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A structural equation model analysis of perceived control and psychological distress on worry among African American and European American young adults

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ABSTRACT

Perceived control has been identified as an important factor in the development and maintenance of mood disorders, and worry has been shown to have a unique relationship with psychological distress associated with mood disorders. The relationships between these variables have received little attention in the literature, and even less in terms of the role racial status may serve. The current study investigated the structural relationship between psychological distress and perceived control in predicting self-reported worry as well as potential differences in paths to worry in African American and European American young adults using a structural equation model. One hundred twenty-one European American and 100 African American undergraduate students completed the Beck Depression Inventory (BDI), the State Trait Anxiety Inventory (STAI), the Anxiety Control Questionnaire (ACQ), and the Penn State Worry Questionnaire (PSWQ). Results suggest that psychological distress and perceived control predict worry in both the African American and European American samples, however there were significant differences in terms of which construct contributed most. For African Americans, psychological distress contributed significantly more to worry than perceived control, whereas low perceived control contributed more to worry for European Americans. Implications and suggestions for future research are discussed.

The nascent literature supports the dimensional nature of anxiety and mood disorders (e.g., Brown, Chorpita, & Barlow, 1998) with symptoms of psychological distress being implicated in the experience of mood disorders (see Brown et al., 1998; Clark, Watson, & Mineka, 1994). Similarly, low perceptions of control of both internal and external events have been consistently implicated in mood disorders (Chorpita & Barlow, 1998). Perceived control is also related to worry in that the worrier is usually focused on a future potential threat that is uncontrollable by nature (Borkovec, Ray, & Stober, 1998). Other work has suggested that perceived control also has a stronger negative relationship with worry than somatic anxiety (Zebb and Beck, 1998). Further, worry has been correlated with both anxiety and mood disorders and general psychological distress has been associated with worry (Beck et al., 2001). Despite their role in worry, causal links between psychological distress and perceived control over internal and external events are not yet clear. It is also not clear that the relationships among these variables is consistent in ethnically diverse samples as existing literature has relied on primarily European American samples with little information about mood disorders and perceptions of control in African Americans.

The current study investigated the structural relationship between distress and perceived control in predicting self-reported worry as well as potential path differences within African American and European American young adults using a structural equation model.

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1. Mood disorders in African Americans: a known unknown

To date, the literature on mood disorders relies on predominantly European American samples and the status of mood disorders in African American samples remains relatively unknown (Last & Perrin, 1993; Neal & Turner, 1991). The ambiguity surrounding the nature of these disorders in African Americans continues to be well documented in both the anxiety and depression literature (see Breslau, Kendler, Su, Gaxlola-Aguilar, & Kessler, 2005; Heurtin-Roberts, Snowden, & Miller, 1997; Horwath, Johnson, & Hornig, 1994; Lewis-Hall, 1994; Neal & Brown, 1994; Neal & Turner, 1991; Smith, Friedman, & Nevid, 1999; US Department of Health & Human Services, 2001; Williams et al., 2007). Although this area remains understudied, available information suggests that African Americans may be at increased risk for certain disorders (e.g., Posttraumatic Stress Disorder, Specific Phobia) and may be less likely to develop others (e.g., Major Depressive Disorder). These findings highlight the need for progression in the literature, especially in consideration of the under-identification, misdiagnosis, and persistence of mood disorders in African Americans (Friedman, Paradis, & Hatch, 1994; Heurtin-Roberts et al., 1997; Horwath et al., 1994; Williams et al., 2007). It is critical to examine the nature of mood disorders in African American samples to determine psychosocial factors related to the onset and manifestations of mood disorders in this population.

2. Perceptions of control and mood disorders

Current conceptual theories of the development and maintenance of mood disorders place particular emphasis on perceived control. Several researchers have proposed that the perception that unpleasant events are unpredictable and uncontrollable is a central feature of anxiety and mood disorders, perhaps accounting for high rates of comorbidity among them (Alloy, Kelly, Mineka, & Clemens, 1990; Barlow, 2002; Mineka, Watson, & Clark, 1998; Zvolensky, Lejuez, & Eifert, 2000). Empirical literature also supports this notion, suggesting that repeated exposure to seemingly random negative events can lead to emotional disturbances in animals and humans (Geer, Davidson, & Gatchel, 1970; Haggard, 1943; Mowrer & Viek, 1948; Neale & Katahn, 1968; Overmier & Seligman, 1967; Pervin, 1963; Staub, Tursky, & Schwartz, 1971; Weiss, 1971a,b). In humans, such experiences may lead to the development of an external locus of control, characterized by a belief that events are random and unrelated to one's own behavior, rather than an internal locus of control in which an individual believes consequences to be a direct result of his or her own behavior (Rotter, 1966). External locus of control beliefs have been correlated with both anxiety and depression in children (Nunn, 1988; McCauley, Mitchell, Burke, & Moss, 1988). Work by Rapee, Craske, Brown, and Barlow (1996) focused on a more specific measure of control beliefs related to threat and one's response to threat and found that this measure was correlated even more strongly with anxiety in adult samples. Thus, it appears that control beliefs may extend to external events as well as internal perceptions such as cognitions, emotional states and sensations of physiological arousal (Barlow, 2002; Rapee et al., 1996).

Although these results have significant implications for mood disorders, the role of perceived control in African American populations suffering from these disorders has not been explored. Furthermore, a closer examination of the ways in which control affects psychopathology is warranted considering the negative sociocultural climate of American society, both past and present. For example, it has been suggested that because of historical and ongoing oppression, discrimination, and prejudice, African Americans may be more likely to internalize feelings of helplessness and an inability to effect change in the environment, thus leading to an increased risk of developing an emotional disorder (Gibbs, 1990; Hammack, 2003) and it has been suggested that children growing up in low socioeconomic status environments may learn to attribute events and behaviors to external rather than internal causes (Wheaton, 1980). Although the latter argument is ostensibly related to low socioeconomic status, it is presumed that the racial discrimination that has historically been endemic to African Americans may heighten the risk for experiencing psychological distress. These considerations underscore the importance of examining the role of control beliefs in African American samples.

3. Worry: a cognitive coping attempt for future events

Worry is characterized as a continuous stream of verbal cognition related to future negative and catastrophic events (Barlow, 2002). Although some level of worry is normal, it frequently warrants clinical attention when it becomes uncontrollable and intrusive. In some ways worry may appear to be an effective coping mechanism, as possible ways of dealing with events are entertained by the worrier and the related unpredictability and uncertainty are diminished; however it is important to note that worry is in fact a failed coping attempt because no strategy is identified or employed by the worrier (Barlow, 2002). Further, because it gives the illusion of problem solving to the worrier while simultaneously allowing avoidance of deeper processing of negative emotions, this ineffective coping method is negatively reinforced and thus repeated (Borkovec, Shadick, & Hopkins, 1991; Borkovec et al., 1998; Craske, 1999).

Worry has also been shown to be related to psychological distress. One study found that worriers in a non-clinical sample reported higher levels of anxiety and depression than those who were not worried (Pruzinsky & Borkovec, 1983). Andrews and Borkovec (1988) also found that inducing worry in a non-clinical sample resulted in similar levels of anxiety and depression. Further, it may be that worry alternates between anxious thoughts about threatening events in the future and depressed thoughts about negative events in the past (Borkovec et al., 1998).

Despite suggestions that ethnicity may play an important role in worry, little empirical research has examined ways in which African Americans and European

Americans might differ in this domain. Only one study has examined the factor structure of worry in a non-clinical sample across the two ethnic groups, with results indicating that a two factor solution provided the best fit for the data in European American samples, while a three factor solution provided the best fit for the data for the African American samples (Carter et al., 2004). Studies in non-clinical samples have indicated that African Americans report less worry than European Americans (Carter et al., 2004), while other studies have shown no differences between groups in overall worry (Gillis et al., 1995; Scott, Eng, & Heimberg, 2002) although differences were found in terms of specific domains of concern (Scott et al., 2002). This is clearly an area in need of further investigation.

4. Perceived control, psychological distress and worry: racial differences?

Perceived control has been implicated as one important factor in the etiology and maintenance of mood disorders. In turn, worry has been identified as a result of psychological distress associated with both anxiety and depression. In general, these constructs have received little attention, and even less attention in terms of potential racial differences that may exist. Considering the influence of historical and psychosocial factors that may affect control beliefs in African Americans, the current study sought to expand existing literature in two ways. First, the current study investigated the structural relationship between psychological distress and perceptions of control in predicting self-reported worry using a structural equation model. Second, potential differences in the pathways leading to worry were examined in African American and European American young adults using the same model.

5. Method

5.1. Participants

Participants in the current study were 221 undergraduate students from a large public Midwestern university. Students were recruited from different sections of an introductory to psychology course ($N = 130$) and introductory-level Pan African Study sections ($N = 91$). The sample included 71 males and 150 females with a mean age of 20 years. Fifty-five percent of the sample was European American while the remaining 45% was African American. Participants completed a battery of self-report questionnaires that measured anxiety and related constructs as part of a larger study measuring ethnic differences in anxiety. Table 1 presents demographics for the sample.

Table 1
Demographics

Variable	African American	Caucasian American	t/Chi-square
Gender			.106
Male	31	40	
Female	69	81	
Age			−4.03***
M	21.7	19.14	
S.D.	5.81	3.52	
Living Arrangements			3.352
On campus, alone	57	54	
Off campus, alone	43	62	
Family income			25.21***
<$29,999	26	17	
$30,000–59,999	44	27	
>$60,000	29	76	

*** $p < .001$.

5.2. Model indicators

Responses from the self-report questionnaires served as model indicators in both the measurement and structural models. Latent factors were psychological constructs conceptually related to the model indicators (e.g., psychological distress, perceived control, worry).

5.2.1. Beck Depression Inventory (BDI; Beck & Steer, 1990)

The BDI is a widely utilized measure of depression that assesses for depressive symptomatology over the last week. The BDI consist of 21 items rated on a 0–3 scale with a total score ranging from 0 to 63. The total score from the BDI was used as an indicator for the latent variable psychological distress. Internal consistency for the BDI was excellent in the overall sample was excellent ($\alpha = .88$) as well as the European American ($\alpha = .89$) and African American samples, respectively ($\alpha = .86$).

5.2.2. State Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983)

The STAI is a 40-item, well-established self-report questionnaire that assesses "state" and "trait" anxiety as separate, dimensional scales. Both scales range from 0 to 4 with increasing intensity. The state subscale was used as an indicator for the latent variable psychological distress. The trait subscale was not utilized as an indicator due to the significantly high correlation with worry ($r = .69$) and potential problems with multicollinearity (Belsey, Kuh, & Welsch, 1980) as they both seem to be related to trait anxiety (Wells & Carter, 1999). The internal consistency for the STAI was moderate to high in the overall sample ($\alpha = .61$), in the European American ($\alpha = .56$), and the African American sample ($\alpha = .68$).

5.2.3. Anxiety Control Questionnaire (ACQ; Rapee et al., 1996)

The ACQ is a 30-item self-report questionnaire used to assess perceived control of both internal and eternal anxiety-related events. Questions on the ACQ are rated on a six-point likert-type scale (e.g. 0 = "strongly disagree" to 5 "strongly agree") with respondents indicating the extent to which they agree with a particular statement. The ACQ yields three subscales related to overall perceived control over anxiety-related events (total subscale), reactions to internal stimuli (reaction subscale), and perceived control over external events (events subscale). The reaction and events subscales were used as indicators for the latent variable perceived control. The internal consistency for the ACQ was low to moderate in the overall sample ($\alpha = .51$),

the European American (α = .44), and the African American (α = .57), respectively.

5.3. Criterion variable

The perceived control and psychological distress latent constructs were used to predict worry in the current sample. The Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) was utilized as the criterion variable in the subsequent structural equation model.

5.3.1. The Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990)

The PSWQ is a 16-item self-report questionnaire measuring one's tendency and ability to control worry about personally salient events. The PSWQ yields a total score with higher scores indicating more worry. The PSWQ total scores were used as the criterion variable in the structural equation model. To account for error in the observed variable worry as measured by the PSWQ, a latent factor of worry was created from the PSWQ total score. This was achieved by fixing the path from the PSWQ to the worry latent factor to .72, and the error variance of the PSWQ to .28 (i.e., 1 minus the PSWQ reliability), consistent with the internal consistency of the PSWQ in the current sample (α = .72). The internal consistency of the PSWQ was high in the both the European American (α = .70) and African American (α = .73) samples.

5.4. Approach to structural equation modeling

The sample covariance matrix was estimated using a maximum-likelihood solution with an analysis of moment structure program (AMOS; Arbuckle, 2006). Two latent variables (psychological distress and perceived control) were created from the model indicators (BDI, STAI-State, ACQ subscales) and allowed to be intercorrelated; thus, the measurement model was initially estimated to determine model invariance. The latent variables were proposed to predict an additional latent variable of worry in which the PSWQ was utilized as a single indicator with the factor loading set to 1 minus the reliability of the PSWQ in order to account for measurement error (α = .72; .28). This approach has the advantage of taken into account potential unreliability of measurement and allows for simpler specification of the model (Baumgartner & Homburg, 1996). Global fit was measured by the Chi-square goodness-of-fit test. The comparative fit index (CFI; Bentler, 1990), the root mean square error of approximation (RMSEA), and the incremental fit index (IFI; Bollen, 1989) were further utilized as additional measures of global fit. Acceptable fit values for the global fit indices are close to 1.0 (Hoyle & Smith, 1994; Hu & Bentler, 1999) with acceptable RMSEA cutoff values being close to .06 (Hu & Bentler, 1999). Measurement invariance was tested across both groups to determine whether similar patterns emerged for both the African American and European American samples. Nested models were further tested to determine whether factor loadings significantly improved model fit. Finally, within group model testing was employed to determine if psychological distress and perceptions of control uniquely contributed to worry.

Table 2
Partial correlations of age and income with model indicators

Variables	1	2	3	4	5	6	7
1. Age	–	−.123	.045	−.068	.123	.067	−.080
2. Family income	–	–	.017	−.104	.010	.031	−.036
3. BDI	–	–	–	.635	−.412	−.518	.529
4. STAI-State	–	–	–	–	−.376	−.485	.478
5. ACQ-Events	–	–	–	–	–	−.631	−.477
6. ACQ-Reaction	–	–	–	–	–	–	−.639
7. Worry	–	–	–	–	–	–	–

6. Results

6.1. Demographic comparisons

As illustrated in Table 1, the African American and European American participants significantly differed with respect to age and income. The two groups did not significantly differ on living arrangements and gender. Partial correlations were conducted with each indicator along with participant age and income while controlling for ethnicity. The correlations are presented in Table 2. As shown in Table 2, age and income were not significantly correlated with the model indicators after controlling for ethnicity; accordingly age and income were not included in subsequent analyses.

6.2. Racial comparisons of model indicators

Mean differences were also compared between the African American and European American participants on the model indicators. The results are presented in Table 3. As shown in Table 3, the African Americans and European Americans in the current sample significantly differed on

Table 3
Mean Differences in Model Indicators among African American and Participants

	African Americans	European American	t
BDI			
M	9.9063	12.3750	2.218*
S.D.	7.17756	8.21328	
STAI-State			
M	37.7000	40.1000	1.428
S.D.	12.60231	12.25390	
ACQ-Reaction			
M	49.6800	41.8843	−4.714***
S.D.	12.19445	12.27273	
ACQ-Events			
M	55.4100	52.3058	−1.956*
S.D.	11.90543	11.61238	
PSWQ			
M	44.8	50.9421	3.028**
S.D.	14.79421	15.18129	

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 4
Bivariate Pearson correlations of model indicators

Variables	1	2	3	4	5
1. BDI	–	.644**	.433**	.536**	.546**
2. STAI-State	–	–	−504**	−.405**	.499**
3. ACQ-Events	–	–	–	−.651**	−.485**
4. ACQ-Reactions	–	–	–	–	−.665**
5. Worry	–	–	–	–	–

** $p < .01$.

the BDI, ACQ-Reaction subscale, ACQ-Events subscale, and the PSWQ with European Americans endorsing more psychological distress and less perceived control.

6.3. Bivariate correlations for model indicators

Bivariate correlations were conducted with the utilized model indicators to examine the association between variables. The correlations are presented in Table 4. As expected, the model indicators were significantly correlated. As such, the model indicators were utilized to create latent constructs for the subsequent structural equation model.

6.4. Measurement model for psychological distress and perceived control

Measurement invariance was initially tested by examining the measurement models across both groups in which the relationship between perceived control and psychological distress were estimated. The global fit indices for the model indicated excellent fit χ^2 (6, N = 221) = 1.8, p = .783; CFI = 1.0, IFI = 1.0, RMSEA = 0. These results suggest that psychological distress and perceived control are measured the same in both the African Americans and European Americans in the current sample, thus, the covariance matrices in the African American and the European Americans are equivalent.

6.5. Structural equation model for psychological distress, perceived control, and worry

A structural equation model was estimated to determine whether psychological distress and perceived control predicted worry in both samples. The results are presented in Fig. 1. The global fit indices for the model indicated excellent fit with the observed data χ^2 (8, N = 221) = 4.6, p = .595; CFI = 1.0, IFI = 1.0, RMSEA = 0. Results suggest that psychological distress and perceived control predict worry in both the African American and European American samples suggesting similar covariance matrices in both groups.

6.6. Constrained model to test model invariance

Two additional nested models were tested to determine if the contributions of psychological distress and perceived control were similar across the two groups. The path from psychological distress to worry was first constrained to equality across groups to determine if there was a unique contribution to worry. A Chi-square difference test was conducted against the baseline model (without equality constraints) with results indicating no significant change in Chi-square when psychological distress was constrained across groups $\chi^2\Delta$ (1, N = 221) = 7.3, p = .099. A similar

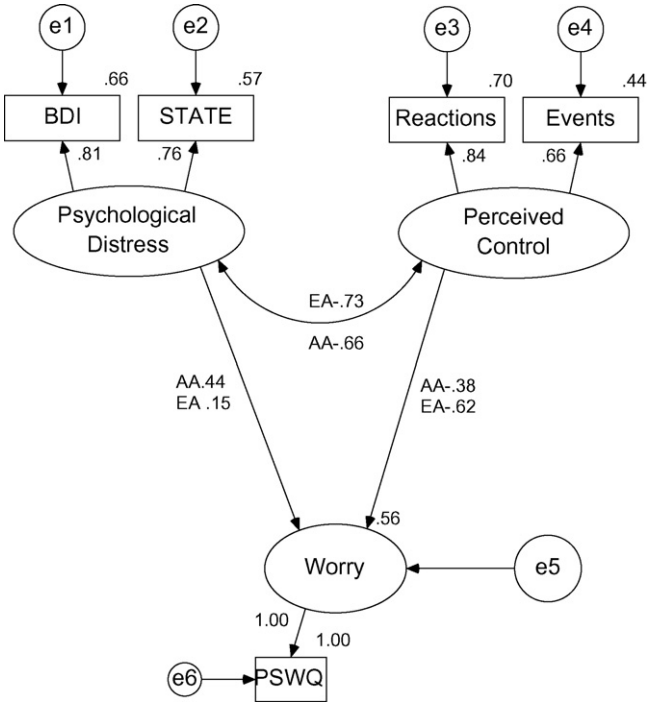

Fig. 1. Structural model of psychological distress and perceived control on worry in African American and European American sample.

procedure was followed constraining perceived control across groups which also resulted in a non-significant Chi-square change $\chi^2\Delta$ (1, $N = 221$) = 5.2, $p = .441$. Both paths were subsequently constrained to equality following a similar rationale and resulted, again, in a non-significant chi square change $\chi 2\Delta$ (1, $N = 221$) = 8.2, $p = .164$. These results suggest that the relationship between psychological distress and perceived control on worry are similar across both the African Americans and European Americans in the current sample.

6.7. Constrained model to test model significance within the African American sample

As displayed in Fig. 1, African Americans and European Americans ostensibly differed with regard to the relative contribution of psychological distress and perceived control to worry. More specifically, the path coefficient for psychological distress predicting worry appeared to be more significant for the African American sample whereas the path coefficient for perceived control appeared more significant in the European American sample. Additionally, the factor loadings for psychological distress appeared to be similar for both groups; however, the factor loadings for perceived control appeared to be significantly dissimilar. This provided an additional rationale to pose two alternative constrained models to test potential within group differences in these two constructs. Two additional nested models were tested to determine if the contributions of psychological distress and perceived control to worry differed significantly within groups. The African American sample was tested first. Psychological distress and perceived control constructs were constrained to equality to determine if these two constructs uniquely contributed to worry. A Chi-square difference test was conducted against the baseline model (i.e., without equality constraints) to determine if the two path coefficients were significantly different from one another within the African American sample. The Chi-square difference in the constrained model compared to the baseline model resulted in a significant change in Chi-square $\chi^2\Delta$ (1, $N = 100$) = 17, $p < .001$ indicating that constraining the psychological distress and perceived control coefficients to equality resulted in significantly poorer fit in the African American sample. This suggests that within the African American sample, psychological distress contributes significantly more to reported worry than does perceived control.

6.8. Constrained model to test model significance within the European American sample

A similar procedure was followed to determine if psychological distress and perceived control differentially contributed to reported worry in the European American sample. A Chi-square difference test was conducted against the baseline model (i.e., no equality constraints) to determine if the path coefficients were significantly different from one another within the European American sample. The Chi-square difference in the constrained model compared to the baseline model resulted in a significant change in Chi-square $\chi^2\Delta$ (1, $N = 121$) = 25, $p < .001$ indicating that constraining the psychological distress and perceived control coefficients to equality resulted in significantly poorer fit. This suggests that within the European American sample, low perceived control contributes significantly more than psychological distress does to reported worry.

7. Discussion

To date, this is the first study to examine racial differences in the structure of constructs that are germane to mood disorders: psychological distress and perceived control, as well as their influences on worry. The results of this study indicated that the African Americans and European Americans in the current sample significantly differed with regard to the indicator variables with the exception of the STAI-State subscale. The results further suggest that psychological distress and perceived control both contributed to self-reported worry in both African American and European American young adults, however, constraining paths within groups resulted in these constructs contributing to worry in a different manner. Specifically, psychological distress was a more significant predictor of worry than low perceived control in the African Americans sample whereas low perceived control was a more significant predictor of worry in the European American group.

These results have significant implications worth noting for future work in this area. As previously noted, there is dearth in the literature with regard to anxiety disorders in African Americans. Although the sample for the current study was non-clinical, the results from the current study definitively have implications for exploring similar constructs in African Americans with anxiety and mood disorders. As previously noted, the African Americans in the current sample endorsed less anxiety and significantly less depressive symptomatology than the European Americans in the current sample. These findings can be interpreted in a number of ways. First, it could be that African Americans young adults are less likely to experience anxiety and depression as measured by PSWQ and the BDI. Although the literature is not clear as to whether African Americans and European Americans differ on reported anxiety symptoms as measured by the STAI, there is evidence that young African American adults experience less worry (Scott et al., 2002) and depression than European Americans (Breslau et al., 2005). Similarly, the finding that factors related to psychological distress are significantly more likely to lead to worry in African Americans compared to European American adults warrants further exploration within African American samples.

The literature consistently indicates that low perceived control have been linked to anxiety and mood disorders (Chorpita & Barlow, 1998; Clark et al., 1994; Leon & Leon, 1990). Interestingly, the African Americans and European Americans in the current sample significantly differed on both the Events and Reaction subscales of the ACQ, with African Americans reporting more perceived control than European Americans. In light of the present finding that African Americans report significantly less anxiety and greater perceived control over both anxiety-related events

and their reaction to these events, these results support the notion that the construct of control needs to be further investigated in racially diverse samples. For instance, many African Americans may construe control differently than European Americans and even perceive parental control as protective in light of aversive events (Brody, Stoneman, & Flor, 1996; Lamborn, Dornbusch, & Steinberg, 1996). Other constructs (e.g., behavioral control, religious beliefs, greater kin support networks) not measured in the current study could account for the racial differences in these two samples. For example, extensive church involvement and the church family may serve as buffers for the development of anxiety given that African Americans have historically relied on spirituality and faith during times of adversity (Boyd-Franklin, 2003; Brody et al., 1996). Presumably, strong religious beliefs may create a greater sense of control over potentially negative events which in turn may influence one's reactions to these events.

Another consideration for future research in this area pertains to the structural stability of anxiety and related constructs in racially diverse samples. Although the African Americans in the current sample were significantly less likely to endorse both anxious and depressive symptomatology, the pathway via psychological distress to worry rather than low perceived control to worry was significant within the African American sample. This finding is important to note for two inter-related reasons. First, in general, worry has been consistently shown to be implicated in both psychological distress and perceived control, which was corroborated by the findings from the current investigation. Second, the current findings indicate that psychological distress may play an integral role in worry for African Americans. Thus, it may be that low perceived control is not endemic to African Americans who experience anxiety and depression. Further, examining the covariance structure of anxiety and related constructs in clinical samples will assist researchers in determining whether the conceptualization of anxiety and mood disorders needs modification depending on racial status.

There are several limitations in the current study worth noting. First, although a latent factor of worry was created by fixing the factor loading and the error variance of the PSWQ which decreased the likelihood of measurement error, the results could have been further enhanced by including multiple indicators of worry to create a latent variable. Although beyond the scope of the current study, the factor structure of the PSWQ could be explored potentially yielding a different structural equation model. Second, as previously noted, the latent factor of psychological distress was modeled by using the BDI and STAI-State measures. Although exploratory in nature, the current findings could be enhanced by representing the construct of interest by at least three indicators (Hoyle & Smith, 1994). Finally, these results are only preliminary. Although intriguing, findings from this study should be cross-validated with other samples before extensive conclusions can be drawn.

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