is a self-report measure that includes 22 items scored on a Likert scale ranging from 0 (*this has never happened to me*), 1 (*event happened but did not bother me*), 2 (*event happened and I was slightly upset*), 3 (*event happened and I was upset*), to 4

(*event happened and I was extremely upset*). For the current study the total global score was used to measure racial discrimination related stress, with higher scores indicating greater frequency of stress. Internal consistency was high (Cronbach’s alpha = 0.942).

Locus of Control. Locus of control was measured using the Internality, Powerful Others, and Chance scales (IPC; Levenson, 1972). The IPC is a 24-item multidimensional instrument comprised of three subscales: internal, and external measured by the powerful others and chance subscales. The internality subscale measures the extent to which an individual believes reinforcements are contingent on their own behaviors. Conversely, the powerful others subscale measures the extent to which a participant believes that reinforcements are attributed to those who they perceive as more powerful, while the chance subscale measures beliefs attributing reinforcements to other forces such as chance, luck, fate. Each subscale includes 8 items scored on a 6-point Likert scale from 1 (*strongly disagree*) to 6 (*strongly agree*). A high score on each subscale indicates beliefs of control by the source of each subscale and does not necessarily indicate a low score on another (Chaturvedi, 2015). The current study showed acceptable internal consistency in the internality subscale (Cronbach’s alpha = 0.756), and good internal consistency in the powerful others (Cronbach’s alpha = 0.858) and chance (Cronbach’s alpha = 0.850) subscales.

Substance Use. The first item from the Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993; “How often do you have a drink containing alcohol?”) and the first item of the Drug Use Disorders Identification Test (DUDIT; Berman et al., 2002; “How often do you use drugs other than alcohol?”) were totaled to obtain a composite substance use score. Items are rated on a Likert-type scale with 0 (*never*), 1 (*monthly or less*), 2 (*two to four times a month*), 3 (*two to three times a week*), and 4 (*four or more times a week*).

Attention Check. To ensure participants’ attentiveness while completing the survey through MTurk recruitment, the survey was

restricted to MTurk users with high approval rates (HITS of 95%; Buchheit et al., 2018), ReCAPTCHA cut-off scores of 0.5 (Von Ahn et al., 2008), and a comprehension question, “What do you call a student in their third year of high school”, and only accepted “junior” to ensure a more reliable data set (Hauser et al., 2018).

2.4. Data analysis & considerations

To create the final data set of 501, only participants with complete data were included. Data from the 69 removed participants were comparable to our final study sample (see Table 2 for comparisons). Prior to analyzing the study aims, the skewness (Hair et al., 2016) and kurtosis were examined (Field, 2009) and were within normal limits. Assumptions of normality for mediation analyses were met. To test for common method effects underlying the results, the Harman’s Single-Factor test was run and indicated no issues. The total variance extracted by one factor was at 25.61 percent, which is less than the threshold of 50 percent (Podsakoff et al., 2012). Lastly, multicollinearity was checked, and all predictor variables showed low multicollinearity (Senaviratna & Cooray, 2019). All analyses were performed using SPSS 27.0. Bivariate correlations were used to examine the relationship between racial discrimination related stress, each locus of control domain, and substance use, as well as age, gender, and recruitment source. Although not the aim of this study, age (Newton-Howes et al., 2019) and gender (O’Malley & Johnston, 2002) were added as covariates to control for their unique and combined contribution to substance use, and recruitment source was also added as a covariate post hoc, as it was plausible that variability on study variables may have been impacted based on the recruitment source.

Analyses of indirect effects were completed using the PROCESS macro (Hayes, 2013) to explore the relationship between racial discrimination related stress and substance use through each locus of control subscale (simple parallel mediation: Model 4 specified by Hayes, 2013) to look at competing pathways between internal and external locus of control. Although the term mediation is used for these analyses, given the cross-sectional nature of the data, temporal order could not be explicitly examined. However, Model 4 provides indirect effects, consistent with mediation analysis (Preacher & Hayes, 2004). The PROCESS macro estimates the total and direct effect of the independent variable on the dependent variable and the indirect effect of the independent variable through the mediator(s). To better ensure the parameters of the results, bootstrapping tests were administered, using 10,000 bootstrap samples.

3. Results

3.1. Preliminary findings

A majority of participants reported past year alcohol use (55%) with over one-quarter reporting past month alcohol use. Moreover, approximately one-quarter of participants reported past year drug use, with fewer reporting past month drug use (13%). For further breakdown of substance use among the sample, see Table 3.

Table 2 Mean Values of Study Variables.

	Final sample			Removed sample					
	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>t</i>	<i>df</i>	<i>p</i>
Racial discrimination	52.99	21.68	501	62.57	26.09	42	2.307	541	0.026*
Internal locus of control	31.80	7.60	501	31.93	8.88	42	0.109	541	0.913
Powerful others locus of control	22.48	10.07	501	24.63	12.82	41	1.041	540	0.304
Chance locus of control	22.83	10.04	501	24.27	12.09	48	0.962	547	0.337
Substance use	1.40	1.63	501	1.96	1.87	50	2.283	549	0.023*

Note: * indicates *t*-test value < 0.05 between final sample and removed sample.

Table 3 Substance Use Descriptives.

Frequency of Use	Alcohol	Drugs
Past year use	275 (54.9%)	125 (25%)
Past month use	132 (26.3%)	67 (13.4%)
2–4 times a month	83 (16.6%)	34 (6.8%)
2–3 times a week	49 (9.8%)	14 (2.8%)
4 or more times a week	11 (2.2%)	10 (2%)

Note: N = 501.

Bivariate correlations with listwise deletion were used to examine the relationship between racial discrimination related stress, locus of control (internal, chance, powerful others), substance use, and covariates (i.e., age, gender, and recruitment source). Stress related to racial discrimination was positively associated with substance use (*r* = 0.170, *p* < .001). Stress related to racial discrimination was also positively associated with powerful others locus of control.

(*r* = 0.158, *p* < .001) chance locus of control (*r* = 0.125, *p* < .01), but not with internal locus of control (*r* = 0.012, *ns*). Substance use was positively associated with powerful others (*r* = 0.175, *p* < .001) and chance locus of control (*r* = 0.207, *p* < .001). See Table 4 for more details.

3.2. Simple Parallel mediations

Parallel mediation models included age, gender, and recruitment source as covariates. A significant indirect effect (i.e., the 95% confidence interval crossed zero) was not found for the pathway of racial discrimination related stress on substance use via internal locus of control (effect = 0.0000; 95% CI: [-0.0004, 0.0004]), however, a significant effect was found for racial discrimination related stress on substance use via powerful others locus of control (effect = 0.0010; 95% CI: [0.0000, 0.0024]). See Fig. 2 for more details.

When running the same simple mediation model for chance locus of control, a significant indirect effect (i.e., the 95% confidence interval did not cross zero) was observed for the effect of stress related to racial discrimination on substance use via chance locus of control (effect = 0.0013; 95% CI: [0.0002, 0.0028]), but not for internal locus of control. See Fig. 3 for more details.

4. Discussion

This current study aimed to examine whether locus of control may be an underlying mechanism to explain the relationship between stress related to racial discrimination and substance use among racial and ethnic minority adults. Specifically, we examined the indirect effect of locus of control domains (i.e., internal, powerful others, and chance) on the pathway between stress related to racial discrimination and substance use, while controlling for age, gender, and recruitment source. Contrary to our hypothesis and the limited literature (Blagojević-Damašek et al., 2012; Coman et al., 2014; Ruggiero & Taylor, 1997), no relationship was found for internal locus of control, in that it was not significantly related to either stress related to racial discrimination or

Table 4
Correlation Coefficient Matrix.

	Age	Gender	Recruit	RD	Internal	PO	Chance	SU
Age	—							
Gender		−0.32**						
Recruitment Source			0.81**	0.08	0.17**	0.24**	0.19**	0.23**
Racial Discrimination			−0.26**	0.03	−0.06	−0.20**	−0.17**	−0.14**
Internal Locus of Control			—	0.05	0.16**	0.28**	0.20**	0.24**
Powerful Others Locus of Control				—	0.01	0.16**	0.13**	0.17**
Chance Locus of Control					—	0.27**	0.27**	0.05
Substance Use							0.82**	0.18**
							—	0.21**

Note: N = 501. Gender: male = 0, female = 1. Recruitment Source: SONA = 0, MTurk = 1.
*p < .05; **p < .01.

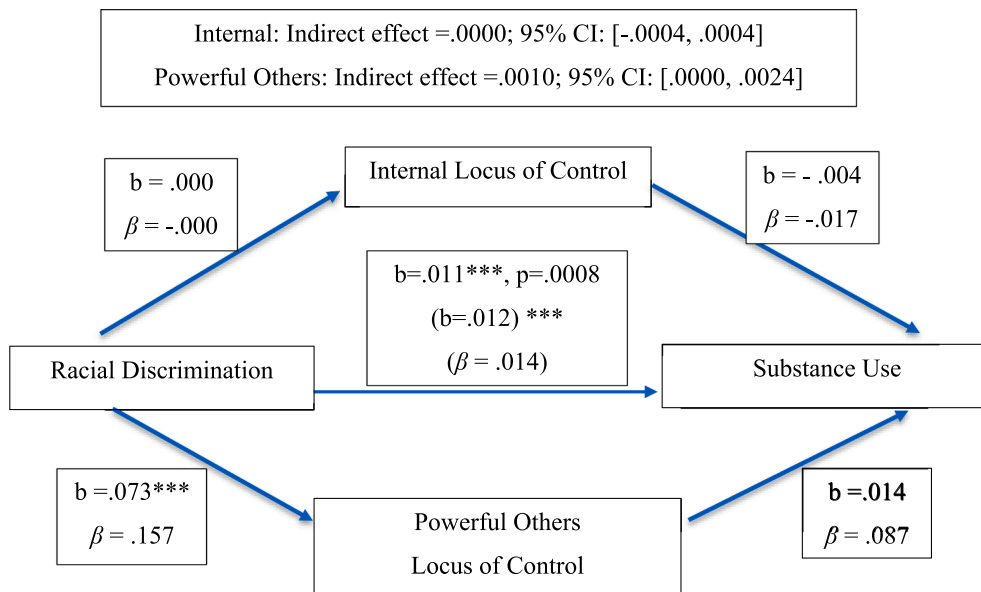


Fig. 2. Internal and Powerful Others Simple Parallel Mediation Model. Note: The figure above is a mediational model testing the indirect effect of stress related to racial discrimination on substance use through internal and powerful others locus of control controlling for age, gender, and recruitment source. The total effect of stress related to racial discrimination on substance use is shown in parenthesis, and the direct effect (i.e., the effect of racial discrimination related stress controlling for internal locus of control, powerful others, age, gender, and recruitment source) is shown without parenthesis. b = the unstandardized regression coefficient. β = standardized regression coefficient. + = $p < .1$ * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

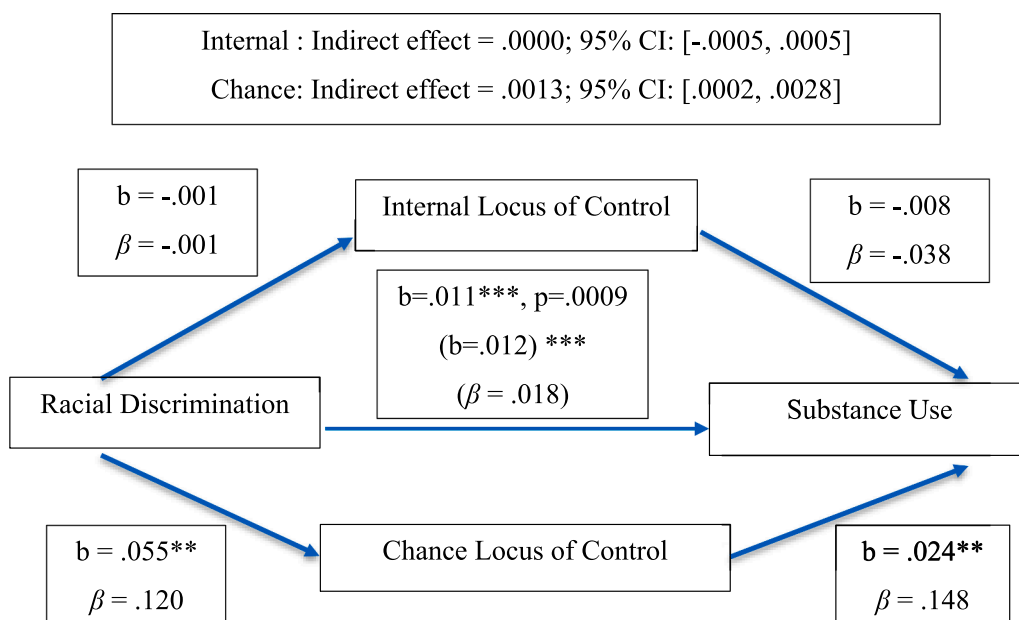


Fig. 3. Internal and Chance Simple Parallel Mediation Model. Note: The figure above is a mediational model testing the indirect effect of stress related to racial discrimination on substance use through internal and chance locus of control, controlling for age, gender, and recruitment source. The total effect of stress related to racial discrimination on substance use is shown in parenthesis, and the direct effect (i.e., the effect of racial discrimination related stress controlling for internal locus of control, chance locus of control, age, gender, and recruitment source) is shown without parenthesis. b = the unstandardized regression coefficient. β = standardized regression coefficient. + = $p < .1$ * = $p < .05$, ** = $p < .01$, *** = $p < .001$.

substance use. This contradictory finding may be due to the type of stressor examined in this study, as previous literature has mainly focused on general stressors (Ryon et al., 2014) or non-race specific

discrimination (Ruggiero & Taylor, 1997), as well as only including African American/Black samples (Broman, et al., 2000; Gibbons et al., 2010). Thus, it is plausible that internal locus of control may have varied

relationships with different types of stressors and varies across race/ethnicity.

For our external locus of control variables, we did find that stress related to racial discrimination was significantly associated with higher powerful others and chance locus of control, making the case that stress related to racial discrimination relates to external rather than internal locus of control. Moreover, a significant indirect effect was observed between stress related to racial discrimination, the external locus of control domains and problem substance use. Thus, stress related to racial discrimination may result in higher beliefs that events in one's life are attributed to outside sources including other powerful people or by chance, which may then increase risk for substance use. These results highlight the need to examine each external locus of control domain, given that some research has theorized that powerful others may be more salient for racial/ethnic minority adults (Garcia & Levenson, 1975), as living in a racialized society can affect one's sense of agency and control (Broman et al., 2000). Our findings indicate that although powerful others beliefs are significant, chance should also be examined and not discounted, as it is plausible that chance beliefs may also explain the relationship between stress related to racial discrimination and substance use. The reasons for the effect of chance locus of control is unclear, as previous research is limited and has not consistently examined external locus of control at the domain level. It may be that chance beliefs, such as events in life being complex and chaotic and out of one's hands, may be distressing, resulting in substance use to cope with the distress (Clark, Anderson, Clark, & Williams, 1999). Therefore, future work is warranted to confirm these findings through the utilization of longitudinal study designs, and build from this work by focusing efforts on external locus of control domains and how they may relate differently to variables of interest.

Although this study is novel, there are some limitations to be noted. First, more than half of data for the current study was obtained from a college sample (63.4%), predominantly in the Midwest (51.7%), limiting the generalizability of its findings. Second, our sample consists of primarily African American/Black, Hispanic/Latino, and those identifying with female or male gender categories, limiting the generalizability of our findings. Future research should examine these models among different racial/ethnic minority categories, gender diverse samples, and other sample characteristics.

Future studies can also expand on the current study by using other scales measuring locus of control that may provide useful information. For example, there are measures for locus of control scales that assess perceived control in specific domains such as the Academic Locus of Control for College Students revised (ALC-R; Curtis & Trice, 2013) and the Multidimensional Health Locus of Control scale (MHLC; Wallston et al., 1978). Other specific measures of locus of control may provide additional insight into the influence of locus of control on risk models of racial discrimination on health outcomes among racial/ethnic minority adults. Lastly, research has found that locus of control has enduring and malleable elements (Keeton et al., 2008), therefore, one-time measures of locus of control may not necessarily be measuring the person's general enduring locus of control. Thus, future studies can build from the current work by obtaining multiple assessments of locus of control to examine temporal ordering through prospective designs. However, a cross-sectional design is a necessary first step for a program of research on the relationship between racial discrimination on substance use through locus of control.

4.1. Conclusions

Taken together, our findings can inform future research by further examining the effect of locus of control in understanding risk for substance use and other health outcomes among racial/ethnic minority adults. Although we expected to see effects for all three locus of control domains, effects were only observed for the external domains. Our findings suggest further examination of external locus of control,

especially at the subscale level, in ultimately reducing risk for substance use as a consequence of discrimination exposure among racial/ethnic minority adults.

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CRedit authorship contribution statement

Shirin Khazvand: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. **Tamika C.B. Zapolski:** Conceptualization, Methodology, Writing – review & editing, Supervision. **Melissa A. Cyders:** Conceptualization. **Evava S. Pietri:** Conceptualization.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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