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Emotional and Behavioral Health Symptoms in Black Breast Cancer Survivors: Interpreting the  
Impact of Risk, Resilience, and Coping Using a Culturally-Relevant Approach

A dissertation submitted in partial satisfaction of the requirements for the degree Doctor of  
Philosophy in Psychology

by

Yrvane Cassandra Pageot

2024

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## ABSTRACT OF THE DISSERTATION

Emotional and Behavioral Health Symptoms in Black Breast Cancer Survivors: Interpreting the Impact of Risk, Resilience, and Coping Using a Culturally-Relevant Approach

by

Yrvane Kassandra Pageot

Doctor of Philosophy in Psychology

Professor Julienne E. Bower, Chair

### **I. Abstract**

Breast cancer is the most common cancer among Black women in the US, and empirical evidence consistently shows that they have poor breast cancer-related health outcomes. Although the five-year survival rate for breast cancer for women is 90%, racial differences are evident such that the five-year survival rate for Black women is 78%. There is a paucity of research that focuses on predictors of emotional and behavioral health outcomes, particularly in Black women, despite evidence that women in this clinical population report depressive and anxiety symptoms and sleep disturbance throughout the breast cancer continuum. The current study utilized a mixed-methods approach to examine predictors of emotional and behavioral health symptoms and identify behaviors and illness perceptions that are relevant for breast cancer. Participants (N=151) completed an online assessment to report risk factors (i.e., racial discrimination), resilience factors (i.e., hope, optimism), culturally-relevant factors (e.g., Strong Black Woman schema, John Henryism), coping strategies (i.e., COPE, Africultural Coping Systems Inventory), distress (i.e., depressive, anxiety symptoms), and sleep disturbance. Participants also completed open-ended responses to report Strong Black Woman qualities and breast cancer-related illness perceptions.

Consistent with hypotheses, psychological resilience was associated with lower levels of distress and sleep disturbance. In addition, racial discrimination and Strong Black Woman qualities were associated with higher levels of distress and sleep disturbance. Mediation analyses showed that approach-oriented coping strategies significantly mediated effects of psychological resilience and race-related factors on sleep disturbance as hypothesized, and avoidant-oriented coping strategies significantly mediated effects of psychological resilience and race-related factors on distress. Analyses of qualitative data indicate that Black women acknowledge that they neglect their health by engaging in behaviors that increase risk for poor health, underutilizing the healthcare system, and encountering barriers to seeking care. Relatedly, participants most frequently attributed their breast cancer to well-known social determinants of health, including food, neighborhood and physical environment, community and social context, and health and healthcare. Study findings underscore the importance of examining culturally-relevant factors that shape psychological responses and demonstrate how unique experiences of Black women may enhance understanding of poor physical health outcomes among Black women diagnosed with breast cancer.

The dissertation of Yrvane Kassandra Pageot is approved.

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Martin, K., Denyse, T., Pageot, Y., Kim, J., Owoyemi, P., DeLuz, K., Stanton, A. (2023). “I’m Fighting for My Life”: Exploring Interactions between Black Women with Breast Cancer and Healthcare Providers. *Qualitative Health Research*.

Pageot Y.P., Stanton, A.L., Ganz, P.A., Irwin, M.R., Cole, S.W., Crespi, C.M., Breen, E.C., Kuhlman, K.R., Bower, J.E. (2021). Socioeconomic Status and Inflammation in Women with Early-stage Breast Cancer: Mediation by Body Mass Index. *Brain Behavior and Immunity*.

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Pageot, Y. (2023, March.) Identifying Potential Pathways Linking Socioeconomic Status & Accelerated Aging in Women Diagnosed with Early-stage Breast Cancer. Invited presentation for the Biobehavioral Influences on Accelerated Aging in Cancer Survivors at the American Psychosocial Oncology Society. San Juan, Puerto Rico.

Pageot, Y. (2022, March). Identifying Modifiable Psychosocial and Behavioral Targets to

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Pageot, Y.K., Denyse, T., Owoyemi, P., Martin, K.J., DeLuz, D.K., Kim, J. H.J., Stanton, A. L. (2024, March). Socioeconomic status, John Henryism, and Sleep Disturbance in Black Women Diagnosed with Breast Cancer [Abstract accepted for Poster Presentation]. Society for Behavioral Medicine, 45th Annual Meeting, Philadelphia, PA.

Owoyemi, P., Denyse, T., Pageot, Y. K., et al. (2024, March). Project SOAR (Speaking Our African American Realities): Spirituality as a Predictor of Posttraumatic Growth and Physical Symptoms among Black Breast Cancer Survivors [Abstract accepted for Poster Presentation]. American Psychosomatic Society, 81st Annual Scientific Meeting, Brighton, UK.

Denyse, T., Martin, K.J., Pageot, Y.K., et al. (2023, August). A Qualitative Study of the Strong Black Woman Schema in the Breast Cancer Context. 2023 RISE for Equity: Reflect, Inspire, Strengthen & Empower Conference, Minneapolis, United States.

Owoyemi, P., Denyse, T., Pageot, Y.K., et al. (2023, March). Project SOAR (Speaking Our African American Realities): Examining the role of spirituality among Black women in the breast cancer context. American Psychosomatic Society. San Juan, Puerto Rico.

Denyse, T., Martin, K. J., Pageot, Y. K., deLuz, D., Kim, J. H. J., Owoyemi, P., & Stanton, A. L. (2021, December). Project SOAR: The Strong Black Woman schema in the breast cancer context. 2021 San Antonio Breast Cancer Symposium, San Antonio, TX, United States.

Pageot, Y., Stanton, A.L., Ganz, P.A., Irwin, M.R., Cole, S.W., Crespi, C.M., Bower, J.E. (2021, May). Socioeconomic status and inflammation in women with early-stage breast cancer: mediation by body mass index. PsychoNeuroImmunology Research Society, Virtual.

Pageot, Y., Stanton, A.L., Ganz, P.A., Irwin, M.R., Cole, S.W., Crespi, C.M., Bower, J.E. (2021, March). Socioeconomic status and inflammation in women with early-stage Breast cancer: mediation by body mass index. American Psychosocial Oncology Society, Virtual.

Emotional and Behavioral Health Symptoms in Black Breast Cancer Survivors: Interpreting the Impact of Risk, Resilience, and Coping Using a Culturally-Relevant Approach

**Breast Cancer-Related Health Outcomes in Black Women**

Breast cancer is the most common cancer among women across all races in the United States, accounting for 30% of new cancer cases each year (i.e., approximately 270,000 new cases each year)<sup>1</sup>. Breast cancer is also the most common cancer among Black women in the US, accounting for 32% of new cancer cases each year (i.e., nearly 34,000 new cases each year)<sup>2</sup>. Despite lower incidence rates among Black women (i.e., 407 per 100,000), relative to White women (i.e., 438.4 per 100,000), research findings reliably show that Black women have the worst breast cancer-related health outcomes, including cancer-related mortality. Indeed, the five-year survival rate for Black women with breast cancer is 78% whereas the five-year survival rate for all women is 90%<sup>3</sup>. To date, studies have primarily examined breast cancer-specific biological factors to understand race-related disparities in this clinical population. Study findings show that Black women, relative to White women, present with more aggressive breast cancer subtypes such as triple-negative breast cancer (TNBC) which is characterized by invasive tumors that are negative for estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). Importantly, patients with TNBC are not candidates for endocrine therapy or other treatments (e.g., Herceptin) which limits targeted therapeutic options<sup>4</sup>. Black women are also more likely to be diagnosed at a later stage<sup>4</sup> and experience longer intervals between screening and follow-up appointments<sup>5</sup> than White women. However, even when accounting for these differences in biological and clinical factors, health disparities remain. Empirical evidence has shown that in comparison to White women, Black women who present with more favorable breast cancer characteristics (e.g., early stage at diagnosis, hormone receptor

positive tumors) still exhibit higher risk for recurrence and lower survival rates<sup>6</sup>. Although biological and clinical characteristics are important determinants of breast cancer mortality, these findings demonstrate that there is a need for examination of additional factors that are relevant for breast cancer-related health outcomes.

To date, little attention has been paid to emotional and behavioral symptoms in Black breast cancer survivors, specifically, despite decades of work examining these health-related quality of life indicators in breast cancer survivors<sup>7</sup>. These outcomes (e.g., depressive symptoms, anxiety symptoms, and sleep problems) are important in their own right and may also be modifiable contributors to morbidity- and mortality-related health disparities in this population. In addition, there is a paucity of research that is focused on psychological predictors of these outcomes. Specifically, research that focuses on factors that are relevant to Black individuals and are known contributors to other race-related health disparities<sup>8</sup> is limited. Therefore, the goal of this dissertation is to examine how general psychological and culturally-relevant factors may be associated with common emotional and behavioral symptoms in Black women with breast cancer. The results of this study will provide important information about emotional, psychological, and behavioral responses to the breast cancer experience in Black women. Importantly, these data may identify targets for culturally relevant interventions to improve breast cancer-related health outcomes for Black women specifically.

### **Emotional and Behavioral Health in Black Women with Breast Cancer**

*Emotional health:* To better understand poor physical health outcomes (i.e., morbidity and mortality) among Black women diagnosed with breast cancer, it is important to examine indicators of emotional/mental health. In the breast cancer population, women report psychological problems throughout the cancer continuum, from diagnosis through treatment and

into survivorship<sup>9</sup>. Emotional responses are common after a breast cancer diagnosis, including anger, despair, helplessness, and fear of death<sup>9</sup>. Many women experience psychological distress, which includes feelings of worry, anxiety, depression, fear, and sadness<sup>10,11</sup>, and is characterized as “an unpleasant experience of emotional, psychological, social, or spiritual nature that interferes with the ability to cope with cancer treatment”<sup>12</sup>. Indeed, nearly 80% of cancer survivors report a fear of recurrence and approximately 60% of survivors report feelings of grief, identity issues, or emotional distress<sup>13</sup>. Mental health disorders are also prevalent in the breast cancer population; prevalence is 17-23% for anxiety<sup>14</sup> and 20-30% for depression<sup>7</sup>.

Although prevalence of emotional issues is well-documented for the general breast cancer population, these data may not accurately reflect the prevalence of depression, anxiety, or psychological distress among Black women due to small samples of Black women in research studies<sup>15-17</sup>, limitations in study designs<sup>15,17-22</sup>, and omission of information about racial background of participants in published studies<sup>15,18,19,23</sup>. Although limited, the literature shows that poor mental health is prevalent in Black women with breast cancer and more research is needed to elucidate risk. In one sample of Black women with breast cancer (n=82), 32% of participants had either borderline or clinically-significant levels of anxiety or depression<sup>24</sup>.

To date, most research studies compare mental health outcomes between Black and White women in healthy and clinical samples. Examination of racial differences in psychological well-being suggest that Black women in the breast cancer population demonstrate better indicators of mental health relative to White women which is surprising given that Black women are known to have worse breast cancer-related health outcomes than White women<sup>25</sup>. This unexpected racial difference in mental health is known as the Black-White mental health paradox with previous studies showing that Black women have better mental health, including lower rates



of major depression<sup>26,27</sup>, generalized anxiety disorder<sup>27</sup>, social phobia, and substance use disorder than White women<sup>27,28</sup> in healthy samples. Previous research shows that Black female breast cancer survivors have higher emotional well-being, positive growth<sup>18,21,29</sup>, and lower levels of distress<sup>17</sup> compared to White women. In one empirical study, including low-income women with breast or gynecological cancer, 5% of Black women (n=17) reported major depressive disorder relative to 12% of White women<sup>15</sup>. A recent study also showed that Black women reported less worry about noncancer-related and cancer-related health, although only 19% of the participants were Black women<sup>30</sup>.

Although these studies show better emotional health outcomes in Black women relative to White women<sup>15,18,31</sup>, these findings are not consistent. Studies comparing Black-White differences in mental health in the breast cancer population also show that Black women report worse symptoms than White women including findings that Black women reported more worry about knowing their personal breast density than White women<sup>32</sup>. Further, a recent longitudinal study showed that female Black breast cancer survivors had elevated levels of cancer-related distress 18 months post-treatment relative to White women<sup>33</sup>. This study also showed that Black and White women did not differ in trajectories of depressive symptoms. An important limitation of this study was that there were 163 White participants and only 32 Black participants. Lower sample sizes of Black women relative to White women is a common limitation in studies that examine cancer-related psychological distress<sup>15,18</sup>. This limitation, in addition to a small number of studies that focus on emotional health symptoms among Black women, may be contributing to findings that show lower rates of distress and depressive symptoms among Black women.

Interestingly, comparison studies show mixed findings about the severity of mental health problems in Black women relative to White women in non-cancer populations. Indeed, a

systematic review shows that Black women show lower depressive symptoms but higher levels of distress than White women<sup>34</sup>, which suggests that the Black-White mental health paradox may not apply for all aspects of mental health. Of note, comparisons of mental health between these two racial groups of women may be overlooking important differences in experiences that shape mental health status throughout the breast cancer continuum. Further examination of mental distress is necessary to characterize how mental health in Black breast cancer survivors may be shaped by breast cancer-related and non disease-related factors. Black women with breast cancer require attention in the domain of mental health because they are less likely to seek out and receive mental health services<sup>35</sup> which may compound the effects of breast cancer-related psychological distress in this group of women. Characterizing emotional health symptoms among Black women in the context of breast cancer underlies opportunities to address health disparities by identifying specific targets to improve overall mental health.

*Sleep:* Another approach to understanding health disparities in the breast cancer population is to examine prevalent behavioral health problems which may adversely influence mental and physical domains of health and overall quality of life. In the breast cancer population, poor sleep quality is commonly reported and often co-occurs with depression and anxiety<sup>36</sup>. Sleep quality is characterized by quantitative factors including duration, latency, and arousals, as well as subjective aspects including depth or restfulness<sup>37</sup>. Studies that examine sleep disturbance among Black breast cancer survivors are limited with findings largely focused on links between sleep and breast cancer risk, prognosis, and mortality<sup>38</sup>. More research is needed in the context of survivorship given that findings suggest that Black women with breast cancer report worse sleep quality than healthy Black women<sup>22</sup> and that sleep disturbances are prevalent throughout the breast cancer continuum<sup>39</sup>. In a sample of 637 Black breast cancer survivors, the

majority of participants reported sleep disturbances prior to diagnosis (57%), 10 months post-diagnosis (53%), and two years post-diagnosis (61%)<sup>39</sup>. In multi-racial samples of breast cancer survivors that include Black women, 78% of participants reported sleep disturbances<sup>40</sup> and 43% of participants reported clinically significant problems with sleep<sup>41</sup>.

To date, evidence of emotional and behavioral health outcomes among Black women are alarmingly inconclusive and limited. To better characterize emotional and behavioral health outcomes among Black women, race-relevant factors that provide context about experiences with breast cancer should be investigated. Similarly, examination of culturally-shaped psychological responses to breast cancer is necessary. Currently, theoretical models do not provide sufficient information to adequately describe mental health outcomes in Black women with breast cancer. Although previous research highlights the need for inclusion of contextual factors in analyses to better understand which factors may be correlated with higher psychological distress in breast cancer patients<sup>42</sup>, few studies have investigated culturally-relevant contextual factors (e.g., racial discrimination) or psychological processes (e.g., culturally-relevant coping strategies)<sup>31,43</sup> that may shape well-being among Black women in the breast cancer population.

### **Use of Coping Strategies Among Black Women with Breast Cancer**

Breast cancer diagnosis and treatment are stressful experiences that can elicit a variety of psychological responses. Examination of these unique responses may be helpful in predicting symptoms within mental and behavioral domains of health. Coping is particularly relevant for breast cancer-related health outcomes given strong support for its links with health outcomes in this population<sup>44</sup>. Among Black women, specifically, previous research suggests that unique coping strategies may be an important determinant of health outcomes<sup>45</sup>. In addition, studies that focus on coping strategies used by Black women highlight unexpected links between coping and

health relative to White women. The sections below will review literature on traditional coping models and consider culturally-informed coping strategies that may be particularly relevant for Black female breast cancer survivors.

### *Coping with Breast Cancer: Traditional Models*

Previous research shows that coping (i.e., processes utilized to manage the demands created by stressful events that are perceived as taxing or exceeding a person's resources<sup>46</sup>), is associated with mental health outcomes in healthy and clinical populations<sup>47,48</sup>. Theoretical models have conceptualized and categorized coping strategies in a variety of ways<sup>46,49</sup>. According to the stress and coping theory by Lazarus and Folkman, individuals can exhibit responses to stressors that are problem-focused (i.e., aimed at resolving the stressful situation) or emotion-focused (i.e., aimed at alleviating event-related stress) in nature<sup>46</sup>. Relatedly, a framework by Suls and Fletcher identifies approach- and avoidant-oriented coping strategies based on responses to stress<sup>50</sup>. Previous research shows that approach-oriented coping strategies (e.g., positive reinterpretation) have been linked to better psychological and physical health while avoidant-oriented coping strategies (e.g., behavioral disengagement) have been associated with chronic disease progression and mortality in clinical populations<sup>48</sup>. Further, findings from a systematic review of coping strategies in breast cancer samples showed that approach-oriented coping strategies were associated with better health outcomes, including health related quality of life. In contrast, avoidance-oriented coping strategies were associated with worse health outcomes such as intrusive thoughts and depressive symptoms<sup>51</sup>.

Investigation of unique coping strategies in the breast cancer context is particularly relevant for understanding racial differences in mental health outcomes generally because previous research suggests that Black women cope with breast cancer in distinct ways, relative to

women from other racial/ethnic groups<sup>52</sup>. For example, findings from a study of Black (n=442) and White (n=405) women with breast cancer showed that there were racial differences in coping<sup>53</sup>. In this study, Black women were more likely to suppress emotions and engage in wishful thinking and positive reappraisal whereas White women were more likely to express emotions and engage in problem-solving and escapism. Further, emotional expression was associated with lower risk for mortality while emotional suppression was associated with higher risk for mortality among Black and White women<sup>53</sup>. This study includes the largest sample of Black women in research focused on coping with breast cancer to date<sup>54</sup> and highlights a need for more research to elucidate racial differences in coping strategies that may underlie prevalent emotional and behavioral health outcomes.

The large literature on coping with breast cancer has used measures derived from prominent stress and coping models, including the COPE<sup>55</sup> and the Ways of Coping Questionnaire<sup>56</sup>. However, previous research suggests that Black individuals report unique coping strategies that may not be adequately captured by these measures. These include religious coping and Africultural coping. Endorsement of these culturally-relevant responses among Black individuals suggests that traditional coping strategies (e.g., acceptance, denial) may not fully encapsulate the psychological processes used by Black women to respond to some stressors, including hardships associated with breast cancer. Importantly, research that examines use of these coping strategies in the context of breast cancer is limited. To address these limitations, both traditional *and* race-specific coping strategies should be examined to identify coping strategies that are most relevant for breast cancer-related health outcomes for Black women. Indeed, close examination of traditional and race-specific strategies will provide important

insight about coping strategies that are protective and detrimental for health outcomes in this group of women. Unique coping strategies used by Black individuals are considered below.

### *Religious Coping*

Religion is relevant for Black individuals, in general<sup>57</sup>, and religious coping (i.e., use of religious beliefs or behaviors to prevent or mitigate negative, emotional consequences of stressful life circumstances<sup>58</sup>) is particularly salient for Black women in the context of breast cancer. Indeed, Black women in the breast cancer population report religious coping more often than women from other racial/ethnic groups<sup>16</sup>. Religious coping can function in different ways including finding meaning, control, comfort/spirituality, intimacy/spirituality, and life transformation, and previous research shows that religious coping is operationalized in distinct ways. For example, some of the most endorsed coping strategies statements in a study of 17 Black women included “I pray for the pain to stop” and “I rely on faith in God”<sup>52</sup>. Qualitative research findings from a sample of Black female breast cancer survivors highlight the multi-faceted role of religion in this subpopulation. Specifically, participants indicated that God provides constant protection, actively listens to requests, provides guidance, makes decisions about life and death, and provides strength during breast cancer <sup>59</sup>.

Examining the role of religion in the context of coping along the breast cancer continuum is critical for understanding this disease experience in Black women. For Black women who rely on religion to cope with breast cancer, a relationship with God provides a consistent and reliable source of support and comfort <sup>60-64</sup> and allows women to receive support from a community that shares similar beliefs <sup>62,65</sup>. Further, religious coping represents an important strategy for psychological adjustment and enhanced the ability to engage in treatment decisions, inner strength, and need for closeness in Black women<sup>66</sup>. Religious coping also has important

implications for emotional health symptoms. Results from a longitudinal study showed that among women undergoing treatment for breast cancer, Black women had fewer depressive symptoms than Hispanic and non-Hispanic White women<sup>16</sup>. Although relationships between coping strategies and depressive symptoms were not analyzed, religious coping remained stable among Black women throughout the study period<sup>16</sup>. Findings from this study, in particular, highlight the importance of religion for Black women and suggest that further examination of this culturally-relevant coping strategy may be important for understanding emotional health symptoms in Black breast cancer survivors.

It is important to note that religious coping can have positive and negative associations with mental health outcomes. Indeed, positive religious coping patterns are typically related to more positive outcomes, and negative religious coping patterns are generally related to more negative outcomes<sup>67</sup>. Negative religious coping (i.e., a pattern of coping that is characterized by spiritual discontent, beliefs that hardships reflect the punishment by God, interpersonal religious discontent, reappraisal of God's powers, and demonic reappraisal)<sup>68</sup> is associated with higher psychological distress, anxiety, and depression. Further, less use of negative religious coping is associated with greater total spiritual well-being<sup>52</sup>.

### *Africultural Coping*

Previous studies indicate that Black individuals use some coping strategies that are distinct from widely used measures such as the COPE. Culturally-relevant coping strategies that are prevalent among Black individuals in response to stressful experiences comprise the Africultural Coping Systems Inventory (ACSI). This questionnaire was created to address a gap in the operationalization of coping styles that are relevant for Black individuals and is categorized into four subscales that underlie Black individuals' responses to stressful events:

Cognitive/Emotional Debriefing (i.e., adaptive responses to manage environmental stressors; “Tried to forget about the situation”), Spiritual-Centered Coping (i.e., responses to stressors based on individuals’ connection with the spiritual elements with the universe or with a higher power; “Prayed that things would work themselves out”), Collective Coping (i.e., responding to stressors by relying on group-centered activities; “Got a group of family or friends together”), and Ritual-Centered Coping (i.e., responding to stressors by relying on the performance of rituals to acknowledge the role of ancestors in one’s life, celebrating events, and paying homage to a higher power; “Lit a candle for strength or guidance in dealing with the problem”)<sup>69</sup>.

Only a few studies have utilized the ACSI to examine responses to race-related stressors and mental health outcomes among Black women. Previous research findings identified greater use of cognitive-emotional debriefing as a partial mediator of the relationship between elevated levels of gendered racism (i.e., racial discrimination due to Black race and female gender) and higher levels of psychological distress among Black women<sup>70</sup>. In another sample of Black women, researchers observed inconsistent findings for associations between cognitive-emotional debriefing such that high levels of cognitive-emotional debriefing were associated with lower anxiety and depressive symptoms<sup>71</sup>. In this study, ritual coping was identified as a significant moderator of the effects of stress on mental health outcomes such that this coping strategy exacerbated the negative effects of race-related stress. Among individuals who reported high levels of ritual-centered coping, race-related stress was associated with worse anxiety symptoms<sup>71</sup>. These results suggest that distinct subgroups of race-related coping strategies may differentially influence the effects of race-related stress on mental health symptoms. However, less is known about the use of the ACSI and its impact on psychological and behavioral health symptoms relative to traditional coping strategies used by Black individuals, and particularly



Black women with breast cancer. Given that emotional and behavioral health outcomes are not well understood for Black women in the breast cancer population, it is necessary to investigate the extent to which culturally-relevant coping strategies may be helpful, harmful, or neutral for these domains of health.

### **Culturally-Relevant Factors: Identifying Potential Predictors of Coping and Mental and Behavioral Health Outcomes Among Black Individuals**

Use of distinct coping strategies by Black women in response to breast cancer may be influenced by unique life experiences prior to breast cancer. Stress and coping theory suggests that appraisals of stressful events, including evaluation of threat and availability of coping resources, are important determinants of coping responses<sup>46</sup>. This framework suggests that culturally-relevant contextual factors, which likely shape these appraisals, should also influence coping strategies. However, contextual factors have rarely been investigated as predictors of coping strategies used by Black women in the breast cancer population, which is problematic because omission of culturally-relevant factors limits opportunities to identify and address poor breast cancer-related health outcomes in this group of women. Indeed, there are “resilience”, “risk”, and race-relevant contextual factors that have been linked with health outcomes in previous research and may influence coping and emotional and behavioral health in Black breast cancer survivors.

#### *Resilience Factors*

In the context of breast cancer, there are a variety of psychological factors that may influence resilience among Black women, including hope and optimism. These intrapersonal resources have been identified as key coping resources in the broader literature<sup>48</sup> and may be particularly relevant for Black women in the context of breast cancer. Hope is defined as a set of

beliefs that reflect individuals' "agency" related to goals (i.e., determination in meeting goals) and pathways to these goals (i.e., sense of ability in meeting goals)<sup>72</sup>. Women who report high hope have shown distinct appraisals about breast cancer treatment relative to women who report low hope<sup>73</sup>. Specifically, women with high hope reported that they would be able to utilize emotion-focused coping strategies. Hope has also been associated with positive reappraisals (i.e., an approach-oriented coping strategy) in a sample of female breast cancer survivors<sup>74</sup>. Lastly, hope is associated with religion<sup>75</sup>, a coping strategy that is prevalent among Black women.

A recent review highlighted optimism as an important predictor of resilience, coping, and better mental health outcomes (e.g., fewer anxiety symptoms)<sup>76</sup>. Optimism (i.e., relatively stable, generalized expectations for the future<sup>77</sup>) is associated with active coping (i.e., identifying solutions or alternative to address a stressor) in cancer populations<sup>78</sup>, including breast cancer<sup>79</sup> and contributes to greater emotional well-being in cancer samples<sup>80,81</sup>. Importantly, this construct underscores elements of strength and high-effort which are salient factors for culturally-relevant traits endorsed by Black individuals.

### *Risk factors*

Racial discrimination (i.e., unfair treatment towards individuals and groups including actions towards and judgements/decisions about group members<sup>82</sup>), negatively impacts individuals, environments, and systems. Racial discrimination underlies interpersonal interactions, access to resources, and governmental policies that shape future experiences, and empirical evidence shows that this chronic stressor can contribute to negative effects on mental<sup>83</sup> and physical health outcomes<sup>84</sup>. Although this construct is often measured by individuals' everyday experiences of major events<sup>85</sup>, the pervasiveness of this psychosocial stressor among

Black individuals highlights a need to examine the effects of racial discrimination on mental and physical health outcomes in vulnerable clinical populations.

Researchers have begun to examine links between racial discrimination and cancer-related health outcomes for Black women. Results from the Black Women's Health Study showed that racial discrimination may increase risk for breast cancer incidence in Black women. In this study, breast cancer incidence was highest among women who reported multiple experiences with discrimination (i.e., housing, employment, and encounters with police) in comparison to individuals who reported zero experiences with discrimination<sup>86</sup>. Importantly, these results underscore the need to investigate how exposure to race-related stressors prior to a breast cancer diagnosis can negatively impact breast cancer-related health outcomes.

One approach to understand associations between racial discrimination and breast cancer-related health outcomes is to examine links with coping. In a sample of White and Black individuals with cancer, coping was identified as a mediator of the association between perceived discrimination and quality of life. Specifically, discrimination was associated with more disengagement coping, and this coping strategy was associated with lower quality of life<sup>87</sup>. Although evidence of links between racial discrimination and coping are limited in the context of breast cancer, these findings suggest that this race-related stressor may be an important predictor of traditional and possibly culturally-relevant coping strategies used by Black women in the breast cancer population.

Given that racial discrimination is associated with breast cancer incidence, examination of links between racial discrimination and important psychological processes that are known contributors to mental and behavioral health outcomes will be critical. Indeed, there are various aspects of racial discrimination that individuals respond to, including the intensity and nature of

the threat, perceived intentions of perpetrator, potential consequences of the act and coping response, availability of resources to assist the target, and perceptions of the need to repeatedly utilize different coping resources and the appraisal of one's ability to do so<sup>88-91</sup>. In the context of breast cancer, it is possible that Black women who report more racial discrimination may report unique coping strategies relative to women who have not experienced racial discrimination. For these women, in particular, negative emotions such as anger, sadness, nervousness, and hypervigilance may negatively influence overall well-being by contributing to negative psychological symptoms and unhealthy behaviors<sup>84</sup>.

#### *Race-relevant Factors: Strong Black Woman/Superwoman Schema*

Applying a cultural lens to this research may elucidate the extent to which culturally-relevant traits structure coping and emotional and behavioral health outcomes in Black breast cancer survivors. To date, empirical evidence shows that culturally-informed traits in Black individuals have been linked to physical health<sup>92,93</sup>. However, evidence of associations with coping strategies and emotional and behavioral health symptoms that are known to shape overall health remain understudied.

The Strong Black Woman (SBW)/Superwoman Schema is a theoretical model that describes unique cognitive, affective, and behavioral characteristics of roles that are common among Black women<sup>94</sup>. Black women who possess characteristics of this schema report an obligation to manifest strength, suppress emotions, resist vulnerability or dependence on others, determination to succeed despite limited resources, and prioritize the needs of others<sup>94,95</sup>. Data from qualitative interviews highlight important factors that shape this identity: a historical legacy of racial and gender stereotyping or oppression, lessons from foremothers, past personal history of disappointment, mistreatment, abuse, and spiritual values. Although these qualities were

nurtured from adverse experiences, there are positive and negative components of the schema. Benefits of the SBW characteristics include preservation of self and survival, preservation of the Black family, and preservation of the Black community. Conversely, SBW is also associated with strain in interpersonal relationships, engagement in stress-related health behaviors, and the embodiment of stress<sup>94</sup>.

Numerous studies have highlighted the importance of the SBW schema in predicting mental health symptoms. Quantitative research findings show that the SBW schema is associated with higher levels of anxiety symptoms and depressive symptoms<sup>92</sup>. Further, associations between the SBW schema and negative mental health outcomes are explained by psychosocial constructs. In one study, self-silencing was identified as a mediator of the relationship between SBW schema and higher depressive symptoms<sup>96</sup>. In another study, the SBW schema was independently associated with depression, anxiety, and loneliness in a sample of healthy Black women. Mediation analyses showed that maladaptive perfectionism (i.e., holding unrealistically high standards, perceived pressure from others to be perfect, being overly concerned with mistakes, and a perceived discrepancy between one's performance and personal standard) explained independent relationships between the SBW schema and higher depression and anxiety symptoms. In addition, self-compassion was a mediator of lower depression, anxiety, and loneliness while greater use of collective coping mediated the relationship between relatively low endorsement of the SBW schema and less loneliness<sup>97</sup>. To date, SBW traits have not been linked to positive health outcomes in healthy samples. In the context of an uncontrollable stressor such as breast cancer, however, various elements of strength in Black women that are posited to be beneficial for personal challenges<sup>94</sup> may be protective for mental health. More research is needed to determine whether SBW traits play a distinct role in this clinical population.

Although there is support for associations between SBW and poor mental health outcomes in healthy populations, evidence is limited for associations between SBW and breast cancer-related health outcomes. One qualitative study showed that women who reported high levels of SBW traits delayed preventive breast health (e.g., receiving a mammogram)<sup>98</sup>. Aspects of the SBW schema (e.g., suppressing emotion) may also lead Black women to engage in unhealthy behaviors (e.g., sedentary behaviors, alcohol consumption) that are relevant for breast cancer<sup>99</sup> and may contribute to worse mental health outcomes in the context of breast cancer<sup>98</sup>. Thus, examination of these culturally-relevant psychosocial qualities that are embedded in the SBW schema may be particularly useful for understanding how these traits shape coping strategies. Further investigation of cultural predictors of coping strategies may also be helpful in interpreting emotional and behavioral health outcomes among Black breast cancer survivors.

### *John Henryism*

Non-traditional responses to stress that have been endorsed by Black individuals may provide important insight about emotional health in Black women. Previous research shows that Black individuals commonly report John Henryism (JH), a “high-effort coping” style, including qualitative findings that highlight Black participants’ belief that minority groups (e.g., Black individuals) must work hard to cope with everyday challenges<sup>100</sup>. This is reflected in the folklore where John Henry, a tunnel worker who was known for his physical strength and endurance, beat a mechanical steam drill during a “steel-driving” contest. Shortly after his victory, he suddenly died as a result of physical and mental exhaustion<sup>101</sup>. This folklore in addition to observational research were used to develop the JH hypothesis which states that use of high-effort active coping to overcome stressors predicts adverse health outcomes for Black individuals of low SES<sup>102</sup>.

To date, most research studies have investigated associations between JH and health outcomes in Black men and have generally found that high JH is associated with worse physical health outcomes (i.e., higher hypertension<sup>101</sup>). Results from a systematic review of John Henryism examined 21 studies that used the 12-item JH scale, eight of which were conducted among women only<sup>103</sup>. In samples that included men *and* women, study findings showed gender differences in health outcomes such that high JH and low SES predicted worse health in men relative to women<sup>104-108</sup>. Examination of JH among women, only, shows mixed findings such that high JH has been associated with lower blood pressure outcomes<sup>109</sup>, flatter daily cortisol slopes, and lower perceived stress scores and depressive symptoms<sup>110</sup>. Inconclusive results regarding associations between JH and health<sup>111-114</sup> suggests that the JH hypothesis is not fully supported when tested among women<sup>103</sup>. It is possible that the lack of support for the JH hypothesis among women may be due to a paucity of research that examines associations between this coping style and health outcomes. Thus, future research can be instrumental in identifying which health outcomes are most relevant in the context of this coping style.

Although JH is posited to predict physical health outcomes, researchers have begun to examine associations between high-effort coping and emotional health in Black individuals more recently. A study including Black women showed that higher JH was associated with fewer depressive symptoms, controlling for demographic characteristics<sup>115</sup>. In clinical populations, high JH was associated with lower depressive symptoms<sup>116</sup>, lower distress and lower likelihood of having any mental disorder or substance use disorder<sup>117</sup> which suggests that JH may be protective for emotional health outcomes in clinical populations. Thus, more research is needed to determine the relevance of this coping style for emotional health outcomes among Black breast cancer survivors.

To our knowledge, no studies have examined associations between JH and emotional and behavioral health outcomes in the breast cancer population. In addition, there is a paucity of research that investigates prevalence among Black women despite research showing that JH is relevant among Black women<sup>103</sup>. Given that this hypothesis is based on mythical and empirical research involving men<sup>101,113,118</sup>, it is possible that interpretation of this coping strategy may be limited for women. However, common themes embedded in JH and other traits endorsed by Black women warrant investigation in Black breast cancer survivors.

### *Illness Perceptions*

In Black breast cancer survivors, health-related knowledge is an important factor to examine given that individuals' beliefs about illness and disease can be shaped by culture. Illness perceptions may underlie unique aspects of breast cancer such as perceived risk of disease, various treatment options, and survival. Illness perceptions are defined as the cognitive (i.e., beliefs, thoughts, ideas) and emotional (i.e., feelings) representations of symptoms and illness<sup>119</sup>. More specifically, illness perceptions represent interrelated beliefs about the cause of the illness, how long it will last, what the consequences of the illness are on the patient's life, the symptoms that go with the condition, and how the illness is controlled or cured<sup>120</sup>. Results from a meta-analysis showed that positive illness perceptions were associated with better health outcomes (e.g., higher physical functioning, lower distress) whereas negative illness perceptions were associated with worse health outcomes (e.g., lower physical functioning, higher distress)<sup>121</sup>. Previous research also shows that Black individuals report distinct illness perceptions relative to White individuals. For example, when asked about depression, Black individuals perceived depression to have less serious consequences, associated depression with fewer symptoms,



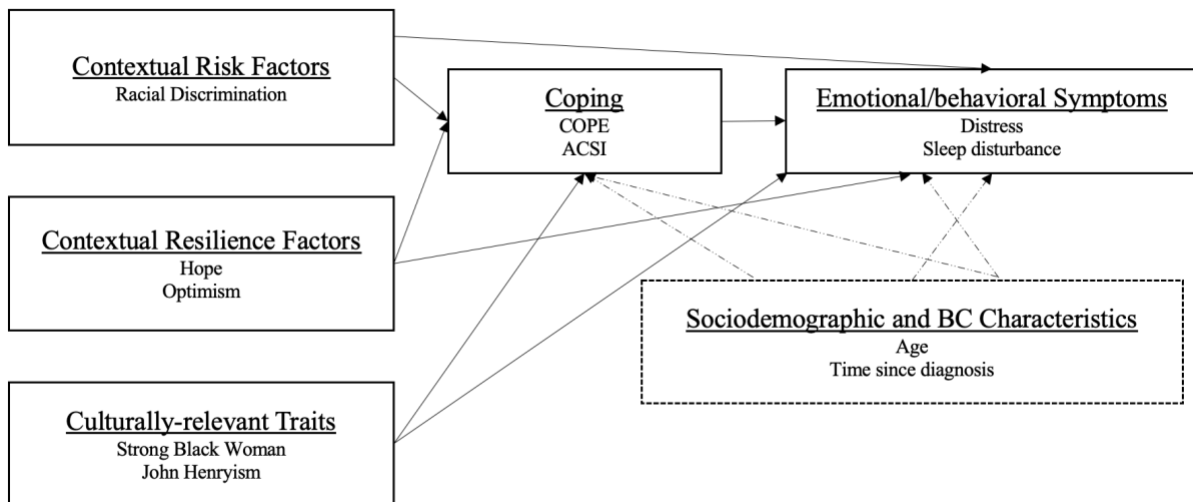
perceived depression to be less chronic and less amenable to treatment, and attributed depression to social factors more frequently<sup>122</sup>.

To understand how Black women perceive breast cancer and respond to stressors in this context, it is necessary to evaluate illness perceptions. Empirical evidence shows that there are shared beliefs about various components of this disease. Some cultural beliefs held by women in this population include that injury to the breast and toxins in the blood cause breast cancer, breast cancer is airborne, and breast cancer is a “White woman’s disease”<sup>123–126</sup>. Relatedly, data show that Black women also report many fears about breast cancer, including onset, treatment, and survival<sup>125</sup>. This is important because these beliefs have been linked to underuse of preventive breast cancer health behaviors<sup>127</sup> such as mammography.

Previous research also shows that life experiences play a role in shaping illness perceptions among Black women. While comparing the experience of Black women with breast cancer, participants shared their perceptions about how America positions the needs of individuals with breast cancer. One participant postulated that if White men were a vulnerable group, research initiatives aimed to improve breast cancer-related health outcomes would be prioritized<sup>128</sup>. However, there has only been one study that has administered an illness perception questionnaire among Black women with breast cancer. In this study, Black women were more likely to attribute breast cancer to immunity (i.e., caused by a germ or virus) relative to White women<sup>129</sup>. Evidence of negative perceptions about breast cancer highlights a unique opportunity to address health-related knowledge about breast cancer which may promote improvements in health outcomes among Black breast cancer survivors.

### **Current Study**

Although culturally-relevant traits and coping strategies in the context of emotional and behavioral health symptoms are particularly salient for Black women diagnosed with breast cancer, there is a paucity of research examining these relationships. The current study examined how the unique experiences of Black women and responses to stressors are linked to common breast cancer-related mental and behavioral health symptoms using a mixed-methods research design. Using quantitative data, the current study addressed these gaps in the literature by testing culturally-relevant risk and resilience factors and traditional and culturally-relevant coping strategies as predictors of distress and sleep disturbance (Figure 1). This study also tested coping as a mediating pathway linking culturally-relevant factors and health symptoms. Using qualitative data, this study characterized culturally-relevant experiences of Black women that are relevant for breast cancer.



### Specific Aims and Hypotheses

Aim 1. Examine links between coping strategies and emotional/behavioral health in Black breast cancer survivors.

H1a: Traditional approach-oriented coping strategies and the spiritual-centered,

collective, and ritual-centered subscales of the Africultural coping inventory will be associated with lower levels of distress and less sleep disturbance.

H1b: Traditional avoidance-oriented coping strategies and the cognitive debriefing subscale of the Africultural coping inventory will be associated with higher levels of distress and greater sleep disturbance.

Aim 2. Evaluate associations between culturally-relevant contextual factors and emotional/behavioral health in Black breast cancer survivors.

H2a: Racial discrimination will be associated with higher levels of distress and greater sleep disturbance.

H2b: Psychological resilience factors (i.e., hope, optimism) will be associated with lower levels of distress and lower sleep disturbance.

Exploratory H2c: High SBW will be associated with lower levels of distress and greater sleep disturbance. SBW is comprised of traits that underlie resilience (e.g., self-efficacy) that may be beneficial for mental health<sup>94</sup> in the context of breast cancer. SBW is also comprised of traits that underlie vulnerability (e.g., stress-related health behaviors) that may be detrimental for behavioral health<sup>94</sup> in the context of breast cancer.

Exploratory H2d: High John Henryism will be associated with lower levels of distress and greater sleep disturbance given that previous research shows that John Henryism is linked to positive (e.g., lower depressive symptoms) and negative (e.g., flatter daily cortisol slopes) health symptoms in Black women<sup>110</sup>.

Aim 3. Investigate traditional and culturally-relevant coping strategies as mediators of the association between culturally-relevant contextual factors and emotional/behavioral health.

H3a: Associations between culturally-relevant contextual risk factors (i.e., racial

discrimination) and worse emotional/behavioral health symptoms (i.e., higher distress, greater sleep disturbance) will be mediated by lower levels of approach- oriented coping strategies and spiritual-centered, collective, and ritual-centered subscales of the Africultural coping inventory. These associations will also be mediated by higher levels of avoidant-oriented coping strategies and cognitive debriefing.

H3b: Associations between culturally-relevant contextual resilience (i.e., hope, optimism) and better emotional/behavioral health symptoms (i.e., lower levels of distress, lower sleep disturbance) will be mediated by higher approach- oriented coping strategies and spiritual-centered, collective, and ritual-centered subscales of the Africultural coping inventory. These associations will also be mediated by lower avoidant-oriented coping strategies and cognitive debriefing.

Aim 4. Characterize participants' perceptions of neglected health and participants' perceived causes of disease to elucidate experiences of Black women in the context of breast cancer.

## **Method**

### **Participants**

Women who met the following inclusion criteria were eligible to participate in this study: self-identify as Black, at least 18 years of age, diagnosed with any stage of breast cancer within the past 10 years. These broad eligibility criteria were chosen to make the study inclusive for Black women in this clinical population.

### **Recruitment**

Participants were recruited primarily through the University of California, Los Angeles (UCLA) Cancer Registry, a database of survivors who received a cancer diagnosis or

cancer-related treatment at UCLA. Contact information for 512 individuals who met the inclusion criteria were received from the registry, and these women were contacted via email with information about the study from May 2023 to February 2024.

Participants were also recruited by forming relationships with administrators of organizations that serve breast cancer patients and/or Black women. Organizations included Cancer Support Community, Foundation for Black Women's Wellness, Touch 4 Life, UCLA Simms/Mann, UCLA Health, My Sister My Friend Breast Cancer Support and an online breast cancer support group for women of color. Administrators shared the flyer with their networks, on social media, and in newsletters.

### **Procedure**

Participants completed an on-line screening instrument to determine eligibility and confirm interest in the study. Eligible and interested participants provided consent and completed an online questionnaire administered through Qualtrics. The questionnaire included information on demographic and disease-related characteristics as well as measures of coping, contextual factors, and emotional and behavioral health outcomes, focusing on measures that have been validated for use in women with breast cancer. Participants were asked to provide their email address at the end of the survey and were sent a \$25 Amazon gift card as compensation.

### **Measures**

*Breast Cancer Characteristics.* Participants self-reported age at diagnosis, breast cancer stage at diagnosis, adjuvant treatment (i.e., radiation, chemotherapy, endocrine therapy, trastuzumab), and the type of surgery received (i.e., lumpectomy, mastectomy).

*Sociodemographic Factors.* Participants self-reported their current age, marital status, highest

level of educational attainment and annual household income, two key components of SES<sup>130</sup>. Participants also reported net worth based on previous research showing that this indicator of SES is an important predictor of health in Black individuals<sup>131</sup>.

### **Outcome Variables: Emotional/Behavioral Health Symptoms**

*Depressive Symptoms.* Participants reported depressive symptomatology during the past week using the 20-item version of the Center for Epidemiologic Studies Depression Scale (CES-D)<sup>132</sup>. Items include: “I felt depressed” and “I was bothered by things that usually don’t bother me”. Participants responded to each item on a 1 (Rarely or none of the time) to 4 (Most or all of the time) scale. The CES-D was identified as useful in measuring psychosocial functioning in Black women with cancer<sup>133</sup>.

*Anxiety Symptoms.* Participants reported symptoms of anxiety using the 7-item (GAD-7)<sup>134</sup> during the past two weeks. Items include: “Feeling nervous, anxious, or on edge”, “Trouble relaxing”. Participants responded to each item using a 4-point scale ranging from 0 (Not at all) to 3 (Nearly every day). Scores range from 0 to 21. Scores in the 0-4 range indicate no or low anxiety, scores in the 5-9 range represent mild anxiety, scores in the 10-14 range represent moderate anxiety, and scores greater than 15 represent severe anxiety symptoms. GAD-7 has been previously administered in a sample of women with breast cancer<sup>135</sup>.

*Distress Composite.* Distress was operationalized as a composite score, including anxiety and depressive symptoms, as consistent with previous research<sup>24</sup>. The distress composite variable was created by standardizing the CES-D and GAD-7 questionnaires and summing scores.

Depressive symptoms were significantly correlated with anxiety symptoms ( $r=0.69, p<0.001$ )

*Sleep Disturbance.* Participants self-reported sleep disturbance during the past seven days using the 8-item PROMIS Sleep Short Form<sup>136</sup>. Example items include: “In the past seven days, my sleep was restless” and “In the past seven days, I got enough sleep”. Participants responded to each item using a 5-point scale from 1 (Not at all) to 5 (Very much). T-scores were calculated from raw scores using validated protocols. A score of 50 represents the mean of the general population and scores above the mean indicate worse sleep disturbance. Scores below 45 indicate sleep disturbance within normal limits, scores between 45 and 55 indicate mild sleep disturbance, scores between 55 and 60 indicate moderate sleep disturbance, and scores greater than 60 indicate severe sleep disturbance<sup>137</sup>.

### **Predictor Variables: Contextual Resilience Factors**

*Optimism.* Participants responded to a valid and reliable measure of dispositional optimism by completing the Life Orientation Test-Revised (LOT-R)<sup>138</sup>. Example items include: “In uncertain times, I usually expect the best” and “I’m always optimistic about my future”. Participants responded to six items using a 5-point scale ranging from 0 (I agree a lot) to 4 (I disagree a lot), and higher scores indicate greater dispositional optimism.

*Hope.* Participants reported their levels of hope using the Adult Hope Scale<sup>139</sup>. This 12-item questionnaire contains two subscales: (1) Agency (i.e., goal-directed energy) and (2) Pathways (i.e., planning to accomplish goals). Items include: “I energetically pursue my goals” and “My past experiences have prepared me well for my future”. Participants responded to each item using an 8-point scale ranging from 1 (Definitely False) to 8 (Definitely True).

*Psychological Resilience Composite.* Psychological resilience was operationalized as a composite score, including optimism and hope, as consistent with previous research<sup>140</sup>. The

psychological resilience variable was created by standardizing scores from the Adult Hope Scale and the Life Orientation Test-Revised questionnaire and summing scores. In this sample, optimism was significantly correlated with hope ( $r=0.27, p=0.01$ ) as previously shown in a sample of women diagnosed with advanced breast cancer<sup>141</sup>.

### **Predictor Variables: Culturally-Relevant Traits**

*Racial Discrimination.* Participants reported experiences of racial discrimination during the past year using the Everyday Discrimination Scale (EDS)<sup>142</sup>. The EDS is one of the most widely used measures for perceived discrimination and captures aspects of interpersonal discrimination that are chronic or episodic but generally minor<sup>143</sup>. Items include: “You received poorer service than other people at restaurants or stores.” Participants responded to each item using a 6-point scale ranging from 1 (Never) to 6 (Almost everyday). A total possible range of the original EDS is 1 to 54, with higher scores indicating higher levels of perceived racial discrimination.

*Giscombe Superwoman Schema Scale.* Participants completed the Giscombe Superwoman Schema Questionnaire<sup>144</sup> to report the extent to which they identify with culturally-relevant racial and gender identity characteristics that comprise the Superwoman Schema construct. The five subscales include: 1) obligation to present an image of strength (e.g., “I have to be strong”); 2) obligation to suppress emotions (e.g., “Expressing emotions is difficult for me”); 3) resistance to being vulnerable (e.g., “I wait until I am overwhelmed to ask for help”); 4) intense motivation to succeed (e.g., “I put pressure on myself to achieve a certain level of accomplishment”); and 5) obligation to help others (e.g., “I take on too many responsibilities in my family”). One item in this measure asks participants to report whether they neglect their health. Participants who indicated that they neglect their health were asked to report the specific ways in which they neglect their health in an open-response question.



*Illness Perceptions.* Participants reported illness perceptions about breast cancer using the Brief Illness Perception Questionnaire (IPQ)<sup>145</sup>. This questionnaire examines cognitive illness representations (i.e., consequences, timeline, personal control, treatment control, and identity), emotional representations (i.e., concern, emotions), and illness comprehensibility. Sample items include “How much does your illness affect your life?” and “How long do you think your illness will continue?”. Participants responded to each item, except the causal question, using a 0 to 10 scale, and higher scores indicate stronger perceptions along that dimension. Participants also ranked the three most important causes of their illness in an open-response question.

*John Henry Active Coping Scale.* Participants completed the 12-Item John Henryism Active Coping Scale (JHAC-12)<sup>102</sup> to identify culturally-relevant responses to stressors. Example items include: “When things don’t go the way I want them to, that just makes me work even harder” and “Once I make up my mind to do something, I stay with it until the job is completely done”. Participants responded to all items using a 5-point Likert scale ranging from 1 (Completely false) to 5 (Completely true). The JHAC-12 has been psychometrically validated in African American populations and has demonstrated high reliability, with reported Cronbach’s alpha ranging from 0.61 to 0.80<sup>146</sup>.

### **Mediators: Traditional and Culturally-Relevant Coping Strategies**

*COPE.* Participants completed the 60-item COPE<sup>55</sup>, including the Emotional Approach Coping Scales to indicate general responses to stress<sup>147</sup>. This scale assesses the following approach-oriented coping strategies: Acceptance (e.g., “I accept the reality of the fact that it happened”), Problem-Focused Coping (Active Coping and Planning subscales – e.g., “I make a plan of action”), Seeking Social Support (Seeking Social Support for Instrumental Reasons and Seeking Social Support for Emotional Reasons subscales; e.g., “I get emotional support from others”),

Positive Reappraisal (e.g., “I learn something from the experience”), and Emotional Approach (Emotional Processing and Emotional Expression subscales – e.g., “I take time to figure out what I’m really feeling” and “I take time to express my emotions”). Participants responded to all items using a 4-point Likert scale ranging from 1 (I don’t do this at all) to 4 (I do this a lot). Scores from each subscale were standardized, summed, and averaged to create a composite score. Cronbach’s alpha for the approach composite was 0.81.

The COPE also assesses avoidance-oriented coping strategies: Mental Disengagement (e.g., “I go to movies or watch TV to think about it less”), Behavioral Disengagement (e.g., “I admit to myself that I can’t deal with it and quit trying”), and Denial subscales (e.g., “I say to myself this isn’t real”). Participants responded to all items using a 4-point Likert scale ranging from 1 (I don’t do this at all) to 4 (I do this a lot). Scores from each subscale were standardized, summed, and averaged to create a composite score. Cronbach’s alpha for the avoidant composite was 0.73.

*Africultural Coping Systems Inventory (ACSI)*. Participants completed the ACSI to report culture-specific coping strategies in response to stressful situations. This 30-item questionnaire uses a 4-point Likert-type scale 0 (Did not use) to 3 (Used a great deal). Participants rated the extent to which they used certain Africultural coping strategies to deal with a stressful situation. The ACSI includes four coping subscales: Cognitive/Emotional Debriefing (e.g., “Hope that things would get better”), Spiritual-Centered (e.g., “Prayed that things would work themselves out”), Collective (e.g., “Sought emotional support from family and friends”), and Ritual-Centered (e.g., “Lit a candle for strength or guidance in dealing with the problem”). Scores were summed to compute a total score for each subscale and the ACSI total score.

Cronbach's alphas of .77, .85, .74, and .81 were identified for the Cognitive/Emotional Debriefing, Spiritual-Centered, Collective, and Ritual-Centered Coping subscales, respectively.

### **Power Analyses**

For Aims 1 and 2, power analyses for linear multiple regression showed that  $n=395$  would provide 80% power to detect main effects with a small effect size (Cohen's  $f^2 = 0.02$ ),  $n=101$  would provide 80% power to detect effects with a small – medium effect size (Cohen's  $f^2 = .08$ ), and  $n=55$  would provide 80% power to detect main effects with a medium effect size based on a model with one predictor and two covariates. Based on these analyses, this study is powered to detect small to medium effects. Of note, a small effect is equivalent to a Cohen's  $d$  of 0.2, a medium effect (Cohen's  $f^2 = 0.15$ ) is equivalent to a Cohen's  $d$  of 0.5, and a large effect (Cohen's  $f^2 = 0.35$ ) is equivalent to a Cohen's  $d$  of 0.80. For Aim 3, power analyses for single mediation showed that  $N=103$  would provide 80% power to detect medium effects of coping strategies as mediators of the associations between contextual and culturally-relevant factors and distress and sleep disturbance. G\*Power was used to conduct power analyses for Aims 1 and 2, and the Monte Carlo Power Analysis for Indirect Effects<sup>148</sup> was used to conduct power analyses for Aim 3.

Few studies have examined these outcomes in Black women, with only study reporting a posthoc effect size in a sample of Black breast cancer survivors<sup>149</sup>. Thus, analyses will not control for multiple comparisons. In addition, composite scores will be used to limit the number of predictor variables and associated analyses. To determine the variance explained in each outcome by each predictor,  $R^2$  was provided for each model.

### **Quantitative Data Analysis**

Linear regression models tested hypotheses related to Aim 1 by examining associations between coping strategies and each emotional/behavioral health outcome (i.e., distress, sleep disturbance). Linear regression models tested hypotheses related to Aim 2 by examining associations between culturally-relevant factors and each emotional/behavioral health outcome (i.e., distress, sleep disturbance). Age<sup>150</sup> and years since diagnosis<sup>151</sup> were included in all analyses as covariates given that these factors are known to be associated with breast cancer-related quality of life<sup>152</sup>. Models did not control for disease-related factors (i.e., treatment type, surgery, current or previous treatment) based on previous research<sup>153</sup> and nonsignificant associations with the outcome variables in this sample.

To evaluate Aim 3, the IBM SPSS PROCESS macro was used to test mediation. For Hypothesis 3a, indirect effects of 1) traditional approach-oriented coping strategies were tested as a mediator of culturally-relevant factors and emotional/behavioral health symptoms in separate models. For Hypothesis 3b, indirect effects of traditional avoidant-oriented coping strategies were tested as a mediator of the culturally-relevant factors and emotional/behavioral health symptoms in separate models. Estimates were generated for each path: 1) the total effect of the independent variable on the dependent variable (c path); 2) the direct effect of the independent variable on the dependent variable when the mediator is included in the model (c' path); 3) the effect of the independent variable on the mediator (a path); 4) the effect of the mediator on the dependent variable (b path); and 5) the indirect effect of the mediator on the association between the Independent and dependent variables (ab path). Path estimates, standard errors, and 95% bias-corrected bootstrap confidence intervals (10,000 random samples) were estimated for each model. Of note, mediation was only tested for coping strategies that showed significant associations with the outcome variables in linear regression models.

## **Qualitative Data Analysis**

Open-ended responses from the Superwoman Schema Scale (i.e., “In what specific ways do you think that you neglect your health?”) and the Brief Illness Perceptions Questionnaire (i.e., “Please list the three most important factors that you believe caused your breast cancer”) were analyzed using reflexive thematic analysis<sup>154</sup>. This approach is used to identify, analyze, and report themes within qualitative data. In the current study, this analysis was utilized to examine participants’ acknowledgement of health neglect and perceived causes of breast cancer.

A well-established process<sup>154</sup> was used to analyze and report themes within the data. The principal investigator of the study first reviewed the data to generate a list of codes. Codes represent researchers’ interpretations of meaning within a dataset<sup>155</sup>. Both latent (i.e., labeling data based on underlying meaning of participants’ responses) and semantic codes (i.e., labeling data based on what is explicitly stated by participants) were identified based on participants’ responses. Next, codes were grouped into categories based on similarities<sup>156</sup> and categories were clustered into themes. Lastly, the principal investigator provided a definition for each theme to provide a thorough description of the data. Given that participants provided short responses that did not require multiple interpretations, one coder (i.e., principal investigator) was sufficient to derive meaning from the data and did not require a consensus<sup>155</sup>. Indeed, the most valuable features of reflexive thematic analysis include reflective and thoughtful engagement with the data and reflexive and thoughtful engagement with the analytic process rather than ‘accurate’ and ‘reliable’ coding, or achieving consensus between coders<sup>157</sup>.

## **Quantitative Results**

### **Descriptives**

151 women who completed the screening questions (i.e., race, age, undergoing treatment, breast cancer status, metastatic breast cancer), were eligible to participate in the study, and provided consent to complete the online survey. 138 participants started the survey and completed at least one subscale. Sample size for the main study measures ranged from 102 to 136 due to drop-off. 100 women provided demographic information. Women were recruited from the UCLA Tumor Registry (n=72) or external organizations (n=28). Characteristics of the sample are provided in Table 1. The mean age of participants in this sample was 56.6 years and nearly 45% of women were married. On average, women had obtained a college degree and more than half of women in the sample reported an annual household income greater than \$90,000.

Breast cancer characteristics were self-reported by participants. Most women were diagnosed with Stage I or II at diagnosis, received a lumpectomy, received radiation therapy, and were diagnosed with breast cancer within the past four years on average. Approximately 34% of the sample were currently receiving treatment and 60% of the sample previously received treatment.

Average scores for predictors, mediators, and outcomes are described in Table 2. On average, participants scored above the standardized mean (i.e.,  $M=50$ )<sup>158</sup> on the PROMIS sleep disturbance scale ( $M=52.34$ ), indicating mild levels of sleep disturbance<sup>137</sup>. Nearly 57% of women reported sleep disturbance within normal limits and 20% reported mild sleep disturbance. In the context of emotional health symptoms, the average score for the GAD-7 indicated minimal anxiety ( $M=4.70$ ), reported by nearly 62% of the sample. On average, participants reported scores on the CES-D that reflect risk for clinical depression ( $M=18.69$ ) with more than half of the sample (52.8%) reporting scores that exceed the clinical cut-off for clinical depression.

On average, participants reported higher levels of hope ( $M=70.80$ ) than healthy Black individuals in previous research<sup>159</sup>. Participants also reported higher scores for Strong Black Woman qualities ( $M=65.44$ ) relative to healthy Black women<sup>160</sup>. Participants reported lower scores for John Henryism ( $M=36.35$ ) relative to healthy Black women<sup>109,113,115,161</sup>. The average level of optimism ( $M=17.54$ ) was lower than levels reported by Black women<sup>162</sup> but similar to optimism scores in a multiracial sample of women with breast cancer<sup>163</sup> and a sample of White breast cancer survivors<sup>164</sup>. In addition, participants reported high levels of COPE approach-oriented ( $M=3.06$ ) such that they reported utilizing these strategies “a medium amount” on average. In contrast, participants reported lower scores for COPE avoidant-oriented coping strategies ( $M=1.81$ ) such that they reported utilizing these strategies “a little bit” or “not at all” on average. For culturally-relevant coping strategies, participants reported lower scores on the cognitive debriefing subscale ( $M=0.96$ ), spiritual coping ( $M=1.17$ ), collective coping ( $M=1.23$ ), and ritual coping ( $M=0.36$ ) subscales relative to healthy Black women<sup>165</sup>. Thus, participants utilized each coping strategy “a little” on average.

### **Associations between Outcome Variables**

Emotional and behavioral health symptoms were positively correlated in this sample. Depressive symptoms were significantly associated with anxiety symptoms ( $r=0.69, p<0.001$ ) and sleep disturbance ( $r=0.51, p<0.001$ ). Anxiety symptoms were significantly associated with sleep disturbance ( $r=0.50, p<0.001$ ).

### **Associations between Predictors and Mediators**

Correlations between risk, resilience, and race-related factors are shown in Table 3. Racial discrimination, psychological resilience, and Strong Black Woman qualities were

significantly correlated with each other. John Henryism was not significantly correlated with the other variables.

Correlations between coping strategies are shown in Table 4. Each of the ACSI subscales were positively correlated and associations were statistically significant. In addition, ACSI subscales showed statistically significant correlations with COPE Approach and Avoidant composite scores. The COPE Approach composite was not significantly associated with the Avoidant composite.

### **Examining Coping Strategies as Predictors of Distress and Sleep Disturbance**

Adjusting for covariates, traditional coping strategies were significantly associated with distress and sleep disturbance, consistent with hypotheses (Table 5). Greater use of approach-oriented strategies was significantly associated with lower levels of distress ( $b=-7.00, p=0.003$ ), accounting for nearly 20% of the variance. Greater use of approach-oriented strategies was also significantly associated with less sleep disturbance ( $b=-6.91, p<0.001$ ), accounting for nearly 16% of the variance. In contrast, greater use of avoidant-oriented coping strategies was significantly associated with higher levels of distress ( $b =11.82, p<0.001$ ), accounting for nearly 32% of the variance. Greater use of avoidant-oriented coping strategies was significantly associated with more sleep disturbance ( $b=4.24, p=0.03$ ), accounting for 6.5% of the variance.

Adjusting for covariates, culturally-relevant coping strategies (i.e., ACSI) were not significantly associated with distress or sleep disturbance (Table 5). Thus, culturally-relevant coping strategies were not tested as mediators in subsequent models.

### **Associations between Contextual/Culturally-Relevant Factors, Distress, and Sleep Disturbance**

*Psychological Resilience:* Adjusting for covariates, psychological resilience was



significantly associated with distress and sleep disturbance (Table 6). As predicted, higher levels of psychological resilience were associated with lower levels of distress ( $b=-0.65, p<0.001$ ), accounting for 10% of the variance. Similarly, higher levels of psychological resilience were associated with less sleep disturbance ( $b=-0.30, p=0.01$ ), accounting for 31% of the variance.

*Racial Discrimination:* Adjusting for covariates, racial discrimination was significantly associated with distress and sleep disturbance (Table 6). Higher levels of racial discrimination were significantly associated with distress ( $b=0.55, p<0.001$ ), accounting for 24% of the variance. Similarly, higher levels of racial discrimination were significantly associated with more sleep disturbance ( $b=0.29, p=0.01$ ), accounting for 12% of the variance.

*Culturally-Relevant Factors:* Contrary to hypotheses, higher endorsement of Strong Black Woman Schema qualities was associated with higher levels of distress ( $b=0.31, p<0.001$ ), accounting for 29% of the variance. Higher endorsement of Strong Black Woman Schema qualities was also significantly associated with more sleep disturbance ( $b=0.15, p=0.01$ ), accounting for 13% of the variance. John Henryism was not significantly associated with distress or sleep disturbance.

### **Traditional Coping Strategies as Mediators of the Associations Between Racial Discrimination and Distress and Sleep Disturbance**

*Distress:* Higher levels of racial discrimination were significantly associated with lower scores on the COPE Approach composite (a path) (Table 7). Higher scores on the COPE Approach composite were marginally associated with lower levels of distress (b path). The mediated effect of racial discrimination on distress through the COPE Approach composite was nonsignificant (ab path).

Higher levels of racial discrimination were significantly associated with higher scores on the COPE Avoidant composite (a path) (Table 7). Higher scores on the COPE Avoidant composite were significantly associated with higher levels of distress (b path). The mediated effect of racial discrimination on distress through the COPE Avoidant composite was significant (ab path), indicating that avoidant-oriented coping strategies mediated the association between racial discrimination and distress.

*Sleep Disturbance:* Higher levels of racial discrimination were significantly associated with lower scores on the COPE Approach composite (a path) (Table 7). Higher scores on the COPE Approach composite were associated with lower sleep disturbance (b path). The mediated effect of racial discrimination on sleep disturbance through the COPE Approach composite was significant (ab path), indicating that approach-oriented coping strategies mediated the association between racial discrimination and sleep disturbance.

Higher levels of racial discrimination were significantly associated with higher scores on the COPE Avoidant composite (a path) (Table 7). Higher scores on the COPE Avoidant composite were not significantly associated with sleep disturbance (b path). The mediated effect of racial discrimination on sleep disturbance through the COPE Avoidant composite was nonsignificant (ab path).

### **Traditional Coping Strategies as Mediators of the Associations Between Psychological Resilience and Distress and Sleep Disturbance**

*Distress:* Higher levels of psychological resilience were significantly associated with higher scores on the COPE Approach composite (a path) (Table 8). Higher scores on the COPE Approach composite were marginally associated with lower distress (b path). The mediated

effect of racial discrimination on distress through the COPE Approach composite was nonsignificant (ab path).

Higher levels of psychological resilience were significantly associated with lower scores on the COPE Avoidant composite (a path) (Table 8). Higher scores on the COPE Avoidant composite were significantly associated with higher distress (b path). The mediated effect of psychological resilience on distress through the COPE Avoidant composite was significant (ab path), indicating that avoidant-oriented coping strategies mediated the association between psychological resilience and distress.

*Sleep disturbance:* Higher levels of psychological resilience were associated with higher scores on the COPE Approach composite (a path) (Table 8). Higher scores on the COPE Approach composite were significantly associated with lower sleep disturbance (b path). The mediated effect of psychological resilience on sleep disturbance through the COPE Approach composite was significant (ab path), indicating that approach-oriented coping strategies mediated the association between psychological resilience and sleep disturbance.

Higher levels of psychological resilience were associated with lower scores on the COPE Avoidant composite (a path) (Table 8). Higher scores on the COPE Avoidant composite were not significantly associated with sleep disturbance (b path). The mediated effect of racial discrimination on sleep disturbance through the COPE Avoidant composite was nonsignificant (ab path).

### **Traditional Coping Strategies as Mediators of the Associations Between Strong Black Woman Traits and Distress and Sleep Disturbance**

*Distress:* Higher endorsement of Strong Black Woman qualities was significantly associated with lower scores on the COPE Approach composite (a path) (Table 9). Scores on the

COPE Approach composite were not significantly associated with distress scores (b path). The mediated effect of Strong Black Woman qualities on distress through the COPE Approach composite was nonsignificant (ab path).

Higher endorsement of Strong Black Woman qualities was significantly associated with higher scores on the COPE Avoidant composite (a path) (Table 9). Higher scores on the COPE Avoidant composite were significantly associated with higher levels of distress (b path). The mediated effect of Strong Black Woman qualities on distress through the COPE Avoidant composite was significant (ab path), indicating that avoidant-oriented coping strategies mediated the association between Strong Black Woman qualities and distress.

*Sleep Disturbance:* Higher endorsement of Strong Black Woman qualities was significantly associated with lower scores on the COPE Approach composite (a path) (Table 9). Higher scores on the COPE Approach composite were significantly associated with less sleep disturbance (b path). The mediated effect of Strong Black Woman qualities on distress through the COPE Approach composite was significant (ab path), indicating that use of approach-oriented coping strategies mediated the association between Strong Black Woman qualities and sleep disturbance.

Higher endorsement of Strong Black Woman qualities was significantly associated with higher scores on the COPE Avoidant composite (a path) (Table 9). Higher scores on the COPE Avoidant composite were not significantly associated with sleep disturbance (b path). The mediated effect of Strong Black Woman qualities on sleep disturbance through the COPE Avoidant composite was nonsignificant (ab path).

### **Traditional Coping Strategies as Mediators of the Associations Between John Henryism and Distress and Sleep Disturbance**

*Distress:* Higher John Henryism scores were not significantly associated with scores on the COPE Approach composite (a path) (Table 9). Higher scores on the COPE Approach composite were significantly associated with lower levels of distress (b path). The mediated effect of John Henryism on distress through the COPE Approach composite was nonsignificant (ab path).

Higher John Henryism scores were not significantly associated with scores on the COPE Avoidant composite (a path) (Table 9). Higher scores on the COPE Avoidant composite were not significantly associated with distress (b path). The mediated effect of John Henryism on distress through the COPE Avoidant composite was nonsignificant (ab path).

*Sleep Disturbance:* Higher John Henryism scores were not significantly associated with scores on the COPE Approach -composite (a path) (Table 9). Higher scores on the COPE Approach composite were significantly associated with less sleep disturbance (b path). The mediated effect of John Henryism on sleep disturbance through the COPE Approach composite was nonsignificant (ab path).

Higher John Henryism scores was not significantly associated with scores on the COPE Avoidant composite (a path) (Table 9). Higher scores on the COPE Avoidant composite were not significantly associated with sleep disturbance (b path). The mediated effect of John Henryism on sleep disturbance through the COPE Avoidant composite was nonsignificant (ab path).

## **Qualitative Results**

### **Black Women Acknowledge That They are Neglecting Their Health**

83 participants reported that they neglect their health on the SBW scale and 82 participants described ways in which they neglected their health in an open-response. Three themes were identified based on their responses:

**Theme 1 – Behaviors that increase risk for poor health:** Participants described health behaviors and lifestyle choices that are known to increase risk for poor health. Specifically, participants noted that they engaged in behaviors that are known to exacerbate poor health, including sedentary behaviors, smoking, and unhealthy eating and drinking habits. Similarly, participants failed to engage in behaviors that are known to promote good health such as rest, self-care, and maintaining good health habits.

**Theme 2 – Underutilization of the healthcare system:** Participants noted that they neglected their health by engaging with the healthcare system inconsistently. Some participants described irregular interactions with the healthcare system which were characterized by not seeking medical care, delaying medical care, not reporting health symptoms to physicians, and ignoring health symptoms with the hopes of improvement.

Participants also noted that other obligations led them to de-prioritize their health needs. Specifically, participants made healthcare-related appointments for others before themselves, prioritized the health of others over themselves, refrained from exercising in order to do things for family members, and were occupied by other responsibilities such as work.

**Theme 3 – Barriers to seeking health care:** Participants indicated that psychological factors and socioeconomic status shaped the ways in which they neglected their health. Psychological factors such as depression hindered participants from taking care of their health. In addition, a lack of monetary resources was identified as a social determinant of health that prevented participants from seeking health care.

### **Identifying Breast Cancer-Related Illness Perceptions of Black Women**

82 participants reported perceived causes for their breast cancer diagnosis on the Illness Perceptions Questionnaire. Analysis of the data highlighted commonalities between participants'

responses and well-established social determinants of health. Thus, responses were grouped into the categories from the social determinants of health model<sup>166</sup>: economic stability (n=3), neighborhood and the physical environment (n=37), food (n=42), community and social context (n=35), and health and health care (n=83). Participants reported factors that are known to be associated with poor health such as sociodemographic factors (n=9), exposure to toxins (n=3), unknown/higher power (n=26), and lifestyle (n=6). Codes that comprise each category are described in Table 10. In addition, codes were also categorized into individual-, structural-, and/or social-level factors based on their responses.

Economic stability: Some participants perceived their occupation as a cause of their breast cancer. Some participants indicated that work, in general, caused their disease while others described how contextual factors such as type of occupation contributed to their disease.

Neighborhood and physical environment: Some participants broadly reported environmental factors as a cause of their breast cancer. Additionally, participants reported aspects of health behaviors that may be related to limitations of their neighborhood and built environment, including a lack of exercise, as a cause of their breast cancer diagnosis. This may be due to a lack of neighborhood infrastructure to support exercise such as sidewalks, parks, and recreation centers as previously described in research studies<sup>167</sup>.

Food: Some participants perceived their dietary habits as a cause of their disease. Consumption of unhealthy food and beverage products, and relatedly being overweight, were named as causes of breast cancer. Additionally, participants indicated that poor food quality (i.e., food additives and genetically modified organisms in food) was an important cause of their disease. Further, consumption of alcohol and low water intake were named as causes of their disease.

Community and social context: Participants indicated that elements of their community and social context caused their disease. Participants believed that stress, negative experiences with family members (e.g., divorce), Black race, and racism were linked to their breast cancer diagnosis.

Health and Healthcare: Participants indicated that various, personal health conditions caused their disease. Specifically, prolonged health issues, fibroids, dense breast tissue, and constipation were named as causes of their breast cancer diagnosis. Additionally, participants named biological factors and hormones as causes of their disease. Participants also identified history of family health as causes of breast cancer. Genetics, heredity, inherited condition, and ancestry were named as causes of their disease.

Participants indicated that interactions with the healthcare system caused their disease. Specifically, being treated poorly due to being Black, receipt of surgery, and vaccines were identified as causes of breast cancer. Participants also indicated that their lack of interactions with the healthcare system caused their disease. Specifically, medical negligence, missing a mammogram, and not utilizing health services were perceived as causes of their breast cancer. Participants reported that their mental health status caused their disease. Specifically, factors such as mindset, lack of meditation, depression, unexpressed emotion, and emotions were named as important contributors to their breast cancer diagnosis.

Sociodemographic factors: Participants indicated that sociodemographic factors caused their disease. Specifically, participants indicated that being older and female were linked to their disease.

Exposure to toxins: Participants indicated that exposure to various toxins caused their disease. Participants reported behaviors such as smoking and hair chemicals were linked to breast cancer.



Participants also reported that hair chemicals, which are commonly found in hair relaxers among Black women, were a cause of their breast cancer.

Chance: Participants indicated that their disease was caused by factors beyond their control.

Participants named God, dumb luck, life, body randomness, chance, life lesson, and fate as reasons for their breast cancer diagnosis.

Lifestyle: Participants reported that their lifestyle caused their disease.

## **Discussion**

### **Summary of Findings**

Results from this mixed-methods study demonstrate that examining traditional and culturally-relevant factors elucidate risk for breast cancer-related emotional and behavioral health outcomes in Black women. As hypothesized, psychological resilience (i.e., optimism, hope) was significantly associated with lower levels of distress and less sleep disturbance. In addition, race-related factors (i.e., racial discrimination and Strong Black Woman qualities) were associated with higher levels of distress and more sleep disturbance. Mediation analyses showed that approach-oriented coping strategies significantly mediated effects of psychological resilience and race-related factors on sleep disturbance, and avoidant-oriented coping strategies significantly mediated effects of on distress. Contrary to hypotheses, John Henryism was not significantly associated with these study outcomes. Importantly, these findings demonstrate that in addition to well-known predictors of health, Black women have distinct experiences and intrapersonal qualities that are relevant for elucidating distress and sleep disturbance in the aftermath of a breast cancer diagnosis.

Analyses of qualitative data provided valuable insight about health and perceived causes of breast cancer among Black breast cancer survivors. Indeed, further investigation of the Strong

Black Woman Schema highlighted that Black women report neglecting their health by engaging in behaviors that increase risk for poor health, underutilizing the healthcare system, and encountering barriers to seeking care. Relatedly, participants most frequently attributed their breast cancer to well-known social determinants of health, including food, neighborhood and physical environment, community and social context, and health and healthcare.

### **Prevalence of Distress and Sleep Disturbance in Black Breast Cancer Survivors**

In the current study, participants reported higher than average sleep disturbance scores, and approximately 24% of women reported moderate to severe sleep disturbance. Previous research shows similar prevalence in a sample of Black (n=23) and White (n=16) breast cancer survivors<sup>40</sup> with mean scores exceeding the standardized average on the PROMIS Sleep Disturbance instrument. In a larger sample of Black breast cancer survivors, over 50% of participants reported clinically significant sleep disturbance pre-diagnosis (n=366), 10 months post-diagnosis (n=139), and 2 years post-diagnosis (n=385)<sup>39</sup> using the PSQI. The findings from the current study add to this small body of literature by highlighting the prevalence of sleep disturbance in Black breast cancer survivors and underscores the need for further investigation given prolonged issues in this clinical population.

The current study also provides valuable insight about emotional health symptoms. Participants reported relatively low anxiety symptom scores, with the sample mean in the “minimal” symptom range of the GAD-7. Approximately 17% of participants reported symptoms in the moderate to severe range on this measure. Some studies similarly show non-clinical anxiety scores in Black women<sup>24,149</sup> whereas other studies show that Black women report higher than average anxiety scores<sup>40</sup>. Mean scores for depressive symptoms, however, were in the clinically elevated range on the CES-D, and over 50% of participants scored in the clinical

range. Some studies have previously shown clinically significant levels of depression in Black breast cancer patients<sup>20,168</sup> while others have shown low average scores for depression in Black breast cancer patients<sup>24</sup> and survivors<sup>149</sup>. Given that there are mixed findings in the context of anxiety and depression in Black breast cancer survivors, more research is necessary to accurately characterize these emotional and behavioral health concerns.

### **Traditional Coping Strategies Are Stronger Predictors of Emotional/Behavioral Health than Culturally-Relevant Coping Strategies**

As hypothesized, traditional coping was a significant predictor of emotional and behavioral health symptoms in the current study. Specifically, greater use of approach-oriented coping strategies was significantly associated with lower levels of distress and less sleep disturbance, and avoidant-oriented coping strategies were significantly associated with higher levels of distress and more sleep disturbance. Contrary to hypotheses, culturally-relevant strategies (i.e., ACSI) were not significantly associated with distress or sleep disturbance. ACSI cognitive debriefing coping strategies were expected to show distinct associations with distress and sleep disturbance, but all ACSI subscales were highly positively correlated and could not be categorized into approach- and avoidant-oriented coping domains. It is possible that the ACSI is not suitable to examine breast cancer-related health symptoms given nonsignificant associations between ACSI and depression and anxiety in a healthy<sup>97</sup> and clinical sample of Black women (i.e., those who reported a previous suicide attempt)<sup>160</sup>. Notably, some ACSI subscales have overlapping items which would make it difficult to identify protective or harmful associations with emotional and behavioral health symptoms. Given these limitations, the ACSI may best be used to supplement traditional coping strategies by providing valuable descriptive information about psychological responses to stress among Black women.

To our knowledge, this is the first study to examine the COPE and the Africultural Coping Systems Inventory in a sample of Black women diagnosed with breast cancer. Black women in this sample reported similar use of religious coping strategies as Black breast cancer survivors in other studies<sup>169</sup> and relatively similar use of disengagement, problem-focused, spirituality, and social support coping strategies as healthy Black women as measured by the Brief COPE<sup>170</sup>. In the current study, Black women also reported lower ACSI scores than Black women in a clinical sample<sup>160</sup> and similar scores for each ACSI coping subscale to healthy Black individuals<sup>171</sup>. Despite nonsignificant associations with distress and sleep disturbance, these findings demonstrate the ACSI was relevant to this sample of Black breast cancer survivors. Further research is needed to investigate the extent to which this instrument is relevant for breast cancer-related health outcomes in Black women. Of note, culturally-relevant coping strategies have important implications for breast cancer-related health behaviors such as seeking mammograms<sup>172</sup>.

### **Culturally-relevant Factors Are Useful for Understanding Breast Cancer-Related Health in Black Women**

In the current study, resilience factors that are relevant to Black women were significantly associated with breast cancer-related emotional and behavioral health outcomes. Psychological resilience, operationalized as hope and optimism, was associated with lower levels of distress and less sleep disturbance. Risk factors and culturally-relevant traits were also significantly associated with breast cancer-related emotional and behavioral health outcomes, though in the opposite direction. Specifically, racial discrimination and Strong Black Woman qualities were associated with higher levels of distress and sleep disturbance. Strong Black Woman qualities were hypothesized to predict lower levels of distress and higher levels of sleep

disturbance given that this conceptual framework posits positive and negative impacts on health<sup>144</sup>. However, this construct was negatively associated with both emotional and behavioral health in the current sample which is consistent with findings in healthy Black women<sup>92,96</sup>. Probing constructs that are highly relevant to Black women, in addition to factors that are typically examined, can be extremely useful in understanding prevalent health concerns in the breast cancer population. Indeed, racial discrimination and Strong Black Woman qualities explained more variance in distress whereas psychological resilience explained more variance in sleep disturbance.

Notably, findings from the current study are consistent with previous research in other clinical and healthy populations. Relevant to racial discrimination, a study with Black breast cancer survivors found that experienced racism was associated with depression and inadequate sleep<sup>173</sup>. In addition, the Strong Black Woman schema was associated with emotional health symptoms, including depression and anxiety<sup>97</sup>, and with sleep quality<sup>174</sup> in non-clinical samples of Black women. This is consistent with findings from the current study showing links between Strong Black woman qualities and higher levels of distress and worse sleep disturbance. In the current sample, John Henryism was not significantly associated with coping strategies, distress, or sleep disturbance. These null findings were not surprising given that previous studies show inconsistent links with health<sup>111–113</sup> in women. Further, the average score ( $M=36$ ) on this measure was relatively low in the current study relative to previous research showing associations with poor health outcomes<sup>115,161</sup> which was likely a hindrance to detecting associations with distress and sleep disturbance. Of note, John Henryism and the Strong Black Woman Schema similarly measure individuals' persistence despite hardship. However, the Strong Black Woman Schema captures additional psychosocial factors that may be particularly salient for emotional and

behavioral health. Given that racial discrimination and Strong Black Woman qualities were significantly associated with distress and sleep disturbance, further examination of culturally-relevant factors in relation to common emotional and behavioral health outcomes is warranted.

An important contribution of this study is that its examination of traditional and culturally-relevant measures showed inconsistencies in well-known constructs. This is particularly evident with the Strong Black Woman Schema which has been examined as a framework to understand resilience<sup>175</sup>. Although resilience is defined as a process of positive adaptation despite experiences with adversity or trauma<sup>176</sup>, Strong Black Woman qualities were associated with poor health in the current study. The subscales that comprise this measure represent aspects of resilience, including “obligation to manifest strength” and “determination to succeed despite limited resources”. However, there are also subscales that represent risk, including “obligation to suppress emotions” and “resistance to being vulnerable or dependent”. The current findings demonstrate that the resilient qualities of the Strong Black Woman Schema did not protect participants from poor emotional and behavioral health symptoms in this sample. Indeed, subscales that represent risk and resilience were correlated with higher levels of distress and sleep disturbance (Exploratory Table 1). Importantly, these findings highlight that the Strong Black Woman schema is distinct from traditional resilience measures and demonstrates that the nuance in this culturally-relevant resilience measure is useful for elucidating poor breast cancer-related health outcomes in Black women. Of note, associations between Strong Black Woman qualities and poor emotional and behavioral health symptoms are consistent with research showing that culturally compelled coping resources (i.e., adaptive responses to race-related stressors) predict worse mental health<sup>177</sup>. These findings highlight an important distinction by showing that SBW traits serve different functions with respect to social context and health. There

are positive implications for community-level factors such that SBW traits have historically been beneficial for survival and maintaining familial structure in the face of threats<sup>94</sup>. However, in the context of health SBW traits represent “an overused asset that develops uncritically without ongoing evaluation and attention to changing needs and demands runs the risk of becoming a liability”<sup>178</sup> as evidenced in empirical research, including the current study.

### **Traditional Coping Strategies Represent Significant Pathways to Elucidate Distress and Sleep Disturbance**

As evidenced in the current study, coping was an important pathway linking contextual and culturally-relevant factors and common breast cancer-related health concerns. As predicted, psychological resilience was associated with greater use of approach-oriented coping strategies and less use of avoidant-coping strategies. In contrast, racial discrimination and Strong Black Woman qualities were associated with less use of approach- and greater use of avoidant-oriented coping strategies. Further, these coping strategies mediated associations between the predictors and emotional and behavioral symptoms, though effects differed based on the outcome.

In the current study, approach-oriented coping was a statistically significant pathway that consistently explained associations between risk, resilience, and race-related and sleep disturbance. Previous studies show that approach-oriented coping strategies (e.g., acceptance) are associated with positive psychological (e.g., lower depressive symptoms) and physical health (e.g., reductions in pain symptoms) although evidence of links with health are less established<sup>48</sup>. This is consistent with current findings such that approach-oriented strategies mediated associations between higher levels of psychological resilience and lower sleep disturbance. In addition, approach-oriented strategies mediated associations between higher levels of race-related factors (i.e., racial discrimination, SBW traits) and higher sleep disturbance. In previous

studies, approach-oriented coping strategies were associated with sleep disturbance in a healthy sample<sup>179</sup> but were not associated in a breast cancer sample<sup>180</sup>. Interestingly, this is the first study to demonstrate links between approach-oriented coping strategies and sleep disturbance in a breast cancer sample.

Findings from the current study also showed that avoidance-oriented coping was a statistically significant pathway that consistently explained associations between risk, resilience, and race-related and distress. Previous research shows that avoidance-oriented coping strategies are associated with poor mental (e.g., depression) and physical health (e.g., increase in pain symptoms)<sup>48</sup>. The current study similarly showed that avoidance-oriented strategies mediated associations between higher levels of psychological resilience and lower distress. In addition, avoidance-oriented coping strategies mediated associations between higher levels of culturally-relevant factors (i.e., racial discrimination, Strong Black Woman qualities) and higher levels of distress. These findings address a gap in the literature by showing that racial discrimination and Strong Black Woman qualities predict traditional coping strategies in the context of breast cancer. Although racial discrimination and Strong Black Woman qualities may not be easily modified, these significant indirect pathways provide valuable information about potential targets to lower distress and sleep disturbance in Black women.

### **Characterizing Experiences of Black Women in the Context of Breast Cancer**

The current findings provide an important contribution to a growing literature that highlights the relevance of the Strong Black Woman Schema in the context of breast cancer<sup>181-183</sup>. In previous research, Black women indicated that some Strong Black Woman qualities may lead women to engage in behaviors that promote poor health, including sedentary behaviors and alcohol consumption, that are particularly relevant for breast cancer<sup>99</sup>. In the current study,



participants reported each of these behaviors in addition to highlighting a lack of healthy habits and self-care more generally. Importantly, many of these behaviors are linked to morbidities which can exacerbate poor breast cancer-related health outcomes<sup>184</sup>. Participants also reported underutilization of the healthcare system which is relevant for breast cancer such that Black women who reported Strong Black Woman traits de-prioritized preventive breast health (e.g., delays in obtaining mammograms) in a qualitative study<sup>98</sup>. Of note, these themes are modifiable and enhancing health-promoting behaviors such as exercise, for example, are known to be associated with better prognosis<sup>185</sup>. Thus, these data can be leveraged to address poor health, especially in the context of breast cancer, as it provides important insight on factors that may contribute to higher rates of mortality.

Illness perceptions provide valuable information about poor health given that they are associated with health outcomes<sup>121</sup>. However, empirical evidence of breast cancer-related illness perceptions in Black women is limited. To date, only two studies have examined breast cancer-related illness perceptions among Black women. The current study adds to this small body of literature by being the first to qualitatively analyze open-ended responses. Results from previous research show overlap with findings from the current study. In the first study, participants attributed breast cancer risk and delays in breast cancer detection to bad luck or fate, lack of cancer-related symptoms, belief that a higher power determines illness, reluctance to turn to others for help while in an abusive marriage, family history of cancer invulnerability due to other prevalent diseases, and fear of gynecologic exams stemming from childhood abuse<sup>186</sup>. In the second study, results indicated that Black women were more likely to attribute breast cancer to immunity (i.e., caused by a germ or virus) relative to White women<sup>129</sup>. These findings are particularly relevant to participants' perceptions that their disease was caused by a vaccine or

surgery. Another important contribution of this study is that qualitative analysis demonstrated that the themes derived from participants' breast cancer-related illness perceptions in the current study represent individual-, structural-, and social-level factors. Distinguishing breast cancer-related illness perceptions in this way provides additional perspective on how to interpret individuals' responses. Further, these data are relevant for promoting change in various domains rather than solely placing blame or responsibility on the individual. Of note, most codes were operationalized as individual- or structural-level causes of breast cancer. Thus, participants' breast cancer-related illness perceptions show that there are various targets to address their beliefs about breast cancer including providing Black women with information about testing for breast cancer, identifying culturally-relevant resources to reduce psychological burden, and utilizing policy-oriented approaches to modify their environments.

### **Limitations and Future Directions**

It is important to note that this study has some limitations. Although the study had adequate power to detect main effects (Aims 1 and 2), mediation analyses were underpowered. The data from this study are also cross-sectional which limits interpretation because causality cannot be determined. Another limitation of this study is that disease-related characteristics were self-reported by participants. A majority of participants were located in California given that participants were largely recruited from the UCLA Cancer Registry. Future research should recruit women from across the United States to determine whether geographic location and socioeconomic status may influence the effects of culturally-relevant and contextual factors on emotional and behavioral health symptoms.

As previously mentioned, the ACSI subscales have similar items which may have overshadowed distinct associations with distress and sleep disturbance and led to high

correlations between subscales. For the open-ended questions in the Superwoman Schema Scale and the Brief Illness Perceptions Questionnaire, participants provided short responses. In some cases, short responses were sufficient to interpret ways of neglecting one's health or perceived causes of breast cancer. However, some responses were more difficult to interpret (e.g., "lifestyle") due to limited details. Another limitation of this study is that we were unable to ask follow-up questions to obtain more information for participants' open-ended responses. Although many of the responses for the Superwoman schema were interpreted as individual-level factors, it is possible that structural-level barriers may have led participants to neglect their health which warrants further investigation. Similarly, illness perceptions may be classified into categories other than individual-, structural-, and social-level causes of breast cancer, but further interpretation is limited. Future research should examine culturally-relevant measures to provide additional context about unique experiences of Black women that contribute to poor breast cancer-related health outcomes and social contexts.

In terms of survey administration, participants reported barriers to completing the study. Specifically, participants reported computer-related difficulties that prevented them from completing the survey. Some participants had incomplete data due to starting the survey but not submitting their responses. Further, sociodemographic information (e.g., educational attainment) were included at the end of the survey which limited our ability to compare participants who completed the survey relative to participants who did not. Other barriers to completing the survey included distrust. Study materials indicated that participants in the study would involve completion of the online survey, only. However, some participants indicated that they were concerned about biological data collection. Attempts were made to address prospective participants' concerns by scheduling phone calls to provide additional information about the

study and answer any questions which often led participants to enroll in the study. Given that the PI was able to increase study enrollment through interactions to provide further clarification via phone calls and follow-up emails with participants, researchers may benefit from recruiting participants at in-person events to increase recruitment of Black breast cancer survivors.

## **Conclusions**

The current study adds to a small but growing number of cross-sectional studies that focus on behavioral and emotional health outcomes in Black breast cancer survivors<sup>16,40,149,169,187,188</sup> and provides valuable contributions to the literature. Notably, study results characterized two understudied indicators of emotional and behavioral health, identified predictors of these outcomes, and distinguished between traditional and culturally-relevant coping strategies as significant mediating pathways. In addition, the mixed-methods design was a strength of this study in that it contributed important information about health behaviors and breast cancer-related illness perceptions.

These findings can be leveraged in the breast cancer context in various ways. Healthcare providers should be aware of experiences (e.g., racial discrimination) and traits (e.g., Strong Black Woman qualities) that are salient in Black women in order to effectively communicate with patients about strategies to address these common health concerns. To ensure that the experiences of Black women are acknowledged in healthcare settings, there should be cultural competency training to improve interactions with Black women diagnosed with breast cancer. A recent study showed that despite having higher levels of distress than Black men, White men, and White women, the probability of being referred to psycho-oncology services was lowest among Black women<sup>189</sup>. Thus, knowledge of culturally-relevant risk factors, in particular, may be particularly useful to improve health outcomes of Black breast cancer survivors.

The findings from the current study also provide actionable targets to improve health for Black women in the breast cancer population. Specifically, resources can be provided to Black women in healthcare settings and non-healthcare settings to address the factors that underlie neglected health based on findings from this study. Within healthcare settings, healthcare providers may provide patients with tangible solutions to address eating behaviors such as interventions with Black women to increase health-promoting behaviors, utilization of healthcare services, and enhance vital health-related knowledge about causes of breast cancer. Importantly, results from this study show that participants are aware of the harmful factors that contribute to worse health. Therefore, it is possible that they may benefit from tailored interventions that aim to promote healthy behaviors and increase utilization of healthcare services while accounting for the outstanding obligations and breast cancer-related illness perceptions that were reported by Black women in this sample.

**Table 1***Characteristics of Study Sample*

Age, mean (SD) [range]	56.55 (13.80) [26-90]
Age (at first diagnosis), mean (SD) [range]	52.85 (13.18) [24-88]
Years since first diagnosis, mean (SD)	4.36 (3.10)
Race, n (%)	
Black	151 (100.00)
Sex, n (%)	
Female	151 (100.00)
Breast Cancer Stage at Diagnosis, n (%)	
Stage 0	28 (19.60)
Stage 1	44 (30.80)
Stage 2	43 (30.10)
Stage 3	16 (11.20)
Stage 4	8 (5.60)
Unsure/Don't Know	4 (2.80)
Surgery Type, n (%)	
Lumpectomy	73 (57.00)
Mastectomy	48 (37.50)
Lumpectomy + Mastectomy	7 (5.50)
Breast Cancer Treatment, n (%)	
Currently receiving treatment	52 (40.00)
Previously received treatment	78 (60.00)
Treatment Type, n (%)	
Radiation	88 (58.30)
Chemotherapy	78 (51.70)
Endocrine therapy	48 (27.20)
Trastuzumab	10 (6.60)
TNBC, n (%) (n=143)	
Yes	28 (19.60)
No	115 (80.40)

**Table 2***Summary of Health Symptoms and Psychological and Culturally-Relevant Factors*

GAD-7 (N=104), mean (SD)	4.70 (5.52)
Minimal, n (%)	64 (61.50)
Mild, n (%)	22 (21.20)
Moderate, n (%)	8 (7.70)
Severe, n (%)	10 (9.60)
CES-D (n=108), mean (SD)	18.69 (6.82)
0-15, n (%)	51 (47.20)
≥16, n (%)	57 (52.80)
PROMIS Sleep (N=105), mean (SD)	52.34 (10.37)
Within normal limits, n (%)	59 (56.20)
Mild, n (%)	21 (20.00)
Moderate, n (%)	18 (17.10)
Severe, n (%)	7 (6.70)
Everyday Discrimination Scale (N=106), mean (SD)	21.58 (9.42)
Psychological Resources, mean (SD)	
Optimism (n=111)	17.54 (5.21)
Hope (n=102)	70.80 (7.38)
SBW (N=133), mean (SD)	65.44 (17.57)
Obligation to manifest strength, mean (SD) (n=134)	13.87 (2.85)
Obligation to suppress emotions, mean (SD) (n=138)	11.59 (4.55)
Resistance to being vulnerable or dependent, mean (SD) (n=138)	12.59 (4.93)
Determination to succeed despite limited resources, mean (SD) (n=138)	11.84 (3.44)
Obligation to help others, mean (SD) (n=137)	14.90 (6.40)
John Henryism (n=113), mean (SD)	36.35 (5.39)
COPE, mean (SD)	
Positive Reinterpretation (n=136)	3.33 (0.67)
Acceptance (n=134)	3.18 (0.60)
Problem-Focused (n=136)	3.33 (0.63)
Seeking Social Support (n=136)	2.66 (0.83)
Emotional Expression (n=133)	2.72 (0.80)
Emotional Processing (n=131)	3.13 (0.77)
Religious Coping (n=123)	3.21 (1.01)
Denial (n=136)	1.43 (0.57)
Mental Disengagement (n=136)	2.39 (0.62)
Behavioral Disengagement (n=136)	1.61 (0.57)
Approach Composite (n=136)	3.06 (0.51)
Avoidance Composite (n=136)	1.81 (0.47)
ACSI, mean (SD)	
ACSI Cognitive Emotional Debriefing (n=123)	0.96 (0.55)
ACSI Spiritual Coping (n=123)	1.17 (0.76)
ACSI Collective Coping (n=123)	1.23 (0.64)
ACSI Ritual Coping (n=119)	0.36 (0.69)

ACSI Total (n=105)	31.44 (15.64)
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**Table 3**

*Bivariate Correlations Between Risk, Resilience, and Race-Related Factors*

	1	2	3	4
1. Racial Discrimination	-			
2. Strong Black Woman	0.43**	-		
3. Psychological Resilience	-0.41**	-0.23*	-	
4. John Henryism	-0.08	0.08	0.32	-

*Note.* \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .



**Table 4***Bivariate Correlations Between Traditional and Culturally-Relevant Coping Strategies*

	1	2	3	4	5	6
1. ACSI Cognitive Emotional Debriefing	-					
2. ACSI Spiritual	0.52***	-				
3. ACSI Collective Coping	0.62***	0.61***	-			
4. ACSI Ritual Coping	0.42***	0.33***	0.30**	-		
5. COPE Approach	0.19	0.35**	0.49***	0.05	-	
6. COPE Avoidance	0.39***	0.12	0.14	0.16	-0.13	-

*Note.* \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . ACSI = Africultural Coping Systems Inventory.

**Table 5**

*Associations between Coping Strategies and Emotional/Behavioral Health Symptoms*

	Distress			Sleep Disturbance		
	b	p	R <sup>2</sup>	b	p	R <sup>2</sup>
COPE Approach Composite	-7.00	0.003**	0.20	-6.91	<0.001***	0.16
<i>Age</i>	-0.25	0.01*		-0.05	0.47	
<i>Years Since Diagnosis</i>	-0.26	0.50		-0.30	0.34	
COPE Avoidant Composite	11.82	<0.001***	0.32	4.24	0.03*	0.07
<i>Age</i>	-0.22	0.01*		-0.08	0.30	
<i>Years Since Diagnosis</i>	-0.24	0.50		-0.31	0.35	
ACSI Total	0.04	0.63	0.14	-0.02	0.82	0.05
<i>Age</i>	-0.36	<0.001***		-0.14	0.08	
<i>Years Since Diagnosis</i>	0.12	0.78		-0.18	0.60	
ACSI Cognitive Emotional Debriefing	0.31	0.20	0.14	0.15	0.42	0.05
<i>Age</i>	-0.30	0.004**		-0.10	0.21	
<i>Years Since Diagnosis</i>	-0.03	0.94		-0.24	0.47	
ACSI Collective Coping	-0.24	0.38	0.15	-0.16	0.46	0.05
<i>Age</i>	-0.35	<0.001***		-0.11	0.16	
<i>Years Since Diagnosis</i>	-0.13	0.75		-0.29	0.39	
ACSI Ritual Coping	0.87	0.17	0.14	0.34	0.50	0.04
<i>Age</i>	-0.31	0.002**		-0.11	0.17	
<i>Years Since Diagnosis</i>	-0.22	0.60		-0.30	0.37	

ACSI Spiritual Coping	-0.17	0.36	0.11	-0.15	0.30	0.05
<i>Age</i>	-0.29	0.004**		-0.11	0.17	
<i>Years Since Diagnosis</i>	-0.26	0.52		-0.26	0.42	

*Note.* \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

**Table 6**

*Associations between Risk, Resilience, and Culturally-Relevant Factors and Emotional/Behavioral Health Symptoms*

	Distress			Sleep Disturbance		
	b	p	R <sup>2</sup>	b	p	R <sup>2</sup>
Psychological Resilience	-0.61	<0.001***	0.10	-0.30	0.01*	0.31
<i>Age</i>	-0.18	0.55		-0.01	0.87	
<i>Years Since Diagnosis</i>	-0.45	0.24		-0.35	0.30	
Racial Discrimination	0.48	<0.001***	0.24	0.29	0.01*	0.12
<i>Age</i>	-0.28	0.003**		-0.09	0.23	
<i>Years Since Diagnosis</i>	-0.09	0.81		-0.25	0.45	
Strong Black Woman Schema	0.27	<0.001***	0.29	0.15	0.01*	0.13
<i>Age</i>	-0.33	<0.001***		-0.12	0.11	
<i>Years Since Diagnosis</i>	0.14	0.73		-0.10	0.76	
John Henryism	-0.24	0.33	0.12	-0.24	0.20	0.05
<i>Age</i>	-0.29	0.003**		-0.10	0.20	
<i>Years Since Diagnosis</i>	-0.27	0.51		-0.33	0.31	

*Note.* \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

**Table 7**

*Coping Strategies as Mediators of the Associations between Racial Discrimination and Emotional/Behavioral Health Symptoms*

	Distress					Sleep Disturbance				
	Indirect Effect	X→M	M→Y	Direct Effect	Total Effect	Indirect Effect	X→M	M→Y	Direct Effect	Total Effect
	ab path b (SE) [CI]	a path b (p)	b path b (p)	c' path b (p)	c path b (p)	ab path b (SE) [CI]	a path b (p)	b path b (p)	c' path b (p)	c path b (p)
Predictor: Racial Discrimination		-0.01 (0.01)*		0.43 (0.002)**	0.50 (0.0002)***		-0.01 (0.01)*		0.21 (0.048)*	0.30 (0.01)*
Mediator: COPE Approach	0.07 (0.04) [-0.004, 0.17]		-4.76 (0.05)			<b>0.08 (0.04) [0.01, 0.18]</b>		-5.56 (0.01)		
Age		0.02 (0.06)		-0.25 (0.01)*	-0.29 (0.002)**		0.01 (0.046)*		-0.05 (0.52)	-0.10 (0.22)
Years Since Diagnosis		-0.002 (0.93)		-0.15 (0.70)	-0.14 (0.72)		-0.002 (0.92)		-0.26 (0.41)	-0.26 (0.42)
Predictor: Racial Discrimination		0.02 (0.001)		0.32 (0.01)	0.50 (0.0002)		0.02 (0.0006)***		0.26 (0.02)*	0.30 (0.01)*
Mediator: COPE Avoidant	<b>0.16 (0.07) [0.03, 0.32]</b>		10.05 (0.0001)			0.03 (0.03) [-0.05, 0.11]		1.68 (0.43)		
Age		-0.01 (0.09)		-0.21 (0.01)	-0.29 (0.002)		-0.01 (0.03)*		-0.08 (0.30)	-0.10 (0.22)
Years Since Diagnosis		0.01 (0.02)*		-0.16 (0.66)	-0.14 (0.72)		0.002 (0.91)		-0.27 (0.42)	-0.26 (0.42)

Note. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ ; Significant indirect effects are bolded.

**Table 8**

*Coping Strategies as Mediators of the Associations between Psychological Resilience and Emotional/Behavioral Health Symptoms*

	Distress					Sleep Disturbance				
	Indirect Effect	X→M	M→Y	Direct Effect	Total Effect	Indirect Effect	X→M	M→Y	Direct Effect	Total Effect
	ab path b (SE) [CI]	a path b (p)	b path b (p)	c' path b (p)	c path b (p)	ab path b (SE) [CI]	a path b (p)	b path b (p)	c' path b (p)	c path b (p)
Predictor: Psychological Resilience		0.03 ( $<0.00001$ )***		-0.58 (0.0001)***	-0.61 ( $<0.00001$ )***		0.03 ( $<0.00001$ )***		-0.15 (0.21)	-0.30 (0.01)*
Mediator: COPE Approach	-0.03 (0.08) [-0.20, 0.11]		-1.17 (0.68)			<b>-0.15 (0.06) [-0.29, -0.04]</b>		-5.46 (0.02)*		
Age		0.002 (0.60)		-0.17 (0.06)	-0.18 (0.06)		0.001 (0.62)		-0.003 (0.97)	-0.01 (0.87)
Years Since Diagnosis		-0.002 (0.91)		-0.45 (0.24)	-0.45 (0.24)		-0.002 (0.90)		-0.36 (0.28)	-0.35 (0.30)
Predictor: Psychological Resilience		-0.02 (0.0001)***		-0.44 (0.0004)***	-0.61 ( $<0.00001$ )***		-0.02 (0.0003)***		-0.27 (0.02)*	-0.30 (0.01)*
Mediator: COPE Avoidant	<b>-0.16 (0.06) [-0.28, -0.04]</b>		8.38 (0.001)**			-0.03 (0.04) [-0.12, 0.04]		1.71 (0.44)		
Age		-0.01 (0.17)		-0.13 (0.13)	-0.17 (0.05)		-0.01 (0.10)		0.01 (0.95)	-0.01 (0.94)
Years Since Diagnosis		-0.01 (0.69)		-0.39 (0.28)	-0.45 (0.24)		-0.01 (0.54)		-0.31 (0.38)	-0.32 (0.35)

Note. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ ; Significant indirect effects are bolded.

**Table 9**

*Coping Strategies as Mediators of the Associations between Race-Related Factors and Emotional/Behavioral Health Symptoms*

	Distress					Sleep Disturbance				
	Indirect Effect	X→M	M→Y	Direct Effect	Total Effect	Indirect Effect	X→M	M→Y	Direct Effect	Total Effect
	ab path b (SE) [CI]	a path b (p)	b path b (p)	c' path b (p)	c path b (p)	ab path b (SE) [CI]	a path b (p)	b path b (p)	c' path b (p)	c path b (p)
Predictor: Strong Black Woman		-0.01 ( $<0.00001$ )***		0.23 (0.002)**	0.27 (0.0001)**		-0.01 ( $<0.00001$ )***		0.09 (0.13)	0.15 (0.005)**
Mediator: COPE Approach	0.04 (0.04) [-0.03, 0.12]		-2.83 (0.27)			<b>0.06</b> <b>(0.03)</b> <b>[0.01,0.14]</b>		-5.17 (0.02)*		
<i>Age</i>		0.01 (0.04)*		-0.31 (0.002)**	-0.33 (0.001)**		0.01 (0.04)*		-0.08 (0.28)	-0.12 (0.11)
<i>Years Since Diagnosis</i>		-0.02 (0.24)		0.08 (0.83)	0.14 (0.73)		-0.02 (0.29)		-0.18 (0.57)	-0.10 (0.76)
Predictor: Strong Black Woman		0.01 (0.03)*		0.21 (0.001)**	0.27 (0.0001)**		0.01 (0.03)*		0.14 (0.01)*	0.15 (0.01)*
Mediator: COPE Avoidant	<b>0.06</b> <b>(0.03)</b> <b>[0.01, 0.13]</b>		9.64 ( $<0.00001$ )***			0.01 (0.01) [-0.01, 0.04]		1.86 (0.35)		
<i>Age</i>		-0.01 (0.09)		-0.26 (0.003)**	-0.33 (0.001)**		-0.01 (0.07)		-0.11 (0.18)	-0.13 (0.12)
<i>Years Since Diagnosis</i>		0.005 (0.79)		0.09 (0.79)	0.14 (0.73)		0.0002 (0.99)		-0.10 (0.76)	-0.10 (0.76)
Predictor: John Henryism		0.002 (0.84)		-0.22 (0.34)	-0.24 (0.33)		0.003 (0.79)		-0.22 (0.21)	-0.24 (0.20)
Mediator: COPE Approach	-0.01 (0.08) [-0.19, 0.16]		-7.02 (0.004)**			-0.02 (0.07) [-0.17, 0.12]		-6.32 (0.001)**		

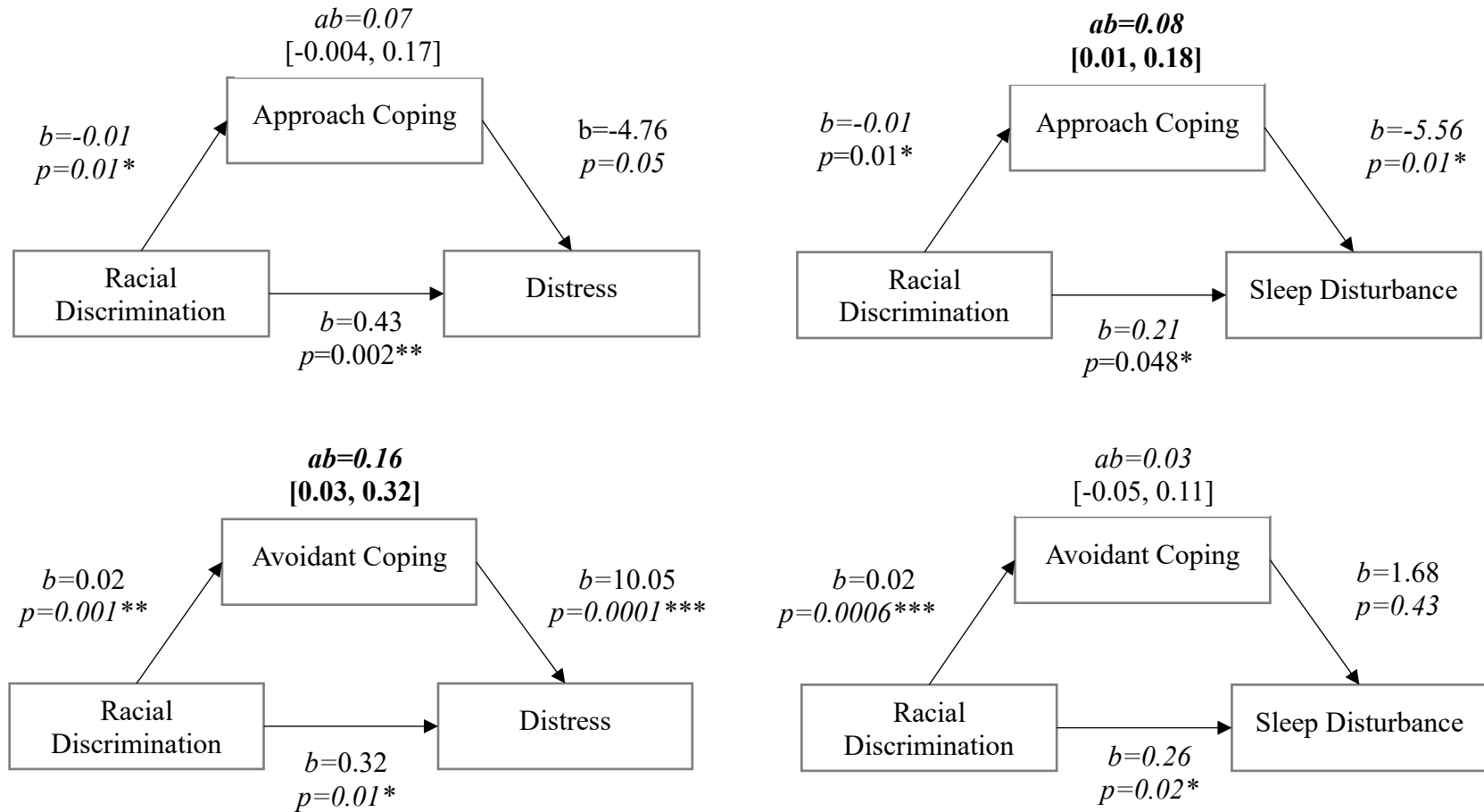
<i>Age</i>		0.007 (0.08)		-0.24 (0.01)**	-0.29 (0.003)**		0.008 (0.06)		-0.05 (0.50)	-0.10 (0.20)
<i>Years Since Diagnosis</i>		0.002 (0.93)		-0.26 (0.51)	-0.27 (0.51)		0.003 (0.86)		-0.31 (0.32)	-0.33 (0.31)
Predictor: John Henryism		-0.02 (0.10)		-0.05 (0.81)	-0.24 (0.33)		-0.01 (0.18)		-0.20 (0.30)	-0.24 (0.20)
Mediator: COPE Avoidant	-0.18 (0.12) [-0.44, 0.05]		11.57 ( $<0.00001$ )***			-0.04 (0.04) [-0.13, 0.03]		3.46 (0.09)		
<i>Age</i>		-0.01 (0.07)		-0.21 (0.02)*	-0.29 (0.003)**		-0.01 (0.06)		-0.07 (0.35)	-0.10 (0.31)
<i>Years Since Diagnosis</i>		-0.003 (0.87)		-0.24 (0.52)	-0.27 (0.51)		-0.01 (0.75)		-0.31 (0.34)	-0.33 (0.31)

Note. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ ; Significant indirect effects are bolded.



**Figure 1**

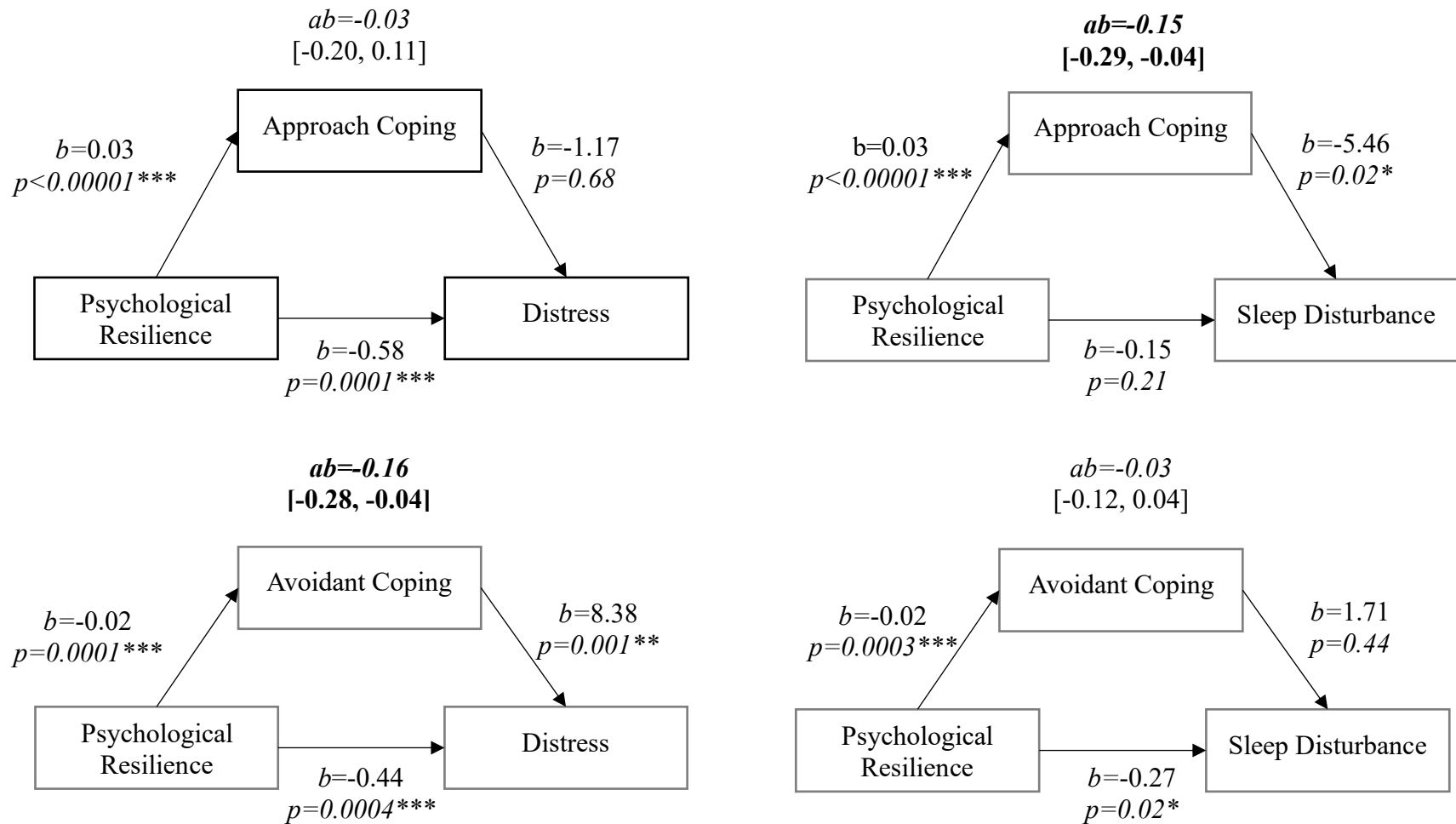
*Coping Strategies as Mediators of the Associations between Racial Discrimination and Emotional/Behavioral Health Symptoms*



Note.  $*p < 0.05$ ,  $**p < 0.01$ ,  $***p < 0.001$ . Significant indirect effects are bolded.

**Figure 2**

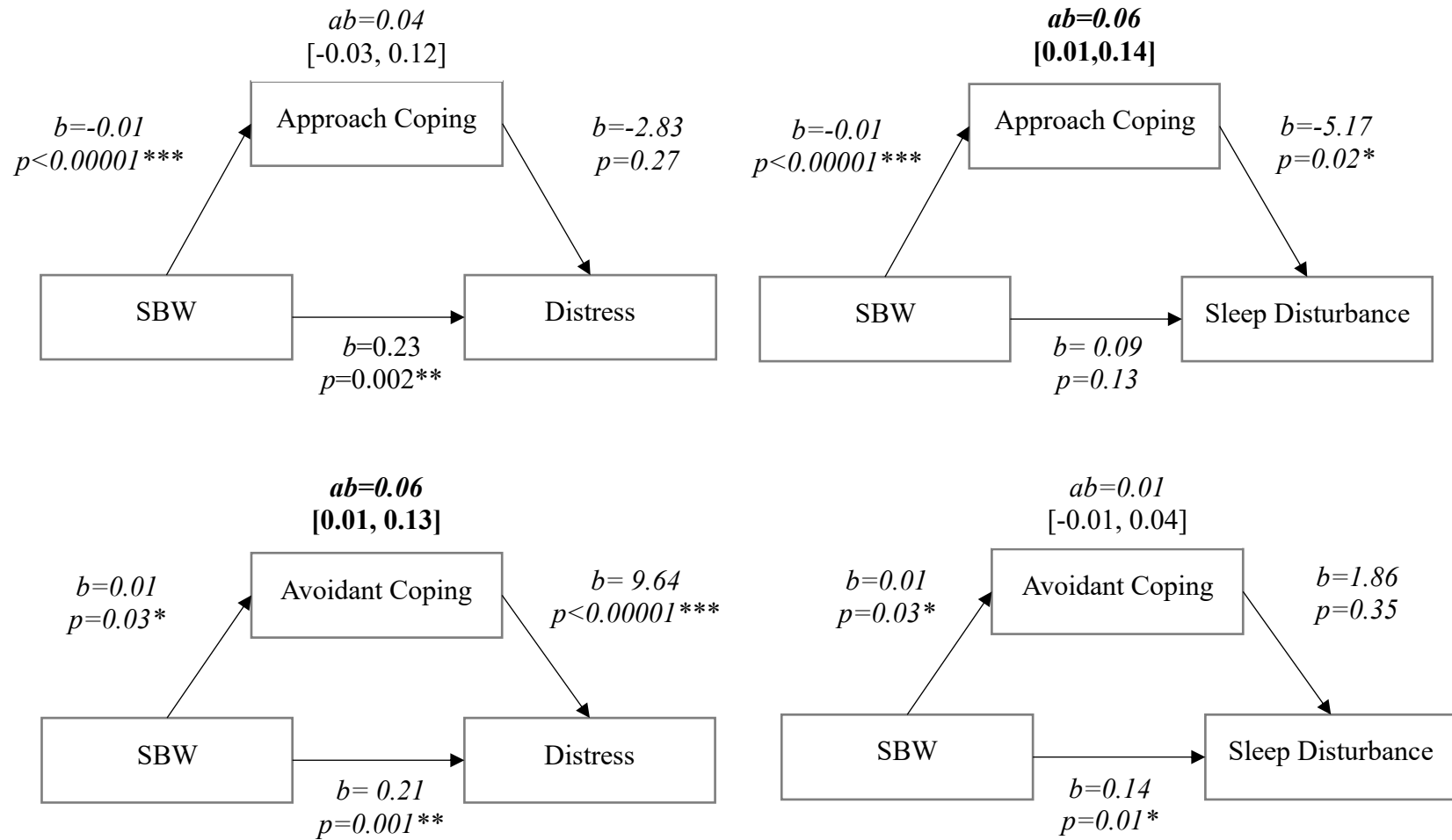
*Coping Strategies as Mediators of the Associations between Psychological Resilience and Emotional/Behavioral Health Symptoms*



Note. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . Significant indirect effects are bolded.

**Figure 3**

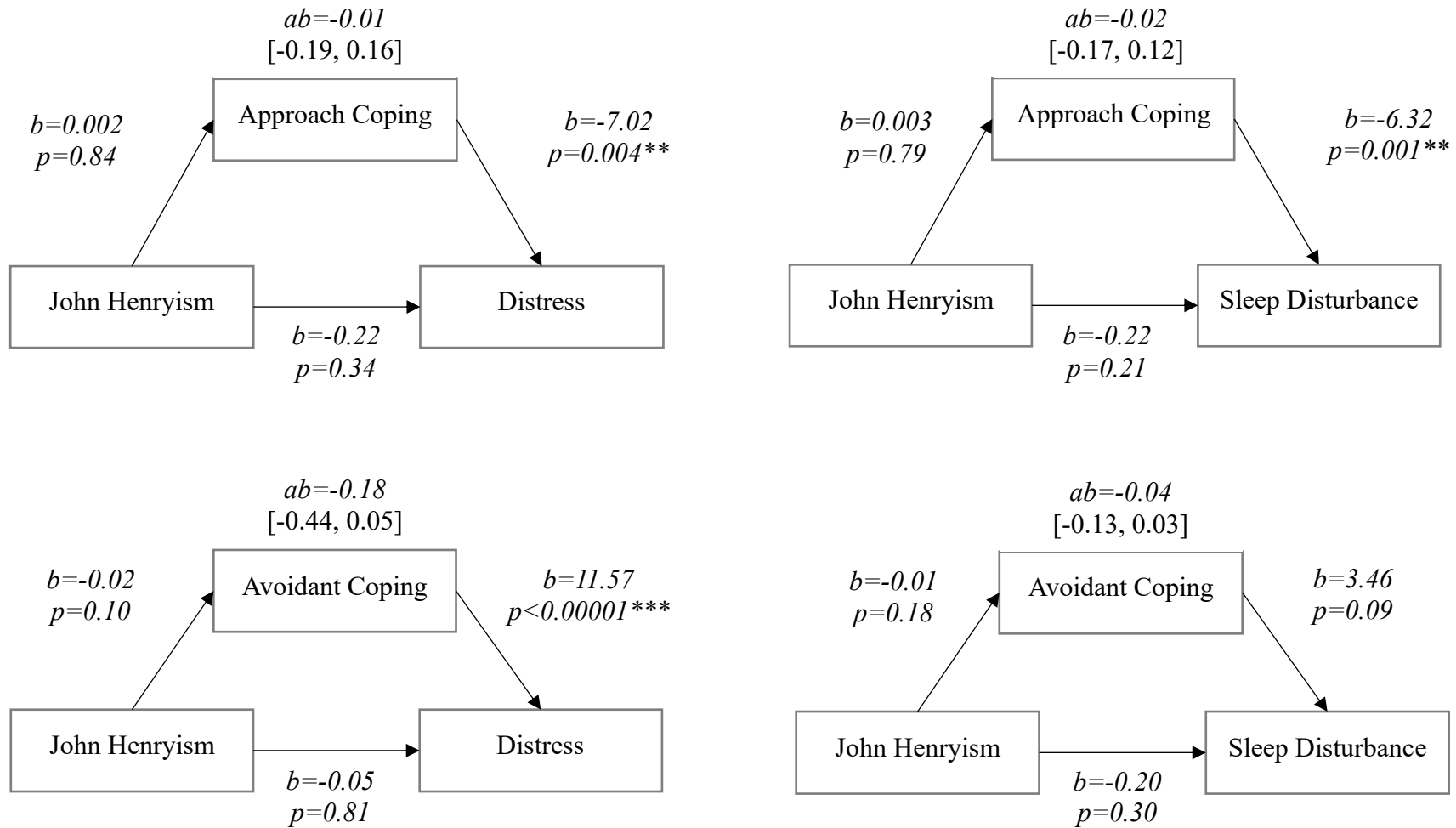
*Coping Strategies as Mediators of the Associations between Strong Black Woman Traits and Emotional/Behavioral Health Symptoms*



Note. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ ; Significant indirect effects are bolded. SBW=Strong Black Woman Traits.

**Figure 4**

*Coping Strategies as Mediators of the Associations between John Henryism and Emotional/Behavioral Health Symptoms*



Note. \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

**Table 10**

*Strong Black Woman Schema: Acknowledging Ways of Neglecting Health*

<b>Theme</b>	<b>Count</b>	<b>Category</b>	<b>Count</b>	<b>Code</b>	<b>Count</b>	<b>Representative Quote</b>
<b><i>Behaviors that increase risk for poor health</i></b>	79	<b><i>Compromising Lifestyle Choices</i></b>	58	Lack of rest	8	“Not taking time to workout”
				Lack of self-care	11	“Not catching things sooner...not valuing my body”
				Lack of healthy habits	13	“Sometimes I forget [to] take medicine, sometimes I don’t get the proper rest”
				Lack of exercise	26	“Not taking time to workout”
		<b><i>Poor Health Behaviors</i></b>	21	Smoking	1	“I drink and smoke occasionally but I stopped smoking for chemo”
				Acknowledging unhealthy eating habits	18	“..Not eating properly on a consistent basis”
				Acknowledging unhealthy drinking habits	3	“I drink alcohol too often”
<b><i>Underutilization of the healthcare system</i></b>	48	<b><i>Irregular interactions with the healthcare system</i></b>	33	Not seeking medical care	14	“I should have gotten my breast lump checked a few months earlier”
				Delaying medical care	11	“Not acting fast enough. Delay going to doctor”
				Not reporting health symptoms	2	“Not sharing all of my concerns when I do see the doctor”

				Ignoring health symptoms	6	“I ignore aches and pains sometimes. I push too hard when my joints want me to stop”
		<i>De-prioritizing health due to outside obligations</i>	15	Obligations upstage personal health needs and care	15	“I will skip morning workouts to get my family ready and out the house. I delayed doctor appointments because of work meeting schedules.”
<b><i>Barriers to seeking health care</i></b>	8	<i>Stress and Mental Health Exacerbate Poor Health</i>	7	Psychological barriers	7	“I stress about things I shouldn't causing myself anxiety and depression.”
		<i>Financial barriers</i>	1	Financial restrictions	1	“..If I don't have money, I don't seek care”

**Table 11**

*Illness Perceptions: Perceived Causes of Breast Cancer*

<b>Theme</b>	<b>Code</b>	<b>Count</b>	<b>Representative Quote</b>	<b>Individual</b>	<b>Structural</b>	<b>Social</b>
<i><b>Economic Stability</b></i> (n=3)	Work	3	“My work”		✓	
<i><b>Neighborhood and physical environment</b></i> (n=37)	Environmental factors	35	“Environment”		✓	
	Lack of exercise	2	“Lack of exercise”	✓		
<i><b>Food</b></i> (n=42)	Consumption of unhealthy foods	20	“Foods I eat”	✓		
	Consumption of alcohol	6	“My drinking”	✓		
	Weight	7	“Being overweight. Obesity can lead to the majority of multiple chronic illnesses”	✓		
	Low food quality	8	“American Food Sources (GMO/Seafood Toxins/Artificial Ingredients)”		✓	
	Lack of water	1	“More water”	✓		
<i><b>Community and social context</b></i> (n=35)	Stress	25	“Chronic stress”	✓		
	Interpersonal relationships	6	“A broken heart over a divorce”			✓
	Race	3	“Being Black”	✓		
	Racism	1	“Racism”			✓
<i><b>Health and Healthcare</b></i>	History of family health	34	“Genetic, my sister is stage 4”			✓

<b>(n=83)</b>						
	Hormones	16	“over production of estrogen”	✓		
	Health condition	12	“Fibroids”	✓		
	Not utilizing health services	4	“Late diagnosis”	✓	✓	
	Mental health	6	“Depression”	✓		
	Poor health due to race	2	“Poor care black woman get”		✓	
	Surgery	2	“I had an elective medial surgery”		✓	
	Vaccine	1	“Vaccines”		✓	
	Biological	5	“My biological makeup”	✓		
	Inflammation	1	“Inflammation”	✓		
<b>Additional Factors</b>						
<b><i>Sociodemographic factors (n=9)</i></b>	Age	8	“Age”			✓
	Gender	1	“Being female”			✓
<b><i>Exposure to toxins (n=3)</i></b>	Smoking	2	“Past smoking”	✓		
	Hair chemicals	1	“Hair relaxers”		✓	
<b><i>Unknown/Higher Power (n=26)</i></b>	Chance	12	“Life”			✓
	Religion	4	“God”			✓
	Unsure	10	“No idea”			✓
<b><i>Lifestyle (n=6)</i></b>	Lifestyle	6	“Lifestyle”	✓	✓	

**Exploratory Table 1**

*Bivariate Associations Between Strong Black Woman Schema Subscales and Distress and Sleep Disturbance*



	1	2	3	4	5	6	7
1. SBW Strength	-						
2. SBW Suppress Emotions	0.50***	-					
3. SBW Vulnerable	0.42***	0.75***	-				
4. SBW Succeed	0.51***	0.40***	0.51***	-			
5. SBW Others	0.47***	0.60***	0.58***	0.54***	-		
6. Distress	0.18	0.39***	0.48***	0.21*	0.37***	-	
7. Sleep Disturbance	0.20**	0.36	0.33***	-0.04	0.23*	0.54***	-

*Note.* \* $p < 0.05$ , \*\* $p < 0.01$ , \*\*\* $p < 0.001$ . SBW Strength = Obligation to manifest strength; SBW Suppress Emotions = Obligation to suppress emotions; SBW Vulnerable = Resistance to being vulnerable or dependent; SBW Succeed = Determination to succeed despite limited resources; SBW Others = Obligation to help others.

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