Racial/ethnic differences in binge-eating prevalence, clinical and cognitive symptoms, and treatment retention/outcome in a community hospital weight-management sample

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Boston University
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RACIAL/ETHNIC DIFFERENCES IN BINGE-EATING PREVALENCE, CLINICAL AND COGNITIVE SYMPTOMS, AND TREATMENT RETENTION/OUTCOME IN A COMMUNITY HOSPITAL WEIGHT-MANAGEMENT SAMPLE

by

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ABSTRACT

Research suggests binge eating (BE) is equally prevalent across racial/ethnic groups. However, the majority of data concerning the assessment and treatment of BE come from clinical trials or specialty clinics where racial/ethnic minorities are underrepresented. Data regarding symptoms and treatment are needed from urban clinical settings where minorities are more likely to seek treatment. The current study assessed racial/ethnic group differences in BE prevalence, clinical and cognitive symptoms, and treatment retention in an ethnically-diverse weight loss treatment-seeking sample.

Participants included 127 Hispanic, 204 African-American and 99 Caucasian adults who completed self-report measures of BE frequency, distress, eating-related cognitive symptoms including shape and weight concerns and dietary restraint, depression, stress, and treatment barriers. Data concerning number of treatment sessions attended and body mass index (BMI) were collected at 6-month follow up.

The first study developed and validated the Dimensional Assessment of Loss of Control Eating (DALC) scale. The 2-factor DALC demonstrated good internal
consistency and convergent, construct and incremental validity. The DALC contributed to variance in eating pathology and depression beyond existing BE measures.

The second study examined racial/ethnic differences in BE prevalence, eating-related cognitive symptoms, and BMI. As hypothesized, no racial/ethnic differences in BE frequency were found and the rate of recurrent BE was 20% to 30%; participants with recurrent BE had higher BMIs, levels of depression, and global eating pathology than individuals without; African-American participants with BE had higher BMIs than other racial/ethnic groups, controlling for demographic variables. The hypotheses that Hispanic participants have higher weight and shape concerns, and that African-Americans have higher levels of restraint, were not supported.

The third study examined the hypothesis that ethnicity is associated with obesity treatment retention and outcome. African-American participants had lower retention rates than Hispanics and Caucasians combined, and had lower levels of obesity-based stigma, which accounted for their lower retention rates. African-Americans lost less weight than Caucasians but this difference disappeared after accounting for age and income.

The findings suggest high BE rates among racial/ethnic minorities at a common entry point for health services utilization. Stigma and African-American ethnicity should be considered when developing retention interventions.
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<td>AN</td>
<td>Anorexia Nervosa</td>
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<td>ANOVA</td>
<td>Analysis of Variance</td>
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<td>APA</td>
<td>American Psychiatric Association</td>
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<tr>
<td>AUC</td>
<td>Area Under the Curve</td>
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<td>$B$</td>
<td>Unstandardized beta weight</td>
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<td>BDI-II</td>
<td>Beck Depression Inventory – 2nd Edition</td>
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<td>BULIT-R</td>
<td>Bulimia Test-Revised</td>
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<td>BWL</td>
<td>Behavioral Weight Loss</td>
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<td>BN</td>
<td>Bulimia Nervosa</td>
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<td>CBT</td>
<td>Cognitive Behavioral Therapy</td>
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<td>CI</td>
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<td>CNWM</td>
<td>Center for Nutrition and Weight Management</td>
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<td>DALC</td>
<td>Dimensional Assessment of Loss of Control Eating</td>
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<td>DOSS</td>
<td>Distress over Symptoms Scale</td>
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<td>Diagnostic and Statistical Manual of Mental Disorders 4th Edition</td>
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<td>DSM-IV-TR</td>
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<td>Eating Disorder</td>
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<td>Objective Binge Eating Episode</td>
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<td>Personality Assessment Inventory Stress Scale</td>
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<td>Subjective Binge Eating Episode</td>
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<td>SCID-I</td>
<td>Structured Clinical Interview for the DSM-IV Axis I Disorders</td>
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<td>WBIS</td>
<td>Weight Bias Internalization Scale</td>
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<td>WHO</td>
<td>World Health Organization</td>
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CHAPTER ONE
General Introduction

The current Diagnostic and Statistical Manual of Mental Disorders, fourth edition (DSM-IV-TR, American Psychiatric Association, 2000) recognizes two main eating disorders: anorexia nervosa (AN), and bulimia nervosa (BN), and an eating disorders not otherwise specified (EDNOS) category. Binge eating disorder (BED) was introduced in 1994 as a provisional diagnosis, and a specific example of EDNOS (DSM-IV, APA, 1994). The core symptom of BED is recurrent binge eating (BE), in the absence of compensatory behavior. The DSM-IV-TR defines a BE episode as (1) the consumption of an objectively large amount of food in a discrete time period; and (2) the subjective experience of a loss of control over eating (American Psychiatric Association, 2000). In order to meet criteria for a diagnosis of BED, at least three of the following behavioral indicators of loss of control (LOC) must be endorsed: (1) eating more rapidly than normal; (2) eating until uncomfortably full; (3) eating large amounts of food when not physically hungry; (4) eating alone due to embarrassment or guilt; (5) feeling disgusted, depressed, or very guilty as a result (DSM-IV-TR, APA, 2000). In addition, BE episodes must occur at least twice per week over a period of at least six months, and individuals must experience distress associated with BE episodes (DSM-IV-TR; APA, 2000).

Substantial limitations regarding the current classification system have been acknowledged, primarily because the majority of treatment-seeking individuals are diagnosed with EDNOS rather than a main ED (Eddy, Celio, Hoste, Herzog, & Le Grange, 2008; Fairburn & Bohn, 2005; Stice, Marti, & Rhode, 2013). EDNOS is therefore a large and heterogenous category, and treatment approaches for one form of EDNOS
may differ from those for another form, which impedes clinical decision-making. As a
case result, researchers have questioned the validity of the definition of a “large amount of
food” and the categorical threshold for BE frequency set at twice per week (Latner &
Clyne, 2008; Latner, Hildebrandt, Rosewall, Chisolm & Hayashi, 2007; Mond, Hay,
Rodgers, Owen et al. 2006; Wolfe, Baker, Smith, & Kelly-Weeder, 2009). Empirical
evidence suggests that the subjective experience of LOC eating is a better indicator of
psychiatric distress (Latner et al., 2007; Latner, Vallance & Buckett, 2008; Mond et al.,
2006; Mond, Latner, Hay, Owen, & Rodgers, 2010; Vallance, 2006), and may therefore
be a more valid criterion than a large amount of food (Brownstone et al., 2013; Latner &
Clyne, 2008; Wolfe et al., 2009). Similarly, research has suggested few differences on
measures of psychological distress or functional impairment between individuals who
experience one BE episode per week and those who meet the twice per week criterion
(Crow, Agras, Halmi, Mitchell, & Kraemer, 2002; Striegel-Moore & Smolak, 2000; Wilson
& Sysko, 2009), suggesting that a refinement of this criterion would improve diagnostic
utility. Consonant with limitations of BE definition and classification, similar limitations
have been identified with current BE assessment tools, which tend to focus on
quantifying the frequency of BE episodes, rather than the distress associated with LOC
eating. Given the reported clinical significance of LOC eating, research suggests that
more reliable assessments of LOC eating are needed (Latner et al., 2007; Tanofsky-
Kraff et al., 2013). To our knowledge, no assessment tools designed to measure distress
associated with LOC exist.

Taken together, these findings formed the basis for the proposed changes to the
ED diagnoses by the APA Task Force in the DSM 5 to a) to recognize BED as a formal
ED; and, b) to relax the BE frequency criteria from twice to once per week. Recent
research suggests that this new nosology, combined with the development of more refined assessment tools, would improve the detection of BE pathology, provide more descriptive diagnoses, and aid in clinical decision making (Keel, Brown, Holm-Denoma, & Bodell, 2011; Stice et al. 2013; Striegel-Moore & Franko, 2008; Tanofsky-Kraff et al., 2013; Trace et al., 2012).

**Epidemiology of BE and racial/ethnic group differences.**

BE is a prevalent and distressing health concern that affects 2-10% of the general population (Marcus, Bromberger, Wei, Brown & Kravitz, 2007; Striegel-Moore & Franko, 2003). Relative to AN and BN, BED is the most prevalent ED diagnosis across racial and ethnic groups (Alegria, Woo, Cao, Torres, Meng, & Striegel-Moore, 2007; Flegal, Carroll, Ogden, & Curtin, 2010; Hudson, Hiripi, Pope & Kessler, 2007; Striegel-Moore & Franko, 2008). Prevalence estimates of recurrent BE and BED appear to be equivalent across racial/ethnic groups in multiple settings. Epidemiological data suggest that the lifetime prevalence of full threshold BED is 3.0% in the general population across racial/ethnic groups (Hudson et al., 2007; Stice et al., 2013). Lifetime prevalence estimates of subthreshold BED (recurrent BE) range from 3 to 11% across racial/ethnic groups (Hudson et al., 2007; Marcus et al., 2007; Stice et al., 2013; Striegel-Moore, Pike, Wilfley, Dohm & Fairburn, 2000). BED is associated with distressing cognitive concerns about body shape, weight, or eating, other psychiatric comorbidity, and is significantly associated with obesity across ethnic groups (Alegria et al., 2007; Marcus et al., 2007; Pike, Dohm, Striegel-Moore, Wilfley, & Fairburn, 2001; Striegel-Moore & Franko, 2003; Striegel-Moore et al., 2000) The prevalence of recurrent BE is observed at 21% among overweight individuals in the community (French, Jeffery, Sherwood,
Neumark-Sztainer, 1999). In weight loss treatment seeking populations, prevalence of BE is estimated at anywhere between 15 and 50% of obese individuals seeking bariatric surgery (Fabricatore et al., 2006; Greenberg, Perna, Kaplan, & Sullivan, 2005; Kalarchian, Wilson, Brolin, & Bradley, 2000; Mazzeo, Saunders, & Mitchell, 2005), and appears to be equivalent across racial/ethnic groups (Azarbad, Corsica, Hall & Hood, 2010).

Despite the comparable prevalence rates of BE across racial/ethnic groups, data from community and treatment-seeking samples evidence some racial/ethnic differences in symptom presentation. For example, higher BMIs have been observed among racial/ethnic minorities compared to Caucasians in community samples (Marcus et al., 2007; Pike et al., 2001), gastric surgery clinics (Mazzeo et al., 2005; Azarbad et al., 2010) and randomized controlled trials (RCTs, Thompson-Brenner et al., 2013). In contrast, data regarding racial/ethnic group differences in cognitive symptoms associated with BED are less consistent. Some studies demonstrate that African Americans have lower shape and weight concerns (Pike et al., 2001) and higher restraint (efforts to restraint caloric intake) than Caucasians (Thompson-Brenner et al., 2013); other studies have failed to find differences in cognitive symptoms (Grilo, Lozano, & Masheb, 2005; Shaw, Ramirez, Trost, Randall, & Stice, 2004). More data among racial/ethnic minorities are needed in order to more completely characterize the clinical presentation in this understudied population.
Data regarding symptom presentation among racial/ethnic minorities come primarily from ED specialty clinics, gastric surgery clinics, and RCTs, where racial/ethnic minorities are severely underrepresented (Franko et al., 2012; Marques et al., 2011). Racial/ethnic minorities are less likely than their non-minority counterparts to access psychological treatment for an ED (Becker, Franko, Speck, & Herzog, 2003; Cachelin & Striegel-Moore, 2006; Cachelin, Veisel, Barzegarazari, & Striegel-Moore, 2000; Marques et al., 2011), and those who do present for treatment in these settings appear to have different demographic and clinical characteristics than the majority racial/ethnic minorities who seek treatment on their own (Grilo, Lozano, & Masheb, 2005). For example, racial/ethnic minorities in community-based settings tend to have lower levels of education and income than those who seek ED treatment in specialty clinics or RCTs (Franko et al., 2012), and more commonly seek treatment in medical settings, such as community hospital weight management clinics (Cachelin & Striegel-Moore, 2006; Hudson et al., 2007; Mond, Hay, Rodgers, & Owen, 2007). Given observed differences between community samples and academic clinical trial participants (Franko et al., 2012), it is likely that those with BE seeking treatment for weight loss in a community hospital setting are more representative of the general population than are participants in RTCs, and yet differ from the non-treatment-seeking population in particular ways. To date, no data exist regarding the prevalence, correlates and racial/ethnic group differences in BE in the settings where they most typically present, and therefore the phenomenology of BE among treatment seeking racial/ethnic minorities with BE remains poorly understood. Data from community hospital weight loss clinics are needed in order to inform culturally relevant and effective interventions for racial/ethnic minorities with EDs.
In addition to treatment access, racial/ethnic differences in treatment retention and outcome have also been observed. Data across studies of the treatment of anxiety and mood disorders treatment suggest higher dropout rates among minorities, after controlling for relevant demographic variables known to influence retention (Fortuna, Alegria, & Gao, 2010; Lester, Resick, Young-Xu, & Artz, 2010). Data aggregated across RCTs for BED suggest that African American participants were more likely than Caucasian participants to prematurely terminate treatment (Thompson-Brenner et al., 2013). Some studies have reported that lower levels of socioeconomic status and education contribute to these observed disparities (Fortuna et al., 2010; Zoellner, Feeny, Fitzgibbons, & Foa, 1999). Evidence from weight management populations also indicate racial/ethnic differences in weight loss outcome. Data from large-scale behavioral weight loss trials suggest that African Americans lose less weight compared to Caucasians (Kumanyika et al., 2002; Svetkey et al., 2012; West, Prewitt, Bursac, & Felix, 2008). However, data regarding racial/ethnic differences in treatment retention and outcome are also limited in their generalizability as they are derived from the settings described above, where minorities are less likely to present for treatment (Franko et al., 2012). Racial/ethnic differences in retention may exist beyond demographic variables (Franko et al., 2012), and may contribute to observed disparities in weight loss outcome. Therefore, the identification of psychosocial obstacles to treatment, which may disproportionately affect racial/ethnic minorities, is essential to the development of targeted retention interventions. In addition to demographic factors, sociocultural variables including perceived stress, weight-based stigma, and treatment readiness merit examination as mediators of treatment retention and outcome. These factors may be mutable and may represent important targets for retention-promoting interventions.
To our knowledge, no data exist regarding treatment retention and weight-loss outcome among racial/ethnic minorities in community hospital weight loss settings, the most common point of entry into health services utilization for these individuals. The investigation of racial/ethnic differences in retention and outcome, as well as potential psychosocial mediators is essential to improving the provision of services for racial/ethnic minorities with eating disorders and obesity.

In summary, recurrent BE is a serious problem among African Americans and Hispanics but data concerning treatment-seeking racial/ethnic minorities are lacking. The present set of studies was designed to investigate racial/ethnic differences in LOC eating, BE symptomatology, treatment retention and outcome in an urban community hospital nutrition weight management setting. Study #1 is designed to develop and evaluate the psychometric properties of a dimensional assessment of distress over LOC eating, as it relates to new diagnostic considerations. A new measure of LOC eating is expected to enhance the assessment of BE by focusing on LOC alone, being dimensional in its assessment, and focusing on distress associated with—as opposed to frequency of—BE alone. Study #2 is designed to characterize the prevalence, correlates and racial/ethnic group differences in recurrent BE among African Americans, Hispanics and Caucasians presenting for nutritional weight management in an urban community hospital. The examination of the clinical presentation in this novel setting will contribute to the growing knowledge base on ethnicity and EDs, and will inform culturally relevant assessment and interventions. Study #3 is designed to examine racial/ethnic group differences in treatment retention and weight loss outcome, and to explore whether potentially mutable psychosocial factors mediate observed racial/ethnic differences.
Results from the present set of studies will speak to three important issues for health services research. First, the studies will report the diagnostic utility of a measure of LOC eating, a salient but under-assessed aspect of BE. Second, the studies will yield necessary data concerning the characteristics, symptoms, correlates, and racial/ethnic group differences between Hispanics, African Americans, and Caucasians in a sample of weight-loss treatment-seeking individuals with and without recurrent BE. The collection of this data in this novel setting in which minorities are adequately represented may yield unique characteristics that can be compared to epidemiological and clinical trial data. Third, the study will examine treatment retention and response, and speak to the relative importance of hypothesized mutable predictors—including stigma, treatment readiness, reasons for treatment, perceived stress, and obstacles to treatment—of treatment retention and response. The identification of these addressable factors, which may differ by race/ethnicity, will be of great significance to the development of interventions that may improve retention/outcome.
CHAPTER TWO

Study #1: Development and Validation of a Loss of Control Eating Scale for Use in an Ethnically-Diverse Weight Management Population

Introduction

Recurrent binge eating (BE) appears to be equally prevalent across racial/ethnic groups including African Americans, Hispanics, and Caucasians, and shows associations with obesity in all racial/ethnic groups (e.g., Alegria et al., 2007; Fitzgibbon et al., 1998; Pike, et al., 2001). However, minimal data exist regarding racial/ethnic group differences among treatment-seeking individuals with BE, as ethnic minorities are severely underrepresented in clinical trials for BED (Franko et al., 2012), and more commonly seek treatment for weight management as opposed to mental health issues (Marques et al., 2011; Striegel-Moore et al., 2005). Studies in such populations indicate the majority of individuals seeking weight loss treatment show some BE (de Zwaan et al., 2004; Kalarchian, et al., 2000). Further, recurrent BE is observed to predict poor weight loss treatment outcome in multiple settings, including community hospital behavioral weight loss (BWL) programs (Grilo, Masheb, Wilson, Gueorguieva, & White, 2011), suggesting that non-psychiatric weight loss settings are important sites for BE diagnosis and treatment.

1 This chapter has been submitted for publication and is currently under review: Richards, L.K., Graves, T., Martinez, A.P., Pratt, E.M., & Thompson-Brenner, H. Development and validation of a loss of control eating scale for use in an ethnically-diverse weight management population.
Despite its prevalence and clinical significance, the few existing, predominantly categorical, measures of BE tend to show poor reliability and validity (Gladis et al., 1998; Wolfe, et al., 2009), and the operational definition and assessment of BE has been identified as an important challenge to the field (Becker et al., 2010). This is in large part due to the uncertain diagnostic utility of the definition of BE, and the consequent limitations of current assessment measures. The DSM-IV-TR defines a binge episode as (1) the consumption of a large amount of food within a discrete time period, (2) accompanied by the perception of a loss of control (DSM-IV-TR; American Psychiatric Association, 2000). Binge eating disorder (BED) was introduced in the 4th edition of the DSM as a provisional diagnosis and a subtype of eating disorder not otherwise specified (EDNOS, DSM-IV-TR). In order to meet current criteria for BED, BE episodes must occur at least twice per week (DSM-IV-TR; APA, 2000). Researchers have questioned the validity of the DSM definition of BE, particularly concerning the reliance on the categorical threshold for frequency set at 2x/week, and the definition of a “large amount of food,” (Latner & Clyne, 2008; Latner, et al., 2007; Mond, Hay, Rodgers, Owen et al. 2006; Wolfe, et al., 2009), rather than the third aspect of a binge episode, loss of control (LOC) eating. With respect to the frequency criterion, while a few studies suggest that higher binge frequency is associated with severity (e.g., Delinsky, Latner, & Wilson, 2006; Striegel-Moore, Wilson, Wilfley, Elder, & Brownell, 1998), competing studies provide evidence that less frequent binge eaters show equally severe co-occurring psychopathology (e.g. Spoor, Stice, Burton, & Bohon, 2007; Striegel-Moore & Smolak, 2000). For example, using a large-scale multicenter sample, Crow and colleagues (2002) compared individuals with full threshold BED (meeting the 2x/weekly BE threshold) to subthreshold BED, on demographic characteristics, eating and other
psychopathology, and found that participants differed only in level of shape concern, and
were indistinguishable on all other indicators (Crow, et al., 2002). Importantly, shape
concern does not contribute directly to the diagnostic criteria for BED; therefore, these
authors suggest that the current criteria has limited diagnostic utility, and subthreshold
BED may be as clinically significant as the full syndrome (Crow et al., 2002). In a recent
literature review, Wilson and Sysko (2009) found little evidence of the validity or utility of
the DSM-IV frequency criterion of twice a week BE for BN or BED. The authors identified
several studies comparing participants across diagnoses meeting full frequency criteria
and those missing the twice a week criterion that found the groups to be
indistinguishable on other key variables including psychosocial impairment and health
services utilization (Garfinkel et al., 1995; Spoor et al., 2007).

Similar limitations in diagnostic utility have been found with respect to the
reliance on the definition of a “large amount of food,” rather than on the subjective
experience of LOC eating. Studies that examined the amount of food consumed in
conjunction with the experienced “loss of control” are converging on the conclusion that
the LOC criterion holds potential to be more valid and reliable than a criterion defining a
large amount of food (Brownstone et al., 2013; Latner & Clyne, 2008; Wolfe et al., 2009).
Some research has compared Objective Binge Eating Episodes (OBEs), in which both
LOC eating is experienced and a “large amount of food” is consumed, to Subjective
Binge Eating Episodes (SBEs), in which only the LOC is experienced. Findings suggest
that perceived LOC eating may be a better indicator of psychiatric disturbance than the
amount of food consumed among individuals with BN and BED (Keel, Mayer, &
Harnden-Fischer, 2001; Latner et al., 2007; Latner, et al., 2008; Mond et al., 2006;
Mond, et al., 2010; Vallance, 2006). Surveys of binge eaters, psychologists, and healthy
students and children all found that LOC is perceived as a more salient aspect of BE than the amount of food consumed (Johnson, Boutelle, Trogrud, Davig, & Turner, 2000; Johnson, Robertson-Nay, Rohan, & Torgrud, 2003; Shomaker et al., 2010; Telch, Pratt, & Niego, 1998), and that it is most strongly associated with eating-related and general distress across ethnic groups (Austin et al., 2008; Colles, Dixon, & O’Brien, 2008; Field, Corliss, Skinner, & Horton, 2011; French, et al., 1999; Marcus, et al., 2007; Wonderlich & Mitchell, 1997).

A major limitation of current assessment instruments, including interview and self-report based measures, is that they are designed to establish and quantify the presence of OBEs rather than the amount of distress caused by LOC eating. Given the above-mentioned significance of LOC eating as it relates to psychopathology, these assessment tools that do not explicitly assess the latter construct may fail to capture key characteristic behaviors and attitudes associated with BE. For example, The Eating Disorders Examination (EDE), an investigator-based interview (Cooper & Fairburn, 1987) is widely considered to be the gold-standard in ED assessment. However, it assesses primarily the frequency of OBEs (a less valid indicator of psychopathology), and the assessment of SBEs using the EDE is observed to be highly unreliable, in part due to the difficulty assessing LOC using just the few questions included in this instrument (Grilo, Masheb, Lozano-Blanco & Barry, 2004). Several self-report measures of BE exist; however, they share similar limitations in scope to those of the EDE. Among the most common are the Eating Disorder Examination Questionnaire (EDE-Q, Fairburn & Beglin, 1994), the Binge Eating Scale (BES, Gormally, Black, Daston, & Rardin, 1982) and the Questionnaire on Eating and Weight Patterns Revised (QEWP-R; Spitzer, Yanovsky, & Marcus, 1993). While these measures also assess the presence of BE and
various behavioral and emotional correlates, they do not assess the distress associated with LOC eating. Several validity studies of these measures have demonstrated low convergence with other diagnostic standards (Black & Wilson, 1996; de Zwaan et al., 2004; Fairburn & Beglin, 1994; Kalarchian et al., 2000). In a study comparing the QEWP-R to the Structured Clinical Interview for the DSM-IV Axis I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1996) for assessing BED among morbidly obese patients evaluated for gastric bypass, Dymek-Valentine et al. (2004) found low agreement (Cohen’s kappa = 0.37) between the two measures for identifying BED (Dymek-Valentine, Rienecke-Hoste, & Alverdy, 2004). These concordance issues have contributed to widely ranging estimates of BE prevalence across many samples (Wilson, 1993). Wilson (1993) also notes that some measures do not define BE clearly, and others yield only a composite index of the eating habits, attitudes, and feelings associated with BE. Several studies have documented the inconsistencies in BE measurement among BED patients, which leads to only modest categorical agreement in classifying patients as binge eaters (Celio, Wilfley, Crow, Mitchell, & Walsh, 2004; Gladis et al., 1998; Greeno, Marcus, & Wing, 1995; Grilo, Masheb, & Wilson, 2001). Concern has been raised regarding the usefulness of these measures as screening and diagnostic tools and the ways in which their widespread use may limit our understanding of BED (Wilfley, Wilson, & Agras, 2003).

While the large majority of BE measures quantify the presence or absence of BE on a dichotomous basis, two groups of researchers have analyzed the frequency of both OBEs and SBEs as continuous variables. Latner et al. (2007), found that in a community sample of women, both OBEs and SBEs, measured continuously, contributed to ED psychopathology. Findings from a subsequent study revealed that that only SBEs,
measured continuously, accounted for unique variance in health-related quality of life (Latner et al., 2008). More recently, Brownstone et al. (2013) found that SBEs measured continuously accounted for unique variance in shape and weight concerns, anxiety, depression and insecure attachment (Brownstone, Printz, & Bardone-Cone, 2013). These results suggest that SBEs may be better markers of broader psychopathology than OBEs, implicating the role of LOC eating in general psychopathology.

In addition to diagnostic utility, the uncertain validity of current BE assessment has implications for treatment course and outcome across diverse patient populations. In psychiatric populations, the experience of SBEs may be slower to remit than OBEs in response to BED treatment (Niego, Pratt, Agras, 1997) and SBEs have shown to persist following treatment for BN (Walsh, Fairburn, Mickley, Sysko & Parides, 2004) and BED (Brownstone et al., 2013), but are rarely assessed as outcome measures in treatment studies (Latner et al., 2007). In weight management populations, SBEs also appear to be more prevalent than OBEs. For example, several studies of weight loss treatment seeking overweight adolescents demonstrate that while only a small minority of individuals meet criteria for BED, approximately one third endorse LOC eating (Decaluwe & Braet, 2003; Eddy et al., 2007; Levine, Ringham, Kalarchian, Wisniewski, & Marcus, 2006), suggesting that LOC eating is an important symptom in these populations. Due to variation in the definition and assessment of BE (i.e. a large amount of food, LOC eating, or both) among weight loss treatment-seeking adults, BE status has been inconsistently related to weight loss outcomes among treatment-seeking adults (Wood & Ogden, 2012). Some studies found that higher BE severity is associated with poorer weight loss outcomes (e.g., Sherwood, Jeffery & Wing, 1999; Yanovski, 2003) and that reductions in BE frequency is associated with improved weight loss (Presnell,
Pells, Stout & Musante, 2008; Wood & Ogden, 2012) while other studies found no such relationship (Bocchieri-Ricciardi et al., 2006; Delinsky, Latner, & Wilson, 2006). It has been suggested that these inconsistent findings may be due to measurement error, and/or the wide variety of measures used to assess BE (Dymek-Valentine et al., 2004). Indeed, the majority of studies employ the assessment tools discussed above, relying heavily on the assessment of the presence and frequency of OBEs. Individuals seeking weight loss treatment may differ in their clinical presentations, such that they may not be seeking treatment for BE, and may be more concerned about their obesity status than about their BE status. A more precise assessment tool that identifies distress over LOC eating independent of or in conjunction with BE frequency may more adequately capture the range of behaviors and distress associated with BE that may affect weight loss outcomes in these populations.

Given the salience of LOC as a marker of eating pathology and the limitations of current measurement instruments, it has been recommended that future research should emphasize the development of more precise assessment tools for assessing aspects of LOC eating (Latner et al., 2007; Tanofsky-Kraff et al., 2013). To our knowledge, no instrument exists designed to assess the distress associated with LOC eating comprehensively and separately from the quantification of OBE and SBE episodes. Given the current public health concern regarding obesity and EDs among all ethnic groups (Striegel-Moore & Smolak, 2000), a valid measure of LOC eating is essential to address local health needs as well as contribute to the knowledgebase regarding the prevalence and phenomenology of BE. In particular, using a measure with strong psychometric properties within an ethnically-diverse weight management population can
refine and improve psychological evaluation in overweight individuals presenting for
treatment, inform treatment decisions, and improve outcomes.

**Specific Aims**

The aim of the current study was to develop the Dimensional Assessment of Loss of Control Eating (DALC) Scale to comprehensively represent all aspects of impaired control over eating and associated distress in the item content. Content included aspects of impaired control and distress that characterize LOC eating among Caucasian, African American and Hispanic male and females with and without BED seeking nutrition and weight management outpatient treatment. We hypothesized that the DALC would represent the full range of eating pathology associated with LOC eating. We aimed to establish the internal structure and validity of the DALC in a key population at high risk for LOC eating: individuals from three different ethnic groups (Hispanic, African American, and Caucasian) seeking nutrition counseling in an inner-city community hospital setting. We hypothesized that the DALC would show high inter-item consistency and would contain subscales consistent with behavioral and physical symptoms of LOC eating and associated distress. We hypothesized that the DALC would demonstrate construct validity through its correlation with theoretically expected outcomes, that it would be significantly related to similar constructs of BE, and that it would demonstrate clinical utility above and beyond established measures of related constructs (Cronbach & Gleser, 1957). A secondary aim was to further demonstrate predictive validity by establishing an optimal cutoff point for the DALC to detect participants with recurrent BE and clinically significant eating pathology.
Methods

Participants

A total of 832 consecutive patients presenting for nutritional counseling at the Center for Nutrition and Weight Management (CNWM) at the Boston Medical Center (BMC) a community hospital serving a racially/ethnically diverse population were recruited for participation. Consenting participants were invited to complete self-report questionnaires in either English or Spanish language and were compensated $20 for their participation. A total of 496 initiated the survey, representing a response rate of 59.6%. Data from 66 participants were excluded because they failed to answer the majority of questions (n=58), exhibited substantial inability to read and comprehend study instructions and/or questions (n=6), or were not seeking weight management treatment (n=2). Thus, of the 496 who initiated the study, 87% completed relevant measures for this study. The sample of participants included in the data analyses consisted of 430 individuals (350 female; 80 male). This study was approved by the Boston University Charles River Campus Institutions Review Board.

Measures

A demographic questionnaire gathered information about participants’ age, gender, race/ethnicity, education, income, and marital status.

Body Mass Index (BMI). BMI (kg/m^2) was determined using a medical balance-beam scale.

Dimensional Assessment of Loss of Control Eating Scale (DALC). The DALC was created by the authors to measure the degree to which a respondent is distressed by LOC eating. We developed an initial pool of items for the DALC through examination of existing measures, previous research, published theory, and expert clinical experience
and observation. Items were chosen to reflect all possible aspects of LOC eating. The original item pool was overinclusive, and included items drawn from previously validated measures (i.e., items reflecting LOC from the EDE-Q, the DSM-IV-TR, and the newly proposed criteria for DSM-5). To document that all of the relevant symptoms were included and that no irrelevant information was included in the scale, a sample of ED researchers (members of the Eating Disorders Research Society) were asked to evaluate a preliminary version of this questionnaire. Experts, identified through personal communication provided feedback on the utility, clarity, and relevance of items. Experts were asked to check that all of the relevant symptoms were assessed, cross out any items that did not reflect a LOC symptom, suggest refinements to the wording of items or instructions, and recommend any additional items that should be included. These responses were used to guide a revision of the preliminary scale. The final version administered to participants consisted of 29 items. Respondents were asked to indicate the degree to which they are distressed by each item on an 11-point Likert scale ranging from “not a problem for me” to “an extreme problem for me.” DALC scores were derived from calculating the mean of the items.

*Beck Depression Inventory- II* (BDI-II, Beck, Steer, & Brown, 1996). The BDI-II is a 21-item self-report measure that assesses severity of depressive symptomatology in the past two weeks. It is widely used including in behavioral health research, including ED treatment research (Thompson-Brenner, Franko, & Davis, 2010). Total scores ranging from 0-13 represent normal/minimal depressive symptoms; 14-19 represent mild depressive symptoms; 20-28 represent moderate depressive symptoms, and 29-63 represent severe symptoms. The BDI-II has demonstrated high internal consistency.
and convergent validity with other self-report measures of depression ($r_s>.50$; Steer & Beck, 2000). Cronbach’s alpha in the current sample was .93. 

*Eating Disorders Examination-Questionnaire* (EDE-Q, Fairburn & Beglin, 1994). The EDE-Q is a 28-item measure assessing eating pathology. The EDE-Q global score is a dimensional summary of eating pathology based on 4 subscales: weight concern, shape concern, eating concern and severity of dietary restraint, over the past 28 days. It has demonstrated validity and reliability in clinical and non-clinical samples (Fairburn & Beglin, 1994; Luce & Crowther, 1999, Mond, Hay, Rodgers, & Owen, 2006). Cronbach’s alphas in the current sample were as follows: Restraint ($\alpha=.67$); Eating Concern ($\alpha=.81$); Shape Concern ($\alpha=.86$); Weight Concern ($\alpha=.69$); Global Score ($\alpha=.91$). 

**Frequency of BE Episodes.** Frequency of OBEs was assessed using two open-ended questions from the EDE-Q (Fairburn & Beglin, 1994) designed to assess the frequency with which an individual consumed a large amount of food and felt a sense of loss of control when eating. Frequency was assessed in terms of both the number of discrete episodes and the number of days on which OBEs occurred in the past 28 days. We then created a dichotomous variable assessing the presence or absence of recurrent BE over the past 28 days. Given the evidence that lower levels of BE frequency are associated with psychological distress and impairment (Mond & Hay, 2007; Striegel-Moore et al., 2000; Wilson & Sysko 2009), we defined recurrent BE as experiencing an average of one BE episode per week. This threshold is consistent with other studies defining recurrent BE as the presence of an average of one episode (versus two) per week (e.g., Striegel-Moore et al., 2010). Participants received a score of 1 (“presence of recurrent BE”) if they experienced at least 4 episodes or at least 4 days of binge eating over the
past 28 days. Participants received a score of 0 (“No recurrent BE”) if they experienced fewer than 4 episodes or 4 days of BE in the past 28 days.

**Translation**

We utilized the Spanish language version of the EDE-Q (S-EDE-Q, Paleaz-Fernandez, 2004). All other study materials were translated from English into Spanish language by a bilingual Spanish speaker. The initial Spanish version was reviewed and revised by a second bilingual speaker. When necessary, adjustments to the Spanish version were made by the study team upon achieving consensus among the bilingual speakers to achieve clarity and to convey intended meaning of relevant constructs.

**Data management**

After completing the questionnaires, participants were given the opportunity to respond in the case of missing responses. Missing data were handled as follows: for the EDE-Q, we followed the authors’ scoring recommendations and calculated subscale scores as long as more than half of the items for each subscale were completed, and calculated the global score as long as at least two subscales were completed (Fairburn & Beglin, 1994). For all other scales that are computed as the mean of multiple items, we calculated scale scores as long as no more than 20% of items were missing. Out of the N=430 participants who completed questionnaires, 304 (70.7%) had 100% completed data on select demographic variables (age, education level, income, ethnicity, race), BMI, BDI-II, DALC and EDE-Q scores. A total of n=422 participants were included in the exploratory factor analysis, which represents a good subject to item ratio of 15:1 and is consistent with factor analysis sample size guidelines (Nunnally, 1978; Stevens, 2006). The remaining validity analyses included the full sample (N=430), and direct
robust maximum likelihood (MLR) estimation was used to account for data missingness, as well as continuous non-normal data.

**Data analytic plan**

Our EFA analysis was conducted using SPSS version 19.0. We performed an EFA on the 29 items of the scale using a principal axis analysis (PAA) for the purposes of data reduction as well as to examine the factor structure of the items. We aimed to identify latent variables underlying the observed variables. We employed an oblique rotation (Direct Oblimin) to allow for the hypothesized intercorrelations of factors. We first conducted analyses stratified by language and race/ethnicity. Because results were very similar for each group, we combined language and racial/ethnic groups for the remainder of the analyses. We then conducted analyses to establish the construct and incremental validity of the DALC using MPLUS version 7.0 (Muthen & Muthen, 1998-2012). We hypothesized that the DALC would be moderately correlated with depression as measured by the BDI-II. Construct validity was assessed by examining bivariate correlations between the DALC and frequency of BE episodes and frequency of BE days over the previous four weeks (Fairburn & Beglin, 1994). Incremental validity was investigated using linear regression predicting both global EDE-Q scores and BDI-II scores. We entered frequency of BE episodes and BE days over the past 4 weeks in the first model and entered DALC scores in the second model, controlling for BMI, age, education and income to determine if the DALC accounted for unique variability in depression and eating pathology as measured by the BDI-II and the EDE-Q global score. We then conducted a receiver operator characteristic (ROC) analysis (Hsiao, Bartko, & Potter, 1989) to evaluate the predictive accuracy of the DALC for identifying both recurrent BE and clinically significant eating pathology (EDE-Q Global score). The
ROC curve was used to provide an overview of a measure’s validity as a screening tool by providing the sensitivity (the correct detection of individuals with recurrent BE and global eating pathology) and specificity (the correct identification of individuals without recurrent BE or clinically significant eating pathology) for each cutoff point of a measure. We followed Kumar and Indrayan’s (2011) guidelines for the evaluation of the ROC curve for medical research. We examined the area under the curve (AUC) to evaluate the inherent diagnostic validity of the scale, and assessed the sensitivity and specificity across various thresholds of the DALC to determine the optimal cut-off point that accurately classified cases with recurrent BE as well as clinically significant eating pathology.

Results

Sample characteristics

The sample mean age was 43 years, (SD=12.53). Twenty-nine-and-a-half percent (29.5%; n=127) self-identified as Hispanic/Latino, 47.4% (n=204) identified as Black/African American and 24.5% (n=99) identified as Caucasian. Seventy participants completed the Spanish language versions of the questionnaires. The majority of the sample (31.6%, n=136), had less than a college level of education, with 26.7% of the sample only having a high school level of education. 14.7% of the sample had a bachelor’s degree, and 7.9% obtained a graduate degree. Three individuals did not report education data. Thirty-nine-and-a-half percent (39.5%) of the sample had an average income of less than $25,000; 11.6% were unemployed and had no income; 22.3% had an average income of $25,000-$50,000, and 18% had an income of greater than $50,000. Thirty-four individuals did not report this information. The mean BMI for
the sample was 39.76 (S.D. = 8.29), which meets criteria for the World Health Organization (WHO) classification of Moderate to Severe Obesity (WHO, 2004). Means and standard deviations for BMI, DALC, the BDI-II, EDE-Q Global Score and OBE frequencies in each racial/ethnic group are displayed in Table 2.1.

**Ethnic/Racial group differences on demographic and clinical variables**

With respect to demographic variables, between-groups ANOVA tests revealed significant differences between racial/ethnic groups in age (F(2, 421) = 8.74, p < .001), annual income (F(2, 393) = 45.53, p < .001), and education status (F(2, 424) = 39.32, p < .001). Results of Games-Howell post-hoc tests revealed that Caucasian participants were significantly older than both Hispanic (p < .001) and African American (p < .05) participants, had higher income than both Hispanic (p < .001) and African American (p < .001) participants and attained higher levels of education than both Hispanic (p < .001) and African American (p < .001) participants. No significant differences between Hispanic and African American participants were found on these demographic variables. In terms of the clinical variables, ANOVA tests revealed significant racial/ethnic group differences in BMI (F(2, 427) = 6.47, p < .01), DALC scores (F(2, 426) = 12.33, p < .001), BDI-II scores (F(2, 422) = 8.25, p < .001), and EDE-Q Global scores (F(2, 420) = 6.48, p < .01). Games-Howell post-hoc tests revealed that African American participants had higher BMIs than Hispanic participants (p = .001), and a trend was observed toward higher BMIs than Caucasian participants (p = .06). African American participants had lower DALC scores than both Hispanic (p < .001) and Caucasian participants (p < .01). Hispanic participants had significantly higher depression scores on the BDI-II compared to African American (p = .001) and Caucasian (p < .01) participants. On the EDE-Q global score, African American participants...
American participants had significantly lower scores for global eating pathology than both Hispanic (p < .05) and Caucasian (p < .01) participants. No racial/ethnic group differences were found on either measure of binge eating frequency.

**Exploratory factor analysis**

In order to improve the quality of the factor solution and to derive a theoretically-driven scale that assessed distress over LOC eating, we followed Nunnally and Bernstein's (1994) guidelines and first examined the corrected item-total correlations of all scale items. The item-total correlations for all initial 29 items exceeded .5 and were retained for the EFA.

**Factor structure and reliability of the DALC scale**

A Kaiser-Meyer-Oklin (KMO) value of .971 suggested that the data were factorable. To determine the appropriate number of factors to retain and interpret, we examined the scree plot. This method produced 2-factor solution. We then examined 1-3 factor solutions (Costello & Osborne, 2005) and found that the 2-component solution was the most interpretable and best fit the data. To further improve the measurement accuracy of the DALC, we then examined the pattern matrix and eliminated any items that did not load highly (< .45) onto any component, and eliminated any items that cross-loaded highly (> .35) onto more than one factor. These procedures resulted in the retention of a 2-factor solution containing 23 of the original items with eigenvalues of 17.17 and 1.53 and accounting for 59.22 % and 5.26% of the total variance, respectively. We then reran the same extraction and rotation procedures on the remaining 23 items, and eliminated one additional item ("When I eat or after I eat I feel
physically full") which did not load highly onto either factor. This procedure resulted in
the final 22-item two-factor solution (Table 2.2) with eigenvalues of 14.30 and 1.14,
accounting for 62% and 5% of the total variance, respectively. We labeled the resultant
factors (a) Loss of Control (LOC) Experience (13 items) and (b) LOC Consequences (9
items). The 22-item DALC scores produced internal consistency estimates of .96 for the
LOC Experience subscale, .94 for the LOC Consequences subscale and .97 for the total
score. We analyzed internal consistency for both the Spanish and English language
versions of the scale separately, which were high and similar (Cronbach’s alpha for the
Spanish full scale version was .98 and the English full scale was .96). Table 2.2 displays
the item factor loadings of the final DALC scale.

**Convergent and construct validity**

The 22-item DALC scale was significantly correlated with the BDI-II \( r = .62, \)
\p < .001, supporting the convergent validity of the scale. Construct validity of the DALC
was supported by significant medium correlations with frequency of BE episodes
experienced in the previous month \( r = .43, \p < .001 \) and frequency of BE days in the
previous month \( r = .44, \p < .001 \). An independent samples T-test demonstrated that
participants who experienced at least one OBE episode in the previous four weeks had
significantly higher mean DALC scores than those who did not experience a BE episode,
\( t(416) = 13.31, \p < .001 \).

**Incremental validity**

We conducted linear regressions to demonstrate the proportion of variance in
both BDI-II scores and global EDE-Q scores accounted for by the DALC scale relative to
binge frequency, controlling for age, BMI, education status and income. The results of our regression analyses predicting BDI-II scores are presented in Table 2.3. In the first model, we regressed BDI-II scores onto OBE episodes and OBE days, including age, BMI, education and income as covariates, and added DALC scale scores in the second regression. The results of our regression analyses predicting global EDE-Q scores are presented in Table 2.4. In this model, we regressed EDE-Q Global scores onto OBE episode and OBE days, controlling for age, BMI, education and income, and added mean DALC scores in the second regression. The first model accounted for 38.9% of the total variance in BDI-II scores and the second model accounted for 40.2% of the variance in global EDE-Q scores. DALC scale scores significantly contributed to variance in both BDI-II and global EDE-Q scores above and beyond the variance accounted for by BE frequency. DALC scores had a large effect size, accounting for an additional 26.5% of the variance in BDI-II scores, and an additional 22% of the variance in global EDE-Q scores. $R^2$ change produced large effect sizes in both models.

**DALC cutoff for identifying recurrent BE and global eating pathology**

The first ROC curve plotted the sensitivity verses 1-specificity for individuals with recurrent BE (i.e., a dichotomous variable of either the presence or absence of >4 BE episodes or days in the past 28 days, derived from responses to open-ended questions from the EDE-Q). Figure 2.1 displays the ROC curve, with the sensitivity and 1-specificity of each cutoff point of the DALC for predicting recurrent BE. We evaluated the predictive accuracy of the DALC according to the AUC values indicated by Greiner, Pfeifer, and Smith (2000), suggesting that AUC values under 0.7 are less predictive, AUC values from 0.7 to 0.9 are moderately predictive, and AUC values from 0.9 to 1.0
are highly to perfectly predictive. The results of the ROC curve analysis demonstrate moderate predictive validity measured by the area under the curve (AUC=.79, SE=.02; 95% CI: .744-.839). For the second ROC curve, we created a dichotomous variable based on a global EDE-Q cutoff score that represented a clinically significant level of eating pathology in the current sample. We first examined established EDE-Q norms for individuals in the community with BED (3.46, Aardoom, Dingermans, Slof Op'tLandt, & Van Furth, 2012) and individuals in the community with obesity (2.75; Aardoom et al., 2012), as well as the mean EDE-Q score in our sample (2.83). We decided to use the average of these three estimates as a normative estimate of ED pathology among weight loss treatment-seeking individuals, and added one standard deviation, achieving consensus that a global EDE-Q score of ≥4 would signify a clinically significant level of eating pathology in the current sample. Figure 2.2 displays the ROC curve for the predictive accuracy of the DALC with respect to clinically significant eating pathology. The ROC curve and AUC was also moderately predictive (AUC=.81, SE=.03; 95% CI=.754-.866). The sensitivity and specificity, and percent correctly classified at various DALC cutoff scores for both recurrent BE and global eating pathology are displayed in Table 3. We first examined the tradeoff between sensitivity and specificity, with the goal of achieving high sensitivity and specificity values (a value of 1 for sensitivity and specificity represents a perfect screening tool). We then looked at the proportion of the sample that met each cutoff score with the aim of determining a cutoff point that included a large proportion of the sample. We then calculated the proportion of individuals that were correctly classified at each cutoff score by adding the true positives identified and the true negatives excluded and dividing by the total number of individuals at each cutoff. The evaluation of the above-mentioned criteria suggested that a cutoff score of
2.34 on the DALC was the optimal threshold for detecting both recurrent BE and clinically significant eating pathology. This threshold mean score had sensitivities of .71 and .78 for recurrent BE and global eating pathology and specificities of .73, respectively. This threshold correctly classified 72.1% of individuals with recurrent BE and 72.6% of individuals with clinically significant eating pathology.

Discussion

The goal of the present study was to develop and demonstrate the psychometric properties of a dimensional assessment tool for LOC eating in an ethnically-diverse weight management treatment seeking population. Results of the present study demonstrate excellent psychometric properties for the DALC scale. Our EFA produced adequate internal reliability for a two-factor scale. High Cronbach’s alpha for the total scale supports the use of the DALC as a unitary construct in our study sample. The DALC demonstrated good convergent validity through a medium-sized significant correlation with a measure of depression. Construct validity was supported by medium-sized significant correlations with items assessing the frequency of BE episodes, though the strength of the correlation (small to medium) suggests that LOC eating is a construct that is related to but distinct from BE frequency. Regression analyses indicated that the DALC can significantly predict variation in measures of depression and global eating pathology. Importantly, our results demonstrated that distress over LOC eating contributed to the variance in both depression and global eating pathology above and beyond the variance accounted for by BE frequency and BMI. These results support the hypothesis that LOC eating is a distinct and important construct in this population. Further, our results contribute to the evidence base for the importance of assessment of
LOC eating, suggesting that LOC may be a better predictor of depression and general eating disorder psychopathology than the presence of BE alone (Mond et al., 2010; Latner et al., 2007).

A secondary aim of the present study was to evaluate the validity of the DALC as a screening measure for recurrent BE and clinically significant eating pathology. Results from our ROC curve analyses suggest that a cutoff score of 2.34 was optimal for identifying both individuals with recurrent BE and global eating pathology in this population. This cutoff score correctly classified approximately 72% of participants with recurrent BE and clinically significant eating pathology. That the same cutoff score was optimal for both recurrent BE and cognitive symptoms of eating pathology further supports the predictive validity of the DALC as a potential screening tool. Given the limitations of existing measures that assess the presence or frequency of BE in correctly classifying BED cases (Wilfley et al., 2003), our findings contribute to the knowledgebase by demonstrating that a measure of distress over LOC eating, independent of the amount of food eaten, can adequately predict categorical thresholds of BE frequency and eating pathology. It is important to note that this cutoff score is relatively low, which may be attributable to the positively skewed distribution of our scale. Almost 85% of our study sample had scores below 5 (out of 11) on our scale, suggesting the majority of the sample fell within the range of “no distress” to “pretty distressed.” A cutoff score of 2.34 represents “a little bit of distress” over LOC eating, and is derived from an average of all 22 items of the scale (see Table 2.2 for the final DALC scale items), suggesting that participants may endorse a small amount of distress over all aspects of LOC eating, or may endorse more distress about some aspects than others. It is possible that some key items that correspond to indicators of impaired
control proposed as part of the research criteria for BED, including feeling disgusted after eating, eating more rapidly than usual, and eating in the absence of hunger, may have higher predictive value for recurrent BE than others. This interpretation is consistent with findings from a recent study utilizing an ROC curve analysis, that suggest that each indicator had a high predictive value with respect to BED diagnosis (White & Grilo, 2011). In our sample, almost 40% of participants met the proposed LOC distress cutoff score of 2.34, which is a significantly higher estimate than previous estimates of OBE prevalence in weight management populations (Gorin et al., 2008). However, this rate is more consistent with other studies in weight management populations investigating the presence of LOC eating independent of OBE episodes, where estimates range from 30% to 60% (Colles et al., 2008; White & Grilo, 2011). This finding may also indicate that while fewer individuals may meet diagnostic thresholds for frequency or amount of food consumed during binge episodes, they may still experience distress over LOC eating. Our highly sensitive measure demonstrates that even low levels of distress over LOC eating may predict recurrent BE and general eating pathology.

This preliminary development and validation of the DALC is a critical step in advancing the growing literature on the topic of LOC eating. The development of measures that assess multiple aspects of LOC eating has been identified as a high priority (Tanofsky-Kraff et al., 2013; Wolfe et al., 2009). To our knowledge, this is the only study to develop a multifaceted, dimensional assessment of distress over LOC eating. Current thinking in the field of classification and diagnosis emphasizes the conceptual importance of seeing pathology on a dimensional continuum (Brown & Barlow, 2005; Cuthbert, 2005; Krueger, Watson, & Barlow, 2005; Wilson & Sysko, 2005).
The Research Domain Criteria Project (RDoC) recently launched by The National Institutes of Mental Health (NIMH) calls for the classification of psychopathology based on dimensions of functioning with the goal of achieving a more integrated view of pathology and developing transdiagnostic treatments. A dimensional assessment of LOC is well aligned with these goals as it is designed to measure a core symptom that spans across traditionally categorically defined disorders. Further, a dimensional assessment allows flexibility in identifying etiological and mediating factors in the development and treatment of symptoms (Patel & Sumapithala, 2001). Studies evaluating the validity and utility of the current definitions of BE have indicated that focusing on core dimensions across diagnoses may inform a transdiagnostic set of defining criteria (Keel, Crosby, Hildebrandt, Haedt-Matt, & Gravener, 2013; Wilson & Sysko, 2009; Wolfe et al., 2009). Future studies will benefit from having a more sound assessment tool for assessing LOC eating. It will be important to replicate study findings in different populations to investigate the performance of the DALC across ED diagnoses as well as in non-clinical samples.

Despite the potential contribution of the current study findings to the field of binge eating, our results should be interpreted in the context of several limitations. First, the scale was developed and validated in a low income, ethnically-diverse weight management sample, and the generalizability of the performance of this scale to other populations is uncertain. In addition, the relatively low scores on the DALC in this population require future examination to better contextualize the prevalence of this construct. For example, further research investigating rates of LOC eating as measured by the DALC is needed to obtain appropriate prevalence estimates of LOC eating across different samples. Second, our validation analyses were limited by their exclusion of
other measures designed to assess BE and correlates, including both self-report and interview-based assessment. It will be important to examine how the DALC relates to such self-report scales such as the Bulimia Test-Revised (BULIT-R; Thelen, Farmer, Wonderlich, & Smith, 1991) and the QEWP-R, as well as interview-based diagnostic standards such as the EDE. The literature suggests that interview-based assessments may produce a more accurate categorization of EDs than self-report (e.g., Wilfley et al., 2003). It is possible that the predictive validity of the DALC may be enhanced by the use of structured interviews to classify individuals with recurrent BE or with clinically significant eating pathology, as individuals who were incorrectly classified based on self-report may be correctly classified with a more stringent assessment. Future research may benefit from the use of investigator-based interviews when evaluating the predictive validity of the DALC. Future investigations would also benefit from including self-report BE scales in regression analyses to assess whether the DALC exhibits incremental validity beyond the variance accounted for by these established BE assessments. Finally, the cross-sectional nature of the present study did not permit the evaluation of test-retest reliability. Future psychometric evaluations of the DALC would benefit from including this important psychometric data.

Despite the above-mentioned limitations, our results provide support for the DALC as a valid measure of LOC eating in an ethnically diverse weight management population. Our results suggest that distress over LOC eating is distinct from frequency of BE episodes, and should be included as part of both research and clinical evaluations. The development of the DALC contributed to the knowledge base through better characterizing an important phenomenon in the study of BE. The thorough assessment of LOC eating will further contribute to the development of targeted intervention efforts.
### Table 2.1  Demographic and Clinical Characteristics by Racial/Ethnic Group (N = 430)

<table>
<thead>
<tr>
<th></th>
<th>Hispanic (N=127)</th>
<th>African American (N=204)</th>
<th>Caucasian (N=99)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Age</td>
<td>40.41</td>
<td>11.50</td>
<td>43.00</td>
</tr>
<tr>
<td>BMI</td>
<td>38.14</td>
<td>6.80</td>
<td>41.23</td>
</tr>
<tr>
<td>DALC</td>
<td>2.85</td>
<td>2.50</td>
<td>1.75</td>
</tr>
<tr>
<td>BDI-II</td>
<td>18.38</td>
<td>11.22</td>
<td>13.76</td>
</tr>
<tr>
<td>EDEQ Global</td>
<td>2.92</td>
<td>1.21</td>
<td>2.55</td>
</tr>
<tr>
<td># of OBE episodes in past month</td>
<td>4.45</td>
<td>10.21</td>
<td>3.37</td>
</tr>
<tr>
<td># of Days of OBEs in past month</td>
<td>3.78</td>
<td>7.12</td>
<td>3.83</td>
</tr>
<tr>
<td>Recurrent BE</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Education</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Some High School or Less</td>
<td>46</td>
<td>36.5%</td>
<td>27</td>
</tr>
<tr>
<td>High School Graduate</td>
<td>36</td>
<td>28.3%</td>
<td>63</td>
</tr>
<tr>
<td>Some college</td>
<td>30</td>
<td>23.6%</td>
<td>79</td>
</tr>
<tr>
<td>College graduate</td>
<td>14</td>
<td>11.0%</td>
<td>33</td>
</tr>
<tr>
<td>Income</td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Unemployed/no income</td>
<td>19</td>
<td>16.2%</td>
<td>25</td>
</tr>
<tr>
<td>Less than $25,000</td>
<td>55</td>
<td>47.0%</td>
<td>93</td>
</tr>
<tr>
<td>$25,000-$50,000</td>
<td>30</td>
<td>25.6%</td>
<td>48</td>
</tr>
<tr>
<td>Greater than $50,000</td>
<td>13</td>
<td>11.1%</td>
<td>19</td>
</tr>
</tbody>
</table>
### Table 2.2  Exploratory factor analysis of the DALC Scale (N=422)

<table>
<thead>
<tr>
<th>Original DALC Item</th>
<th>Factor 1 LOC Experience</th>
<th>Factor 2 LOC Consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>I experience episodes of eating that are unplanned where I felt like I can’t stop eating once I start</td>
<td>.88</td>
<td>-.05</td>
</tr>
<tr>
<td>I cannot control how much I am eating</td>
<td>.78</td>
<td>.07</td>
</tr>
<tr>
<td>I do not feel full after eating</td>
<td>.80</td>
<td>-.01</td>
</tr>
<tr>
<td>I eat much faster than usual</td>
<td>.76</td>
<td>-.05</td>
</tr>
<tr>
<td>If I feel I’ve already eaten more than I would like, I eat as much as possible</td>
<td>.97</td>
<td>.06</td>
</tr>
<tr>
<td>I eat when I am not physically hungry</td>
<td>.73</td>
<td>.06</td>
</tr>
<tr>
<td>I eat different foods than I would normally eat</td>
<td>.83</td>
<td>-.08</td>
</tr>
<tr>
<td>I eat more food than I planned on eating</td>
<td>.72</td>
<td>.12</td>
</tr>
<tr>
<td>I feel distracted while eating and am unaware of my surroundings</td>
<td>.55</td>
<td>.20</td>
</tr>
<tr>
<td>I am unable to delay eating right in that moment</td>
<td>.74</td>
<td>.10</td>
</tr>
<tr>
<td>When I eat, I feel like I could not have prevented it from occurring</td>
<td>.66</td>
<td>.20</td>
</tr>
<tr>
<td>When I am eating, I feel like I can’t stop eating</td>
<td>.60</td>
<td>.26</td>
</tr>
<tr>
<td>I feel like I will be unable to stop eating once I start, no matter how much I am eating</td>
<td>.58</td>
<td>.28</td>
</tr>
<tr>
<td>When I eat or after I eat, I feel disgusted</td>
<td>.20</td>
<td>.66</td>
</tr>
<tr>
<td>When I eat or after I eat, I feel fat</td>
<td>.16</td>
<td>.70</td>
</tr>
<tr>
<td>When I eat or after I eat, I feel like a bad person</td>
<td>-.05</td>
<td>.89</td>
</tr>
<tr>
<td>When I eat or after I eat, I feel sad</td>
<td>.02</td>
<td>.88</td>
</tr>
<tr>
<td>When I eat or after I eat, I feel like I am unable to engage in my daily activities</td>
<td>.14</td>
<td>.69</td>
</tr>
<tr>
<td>When I eat or after I eat, I feel like I want to avoid other people</td>
<td>-.06</td>
<td>.88</td>
</tr>
<tr>
<td>When I eat or after I eat, I feel anxious or afraid</td>
<td>.08</td>
<td>.67</td>
</tr>
<tr>
<td>When I eat or after I eat, I feel hopeless</td>
<td>.02</td>
<td>.83</td>
</tr>
</tbody>
</table>

**Eliminated Items**

| I eat because I am physically tired                                               | .38                     | .29                       |
| While I am eating I feel numb or “spaced out”                                     | .25                     | .40                       |
| When I am eating, I feel like doing anything else seems impossible                | .37                     | .33                       |
| When I am eating, I feel if I were interrupted I would not be able to stop       | .42                     | .28                       |
Table 2.3  Summary of Multiple Regression Analyses Predicting BDI-II Scores (N=430).

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Standardized Beta</th>
<th>S.E</th>
<th>R²</th>
<th>R² change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regression 1</strong></td>
<td></td>
<td></td>
<td><strong>.142</strong></td>
<td></td>
</tr>
<tr>
<td>OBE episodes</td>
<td>.06</td>
<td>.09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBE days</td>
<td>.25**</td>
<td>.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>.08</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.02</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>-.19***</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>.07</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Regression 2</strong></td>
<td></td>
<td></td>
<td><strong>.402</strong>*</td>
<td><strong>.26</strong></td>
</tr>
<tr>
<td>OBE episodes</td>
<td>-.08</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBE days</td>
<td>.11</td>
<td>.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>.04</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>.02</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>1.14**</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>.00</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DALC scores</td>
<td>.59***</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p<.05  **p<.01  ***p<.001
Table 2.4  Summary of Multiple Regression Analyses Predicting EDE-Q Global Scores (N=430).

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Standardized Beta</th>
<th>S.E</th>
<th>R²</th>
<th>R² change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regression 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OBE episodes</td>
<td>0.06</td>
<td>.12</td>
<td>.182**</td>
<td></td>
</tr>
<tr>
<td>OBE days</td>
<td>.32***</td>
<td>.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>.06</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.14**</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>-.02</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>.09**</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Regression 2</strong></td>
<td></td>
<td></td>
<td></td>
<td>.22</td>
</tr>
<tr>
<td>OBE episodes</td>
<td>-.07</td>
<td>.09</td>
<td>.398***</td>
<td></td>
</tr>
<tr>
<td>OBE days</td>
<td>.18**</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>.03</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.11**</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>.03</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td>.09</td>
<td>.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DALC scores</td>
<td>.53***</td>
<td>.04</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p<.05   **p<.01   ***p<.001
Figure 2.1 ROC Curve Predicting Recurrent Binge Eating (≥4 times in previous month)

Diagonal segments are produced by ties.
Figure 2.2 ROC Curve for Predicting Eating Pathology (EDE-Q score ≥4).

Diagonal segments are produced by ties.
Table 2.5. Sensitivity, Specificity and Percent Correctly Classified for DALC Cutoff Scores

<table>
<thead>
<tr>
<th>DALC score</th>
<th>N (%)</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>% Correctly classified</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>% Correctly classified</th>
</tr>
</thead>
<tbody>
<tr>
<td>.25</td>
<td>355 (82.8)</td>
<td>.98</td>
<td>.21</td>
<td>38.9%</td>
<td>.97</td>
<td>.20</td>
<td>32.9%</td>
</tr>
<tr>
<td>1.25</td>
<td>237 (55.2)</td>
<td>.91</td>
<td>.55</td>
<td>63.2%</td>
<td>.89</td>
<td>.52</td>
<td>58.1%</td>
</tr>
<tr>
<td>1.80</td>
<td>187 (43.6)</td>
<td>.79</td>
<td>.67</td>
<td>69.9%</td>
<td>.81</td>
<td>.64</td>
<td>67.1%</td>
</tr>
<tr>
<td><strong>2.34</strong></td>
<td><strong>162 (37.8)</strong></td>
<td><strong>.71</strong></td>
<td><strong>.73</strong></td>
<td><strong>72.1%</strong></td>
<td><strong>.78</strong></td>
<td><strong>.73</strong></td>
<td><strong>72.6%</strong></td>
</tr>
<tr>
<td>3.30</td>
<td>124 (28.9)</td>
<td>.59</td>
<td>.80</td>
<td>75.2%</td>
<td>.69</td>
<td>.80</td>
<td>77.7%</td>
</tr>
<tr>
<td>5.00</td>
<td>67 (15.6)</td>
<td>.35</td>
<td>.90</td>
<td>77.3%</td>
<td>.48</td>
<td>.91</td>
<td>83.8%</td>
</tr>
<tr>
<td>6.00</td>
<td>41 (9.6)</td>
<td>.21</td>
<td>.93</td>
<td>76.6%</td>
<td>.33</td>
<td>.95</td>
<td>84.6%</td>
</tr>
<tr>
<td>7.00</td>
<td>22 (5.1)</td>
<td>.11</td>
<td>.97</td>
<td>76.6%</td>
<td>.22</td>
<td>.98</td>
<td>85.1%</td>
</tr>
<tr>
<td>9.05</td>
<td>2 (0.5)</td>
<td>.01</td>
<td>1.0</td>
<td>76.6%</td>
<td>.03</td>
<td>1.0</td>
<td>83.2%</td>
</tr>
</tbody>
</table>
CHAPTER THREE
Study #2: Binge Eating Prevalence, Correlates and Racial/Ethnic Group Differences in the Weight Management Population

Introduction

Binge eating disorder (BED) is a serious psychiatric disorder, associated with obesity, and common across racial/ethnic groups (Alegria, et al., 2007; Flegal et al., 2010; Marcus et al., 2007). BED is characterized by recurrent binge eating (BE), which is defined as the consumption of an objectively large amount of food in a discrete period of time, accompanied by a loss of control over eating (DSM IV-TR; APA, 2000). It is distinguished from bulimia nervosa by the absence of severe compensatory weight control behaviors (DSM-IV-TR; APA, 2000). While BED and recurrent BE appear to be equally prevalent across major US-based racial/ethnic groups including African Americans, Hispanics, and Caucasians, racial/ethnic differences have been observed in the type and severity of cognitive symptoms (Franko et al., 2012); body mass index (BMI) (Grilo, Lozano, & Masheb, 2005); and rates of BED diagnosis and treatment (Becker et al., 2003).

The majority of data comparing African Americans, Hispanic Americans, and Caucasian Americans with BE come from epidemiological studies and community samples (Striegel-Moore & Franko, 2003). Unlike other EDs, BED appears to be equally prevalent among these three ethnic groups in the general population (Alegria et al., 2007; Marcus et al., 2007; Marques et al., 2011; Regan & Cachelin, 2006). However, among respondents from community samples of adults with BED, African Americans and Hispanic Americans show higher average BMIs than Caucasian Americans (Marcus
et al., 2007; Pike et al., 2001). Data concerning symptom severity are inconsistent; some studies indicate racial/ethnic differences in severity of BE and cognitive symptoms, while others do not evidence such differences (Fitzgibbon et al., 1998; Marcus et al., 2007; Pike et al., 2001; Striegel-Moore et al., 2003;). For example, a community study comparing black and white women with BED found that black women reported lower shape and weight concerns, but higher BMI and higher BE frequency (Pike et al., 2001). In contrast, another study reported that significantly fewer black women met criteria for BED than white women (Striegel-Moore et al., 2003). Yet another study found that Hispanic women had lower BE frequency than both black and white women (Fitzgibbon et al., 1998).

Inconsistent racial/ethnic differences in individuals with BED have also been observed among treatment-seeking samples, the data for which come primarily from RCTs for BED and gastric surgery clinics (which often screen for the presence of BED; Thompson-Brenner et al., 2013). In data aggregated from clinical trials, African Americans were observed to have higher BMIs and dietary restraint scores than Caucasians with BED (Franko et al., 2012; Becker et al., 2003) and Hispanic participants reported higher shape and weight concerns than Caucasian participants (Franko et al., 2012). Studies of individuals with BE seeking gastric surgery have also observed higher BMI among racial/ethnic minorities (Mazzeo et al., 2005; Azarbad et al., 2010). One study found no differences between minority individuals and Caucasians in BE frequency but reported higher levels of disinhibition among Caucasians compared to African American and Hispanic patients seeking bariatric surgery (Sanchez-Johnsen, Dymek, Alverdy, & le Grange, 2003). In a rare sample of black and white patients recruited from a university-based ED center, Grilo and colleagues (2005) observed no
significant differences between black and white participants in cognitive symptoms or BE frequency (Grilo et al., 2005).

Several studies have documented sampling biases among treatment seekers with BED that limit the generalizability of these samples (Grilo et al., 2005; Grilo, White, & Masheb, 2012; Franko et al., 2012), and it has been suggested that these biases are more pronounced among minorities (Grilo et al., 2005). For example, ethnic minorities who sought treatment in RCTs for BED (Franko et al., 2012) were older, had higher BMIs and higher levels of education than those with BED in a large epidemiological study (Heeringa et al., 2004). RCTs have included very few African Americans and Hispanics with less than a college level of education; in contrast, epidemiological data suggest the majority of minorities with BED have less than a high school level of education (e.g., Marcus et al., 2007). Treatment-seeking clinic samples have also reported biases (Fitzgibbon et al., 1998; Wilfley, Pike, Dohm, Striegel-Moore, & Fairburn, 2001). Black women recruited for BED treatment in a university ED clinic had higher BMIs and more severe cognitive symptoms of BED when compared to black women with BED in a community sample, but reported lower frequency of BE (Grilo et al., 2005). In summary, recruited clinic samples tend to be comprised of well educated participants who choose to participate in research studies, and may not be representative of minority patients with BED who seek treatment on their own in community-based settings (Grilo et al., 2005).

Data from academic randomized clinical trials (RCTs) of psychotherapy and weight loss treatments, and specialty clinics are particularly limited in their generalizability to the majority of treatment-seeking African American and Hispanic Americans, who typically have lower levels of education and seek outpatient treatment
for obesity (not BE) in medical settings (Franko et al., 2012; Cachelin & Striegel-Moore, 2006; Mond, Hay, Rodgers, & Owen, 2007). Such biases have resulted in a serious dearth of knowledge about the clinical presentation of racial/ethnic minority individuals with BE. It has been suggested, therefore, that research is needed in different settings, such as community hospital weight management programs, where racial/ethnic minorities with lower levels of education may be more likely to present for treatment (Franko et al., 2012). Indeed, evidence suggests that individuals with BE more frequently seek treatment for weight loss than for BED (Hudson et al., 2007; Striegel-Moore, Dohm, Kraemer, Schreiber, Crawford, & Daniels, 2005; Ogg, Millar, Pusztai, & Thom, 1997; Sansone, Widerman, & Sansone, 1997). In a community study of individuals with BED, the majority (87.1%) had sought treatment for weight management in their lifetime rather than treatment for symptoms specific to one or more ED (Mond et al., 2007). These findings suggest that non-psychiatric weight loss settings are important sites for diagnosis and treatment of BE. Data regarding racial/ethnic minorities with BE seeking nutritional weight loss treatments are severely lacking. The identification of prevalence rates and correlates of BE in the settings in which these patients present are needed to inform efficacious and disseminable interventions.

It is also particularly important to consider the potential role of demographic and sociological factors, including education, socioeconomic status (SES) and stress, in observed racial/ethnic group differences in the symptoms of BE. Racial/ethnic minorities in the community with BED have lower levels of SES and education compared to non-minority individuals (Franko et al., 2012; Marcus et al., 2007). Further, SES, education, and stress have been consistently identified as risk factors for the development of BED across ethnic groups (Alegria, et al., 2007; Harrington, Crowther, Payne Henrickson &
Mickelson, 2006; Reagan & Hersch, 2005). However, less is known about the degree to which these variables contribute to observed racial/ethnic differences in BED. Several studies have posited that observed racial/ethnic differences may be better attributed to differences in SES (e.g., Wilfley et al., 2001). However, there is also evidence that true racial/ethnic differences in clinical characteristics among minorities exist. There are culturally-based beliefs regarding body shape and eating norms that may contribute to racial/ethnic group differences. For example, data suggest that African American women endorse a greater acceptance of higher weight than Caucasians (Wilfley, Schreiber, Pike, & Striegel-Moore, 2006), and lower levels of body dissatisfaction than do Caucasian women (Altabe, 1998). Weight and shape based values among Hispanic racial groups is less consistent, with some research suggesting Hispanics endorse more positive attitudes towards weight gain (Cachelin et al., 2000), and other studies finding high levels of body dissatisfaction among Hispanics (Chamorro & Flores-Ortiz, 2000). Culturally distinct values around body size may be reflected in symptom presentation. For example, black women with BED report fewer shape and weight concerns than white women with BED, despite having higher BMIs, suggesting a distinct presentation of BED among African Americans compared to Caucasians that may be culturally specific (Pike et al., 2001). Other evidence suggests that higher BMI among African Americans compared to Caucasians was associated with greater efforts to control food intake (eating restraint) among African Americans (Franko et al., 2012), suggesting that culturally based values may impact cognitive concerns. Another study found that Hispanic participants endorsed a similar thin body ideal as Caucasians despite having higher BMIs (Fitzgibbon et al., 1998), suggesting that the discrepancy between actual and ideal body size among Hispanics in particular may impact pathological cognitive
concerns. A recent study of treatment-seeking Hispanics with BED suggests that Hispanic participants had greater body dissatisfaction compared to other groups, and indicate that cultural variables should be taken into account when screening for and treating BED (Franko et al., 2012).

Studies among treatment seeking minorities have suggested that these racial/ethnic differences persist despite differences in SES (Fitzgibbon et al., 1998; Franko et al., 2012; Sanchez-Johnsen et al., 2003). For example, in data aggregated from RCTs for BED, Franko and colleagues (2012) found that BMI and SES only partially mediated observed racial/ethnic differences in BED symptoms (Franko et al., 2012). In a sample of individuals seeking treatment for bariatric surgery, racial/ethnic differences in disinhibition (LOC eating) persisted after controlling for education, BMI and age (Sanchez-Johnsen et al., 2003). Given evidence that some racial/ethnic group differences in BE symptomatology persist after controlling for demographic variables, it has been suggested that additional factors—including stress—may better explain differences in ED presentations (Franko et al., 2012). One study examining the role of perceived stress in racial/ethnic differences in BE in a multiethnic bariatric treatment-seeking sample found that African American women reported slightly higher levels of stress than Caucasian women, but that ethnicity did not moderate the relationship between stress and BE (Azarbad et al., 2010). Notably, the sample was comprised of highly educated individuals, and stress levels across ethnic groups were in the average range (Azarbad et al., 2010). It is important to examine the mediating role of education, income, and stress in a setting in which racial/ethnic minorities with low income and lower levels of educational attainment present for treatment.
The current study aims to characterize the prevalence, correlates and racial/ethnic group differences in recurrent BE among Hispanics, African Americans and Caucasians seeking nutritional counseling in a large, urban, community hospital. Examining racial/ethnic differences in BE in one of the most common points of entry for health services utilization for these individuals will contribute to the small literature on ethnicity and BE, and will speak to culturally appropriate assessment and interventions for diverse ethnic groups. We hypothesize that prevalence rates of BE frequency and recurrent BE will not differ between racial/ethnic groups, but that individuals with recurrent BE in all racial/ethnic groups will show higher BMI, higher depression scores, and more severe cognitive symptoms (i.e., shape and weight concerns) than those without recurrent BE. Given evidence that there may be true racial/ethnic differences in BED that are culturally based and which may be reflected in symptom expression, we further hypothesize that Hispanics with recurrent BE will show higher shape/weight concerns than other racial/ethnic groups and African Americans with recurrent BE will show higher BMI and dietary restraint scores than other racial/ethnic groups. A secondary hypothesis is that these ethnic differences in BE symptoms will be partially accounted for by income, education, and perceived stress.

**Methods**

**Participants**

A total of 832 consecutive patients presenting for nutritional counseling at the Center for Nutrition and Weight Management (CNWM) at the Boston Medical Center (BMC), a community hospital serving a racially/ethnically diverse population, were recruited for participation. Consenting participants were invited to complete self-report
questionnaires in either English or Spanish language and were compensated $20 for their participation. A total of 496 initiated the survey, representing a response rate of 59.6%. Data from 66 participants were excluded because they failed to answer the majority of questions (n=58), exhibited substantial inability to read and comprehend study instructions and/or questions (n=6), or were not seeking weight management treatment (n=2). Thus, of the 496 who initiated the study, 87% completed relevant measures for this study. The sample of participants included in the data analyses consisted of 430 individuals (350 female; 80 male). This study was approved by the Boston University Charles River Campus Institutions Review Board.

Measures

Demographic Information Form includes eight simple self-report items including age, income, number of dependents, occupational and educational history. Race/ethnicity was determined by participant’s self-reported ethnic/racial background.

BMI. BMI (kg/m²) was determined using a medical balance-beam scale and stadiometer. The World Health Organization (WHO) interpretive BMI ranges suggest BMI of 18.5-25 is within the normal range, 25 to 30 is in the overweight range, and >30 is in the obese range.

Beck Depression Inventory- II (BDI-II, Beck, Steer, & Brown, 1996). The BDI-II 21-item self-report measure that assesses severity of depressive symptomatology in the past two weeks. It is widely used including in ED treatment research (Thompson-Brenner et al., 2013). Total scores ranging from 0-13 represent normal/minimal depressive symptoms; 14-19 represent mild depressive symptoms; 20-28 represent moderate depressive symptoms, and 29-63 represent severe symptoms. The BDI-II has
demonstrated high internal consistency (a=.90) and convergent validity with other self-report measures of depression (rs>.50; Steer & Beck, 2000). Cronbach’s alpha is the current sample was .93.

*Eating Disorders Examination-Questionnaire* (EDE-Q Fairburn & Beglin, 1994). The EDE-Q is a 28-item measure assessing eating pathology. The EDE-Q global score is a dimensional summary of eating pathology based on 4 subscales: weight concern, shape concern, eating concern and severity of dietary restraint, over the past 28 days. It has demonstrated validity and reliability in clinical and non-clinical samples (Fairburn & Beglin, 1994; Luce & Crowther, 1999, Mond, Hay, Rodgers, & Owen, 2006). Cronbach’s alpha in the current sample were as follows: Restraint Subscale (α=.67); Eating Concern Subscale (α=.81); Shape Concern Subscale (α=.86); Weight Concern Subscale (α=.69); Global Score (α=.91).

*Frequency of BE Episodes*. Frequency of OBEs was assessed using two open-ended questions on the EDE-Q designed to assess the frequency with which an individual consumed a large amount of food and felt a sense of loss of control eating. Frequency was assessed in terms of both number of discrete episodes and number of days on which OBEs occurred in the past 28 days.

*Recurrent BE*. In addition to obtaining a continuous measure of BE frequency, we created two categorical measures that assessed the presence of recurrent BE. The first measure was based on frequency alone: participants received a score of 1 (“presence for recurrent BE”) if they experienced at least 4 episodes or at least 4 days of binge eating over the past 28 days. Participants received a score of 0 (“No recurrent BE”) if they experienced fewer than 4 episodes or 4 days of BE in the past 28 days. The second measure was based on both frequency and distress over BE. Participants received a
score of 1 (“Recurrent BE and distress”) if they reported experiencing 4 episodes or days of binge eating in the past month and indicated they experienced distress or interference because of recurrent BE, by endorsing a score of 3 or above out of 10 on a Likert scale on one of two items assessing distress and interference due to BE. (A score within this range represents a level of distress/interference from “pretty distressed about BE” (3) to “extremely distressed about BE” (10)). If participants did not meet either the frequency criterion or the distress/impairment criterion, they received a score of 0 (“No recurrent BE and distress”).

The Personality Assessment Inventory Stress Scale (PAISS; Morey, 1991). The PAISS is an 8-item measure assessing the perceived impact of current and recent stressors in the domains of family relationships, health, employment, finances, and recent major life changes or impending life changes. Items reflect chronic problems and major but less frequent stressors (Azarbad et al., 2010). The scale has cut-off points for lack of stressors, moderate stress, and significant stress: a T score of <60 is within the average range and is indicative of minimal to no stress; a T score of 60 to 69 reflects a moderate degree of stress and scores of >70 reflect significant difficulties that negatively impact the life of the respondent (Morey, 1991). The scale has demonstrated reliability and validity, and has been used in ethnically-diverse samples in ED research (Azarbad et al., 2010). The scale is simple and brief, and is useful as a broadly applicable scale of stressors distinct from psychological functioning and SES. We transformed PAISS raw scores into T scores derived from a census-matched standardization sample provided in the PAI Professional Manual (Morey, 2007). We also employed the scale dimensionally by calculating a mean total stress score ranging from 0 (little to no stress) to 3 (significant stress). Cronbach’s alpha for the dimensional measure in the current sample
was .79.

**Translation**

We employed the Spanish language version of the EDE-Q (S-EDE-Q, Palaez-Fernandez, 2004). All other study materials were translated from English into Spanish language by a bilingual Spanish speaker familiar with clinical terminology. The initial Spanish version was reviewed and revised by a second bilingual speaker. When necessary, adjustments to the Spanish version were made by the study team upon achieving consensus among the bilingual speakers to achieve clarity and to convey intended meaning of relevant constructs.

**Data Management**

After completing the questionnaires, participants were given the opportunity to respond in the case of missing responses. Missing data were otherwise handled as follows: for the EDE-Q, we followed the authors’ scoring recommendations and calculated subscale scores as long as more than half of the items for each subscale were completed, and calculated the global score as long as at least two subscales were completed (Fairburn & Beglin, 1994). For all other scales that are computed as the mean of multiple items, we calculated scale scores as long as no more than 20% of items were missing. Direct robust maximum likelihood (MLR) estimation was used to account for data missingness, as well as continuous non-normal data.

**Data Analytic Plan**
Descriptive data were produced using SPSS 16.0. All remaining analyses were performed using MPLUS software (Muthen and Muthen, 1998-2012), an MLR software that accounts for missing data and the non-normal distribution of continuous variables. The first set of analyses examined racial/ethnic group differences in BE. To examine the relationship between race/ethnicity and relevant clinical variables, we conducted a series of regression analyses, including racial/ethnic group membership and a standard set of covariates (age, income, education, and BMI) in each analysis. To evaluate racial/ethnic group differences in each model, we first entered African American and Latino ethnicity as compared to Caucasian ethnicity by creating two dummy coded variables for minority race ethnicity (African American = 1/Caucasian = 0 and Latino = 1/Caucasian = 0). We interpreted regression coefficients for the dummy variables as changes in the dependent variables with respect to the reference group. We then compared African Americans to Hispanic participants by excluding Caucasian participants from the analyses and comparing the two minority racial/ethnic groups. We assessed ethnic/racial group differences employing BE frequency as both continuous and dichotomous measures. We conducted a linear regression entering racial/ethnic group category as the independent variable and the number of BE episodes over the past 28 days as the dependent variable, entering age, BMI, education status and income as covariates.

We conducted a second linear regression using the number of binge days in the previous month as the dependent variable. We conducted a logistic regression to examine racial/ethnic differences in the presence or absence of recurrent BE. The second group of analyses examined differences between individuals with recurrent BE and those without. To evaluate whether all individuals with recurrent BE exhibit higher
BMI, depression symptoms and ED cognitive concerns, we included separate regression models for the dependent variables of BMI, BDI-II, EDEQ shape concern subscale, EDE-Q weight concern subscale, and EDE-Q global score with recurrent BE as the independent variable. We controlled for age, education status and income for all regressions.

The third group of analyses examined racial/ethnic group differences within the subsample of individuals with recurrent BE, including only recurrent binge eaters in the regressions (n=97). To evaluate whether Hispanic participants had higher shape and weight concerns than other ethnic groups, we created a dichotomous ethnicity variable with Hispanic ethnicity coded as 1 and all other groups coded as 0. We regressed EDE-Q shape concern subscale and EDE-Q weight concern subscale onto Hispanic ethnicity. To evaluate whether African Americans had higher BMI and restraint scores than other racial/ethnic groups with recurrent BE, we coded an African American ethnicity variable as 1 with all other groups as 0, and regressed EDE-Q restraint scores and BMI onto African American ethnicity. To evaluate whether education, income and stress partially accounted for differences found, we included these variables in a second step of the regression to evaluate whether any of these covariates accounted for additional variance in the dependent variables.

Results

Sample characteristics

The full sample mean age was 43 years, (SD=12.53). Twenty-nine-and-a-half percent (29.5%; n=127) self-identified as Hispanic/Latino, 47.4% (n=204) identified as Black/African American and 24.5% (n=99) identified as Caucasian. Seventy participants
completed the Spanish language versions of the questionnaires. Approximately one third of the sample (31.6%, n=136), had less than a college level of education, with 26.7% of the sample only having a high school level of education. Approximately one in seven (14.7%) had a bachelor’s degree, and 7.9% obtained a graduate degree. Three individuals did not report education data. Thirty-nine-and-a-half percent (39.5%) of the sample had an average income of less than $25,000; 11.6% were unemployed and had no income; 22.3% had an average income of $25,000-$50,000, and 18% had an income of greater than $50,000. Thirty-four individuals did not report this information. The mean BMI for the sample was 39.76 (S.D.= 8.29), which meets criteria for the World Health Organization (WHO) classification of Moderate to Severe Obesity (WHO, 2004).

Means and standard deviations for demographic and psychosocial variables of interest in each racial/ethnic group for the full sample are displayed in Table 3.1. With respect to demographic variables, between-groups ANOVA tests revealed significant differences between racial/ethnic groups in age F(2, 421) = 8.74, p<.001, annual income F(2,393)= 45.53, p<.001, and education status F(2, 424)= 39.32, p<.001. Results of Games-Howell post-hoc tests revealed that Caucasian participants were significantly older (M = 46.9, SD = 12.22) than Hispanic ((M = 40.0, SD = 11.46); p<.001) and African American ((M = 42.9, SD = 12.80); p<.05) participants, had higher income than Hispanic (p<.001) and African American (p<.001) participants and attained higher levels of education than both Hispanic (p<.001) and African American (p<.001) participants. No significant differences between Hispanic and African American participants were found on any demographic variables. In terms of the clinical variables, ANOVA tests revealed significant racial/ethnic group differences in BMI F(2,427) = 6.47, p<.01, BDI-II scores F(2, 422) = 8.25, p<.001, EDE-Q shape concern subscale F(2,420) = 15.49, p<.01, and
EDE-Q Global scores $F(2, 420)= 6.48$, $p<.01$. Games-Howell post-hoc tests revealed that African American participants had higher BMIs ($M = 41.23$, $SD = 8.51$) than Hispanic participants ($M = 38.14$, $SD = 6.82$; $p=.001$), and Caucasian participants ($M = 38.78$, $SD = 9.07$; $p=.06$). Hispanic participants had significantly higher depression scores on the BDI-II ($M = 18.38$, $SD = 11.2$) compared to African American ($M = 13.76$, $SD = 10.0$; $p=.001$) and Caucasian ($M = 13.77$, $SD = 11.2$; $p<.01$) participants. African American participants had lower shape concern scores ($M = 3.33$, $SD = 1.64$) than both Hispanic ($M = 3.82$, $SD = 1.56$; $p=.02$) and Caucasian ($M = 3.93$, $SD = 1.52$; $p<.01$) participants. On the EDE-Q global score, African American participants had significantly lower scores of global eating pathology ($M = 2.55$, $SD = 1.20$) than both Hispanic ($M = 2.92$, $SD = 1.20$; $p<.05$) and Caucasian ($M = 3.03$, $SD = 1.20$; $p<.01$) participants. No racial/ethnic group differences were found on stress level as measured by the PAISS T scores. The means across racial/ethnic groups were within the average range (Morey, 1991).

**Prevalence of binge eating**

We examined the prevalence of BE using continuous measures of number of BE episodes experienced in the previous month and number of BE days experienced in the previous month. Means and standard deviations for these variables by racial/ethnic group are displayed in Table 3.2. Means of number of BE episodes ranged from 3.78 (Hispanic) to 4.04 (Caucasian). We then evaluated the prevalence of recurrent BE as a dichotomous variable. When we defined recurrent BE based solely on frequency ($\geq 4$ BE episodes or days in the previous month), prevalence estimates ranged from 20.2% to 30.5%. When we added a distress criterion, prevalence estimates were significantly
lower, ranging from 8.5% to 12.6%. We also conducted a post-hoc analysis to evaluate whether those participants who met the distress criterion exhibited a higher frequency of BE than those participants who met only the frequency criterion. Chi-squared analysis revealed a significant difference, $\chi^2 (21, N = 419) = 191.49, p<.001$. On average, individuals with distress experienced 17 BE episodes in the previous month (SD = 14.78) while those who only met prevalence experienced 13 BE episodes (SD= 11.49) in the previous month. Prevalence estimates for recurrent BE for each racial/ethnic group are displayed in Table 3.2. Given the greater proportion of participants meeting criteria for recurrent BE based only on frequency, we utilized this more inclusive estimate of recurrent BE for the remaining analyses.

**Racial/ethnic differences in BE prevalence and recurrent BE**

We first evaluated racial/ethnic differences in BE with respect to the continuous variables of number of discrete BE episodes and number of days of BE episodes. We did not expect differences in these variables, and indeed results from our linear regression revealed no significant racial/ethnic group differences in either frequency of episodes or days of BE experienced in the previous month controlling for age, BMI, education status and income. With respect to BE episodes in the past month, Latino participants did not differ significantly from Caucasian participants ($B = -.06, p=.52$) or African American participants ($B = .09, p=.15$). African American participants did not differ from Caucasian participants ($B = -.11, p=.10$). Similarly, Hispanic participants did not differ from either Caucasian participants ($B = -.08, p=.28$) or African American participants ($B =.02, p=.79$) on BE days in the past month, and no differences between African American participants and Caucasian participants were found ($B =-.07, p=.28$).
We then examined racial/ethnic group differences in prevalence rates of recurrent BE (defined as ≥4 BE episodes or days in the previous month). Results from our logistic regression revealed no significant differences in prevalence rates of recurrent BE between Hispanic participants and Caucasian participants (β = -.09, p = .17) or African American participants (β = .02, p = .70), or between African American participants and Caucasian participants (β = -.09, p = .13) controlling for age, BMI, education status and income.

**BMI, depression and ED cognitive symptoms among those with recurrent BE**

Results from our linear regression analyses revealed that across racial/ethnic groups, individuals with recurrent BE exhibited higher BMI (β = .13, p < .01), BDI-II scores (B = .22, p < .001), EDE-Q shape concern scores (B = .27 p < .001), EDE-Q weight concern scores (B = .28 p < .001) and global EDE-Q scores (B = .33 p < .001) than participants without recurrent BE, controlling for age, education level and income.

**Racial/ethnic differences among recurrent binge eaters**

We tested the hypothesis that Hispanic participants would show higher shape and weight concerns through multiple regression analyses predicting EDE-Q subscale scores. The analyses indicated that among participants with recurrent BE (n = 97), Hispanic participants did not exhibit greater shape (B = - .15, p = .51) or weight concerns (B = -.04, p = .74) than other racial/ethnic groups. We tested the hypothesis that African American participants would show higher BMI and lower dietary restraint through regression models predicting those variables. Analyses indicated that African American participants with recurrent BE did have significantly higher BMIs than the other groups (β
= 3.81, p<.01), but did not evidence differences in restraint scores relative to other racial/ethnic groups (\(B = .01, p=.92\)). We then added education, income and perceived stress to the model to evaluate whether these covariates partially contributed to racial/ethnic group differences in BMI. Regression results revealed that only education status had a significant effect on BMI among recurrent binge eaters (\(\beta = -1.22, p=.01\)). When all variables were included in the model, only African American ethnicity and education level had significant effects on BMI. However, African American ethnicity remained a significant predictor of BMI after including education level in the model, and in fact the relationship between African American ethnicity and BMI was more pronounced when education was controlled. The final model accounted for 11% of the variance in BMI scores. Results from our regression analyses are presented in Table 3.3.

**Discussion**

The aim of the current study was to evaluate racial/ethnic group differences in the prevalence and correlates of BE in an ethnically diverse treatment-seeking weight management sample. To our knowledge, this is the first study to examine BE pathology among racial/ethnic minorities seeking nutritional weight-loss treatment in an urban community hospital setting, and provides important data on the clinical presentation of racial/ethnic minorities at the most common point of entry for eating-related health services utilization.

We assessed the prevalence of recurrent BE as operationalized by frequency alone and then by frequency and distress. When utilizing only the frequency criterion, we observed the prevalence rate of recurrent BE to be between 20% and 30% across
racial/ethnic groups. This finding is consistent with estimates of BE in overweight individuals in the community (French et al., 1999); with prevalence rates observed among weight loss treatment-seeking overweight youth (Eddy et al., 2007; Goossens, Braet, & Decaluwe, 2007); and with prevalence rates observed among overweight adults seeking bariatric surgery (Greenberg et al., 2005; Kalarchian, Wilson, Brolin, & Bradley, 1998). However, when we evaluated prevalence of recurrent BE with respect to frequency and distress over BE, prevalence rates ranged from 8% to 12% across racial/ethnic groups. This finding is consistent with findings from community studies that report comparably high levels of distress associated with BE across racial/ethnic groups (Franko, Becker, Thomas, & Herzog, 2003; Striegel-Moore et al., 2000). This rather marked difference in prevalence is consistent with the hypothesis that different BE assessment methodologies may account for widely ranging BE prevalence estimates across many samples, including ethnically diverse patients seeking obesity treatment. In one study of a multiethnic bariatric treatment-seeking sample, BED prevalence rates as measured by self-report ranged from 33% to 38% (Mazzeo et al., 2005). In contrast, only 11% to 15% of a multi-ethnic sample of bariatric surgery candidates met DSM-IV criteria for BED (Azarbad et al., 2010). Taken together, current findings suggest that among patients who are primarily seeking treatment for overweight as opposed to BE, almost one third of the sample reported recurrent BE. Further, our findings highlight the importance of the distress criterion as an indicator of BE severity, as participants in our sample who endorsed distress had a significantly greater frequency of BE episodes than those who did not.

Current findings are consonant with a recent study that examined the diagnostic utility of the “marked distress” criterion for BED. Grilo & White (2011) found that
participants with BED who endorsed distress differed substantially from individuals with BED without distress on measures of eating disorder psychopathology and depressive symptoms. They suggested that if distress was not included as a criterion for BED a substantial increase in BED prevalence would occur but that this group would not differ on the degree of BE-related distress from individuals who do not binge eat. Our results, from a diverse, lower-income group, support this conclusion. Taken together, these findings suggest that distress associated with BE is an important aspect of BE and BED diagnosis and should be included in assessment measures for weight management populations in order to inform efficacious and targeted interventions.

Our finding that no significant differences in prevalence of BE frequency or rates of recurrent BE exist between racial/ethnic groups is consistent with data from community samples (Alegria et al., 2007; Marques et al., 2011; Ragen & Cachelin, 2006; Striegel-Moore et al., 2003), as well as data from weight loss surgery samples (Azarbad et al., 2010; Grilo et al., 2005; Mazzeo et al., 2005; Sanchez-Johnsen et al., 2003). It has been shown that, despite observed equivalence of BE prevalence, minority women are more likely to be treated for a weight problem rather than for an eating problem (Pike et al., 2001). Our findings are novel in that they help to better understand BE prevalence rates of racial/ethnic minority individuals in a setting where they are most likely to present for treatment. In community hospital behavioral weight loss programs, racial/ethnic minority individuals are as vulnerable to recurrent BE as their majority counterparts, suggesting that weight management settings represent important sites for the BE diagnosis and treatment among racial/ethnic minorities.

We did not observe group differences in cognitive symptoms associated with BE, including weight concern, shape concern or dietary restraint in our sample. These
findings stand in contrast to findings from some community-based studies that found differences in cognitive symptoms (Pike et al., 2001), and findings from treatment-seeking minorities with BED in RCTs, which observed higher shape and weight concerns among Hispanics and higher restraint scores among African American compared to Caucasian participants (Franko et al., 2012). However, our findings are more consistent those from studies conducted in ED clinics and other weight management samples that there are more similarities than differences between racial/ethnic groups on BE symptomatology (Azarbad et al., 2010; Grilo et al., 2005). It is important to note that all three groups reported above average scores on shape concerns, weight concerns and restraint subscales of the EDE-Q (Fairburn & Beglin, 1994), suggesting that despite the lack of racial/ethnic differences, cognitive symptoms are present and should be evaluated and addressed in weight management samples.

We did observe higher BMI among African American participants with recurrent BE compared to other racial/ethnic groups, which is consistent with the majority of findings across many settings (Azarbad et al., 2010; Franko et al., 2012; Marcus et al., 2007; Mazzeo et al., 2005; Pike et al., 2001). It is well established that African Americans are at high risk for obesity (e.g., Freedman, Khan, Serdula, Galuska & Dietz, 2002), and may be at higher risk for obesity-related health complications (Mokdad et al., 2003). Our findings suggest that African Americans with recurrent BE may have to be substantially heavier than other groups before seeking weight management treatment, and point to the importance of identifying this particularly high-risk group in community hospital weight management settings.

We also assessed whether perceived stress, income, or education accounted for any of the variance in the observed racial/ethnic group differences in BMI among
recurrent binge eaters, and found that education contributed significantly to variance in BMI scores. Importantly, we found that the effect of African American ethnicity on BMI persisted after controlling for education. This finding is consistent with other findings in RCTs (Franko et al., 2012) and bariatric surgery samples (Sanchez-Johnsen et al., 2002) suggesting that true racial/ethnic differences exist beyond differences in demographic variables. Our findings failed to support the hypothesis that perceived stress would contribute to the variance in racial/ethnic differences in BMI among binge eaters. Notably, our sample did not differ in level of perceived stress, and all racial/ethnic groups exhibited levels of perceived stress in the average, non-clinical range (Morey, 1991). On the other hand, current findings are similar to results from a prior study of a multiethnic sample of bariatric candidates using the same measure of perceived stress. Azarbad and colleagues (2010) similarly reported stress levels in the average range among Hispanics, African Americans and Caucasians, and noted that ethnicity did not moderate the relationship between stress and binge eating. It is possible that our rather brief measure failed to capture culture-specific stressors that may disproportionately affect different racial/ethnic minority groups. The use of a more comprehensive and culturally sensitive assessment tool may have more accurately characterized aspects of stress among racial/ethnic minorities, and may enhance our understanding of the relationship between ethnicity, stress, BMI and BE.

A number of methodological limitations of this study should be considered when interpreting our findings. First, we utilized self-report measures, which may be less reliable than interview-based assessments. It has been suggested that self-report measures of BE symptomatology may inaccurately measure the prevalence and severity of BE (e.g., Wilfley, Wilson, & Agras, 2003). We attempted to overcome this limitation by
providing clear explanations of each self-report item, and including self-report assessments of items (such as distress) that are often included only in interviews. It is likely that the use of interview-based investigation and diagnosis of recurrent BE would result in a more accurate assessment of BE phenomenology, by allowing for more detailed questioning and clarification regarding various features of BE. However, several factors, such as resources for trained clinicians to conduct assessments and substantial time constraints, may limit the utility of interview-based assessments in community weight management clinics. Further, it is noteworthy that the rate of BE among the present sample is consistent with rates of BE in other similar samples (Azarbad et al., 2010; Grilo et al., 2005), suggesting that self-report measures may adequately capture BE prevalence rates and symptomatology, and may be suitable for use in settings where resources are limited. Second, the cross-sectional nature of our study design did not permit the examination of causality of BE among racial/ethnic minorities seeking weight management treatment. In particular, because our clinical variables and hypothesized demographic covariates were assessed at a single time point, their respective roles as predictors or consequences remain unclear. Future research may employ longitudinal designs to better understand risk factors for BE that affect individuals seeking nutritional counseling.

Despite these limitations, our study adds to the small literature on racial/ethnic minorities with BE. Most data concerning BE among racial/ethnic minorities come from clinical trials and specialty clinics where minorities are underrepresented. Further, the biases identified at these sites severely limit the generalizability of their findings to the majority of racial/ethnic minority individuals with BE. The current study is particularly innovative in that our findings help to better characterize the clinical presentation of
ethnic minorities in a setting where they are adequately represented. Participants in our sample tended to have much lower levels of education and income than those observed across RCTs and in specialty clinics (Franko et al., 2012; Grilo et al., 2005), and our findings may be more generalizable to the majority of treatment-seeking minorities. Results from the current study concerning BE prevalence and symptomatology suggest that urban community clinical settings are important sites for the assessment and treatment of BE among ethnic minorities. Our findings, while preliminary, have implications for improving the specificity of treatments in behavioral weight management populations. For example, given the proportion of individuals in our sample with recurrent BE, and the higher levels of eating-related and general psychopathology among them compared to non-BE participants, it is possible that this subgroup would benefit from psychosocial treatment targeting these concerns, in addition to weight loss treatment. Recent findings suggest that behavioral weight loss (BWL) interventions of the type that are typically disseminated in the current setting, produce minimal weight loss among this subgroup of individuals with BE (e.g., Grilo & Masheb, 2005; Reas & Grilo, 2008). Therefore, the development of treatments that lead to remission of BE as well as weight loss among obese individuals with BE or BED has been identified as a priority (Grilo et al., 2011). However, data suggest that sequential delivery of cognitive behavioral therapy (CBT) aimed at reducing BE, followed by BWL did not produce greater weight loss than either alone (Grilo et al., 2011). The identification of individuals who might benefit more from one or the other may help to improve outcomes. Our findings suggest that Hispanic and Caucasian participants may be particularly likely to benefit from psychosocial treatment (such as CBT) to reduce painful cognitive concerns. In contrast, this approach may be less beneficial for African Americans, given their lower
levels of general eating pathology, who may benefit more from targeted weight loss
treatment, given their relatively higher BMIs. Future research comparing these types of
treatments in community hospital weight management clinics would continue to
contribute to the growing knowledgebase and inform the development of culturally
relevant interventions for racial/ethnic minorities with BE and overweight.
Table 3.1  Demographic and Clinical Characteristics by Racial/Ethnic Group (N = 430)

<table>
<thead>
<tr>
<th></th>
<th>Hispanic (N=127)</th>
<th></th>
<th>African American (N=204)</th>
<th></th>
<th>Caucasian (N=99)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Age</td>
<td>40.0</td>
<td>11.5</td>
<td>43.0</td>
<td>12.80</td>
<td>46.9</td>
<td>12.2</td>
</tr>
<tr>
<td>BMI</td>
<td>38.14</td>
<td>6.8</td>
<td>41.23</td>
<td>8.5</td>
<td>38.79</td>
<td>9.1</td>
</tr>
<tr>
<td>BDI-II</td>
<td>2.92</td>
<td>1.2</td>
<td>2.55</td>
<td>1.2</td>
<td>3.03</td>
<td>1.2</td>
</tr>
<tr>
<td>EDEQ Global</td>
<td>2.68</td>
<td>1.7</td>
<td>3.64</td>
<td>1.5</td>
<td>3.01</td>
<td>1.3</td>
</tr>
<tr>
<td>EDEQ Restraint</td>
<td>3.82</td>
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<td>3.33</td>
<td>1.6</td>
<td>3.93</td>
<td>1.5</td>
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<td>EDEQ Shape</td>
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<td>1.4</td>
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<tr>
<td>EDEQ Weight</td>
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<td>12.1</td>
<td>59.15</td>
<td>11.9</td>
<td>56.15</td>
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<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some high School or Less</td>
<td>46</td>
<td>36.5%</td>
<td>27</td>
<td>13.2%</td>
<td>22</td>
<td>22.2%</td>
</tr>
<tr>
<td>High School Graduate</td>
<td>36</td>
<td>28.3%</td>
<td>63</td>
<td>30.9%</td>
<td>16</td>
<td>16.2%</td>
</tr>
<tr>
<td>Some college</td>
<td>30</td>
<td>23.6%</td>
<td>79</td>
<td>38.7%</td>
<td>27</td>
<td>27.3%</td>
</tr>
<tr>
<td>College graduate</td>
<td>14</td>
<td>11.0%</td>
<td>33</td>
<td>16.2%</td>
<td>50</td>
<td>50.5%</td>
</tr>
<tr>
<td>Income</td>
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</tr>
<tr>
<td>Unemployed/no income</td>
<td>19</td>
<td>16.2%</td>
<td>25</td>
<td>13.5%</td>
<td>6</td>
<td>6.4%</td>
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<td>30</td>
<td>25.6%</td>
<td>48</td>
<td>25.9%</td>
<td>18</td>
<td>19.1%</td>
</tr>
<tr>
<td>Greater than $50,000</td>
<td>13</td>
<td>11.1%</td>
<td>19</td>
<td>10.3%</td>
<td>48</td>
<td>48.5%</td>
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</tbody>
</table>
Table 3.2  Means and SDs of BE Episodes and Days, and Prevalence of Recurrent BE for all Racial/Ethnic Groups (N = 430)

<table>
<thead>
<tr>
<th></th>
<th>Hispanic (N=127)</th>
<th>African American (N=204)</th>
<th>Caucasian (N=99)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td># of OBE episodes in past month</td>
<td>4.45</td>
<td>10.2</td>
<td>3.37</td>
</tr>
<tr>
<td># of Days of OBEs in past month</td>
<td>3.78</td>
<td>7.1</td>
<td>3.83</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Recurrent BE frequency</td>
<td>25</td>
<td>20.2%</td>
<td>43</td>
</tr>
<tr>
<td>Recurrent BE with distress</td>
<td>13</td>
<td>10.2%</td>
<td>17</td>
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</table>
Table 3.3  Linear Regression Predicting BMI Scores with Covariates Among Recurrent Binge Eaters (n=97)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>β</th>
<th>S.E</th>
<th>R^2</th>
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<tr>
<td><strong>Regression 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American ethnicity</td>
<td>3.81**</td>
<td>1.45</td>
<td>.070</td>
</tr>
<tr>
<td><strong>Regression 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American ethnicity</td>
<td>4.70**</td>
<td>.47</td>
<td>.11*</td>
</tr>
<tr>
<td>Education</td>
<td>-1.22**</td>
<td>.09</td>
<td></td>
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<tr>
<td>Income</td>
<td>.84</td>
<td>.49</td>
<td></td>
</tr>
<tr>
<td>PAISS</td>
<td>.06</td>
<td>.99</td>
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</tbody>
</table>

* p<.05  **p<.01
CHAPTER FOUR

Study #3: Treatment Access, Retention and Outcome: Racial/Ethnic Group Differences, and Mediators of Retention and Outcome in the Weight Management Population

Introduction

Binge eating disorder (BED) is defined by recurrent BE episodes where a large amount of food is consumed within a discrete time period and a perception of loss of control is experienced (DSM-IV-TR; APA, 2000). BED is associated with distressing cognitive concerns about body shape, weight or eating, other psychiatric comorbidity, and obesity (Alegria et al., 2007; Marcus et al., 2007; Stice & Agras, 1998; Striegel-Moore & Franko, 2003). BED appears to be comparably prevalent among racial/ethnic minorities, and predicts poor outcome from obesity treatment, psychiatric distress, and health services consumption (Grilo & White, 2011; Marques et al., 2011; Mond et al., 2007).

Despite the prevalence and clinical significance of BED among racial/ethnic minority individuals, little is known about the clinical presentation and treatment efficacy in this population. This is due in large part to the severe underrepresentation of racial/ethnic minorities in clinical trials for BED (Franko et al., 2012), and in specialty mental health treatment clinics (Marques et al., 2011). Research suggests that African American and Hispanic Americans are less likely than Caucasian Americans to receive psychological treatment for an ED (Becker et al., 2003; Cachelin & Striegel-Moore, 2006; Cachelin et al., 2000; Marques et al., 2011;). EDs are frequently under-recognized
among racial/ethnic minorities in clinical settings (Johnson, Spitzer, & Williams, 2001; Mond et al., 2010; Whitehouse, Cooper, Vize, Hill, & Vogel, 1992), and appropriate care is not often initiated even when ED symptoms do come to clinical attention (Crow, Mussell, Peterson, Knopke, & Mitchell, 1996). For example, Hispanic participants with ED symptoms in a national screening study were less likely than White participants to receive a recommendation for further evaluation, and all racial/ethnic minority subjects with self-reported eating or weight concerns were less likely than White participants to be asked about ED symptoms (Becker et al., 2003). Several studies comparing Black and White women with EDs reported Black women are significantly less likely to be treated for an ED compared to White women (Pike et al., 2001; Striegel-Moore et al., 2003; Striegel-Moore et al., 2000).

Epidemiological studies suggest that across racial/ethnic groups, individuals with BE report more often seeking treatment at medical centers (Hudson et al., 2007), and there are indications that individuals from racial/ethnic minority groups with BED or recurrent BE are particularly likely to seek treatment at generalist or primary care settings rather than psychological treatment (Cachelin & Striegel-Moore, 2006; Marques et al., 2011). One study of Mexican American and European American women with BED did not find different rates of endorsement of a “significant eating problem” or “wanting help for an eating problem” (Cachelin & Striegel-Moore, 2006). However, Mexican American women reported more often seeking help for overweight than for psychological distress. Data regarding racial/ethnic minorities with BE are scarce. For example, among individuals in three large ED treatment center studies, racial/ethnic minorities composed only 2.6% to 10% of the samples (Fernandez, Crow, Thuras, & Peterson, 2010; Grilo, Lozano & Masheb, 2005), with one study sample including no racial/ethnic minorities.
(Wilfley et al., 2001). Aggregated data from 12 treatment trials conducted in specialty settings with over 1,400 total participants included only 15% non-Caucasian individuals (Franko et al., 2012). In contrast, 50% of individuals presenting for ED treatment at a primary care clinic and 64.8% of individuals in an urban weight-loss surgery center were racial/ethnic minorities (Azarbad et al., 2010; Grilo et al., 2005). Data regarding racial/ethnic minorities with BED have not been collected from urban hospital weight loss treatment centers.

Treatment retention and outcome are also crucially important issues among racial/ethnic minorities with BE and obesity. Data from an aggregated database of BED clinical trial data indicate a higher drop-out rate among African Americans than among Caucasians across psychosocial treatment trials for BED (Thompson-Brenner et al., 2013). These data are consistent with research across diagnostic groups suggesting that racial/ethnic minorities are more likely than Caucasians to prematurely terminate psychological treatments (Fortuna et al., 2010). Racial/ethnic group differences in weight loss outcome have also been observed. Data from BWL programs demonstrate that African Americans tend to lose less weight and at a slower rate when compared with Caucasians (Appel et al., 2003; Hollis et al., 2008; Kumanyika et al, 2002; Kumanyika, Obarzanek, Stevens, Hebert, & Whelton, 1991; Svetkey et al., 2012; Svetkey et al., 2005) and Hispanics (West et al., 2008). Despite disparities in treatment access, retention and outcome, the effect of psychosocial treatments for BED appears to be similar in clinical trials across racial/ethnic groups, suggesting that treatments for BED or recurrent BE could be effective for racial/ethnic minority groups if treatment recruitment and retention issues were addressed (Thompson-Brenner et al., 2013). These findings suggest that research investigating treatment access, retention and outcome for obesity
among racial/ethnic minorities with and without BE should be conducted in settings where they are more likely to seek treatment, such as community hospital weight loss centers, in order to inform successful provision of health services.

A range of personal and sociocultural factors are hypothesized to explain racial/ethnic differences in psychological treatment access and retention. Several studies have identified personal factors such as shame, stigma, lack of knowledge about treatment resources, and discrimination as major barriers to accessing care among racial/ethnic minority individuals with eating concerns (Becker, Hadley Arrindell, Perloe, Fay, & Striegel-Moore, 2010; Cachelin et al., 2001; Cachelin & Striegel-Moore, 2006). In a qualitative study of perceived barriers to ED care, stigma and shame regarding the perception of symptoms as a “weakness” emerged as potent barriers to help-seeking (Becker et al., 2010). Perceived racially-based social stereotypes, such as the perception that clinicians dismissed symptoms of an ED because they did not expect them among certain racial/ethnic minority groups, further dissuaded the pursuit of treatment (Becker et al., 2010). Other specific personal culturally-based beliefs about seeking treatment for an ED, such as the belief that one should handle the problem oneself, or the belief that others cannot help, have also contributed to racial/ethnic disparities in psychological treatment access (Becker et al., 2010; Cachelin & Striegel-Moore, 2006; Cachelin et al., 2000). Societal barriers such as the availability and affordability of health care have also been shown to mediate access to psychological services among both minority and non-minority individuals (Becker et al., 2010). Large-scale studies of mental health treatment retention suggest that lower SES, fewer years of education, and reduced likelihood of receiving care from a mental health specialist
help account for racial/ethnic differences in treatment retention for psychological problems (Fortuna et al., 2010).

Comparatively less is known about factors that mediate ethnic differences in treatment outcome. Studies have identified predictors of both ED and weight loss treatment outcome, but they have not been studied among racial/ethnic minorities. For example, several studies have documented that stigma and binge eating have been associated with poorer weight loss outcomes in weight management populations (Carels et al., 2009; Gorin et al., 2008; Wott & Carels, 2010), and weight stigma is associated with psychological distress and maladaptive eating patterns among adults seeking weight loss treatment (e.g., Friedman et al., 2005). Racial/ethnic differences in weight-based stigma have been observed among non-clinical samples (e.g., Gray, Simon, Janicke, & Dumont-Driscoll, 2011), but the relationships between race/ethnicity, stigma, and weight-loss or BE treatment outcome have not been investigated previously.

In addition, one of the most powerful predictors of treatment retention, outcome, and weight loss across ED diagnostic categories is readiness for treatment (Willinge Touyz, & Thorton, 2010; Webber, Tate, Ward, & Bowling, 2010), which has not been examined among racial/ethnic minorities. However, research suggests that illness representation (e.g., beliefs about illness, knowledge about the nature of illness) is important in influencing treatment readiness (Brown et al., 2001). Lower ED treatment readiness has been associated with lower levels of emotional distress about an eating problem and a lower level of understanding regarding the ED (Stockford, Turner, & Cooper, 2007). Racial/ethnic minorities with EDs typically present for weight loss treatment rather than ED treatment, and may be more concerned about overweight than ED symptoms (Grilo et al., 2005). Further, qualitative data suggest that clinician
underrecognition or dismissal of ED symptoms among racial/ethnic minorities is a salient barrier to treatment access (Becker et al., 2010). It is important to investigate treatment readiness in this population, as it may show associations with other factors described above, such as baseline symptoms, interest, knowledge, and stigma, as well as treatment completion and response.

Other social factors presenting possible obstacles to treatment—which may be associated with SES or cultural group membership—should be investigated as additional explanatory factors. For example perceived stress level has shown significant relationships to the development of BE in some studies (e.g., Azarbad et al., 2010), but has not been tested as a predictor of treatment retention or outcome. It is important to investigate the relationships of race/ethnicity, SES, perceived stigma, treatment readiness, and perceived stress to treatment outcome in an ethnically diverse, treatment-seeking population. Some factors, such as stigma, treatment readiness, perceived stress, and certain obstacles to treatment, may be mutable, and therefore represent important targets for intervention that can improve treatment retention and outcome among racial/ethnic minorities with BE.

The current study aims to examine the relative influence of racial/ethnic group, SES, treatment readiness, distress, perceived obstacles to treatment, perceived stress, and self-stigma on retention and weight loss outcome in an urban community hospital weight management population. We hypothesized that treatment retention after six months would be associated with Caucasian ethnicity and higher levels of education. We also hypothesized that greater weight loss would be associated with the absence of BE and with Caucasian ethnicity. A secondary aim of the study was to explore whether psychosocial variables including depression, treatment readiness, distress, perceived
obstacles to treatment, perceived stress, and self-stigma would partially mediate the associations between race/ethnicity and treatment retention, and race/ethnicity and weight loss.

Methods

Participants

A total of 832 consecutive patients presenting for nutritional counseling at the Center for Nutrition and Weight Management (CNWM) at the Boston Medical Center (BMC) a community hospital serving a racially/ethnically diverse population were recruited for participation. Consenting participants were invited to complete self-report questionnaires in either English or Spanish language and were compensated $20 for their participation. A total of 496 initiated the survey, representing a response rate of 59.6%. Of these respondents, data from 66 were excluded because they failed to answer the majority of questions (n=58), exhibited substantial inability to read and comprehend study instructions and/or questions (n=6), or were not seeking weight management treatment (n=2). Of the 496 who initiated the study, 87% completed relevant measures for this study. The sample of participants included in the data analyses consisted of 430 individuals (350 female; 80 male). This study was approved by the Boston University Charles River Campus Institutions Review Board.

Baseline Measures

Demographic Information Form includes eight simple self-report items including date of birth, household income, number of dependents, occupational and educational history. Participants were asked to circle the highest level of education achieved ranging from 1
“less than seven years of school” to 7 “graduate degree”. Race/Ethnicity was determined by participant’s self-reported racial/ethnic background.

**BMI.** BMI (kg/m2) was determined using a medical balance-beam scale and stadiometer. Participants’ BMI was recorded from their electronic medical record at baseline (T1) and at 6-months follow up (T2). The World Health Organization (WHO) interpretive BMI ranges suggest BMI of 18.5-25 is within the normal range, 25 to 30 is in the overweight range, and >30 is in the obese range.

**Beck Depression Inventory- II** (BDI-II, Beck, Steer, & Brown, 1996). The BDI-II 21-item self-report measure that assesses severity of depressive symptoms in the past two weeks. It is widely used including in ED treatment research (Thompson-Brenner et al., 2010). Total scores ranging from 0-13 represent normal/minimal depressive symptoms; 14-19 represent mild depressive symptoms; 20-28 represent moderate depressive symptoms, and 20-63 represent severe symptoms. The BDI-II has demonstrated high internal consistency (a=.90) and convergent validity with other self-report measures of depression (rs>.50; Steer & Beck, 2000). Cronbach’s alpha is the current sample was .93.

**Eating Disorders Examination-Questionnaire** (EDE-Q; Fairburn & Beglin, 1994). The EDE-Q is a 28-item measure assessing eating pathology. The EDE-Q global score is a dimensional summary of eating pathology based on 4 subscales: weight concern, shape concern, eating concern and severity of dietary restraint, over the past 28 days. It has demonstrated validity and reliability in clinical and non-clinical samples (Fairburn & Beglin, 1994; Luce & Crowther, 1999, Mond et al., 2006). Cronbach’s alpha in the current sample were as follows: Restraint Subscale (α=.67); Eating Concern Subscale
($\alpha = .81$); Shape Concern Subscale ($\alpha = .86$); Weight Concern Subscale ($\alpha = .69$); Global Score ($\alpha = .91$).

_The Personality Assessment Inventory Stress Scale_ (PAISS; Morey, 1991). The PAISS is an 8-item measure assessing the perceived impact of current and recent stressors in the domains of family relationships, health, employment, finances, and recent major life changes or impending life changes. Items reflect chronic problems and major but less frequent stressors (Azarbad et al., 2010). The scale has cut-off points for lack of stressors, moderate stress, and significant stress: a T score of <60 is within the average range and is indicative of minimal to no stress; a T score of 60 to 69 reflects a moderate degree of stress and scores of >70 reflect significant difficulties that negatively impact the life of the respondent (Morey, 1991). The scale has demonstrated reliability and validity, and has been used in previous ED research with racial/ethnic minorities (Azarbad et al., 2010). The scale is simple and brief, and is useful as a broadly applicable scale of stressors distinct from psychological functioning and SES. We transformed PAISS raw scores into T scores derived from a census-matched standardization sample provided in the PAI professional Manual (Morey, 2007). We also employed the scale dimensionally by calculating a mean total stress score ranging from 0 (little to no stress) to 3 (significant stress). Cronbach’s alpha for the dimensional measure in the current sample was .79.

_Eating Disorders Stage of Change Scale_ (EDSOC; Ackard, Croll, Richter, Adlis, & Wonderlich, 2009). The EDSOC is a measure adapted from a previously reported Stages of Change Scale (Wolk & Devlin, 2001) to assess the stage of change (precontemplation, contemplation, or preparation) for specific behavioral ED symptoms. The current study assessed readiness to change weight status and BE, and was
comprised of a total of six questions. For each behavior there are three questions regarding intentions and actions to stop behavioral symptoms ("Do you intend to stop binge eating in the next 6 months?"; "Do you intend to stop binge eating in the next 30 days?"; "Have you attempted to lose weight in the past?"). Participants were asked to respond either YES or NO to each question, or to indicate that he or she did not engage in the behavior. A stage of change score is calculated for each behavior according to answers to each separate question. Answering “No” to the first question generates a Precontemplation score; answering “Yes” to the first question and “No” to at least one of the following two questions yields a Contemplation score; a Preparation score is generated from a “yes” response to all three questions for each behavior. The EDSOC is based on well-validated scales and has demonstrated reliability and validity with an ED sample (Ackard et al, 2009). Cronbach’s alpha for each behavior in the current samples was .58 for BE and .53 for weight status.

*Weight Bias Internalization Scale* (WBIS, Durso & Latner, 2008). The WBIS is an 11-item self-report questionnaire measuring how much a participant believes that negative stereotypes and self-statements about overweight/obese persons apply to the self. Items address aspects of stigma including strongly critical rejection of weight status and associated low perceived personal value. Sample items include “I hate myself for being overweight” and “I don’t feel that I deserve to have a really fulfilling social life, as long as I’m overweight”. Respondents rate each item on a 7-point scale from “strongly disagree” to “strongly agree.” The WBIS has demonstrated excellent psychometric properties in overweight/obese community samples (Durso & Latner, 2008). For this study, the WBIS was adapted to assess the same negative self-statements about *binge eating* as well
Cronbach’s alphas for the weight bias and binge eating bias scales were .83 and .85, respectively.

**Distress over Symptoms Scale (DOSS).** A simple 5-item scale designed for this study was used to assess the amount of distress participants were experiencing relative to five theorized major reasons for seeking weight management treatment. Items probed the amount of distress associated with the following reasons for seeking treatment: obesity, medical problems associated with obesity, medical problems not associated with obesity, binge eating, and shape/weight concerns. Respondents were asked to indicate the level of distress associated with each reason on an 11-point likert scale ranging from “Not at all distressed” to “Extremely distressed”. The means of each item were averaged to obtain a global summary of amount of distress over all symptoms. Cronbach’s alpha for the global scale was .75.

**Perceived Barriers to Treatment Questionnaire (PBTQ).** The PBTQ is a 12-item measure derived from a qualitative study of the perceived social and cultural barriers to care among ethnic minority individuals seeking treatment for an eating problem (Becker et al., 2010). Items assess whether certain factors including self-stigma, divergent interpretations of ED symptoms from diagnostic criteria, financial constraints and stressors, culturally specific beliefs about mental health services, and unfamiliarity with the available services, render it difficult to receive treatment for an eating problem. Each item was constructed based on themes detected in a previous study that negatively impacted treatment access among individuals with ED symptoms. Sample items include “My eating problem could be viewed as a ‘weakness’ or ‘flaw’ by members of my community”, and “I would not be able to afford to get treatment due to my insurance.” Participants are asked to rate each factor on a 10-point likert scale from “would not make
it hard to get help” to “would make it very hard to get help.” Cronbach’s alpha in the current sample was .92.

Follow-up Information Obtained from Medical Chart

Trained research staff collected follow-up data six months after each participant’s initial visit to the treatment center. Data included the number of treatment sessions attended at 6-month follow up; BMI at follow up, and type of treatment provider (e.g., dietician or mental health clinician). Given the hypothesized prevalence of recurrent BE in the sample, we also looked at the whether BED or BE was a focus of treatment by rating content of clinical charts to see if any treatment was provided for BE. For individuals who did not receive treatment, and those who dropped out of treatment before 4 sessions (in accordance with guidelines developed for other large-scale retention studies, Fortuna et al., 2010; Wang, Berglund & Kessler, 2000), BMI at the last recorded time point was used as a measure of weight loss outcome.

Translation

We employed the Spanish language version of the EDE-Q (S-EDE-Q, Palaez-Fernandez, 2004). All other study materials were translated from English into Spanish language by a bilingual Spanish speaker familiar with clinical terminology. The initial Spanish version was reviewed and revised by a second bilingual speaker. When necessary, adjustments to the Spanish version were made by the study team upon achieving consensus among the bilingual speakers to achieve clarity and to convey intended meaning of relevant constructs.
**Data Management**

After completing the questionnaires, participants were given the opportunity to respond in the case of missing responses. Missing data were handled as follows: for the EDE-Q, we followed the authors’ scoring recommendations and calculated subscale scores as long as more than half of the items for each subscale were completed, and calculated the global score as long as at least two subscales were completed (Fairburn & Beglin, 1994). For all other scales that are computed as the mean of multiple items, we calculated scale scores as long as no more than 20% of items were missing. Direct robust maximum likelihood (MLR) estimation was used to account for data missingness, as well as continuous non-normal data.

**Data Analytic Plan**

Descriptive data were produced using SPSS 16.0. All remaining analyses were performed using MPLUS software (Muthen & Muthen, 1998-2012) an MLR software that accounts for missing data and the non-normal distribution of continuous variables. The first set of analyses examined racial/ethnic group differences in treatment retention and outcome. To examine the relationship between race/ethnicity and retention and outcome, we employed a staged model first adjusting for BMI, and then including demographic variables of age, education and income in each regression analysis. This approach allows for the conceptual grouping of factors that are known to influence treatment retention and outcome, in order to examine their impact on racial/ethnic differences (Fortuna et al., 2010). To evaluate whether treatment retention was associated with Caucasian ethnicity and higher levels of education, we first entered African American and Hispanic ethnicity as compared to Caucasian ethnicity by creating
two dummy coded variables for minority race/ethnicity (African American = 1/Caucasian = 0 and Latino = 1/Caucasian = 0). We interpreted regression coefficients for the dummy variables as changes in the dependent variables with respect to the reference group. In our first model, we conducted linear regressions with Caucasian ethnicity and education level as IVs predicting the total number of treatment visits, adjusting for BMI. Our second model included age and income as covariates. To evaluate whether weight loss outcome was associated with Caucasian ethnicity and the absence of recurrent BE, we conducted linear regressions with Caucasian ethnicity and the presence of recurrent BE as IVs predicting change in BMI from baseline to 6-months follow-up first including BMI, and then including age, income, and education as covariates. To examine whether the psychosocial variables of interest (including depression, treatment readiness, distress, perceived obstacles to treatment, perceived stress, self-stigma) mediated any of the hypothesized racial/ethnic differences in weight loss outcome and retention, we first conducted preliminary bivariate correlations in order to identify psychosocial factors that were independently related to retention and/or weight loss. We then included significant variables in our mediation models. We employed the Monte Carlo Method for Assessing Mediation (MCAM, MacKinnon, Lockwood, & Williams, 2004) to evaluate whether race/ethnicity had an indirect effect on retention or outcome that was transmitted through the hypothesized psychosocial mediator. We entered the relevant path coefficients and standard errors into an interactive tool for estimating confidence intervals for indirect effects (Selig & Preacher, 2008). Mediation is considered significant if the confidence interval does not include 0.

Results
**Sample characteristics**

The sample mean age was 43 years, (SD=12.53). Twenty-nine-and-a-half percent (29.5%; n=127) self-identified as Hispanic/Latino, 47.4% (n=204) identified as Black/African American and 24.5% (n=99) identified as Caucasian. Seventy participants completed the Spanish language versions of the questionnaires. One third of the sample (31.6%, n=136), had less than a college level of education, with 26.7% of the sample only having a high school level of education. Approximately one in seven (14.7% of the sample) had a bachelor’s degree, and 7.9% obtained a graduate degree. Three individuals did not report education data. Thirty-nine-and-a-half percent (39.5%) of the sample had an average income of less than $25,000; 11.6% were unemployed and had no income; 22.3% had an average income of $25,000-$50,000, and 18% had an income of greater than $50,000. Thirty-four individuals did not report this information. The mean BMI for the sample was 39.76 (S.D.= 8.29), which meets criteria for the World Health Organization (WHO) classification of Moderate to Severe Obesity (WHO, 2004). Means and standard deviations for demographic variables in each racial/ethnic group are displayed in Table 4.1.

**Racial/ethnic differences at baseline**

With respect to demographic variables, between-groups ANOVA tests revealed significant differences between racial/ethnic groups in age F(2, 421) = 8.74, p<.001, annual income F(2,393)= 45.53, p<.001, and education status F(2, 424)= 39.32, p<.001. Results of Games-Howell post-hoc tests revealed that Caucasian participants were significantly older (M = 46.9, SD = 12.22) than Hispanic ((M = 40.0, SD = 11.46; p<.001) and African American (M = 42.9, SD = 12.80; p<.05)) participants, had higher income
than Hispanic (p<.001) and African American (p<.001) participants and attained higher levels of education than both Hispanic (p<.001) and African American (p<.001) participants. No significant differences between Hispanic and African American participants were found on any demographic variables.

Means and standard deviations for clinical variables in each racial/ethnic group at baseline are displayed in Table 4.2. There was no difference in prevalence of BE by racial/ethnic group. 20.2% (n = 25) of Hispanic participants, 21.5% (n = 43) of African American participants and 30.5% (n = 29) of Caucasian participants met criteria for recurrent BE (i.e., endorsed at least 4 episodes or days of BE in the previous month). Between groups ANOVA tests revealed significant racial/ethnic group differences in BMI F(2,427) = 6.47, p<.01, BDI-II scores F(2, 422) = 8.25, p<.001, EDE-Q Global scores F(2, 420) = 6.48, p<.01, WBIS scores F(2, 423) = 16.83, p<.001; and DOSS scores F(2, 422) = 6.55, p<.01. Games-Howell post-hoc tests revealed that African American participants had higher BMIs (M = 41.23, SD = 8.51) than Hispanic participants (M = 38.14, SD = 6.82; p=.001), and a trend was observed toward higher BMIs than Caucasian participants (M = 38.78, SD = 9.07; p=.06). Hispanic participants had significantly higher depression scores on the BDI-II (M = 18.38, SD = 11.2) compared to African American (M = 13.76 SD = 10.0; p=.001) and Caucasian participants (M = 13.77, SD = 11.2; p<.01), with mean BDI-II scores for Hispanic participants falling in the range of borderline clinical depression, and the latter two groups within the range of mild mood disturbance. African American participants had significantly lower scores of global eating pathology as measured by the EDE-Q (M = 2.55, SD = 1.20) than both Hispanic (M =2.92, SD = 1.20; p<.05) and Caucasian (M = 3.03, SD = 1.20; p<.01) participants. With respect to general distress over symptoms, Hispanic participants had higher scores on
the DOSS (M = 4.69, SD = 2.55) than African Americans (M = 3.77, SD = 2.18; p = .003), but did not differ from Caucasians (M = 4.28, SD = 2.05; p = .39). In terms of distress and impairment related to BE specifically, Hispanic participants endorsed greater BE distress/impairment (M = 3.33, SD = 2.98) than both African American (M = 1.75, SD = 2.47; p < .001) and Caucasian (M = 2.16, SD = 2.56; p < .01) participants. African Americans and Caucasians did not significantly differ in their level of general distress or distress over BE. No significant racial/ethnic group differences were found on BE frequency, PAISS scores, PTBQ scores or EDSOC scores. Stress levels across ethnic/racial groups were within the average range (Morey, 1991), and 70% to 80% of each racial/ethnic subsample reported the highest level (preparation) of readiness to change.

**BMI change, retention and BE treatment status at 6-months follow-up**

The mean BMI at 6-month follow up was 38.6 (SD = 8.15), representing a mean BMI change of -1.16 BMI points (SD = 2.06). The mean number of sessions attended at 6-month follow up was 3.28 (SD = 3.13). The majority of the participants (52.3%, n = 225) were seen by both a weight management medical doctor and a registered dietician. 26.7% (n = 115) of the sample were seen by a medical doctor only and 3.3% (n = 14) of the sample were seen by a registered dietician only. Only one participant in the sample received psychological treatment, from a clinical social worker. 17.7% (n = 76) of the sample did not attend any treatment visits since baseline. 4.4% (n = 19) of the sample underwent weight loss surgery within the 6 months. While BE was mentioned in the clinical charts of 16 (3.7%) participants, no discernable interventions for BE were
recorded in any patient’s chart, despite the observed prevalence of recurrent BE of 20% to 30% across racial/ethnic groups in research assessments.

**Racial/Ethnic group differences in treatment retention & outcome**

We first evaluated whether greater treatment retention and outcome was associated with ethnicity and education. In our first model, adjusted for BMI, Caucasian ethnicity was significantly associated with greater number of treatment sessions attended at 6 months ($\beta = 0.04$, $p = .05$). However, when we adjusted for age, income and education, this racial/ethnic difference was no longer significant ($\beta = .05$ $p = .32$), with older age, higher income, and higher BMI accounting for 5.7% of the variance in treatment retention. Education status was not significantly associated with treatment retention ($\beta = -.01$, $p = .86$). We then conducted a regression analysis to compare Caucasian participants to Hispanic and African American participants separately, in order to explore the nature of the observed racial/ethnic group difference in our first model. In our model adjusted for BMI, Caucasian participants remained in treatment significantly longer than African American participants ($\beta = -.17$, $p = .01$), but did not significantly differ from Hispanic participants ($\beta = -.05$, $p = .36$). When we adjusted for age, income and education, the difference between Caucasians and African Americans became non-significant, with older age and higher levels of income emerging again as significant predictors of treatment retention. Retention rates among Hispanic participants fell between those of African American and Caucasian participants but were not statistically different from either.

Despite the fact that retention rates of Hispanic participants did not statistically differ from either African Americans or Caucasian participants, examination of the means
and confidence intervals of the number of visits indicated that Hispanic participants were more similar to Caucasian participants than to African American participants with respect to treatment retention. We observed that the mean number of treatment sessions for Hispanic participants ($M = 3.40, SD = 2.71$) fell within the 95% confidence interval (CI) of the mean number of sessions attended for Caucasian participants (95% CI = 3.11 to 4.52) and the mean number of visits for Caucasian participants ($M = 3.82, SD = 3.53$) fell within the 95% CI for Hispanics (2.93 to 3.88) with neither mean falling within the 95% CI of African American participants ($M = 2.95, SD = 3.13; 95\%CI = 2.52 to 3.38$). This data provided a rationale for including Hispanic and Caucasian participants together in the following analyses. Given the observed lower retention rates among African Americans in our partially adjusted model, we sought to evaluate whether African Americans had lower rates of retention compared to all other racial/ethnic groups in an adequately powered model. We compared African American ethnicity as compared to all other ethnicities by created a dummy coded variable (African American =1/All other ethnicities = 0), and regressing the total number of treatment visits onto our ethnicity variable, interpreting the regression coefficient for the dummy variable as changes in the depended variable with respect to African American ethnicity. Table 4.3 displays the results of our model, adjusting for age, income, education and BMI. In this fully adjusted model, African Americans had significantly lower retention rates than all other ethnic groups ($\beta = -.11 \ p<.05$). Older age and higher BMI also emerged as significant predictors of retention in this model.

With respect to weight loss outcome, our regression analyses revealed that Caucasian participants lost significantly more weight than African American participants, when adjusting for baseline BMI ($\beta = 0.64 \ p = .02$), with Hispanic participants falling
between Caucasians and African Americans and not significantly different from either. African Americans exhibited less reduction in BMI points compared to Caucasians (i.e., lost less weight). However, in our model adjusted for age, income and education, this difference was no longer significant ($\beta = 0.28$, $p = .41$), with higher income associated with greater weight loss ($\beta = -.06$ $p = .001$) and higher baseline BMI associated with greater reduction in BMI ($\beta = -.35$ $p = .001$).

The absence of BE was not significantly associated with greater weight loss outcome ($\beta = -.24$, $p = .33$). In bivariate correlations, none of the psychosocial variables, including treatment readiness, perceived stress, self-stigma, or barriers to treatment, were independently associated with weight loss (all correlations were non-significant). Retention (operationalized as the total number of visits attended at 6 months) was significantly associated with greater reduction in BMI at 6 months ($r = -.36$, $p<.001$), across ethnic groups, indicating that the more sessions attended predicted greater weight loss.

**Psychosocial predictors of treatment retention**

Results of our bivariate correlations of hypothesized predictors of treatment retention are displayed in Table 4.4. Only WBIS (weight bias and stigma) scores were significantly correlated with the total number of visits at 6-months ($r = .15$, $p<.01$), in an unexpected direction, indicating that higher internalized weight stigma was associated with more treatment visits. Demographic predictors of retention included age and income. WBIS (stigma) scores were also significantly correlated with BDI-II scores ($r = .58$ $p<.001$), Global EDE-Q scores ($r = .66$, $p<.001$) and presence of recurrent BE ($r = .30$ $p<.001$) across racial/ethnic groups. We used WBIS scores in the remaining
analyses to investigate whether it was a significant mediator of the observed racial/ethnic differences in retention.

**Internalized weight bias as a mediator of race/ethnicity and treatment retention**

Results from our regression analyses revealed that African American participants had significantly lower WBIS scores than both Hispanic participants \( B = -.25, p<.001 \) and Caucasian participants \( B = -.31, p<.001 \), after controlling for BMI, age, income, and education. To evaluate whether WBIS scores mediated the observed racial/ethnic difference in retention, we used the significant path coefficient for the association between African American ethnicity and WBIS, and the significant path coefficient for the association between WBIS scores and retention for the Monte Carlo test of mediation. The 95% CI of -0.9034 to -0.08537 did not approach 0, demonstrating that WBIS scores significantly mediated the relationship between African American racial/ethnic group membership and lower rates of retention. In other words, the observed lower internalized weight bias among African Americans accounted for the statistical association between African American ethnicity and lower treatment retention.

**Discussion**

The aim of the current study was to examine racial/ethnic differences at baseline, treatment retention and weight loss outcome in a community hospital weight management treatment-seeking sample. Racial/ethnic differences at baseline suggest that African Americans reported higher BMIs and lower global eating pathology than Hispanic and Caucasian participants which is consistent with previous findings across settings (Azarbad et al., 2010; Franko et al., 2012, Marcus et al., 2007; Mazzeo et al.,
2005; Pike et al., 2001). Psychologically, Hispanic participants endorsed elevated levels of depression compared to other groups which is consistent with a previous report among a similar sample of racially/ethnically diverse bariatric surgery candidates (Azarbad et al., 2010). The finding that the prevalence of recurrent BE did not differ across racial/ethnic groups seeking weight-loss treatment contributes to the growing body of literature that ethnic minorities are as likely to report a history of binge eating as Caucasians (Alegría et al., 2007; Azarbad et al., 2010; Grilo et al., 2005; Marques et al., 2011; Mazzeo et al., 2005; Regan & Cachelin, 2006; Striegel-Moore et al., 2003). We did observe racial/ethnic differences in distress over BE, with Hispanics endorsing greater BE distress than both African Americans and Caucasians. While level of distress over symptoms has been theorized to differentially impact treatment-seeking patterns and contribute to ethnicity-based health disparities, there are very few data concerning racial/ethnic differences in distress over eating concerns. Our findings are consistent with a community-based study that found that African Americans and Caucasians endorsed similarly elevated levels of distress associated with BE, though that study did not include Hispanic participants (Striegel-Moore et al., 2000). Our findings stand in contrast, however, to another community study that found distress over BE to be equally high among Hispanics, Caucasians and African Americans (Franko et al., 2003).

Significant differences in sample characteristics and measurement may account for some of these differences, as data from random community samples are not directly comparable to treatment-seeking samples. Our findings suggest that among individuals seeking weight loss treatment in an urban community hospital setting, Hispanic patients in particular may endorse high levels of distress about their ED symptoms. It is possible that the observed racial/ethnic variation in BE distress may differentially impact symptom
disclosure and clinician recognition of EDs in a setting where racial/ethnic minorities are likely to present for treatment. For example, although the prevalence of BE is equivalent across racial/ethnic groups, African Americans and Caucasians may be less likely to disclose this symptom because they are not as distressed by it. However, given evidence that BE can negatively affect BWL treatment outcomes (Sherwood, Jeffery & Wing, 1999; Yanovski, 2003), clinicians in such settings may benefit from the knowledge that BE may interfere with treatment even if a patient does not report associated distress.

Our observed prevalence rates of BE ranged from 20% to 30% across groups, suggesting that community hospital weight management clinics, a common point of entry into health services utilization among minority groups, are important sites for BE diagnosis and treatment. Despite the prevalence of BE in our sample, our findings at follow-up (conducted by chart review) did not indicate that BE was a focus of treatment for any participant. This discrepancy suggests that treatment access for BE, in a setting where racial/ethnic minorities with BED are likely to present for treatment (Striegel-Moore et al., 2005) remains a persistent problem for these individuals. This is particularly concerning given that our data demonstrate elevated levels of eating and general pathology (i.e. depression scores) among individuals who endorse recurrent BE. Overall, our findings highlight the need for including more comprehensive BE assessment and treatment in these settings in order to improve health care delivery for EDs in ethnically diverse populations.

We found that Caucasian participants had higher retention rates than African Americans when controlling for BMI, but that this difference disappeared after adjusting for age and income. This is consistent with prior research across suggesting that
relationships between race/ethnicity and dropout disappear when accounting for the role of relevant demographic variables (e.g., Zoellner et al., 1999). Our findings indicate that older age, higher BMI and greater income are associated with the number of sessions attended and may be more important determinants of treatment retention than Caucasian ethnicity status. Of note, older age, and greater income are associated with Caucasian ethnicity in the current sample. While the cross-sectional nature of our baseline data does not permit conclusions about causality, it is possible that Caucasians remain in treatment longer because they are older and have higher incomes than African American participants. However, we did find that African American ethnicity predicted lower treatment retention when compared to other racial/ethnic groups, even after controlling for factors known to influence retention (age, income, BMI and education). Moreover, African Americans in this sample had higher BMIs than other ethnic groups, indicating a particularly strong need for treatment. This finding supports the conclusion from several studies in the psychotherapy literature suggesting African American ethnicity is associated with greater dropout even when controlling for relevant demographic variables (Fortuna et al., 2010; Lester et al., 2010; Thompson-Brenner et al., 2013). Of particular relevance, our study is consistent with findings from a recent study of aggregated clinical trials for BED that found that African Americans were significantly less likely to complete treatment for BED in RCTs compared to Caucasians, even when adjusting for demographic characteristics (Thompson-Brenner et al., 2013). The authors concluded that the identification of obstacles to treatment completion among African Americans in particular is an important and necessary step to promoting retention. However, data regarding racial/ethnic differences in retention for eating or weight concerns is extremely limited, as the majority of data come from RCTs and ED
specialty clinics where minorities are severely underrepresented (Franko et al., 2012). To our knowledge, this is the first study to compare racial/ethnic differences in treatment retention in a community hospital weight management setting, where minorities most typically present. Our findings support the conclusion that African Americans are at particularly high risk for treatment dropout from behavioral weight loss treatment, despite their comparatively higher BMIs, suggesting that retention efforts should be targeted towards this high-risk group.

We found that internalized weight bias emerged as a more significant positive predictor of retention than other psychosocial variables including distress over symptoms, barriers to care, depression and global eating pathology, across racial/ethnic groups. Mean levels of internalized weight bias in this study sample were comparable to levels observed in obese individuals in the community (Durso & Latner, 2008), and obese BWL treatment-seeking adults (Latner, Durso & Mond, 2013). Consistent with other literature in overweight community samples and obese treatment-seeking samples, weight bias internalization was positively associated with global eating pathology, depression and distress (Carels et al., 2013; Durso & Latner, 2008; Latner, Durso, & Mond, 2013), as well as BE (Ashmore, Friedman, Reichmann, & Musante, 2008; Durso & Latner, 2008; Puhl, Moss-Racusin & Schwartz, 2007) across racial/ethnic groups.

Our finding that greater stigma was associated with greater retention is at odds with another study investigating the role of stigma on retention. Carels et al. (2009) found that individuals who experienced higher levels of weight bias were more likely to drop out of weight loss treatment. However, our finding is consistent with a study of obese treatment-seeking adults that found that increased stigma was associated with greater weight loss and maintenance following BWL treatment (Latner, Wilson, Jackson,
Our finding that African American participants reported significantly lower levels of internalized weight bias than both Hispanic and Caucasian participants is consistent with previous findings from a multiethnic college sample that African Americans were less stigmatizing of overweight compared to other racial/ethnic groups (Latner, Stunkard, & Wilson, 2005). However, to our knowledge, this is the first study to report racial/ethnic group differences in internalized weight bias among overweight treatment-seeking adults. Further, we found that internalized weight bias significantly mediated the relationship between African American ethnicity and treatment retention such that their reduced levels of internalized weight bias explained their premature termination of weight loss treatment. Together, our findings provide preliminary evidence for ethnic variation in the experience of stigma that may differentially impact treatment engagement in culturally-specific ways. For example, one explanation for the reduced weight stigma among African Americans is that the higher prevalence of overweight in this cultural group may render obesity less deviant, resulting in a greater acceptance of overweight (Hebl & Heatherton, 1998; Latner et al., 2005). This acceptance, however, may adversely impact their motivation for weight loss treatment. Therefore, interventions aimed at increasing psychoeducation about the consequences of overweight may be particularly helpful strategies to increase treatment engagement among African Americans in particular.

With respect to weight loss outcome, participants lost an average of 1.16 BMI points across ethnic groups; this is consistent with prior 6-month weight loss outcomes among patients in BWL settings (Appel et al., 2003; Hollis et al., 2008; West et al., 2008). We also found that African Americans had poorer weight loss outcomes than Caucasians when controlling for baseline BMI. This finding supports the conclusion from
the majority of large-scale trials suggesting BWL interventions are less effective among African Americans (Kumanyika et al, 2002; Svetkey et al., 2005; West et al., 2008). For example, in a recent study comparing weight loss outcome between African Americans and Caucasians in a lifestyle modification intervention, Svetkey et al. (2012) found that at 6-months, African American participants lost an average of 7% of their baseline body weight, which was significantly less than Caucasians, who lost 10%. Other significant predictors of greater weight loss outcome in our study included retention, and higher baseline BMI, which is consistent with findings from other BWL studies (e.g., Hollis et al., 2008).

Notably, in our model adjusting for age, income and education, the racial/ethnic difference in weight loss outcome between African Americans and Caucasians was no longer significant, suggesting that a lower level of income is a more robust predictor of poorer weight loss than African American ethnicity. This finding is consistent with a recent study that found that race/ethnicity was not significantly associated with weight loss after controlling for demographic variables (Turk et al., 2012). However, the role of these demographic factors on racial/ethnic disparities in weight loss outcome remains unclear as some studies suggest that income and education do not account for observed racial/ethnic differences (Hollis et al., 2008; Kumanyika et al., 1991; Svetkey et al., 2012). One plausible explanation for our contrasting findings is the composition of our study sample. The above-mentioned studies were randomized trials of BWL interventions, and to our knowledge, this is the first study to investigate racial/ethnic group differences in weight loss in a naturalistic setting. It has been established that individuals who present for treatment in RCTs have different demographic characteristics than those who seek treatment on their own (Grilo et al., 2005). Indeed,
participants in our sample had significantly lower levels of income and education than the participants included in BWL controlled trials (Hollis et al., 2008; Turk et al., 2012; Svetkey et al., 2012). Our findings suggest that community hospital weight management populations have different characteristics than those included in BWL clinical trials, and demographic factors including income are important determinants of weight loss outcome in these settings.

Our results should be interpreted in the context of the following limitations. First, in order to assess multiple variables in a busy clinical setting, we utilized self-report measures, several of which were brief. It may be that BE, stigma, stress, or other variables are better measured by interview. Nonetheless, current findings offer some suggestions regarding variables of interest for future research. Second, follow-up data were collected from a review of clinical charts rather than repeated assessment, and did not permit conclusions regarding changes in baseline symptoms such as BE and associated distress, depression and stigma. Studies from other BWL treatment samples have observed reductions in both BE and internalized weight stigma following BWL treatment (e.g., Carels et al., 2010). Future research would benefit from assessing these symptoms at follow-up to ascertain the degree that these symptoms improve with treatment. Further, we were unable to gather data regarding provider or health-system related factors that may have also influenced treatment retention. For example, cultural mismatch and clinician bias have been associated with racial/ethnic disparities in treatment access and retention (Becker et al., 2003; Fortuna et al., 2010; Mond et al., 2010). Future research would benefit from a more comprehensive assessment of such factors and their role in explaining observed racial/ethnic differences in the current sample.
Despite these limitations, the current study contributes to the small knowledgebase regarding racial/ethnic differences in treatment access, retention, and outcome. The finding that African Americans terminate weight loss treatment sooner than other groups, despite their higher baseline BMIs (and therefore greater need for treatment), has significant implications for weight loss maintenance in particular. While BWL interventions have produced substantial short-term weight loss, weight regain is common, as it requires long-term adherence to lifestyle change (Jeffrey et al., 2000; Svetkey et al., 2012). There is evidence that post-treatment weight regain may be even more pronounced for African Americans in particular (Phelan, Wing, Loria, Kim, & Lewis, 2010; Sheehan, DuBrava, DeChello, & Fang, 2003). Some recent studies, however, have indicated no racial/ethnic group differences in weight maintenance following BWL interventions (Svetkey et al., 2012, Turk et al., 2012). However, the latter studies cited factors such as short-term weight-loss, adherence, and barriers to healthy eating as significant predictors of weight regain (Svetkey et al, 2012; Turk et al., 2012), factors found to disproportionately affect racial/ethnic minority groups (Hollis et al., 2008; Kumanyika, 2008). For example, culturally-specific preference for high calorie foods and culturally-based attitudes towards physical activity may predispose minority groups towards weight gain and regain (Eyler et al., 2002; Kumanyika, 2008b, Parham & Scarinci, 2007). Environmental factors such as the higher prevalence of fast-food outlets, and fewer opportunities for physical activities among African Americans than Caucascians (Eyler et al., 2002; Grier & Kumanyika, 2008) may also undermine efforts at weight loss maintenance. In sum, our findings imply that if African American individuals are more likely to discontinue treatment at earlier stages of treatment, they are at risk for reduced short-term weight loss, and at even greater risk for weight regain. Given the
disproportionately high rates of obesity and associated comorbidities among African Americans in particular (Flegal et al., 1999; Lloyd-Jones et al., 2009; Wright et al., 2008), addressing retention issues in this group in particular is imperative. The identification of psychosocial factors that may account for observed racial/ethnic differences in treatment retention has been identified as an important challenge (Franko et al; 2012; Thompson-Brenner et al., 2013). Our study suggests that, in a setting where African Americans are most likely to present for weight loss treatment, weight-based stigma should be considered in the development of culturally relevant retention interventions, in order to improve short and long term weight loss for this high risk group.
Table 4.1 Means and SDs for Demographic Variables by Racial/Ethnic group (N= 430)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Hispanic (N=127)</th>
<th>African American (N=204)</th>
<th>Caucasian (N=99)</th>
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<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
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<tr>
<td>High School Graduate</td>
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<td>28.3%</td>
<td>63</td>
</tr>
<tr>
<td>Some college</td>
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<tr>
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</tr>
<tr>
<td>Income</td>
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Table 4.2  \hspace{1cm} \textit{Means and SDs for Baseline Clinical Variables by Racial/Ethnic Group (N = 430)}

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<th>African American (N=204)</th>
<th>Caucasian (N=99)</th>
</tr>
</thead>
<tbody>
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<td>SD</td>
<td>Mean</td>
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<td>BDI-II</td>
<td>18.38</td>
<td>11.2</td>
<td>13.76</td>
</tr>
<tr>
<td>EDEQ Global</td>
<td>2.92</td>
<td>1.2</td>
<td>2.55</td>
</tr>
<tr>
<td>PAISS T-Score</td>
<td>58.9</td>
<td>12.1</td>
<td>59.15</td>
</tr>
<tr>
<td>WBIS Obesity</td>
<td>3.98</td>
<td>1.2</td>
<td>3.47</td>
</tr>
<tr>
<td>DOSS total</td>
<td>4.69</td>
<td>2.6</td>
<td>3.77</td>
</tr>
<tr>
<td>DOSS Binge Eating</td>
<td>3.33</td>
<td>2.9</td>
<td>1.75</td>
</tr>
<tr>
<td>PTBQ Score</td>
<td>2.46</td>
<td>1.3</td>
<td>2.18</td>
</tr>
<tr>
<td>\textbf{N}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>\textbf{Recurrent BE}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precontemplation</td>
<td>13</td>
<td>10.2%</td>
<td>12</td>
</tr>
<tr>
<td>Contemplation</td>
<td>21</td>
<td>16.5%</td>
<td>42</td>
</tr>
<tr>
<td>Preparation</td>
<td>91</td>
<td>71.7%</td>
<td>144</td>
</tr>
</tbody>
</table>
Table 4.3  Linear Regression Predicting Retention with Covariates (N = 430)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>$\beta$</th>
<th>S.E</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American ethnicity</td>
<td>-0.11*</td>
<td>0.05</td>
</tr>
<tr>
<td>BMI</td>
<td>0.20***</td>
<td>0.05</td>
</tr>
<tr>
<td>Age</td>
<td>0.12**</td>
<td>0.04</td>
</tr>
<tr>
<td>Income</td>
<td>0.11</td>
<td>0.06</td>
</tr>
<tr>
<td>Education</td>
<td>-0.02</td>
<td>0.05</td>
</tr>
</tbody>
</table>

* $p<.05$  **$p<.01$  ***$p<.001$
Table 4.4: Bivariate Correlations of Psychosocial Predictors of Treatment Retention

<table>
<thead>
<tr>
<th>Psychosocial predictors</th>
<th>Total Visits at 6-months</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBIS</td>
<td>.15*</td>
</tr>
<tr>
<td>BDI-II</td>
<td>.05</td>
</tr>
<tr>
<td>EDEQ Global</td>
<td>.08</td>
</tr>
<tr>
<td>DOSS total</td>
<td>.06</td>
</tr>
<tr>
<td>EDSOC BE</td>
<td>.00</td>
</tr>
<tr>
<td>EDSOC Weight Loss</td>
<td>.05</td>
</tr>
<tr>
<td>PTBQ Score</td>
<td>.05</td>
</tr>
</tbody>
</table>

*p<.01, two-tailed test
CHAPTER FIVE
General Discussion

The present set of studies was designed to investigate racial/ethnic differences in LOC eating, BE symptomatology, treatment retention and weight loss outcome in an urban community hospital nutrition weight management treatment-seeking sample. The studies aimed to better characterize the clinical presentation of racial/ethnic minorities as well as identify predictors of treatment retention and outcome in a novel setting, where these individuals most typically present for treatment. Study #1 aimed to develop and evaluate the psychometric properties of the Dimensional Assessment of Loss of Control Eating (DALC) scale, a new measure designed to assess the distress associated with LOC eating. Study #2 aimed to describe the prevalence, correlates and racial/ethnic group differences in baseline BE symptomatology among Hispanics, African Americans and Caucasians seeking weight management treatment. Study #3 explored racial/ethnic group differences in weight loss treatment retention and outcome at 6-months follow up, with a focus on identifying demographic and psychosocial factors that may mediate observed differences.

Summary of Results

Our first study demonstrated excellent psychometric properties of the DALC scale. Our exploratory factor analysis produced a 2-factor scale with high Cronbach’s alphas for each subscale as well as the total scale. Convergent, construct and incremental validity were good. Medium sized correlations with the frequency of BE episodes demonstrated that LOC eating is related to but distinct from BE frequency.
Results from our regression analyses indicated that the DALC can predict variation in both depression and global eating pathology above and beyond the variance accounted for by existing measures of BE frequency and BMI. The study also demonstrated, through an ROC curve analysis, that the DALC can be an appropriate screening tool for recurrent BE and clinically significantly eating pathology. A cutoff score of 2.34 on the DALC (representing a little distress over LOC eating) correctly classified 72% of individuals with recurrent BE and global eating pathology, and suggests that even low levels of distress over LOC eating, independent of the amount of food consumed, predicts the presence of recurrent BE and disordered eating. Overall, our development of a valid and comprehensive tool for assessing distress over LOC eating helps to better characterize this important and under-assessed phenomenon, and its future use in research and clinical settings can produce a more accurate classification and clinically useful picture of BE-related eating disorders.

In our study of baseline BE prevalence and symptomatology, the observed prevalence of recurrent BE was 20% to 30%, and did not differ between racial/ethnic groups. This finding suggests that among patients who are seeking treatment primarily for weight loss rather than for BE, a relatively large proportion report experiencing recurrent BE episodes. Further, the presence of recurrent BE was associated with higher BMI, higher levels of depression, and higher levels of global eating pathology, suggesting a distinct clinical picture of recurrent binge eaters presenting for obesity treatment. In addition, a subset of individuals endorsed significant distress over their recurrent BE (approximately 10% across racial/ethnic groups), suggesting that, although it is rarely comprehensively assessed, distress is an important indicator of BE severity, and should also be considered in the development of treatment interventions across
racial/ethnic groups. Though we did not observe racial/ethnic differences in cognitive symptoms of BED, African Americans with recurrent BE had higher BMIs than other racial/ethnic groups with recurrent BE, after controlling for demographic variables. This finding, from a novel setting in which African Americans are most likely to present, is consistent with the extant literature suggesting that African American individuals are at particularly high risk for obesity and related health consequences. Overall, our findings help to better characterize the clinical presentation of racial/ethnic minorities with BE, and suggest that urban hospital nutritional weight management settings are important sites for the assessment and treatment of BE and related psychopathology. Future research designed to develop culturally appropriate BE interventions may benefit from recruitment in similar settings where minorities are likely to present for treatment.

Our third study revealed that, despite the prevalence of recurrent BE in the current sample, treatment for BE was not observed for any participant. This finding from a common point of entry into health services use for racial/ethnic minorities, supports the conclusion that BE treatment is often inaccessible to these individuals. We found that African Americans terminated weight management treatment sooner than other racial/ethnic groups, despite having comparatively higher BMIs, identifying this group as at particularly high risk for inadequate treatment effects in such settings. Our finding that weight based self-stigma mediated this relationship indicates that comparatively lower levels of internalized weight bias among African Americans explained their premature termination of treatment. Overall, our findings suggest that African Americans are at higher risk for drop out, weight gain and weight regain following weight loss treatment, and retention interventions should be targeted towards this group.
Strengths and Limitations of the Present Studies

Strengths of the current studies include the recruitment of a large ethnically diverse (77% non-Caucasian) sample in a novel setting where racial/ethnic minorities are likely to present for treatment. Nearly all the existing literature pertaining to racial/ethnic differences in BE and BED come from RCTs, and specialty ED or gastric bypass clinics, where minority and non-minority individuals tend to have higher levels of income and education than community or real-world treatment-seeking samples (Grilo et al.; 2005; Franko et al., 2012; Thompson-Brenner et al., 2013). Racial/ethnic minorities with lower levels of income and education are not represented among participants in these prior studies, limiting the generalizability of their findings (Franko et al., 2012). Our recruitment method at an urban community hospital weight management setting resulted in a large sample that may be more generalizeable to racial/ethnic minorities in the community with BE and obesity, and allowed us to compare racial/ethnic differences at baseline and follow-up. To our knowledge, no data regarding race/ethnicity and BE have been collected in urban weight management clinics. The current set of studies provided a more complete description of these individuals in settings where they are adequately represented, and identified important culturally-based factors for consideration in the development of culturally sensitive interventions.

Despite the significance of our findings, several limitations are noteworthy. First, across the studies, we did not employ established interview-based methods to assess symptoms. The literature suggests that such methods produce more accurate diagnosis of BE related symptoms (Wilfley et al., 2003). In our first study, the use of interview-based diagnostic standards may have enhanced the validity of the DALC by more accurately classifying individuals with recurrent BE. In our second and third studies, the
use of gold-standard interview diagnostic assessments may have more accurately measured the prevalence and severity of BE in our sample, and would have permitted the reliable diagnosis of full threshold BED, rather than recurrent BE. However, in hospital-based community clinics, lack of trained clinicians as well as substantial time constraints render the use of interview-based assessments unrealistic. In our investigations, we attempted to overcome this limitation by providing detailed explanations of constructs, and including items from interview assessments that are typically excluded from self-report measures. Further, our findings regarding prevalence and correlates of BE were consistent with previous reports (Azarbad et al., 2010; Grilo et al., 2005; Pike et al., 2001), supporting the adequacy of self-report measures for use in weight management settings. Second, our follow-up data was somewhat limited in its exclusive reliance on chart review. Similar resource and time constraints in the current setting did not permit the evaluation of changes in BE symptomatology or psychosocial factors of interest such as weight-based stigma. Further, we were unable to investigate potential clinician or system factors that have been previously shown to influence retention and outcome (Becker et al., 2010; Fortuna et al., 2010). Our findings may have been enhanced if we were able to ascertain the degree to which these symptoms improved in treatment, and if factors such as clinician bias impacted retention and weight loss outcome in culturally-specific ways.

**Overall Conclusions and Implications for Future Study**

*Clinical significance of LOC eating and implications for future research*

Findings from several studies investigating the clinical utility of the diagnostic criteria for BE and BED have converged on the conclusion that LOC eating is a distinct
and critical component of BE episodes. For example, numerous studies suggest that LOC eating is a better indicator of psychiatric disturbance and eating disordered psychopathology than other criteria of BE (such as the consumption of a large amount of food) (Brownstone, Printz, & Bardone-Cone, 2013; Latner, Vallance, & Buckett, 2008; Mond, Latner, Hay, Own, & Rodgers, 2010). Treatment outcome research suggests that in psychiatric populations, LOC eating may be slower to remit than objective BE episodes following psychological treatment for BN and BED (Brownstone et al., 2013; Walsh, Fairburn, Mickley, Sysko & Parides, 2004), suggesting that the assessment of this construct is essential to improving treatment outcomes. In weight management populations, the unreliable assessment of BE frequency and severity has resulted in inconsistent findings regarding BE and weight loss (Dymek-Valentine, Rienecke-Hoste, & Alverdy, 2004), suggesting that assessment of distress over LOC eating independent of BE frequency may enhance our understanding of this important relationship. However, current assessment instruments are designed primarily to quantify the presence and frequency of BE episodes, and include very few items, if any, that assess distress over LOC eating. Research has demonstrated the limited clinical utility of such measures (Celio, Wilfley, Crow, Mitchell, & Walsh, 2004; Wilfley, Wilson, & Agras, 2003), and has identified the development of more precise LOC assessment tools as a priority (Latner et al., 2007; Tanofsky-Kraff et al., 2013).

To our knowledge, this is the first study to develop and provide preliminary evidence for the validity of a comprehensive assessment tool for LOC eating. The DALC demonstrated excellent psychometric properties, and our findings provided evidence that LOC eating is distinct from BE frequency in the weight management population. It will be important for future investigations to establish the validity of the DALC in ED clinical and
non-clinical samples, and to obtain norms and prevalence estimates for LOC eating. Investigators as well as clinicians will benefit from the use of the DALC to evaluate this important, prevalent, yet underrecognized aspect of BE, in order to improve diagnostic accuracy and inform the development of targeted interventions. Further, the inclusion of the DALC as a repeated outcome measure throughout treatment course will greatly improve the detection of this distressing symptom, and will provide important data regarding the degree to which it improves with the use of empirically supported treatments.

**Racial/ethnic differences in BE presentation and implications for treatment access**

Extensive research suggests that individuals of low SES and of racial/ethnic minority status are less likely to receive psychological treatment for an ED (Becker et al., 2003; Becker et al., 2010; Cachelin & Striegel-Moore, 2006; Pike et al., 2001), and are more likely to access ED treatment in primary care or hospital-based settings (Cachelin & Striegel-Moore, 2006; Marques et al., 2011). In the field of ED treatment, the concentration of services in specialty and academic clinics is observed to reduce treatment access for these populations (Wilson & Zandberg, 2012). Our results suggest that despite the high prevalence of BE and associated emotional distress across racial/ethnic groups in our weight-loss treatment seeking sample, treatment for BE did not appear to be accessed by any participant. This striking finding supports the conclusion that only a small proportion of individuals with BE and BED access empirically supported treatments (Wilson & Zandberg, 2012), and extends this finding to suggest that hospital-based obesity treatment centers may not have extensive services for the treatment of BE and BED. Improving access to empirically supported treatments
by identifying effective ways to disseminate them into the community has been identified as a priority for future research (Tanofsky-Kraff et al., 2013). Given that the majority of treatment seeking low-income racial/ethnic minorities present at community hospital weight management clinics, our findings identify these sites as appropriate settings for the dissemination of cost-effective treatments for BE, in order to reduce race-related disparities in mental health utilization.

Understandably, the lack of resources available in such settings (such as the limited resources to train psychologists) renders the provision of comprehensive services particularly difficult. Therefore, the necessity of low-cost and easily disseminable treatment approaches, such as self-help, should be emphasized. Research suggests that guided self-help cognitive behavioral therapy for the treatment of BED is an efficacious and cost-effective option, and can conceivably address health disparities (Wilson & Zandberg, 2012). This type of treatment may be most appropriate for implementation in these settings as it includes reduced patient contact and can be successfully administered by non-specialists (Striegel-Moore et al., 2010; Wilson & Zandberg, 2012). Recent data suggests that the provision of low-cost psychological services for depression and anxiety in medical settings has been shown to improve treatment access (DeJesus, Diaz, Gosalves, & Careki, 2011), suggesting that similar results can be achieved with the treatment of BED. An important direction for future research will be to investigate the feasibility, efficacy, and effectiveness of such a low-cost, empirically-supported treatment for BED in this community hospital setting. Specific research targets should include the modification of the treatment to address the specific needs of low-income, culturally diverse individuals with obesity. For example, culturally-specific adaptations such as including a targeted psychoeducation component
addressing BE, obesity, and treatment options, may help to increase treatment engagement among individuals with culturally-based beliefs about EDs and/or psychological treatment that deter them from initiating treatment. The development of innovative treatment in this setting is the next step in improving outcomes and reducing mental health disparities among racial/ethnic minorities with eating disorders.

*Racial/ethnic differences in retention and implications for future interventions*

In addition to access, retention among racial/ethnic minorities with lower SES in psychological treatment for BED as well as BWL treatment for obesity remains a persistent concern (Franko et al., 2012; Hollis et al., 2008; Thompson-Brenner et al., 2013). Our findings add to this literature, suggesting that African Americans with and without BE terminate behavioral weight loss treatment for obesity sooner than other racial/ethnic groups, notwithstanding their comparatively higher BMIs. Premature termination from weight loss treatment, despite high need for treatment, increases the already high likelihood of future weight regain. Research suggests that weight maintenance following treatment is common (Svetkey et al., 2012) and African Americans may be at higher risk for weight regain (Phelan et al., 2010; Sheehan et al., 2003). Therefore, the identification of modifiable obstacles to treatment retention among African Americans in particular is a critical element to reducing health outcome disparities in this area (Thompson-Brenner et al., 2013). The results of our study identify reduced levels of obesity-based self-stigma as a salient obstacle to obesity treatment retention among African Americans. The literature suggests that a greater tolerance for overweight among African American individuals may be culturally-based (Hebl & Heatherton, 1998; Latner et al., 2005), which may render them less to susceptible self-
stigma, and therefore feel less motivated to complete weight loss treatment. The development of specific retention interventions targeting such treatment-deterring cultural values holds the potential to improve both short-term weight loss and long-term weight loss maintenance for this particular racial/ethnic group.

An important target for future research will be the development of retention interventions that are both culturally relevant, and appropriate for individuals with low levels of income and education seeking weight loss treatment in community hospital settings. For example, education regarding the health consequences of overweight may be crucial to increasing patient awareness and engagement in obesity treatment among African Americans, who appear to be less motivated to achieve recommended weight loss goals. In the weight management literature, several cultural adaptations have been recommended, including the incorporation of culturally relevant food preferences into BWL programs (Kumanyika & Grier, 2006; Kumanyika & Morssink, 1997). However, the research investigating the efficacy of such adaptations in specific patient populations is lacking (Kumanyika, 2008). Adaptations specific to individuals seeking nutritional weight loss treatment who may or may not have BE include the incorporation of easily comprehensible psychoeducational materials concerning BE, obesity, and mental health.

Taken together, the findings of the present set of studies suggest that community hospital weight management clinics are important sites for the diagnosis and treatment of BE. Research promoting the development of culturally specific retention, BED and obesity interventions should be conducted in these settings where racial/ethnic minorities are adequately represented. Results from our investigations identify important considerations for future research, and have the potential to greatly reduce racial/ethnic health disparities in the area of eating disorders and obesity.
REFERENCES


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Kumanyika, S. K. (2008). Ethnic minorities and weight control research priorities: Where are we now and where do we need to be? *Preventive Medicine, 47*, 583-586.


Coronary Artery Risk Development in Young Adults Study. *American Journal of Preventive Medicine, 39*, 546-554.


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EDUCATION

Boston University, Boston, MA 2008-2014
Doctor of Philosophy, Clinical Psychology September 2014
Masters of Arts, Clinical Psychology January 2010

Master’s Thesis: The Effect of Peer Influence on Disordered Eating in an Ethnic Fijian Female Adolescent Sample: Peer Interactions as a Mediator between Cultural Orientation and Disordered Eating

Dissertation Title: Racial/ethnic Differences in Binge-Eating Prevalence, Clinical and Cognitive Symptoms, and Treatment Retention/Outcome in a Community Hospital Weight-Management Sample

McGill University, Montreal, QC 2000-2004
Bachelor of Arts with concentration in psychology, with distinction May 2004
Minors: French Language and Literature, Behavioral Science

AWARDS AND HONORS

American Board of Professional Psychology (ABPP)
Arthur Nezu Diversity Dissertation Award 2014

National Institute of Health/National Institute of Mental Health
Mental Health Dissertation Research Grant to Increase Diversity 2012-2014
Early Career Investigator Travel Fellowship to the International Conference on Eating Disorders 2009
Classification of DSM-V Eating Disorders Conference Trainee Fellowship 2009
Boston University, Boston, MA
Clara Mayo Dissertation Award 2011-2012
Martin Luther King Jr. Research Fellowship 2008-2011

Massachusetts General Hospital, Harris Center, Boston, MA
Matina S. Horner Summer Research Fellowship 2010

McGill University, Montreal, QC, CA
Bertha Lapitsky Summer Research Award 2004
Great Distinction Graduation Honor 2004
Dean’s Honors List 2003-2004

POSTDOCTORAL CLINICAL EXPERIENCE
Massachusetts General Hospital, Department of Psychiatry, Home Base Program

Clinical Psychology Postdoctoral Fellow, 2014-2016

PREDOCTORAL CLINICAL EXPERIENCE

VA Boston Healthcare System, Center for Returning Veterans
Supervisors: Erin Daly, Ph.D., Kevin Brailey, Ph.D., Scott Litwack, Ph.D.

Psychology Intern, 2013-2014 (8 months)
• Carried individual caseload of 10 to 12 patients and co-lead two groups addressing the treatment of PTSD symptoms and post-deployment readjustment concerns. Conducted intake assessments and formal psychological assessments, as assigned. Attended and participated in team meetings, as assigned. Complete associated administrative duties and report writing. Attended weekly didactic training. Will fulfill the training requirements of the Boston Consortium Psychology Internship Program by the completion of the Internship year.

VA Boston Healthcare System, Behavioral Medicine Service
Supervisors: DeAnna Mori, Ph.D., Amy Silberbogen, Ph.D., Sari Chait, Ph.D.

Psychology Intern, 2014-2014 (4 months)
• Carried individual caseload of 5 individual patients and co-lead four groups addressing adjustment to medical diagnoses. Conducted intake assessments and psychological evaluations for transplant candidates. Attended and participated in team meetings. Complete associated administrative duties and report writing. Attended weekly didactic training. Will fulfill the training requirements of the Boston Consortium Psychology Internship Program by the completion of the Internship year.
Adult Anxiety Program, Center for Anxiety and Related Disorders  
Boston University  
Supervisors: Lisa Smith, Ph.D., Heather Murray, Ph.D., Todd Farchione, Ph.D.

Psychology Extern, 2008-Present
- Received formal training in and administered the Anxiety Disorder Interview Schedule for DSM-IV (AIDS-IV), to assess the presence and severity of AXIS I disorders. Conducted intake assessments and wrote formal reports. Received formal training in and conducted manualized cognitive behavioral therapy (both individual and group) for adults with anxiety and mood disorders. Provided short- and long-term individual CBT to adult clients with a range of anxiety, depressive, and personality disorders. Carried an average caseload of 4 to 6 patients per week, and co-led 3 groups for the treatment of social phobia for 12 weeks each, focused on in-vivo exposures and cognitive restructuring. Participated in weekly diagnostic meetings and weekly supervision meetings.

Eating Disorders Program, Center for Anxiety and Related Disorders  
Boston University  
Supervisors: Heather Thompson-Brenner, Ph.D., Elizabeth Pratt, Ph.D.

Psychology Extern, 2008-Present
- Received formal training in and conducted structured and semistructured eating disorders assessment interviews for adults with eating disorders and severe personality pathology. Conducted comprehensive intake assessments and wrote formal assessment reports. Received formal training in integrative treatment approaches for anorexia nervosa and bulimia nervosa including CBT, IPT and short-term psychodynamic psychotherapy. Provided individual long-term, intensive psychotherapy (2 sessions weekly) to adult clients with eating disorders and severe comorbid personality pathology. Served as a protocol therapist on a clinical trial comparing two versions of CBT for individuals with bulimia nervosa and borderline personality disorder and a trial comparing CBT to short-term psychodynamic psychotherapy for individuals with eating disorders. Maintained an average caseload of 4 clients per week.

Bipolar Clinic and Research Program  
Massachusetts General Hospital  
Supervisors: Louisa G. Sylvia, Ph.D., Thilo Deckersbach, Ph.D.

Psychology Extern, 2011-Present
- Received formal training in empirically-based structured assessments for mood and anxiety disorders. Conducted comprehensive intake assessments and delivered individual CBT and DBT to adult patients with Bipolar I and II disorders. Created detailed cognitive behavioral case formulations, treatment plans and summaries. Served as an assessment clinician for a treatment effectiveness
study for Bipolar disorder and provided blinded assessment of depressive and manic symptoms and overall ratings of functioning. Participated in didactic seminars and attended weekly supervision.

The Danielsen Institute
Boston University
Supervisor: George Stavros, Ph.D., Chris O’Rourke, LICSW.

Psychology Extern, 2010-2011
- Provided long-term therapy to clients with a range of psychiatric disorders including trauma, eating, and personality disorders based on a reflective-practitioner model, with an emphasis on the interface of psychology and spiritual perspectives. Participated in weekly externship meetings that encouraged open reflection on personal history and religious identity. Conducted comprehensive assessments and prepared psychodynamically-informed formulations, intake reports and treatment plans and summaries.

Psychological Services Center
Boston University
Supervisor: Wendy Lippe, Ph.D.

Psychology Extern, 2009-2010
- Received training on and conducted structured assessment of mood, anxiety and personality disorders. Received training in and conducted manualized individual cognitive behavioral therapy and integrative, process-oriented therapy for adults with anxiety and mood disorders. Prepared comprehensive intake reports, treatment plans and case summaries.

Massachusetts Eating Disorders Association
Newton, MA
Supervisor: Beth Mayer, LICSW.

Clinical and Advocacy Intern, 2005
- Prepared presentations on eating disorder awareness and diagnosis for university students and staff, assisted with eating disorders awareness campaigns, and attended clinical meetings discussing clinical cases and treatment planning. Conducted phone screens with patients and provided referrals for appropriate eating disorder treatment.

Taylor Adolescent Program
Montreal, QC
Supervisors: Leonard Shenker, Ph.D.; Renee Stevens, Ph.D.

Clinical Intern, 2003-2004
- Provided academic mentorship to an adolescent with a severe non-verbal learning disability, attended clinical meetings twice a week to discuss and
evaluate the progress of the student, prepared semi-annual clinical evaluative progress reports, and participated in semi-annual parent meetings to discuss the progress of the student.

RESEARCH EXPERIENCE

Eating Disorders Program, Boston University
*Supervisor: Heather Thompson-Brenner, Ph.D.*

Graduate Research Assistant, 2008-Present
- Conducted research investigating eating and personality disorders, eating disorder treatment access among underserved populations, and symptom presentation and psychosocial treatment response among African American and Hispanic/Latino subjects with binge eating disorder through the re-analysis of existing data. Served as a project coordinator for NIMH-sponsored career development award comparing the efficacy of two versions of CBT for the treatment of adult women with bulimia nervosa and dysregulated personality. Assisted with participant recruitment, patient evaluation, and data management. Presented research at conferences, analyzed data using SPSS and Mplus and prepared manuscripts for publication.

The Harris Center, Massachusetts General Hospital, Boston, MA
*Supervisor: David Herzog, M.D., Deborah Franko, Ph.D., Kamryn Eddy, Ph.D.*

Research Fellow, 2010
- Assisted with the development and submission of an NIMH grant for the collection of 25-year-follow-up data in a longitudinal study investigating recovery, relapse and global functioning of patients with anorexia nervosa and bulimia nervosa. Prepared independent NIMH grant for a study investigating ethnic differences in binge eating in a community hospital weight loss population. Attended weekly research meetings to discuss progress and findings.

University of California at San Francisco, San Francisco, CA
*Supervisor: Michele Mietus-Snyder, M.D.*

Research Assistant and Protocol Counselor, 2007-2008
- Developed and disseminated stress reduction curriculum for a pilot nutrition intervention for overweight adolescents. Received formal training in and delivered Mindfulness Based Stress Reduction (MBSR) Therapy to Hispanic youth and their families as part of an obesity prevention research project

Eating Disorders Research Program, Massachusetts General Hospital, Boston, MA
*Supervisor: Anne Becker, M.D., Ph.D., S.M.*

Research Assistant, 2005-2007
Coordinated studies related to sociocultural factors, ethnicity, and eating disorders. Assisted in preparation and submission of NIH grant, submitted protocols for IRB review, carried out literature searches in online databases (PsycInfo, Medline). Conducted field work in rural Fiji, recruiting subjects, collecting cross-cultural data on social transition and adolescent mental health. Managed data using SPSS and aided in the production of manuscripts for publication in peer-reviewed journals.

**Research Assistant, McGill University, Department of Psychology, Montreal, QC**

*Supervisor: John Lydon, Ph.D.*

**Research Assistant, 2004**

- Assessed a large sample of women from diverse social and economic backgrounds during pregnancy and postpartum for the Montreal New Mothers Project. Conducted hour-long psychosocial interviews with participants, collected saliva samples to measure cortisol levels, reviewed hospital charts, integrated and managed raw data using SPSS. Prepared manuscripts for publication.

**TEACHING EXPERIENCE**

**Theories of Personality Graduate Course, Boston University**

*Professor: Heather Thompson-Brenner, Ph.D.*

**Teaching Assistant, 2012**

- Developed lesson plans, and prepared lecture materials with professor, graded papers and examinations, and provided mentorship for individual graduate-level students.

**Abnormal Psychology Undergraduate Course, Northeastern University**

*Professor: James Roehrig, M.A.*

**Guest Lecturer, 2011**

- Planned and executed 3-hour lecture concerning current conceptualizations of eating disorders to advanced undergraduate students with concentrations in psychology.

**GRANTS**

**Binge Eating Disorder in an Ethnically Diverse Treatment-Seeking Population**

National Institutes of Health, Division of Services and Intervention Research (DSIR) (1R36MH095395-01A1)

*Mentor: Heather Thompson-Brenner, Ph.D.*

**Principal Investigator, 2012-2014**

- The aim of this project is to describe and compare the prevalence, characteristics, and correlates of African American, Hispanic, and Caucasian
patients with binge eating presenting for treatment at an urban, ethnically-diverse, community-hospital center for nutrition and weight management. Secondary aims include investigating the predictors of treatment retention and response to interventions for obesity.

EDITORIAL ACTIVITIES

Ad Hoc Reviewer

*Psychotherapy*  
Editor-in-Chief: Mark J. Hilsenroth, Ph.D.

*Clinical Psychology Review*  
Editor-in-Chief: Alan Bellak, Ph.D., ABPP

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS

American Psychological Association, Graduate Student Affiliate  
2011-Present

Association for Behavioral and Cognitive Therapies,  
Graduate Student Member  
2011-Present

Academy for Eating Disorders, Graduate Student Member  
2009-Present

PUBLICATIONS


**MANUSCRIPTS IN PREPARATION**


**PUBLISHED ABSTRACTS AND PRESENTATIONS**


5. **Richards, L.** (May, 2011). *Treatment of eating disorders: Cognitive behavioral principles.* Invited talk at the Professional Development Seminar, the Danielsen Institute, Boston University, Boston, MA.

6. **Richards, L.** (May, 2011). *The classification and assessment of eating disorders: implications for ethnic minority populations.* Invited talk at the Professional Development Seminar, the Danielsen Institute, Boston University, Boston, MA.


