Anxiety Sensitivity and Fast-food Ordering Habits Among Black Adults

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Abstract

Black adults experience high rates of overweight/obesity, which is linked to chronic diseases and is exacerbated by fast-food consumption. Anxiety sensitivity, a relatively stable fear of anxiety-related sensations, has been linked to high caloric intake. Here, we examine whether anxiety sensitivity is associated with fast-food ordering habits within a convenience sample of black adults. Of 124 adults (79.4% women; M_{age} = 49.3±11.6; 84.8% overweight/obese), 107 (86.3%) reported eating from a fast-food restaurant in the last month. Participants completed the Anxiety Sensitivity-Index 3, which has a total score and physical, cognitive, and social concerns subscales. Investigator-generated items queried frequency of ordering "supersized" quantities of fast-food (e.g., cheeseburgers, fries), and healthy items (e.g., salads, oatmeal, yogurt), respectively, from "never" to "always." Covariate-adjusted ordinal logistic regression models were used to assess relations between measures of interest. Anxiety sensitivity (total and physical concerns) was associated with greater odds of more frequently ordering supersized unhealthy fast-food; and anxiety sensitivity (total and cognitive concerns) was associated with lower odds of more frequently ordering healthy items from fast-food restaurants. Results suggest that adults with greater anxiety sensitivity may engage in fast-food ordering habits that can contribute to the overweight/obesity epidemic. Future studies should replicate results and determine the potential for anxiety sensitivity-reduction interventions to affect dietary choices that contribute to overweight/obesity.

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Introduction

Anxiety sensitivity (AS) is a relatively stable fear of anxiety-related sensations, such that those symptoms are believed to be the cause of or associated with serious illness (Reiss et al., 1986). AS is considered a trans-diagnostic construct that, although a risk factor for the development of anxiety and depressive disorders, is distinct from such disorders (Olatunji & Wolitzky-Taylor, 2009). A wide variety of studies have linked AS with myriad behavioral health issues (Alcántara et al., 2017; Bakhshaie et al., 2018; Zvolensky et al., 2009). AS has three lower-order dimensions, including physical, cognitive, and social concerns (Farris et al., 2015; Taylor et al., 2007). Physical concerns refer to fears that anxiety symptoms may cause physical health problems like heart attacks. Cognitive concerns refer to fears that anxiety symptoms may cause mental illness. Social concerns refer to fears that anxiety symptoms can lead to social embarrassment via their visibility to the external world.

AS has been linked not only to behavioral health disorders (e.g., panic disorder; Olatunji & Wolitzky-Taylor, 2009; Wheaton et al., 2012) but also to a variety of negative health behaviors (e.g., cigarette smoking, cannabis use, alcohol misuse) through coping motives (DeMartini & Carey, 2011; Guillot

et al., 2018). Otto and colleagues (2016) described a conceptual framework whereby AS intensifies negative emotions and sensations to a level that feels so unbearable and distressing that maladaptive "quick fix" coping methods are triggered, such as substance use. Thus, AS is associated with maladaptive coping behaviors through the intensification of negative feelings and sensations that leads to the execution of undesirable and harmful behaviors in an attempt to alleviate the amplified distress as quickly as possible (Otto et al., 2016). However, substance use is not the only behavioral way to cope with amplified distress; an alternative coping method is through maladaptive eating behaviors, as explicitly identified in Otto and colleagues' framework (2016; see Figure 1 for an adapted model).

Prior work has linked AS with bulimic behaviors in undergraduate students (e.g., Anestis et al., 2008), and with the consumption of large amounts of food to modulate emotional distress (DeBoer et al., 2012). Greater AS has also been associated with greater calorie consumption in women, as well as greater calorie consumption following the experience of a negative emotion relative to the experience of more neutral states (Hearon et al., 2014). In addition, higher scores on cognitive AS, coupled with higher scores on the "eating leads to feeling out of control" subscale of the Eating Expectancy test and greater body mass index (BMI), are together associated with very high rates of calorie consumption (Hearon et al., 2013). Other studies suggest that stress and negative affect may specifically increase the consumption of foods high in sugar and fats (cf. Austin et al., 2009; Dallman et al., 2005; Dubé et al., 2005; Epel et al., 2001; Steptoe et al., 1998; Torres & Nowson, 2007; Wedig & Nock, 2010), such as fast-food. Greater calorie consumption can lead to overweight/obesity, culminating in the development of diabetes, heart disease, and other chronic diseases (Haslam & James, 2005). Other studies have also found that AS is related to expectancies that eating can help cope with negative affect (Kauffman, Rogers, et al., 2019; Kauffman, Shepherd, et al., 2019). However, there is a need for additional research in this area to better understand connections between AS and eating behaviors that may endanger health (cf. Otto et al., 2016).

One population subgroup at risk of obesity is black adults. Research indicates that 49.6% of non-Hispanic black adults were overweight/obese in 2017-2018 (Hales et al., 2020). A contributor to overweight/obesity in the black community is fast-food consumption. One study, for example, linked elevated BMI with greater residential proximity to fast-food restaurants (FFRs) (Reitzel et al., 2014). FFRs are also disproportionately located in food deserts and in neighborhoods with a high density of black residents (Strong et al., 2013). FFRs are notorious for offering high-calorie foods with high saturated fat, which are linked to obesity (Drewnowski & Specter, 2004; Hariri et al., 2010). Thus, FFRs could be facilitating the consumption of unhealthy foods among black adults. However, FFRs offer a selection of foods, some of which may be considered healthy foods (e.g., salads). On the other hand, larger portions of less healthy items (e.g., "supersized" French fries) may be particularly obesogenic. Although AS may affect food consumption, the extent to which AS may be associated with dietary choices at FFRs or, more specifically, the frequency with which black adults select healthy and/or supersized unhealthy items from FFRs is not currently known.

The current study explored the relationship between AS and FFR ordering habits within a sample of black adults. Two

Figure 1. A model of how anxiety sensitivity may affect fast food ordering habits via elevated drive for escape/avoidance of distress.
Note. Figure adapted from Otto and colleagues (2016) [Otto, M. W., Eastman, A., Lo, S., Hearon, B. A., Bickel, W. K., Zvolensky, M., Smits, J. A. J., & Doan, S. N. (2016). Anxiety sensitivity and working memory capacity: Risk factors and targets for health behavior promotion. *Clinical Psychology Review*, *49*, 67–78. https://doi.org/10.1016/j.cpr.2016.07.003; page 69].

directional hypotheses were asserted. First, we expected greater AS to be associated with greater odds of more frequently ordering supersized unhealthy fast-food. Secondly, we expected greater AS to be associated with lower odds of more frequently ordering healthy fast-food.

Methods

Participants and Procedures

Participants were adults recruited from a Methodist church in Houston, TX, that was the site of prior studies (Advani et al., 2014; Cuevas et al., 2014; McNeill et al., 2018; Obasi et al., 2020; Reitzel et al., 2014, 2017; Savoy et al., 2014; Strong et al., 2013). Participants were recruited via broad email solicitation and word of mouth. Eligibility criteria were: 1) ≥ 18 years old; 2) self-reported black/African American ethnicity; and 3) willingness to comply with the study protocol, which included procedures irrelevant to the current report (e.g., saliva collection (Obasi et al., 2020)).

Overall, 149 (of 159) interested adults were eligible for participation, of which 25 were unavailable during data collection and/or no-showed. Following informed consent, participants completed study measures on a laptop computer in a private room in the church from December, 2013 to February, 2014. Participants could be compensated up to $100 in department store gift cards for the completion of all study procedures, including those not relevant to the current study. Study procedures were approved by the associated Institutional Review Boards.

Measures

Participant characteristics. Self-reported data included sex, age, partner status, educational attainment, employment status, and annual income. Additionally, participants' body mass index (BMI; kg/m²) was calculated using staff-administered height and weight measurements.

Anxiety symptoms. The 21-item Beck Anxiety Inventory (BAI) was designed to assess common symptoms of anxiety experienced over the last week (Beck et al., 1988). Participants indicated symptom presence/severity as "not at all," "mild," "moderate," or "severe." Scores could range from zero to 63, with higher scores indicating greater symptomatology. Cronbach's alpha for the BAI in this sample was .95.

Depressive symptoms. The 20-item Center for Epidemiologic Studies Depression scale (CESD) assesses depressive symptoms over the last week (Radloff, 1977). Participants indicated symptom frequency as "rarely or none of the time (less than one day)," "some or a little of the time (one to two days)," "occasionally or a moderate amount of the time (three to four days)," or "most or all of the time (five to seven days)." Scores could range from zero to 60, with higher scores indicating greater symptomatology. Cronbach's alpha for the CESD in this sample was .93.

Anxiety sensitivity (AS). The 18-item Anxiety Sensitivity Index 3 (ASI-3) was designed to measure sensitivity to and discomfort with physical sensations (Taylor et al., 2007) and is the most widely used measure of AS (Bernstein et al., 2010; Taylor et al., 2007). The ASI-3 comprises three subscales that can be helpful for intervention tailoring (Zvolensky et al., 2001; cf. Martin et al., 2020): 1) physical concerns (e.g., "It scares me when my heart beats rapidly"), 2) cognitive concerns (e.g., "When my mind goes blank, I worry there is something terribly wrong with me"), and 3) social concerns (e.g., "It scares me when I blush in front of people"). Participants are asked to

indicate their level of agreement with each statement on a five-point scale from "very little" to "very much," with higher scores indicating greater AS. ASI-3 subscales can each range from zero to 24, and the total score can range from zero to 72. Internal consistency in this sample was .93 overall and .90 for physical concerns, .89 for cognitive concerns, and .70 for social concerns.

Fast-food ordering habits. Participants were asked: "Over the last month, have you eaten any meals from a fast-food place like McDonalds, Kentucky Fried Chicken, Pizza Hut, Taco Bell, or other local fast-food restaurant?" Those responding "yes" were then asked: "[…], how often do you order and consume 'healthy' foods, like salads, yogurt, fruit, and/or oatmeal?" (options were never, rarely, sometimes, most of the time, and always). Due to infrequency of some endorsements (e.g., n = 4 for always), responses were collapsed into never, rarely, and sometimes/most of the time/always. Secondly, participants were asked: "[…] how often do you order and consume 'supersized' items, like extra-large French fries, a double or triple patty cheeseburger, or an extra-large sugared soft drink?" (options were never, rarely, sometimes, most of the time, and always). Due to infrequencies/lack of endorsement of some responses (e.g., n = 3 most of the time, n = 0 always), the latter three categories were collapsed into "sometimes/most of the time."

Data Analysis

Within-sample comparisons based on ordering habits were performed using ANOVA or chi-square tests for continuous and categorical variables, respectively. Correlations between variables of interest were also examined. Ordinal logistic regression models were used to assess the associations between total AS, the AS subscales, and healthy or unhealthy/ supersized fast-food ordering habits, respectively. The sample size was relatively small, which could affect the interpretability of results as well as resilience to covariate inclusion, and so a stepped analytic approach was used. Specifically, main analyses comprised both partially and fully adjusted models; each was assessed to ensure that proportional odds assumptions were met prior to interpretation. Partially adjusted models controlled for sex, age, and BMI, and fully adjusted models additionally controlled for anxiety and depressive symptomatology. The latter helped to demonstrate that the effect of AS was additionally independent of general anxiety and depressive symptoms, which was important due to known covariation between these constructs (Leventhal & Zvolensky, 2015; Wolitzky-Taylor et al., 2016; Zvolensky et al., 2015; Zvolensky & Schmidt, 2007). The chi-square score test was employed to examine whether the proportional odds assumption was met (McCullagh, 1980) with a $p > .05$ result for this test implying that the regression lines for the comparison of categories were parallel and that parameter estimates were interpretable. For each interpretable result, odds ratios (ORs) and 95% confidence intervals (CIs) were calculated. Partial proportional odds models were not conducted due to the small sample size. All analyses were conducted using SAS Version 9.4. Alpha was set at .05.

Results

Participant Characteristics

The analytic sample was confined to n = 107/124 (86.2%), who said they had consumed a fast-food meal over the last month. Table 1 shows participant characteristics overall and by fast-food ordering habits. Of the 107 participants,

20.56% were males (n = 22), 15.24% were normal weight (BMI = 18.5-24.9; n = 16), 19.05% were overweight (BMI = 25-29.9; n = 20), and 65.71% were obese (BMI ≥ 30; n = 69). The average age was 49.33 ± 11.61 years (range 19-75) and the average BMI was 32.87 ± 7.34 (range 18.56-63.54). Overall, 39.25% of the sample were partnered, 52.34% had less than a bachelor's degree, 60.75% reported full-time employment, and 38.32% reported an annual household income of ≤ $42,000. The sums of BAI and CESD scale were 5.93 ± 9.73 and 9.89 ± 10.37, respectively. The average of the total AS score, physical concerns, cognitive concerns, and social concerns were 9.90 (SD = 11.48), 3.65 (SD = 5.04), 1.97 (SD = 4), and 4.27 (SD = 3.88), respectively. The proportion of participants who never, rarely, and sometimes/most of the time/always ordered only healthy foods were 12.15%, 26.17%, and 61.68%, respectively. The prevalence of participants who never, rarely, and sometimes/most of the time ordered supersized items were 71.03%, 19.63%, and 9.34%, respectively. Relative to men, women more commonly never (85.53% vs. 14.47%) or rarely (66.67% vs. 33.33%) ordered unhealthy/supersized food items over the last month (p = 0.047). Additionally, participants who ordered unhealthy/supersized items sometimes/most of the time had significantly higher AS physical concerns than those who never ordered unhealthy/supersized items over the last month (6.90 vs. 2.87; p = 0.047).

Correlations between study variables are presented in Table 2. Women endorsed greater anxiety (BAI: r = .22, p < .05), AS total (r = .2, p < .05), and AS social concerns (r = .22, p < .05), and were less likely to order unhealthy/supersized food (r = -.23, p < .05). Older participants endorsed less depressive symptomatology (CESD: r = -.3, p < .01) and were less likely to order unhealthy/supersized food (r = -.2, p < .05). The BAI, CESD, and ASI-3 and its subscales were each significantly positively correlated with one another, ranging from 0.39 to 0.91 (ps < .001).

Proportional Odds Models

Healthy Items. The results of the ordinal logistic regression models are presented in Table 3. The proportional odds assumptions were satisfied (p > .05) in both partially and fully adjusted analyses except in the case of AS physical concerns (p = .049). None of the ASI-3 predictors were significant in partially adjusted analyses; however, in fully adjusted models, total AS (adjusted OR: 0.94, (95% CI: 0.9, 1.0)) and AS cognitive concerns (adjusted OR: 0.86, (95% CI: 0.75, 0.99)) were significantly associated with healthy fast-food item ordering, implying that greater total AS and AS cognitive concerns were associated with decreased odds of the "more likely to order" responses.

Unhealthy/Supersized Items. The proportional odds assumptions were satisfied (p > .05) in initial analyses but not secondary, fully adjusted analyses. When sex, age, and BMI were the covariates, associations of total AS (adjusted OR: 1.05, (95% CI: 1.01, 1.08)) and AS physical concerns (adjusted OR: 1.13, (95% CI: 1.04, 1.23)) with unhealthy/supersized fast-food ordering were significant. In other words, the expected odds of "more likely to order" unhealthy/ supersized items were significantly greater for those with higher total AS or AS physical concerns scores. The results of fully adjusted analyses are not presented here, as the assumptions of proportional odds were not met.

Table 1

Participants' Characteristics by Fast-food Ordering Habits (N = 107 Black Adults).

		Healthy Items†			Unhealthy/Supersized Items‡		
Frequency	Total	Never	Rarely	Sometimes/ Most of the Time/Always	Never[a]	Rarely[b]	Sometimes/ Most of the Time[c]
n [%]	107	13 [12.15%]	28 [26.17%]	66 [61.68%]	76 [71.03%]	21 [19.63%]	10 [9.34%]
	M (SD)/ *n* [%]						
Sex‡*							
Male	22 [20.56]	4 [30.77]	8 [28.57]	10 [15.15]	11 [14.47]	7 [33.33]	4 [40]
Female	85 [79.44]	9 [69.23]	20 [71.43]	56 [84.85]	65 [85.53]	14 [66.67]	6 [60]
Age	49.33 (11.61)	53.31 (10.19)	44.68 (12.14)	50.52 (11.2)	50.66 (11.39)	47.52 (9.92)	43 (14.8)
BMI	32.87 (7.34)	33.62 (7.63)	33.55 (7.25)	32.44 (7.4)	32.21 (7.41)	34.08 (6.81)	35.26 (7.8)
BAI	5.93 (9.73)	4.46 (8.66)	6.46 (14.13)	5.98 (7.54)	5.91 (9.68)	3.38 (4.66)	11.4 (15.39)
CESD	9.89 (10.37)	7.92 (12.45)	10.54 (12.12)	10 (9.21)	9.86 (10.33)	7.57 (6.39)	15 (15.69)
ASI-3 Total	9.9 (11.48)	13.31 (10.06)	10.25 (12.33)	9.08 (11.41)	8.5 (9.99)	12.43 (15.91)	15.2 (9.83)
ASI-3 Physical Concerns‡*[ac]	3.65 (5.04)	5.23 (4.15)	3.75 (5.47)	3.3 (5.02)	2.87 (4.38)	4.95 (6.38)	6.9 (5.26)
ASI-3 Cognitive Concerns	1.97 (4)	2.92 (3.86)	2.14 (4.91)	1.71 (3.61)	1.59 (3.39)	2.71 (5.46)	3.3 (4.69)
ASI-3 Social Concerns	4.27 (3.88)	5.15 (3.58)	4.36 (3.09)	4.06 (4.25)	4.04 (3.76)	4.76 (4.89)	5 (2.21)

Note. *$p < 0.05$; BMI: Body Mass Index; BAI: Beck Anxiety Index; CESD: Center for Epidemiologic Studies Depression; ASI-3: Anxiety Sensitivity Index -3

Table 2

Correlations Between Study Variables (N = 107 Black Adults).

	1	2	3	4	5	6	7	8	9	10	11
1. Sex	1	-0.17	0.07	0.22*	0.03	0.20*	0.16	0.16	0.22*	0.16	-0.23*
2. Age		1	0.04	-0.16	-0.30**	-0.10	-0.06	-0.11	-0.12	0.03	-0.20*
3. BMI			1	0.12	0.03	0.08	0.18	0.04	-0.05	-0.07	0.15
4. BAI				1	0.64***	0.69***	0.65***	0.64***	0.54***	0.03	0.08
5. CESD					1	0.51***	0.39***	0.61***	0.39***	0.04	0.07
6. ASI-3 Total						1	0.91***	0.90***	0.85***	-0.11	0.20*
7. ASI-3 Physical Concerns							1	0.74***	0.64***	-0.12	0.26**
8. ASI-3 Cognitive Concerns								1	0.66***	-0.10	0.15
9. ASI-3 Social Concerns									1	-0.09	0.09
10. Healthy Items										1	-0.23*
11. Unhealthy/Supersized Items											1

Note. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; BMI: Body Mass Index; BAI: Beck Anxiety Index; CESD: Center for Epidemiologic Studies Depression; ASI-3: Anxiety Sensitivity Index-3.

Table 3

Results of Ordinal Logistic Regression Models (N = 107 Black Adults).

	Healthy Items						Unhealthy/Supersized Items					
	Partially adjusted models			Fully adjusted models			Partially adjusted models			Fully adjusted models		
Variable	OR (95% CI)	p-value	p-value[ǂ]	OR (95% CI)	p-value	p-value[ǂ]	OR (95% CI)	p-value	p-value[ǂ]	OR (95% CI)	p-value	p-value[ǂ]
Sex (Female vs. Male)	2.94 (1.12, 7.71)	0.028	0.077	3.17 (1.17, 8.6)	0.023	0.073	0.15 (0.05, 0.44)	0.001	0.993			0.006ǂ
Age	1.02 (0.99, 1.06)	0.272		1.03 (0.99, 1.1)	0.109		0.95 (0.91, 0.99)	0.007				
BMI	0.98 (0.93, 1.03)	0.374		0.97 (0.92, 1)	0.327		1.06 (1, 1.13)	0.042				
BAI				1.03 (0.96, 1.1)	0.406							
CESD				1.03 (0.98, 1.1)	0.233							
ASI-3 Total	0.98 (0.95, 1.01)	0.168		0.94 (0.9, 1)	0.016		1.05 (1.01, 1.08)	0.015				
Sex (Female vs. Male)	2.81 (1.08, 7.3)	0.034	0.060			0.049ǂ	0.14 (0.05, 0.44)	0.001	0.990			0.007ǂ
Age	1.02 (0.99, 1.06)	0.254					0.94 (0.91, 0.98)	0.006				
BMI	0.98 (0.93, 1.03)	0.447					1.05 (0.99, 1.12)	0.081				
BAI												
CESD												
ASI-3 Physical Concerns	0.95 (0.88, 1.03)	0.216					1.13 (1.04, 1.23)	0.004				
Sex (Female vs. Male)	2.81 (1.08, 7.3)	0.034	0.096	3.13 (1.16, 8.46)	0.025	0.165	0.17 (0.06, 0.49)	0.001	0.995			0.009ǂ
Age	1.02 (0.99, 1.06)	0.264		1.03 (1, 1.07)	0.087		0.95 (0.91, 0.99)	0.008				
BMI	0.98 (0.93, 1.03)	0.357		0.97 (0.92, 1.03)	0.288		1.06 (1, 1.13)	0.041				
BAI				1.02 (0.95, 1.08)	0.646							
CESD				1.05 (0.99, 1.11)	0.143							
ASI-3 Cognitive Concerns	0.95 (0.86, 1.04)	0.272		0.86 (0.75, 0.99)	0.031		1.1 (1, 1.21)	0.060				
Sex (Female vs. Male)	3.04 (1.15, 8.06)	0.025	0.083	3.31 (1.21, 9.06)	0.020	0.169	0.16 (0.05, 0.5)	0.001	0.987			0.045ǂ
Age	1.02 (0.99, 1.06)	0.263		1.03 (0.99, 1.07)	0.130		0.95 (0.91, 1)	0.007				
BMI	0.97 (0.92, 1.03)	0.300		0.97 (0.92, 1.02)	0.255		1.07 (1.01, 1.1)	0.025				
BAI				1.01 (0.95, 1.07)	0.812							
CESD				1.03 (0.98, 1.08)	0.288							
ASI-3 Social Concerns	0.93 (0.84, 1.03)	0.166		0.89 (0.78, 1.01)	0.062		1.11 (0.99, 1.2)	0.082				

Note. OR: Odds Ratio; CI: Confidence Internval; ǂ: p-value of test for proportional odds assumption (ǂ: indicates that odds assumption was not satisifed and results should not be interpreted); BMI: Body Mass Index; BAI: Beck Anxiety Index; CESD: Center for Epidemiologic Studies Depression; ASI-3: Anxiety Sensitivity Index-3.

Discussion

The present study examined the relationship between AS and FFR ordering habits within a sample of black adults. Although a conceptual framework for the association of AS with maladaptive eating as a method of coping with amplified distress has been proposed (Otto et al., 2016), limited research informs this area and none to our knowledge focuses on fast-food ordering habits among black adults. Results supported hypotheses that greater AS (total and cognitive concerns) was associated with lower likelihood of more frequent ordering of healthy foods from FFRs. This association was supported only in fully adjusted analyses, which is important given the covariance between AS and anxiety and depressive symptomatology conceptually (Otto et al., 2016) and in this dataset. Conversely, greater AS (total and physical concerns) was associated with greater odds of ordering supersized unhealthy fast-foods; however, this finding was only in partially adjusted analyses; fully-adjusted models could not be executed. Overall, results contribute evidence, albeit cross-sectional, to support the aforementioned conceptual model potentially linking AS to maladaptive eating patterns and to suggest that the association between AS and dietary choices in fast-food ordering may be worthy of further study. Moreover, it is notable that although 86.2% of the study participants ordered fast-food over the last month, a relatively low proportion of those who did rarely or never ordered healthy food (38.8%) and a high proportion rarely or never ordered supersized items (90.9%). However, the current small sample size and consequent limitations on analyses indicate a necessity to examine these associations with larger sample sizes to draw definitive conclusions.

Greater total AS, driven by the cognitive concerns subscale, was associated with lower odds of frequently ordering healthy fast-foods in this sample. Cognitive AS concerns represent a specific fear of cognitive consequences of the perceived distress (e.g., that it might result in psychological problems or "going crazy") and have been associated with anxiety/perceived stress towards challenging stimuli (Zvolensky et al., 2002); eating high-calorie foods has also been conceptualized as a potentially "comforting" reaction to stress (Torres & Nowson, 2007). Therefore, it may be that greater stress accounts for the link between cognitive AS concerns and the lower likelihood of choosing healthy, lower-calorie foods within FFRs. Moreover, other literature has linked AS cognitive concerns with behavioral outcomes via depression distress elevation (e.g., Capron et al., 2013; Norr et al., 2016), and prior research has linked the mitigation of depressive symptoms with exposure to fatty acids (Deaver et al., 2003; Van Oudenhove et al., 2011). These possibilities may explain the connection between greater AS cognitive concerns and a lower likelihood of making healthy choices at FFRs; however, they are suppositional and require future study. Should the present associations be robust to replication in future studies, potential implications could include that addressing AS among at-risk individuals through AS-reduction interventions – specifically targeted toward cognitive AS concerns (e.g., Mitchell et al., 2014) – could affect fast-food ordering choices, which could ultimately affect overweight/obesity.

Greater total AS, driven by the physical concerns subscale, was associated with a greater likelihood of ordering supersized fast-food items within this sample. Physical AS concerns are focused on a fear that perceptible sensations (e.g., high heartbeats per minute) may lead to or be indicative of exaggerated negative physical outcomes. Although this finding linking AS physical concerns with supersizing fast-food ordering

should be accepted with caution due to inability to conduct fully adjusted analyses, results are somewhat complementary to those previously described in that greater AS may simultaneously make ordering healthy items less likely and supersized unhealthy items more likely. Interestingly, the physical concerns subscale has been particularly predictive of behavioral health issues among black adults (Hunter et al., 2012; Reitzel et al., 2017) and the current results extend it to fast-food ordering habits. Again, results require replication but suggest the potential of AS-reduction interventions in addressing dietary factors associated with overweight/obesity within the black community (Hales et al., 2020; Reitzel et al., 2014). In particular, these interventions would need to focus on changing perceptions and beliefs that maladaptive eating is the most effective method to reduce elevated distress. One study showed that an inexpensive, cognitive behavioral therapy (CBT) phone application was effective in reducing maladaptive eating behaviors in overweight young adults (Podina et al., 2017). Similar telephone-based CBT programs showed significant AS reductions in coping-related alcohol consumption that was motivated by anxiety (Olthuis et al., 2015), suggesting that CBT may have similar AS-reducing effects in individuals with maladaptive eating behavior. Prior work has also suggested that moderate intensity physical activity may help to mitigate the association between elevated AS physical concerns and maladaptive eating (DeBoer et al., 2012). This may be an important focus in intervention because high AS among obese adults has been associated with an avoidance of moderate intensity physical activity (Hearon et al., 2014). Ideally, the experience of elevated AS physical concerns would motivate physical activity exposure, as seen amongst normal weight adults (Hearon et al., 2014).

Study limitations include the use of a church-based sample, convenience sampling procedures, limited enrollment, and a cross-sectional study design, which impact generalizability of results and preclude causal inference. In addition, the inability to use the partial proportional odds model (due to the small sample size) was a limitation of this work. Future studies can address this issue by having a larger and more representative sample. Although we controlled for what were envisioned as the most critical covariates in analyses, a larger sample could also allow the ability to control for additional factors of potential relevance (e.g., income). Additionally, fast-food ordering habits were meant to reflect dietary choices: however, this and future studies would benefit from a direct assessment or observation of fast-food consumption. This is particularly the case because the fast-food ordering habit questions were investigator-generated and without reliability data. Finally, the low prevalence of super-size ordering in this study supports the need for larger samples to attain more within-sample variability.

In balance with study limitations, study strengths include extension of AS to an aspect of dietary consumption not previously assessed: fast-food ordering habits. The availability of low-cost, high calorie foods from FFRs is implicated in overweight/obesity (Duffey et al., 2007; Fraser et al., 2010, 2011; Jeffery et al., 2006; Moore et al., 2009; Rydell et al., 2008), and studies show that FFRs may be more available in predominately black than in white neighborhoods (Block et al., 2004; Fleischhacker et al., 2011; Kwate, 2008; Kwate et al., 2009). The convenience of FFR locations relative to black neighborhoods, coupled with the affordability of fast-food may be contributing to the problem of high rates of overweight/obesity within the black population (Reitzel et al., 2014). The present results suggest that adults with greater AS

may be even more likely to engage in ordering habits at these locations that further contribute to the overweight/obesity epidemic. Although the use of a church-based sample comprised largely of women may limit generalizability, women are more likely to use maladaptive eating (greater caloric intake and consumption of calorie-rich foods) as a method to cope with distress (Austin et al., 2009; Dallman et al., 2005; Dubé et al., 2005; Epel et al., 2001; Hearon et al., 2014; Steptoe et al., 1998; Torres & Nowson, 2007; Wedig & Nock, 2010) and church-goers may be less likely to report maladaptive substance use as a coping method (Cuevas et al., 2014). Future studies should replicate results, link ordering habits with actual food consumption behaviors, and determine the potential for AS-reduction interventions to affect dietary choices that contribute to overweight/obesity.

Implications for Health Behavior Theory

This study is the first to link AS with unhealthy fast-food ordering habits among black adults, providing additional support for Otto and colleagues' (2016) conceptual framework linking AS with maladaptive eating. Social-ecological models suggest multiple levels of influence upon health behaviors; therefore, health promotion efforts to address associations between AS and fast-food ordering habits amongst black adults should include interventions implemented at multiple levels of influence (cf. Bronfenbrenner & Morris, 2007). For example, individual-level interventions would be needed to mitigate high levels of AS; such interventions currently exist (Horenstein et al., 2018; Sabourin et al., 2016; Schmidt et al., 2014; Short et al., 2015; Tull et al., 2007). However, recognizing that black adults may be less likely to obtain psychological care, there are clearly implications at organizational levels that suggest the need for more racial/ethnic diversity in practice settings and better multi-cultural training of clinicians to eliminate biases that may lead to lower quality care provision for black adults (McGuire & Miranda, 2008). At the relationship level, engagement of important peers (e.g., family and friends) may help to modify maladaptive eating in response to AS by substituting, for example, dyadic physical activity or peer-to-peer health coaching to increase physical activity as a coping response to elevated distress (cf. Heredia, Lee, et al., 2019). This may also have coactive positive influences on dietary behaviors (Heredia, Fernandez, et al., 2019) that affect fast-food ordering choices. At the community level, there needs to be thought put into ensuring access to healthy yet affordable food items in proximity to black neighborhoods, while potentially also considering limiting the comparatively greater prevalence of FFRs in these areas through zoning laws or conditional use permits (Ashe et al., 2003). At the societal level, attention needs to be paid to policies that reduce limitations on obtaining health care for individuals who may be uninsured/under-insured that could improve black adults' access to care (McGuire & Miranda, 2008).

Discussion Question

1. Findings suggest that anxiety sensitivity may be associated with unhealthy fast-food ordering habits among a sample of black adults. What are some ways that anxiety sensitivity can be addressed in this population?

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