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Factors associated with obesity treatment adherence in Mexican-American women

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FACTORS ASSOCIATED WITH OBESITY TREATMENT ADHERENCE IN MEXICAN-AMERICAN WOMEN

BY

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DISSERTATION

Submitted in Partial Fulfillment of the

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DEDICATION

To the memory of my grandmothers Maria Del Carmen "Lily" and Lillian for their love for family, their honesty, and always approaching life with dignity.

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ABSTRACT OF DISSERTATION

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ABSTRACT

The current study examined environmental and socio-cultural factors postulated to predict adherence to a standard weight management program in Mexican-American women. In addition, the study gathered preliminary data on the effectiveness of the program with the study sample. One-hundred overweight or obese Mexican-American women in the Albuquerque area completed a pre-treatment intake and were enrolled in the group-based treatment. Of the 100 women who enrolled, 82 attended at least one treatment session. In terms of the predictors of treatment adherence, income was found to positively predict attendance in multivariate analyses. In addition, neighborhood satisfaction positively predicted reported walking goals completed, and familism (attention to the needs of the family above those of the self) negatively predicted reported calorie goals completed in multivariate analyses. In addition, exploratory analyses

revealed that intake depression symptoms and body image varied by level of attendance, such that treatment completers reported lower baseline levels of body dissatisfaction and depression symptoms. In terms of treatment effectiveness, women who completed the program demonstrated significant pre- to post-treatment weight losses, reductions in waist-to-hip ratios, and reduced symptoms of depression, binge eating and body dissatisfaction. The results of the current study support the idea that economic, environmental, socio-cultural, and psychological factors predict adherence to a standard obesity treatment in Mexican-American women. In addition, there is preliminary evidence that such a program may be beneficial for weight loss. The results of the current study indicate that weight management programs should attempt to address the multi-level barriers to adherence that Mexican-American women may face.

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Introduction

Significance of Problem

Excess weight is a major health risk factor in the United States (Must et al., 1999). General population studies have linked excess weight, as defined by overweight (Body Mass Index [BMI] 25.0- 25.9) and obesity (BMI ≥ 30), to a number of chronic conditions and to all-cause mortality (Centers for Disease Control [CDC], 2007; Flegal, Graubard, Williamson, & Gail, 2005; Mokdad, Marks, Stroup, & Geberding, 2004). Although excess weight and its consequences are a major concern for the general population, it is not an equal opportunity affliction, as significant racial, ethnic, and economic disparities exist in the prevalence and consequences of excess weight (Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010; Kumanyika, 2002; Wardle, Waller, & Jarvis, 2002).

Indeed, ethnic minority women are at special risk for excess weight and its consequences (Department of Health and Human Services [DHHS], 2002). Although large-scale epidemiological data is absent for many Hispanic subgroups, national survey data indicates that Mexican-American women are significantly more likely be categorized as either overweight or obese than non-Hispanic White women across adult age groups. Specifically, 71.7% of Mexican-American women are at least overweight, compared to 57.2% of non-Hispanic White women, and 38.4% of Mexican-American women are obese, as compared to 30.7% of non-Hispanic White women (Hedley et al., 2004). Overweight and obesity rates are most striking in middle-aged Mexican-American women, with 80.9% of such women falling in the overweight or obese range (Flegal, Ogden, & Carroll, 2004). Epidemiological data suggests that overweight and obesity may increase in this population over the next ten years. Given the current rate of growth it is

expected that approximately 47% of Mexican-American women will be obese by the year 2015 (Wang & Beydoun, 2007). In addition to high rates of overweight and obesity, Hispanic women also report lower levels of leisure-time physical activity (exercise) than any other major demographic group, with approximately half of adult Mexican-American women reporting that they never engage in leisure-time physical activity (Crespo, Keteyian, Heath, & Sempos, 1996; see reviews, Kurian & Cardarelli, 2007; Marquez, McAuley, & Overman, 2004; Neighbors, Marquez, & Marcus, 2008).

The elevated rates of overweight and obesity, along with low levels of physical activity, have been linked to a number of negative health outcomes for Hispanic women (Must et al., 1999). Currently, diabetes is twice as prevalent in Hispanic women as in non-Hispanic White women (9.9% vs. 4.5%; CDC, 2004). Projections indicate that a Hispanic woman born early this century has a one in two chance of developing type 2 diabetes mellitus during her lifetime, compared to less than a one in three chance among non-Hispanic White women (Venkat- Narayan**,** Boyle, Thompson, Sorensen, & Williamson, 2003). Along with elevated risk of renal and heart disease, Hispanic women with type 2 diabetes typically lose 10 years off their lifespan (National Institute of Diabetes and Digestive and Kidney Diseases [NIDDK], 2007; Venkat- Narayan et al., 2003). In addition to diabetes, Hispanic women are also at elevated risk for other obesity-related conditions, such as gallbladder disease (Everhart, Khare, Hill, & Maurer, 1999), gallbladder cancer (Lazcano-Ponce et al., 2001), cardiovascular disease (Teeters et al., 2007) and metabolic syndrome (Ford, Giles, & Dietz, 2002; Park et al., 2003). Thus, excess weight is a serious health concern for Hispanic women and there is dire need for researchers to investigate ways of reducing this health disparity. Given recent evidence

suggesting that Mexican-American women may be even more likely than women from other Hispanic subgroups to struggle with obesity, this issue seems especially important to examine among Mexican-American women (Bates, Acevedo-Garcia, Alegría, & Krieger, 2008).

The Effectiveness of Behavioral Obesity Treatments: Research Gaps

A great deal of research has investigated factors associated with the development of excess weight, as well as methods to help individuals achieve and maintain a healthier body size. Although genetic factors play a role in the development of excess weight, research generally has found that behavioral factors are key determinants of excess weight, including among Hispanic populations (Hill & Peters, 1998; Hill, Wyatt, Reed, & Peters, 2003; Sundquist & Winkleby, 2000). In response to evidence that obesity is influenced by modifiable environmental factors, researchers have designed a number of behaviorally-based obesity treatments associated with positive changes in diet and exercise which help individuals lose a small, but clinically significant, portion of excess weight (see review Wadden & Foster, 2000). In addition, there is some evidence that behavioral weight loss treatments may be associated with positive changes in body image (e.g., Foster, Wadden, & Vogt, 1997) and reported binge eating (see review, Stunkard, 2002).

However, despite the relative success of these programs, research has yet to systematically examine the effectiveness of these behaviorally-based weight loss treatments across ethnic minority samples. In a recent review, Powell, Calvin, and Calvin (2007) examined randomized, long-term, clinical trials of behavioral (or lifestyle) obesity treatments. Of the 12 studies they reviewed, none reported results by ethnicity and only

two reported the full ethnic breakdown of their sample (Diabetes Prevention Program Research Group, 2002; Whelton et al., 1998). Although large-scale research is absent, smaller-scale research has provided preliminary evidence that standard behavioral obesity treatments may not be equally effective or successful across all ethnic or racial groups (see review, Kumanyika, 2002). For example, research with African-American women has demonstrated that they tend have higher attrition rates, may lose weight more slowly, and may lose less total weight than non-Hispanic White clients in the same treatment (see review, Kumanyika, 2002). In fact, Chao and colleagues (2000) found that ethnic minority participants in their weight loss trial (primarily African-American) were *half* as likely to be regular session attendees as compared to White participants (Chao et al., 2000). Given the high rates of excess weight and its consequences in Hispanic women, along with the evidence that behavioral obesity treatments may not be equally effective across all populations, research on the effectiveness of behavioral obesity treatments for Hispanics is an issue of extreme clinical significance (Wadden, Brownell, & Foster, 2002).

Despite the fact that the effectiveness of standard behavioral obesity treatments with Hispanic women is yet unclear, a few researchers have modified behavioral obesity treatments with the aim of creating culturally valid obesity treatments for Hispanic women (see Table 1 for a full description of each program, including the cultural adaptation components). However, the effect of these adapted treatments has been rather limited: one behavioral treatment combined with medication (Orlistat) demonstrated weight losses roughly equal to those found in the general population literature (Poston et al., 2003), two demonstrated relatively poorer weight losses than the general population

literature (Avila & Hovell, 1994; Cousins et al., 1992) and one failed to find treatment-related effects (Poston, Haddock, Suminski, & Olvera, 2001). Thus, not only are there no data on the effectiveness of standard behavioral obesity treatments with Hispanic women, but culturally adapted behavioral programs have not yet proven efficacious.

Obesity Treatment Attrition and Hispanic Women

Low attrition rates are a key component of treatment effectiveness (see review, Keller, Gonzales, & Fleuriet, 2005). However, ethnic minority participants generally demonstrate higher attrition rates during clinical trials, including obesity trials, than majority culture participants (see review Keller et al., 2005; see review, Kumanyika, 2002). High attrition is concerning for a number of reasons. First, high attrition serves as a threat to internal validity in that individuals who are having a poor response to treatment may be less likely to remain in the study or return for follow-up. Thus, the results that influence estimates may be positively biased (see Mann et al., 2007; Powell et al., 2007). Secondly, high attrition serves as a threat to external validity as it is possible that specific participant demographic or psychosocial characteristics predict poorer treatment retention. Consequently, positive treatment effects may only generalize to a subgroup of ethnic minority participants. Finally, assuming that behavioral obesity treatments are indeed effective for ethnic minority participants, these low retention rates are problematic because success in behavioral obesity treatments is typically contingent upon treatment completion (Chao et al., 2000; Honas, Early, Fredrickson, & O'Brien, 2003).

While Hispanic women's attrition rates in standard behavioral treatments are unknown, the attrition rates reported in the four adapted treatments reviewed previously

were quite poor (see Table 1). However, it should be noted that these studies did not clearly define treatment attrition and frequently considered follow-up completion as evidence of treatment non-attrition. For example, Cousins and colleagues (1992) only reported follow-up data for the 51% of participants who remained in the study for the full 12 months (Cousins et al., 1992). Thus, almost half of participants in the study were considered treatment "non-completers" given their definition of returning for follow-up as completion (Cousins et al., 1992). No specific data on session attendance was presented in this study. Similarly, Poston and colleagues (2001) found that an approximate third (30%) of those assigned to the treatment condition had "removed themselves" from the study by six months and approximately half (47%) had done so by the 12th month of treatment. Session attendance was limited, as one-third of participants attended five or fewer (~20%) of the 26 weekly sessions. Six and 12 month follow-up rates were similarly poor (see Table 1). Most recently, Poston and colleagues (2003) implemented a combined behavioral and pharmacological treatment (Orlistat) and found similarly poor retention (see Table 1). Of the 56 participants assigned to treatment, 18 participants (32.2%) declined further participation in the study at 6 months, and an additional 5 participants (8.9%) declined further participation at 12 months. Follow-up data were not collected from the participants who declined further participation and no specific attendance data was presented (Poston et al., 2003). In contrast, one early study with a small sample (n=22) of Mexican-American women reported high retention rates (95%) during an 8-week, one hour per week weight-loss course, but less than half of participants returned for their 3-month follow-up (Avila & Hovell, 1994). Importantly,

the study defined treatment retention as simply attending the post-treatment evaluation and no data on treatment attendance was presented.

None of the above culturally-adapted studies included non-Hispanic White comparison groups, so it is impossible to know whether these attrition rates are *lower* than rates that would have been observed in majority samples assigned the identical treatment protocol. General population research indicates that obesity treatment attrition rates (along with study definitions of attrition) vary considerably, but typically approach one-third of participants in studies ranging from 10 to 26 weeks (see review, Davis & Addis, 1999). A more recent study with a general population sample demonstrated a 12-month attrition rate of 23.5% (Wadden, Berkowitz, Sarwer, Pru-Wisniewski, & Steinberg, 2001), where attrition was defined as suspending session attendance before the final session. Similarly, Gardner and colleagues (2007) reported that just over 20% of their participants did not complete the treatment protocol (Gardner et al., 2007). Thus, attrition rates noted in treatments adapted for Hispanic women (>40% at 12 months) appear higher than those found in relatively comparable and recent general population weight loss trials. As far as follow-up rates, it should be noted that the 12-month follow-up rates reported in the four culturally-adapted treatment studies were lower than follow-up rates that have been encountered at 4-5 years post-treatment in several general population behavioral weight loss treatment studies (see review Mann et al., 2007). Thus, level of participant engagement in the four obesity treatments adapted for Hispanics appears markedly low, creating a need for research to understand factors that may prevent Hispanic women from successfully completing these programs.

Factors Associated with Obesity Treatment Attrition in Hispanic Women

Despite the importance of high retention rates to treatment effectiveness, the low retention rate of ethnic minorities participating in clinical trials has received relatively little attention (see review, Keller et al., 2005). In terms of obesity treatment with Hispanic women, only two of the adapted obesity treatment studies investigated factors related to attrition. They found younger age and less education related to poorer treatment retention (Poston et al., 2001; Poston et al., 2003). Beyond demographic factors, the authors posited that participants may have faced barriers that prevented treatment participation, such as a lack of child care, transportation difficulties, the lack of available health facilities, and limited access to air-conditioned fitness facilities during summer months (Poston et al., 2001). However, no research has yet examined the role of these environmental barriers (e.g., childcare responsibilities) in obesity treatment attrition with this population. More recently, Keller and colleagues (2005) shared preliminary data on 3-day and 5-day walking clubs designed for older adult obese Hispanic women. In line with the obesity trials above, retention rates were very poor for the walking clubs, with only 44% completing the interventions. Prior to the start of the treatment program, the authors conducted focus groups to identify potential barriers to treatment completion. One of the most salient barriers noted by the participants was family obligations, in that fulfilling responsibilities to family was viewed as more important than focusing on the self. However, it should be noted that this study did not measure whether family obligations actually were related to program completion, and if so, in what manner (Keller et al., 2005).

Adherence to Caloric Reduction and Physical Activity

Treatment retention and completion of post-treatment follow-up evaluations are both important components of treatment adherence that are necessary to validly test treatment effects. An additional component of obesity treatment adherence is the completion of behavioral goals within treatment, namely meeting caloric intake and physical activity goals (see review, Wadden et al., 2002). Although three of the four culturally-adapted treatment studies reviewed (see Table 1) did report weight losses associated with treatment, they did not provide insight into what differentiated those women who adhered or did not adhere to specific aspects of the treatment protocol (e.g., reduced their caloric intake and/or increased their physical activity).

Very little is known about factors related to these aspects of obesity treatment adherence in Hispanic women. Only the most basic information regarding general correlates of dietary habits (but not specifically caloric intake) and physical activity in non-treatment seeking Hispanic samples is available. For example, there is preliminary evidence that acculturation to U.S. mainstream culture may be negatively associated with fruit, vegetable, and bean intake in Hispanic women and positively related to sugar intake (see review, Ayala, Baquero, & Klinger, 2008; Neuhouser, Thompson, Coronado, & Solomon, 2004). Other research has focused upon "food insecurity", which is defined as the limited or unstable availability of adequate food. Food insecurity is more prevalent in Hispanic families and is linked to obesity in general population samples (Townsend, Peerson, Love, Achterberg, & Murphy, 2001; United States Department of Agriculture [USDA], 2001). Two studies have linked food insecurity with obesity in Hispanic women (Adams, Grummer-Strawn & Chavez, 2003; Kaiser, Townsend, Melgar-Quiñonez, Fujii,

& Crawford, 2004). It has been suggested that the relationship between food insecurity and obesity may be mediated by an alteration in dietary habits. More specifically, food insecurity may precipitate a cycle of deprivation followed by overeating or binge eating, similar to patterns documented in human and animal models of hunger (Townsend et al., 2001). Thus, in terms of dietary habits, research has focused primarily upon acculturation level and socioeconomic indicators like food insecurity.

Much more research has examined correlates of physical activity in Hispanic women. Similar to majority population samples, socio-cognitive variables such as self-efficacy and social support for physical activity appear to be positively related to engagement in physical activity (see review, Marquez et al., 2004). Additionally, there is some evidence that Hispanic women who are less acculturated to U.S. culture may engage in less physical activity **(**Crespo, Smit, Carter-Pokras, & Andersen, 2001; see review, Marquez et al., 2004). Similarly, other researchers have presented the idea that cultural attitudes specific to Hispanic culture, including attitudes regarding healthy body sizes or family obligations, may play an important role in weight loss behaviors such as physical activity (see Diaz, Mainous, & Pope, 2007). Furthermore, a number of potential environmental barriers to physical activity for ethnic minority women have been identified (see review, Kumanyika, 2002). These include: (a) physical barriers, such as neighborhood crime, neighborhood walkability, and availability of fitness facilities; (b) economic barriers, such as the cost of gym membership or home equipment; and c) socio-cultural barriers, including lack of time due to large family size and household responsibilities. In fact, the more frequently cited reasons Hispanic women give for not engaging in physical activity include cost, lack of child care, family responsibilities, and

work schedule (see review, Eyler et al., 2002; Grassi, Gonzales, Tello, & He, 1999; King et al, 2001).

Thus, previous research has identified a myriad of variables that may relate to dietary habits and physical activity in Hispanic women. It should be noted, however, that the factors related to healthier dietary habits and physical activity engagement in non-treatment samples may not be identical to the factors that predict the completion of behavioral goals within the course of treatment. To the author's knowledge, no studies to date had examined factors that predict Hispanic women's adherence to energy intake or physical activity goals within a standard behavioral obesity treatment program (see review, Marquez et al, 2004).

Obesity Treatment Adherence and the Socio-Ecological Model

As mentioned, distinct notions have been put forth to explain the relatively high attrition rates of Hispanic women in obesity trials, their relatively low participation in physical activity, and their comparatively unhealthy dietary habits (see Diaz et al., 2007; Keller et al., 2005; Kumanyika, 2002; Marquez et al., 2004; Poston et al., 2001). These explanations have ranged from socio-cultural (e.g., lack of social support for healthy behaviors, a focus on family obligations) to economic or environmental factors (e.g., transportation issues, food insecurity, problematic neighborhood characteristics). Although previous authors often cited these factors atheoretically, these various explanations best fit under a socio-ecological framework (Stokols, 1996), a model which has been utilized to explain health behavior in ethnic minority populations (see Fleury & Lee, 2006; Yancey et al., 2004). It has been suggested previously that a socio-ecological framework may be especially applicable to ethnic minority populations, given the

economic disparities and consequent environmental barriers to healthy behaviors that they often face (Yancey et al., 2004). Moreover, utilizing a socio-ecological model avoids the sole focus upon intrapersonal factors, which may place undo blame upon ethnic minority communities for their health problems.

According to socio-ecological theory, health behavior should be viewed as "multi-level" (Stokols, 1996). Health behavior is not solely determined by individual or intrapersonal factors, but also by contextual variables, including environmental factors (e.g., socio-economic resources; Fleury & Lee, 2006) and social or cultural factors (e.g., cultural values or norms). In other words, an individual's behavior is shaped by key contextual factors that may promote or impede the implementation of health behaviors. Thus, according to a socio-ecological framework, socio-economic or environmental variables such as steady access to adequate transportation, nutritious food, or "walkable" neighborhoods may be important determinants of individual health behavior. Additionally, socio-cultural factors including acculturative status, a lack of social support for healthy behaviors, and household or family obligations may also play a role in health behaviors, in that individual health behavior is understood to be embedded within social and cultural contexts.

Obesity Treatment Adherence: Issues for Treatment Adaptation

The conflict between treatment fidelity and treatment "fit"; namely, the issue of when and how to adapt standard treatments for specific populations, is a key issue in the treatment effectiveness literature (Castro, Barrera, & Martinez, 2004). The use of ethnicity as a means by which to adapt treatment is an issue of considerable debate. Researchers who adopt an etic perspective argue that ethnicity is a mere proxy variable

for other demographic factors and as such is a meaningless variable by which to adapt treatment (see O'Donohue, 2005; Winkler, 2004). In contrast, others argue that ethnic identity, while by definition a proxy variable, does correlate with distinct sets of socioeconomic experiences, cultural beliefs, and value systems (Andrés-Hyman, Ortiz, Anez, & Davidson, 2006; Helms, Jernigan, & Maschler, 2005; Sue, 1999).

Among researchers who accept ethnicity as a valid construct upon which to base treatment adaptation, the question of how and when treatments should be adapted for specific ethnic populations is controversial. Cultural sensitivity or compatibility models hold that treatments should continually be adapted to the needs of ethnic minority populations (Bernal & Sáez-Santiago, 2006; Nagayama-Hall, 2001), since many treatments are incompatible with non-majority cultural values and thus do not adequately address the needs of many ethnic minority clients (Bernal, Bonilla, & Bellido, 1995). Although the cultural sensitivity model has received a good deal of attention, some researchers have criticized the model for not specifying the conditions under which treatments should be culturally adapted; a problem which they believe could lead to the continual propagation of indiscriminate or unsuitable adaptations (Aisenberg, 2008; Lau, 2006). The more recent heuristic framework for adaptation represents a compromise between universalist and cultural sensitivity models, as it argues that cultural adaptation should be both specific and directed (Barrera & Castro, 2006; Lau, 2006). According to this model, adaptation is only warranted under certain criteria: when an existing treatment is ineffective for a specific ethnic subgroup and/or there is evidence that this subgroup displays a unique pattern of problematic behavior (Barrera & Castro, 2006; Lau, 2006). Included in the latter requirement would be the expression of a unique pattern of risk or

protective factors for a given condition, which in turn would then indicate that the adapted treatment should make those factors treatment targets (Barrera & Castro, 2006; Lau, 2006).

It has been noted that the scientific rigor of attempts to adapt treatments for specific populations has been limited and often falls below the standard set in the field for developing and establishing empirically-supported treatments (Aisenberg, 2008). Many adaptations consist of ostensibly appropriate but non-empirically-derived alterations (e.g., translating treatment manuals, including ethnic minority therapists, including modules on "culturally relevant" materials; Aisenberg, 2008; Bernal, Jimenez-Chafey, & Rodriguez, 2009). As noted previously, researchers have attempted to adapt obesity treatments for Hispanic women with only moderate success. One possible explanation for the relatively poor performance of these adapted obesity treatments is that these programs failed to fully integrate relevant research findings. In other words, these adaptations were made without first investigating factors that may either promote or impede success in obesity treatment for Hispanic women. As noted above, it has recently been argued that cultural adaptation should be a selective, data-driven process based upon empirical findings with the population of interest (Barrera & Castro, 2006; Lau, 2006). Understanding factors that predict obesity treatment adherence in ethnic minority populations may help researchers identify specific means of adapting treatment for these populations, if and when such adaptation is deemed necessary (Barrera & Castro, 2006; Lau, 2006).

The Current Study

The current study explored factors related to obesity treatment adherence in a socio-economically diverse sample of 100 Mexican-American women enrolled in a

standard 16-week behavioral obesity treatment program. In addition to providing basic data on rates of treatment adherence, the current study had the following two goals: chiefly, 1) to identify factors that predict adherence to standard obesity treatment; and secondarily 2) to present preliminary evidence on the effectiveness of a standard obesity treatment with a Mexican-American sample.

As per the first and primary goal, a socio-ecological model informed the selection of socio-cultural and environmental factors hypothesized to relate to treatment adherence. The current study's independent variables were selected based upon two criteria: 1) They were factors identified as potential barriers to adherence in previous obesity treatment studies with Hispanic women; or 2) They were factors previously associated with dietary patterns and/or physical activity levels in non-treatment seeking Hispanic female samples. Additionally, a valid and reliable method for measuring each variable was required. Treatment retention, the completion of physical activity goals, and the attainment of caloric intake goals served as the dependent measures of treatment adherence. Treatment retention was operationalized both dichotomously (completion versus non-completion) and continuously (treatment "dose").

It should be noted that the study author chose to specifically focus on a single Hispanic subgroup: Mexican-American women. This decision was made for the following reasons: 1) Mexican-origin Hispanics comprise the largest U.S. subgroup of Hispanic origin individuals (64 %; Census, 2006); 2) U.S. epidemiological data on obesity and its consequences typically has focused on Mexican-origin Hispanics, making work with this population especially relevant (Flegal et al., 2004; Hedley et al., 2004); 3) Preliminary evidence suggests that Mexican-American women may be more likely to be

overweight than those from other Hispanic subgroups (Bates et al.,2008); and 4) Hispanic cultures are heterogenous, and a broader focus might limit the extent to which study results would generalize to the health-related behaviors of any particular subgroup (Neighbors et al., 2008).

It should be further noted that the current study took an emic, or a within-group, rather than an etic, or between-group perspective to exploring adherence (see Azibo, 1992). The current study examined factors *within* a sample of Mexican-American women that potentially could relate to adherence based upon three assumptions: 1) Mexican-American ethnicity is correlated with specific socio-cultural values and economic experiences; 2) There should be variation within Mexican-Americans in terms of those values and experiences; and 3) Variation in those values and experiences may relate to obesity treatment adherence within Mexican-American populations (see Azibo, 1992). Thus, the focus of the current study was not in demonstrating that the independent variables of interest were *more* important in explaining adherence for Mexican-Americans than for members of other ethnic groups, but merely that these factors may be predictive of adherence *within* this ethnic group. One advantage of the less common emic approach is that it acknowledges the heterogeneity of ethnic groups and does not limit such heterogeneity by using ethnicity itself as an independent variable (Azibo, 1992; Sue, 1999). Additionally, the emic approach allows one to focus upon factors (e.g., cultural values) that may be specific to an ethnic group. In contrast, an etic, or ethnic comparative framework, would have been problematic as it is unclear what group or groups (e.g., a general population sample, non-Hispanic White women, or an ethnic minority sample) would have served as an adequate comparison group in the current study (Sue, 1999).

Finally, a comparative approach is only warranted if all the constructs of interest have been demonstrated to be conceptually equivalent across the comparison groups, which was not the case in the current study (Azibo, 1992).

Hypotheses of the Current Study

As stated, the primary goal of the current study was to examine factors that predicted obesity treatment adherence in a sample of Mexican-American women. Given the author's utilization of a socio-ecological framework, the focus of the current design was on socio-cultural and environmental factors associated with treatment adherence, rather than on intrapersonal factors. The hypotheses were as follows:

1) As previous researchers have suggested that family obligations may serve as a barrier for Hispanic women in enacting new behaviors (e.g., Keller et al., 2005) the first set of hypotheses was that familism (a measure of family orientation) and hours spent on household/childcare responsibilities would each be negatively associated with: a) treatment dose (i.e., number of sessions) received; b) treatment completion; c) reported step (physical activity) goals met; and d) reported caloric intake goals met.

2) Given the evidence that acculturation level may be associated with both a healthier diet (Neuhouser et al., 2004) and more restricted physical activity (see review, Marquez et al., 2004), a measure of ethnic identity would be positively associated with reported caloric goals met and negatively associated with reported step (physical activity) goals met.

3) Given evidence that social support for health-related behaviors may predict their frequency in this population (see review, Marquez et al., 2004) and that family influence may be an important determinant of health-related behavior for this population

(e.g., see review, Keller et al., 2005), it was expected that family support for healthy eating behaviors would predict reported calorie reduction goals met, and family support for physical activity would predict reported step goals met.

4) Based upon the suggestion that negative neighborhood characteristics may be a barrier to physical activity for Hispanic women (e.g., see Kumanyika et al., 2002), it was believed that a measure of neighborhood satisfaction would be positively associated with reported step goals met.

5) Given the suggestion that lack of transportation may impede some Hispanic women from participating in clinical trials (e.g., Poston, 2001), it was expected that transportation reliability would be related to treatment dosage and treatment completion. More specifically, the number of missed appointment/events in the last month due to unavailable transportation would be negatively associated with treatment dosage and completion.

6) Finally, given the suggestion that food insecurity may be associated with periodic overeating (Townsend et al., 2001), women who were food insecure would make fewer of their reported calorie reduction goals, but not fewer reported step goals, than women who were food secure.

In addition to the above hypotheses regarding treatment adherence, it also was expected that the selected environmental variables would serve as proximal measures of participant socio-economic status. In particular, it was expected that participant income would be positively related to perceived neighborhood quality and negatively related to transportation inadequacy. Food insecurity also was expected to negatively relate to income.

Given the current study's focus on treatment adherence, it was critical to confirm that treatment adherence was indeed associated with treatment outcome in the sample population. Accordingly, anthropometric measures, as well as measures of body image, depression symptoms, and self-reported binge eating were compared from baseline to post-treatment for women who completed the attendance requirements for the program. That is, the author examined treatment outcome under the condition of treatment adherence. This outcome analysis also allowed for a preliminary investigation regarding the effectiveness of a behavioral obesity treatment with this population, which was the secondary goal of the current study.

Thus, in line with the secondary goal of the current study, the hypotheses were as follows:

7) Treatment "completers," defined as individuals who completed more than half of the treatment sessions (see Perri, Martin, Leermakers, Sears, & Noteloivtz, 1997), would demonstrate significant pre- to post-treatment reductions in body weight, waist-to-hip ratio, body image discrepancy, body dissatisfaction, depression symptoms, and self-reported binge eating.

In addition, to further explore the relationship between treatment adherence and outcome, the relationship between the continuous measures of adherence (attendance and goal completion) and treatment outcome was examined. The hypothesis was as follows:

8) Treatment attendance would predict weight loss and waist-to-hip ratio reduction, which would be mediated by the combined number of reported step and caloric intake goals met.

Along with quantitative data, the current study also collected qualitative feedback about the program by conducting short focus groups with participants during their final group meeting (see Diaz et al., 2007). The qualitative data will be presented in a future report.

Method

Participants

This study enrolled a community sample of Mexican-American women from the greater Albuquerque, New Mexico area. Initial eligibility was determined with a phone screen. In order to participate in the study, participants had to be 18 to 65 years old and have a BMI ≥ 25 and ≤ 40. A BMI of 40 was chosen as an upper limit as such individuals typically experience serious medical complications related to their weight, which may impede their ability to safely complete a weight management program and the recommended physical activity (see review, Wadden & Osei, 2002). Women were considered Mexican-American if they self-identified as being of Mexican heritage, that is, identifying with heritage originating in the current or former territories of Mexico (e.g., Mexican, Mexican-American, or Chicana heritage; see Avila & Hovell, 1994). Given that the treatment took place in English, women had to be able to speak and read English proficiently. It should be noted that although 41.6% of Albuquerque residents identify as Hispanic, only 7.5% identify as Spanish monolinguals (Census, 2000). Thus, the majority of Hispanics in the region speak English proficiently and this was not expected to be a major barrier to participation.

In terms of exclusionary criteria, women could not be pregnant or seeking to become pregnant in the six months subsequent to the phone interview. Women who planned to move more than 50 miles from Albuquerque in the six months subsequent to the phone interview were also excluded from the study. Additionally, women had to agree to exclude themselves from other weight loss programs and to refrain from non-prescription weight loss aides or medications if and when they began treatment. All

women were given the Physical Activity Readiness Questionnaire (PAR-Q), a screening measure which assesses risk of increasing physical activity (see Brownell, 2004). Women who answered "yes" to any of the PAR-Q questions or who had a diagnosis of diabetes needed a letter of clearance from a medical professional before participating in the treatment. Additionally, it was stipulated that women who were specifically informed by a physician that they could not safely engage in aerobic exercise would be excluded.

In total, 192 individuals contacted the researcher with an interest in participating in the current study (see below for additional details of the phone eligibility interview). Of those, 59 (30.73%) were deemed ineligible. The exclusionary criteria met were BMI>40 (n=34), not of Mexican heritage (n=15), BMI<25 (n=5), >65 years old (n=1), non-female (n=1), use of over the counter weight loss aide (n=1), non-English speaker (n=1), and domicile >50 miles from Albuquerque area (n=1). In addition to the 59 individuals found ineligible, five individuals contacted the researcher but indicated that they had time conflicts that made participating during the open hours of the study site (a community health center) unfeasible. In terms of medical contraindications, no individuals reported that a physician had deemed them unfit for physical activity, but 26 (20.31%) reported a medical condition on the PAR-Q that necessitated medical permission before beginning the treatment program. The reported conditions included high blood pressure/heart medication prescription (n=19), diabetes mellitus (n=6), dizziness (n=2), and bone/joint problems that might worsen with physical activity (n=2).

All 128 potential participants scheduled an appointment for the pretreatment assessment (see below for additional details). Twenty-three women did not attend their scheduled pre-treatment assessment and five deemed eligible by phone interview

presented for their assessment but were excluded due to a BMI>40. Thus, a total of 100 women completed their pre-treatment assessment and were enrolled in treatment. Of the 100 women who completed their assessment, 18% required medical permission for the program and received such permission from their physician. The medical conditions reported by women enrolled included use of high blood pressure/heart medication (n=14), diabetes mellitus (n=5), dizziness (n=2), and bone/joint problems that might worsen with physical activity (n=2). See Figure 1 for study CONSORT diagram.

Procedure

Recruitment strategy. This study took place at New Heart, a non-profit, community cardiovascular health center in downtown Albuquerque. This center was chosen for its location in a primarily Hispanic neighborhood. Participants were recruited for the study via flyers and advertisements in local periodicals. Flyers were placed in residential neighborhoods and posted in areas such as apartment complexes, schools, supermarkets, and small businesses. As many of the independent variables of interest in the current study were related to socio-economic status (e.g., food insecurity), advertisements were posted in both more and less affluent neighborhoods in Albuquerque and environs. The flyer and periodical advertisements described the weight-loss/ lifestyle intervention study for Mexican-American/Chicana women and asked interested participants to contact the researcher via phone (see Figures 2 & 3). In addition to the study's use of flyers for recruitment, the study made an online posting in the University of New Mexico Mexican-American student listserv regarding the current study, and included the study's toll-free number.

Eligibility determination and pre-treatment assessment. Participants who contacted the researcher were invited to complete an eligibility interview, the PAR-Q measure, and a demographic interview by phone. English language ability was determined by self-report during the phone interview and was defined as a response of "speak well" or "speak it very well" for English language ability during the demographic interview. Individuals who were ineligible for medical reasons (e.g., BMI≥40) were advised to contact a medical professional before attempting a weight loss program. Individuals ineligible for non-medical reasons (e.g., not of Mexican heritage) were referred to the self-help treatment manual utilized in the current study.

Individuals who appeared eligible for participation on the basis of the phone interview were asked to schedule an appointment for a pre-treatment assessment at the New Heart Center. Individuals eligible for participation pending medical clearance (e.g., diabetes mellitus diagnosis) were allowed to schedule the pre-treatment assessment once their medical clearance letter was obtained. Before completing their pre-treatment assessment, participants were asked to give written informed consent. During the consent process women were informed of the study details in both written and verbal formats, and questions and concerns about the study were addressed. In addition, all participants were informed of the protected status of health information and asked to review and sign the University of New Mexico Psychology Clinic HIPPA document. The pre-treatment assessment was conducted by the principal researcher or a trained assistant, and consisted of anthropometric measurements, written measures, and an interview.

Treatment protocol. Participants who gave informed consent and completed the pre-treatment assessment (n=100) were enrolled in the treatment. The treatment took

place in groups of 6 to 16 participants who met for 16 weekly meetings lasting approximately 1 hour each (see Andersen et al., 1999). New groups were started once 15 eligible participants completed the pre-treatment evaluation. Ongoing groups were closed to new participants. The treatment sessions were led by the principal researcher, who is of Mexican heritage. In addition, four clinical psychology graduate student co-facilitators also helped the principal researcher lead the groups. All participants were assigned to the same treatment condition and completed the identical treatment protocol. The principal investigator and co-therapists met for regular session review and supervision with a licensed psychologist with expertise in the protocol area.

Each session followed the LEARN (Lifestyle, Exercise, Attitude, Relationships, and Nutrition) treatment manual, which consists of 12 lessons (Brownell, 2004). During the first session, participants were introduced to the LEARN program and were given guidelines for participating in the group. They also were given a copy of the LEARN treatment manual along with a YAMAX “digiwalker” pedometer, which they practiced using in session. As guided by a worksheet in the first chapter of the LEARN manual, the first session also had participants introduce themselves and their motivation for changing their lifestyle.

The next 12 sessions followed the LEARN treatment manual’s weekly lessons. Each week the session therapist(s) followed a weekly written session outline based on the LEARN manual chapter assigned that week. Topics during the 12 weeks focused on providing nutritional and fitness information along with learning basic behavioral strategies and techniques (e.g., calorie monitoring, stimulus control, problem solving, and behavioral chaining) to modify lifestyle behaviors. In addition, more general issues of

concern for individuals struggling with their weight, such as developing a more positive body image and addressing stress, were addressed in treatment. After completing the 12 weekly lessons, the subsequent two weeks were used to complete any lesson material not yet addressed, review past material as appropriate, and continue practice of acquired behavioral skills. These final two weeks additionally focused on maintenance of lifestyle changes and "relapse prevention."

The final session began with anthropometric measures and paper/pencil post-treatment assessments, and then gave participants a chance to give feedback regarding the program in an audio-taped focus group format. Participants at all levels of attendance were sent reminder notices and contacted by phone prior to the final session. If participants were unable to attend the pre-scheduled final session, the researcher offered to schedule a session at their convenience; 40.98% of women elected to schedule the final session on their own. Participants were paid $40 at the last session for their post-treatment evaluation and feedback.

Protocol definition of goal completion. As part of the LEARN program, participants were asked to use their pedometer and to monitor their steps in a daily diary. Participants were given the goal to walk at least 4000 steps per day starting in the third week, and were asked to increase steps by 200 steps daily (or 1400 steps weekly) starting in weeks # 4-12. Although individuals are allowed to set individualized walking goals in LEARN, meeting or exceeding LEARN's pre-selected goals (e.g., 4200 steps per day in the fourth week) was the definition of goal completion in the current treatment protocol. It should be noted that YAMAX digiwalker pedometers were selected to help participants

monitor their activity as this model is one of the most accurate and validated, and is widely used in scientific research (see Schneider, Crouter, Lukajic, & Bassett, 2003).

In addition to monitoring steps, LEARN participants are asked to monitor their calories daily, and to set a daily caloric goal beginning in week #3. LEARN allows individuals to set individualized caloric goals each week. However, given that individualized caloric need calculations are often inaccurate (see review, Wadden & Osei, 2002), the LEARN program has specific guidelines for participants (see Brownell, 2004). LEARN has designated 1200 calories per day as the most safe, reasonable, and effective goal for female participants, and a range of 1000 to 1500 calories as a more flexible, but still safe, alternative goal (Brownell, 2004). Thus, meeting the daily caloric goal in the current study was defined as eating between 1000 and 1500 calories per day.

At the beginning of each session, the therapist(s) reviewed participant progress on logs and assisted participants in completing calorie counts as necessary. To monitor treatment adherence to step and calorie goals, participants were asked to hand their logs to the therapist in weeks # 4-12. Each weekly log contained separate forms for each day of the week and these goals were monitored for 10 weeks, or a total of 70 days. If participants missed a session, they were allowed to turn in the log for the missed week during the next treatment session. Participants also were allowed to email, fax, or drop off their missing logs within the first week it was overdue. Any log that was more than one week overdue was counted as a failure to meet caloric and pedometer goals for that week. In addition, any log day that was incomplete was counted as a failure to meet the goal for that day (Wadden et al., 2001). For step goals, a complete log was defined as a log that contained the specific number of steps completed for that date in numerical

format (e.g., "4701 steps"). For caloric goal completion, completion was defined as a log that contained the number of calories for each food item consumed that day and/or a grand total of calories consumed that day stated in numerical format.

In addition to collecting logs, treatment attendance was monitored on a weekly basis for the 16 treatment sessions. All participants were contacted by phone after their first and second missed sessions, and as noted, before the final treatment session by both phone and mail. Treatment non-completion (attrition) was defined as attending half or less than half of the treatment sessions (≤8 sessions; see Perri et al., 1997).

Protection of participants. A number of steps were taken to protect participant confidentiality to the greatest extent possible and to minimize risk of harm to participants. At the first session, all participants were asked to sign a document stating that they would uphold the confidentiality of their fellow group members. The group members were informed that this document was no guarantee that their confidentiality would be upheld and that loss of confidentiality was a risk of participating in the treatment. Although participants were asked to monitor their calories, steps taken, and weight as part of the LEARN program, the therapists did not share this information with the other group members. Additionally, all client data were kept in a locked file cabinet in a locked room at the University of New Mexico.

Furthermore, all participants were informed that there is inherent risk in changing their lifestyle habits. They were informed of the signs of cardiac distress and told to contact emergency services in the event that they experienced those symptoms. Referrals to mental health professionals also were made if and when they were appropriate. As per the protocol, if participants appeared to be engaging in unhealthy diet behavior (as

indicated in their logs) or reported symptoms of serious depression, the researcher would inform the participant of local treatment options. During the course of treatment two women were referred for outpatient mental health services for depressed mood. Due to the wait time for obtaining outpatient services, neither of these women started their psychological treatment until after their LEARN sessions had ended.

Measures

All measures were administered in English and presented in randomized order for each participant. Efforts were made to select measures that had been utilized previously with Hispanic and/or Mexican-American samples. All the measures listed below were given during the pre-treatment evaluation. The post-treatment evaluation consisted of only the anthropometric measures and the psychological symptom measures (the measure of binge eating, the two measures of body image, and the depression symptoms measure).

Socio-economic and environmental characteristic measures.

Demographic interview. The interview and supplementary questions were given at intake and contained questions regarding participants' ethnic background, languages spoken, educational background, and current income. This questionnaire also had questions related to the participant's current occupational status and living arrangement. Questions regarding family size, New Mexican heritage, and transportation access were added to the standard form. This questionnaire was given in order to obtain basic background information about participants and obtain participant contact information (i.e., name and address). This personally identifying information was stored separately from the remaining demographic questions and was used to contact participants.

The MacArthur Scale of Subjective Social Status (Adler, Epel, Castellazzo, & Ickovics, 2000). In order to gain additional insight as to participants' perceived social status, participants were given the MacArthur Scale of Subjective Social Status. Subjective social status is a strong predictor of health status (e.g., Singh-Manoux, Marmot, & Adler, 2005). The MacArthur Scale of Subjective Social Status asks participants to indicate their subjective social standing on a pictorial ladder. The ladder is composed of 10 rungs; the bottom rung represents the lowest level of social standing and the top rung the highest level of social standing. Participants rank their social standing compared to all other Americans (socio-economic status) on one ladder and compared to others in their community on a second ladder (community status). The measure is scored from 1 (lowest rung) to 10 (highest rung) for each of the two social standing ratings. The MacArthur Scale of Subjective Social Status has been utilized with diverse populations, including U.S. Hispanics (Ostrove, Adler, Kuppermann & Washington, 2000). Although the MacArthur Scale of Subjective Social Status has been linked to a number of health outcomes, there is only limited data on the reliability and validity of these scales. A recent design did demonstrate that the socio-economic status ladder rating does correlate with other measures of objective socio-economic status (Singh-Manoux et al., 2005).

Neighborhood Environment Walkability Scale (NEWS; Saelens, Sallis, Black, & Chen, 2003). This 83-item scale has individuals rate their neighborhood on various characteristics related to walkability, including residential density, land-use diversity, access to services, neighborhood connectivity (facility of traveling between neighborhood areas), perception of walking/cycling areas, neighborhood aesthetics, safety from traffic, and safety from crime. Each scale is calculated separately. The residential density scale

asks participants to quantify various residence types in their neighborhood (e.g., number of single-family detached homes) on a Likert scale ranging from none to all. Scores are calculated using various weights for each residence type, with higher scores denoting higher density. For the land-use diversity subscale, participants are asked to rate the walking distance between their home and 23 types of facilities and services (e.g., post office, park). Participants choose between the following: "1-5 minutes," "6-10 minutes," "11-20 minutes," "21-30 minutes," "31+ minutes," or "I don't know." Items are scored in reverse order. Higher scores denote greater land-use diversity, which is thought to be a measure of better neighborhood walkability. The response "I don't know" is scored as "31+ minutes" as the measure authors presumed that such responses denoted that services were likely far away. The remaining NEWS subscales are scored on a 4 point Likert scale ranging from "strongly disagree" to "strongly agree," with higher scores denoting greater walkability.

In addition to the above subscales, participants also rate the overall quality of their neighborhood on a 17-item general neighborhood satisfaction subscale. This subscale score was the focus of the current study**.** Participants use a scale from 1 (strongly dissatisfied) to 5 (strongly satisfied) to describe their satisfaction with various neighborhood characteristics. Higher scores equal greater neighborhood satisfaction. The neighborhood satisfaction subscale contains items which reflect the participant's perception of the following characteristics of the neighborhood: ease of walking, connectivity, crime and traffic, and social environment. Test–retest reliabilities of this measure's subscales are moderate to high (Saelens et al., 2003). This measure's subscales also correlate with neighborhood rates of obesity and physical activity in general population samples

(Saelens et al., 2003). In the current study, the general neighborhood satisfaction scale achieved an adequate Cronbach's α of .83.

U.S. Department of Agriculture Food Security Scale-Adult (USDA, 2006). This 10-item measure is delivered in interview format (see Kaiser et al., 2004). Each of the ten items describes various manifestations of limited access to food, or "food insecure conditions" (e.g., "The food that we bought just didn't last and we didn't have money to get more"). The following responses represent feelings of food insecurity: selecting "often" or "sometimes" for questions 1-3, "yes" for questions 4-9 and "almost every month" or "some months but not every month" for question 10. Scores are summed across the ten food insecure condition items to classify women in one of three dichotomous categories: food secure, low food security, or very low food security. Households are classified as food secure if they report ≤2 food-insecure conditions. They are classified as low food security if they report 3-5 food insecure conditions and very low food security if they endorse ≥ 6 food insecure conditions. Individuals who meet the above criteria for either low or very low food security are further categorized as "food insecure." This 10-item measure has been found to relate to excess weight prevalence in Hispanic women (Kaiser et al., 2004). In the current study, this scale achieved adequate inter-item reliability (Cronbach's α=88).

United Kingdom Time Use Survey: Adult One Day Diary (British Office for National Statistics, 2002). Given that the U.S. time use survey was not available for public use, the current study utilized a time use survey designed for the British government. This diary measures an individual's time use over a 24-hour period. All daily activities are recorded in 10-minute intervals for the entire 24-hour period. For the

current study, participants retrospectively recorded their activities for the last full weekday. As per the measure instructions, for each activity in which participants are engaged (e.g., making dinner), they are asked if they were doing any other activities simultaneously (e.g., watching the television). The first activity mentioned is defined by the measure as their primary activity and the simultaneous activity is defined as their secondary activity. As with other brief time use measures, psychometric data were not available.

Activities were categorized using the British Office for National Statistics system. In accord with the focus of the current study on childcare and household duties as time barriers, time diaries were coded for those activities which fell under the British Office for National Statistics code of "Household and Family Care." The Household and Family Care code contains the following categories of activities: food management (e.g., cooking), household upkeep (e.g., vacuuming), making and caring for textiles (e.g., ironing), gardening and pet care (e.g., feeding dog), construction and repairs (e.g., fixing garbage disposal), shopping and services (e.g., buying groceries), household management (e.g., paying bills), childcare of own household (e.g., helping child with homework), and help to an adult of own household (e.g., giving partner their medicine). In addition, in order to capture time that participants spent caring for non-household family members, the study also categorized any time spent in direct care for non-household child or adult family members (e.g., feeding granddaughter, helping elderly mother get dressed) in the category of "Household and Family Care." Total time spent on household duties, child care or non-household child/adult care was summed in 10 minute increments for each participant for the 24-hour period.

Socio-cultural and social support measures.

The Scale of Ethnic Experiences (SEE; Malcarne, Chavira, Fernandez, & Liu, 2006). This 32-item measure examines four constructs (ethnic identity, perceived discrimination, mainstream comfort, and social affiliation) that are associated with the process of acculturation. Participants rate their agreement with various statements related to ethnicity (e.g., "Holidays related to my ethnicity are not very important to me") and check one of five boxes ranging from strongly agree to strongly disagree. The measure also obtains information on participant ethnic background and generational status and is designed for use across various ethnic groups. Higher scores on each subscale indicate higher agreement with subscale items (e.g., greater ethnic identity, perceived discrimination, mainstream comfort, or social affiliation). The ethnic identity subscale, which was used as the measure of acculturation in the current study, assesses the extent to which an individual is engaged in the activities of their culture and experiences ethnic pride (e.g., "Being a member of my ethnic group is an important part of who I am"). The SEE scale has demonstrated concurrent validity with other measures of acculturation and achieves adequate inter-item reliability with ethnically diverse samples (Malcarne et al., 2006). In the current study all the SEE subscales, including the ethnic identity subscale, achieved adequate inter-item reliability (Cronbach's α=.77-.86)

Attitudinal Familism Scale (AFS; Steidel & Contreras, 2003). This 18-item measure was developed to examine attitudes regarding obligation to one's family or the "normative commitment of family members to the family and to family relationships, which supersedes attention to the individual" (Steidel & Contereas, 2003, p.313). Responses are given on a 10-point Likert scale with anchors of one (completely disagree)

and 10 (completely agree). Scores range from 18 to 180, with higher scores denoting increased levels of attitudinal familism. This scale also is comprised of four discrete subscales: familial support, familial interconnectedness, familial honor, and subjugation of self for family. However, only the overall familism score was examined in the current design. The original validity analyses with a U.S. Latino population (Steidel & Contereas, 2003) demonstrated that this scale negatively correlates with acculturative status, and that it has adequate inter-item reliability. With the current sample, the overall measure achieved adequate inter-item reliability (Cronbach's α= .88).

Social Support Surveys for Diet and Exercise Behaviors (Sallis, Grossman, Pinski, Patterson, & Nader, 1987). This 23-item measure; an abbreviated version of the original scale developed by its first author (Sallis), examines social support from friends and family for healthy eating habits and physical activity. Participants are asked to mark on a five-point Likert scale (ranging from none to very often) how often family members have engaged in various behaviors related to the participant's diet and exercise. In terms of healthy eating habits, the scale is divided into encouragement and discouragement for healthy eating habits. In terms of physical activity, the measure includes a scale of mutual participation in exercise. The scale also includes an optional scale of rewards/punishments for physical activity, or the extent to which friends and families provide contingencies for physical activity. Higher scores on each subscale denote that family members or friends engage in such behaviors (e.g., encouragement of healthy eating habits) on a more frequent basis. The abbreviated version of this scale, which was utilized previously with treatment-seeking overweight populations, achieved adequate inter-item reliability (Teixeira et al., 2004). All subscales, with the exception of the

optional scale of rewards/punishments for physical activity, achieved at least adequate inter-item reliability in the current design (Cronbach's α =.75-.92).

Psychological symptom measures.

Binge Eating Scale* (*BES; Gormally, Black, Daston, & Rardin, 1982). This 16-item measure examines characteristics of binge eating. The BES is not considered a diagnostic scale, but instead a screening measure (see Celio, Wilfley, Crow, Mitchell, & Walsh, 2004). Half of the BES questions focus on behavioral manifestations of binge eating and half upon internal experiences of binge eating. Items contain three to four patterns of eating behavior, and participants select the item which most closely represents their own eating pattern. Each item subsequently is scored from 0-3, with higher scores denoting symptoms consistent with binge eating. Total scores range from 0 to 46. Scores > 17 indicate the possible presence of binge eating patterns and scores ≥ 27 denote serious levels of binge eating (Gormally et al., 1982). This scale was originally validated with an overweight sample and is commonly utilized with overweight and obese participants (Gormally et al., 1982). The scale has evidence of convergent validity with independent rater estimates of binge eating symptoms (Gormally et al., 1982). This measure achieved adequate inter-item reliability in the current study (Cronbach's α= .85).

Figure Rating Scale (FRS). This measure consists of nine figure drawings which range from severely underweight (1) to severely overweight (9). Participants select their actual and ideal body sizes. Discrepancy scores are calculated by subtracting each participant's ideal body size from her actual body size. The discrepancy score serves as a measure of body size dissatisfaction. The FRS has been utilized in a number of studies

with Hispanic samples (e.g., Cachelin, Monreal, & Juarez, 2006) and demonstrates adequate test-retest reliability and concurrent validity (Thompson & Atalbe, 1991).

The Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987). This 34-item measure of general body dissatisfaction has participants rate their dislike of various body parts on a scale from one (never) to six (always). A representative item is, "Have you worried about other people seeing rolls of fat around your waist or stomach?". Participants can obtain scores from 34 to 204, with higher scores indicating greater body dissatisfaction. Previous work has indicated that this measure has good concurrent validity with alternate measures of body dissatisfaction and known-groups validity (Cooper et al., 1987). In the current study, this measure achieved a Cronbach's α of .95.

Beck depression inventory-II (BDI-II; Beck, Steer, & Brown, 1996). This 21-item measure examines cognitive, affective, and physical symptoms of depression. Each item contains four possible response patterns, and participants select the response that best fits their experience for the last two weeks. Items are scored from 0-3, with higher scores denoting symptoms more consistent with depression. Total scores range from 0 to 63. Scores between 14 and 19 denote mild symptoms of depression and scores above the cutoff of 20 typically denote clinically significant symptoms of depression. The BDI-II demonstrates adequate test-retest reliability and convergent validity with other measures of depression (Beck et al., 1996). The BDI-II achieved high inter-item reliability with the current sample (Cronbach's α=.91).

Anthropometric measures.

Measurement of participant anthropometric characteristics. Participant height and weight were measured using a single physician's standing scale. BMI was calculated using the formula: weight in kilograms/height in meters^2. The principal researcher or a trained research assistant also measured waist width and hip width with a measuring tape. Waist circumference was measured at the smallest part of the waist, and hip circumference was measured at the largest part of the hips. Three measurements were taken of each body part to the closest 1/10th of an inch and averaged together to ensure accuracy of measurement (see Avila & Hovell, 1994). Waist-to-hip ratio was calculated as waist circumference in centimeters/hip circumference in centimeters.

Qualitative measures.

Focus group interview. Using a focus group format during the final treatment session, participants were asked a series of open-ended questions regarding the treatment program. All responses were audiotaped. Participants were asked: 1) What were your favorite parts of the program? 2) What were your least favorite parts of the program? 3) What made it easier for you to complete your daily steps? 4) What made it harder for you to complete your daily steps? 5) What made it easier for you to make changes to your diet? 6) What made it harder for you to make changes to your diet? 7) What made it harder for you to attend the sessions? 8) What made it easier for you to attend the sessions? 9) What about this program fit with your Mexican-American/Chicana culture? 10) What about this program did not fit with your Mexican-American/Chicana culture?

Results

Participant Characteristics

Socio-demographic characteristics. As indicated by the client demographic questionnaire, participants had a mean age of approximately 45 years and ranged in age from 20 to 65 (see Table 2 for full sample characteristics). The majority of the sample (56%) was currently married. Most participants (89%) identified as mothers, and on average participants had two children (*M*=1.97, *SD*=1.14). Over half of the participants (53%) reported that they had a child currently living at home (*M*=0.96, *SD*=1.08). Children living at home had a mean age of 11.67 (*SD*=5.77) and ranged in age from 4 months to 28 years.

In terms of current employment, over half the sample was employed full-time (54%) or employed part-time (less than 40 hours; 16%). The remaining individuals were retirees (12%), homemakers (7%), or unemployed (11%). Thus, 70% of participants held outside employment at the time of the assessment. In order to better understand participants' employment status, participants' occupations were coded into broad categories based upon the Bureau of Labor Statistics Standard Occupational Code classification system (Bureau of Labor Statistics, 2009). In the case of participants who were not currently employed but who did at one time work, their *primary* past occupation was measured. Of the 89 women who reported a current or former occupation, the most common occupation categories were office/administrative support positions (e.g., receptionist), education/training positions (e.g., school teacher), sales and related occupations (e.g., cashier), and health care support occupations (e.g., medical assistant); (see Table 3 for complete frequency of participant occupations).

The sample reported a median household income of $44,000, which reflects the median household income for Bernalillo County ($46,988; Census, 2010). The sample's household income was quite variable and ranged from no reported household income (i.e., participant received student loans) to $160,000 per year. In terms of the distribution of income levels, the lowest income tercile of the sample reported a household income ≤ $30,000 and the highest income tercile reported a household income ≥ $70,000. In addition to the above measures of objective social status, the participants also reported their perceived social status in the United States and in their own community on the MacArthur Scale of Subjective Social Status. Participants selected an intermediate social status on the U.S. status ladder (*M*=5.29; *SD*=1.70; Range 1-9) and a slightly higher rung on the community ladder (*M*=6.02; *SD*=2.12; Range 1-9).

Ethnic identity. As stated, women had to identify as Mexican, Mexican-American, or Chicana in the phone interview to be eligible for the current study. It should be noted that most of the participants in the current study identified as "Mexican-American" or "Chicana" (92%) rather than "Mexican" (8%). Moreover, 73% reported third generation or greater U.S. residential status (e.g., grandparent or earlier ancestor was born in a Mexican territory). In terms of New Mexican heritage, 42% of the women reported that both of their parents were of New Mexican heritage and an additional 15% reported that one (but not both) of their parents was of New Mexican heritage. Although all women in the study primarily identified with their Mexican/Mexican-American/Chicana heritage, 25% of participants reported that they were of mixed cultural heritage. In particular, women reported co-identification with Native American tribal heritage (13%), European heritage (includes Spanish-American; 13%), African-American

heritage (1%), and Chinese-American heritage (1%). In terms of language, half the sample (50%) spoke Spanish well or very well. In addition, nearly a third of women (29%) reported that Spanish was their first language. Finally, as for acculturative status, women reported an ethnic identity subscale score on the Scale of Ethnic Experience that approximated that found in the original validation study (*M*=3.67; *SD*=.62).

Baseline anthropometric and psychological characteristics. Sample women ranged from overweight (BMI=25.08) to obese (BMI=39.97) in body weight. In terms of body image discrepancy, women reported wanting a body size approximately three silhouette sizes smaller than their current body size (see Table 4). In addition, women reported high levels of body dissatisfaction on the BSQ measure (*M*= 116.46, *SD*=29.97) as compared to community norms (*M*= 81.5, *SD*=28.40; Cooper et al., 1987). A large number of women (41%) reported symptoms consistent with binge eating on the BES and over a third of women (39%) reported at least mild symptoms of depression on the BDI-II (see Table 4 for remaining baseline variables).

Environmental characteristics and income. In addition to socio-demographic and ethnic measures, data were collected on participant food security, neighborhood characteristics, and transportation adequacy. In terms of food security, an examination of scores revealed that in the last 12 months almost one third of participants (32%) reported experiencing at least one food insecure condition on the U.S. Department of Agriculture Food Security Scale-Adult. In particular, 14% of women reported conditions denoting low (3-5 food insecure conditions; n=8) or very low (≥ 6 food insecure conditions; n=6) food security. An additional 18 women (18%) indicated that they had experienced one or two food insecure conditions in the last year. In terms of the second environmental

characteristic, neighborhood walkability, the Neighborhood Environment Walkability Scale (NEWS) indicated that participants rated their general satisfaction with their current neighborhood as slightly above the scale mid-point (M=3.60, SD=0.64) on the 17-item neighborhood satisfaction subscale. Finally, an examination of participant responses to the transportation access items on the demographic measure revealed that the vast majority of participants (97%) had access to reliable transportation.

As previously stated, these three environmental variables were thought to serve as proximal measures of socio-economic resources. Thus, it was expected that each of these measures would correlate with participant household income. As predicted, food insecurity was negatively correlated with income [r (96) = -.29, p<.01]. NEWS walkability subscales (perception of walking/cycling areas; safety from traffic; neighborhood aesthetics; neighborhood residential density; neighborhood connectivity; safety from crime) and the neighborhood satisfaction (quality) score also were expected to positively relate to income. That is, it was thought that individuals with higher income would report higher neighborhood quality on each of these subscales. With the exception of neighborhood aesthetics [r (96)=.26, p<.05], these predictions were not supported. As for the third environmental variable of transportation access, the planned analysis was not performed due to the low variability in the measure (i.e., the vast majority of participants had access to reliable transportation). Thus, the hypothesis that women with poor transportation access would demonstrate lower income could not be tested with the current sample.

Treatment Attendance and Attrition

As noted, 18 of the 100 women who completed the pre-treatment assessment failed to attend a single treatment session. Reasons reported for attrition were recorded for these participants when available (e.g., participant phone call, voice message). Of the 18 women who were unable to attend a single session, five reported that inflexible work/school schedules impeded attendance, four reported that transportation difficulties/high gasoline prices prevented session attendance, two indicated that a family member had fallen ill and needed care, and an additional participant reported lack of child care. The remaining six participants did not indicate a reason for their dropout from the program.

Of the 82 women who entered treatment, approximately half (48.78%) were considered "treatment completers", given that they attended more than eight sessions. The remaining half (51.22%) were "treatment non-completers" because they attended anywhere between one and eight sessions. Excluding the final feedback session, women who entered treatment (n=82) attended a mean of 7.37 out of 15 sessions. On average, those women who stopped attending treatment sometime after the first session did so after session nine (M= 9.44). Reasons for missing individual sessions were recorded when reported in a phone conversation, a phone message, or during the next meeting. The most common reasons participants gave for missing a session were (in order) work/school obligations (n= 21; 25.60% of participants), illness/injury (n=19; 23.17%), travel/out of the local area (n=17; 20.73%), family obligation/event (n=15; 18.29%), and lack of childcare (n=7; 8.53%). Less commonly reported reasons for missing a session included inclement weather (n=3; 3.65%), lack of funds to purchase gasoline (n=2;

2.43%), psychological issues (n=2; 2.43%), jury duty (n=1; 1.22%) and forgetting the session date/time (n=1; 1.22%).

Of the 82 women who attended at least one session, 61 returned for the final session (post-treatment evaluation; 74.4% post-treatment follow-up rate for those with any dose of treatment). In terms of completion status, 38 of 40 (95.0%) of the women who completed treatment (>8 sessions attended) attended the final session, while 23 of 42 (54.76%) who did not complete the treatment (1-8 sessions attended) attended the final session. None of the treatment non-attendees (n=18) returned for their post-treatment evaluation. Similarly, of women who completed only a single treatment session, only 25% (n=2) returned for the post-treatment evaluation (see Figure 1).

Reasons for not attending the final session also were recorded when available. Of the 21 completer and non-completer women who did not attend the post-treatment evaluation, six reported that family obligations or work/school responsibilities interfered with their ability to complete the post-treatment evaluation, one reported she had moved out of state to care for a relative, and a final participant had discovered she was pregnant. The remainder of the women who were unable to attend the final session (n=13) did not specifically indicate a reason for their absence.

As noted, the current study's measure of reported calorie and step goal completion was turning in a food or calorie log on time with the stated weekly goal met within one week of the due date. There was a great deal of variability in the number of daily logs turned in by the current study sample (Range: 0% to 98.57%). On average, women completed few of their daily logs out of 70 possible (Calorie goal logs: *M*=12.45 days, *SD*=21.30; Step goal logs *M*=12.69 days, *SD*= 12.69), but reported meeting their

stated goals on a majority of logs turned in to the researcher (Calorie goals: 64.49%; Step goals: 80.93%).

Baseline Differences among the Three Attendance Groups

To better understand differences among women by attendance level, exploratory analyses compared baseline demographic, anthropometric, and psychological characteristics for women at each of the three levels of attendance: non-attendees (no sessions attended; n=18), treatment non-completers (1-8 sessions attended; n=42), and treatment completers (>8 sessions attended; n=40). A series of one-way ANOVAs were performed to explore baseline differences among these groups (see Table 5). The omnibus ANOVA results revealed group differences in terms of age, body image (FRS discrepancy score), body dissatisfaction (BSQ score), and baseline depression symptoms (BDI-II score; see Table 5). The three groups did not vary in terms of their income, BMI, waist-to-hip ratio, or binge eating scale (BES) score.

Follow-up Tukey's corrected pairwise comparisons of the above omnibus ANOVA tests (see Table 5) indicated that both non-attendees and treatment non-completers were significantly younger than treatment completers ($p < .01$). In order to further investigate which factors might account for the difference in attendance by age, the current study examined the relationship between age and those demographic variables that might influence treatment attendance. These analyses indicated that age was not significantly correlated with income [r (96)=.17, n.s.] nor hours spent in household/childcare activities [r (98)= -.01, n.s.].

In addition, follow-up Tukey's corrected pairwise comparisons revealed that non-attendees had significantly poorer body image (larger discrepancies between their FRS

ideal and actual figures) than treatment completers (p <.05). Despite the significance of the omnibus model, corrected pairwise comparisons failed to indicate significant differences among attendance groups on BSQ scores, see Table 5 for group means.

Although examination of the group means indicated that both non-attendees and non-completers had higher baseline BDI-II scores than completers, corrected pairwise comparisons indicated that only non-attendees had significantly higher baseline depression symptom scores than treatment completers (see Table 5). To further explore group differences in depression symptoms, chi-square analyses were performed to compare the proportion of individuals in each attendance group (non-attendees, non-completers, and completers) with at least mild symptoms of depression on the BDI-II (≥ score of 13). These analyses revealed that a higher proportion of individuals reporting at least mild symptoms of depression was found for the non-attendee, 61.11%; $X^2(1, 57)=7.82$, p = .01, and non-completer groups, 45.23%; $X^2(1, 81)= 4.39$, p = .05, when compared to the treatment completer group (23.07%). The non-attendee and non-completer groups did not vary in terms of the proportion of individuals reporting at least mild symptoms of depression [$X^2(1, 60)= 1.27$, n.s]. In addition to the above comparisons of group differences on demographic, anthropometric, and psychological characteristics (see Table 5), Table 6 presents means for remaining baseline demographic variables for the three attendance groups.

Given previous research supporting a strong relationship between depressive symptomatology and body dissatisfaction (e.g., see Keel, Mitchell, Davis, & Crow, 2000) and the current finding of the BDI-II score as a predictor of attendance group status, the investigator considered whether symptoms of depression accounted for the relationship

found between poor body image and treatment attendance. In the current sample, depressive symptomatology (BDI-II score) was significantly correlated with FRS discrepancy scores [r (96)=.32]. Multiple linear regression analyses were performed using the enter method with total sessions attended as the criterion variable and BDI-II score and FRS discrepancy scores as the predictors. Given the strong relationships between the BDI-II and the FRS, the regression models were examined for evidence of multicollinearity. Variance inflation factor and tolerance statistics from each model indicated that neither model appeared to violate the multicollinearity assumption. The omnibus model was significant, but the FRS was only a marginally significant predictor of session attendance when holding BDI-II scores constant, see Table 7.

In order to investigate whether level of depression symptoms moderated the relationship between body dissatisfaction and session attendance, a subgroup analysis was performed using depression symptom categories. As per the BDI-II standard cutoff scores (Beck et al., 1996), women were split into a group with minimal symptoms of depression (61% of participants; BDI-II $\leq$13) or mild or greater symptoms of depression (39% of participants; BDI-II $\geq$14). The subgroup analysis revealed that for women with minimal symptoms of depression, body dissatisfaction (as measured by the BSQ) significantly and negatively predicted session attendance, while for women with mild or greater symptoms of depression, body dissatisfaction did not predict session attendance (see Table 8).

Predictors of Treatment Adherence

The primary interest of the current study was to examine socio-cultural and environmental factors related to treatment adherence. As noted, the first hypothesis

regarding treatment adherence predicted that familism and hours spent on household/childcare responsibilities would each be negatively associated with treatment dose, treatment completion, reported step goals met, and reported caloric intake goals met. The subsequent hypotheses respectively stated that: 1) Ethnic identity would be positively associated with caloric intake goals met, but negatively associated with step goals met; 2) Family social support for healthy behaviors would be positively associated with calorie reduction and step goals met; 3) Neighborhood satisfaction would be positively associated with step goals met; 4) Number of missed appointment/events in the last month due to unavailable transportation would be negatively associated with treatment dosage and completion; and 5) Women who were food insecure would make fewer of their reported calorie reduction goals, but not fewer reported step goals, than women who were food secure.

To explore these questions, three separate multiple linear regression analyses were performed with the three continuous variables of treatment dose, step goals met, and caloric intake goals met as the criterion variables. In addition, for the dichotomous variable of treatment attrition, a logistic regression was performed with completion status (completer versus non-completer) as the criterion variable. As per the a priori analysis plan, all of these models also included a measure of socio-economic status (income) and baseline BMI to serve as controls, and utilized the simultaneous enter method (standard regression).

It should be noted that for the criterion variables of treatment dose and completion (sessions attended), all participants who completed the pre-treatment assessment (n=100) were included in the following analyses, given that all of these participants were invited

and had an equal opportunity to attend treatment sessions. In contrast, for the criterion variables of calorie goal and step goal completion, only participants who attended at least one treatment session (n=82) were included in the analyses. As previously stated, participants received their treatment manual, pedometer, and monitoring instructions at the first treatment session (or following the subsequent session in the event that a participant missed the first treatment session). Thus, only participants who were exposed to the basic principles of monitoring and given explicit instructions as per the treatment goals were of interest in the step and calorie goal analyses.

It should be noted further that the final hypothesis regarding treatment adherence stated that women who were food insecure would complete fewer of their calorie reduction goals, but not fewer of their step goals, than women who were food secure. Although the original plan had been to explore the relationship between goal completion and food insecurity with a MANCOVA, it became unfeasible to examine food insecurity as a dichotomous variable given the limited number of women in the sample who met the standard criteria for food insecurity (14%). Thus, a continuous variable of food insecurity was added to the above regression models for the criterion variables of calorie and step goals.

Before completing the above multiple linear regression analyses, zero-order correlations were examined among the predictor and criterion variables of interest for participants; (see Table 9). In terms of the relationship between the above described study predictor variables and treatment attendance (n=100), only income level [r (96)=.24, $p<.05$] was significantly related to treatment attendance. The correlational analyses also revealed that number of reported step goals met (n=82) was significantly and positively

related to perceived neighborhood quality [r (79) =.23, p<.05]. Reported calorie goals met (n=82) was found to be significantly and negatively related to familism score [r (79) = -.32, p<.01].

Tests of study hypotheses regarding treatment adherence.

To examine the criterion variable of treatment dose (attendance; n=100), the following predictor variables were entered simultaneously in a linear regression model: familism score, pre-treatment hours spent per week on household/childcare responsibilities, income, and baseline BMI, as per the study hypotheses. Although, as stated above, the plan had been to include the transportation item in this model, the low variability in this measure precluded its use. Variance inflation factor and tolerance indices indicated that multicollinearity was within normal limits, and therefore the assumption was not violated. The model containing the four predictor variables was only marginally significant (see Table 10). As expected from the above described correlational analyses, income was the only predictor variable that significantly (and positively) predicted attendance, β=.28, t(97)= 2.16, p<.05 and accounted for a significant proportion of the variance in attendance, R^2 change= .05, F(1, 93) = 4.65, p<.05 (see Table 10).

For step goals met (n=82), the predictor variables of familism, hours spent on household/ childcare responsibilities, ethnic identity, neighborhood satisfaction, family support for physical activity, food insecurity, income, and baseline BMI were entered into a regression model, as per the study hypotheses. Model variance inflation factor and tolerance indices were within normal limits and therefore the multicollinearity assumption was not violated. The omnibus model containing the above eight predictors was not significant (see Table 11). However, an examination of individual predictor

variable beta weights revealed that subjective neighborhood quality predicted reported step goals completed, β=.24, t(79)= 2.06, p<.05, and accounted for a significant proportion of the variance in reported step goals met, R^2 change= .05, $F(1, 71) = 4.23.$, $p<.05$ (see Table 11).

To examine the criterion variable of caloric intake goals met (n=82), familism, hours spent on household/childcare responsibilities, ethnic identity, family support for healthy eating habits, food insecurity, income, and baseline BMI served as predictor variables, as per the study hypotheses. Variance inflation factor and tolerance indices again indicated that multicollinearity was within normal limits. The omnibus model containing the above seven predictors was marginally significant (see Table 12). Of the seven predictor variables, only familism predicted reported caloric goals met, β= -.35, t(79)=-3.05, p<.01 and accounted for a significant proportion of the variance, R^2 change= .11, $F(1, 72) = 9.15$, $p<.01$ (see Table 12).

Finally, for the dichotomous variable of treatment attrition (n=100), a multivariate binary logistic regression was performed with completion status (completer versus non-completer) as the criterion variable and familism score and pre-treatment hours spent per day on household/childcare responsibilities as the predictor variables. As delineated by the study a priori hypotheses, income and baseline BMI were entered into the model as covariates using the simultaneous enter method. Against prediction, descriptive statistics revealed that completers reported a greater number of hours spent per day (measured in minutes) on household/childcare responsibilities (M=200.75, SD=181.54) as compared to non-completers (M=193.33, SD=181.54). Consistent with prediction, completers reported marginally lower familism scores (M=113.23, SD=25.25) as compared to non-completers

(*M*=121.62, *SD*=29.13). However, Wald's test for significance revealed that neither familism nor pre-treatment hours spent per day on household/childcare responsibilities significantly predicted likelihood of being a treatment completer (see Table 13).

Thus, in sum, only a few study variables appeared to significantly predict treatment adherence in the a priori multivariate analyses. In particular, income was found to negatively and significantly predict attendance, neighborhood satisfaction positively predicted steps completed, and familism negatively predicted completion of caloric intake goals. No variables were found to predict completion status.

The Relationship between Treatment Adherence and Outcome

As noted, the seventh study hypothesis stated that women who completed the treatment (attended ≥ 8 treatment sessions) would demonstrate significant pre- to post-treatment reductions in body weight, waist-to-hip ratio, body image discrepancy, body dissatisfaction, depression symptoms, and self-reported binge eating. To test this hypothesis, a series of paired t-tests were performed with the subsample (n=38) of women who completed both the treatment (i.e., treatment completers) and the post-treatment assessment, as per the a priori data analytic plan. Time served as the within subjects independent variable for these analyses, and body weight, waist-to-hip ratio, body image discrepancy, body dissatisfaction, depression symptoms and binge eating score were the six dependent variables. All of the above hypotheses were confirmed (see Table 14 for sample means and statistics).

Further examination of the anthropometric data revealed that the 38 women who completed the program and post-treatment evaluation lost a mean of 2.29 inches (SD=2.01) off their waist, $t(37)=7.01$, $p<.001$. In terms of weight loss, almost half of the

treatment completers (n=18; 47.4%) achieved a weight loss ≥ 5% of their body weight. In addition, seven of the 30 treatment completers (23.33%) with intake BMIs in the obese range were able to reduce their BMI to a value in the overweight range. Finally, ten of the 38 women (26.31%) were able to decrease their waist circumference to below 35 inches, an established marker for lowered risk of obesity-related disease (Lean, Han, & Morrison, 1995).

To better understand the relationship between treatment attendance and outcome, a series of exploratory univariate ANOVA analyses were performed in order to understand whether treatment outcomes varied by attendance group (completer versus non-completer). Change scores (Time 1- Time 2) were calculated for each outcome variable of interest (weight, waist-to-hip ratio, BDI-II score, FRS discrepancy, BSQ score, and BES score) and entered as the dependent variables. Weight loss was found to significantly vary by attendance group, with completers losing approximately 6 lbs more than non-completers, $F(1,61)=11.51$, $p<.01$. In addition, treatment completers also experienced a greater change in their binge eating symptom scores (BES) than did non-completers [$F(1, 59)= 4.50$, $p<.05$]. Change in the remaining outcome variables did not vary as per completion status: waist-to-hip ratio [$F(1, 61)= .14$, n.s.], [$F(1, 61)= .14$, n.s.], BDI-II score [$F(1, 60)=.11$, n.s.], FRS discrepancy [$F(1, 60)=.21$, n.s.], and BSQ score [$F(1, 60)=.07$, n.s.]; (see Table 15).

In order to further examine the relationship between treatment adherence and treatment outcome, the eighth and final hypothesis stated that treatment attendance would predict weight loss and waist-to-hip ratio reduction, which would be mediated by the combined number of reported step and caloric intake goals met. As outlined by the study

hypotheses, this analysis included all participants (n=61) who completed the post-treatment evaluation and thus included women regardless of completion status. Linear regression analyses revealed that treatment attendance predicted weight loss (see Figure 4), but not waist-to-hip ratio reduction. In order to test whether reported step and caloric intake goal completion mediated the relationship between attendance and weight loss, Baron and Kenny's (1986) steps of mediation were completed. As such, a series of linear regression analyses sought to determine the following: a) that treatment attendance predicted weight loss; b) that treatment attendance predicted goal completion; c) that goal completion predicted weight loss, while controlling for treatment attendance; and d) that the relationship between treatment attendance and weight loss became non-significant when controlling for goal completion. All of these steps were confirmed, supporting full mediation (see Figure 4). In order to measure the magnitude of the indirect effect a two-tailed Sobel's test was performed. This test revealed that the relationship between attendance and weight loss was significantly reduced when goal completion was added to the model (z=3.40, p<.001), thereby supporting the meditational model.

Further Exploratory Analyses of Calorie and Step Goal Completion

Given the paucity of study findings in relation to family support of healthy eating and exercise habits, the author sought to investigate whether level of familism might moderate the relationship between family support and goal completion. That is, was family social support, as measured by the social support for diet and exercise scale, positively associated with goal completion as level of familism increased? Participants who attended at least one session (n=82) were split into high and low familism groups as per the sample median familism score. A subgroup analysis revealed that family

encouragement of healthy eating habits predicted reported caloric intake goal completion among individuals with high [$r(43)=.32$, $p<.05$], but not low, levels of familism [$r(38)=-.15$, n.s.]. Although demonstrating the same pattern of results, family participation in exercise did not predict reported step goal completion among individuals with either high [$r(43)=.22$, n.s.] or low levels of familism [$r(38)=-.08$, n.s.].

Discussion

Study Overview

To the author's knowledge, this is the first study both to examine factors that predict adherence to standard obesity treatment in a Mexican-American sample and to present preliminary evidence on the effectiveness of such a treatment with this population. The primary goal of the current study was to better understand factors that predict Mexican-American women's adherence to a standard, well-known weight management program (the LEARN program). As such, the current study examined a host of socio-cultural and environmental factors postulated to predict obesity treatment adherence, which the author defined as attending treatment sessions and reporting completion of specific behavioral (calorie and step) goals. Although a number of environmental and socio-cultural factors were theorized to relate to obesity treatment adherence in this population, only a few select factors (familism, neighborhood satisfaction, and income) emerged as significant independent predictors of the study's adherence measures in the multivariate analyses.

The secondary goal of the study was to gather preliminary evidence regarding the effectiveness of the LEARN program in treatment adherent Mexican-American women. In terms of treatment effectiveness, the current study determined that Mexican-American women who were adherent to a standard weight management program lost weight and saw reductions in waist-to-hip ratio. In addition, such women saw significant pre- to post-treatment improvements in their body dissatisfaction (as per two measures), in binge eating symptoms, and in depressive symptomatology. Moreover, women who completed the program lost significantly more weight than women who did not complete the

program, and saw a larger reduction in binge eating symptoms as well. Finally, the current study also found support for dosage effects for weight loss, whereby frequency of attendance predicted weight loss magnitude, which was mediated by reported behavioral (step and calorie) goals met.

Study Hypotheses

Hypothesis 1. As noted, familism, or commitment to the needs of family over the needs of oneself, was one of the few factors that emerged as a significant predictor of treatment adherence. Familism was not found to predict either treatment dosage (sessions attended), treatment completion (attending >8 sessions), or step goal completion in the multivariate analyses, but *was* found to negatively predict calorie goal completion. Thus, these findings appear to offer at least partial support for the notion that commitment to the needs of family above the needs of the individual may hinder Mexican-American women's ability to engage in standard obesity treatment (see Diaz et al., 2005).

One can only speculate about the discrepancy in the study findings regarding the role of familism, because there do not appear to be other studies that have examined familism as a predictor of treatment adherence. One possibility is that familism may selectively impact calorie goals since they are typically performed within a family context. In contrast, both treatment attendance and step goal completion were likely performed outside of the family context. That is, women were likely to be at home with family during the time they were asked to prepare, consume, and monitor lower calorie meals. This context may have made it especially challenging for women high in familism to attend to an individual goal. For example, such women may have learned that attending to their own health needs in the home context, or attempting to encourage their

family to eat healthier meals, was met with negative responses (see Ladrine and Klonoff, 2004). For women high in familism, such negative responses may have been especially salient given the value they place on the needs of their family. In contrast, these same negative responses may not have been particularly powerful for Mexican-American women with lower levels of familism.

In addition to considering the importance of the home context, it should be noted that the participant (and family) burden associated with monitoring and meeting calorie goals may have been greater than that of step goals or attending a weekly session. Women high in familism may have had difficulty justifying time removed from directly serving the needs of their family to plan, prepare and monitor lower-calorie meals. In contrast, the step goals in the current study were designed to be easily attainable (as per LEARN guidelines) and accrued throughout the day. Similarly, the one-hour long weekly session was specifically chosen to be either during the typical lunch hour (e.g., 12-1 pm) or immediately following the typical work day (e.g., starting between 4:30 and 6:00 pm) in order to accommodate this largely employed sample.

In addition to familism as a predictor of adherence, it also was expected that time barriers, as measured by self-reported time spent on household/childcare responsibilities in a retrospective time diary, would be negatively associated with treatment adherence in Mexican-American women. This prediction was not supported. This hypothesis was chosen to test the widespread speculation in the ethnic minority obesity treatment literature that family and household commitments may serve as key barriers to engaging in healthy behaviors (e.g., see Kumanyika et al., 2002). In fact, a body of work has indicated that perceived time barriers (e.g., participant estimation of typical time spent on

child care and family responsibilities) are a crucial barrier to health behaviors for Hispanic women (see review, Eyler et al., 2002; Grassi et al., 1999). Importantly, it may be the case that *perceived* time barriers, but not more *objective* time barriers (measurement of actual behaviors in real time, such as with diary methods in the current study), are responsible for the earlier association between time barriers and health behavior. A study by Heesch and Mâsse (2004) supports this explanation, as they found that perceived time barriers positively correlated with BMI, but no such relationship was reported for their measure of objective time barriers.

Although the current finding does not support the notion that objective time barriers prevent Mexican-American women from completing behavioral goals during a weight loss attempt, it is also possible that Mexican-American women with excessive time barriers may have self-selected out of participating in the current study. Women in the current study had approximately two children and reported a mean of one child living in their household. National demographic data reveals that Hispanic women have the highest fertility rate of any ethnic group, with an average of 2.7 children per adult woman (Ventura, Hamilton, & Sutton, 2003). Thus, women in the current study likely had fewer household and childcare commitments than many Mexican-American women, which may have restricted sample variability in terms of time spent on household/childcare activities, and attenuated the effect of objective time barriers on step and calorie goal completion.

Hypothesis 2. The second hypothesis stated that ethnic identity would be positively associated with reported calorie goals met and negatively associated with reported step goals met. No support was found for this hypothesis using the Ethnic

Identity subscale of the Scale of Ethnic Experience (Malcarne et al., 2006) as the measure of acculturation.

Although a great deal of research has found a relationship between dietary and exercise habits and acculturative status in *community* samples of Hispanic women (e.g., see review Ayala et al, 2008; see review, Marquez et al., 2004), to the author's knowledge this is the first study to examine acculturative status as a predictor of the behavior (i.e., reaching goals) of individuals engaged in weight management *treatment*. Research within the alcohol treatment effectiveness literature suggests that treatment status may moderate the relationship between acculturation and health behavior. For example, Arroyo and colleagues (2004) found that self-reported acculturative status predicted drinking intensity 90 days prior to treatment engagement, but did not predict drinking intensity post-treatment in Hispanics. Thus, it is possible that acculturative status may predict physical activity and caloric intake outside of the treatment context, but not in a sample actively attempting to modify their lifestyle.

Another consideration is the fact that the current study's focus on women who spoke English well enough to complete the treatment may have served to limit the sample to more acculturated women. In addition, an examination of the sample's Scale of Ethnic Experience Scale (Malcarne et al., 2006) revealed a mean ethnic identity score nearly identical to that found in the original validation study with Mexican-Americans enrolled in college; a population speculated to be of higher acculturative status (e.g., see Hurtado & Gauvain, 1997). Thus, future researchers might wish to select women of more varying acculturative status to examine the relationship between acculturative status and weight management adherence.

Moreover, it should be noted that this is the first study on weight-related behaviors to use the Scale of Ethnic Experience's Ethnic Identity subscale as the measure of acculturative status. Research on the relationship between acculturative status and weight-related health behaviors in Hispanic women is often discrepant and measurement-specific. For example, research that operationalizes acculturation as years of U.S. residency or generational status finds increased risk of obesity with acculturation (e.g., Barcenas et al., 2007; Kaplan, Huguet, Newsom, & McFarland, 2004; Khan, Sobal, & Martorell, 1997), while research on language status has found English language ability both positively (e.g., Fitzgerald et al., 2006; Slattery et al., 2006) and negatively associated with obesity (e.g., Khan et al., 1997). Thus, the vast majority of studies have conceptualized acculturation via proxy demographic measures (e.g., language status) rather than through a validated measure of acculturative status; a discrepancy that may account for the lack of findings related to acculturative status in the current design.

Finally, it should be noted that the current study did not examine acculturation as a bi-directional process, the more recent model of acculturation. The bi-directional model holds that acculturation encompasses both level of acceptance of the "host" culture and level of acceptance of the culture of origin; understanding an individual's level of acculturation requires knowledge of each of these dimensions (Flannery, Reise, & Yu, 2001). The ethnic identity subscale of the Scale of Ethnic Experience solely measured acceptance of the culture of origin. Future research should consider a bi-directional conceptualization of acculturative status, which would allow for a better understanding of the how each of these dimensions, along with their interaction, impacts treatment adherence.

Hypothesis 3. Given evidence that social support is an important predictor of health-related behavior (e.g., see Keller et al., 2005), the third set of hypotheses focused on family social support as a predictor of reported calorie and step goals met. Neither hypothesis was supported. The research findings have been mixed regarding the degree to which family support of weight-related behavior change is an important outcome predictor for overweight individuals of both majority and non-majority cultures (King et al., 2001; see review, Marquez, 2004). For example, Castro and colleagues (1999) used an educational and tele-health walking intervention to examine the psychosocial correlates of walking behavior among a sedentary, diverse sample of ethnic minority women ranging from underweight to obese. Using the same support measure as the current study (Sallis et al., 1987), the authors did not find a relationship between the social support scales and reported walking behavior. As with acculturation, family support may be more predictive of health behaviors in community samples than in samples actively engaged in treatment.

While the current study does not support the notion that family support for healthy eating and exercise behaviors predicts completion of behavioral goals across the study sample, exploratory analyses revealed preliminary evidence that family support *may* positively correlate with reported caloric goal completion among a subset of the women: those high in familism. These findings suggest that Mexican-American women who are especially committed to the needs of their family may benefit from family member support for dietary change and/or may find it more difficult to make such changes in the absence of such encouragement. Future research should seek to investigate familism as a potential moderator of the relationship between family support and health

behaviors in a larger sample of both community and treatment engaged Mexican-American women. In addition, future treatment studies might consider ways to increase such social support (e.g., teach family members to provide positive verbal feedback to their loved one or try healthier foods with their loved one) to examine the impact of such training.

Hypothesis 4. Based on the suggestion that negative neighborhood characteristics may serve as a barrier to physical activity (e.g., see Kumanyika et al., 2002), the fourth hypothesis stated that neighborhood satisfaction would be positively associated with reported step goals met. This hypothesis was supported. Women who rated their neighborhood as a generally satisfactory place to live were more likely to report meeting their daily step goals. However, the neighborhood satisfaction rating was not, as expected, related to reported income. Women with higher income did not report being more satisfied with their neighborhood. These findings suggest that neighborhood satisfaction is a unique predictor of Mexican-American women's ability to meet physical activity goals during the course of weight management treatment.

This finding supports socio-ecological approaches to health behavior that state that obesity should be considered from a "multilevel approach," rather than from an individual deficit model (Stokols, 1996). Indeed, perceived neighborhood characteristics have increasingly been identified as key environmental factors in physical activity (see reviews, McNeill, Kreuter, & Subramanian, 2006; Papas et al., 2007). Future researchers might examine the objective neighborhood characteristics that lead Mexican-American women to be more or less satisfied with their neighborhood. For example, a recent study with ethnic minority women identified very specific environmental changes that

participants believed would promote physical activity, such as increased police protection and organized walking groups (Taylor et al., 2007). Future work should continue to identify modifiable neighborhood characteristics and investigate the effect of implementing specific environmental changes. In addition to public policy approaches, future researchers might examine the benefit of teaching problem-solving-based approaches in order to help Mexican-American women cope with less satisfactory neighborhood environments.

Hypothesis 5. The author also examined the environmental variable of transportation, expecting that transportation inadequacy would be negatively related to treatment dosage (sessions attended) and treatment completion (attending >8 sessions). However, given that 97% of participants reported access to reliable transportation, the low variability for the transportation inadequacy measure precluded this hypothesis from being tested.

It is worthwhile noting that several women told the author during the treatment course that transportation-related factors (e.g., high gas prices, not having a "ride") prevented them from attending sessions, thereby calling into question the measure of transportation barriers used. Objective transportation-related items, such as the number of cars in the household, use of public transportation, shortest travel time from work/home to the treatment center via public transportation, and distance from work/home to the treatment center, may have provided better information about a participant's actual transportation barriers. Indeed, within the substance abuse literature, a number of studies have discovered that geographic barriers to treatment center (distance) predict outpatient

treatment engagement (Fortney, Booth, Blow, Bunn, & Cook, 1995; Schmitt, Phibbs, & Piette, 2003).

Although the author chose presumably more proximal measures of barriers to attending treatment (e.g., transportation access, hours spent on household/childcare responsibilities), it should be noted that income was the only variable that emerged as a significant predictor of attendance (see Table 10). Women with lower income were less likely to attend sessions according to the multivariate model. Despite being ostensibly a more distal measure of barriers to treatment engagement, income likely still predicts a number of more proximal barriers to treatment engagement unmeasured in the current design (e.g., child care access, work flexibility). Future research should continue to examine more proximal socio-economic factors that may predict weight management attendance.

Hypothesis 6. The final hypothesis in relation to treatment adherence stated that women who were food insecure would make fewer of their reported calorie goals, but not fewer reported step goals, than women who were food secure. The author expected that women with food insecurity would experience more challenges in purchasing nutritious food during their weight loss attempt, which would make it more difficult to enact dietary change (see Drewnowski, 2004; Drewnowski & Specter, 2004). However, since only a small percentage of women endorsed a high number of food insecure conditions, food insecurity was operationalized continuously. Although, as expected, food insecurity was related to participant income, higher levels of food insecurity did not predict fewer caloric goals met. Given the paucity of findings in relationship to caloric intake, future research should continue to explore the relationship between food insecurity and more

specific dietary behaviors (e.g., binge eating episodes, fruit/vegetable consumption) in both treatment-engaged and non-engaged samples of Mexican-American women.

Treatment Effectiveness

Hypothesis 7. The current study also sought to determine whether treatment adherence was indeed associated with treatment outcome. It was expected that treatment "completers" (those who completed more than half of the treatment sessions) would show significant pre- to post-treatment reductions in body weight, waist-to-hip ratio, body image discrepancy, body dissatisfaction, depression symptoms, and self-reported binge eating. All of these hypotheses were supported. Women who completed the program experienced modest decreases in weight (~4.5% of body weight) and modest waist-to-hip ratio reductions (~2% change in ratio). Despite being relatively small changes in weight, they still are speculated to have health benefits (Valsamakis et al., 2004). The women who completed the program also reported changes in each psychological symptom measure, which suggests that Mexican-American women who complete a standard obesity treatment program may experience improvements in psychological functioning. In addition, women who completed the program lost significantly more weight than women who did not complete the program, and had larger decreases in binge eating symptoms.

In examining the weight loss outcomes for the four treatments that were culturally-adapted for Mexican Americans, one sees that the current study's average weight loss of 4.5% roughly approximated the weight loss for two of the trials (~4%; Avila & Hovell, 1994; Cousins et al., 1992), was larger than that found in a third trial (~2%; Poston et al., 2001), but was lower than that found in a combination psycho-

educational/pharmacological treatment study (~8%; Poston et al., 2003). Thus, the current findings support the notion that a standard obesity treatment may be of benefit to Mexican-American women at a level that at least approximates that of previous culturally-adapted treatments that do not include weight loss medication. Of course, this finding does not imply in general terms that standard treatment is as effective as culturally-adapted treatment for Mexican-American women. Variations in participant weight status and medical exclusionary criteria between the current and previous studies (see Table 1) make it impossible to compare directly across treatment designs. Future work might employ randomized clinical trial methodology to overcome these limitations.

It should be noted that the 4.5% weight loss in the current study was considerably lower than the 10% loss typically found in general population weight management trials at 6 or 12 months post-treatment (see review, Barte et al., 2010). With regard to the LEARN program in particular, Andersen and colleagues (1999) found weight losses of 9.44% of body weight at the completion of a 16 week LEARN trial. However, Gardner and colleagues (2007) more recently found only a 3.3% change from baseline weight at 6 month follow-up with the LEARN program, which the authors speculated could have been due to their decision to present LEARN in an accelerated fashion over just 8 weeks. Thus, the current study's average weight loss appears lower than those found in most behavioral interventions with general population samples. Taken together, these results appear to suggest that Mexican-American women may struggle to attain positive outcomes in *either* standard or adapted weight management treatment, which makes general efforts to improve current treatments for this population even more crucial.

Hypothesis 8. Treatment dosage effects were predicted as well in the current design. It was expected that treatment attendance would predict weight loss and waist-to-hip ratio reduction, which would be mediated by the combined number of reported step and caloric intake goals met. Sessions attended *did* predict weight loss, but not reduction of waist-to-hip ratio. In turn, the relationship between treatment attendance and weight loss was fully mediated by the combination of reported step and caloric intake goals met. These findings add to the large body of work suggesting that homework completion predicts outcome in behaviorally-based treatment (e.g., Carroll, Nich, & Ball, 2005; Hollis et al, 2008; Yovel & Sarfen, 2006). Future research with this population should not only focus on methods for increasing session attendance, but should find means of encouraging women to adhere to and monitor session goals.

Although it is not entirely clear why dosage-related effects occurred for weight loss but not for waist-to-hip ratio, past research has indicated that a change in waist-to-hip ratio during lifestyle change programs is often very small and is a limited indicator of change in visceral (abdominal) fat (van der Kooy et al., 1993), whereas weight loss is a relatively robust indicator of visceral fat loss (Nicklas et al., 2009). Future work might include more sensitive measures of body fat distribution (e.g., x-ray or tomography technology) to more carefully examine the relationship between treatment adherence and change in body shape distribution in this population.

Exploratory Study Findings

In addition to testing the above hypotheses, the author also examined a number of baseline differences among women in the three attendance groups (completer, non-completer, and non-attendee). The analyses, which were corrected for family-wise error,

revealed that women who completed the program were older than both non-completers and non-attendees. This finding reflects those of Poston and colleagues (2001), where older age was also found to predict increased weight management attendance in Mexican-American women. The reason for this group difference is unclear; age was not related to either participant income or objective household/childcare responsibilities in the current design. Future research should carefully investigate other factors that might account for older Mexican-American women being more likely to complete weight management treatment, such as fewer perceived time barriers, more work flexibility, or greater socio-economic resources beyond income (e.g., wealth). In addition, older women might experience increased physical effects of excess weight (Seeman, Merkin, Crimmins, & Karlamangla, 2010), which may serve as a motivation for treatment continuation.

Attendance group differences were found for body dissatisfaction as well. Specifically, treatment completers had significantly better baseline body image (smaller FRS discrepancies) than non-attendees. However, these findings should be considered quite preliminary, as the FRS was only a marginal predictor of attendance in a regression model containing BDI-II score as a simultaneous predictor variable. These exploratory findings reflect the findings of Teixeira and colleagues (2004), who divided women enrolled in a 16-week behavioral weight loss study into two categories based on completion of a 16-month follow-up assessment: treatment completers and treatment non-completers. The authors found that treatment completers had smaller body image discrepancies (measured by the silhouette-based Body Image Assessment Questionnaire) than did treatment non-completers. Thus, the current study adds further support to the notion that poor body image may impair weight management completion.

Logically one might argue that poorer body image should have served as a "motivator" for treatment compliance, but clearly this did not occur in the current design. One possibility is that women with larger body image discrepancies, who ostensibly desired to lose a greater amount of weight, felt discouraged upon learning about the realistic expectations of treatment benefit during the intake assessment process. Indeed, past research has indicated that having “unrealistic” expectations for weight loss may discourage weight management compliance and limit weight loss (Bennett & Jones, 1986; Carels, Cacciapaglia, Douglass, Rydin & O'Brien, 2003). As such, future research might examine whether treatment for body image distress prior to weight management treatment initiation improves attendance in this population. Furthermore, the current study's exploratory finding that body dissatisfaction (as measured by the BSQ) predicted attendance for women with minimal, but not mild or greater symptoms of depression, suggests that such body image interventions might be especially appropriate for women with limited depression symptoms.

Level of depressive symptomatology also distinguished between attendance groups. In particular, both non-attendee and non-completer groups contained a larger proportion of individuals reporting at least mild symptoms of depression on the BDI-II than did the completer group. A number of past studies have likewise found depression symptoms to predict weight management attendance (e.g., see Fabricatore et al., 2009; Teixeira et al., 2004). As with body dissatisfaction, future research might consider factors that could potentially mediate the relationship between depression symptoms and attendance (e.g., lower self-efficacy, physical health concerns, chronic pain symptoms).

In addition, it would be prudent to examine whether treatment for depression symptoms improves treatment engagement in this population.

Limitations

A key limitation of the current design is the author's use of a convenience sample and the study restriction to Mexican-American women who spoke English. In addition, over half of the women reported identification with "New Mexican" heritage, a subgroup of Mexican-Americans presumed to have a unique historical and ethnic heritage (McWilliams & Meier, 1990). Although the sample was diverse in terms of age, income, and Spanish-language status, future research will need to confirm whether the key findings indeed hold across a broader sample of Mexican-American women. In addition, the current study only collected post treatment data and none of the non-attendees returned for the post treatment evaluation, limiting the ability to measure long-term weight loss and to complete intent-to-treat analyses. It should be noted however, that intent-to-treat analyses were designed for use in *randomized* clinical trials, which would make their use in the current design questionable (Feinman, 2009). Moreover, the current study also completed a large number of post-hoc analyses, which were labeled as exploratory and should be considered preliminary. Finally, the current study lacked a comparison group, which disallows the author from differentiating treatment effects from regression to population norms (Fitzmaurice, 2000).

The primary justification for the lack of a comparison condition in the current study is that the research was *not* focused on comparing two treatments or establishing treatment efficacy. Instead, the author sought to gather preliminary evidence that Mexican-American women who adhered to standard treatment would indeed show

evidence of losing weight. Critiques of the lack of a comparison group more generally should be tempered for several reasons. First, evidence suggests that data from single treatment designs may *not* be more biased towards a positive outcome (e.g., positive treatment effects) than are randomized controlled trials (Concato, Shah, & Horowitz, 2000). Furthermore, it has been argued that such designs allow researchers to examine correlates of treatment adherence, the primary focus of the current design, without expending excess resources or awaiting large grants (McCaul, Svikis, & Moore, 2001).

As discussed, additional potential limitations of the study are the relatively poor post-treatment assessment rate (74.4% of those who began the treatment) and the low levels of treatment adherence. The post-treatment assessment rate in the current study was indeed lower than longer-term follow-up rates encountered in relatively recent behavioral weight-management trials with general population samples (~80% at 12 months, e.g., Andersen et al., 1999; Gardner et al., 2007). Furthermore, participants attended a relatively limited number of sessions (~50% of sessions attended versus ~90%; see Andersen et al., 1999) and only completed a limited number of logs (~20% versus ~50% per week; e.g., Hollis et al., 2008). However, it was precisely the evidence of poor adherence to past protocols (e.g., Cousins et al., 1992; Poston et al., 2001) that prompted the current study's focus on factors that predict treatment adherence in Mexican-American women. The current study's post-treatment assessment rates indeed roughly approximated those found in previous work with this population (see Table 1), as did rates of session attendance. For example, both the current study and Poston et al. (2001) noted approximately one-third of participants attending fewer than 20% of the sessions (see Poston et al., 2001). Thus, such compromised adherence provides support

for the notion that future designs must consider potential economic, environmental, and socio-cultural barriers to treatment engagement (Barrera & Castro, 2006; Castro et al., 2004; Kumanyika, 2002; Lau, 2006).

Strengths

Unlike work that focuses on multiple Hispanic subgroups despite intra-ethnic variability, the current design provides information that can be applied specifically to Mexican-American samples (Neighbors et al., 2008). In addition, it should be noted that although the women were arguably quite acculturated and had relatively few children, the sample was diverse in terms of weight status, age, Spanish-speaking ability, and income. Indeed, half the sample spoke Spanish well or very well, and income ranged from below poverty level to well above the median for the county (Census, 2010). Thus, the current study findings should generalize to overweight and obese Mexican-American women of diverse income levels and Spanish-language backgrounds.

Importantly, the current study's broad focus on multilevel factors (economic, environmental, socio-cultural) that predict treatment adherence provides a unique perspective on the barriers that ethnic minority women encounter while attempting to engage in weight loss treatment. As per the heuristic model of treatment adaptation, such data can be utilized to inform specific and directed treatment adaptations, which can subsequently be tested for effectiveness (Barrera & Castro, 2006; Castro et al., 2004; Lau, 2006). The current study also provides useful data for public policy-makers in terms of environmental (neighborhood quality) and economic (income) factors that may prevent full engagement in obesity treatment. Finally, the current study gives valuable information regarding treatment engagement rates, the relationship between treatment

"dosage" and outcome, and treatment effectiveness in the context of adherence to a standard weight management program in this population.

Clinical Implications and Additional Recommendations for Future Research

The current study determined that although Mexican-American women may benefit from standard weight management treatment, they face many challenges to fully engaging in such programs. Specifically, the author identified a host of barriers: economic (income), environmental (neighborhood satisfaction), socio-cultural (familism), and psychological (body dissatisfaction or depression scores). Future providers should carefully assess these factors early in the treatment process and use techniques (e.g., problem solving) to help Mexican-American women counter these barriers if necessary.

It may be prudent for future researchers to present the current findings to Mexican-American women in order to garner their recommendations on how to best adapt treatment in a socially valid manner (Barrera & Castro, 2006; Castro et al., 2004; Lau, 2006). For example, researchers might utilize data gathered from focus groups to compare means of attending to familism in treatment. Since exploratory findings from the current study suggest that helping increase general family support of healthy eating habits may attenuate the impact of familism on treatment adherence, this could prove to be a worthwhile focus of future research. At the same time, it should be noted that previous work with this population (e.g., Cousins et al., 1992) *has* attempted to incorporate family involvement into treatment. Specifically, partners were invited to participate in treatment and the importance of partner support was emphasized. Nonetheless, these changes did

not influence outcome. Consequently, the best method for garnering family support for weight management practices has not yet been identified.

In addition, future researchers might consider investigating lower intensity methods, such as a tele-health approach, to help engage Mexican-American women. These methods have demonstrated efficacy with general population samples and are associated with reduced treatment attrition (Haugen, Tran, Wyatt, Barry, & Hill, 2007). Such programs may serve to reduce participant burden, including the economic burden that attending traditional outpatient sessions may present. In addition, researchers might explore ways to re-engage Mexican-American women who drop out of weight management treatment prematurely. A "stepped-care" model might help keep such women engaged in lower level care (e.g., the option to submit food diaries and information on goals achieved online and to receive feedback on them), with the potential to return to a more intense level of care at a more convenient time (Carels et al., 2005).

Lastly, future research must continually examine means of addressing economic and environmental disparities that may contribute to poorer treatment adherence in ethnic minority populations in general, and among ethnic minority women in particular. Researchers should identify concrete means of improving economic and social policies that may impact ethnic minority women's health and advocate for data-informed policy changes.

References

Adams, E.J., Grummer-Strawn, L., & Chavez, G. (2003). Food insecurity is associated with increased risk of obesity in California women. *Journal of Nutrition, 133,* 1070-1074.

Adler, N. E., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: preliminary data in healthy white women. *Health Psychology, 19,* 586-592.

Andersen, R.E., Wadden, T.A., Bartlett, S.J., Zemel, B., Verde, T.J., & Franckowiak, S.C. (1999). Effects of lifestyle activity versus structured aerobic exercise in obese women. *Journal of the American Medical Association, 281,* 335-340.

Aisenberg, E. (2008). Evidence-based practice in mental health care to ethnic minority communities: Has its practice fallen short of its evidence*? Social Work, 53,* 297-306.

Andrés-Hyman, R.C., Ortiz, J., Aňez, M. P., & Davidson, L. (2006). Culture and clinical practice: Recommendations for working with Puerto Ricans and other Latinas(os) in the United States. *Professional Psychology: Research and Practice, 37,* 694-701.

Arroyo, J.A., Miller, W.R., & Tonigan, S.J. (2003). The influence of Hispanic ethnicity on long-term outcome in three alcohol-treatment modalities. *Journal of Studies on Alcohol, 64,* 98-104.

Avila, P., & Hovell, M.G. (1994). Physical activity training for weight loss in Latinas: A controlled trial. *International Journal of Obesity and Related Metabolic Disorders, 18,* 476- 482.

Ayala, G.X., Baquero, B., & Klinger, S. (2008). A systematic review of the relationship between acculturation and diet among Latinos in the United States: Implications for future research. *Journal of the American Dietetic Association, 108,* 1330-1344.

Azibo, D. (1992). Understanding the proper and improper usage of a comparative framework. In K.H. Burlew (Ed.), *African American psychology: Theory, research and practice.* London: Sage.

Barcenas, C.H., Wilkinson, A.V., Strom, S.S., Cao, Y., Saunders, K.C., Mahabir, S., …Bondy, M.L. (2007). Birthplace, years of residence in the United States, and obesity among Mexican-American adults. *Obesity, 15,* 1043-1052.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182.

Barrera, M., & Castro, F. G. (2006). A heuristic framework for the cultural adaptation of interventions. *Clinical Psychology Science and Practice, 13,* 311-316.

Barte, J.C.M., ter Bogt, N.C.W., Bogers, R.P., Teixeira, P.J., Blissmer, B., Mori, T.A., & Bemelmans, W.J.E. (2010). Maintenance of weight loss after lifestyle interventions for overweight and obesity, a systematic review. *Obesity Reviews. Doi: 10.1111/j.1467-789X.2010.00740.x*

Bates, L., Acevedo-Garcia, D., Alegria, M., & Krieger, N. (2008). Immigration and generational trends in body mass index and obesity in the United States: Results of the National Latino and Asian American Survey, 2002-2003. *American Journal of Public Health, 98,* 70-77.

Beck, A., Steer, R., & Brown, G. (1996). *BDI-II Manual* (2nd ed.). San Antonio, TX: The Psychological Corporation

Bennett, G.A. & Jones, S. E. (1986). Dropping out of treatment for obesity. *Journal of Psychosomatic Research, 30,* 567-573.

Bernal, G., Bonilla, J., & Bellido, C. (1995). Ecological validity and cultural sensitivity for outcome research: Issues for the cultural adaptation and development of psychosocial treatments with Hispanics. *Journal of Abnormal Child Psychology, 23,* 67-82.

Bernal, G., Jimenez-Chafey, M.I., & Rodriguez, M.M.D. (2009). Cultural adaptation of treatments: A resource for considering culture in evidence-based practice. *Professional Psychology: Research and Practice, 40,* 361–368.

Bernal, G., & Sáez-Santiago, E. (2006). Culturally centered psychosocial interventions. *Journal of Community Psychology, 34,* 121-132.

Braveman, P.A., Cubbin, C., Egerter, S., Williams, D.R., & Pamuk, E. (2010). Socioeconomic disparities in health in the United States: What the patterns tell us. *American Journal of Public Health, 100,* S186-S196.

British Office for National Statistics. Technical report: the United Kingdom 2000 time use survey. *National Statistics.* Retrieved January 15th, 2008 from http://www.statistics.gov. uk/ downloads /theme_social/UKTUS_TechReport.pdf

Brownell, K.D. (2004). *The LEARN Program for Weight Management* (10th ed.). Dallas, TX: American Health Publishing Company.

Cachelin, F.M., Monreal, T.K., & Juarez, L.C. (2006). Body image and size perceptions of Mexican-American women. *Body Image, 3,* 67-75.

Carels, R.A., Cacciapaglia, H.M., Douglass, O.M., Rydin, S., O'Brien, W. (2003). The early identification of poor treatment outcome in a women's weight loss program. *Eating Behaviors, 4,* 265-282.

Carels, R.A., Darby, L., Cacciapaglia, H.M., Douglass, O.M., Harper, J., Kaplar, M.E., …Tonkin, K. (2005). Applying a stepped-care approach to the treatment of obesity. *Journal of Psychosomatic Research, 59,* 375-383.

Carroll, K.M., Nich, C., & Ball, S.A. (2005). Practice makes progress? Homework assignments and outcome in treatment of cocaine dependence. *Journal of Consulting and Clinical Psychology, 73,* 749-755.

Castro, F. G., Barrera, M., & Martinez, C. R. (2004). The cultural adaptation of prevention interventions: resolving tensions between fidelity and fit. *Prevention Science, 5,* 41-45.

Castro, C.M., Sallis, J.F., Hickmann, S.A., Lee, R.E., & Chen, A.H. (1999). A prospective study of psychosocial correlates of physical activity for ethnic minority women. *Psychology and Health, 14,* 277-293.

Celio, A.A, Wilfey, D. E., Crow, S.J., Mitchell, J., & Walsh, B.T. (2004). A comparison of the Binge Eating Scale, Questionnaire for Eating and Weight Patterns-Revised, and Eating Disorder Examination Questionnaire with instructions with the Eating

Disorder Examination in the assessment of binge eating disorder and its symptoms. *International Journal of Eating Disorders, 36,* 434-444.

Census. (2000). Profile of general demographic characteristics: 2000. Geographic area: Albuquerque, New Mexico. Retrieved December 1, 2007 from http://www.edd.state.nm.us/ images/uploads/msas/ABQ%20MSA.pdf

Census. (2006). American community survey. Retrieved March 18th, 2010 from http://www.census.gov/population/www/socdemo/hispanic/files/Internet_Hispanic_in_US_2006.pdf

Census (2010). State and county quickfacts. Retrieved April 7th, 2010 from http://quickfacts.census.gov/qfd/states/35/35001.html

Centers for Disease Control. (2004). Prevalence of diabetes among Hispanics – selected areas, 1998—2002. *Morbidity and Mortality Weekly Report, 53,* 941-944. Retrieved May 2, 2007 from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5340a3.htm.

Centers for Disease Control. (2007). Overweight and obesity: Introduction. Retrieved May 22, 2007 from http://www.cdc.gov/nccdphp/dnpa/obesity/index.htm.

Chao, D., Farmer, D.F., Sevick, M., Espeland, M.A., Vitolins, M., & Naughton, M.J. (2000). The value of session attendance in a weight-loss intervention. *American Journal of Health Behavior, 24,* 413-421.

Concato, J., Shah, N., & Horowitz, R. (2000). Randomized, controlled trials, observational studies and the hierarchy of research designs. *New England Journal of Medicine, 342,* 1887-1892.

Cooper, P.J., Taylor, M.J., Cooper, Z., & Fairburn, C.G. (1987). The development and validation of the Body Shape Questionnaire. *International Journal of Eating Disorders, 6,* 485-494.

Cousins, J.H., Rubovits, D.S., Kay Dunn, J., Reeves, R.S., Ramirez, A.G., & Foreyt, J.P. (1992). Family versus individually oriented intervention for weight loss in Mexican-American women. *Public Health Reports, 107,* 549-555.

Crespo, C. J., Keteyian, S. J., Heath, G.W., & Sempos, C. T. (1996). Leisure-time physical activity among US adults: Results from the third National Health and Nutrition Examination Survey. *Archives of Internal Medicine, 156,* 93-98.

Crespo, C. J., Smit, E., Carter-Pokras, O., Andersen, R. (2001). Acculturation and leisure-time physical activity in Mexcian-American adults: Results from NHANES III: 1988-1994. *American Journal of Public Health, 91,* 1254-1257.

Davis, M.J. & Addis, M.E. (1999). Predictors of attrition from behavioral medicine treatments. *Annals of Behavioral Medicine, 21,* 339–349.

De Koning, L., Merchant, A.T., Pogue, J., & Anand, S.S. (2007). Waist circumference and waist-to-hip ratio as predictors of cardiovascular events: Meta-regression analysis of prospective studies. *European Heart Journal, 28,* 850-856.

Department of Health and Human Services. (2002). Protecting the health of minority communities. Retrieved April 29, 2007 from w.hhs.gov/news/press/2002pres/02 minorityhealth.html

Diabetes Prevention Program Research Group. (2002). Reduction in the incidence of type 2 diabetes with lifestyle interventions or metformin. *New England Journal of Medicine, 346,* 393-403.

Diaz, V.A., Mainous, A.G., & Pope, C. (2007). Cultural conflicts in the weight loss experiences of overweight Latinos. *International Journal of Obesity, 31,* 328-333.

Drewnoswski, A. (2004). Obesity and the food environment: dietary energy density and dietcosts. *American Journal of Preventive Medicine, 23,* 154–162.

Drewnoswski, A., & Specter, S.E. (2004). Poverty and obesity: the role of energy density and energy costs. *The American Journal of Clinical Nutrition, 79,* 6-16.

Everhart, J.E., Khare, M., Hill, M., & Maurer, K.R. (1999). Prevalence and ethnic differences in gallbladder disease in the United States. *Gastroenterology, 117,* 632-639.

Eyler, A.E., Wilcox, S., Matson-Koffman, D., Evenson, K.R., Sanderson, B., Thompson, J., … Rohm-Young, D. (2002). Correlates of physical activity among women from diverse racial/ethnic groups. *Journal of Women's Health and Gender-Based Medicine, 11,* 239-253.

Fabricatore**,** A. N., Wadden, T.A., Moore, R.H., Butryn, M.L., Heymsfield, S.B., & Nguyen, A.M. (2009). Predictors of attrition and weight loss success: Results from a randomized controlled trial. *Behaviour Research and Therapy, 47,* 685-691.

Fitzmaurice, G. (2000). Regression to the mean. *Nutrition, 16, 1,* 81-82.

Fitzgerald, N., Himmelgreen, D., Damio, G., Segura-Pérez, S., Peng, Y., & Pérez-Escamilla, R. (2006). Acculturation, socioeconomic status, obesity and lifestyle factors among low-income Puerto Rican women in Connecticut, U.S., 1998-1999. *Pan American Journal of Public Health, 19,* 306-313.

Flannery, P.M., Reise, S.P., & Yu, J. (2001). An empirical comparison of acculturation models. *Personality and Social Psychology Bulletin, 27,* 1035-1045.

Flegal, K.M., Graubard, B.I., Williamson, D.F., & Gail, M.H. (2005). Excess deaths associated with underweight, overweight and obesity. *Journal of the American Medical Association, 293,* 1861–1867.

Flegal, K.M., Ogden, C.L., & Carroll, M.D. (2004). Prevalence and trends in overweight in Mexican-American adults and children. *Nutrition Reviews, 62,* S144-S148.

Fleury, J., & Lee, S.M. (2006). The social ecological model and physical activity in African American women. *American Journal of Community Psychology, 37,* 129-140.

Ford, E.S., Giles, W.H., & Dietz, W.H. (2002). Prevalence of the metabolic syndrome among US adults. *Journal of the American Medical Association, 287,* 356-359.

Fortney, J.C., Booth, B.M., Blow, F.C., Bunn, J.Y., & Cook, C.A. (1995). The effects of travel barriers and age on the utilization of alcoholism treatment aftercare. *The American Journal of Drug and Alcohol Abuse, 21,* 391-406.

Foster, G.D., Wadden, T.A., & Vogt, R.A. (1997). Body image in obese women before, during, and after weight loss treatment. *Health Psychology, 16,* 226-229.

Gardner, C.D., Kiazand, A., Alhassan, S., Kim, S., Stafford, R.S., Balise, R.R., … King, A.C. (2007). Comparison of the Atkins, Zone, Ornish, and LEARN diets for change in weight and related risk factors among overweight premenopausal women: the A TO Z Weight Loss Study: a randomized trial. *Journal of the American Medical Association, 297,* 969-977.

Gormally, J., Black, S., Daston, S., & Rardin, D. (1982). The assessment of binge eating severity among obese persons. *Addictive Behaviors, 7,* 47-55.

Grassi, K., Gonzales, G., Tello, P., & He, G. (1999). La Vida Caminando: A community-based physical activity program designed by and for rural Latino families, *Journal of Health Education, 30,* S13-S17.

Haugen, H.A., Tran, Z.V., Wyatt, H.R., Barry, M.J., & Hill, J.O. (2007). Using telehealth to increase participation in weight maintenance programs. *Obesity, 15,* 3067–3077.

Hedley, A.A., Ogden, C.L., Johnson, C.L., Carroll, M.D., Curtin, L.R., & Flegal, K.M. (2004). Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *Journal of the American Medical Association, 291,* 2847-2850.

Heesch, K.C., & Mâsse, L.C. (2004). Lack of time for physical activity: perception or reality for African-American and Hispanic women? *Women and Health, 39,* 45-62.

Helms, J.E., Jernigan, J., & Mascher, J. (2005). The meaning of race in psychology and how to change it. *American Psychologist, 60,* 27-36.

Hill, J.O., & Peters, J.C. (1998). Environmental contributions to the obesity epidemic. *Science, 280,* 1371-1374.

Hill, J.O., Wyatt, H.R., Reed, G.W., & Peters, J.C. (2003). Obesity and the environment: Where do we go from here? *Science, 299,* 853-855.

Hollis, J.F., Gullion, C.M., Stevens, V.J., Brantley, P.J., Appel, L.J., Ard, J.D., … Svetkey, L.P. (2008). Weight loss during the intensive intervention phase of the

weight-loss maintenance trial. *Journal Preventive Medicine, 35,* 118-126.

Honas, J.J., Early, J.L.**,** Fredrickson, D.D., & O'Brien, M.S. (2003). Predictors of attrition in a clinical weight loss program. *Obesity Research, 11,* 888-894.

Hurtado, M.T., & Gauvain, M. (1997). Acculturation and planning for college among youth of Mexican descent. *Hispanic Journal of Behavioral Sciences, 19,* 506-516.

Kaiser, L.L., Townsend, M.S., Melgar-Quiñonez, H.R., Fujii, M.L., & Crawford, P.B. (2004). Choice of instrument influences relations found between food insecurity and obesity in Latino women. *The American Journal of Clinical Nutrition, 80,* 1372-1378.

Keel, P.K., Mitchell J.E., Davis, T.L., & Crow, S. J. (2000). Relationship between depression and body dissatisfaction in women with bulimia nervosa. *International Journal of Eating Disorders, 30,* 48-56.

Keller, C., Gonzales, A., & Fleuriet, J. (2005). Retention of minorities in clinical research studies. *Western Journal of Nursing Research, 27,* 292-306.

Kaplan, M.S., Huguet, N., Newsom, J.T., & McFarland, B.H. (2004). The association between length of residence and obesity among Hispanic immigrants. *American Journal of Preventive Medicine, 27,* 323-326.

Khan, L.K., Sobal, J., & Martorell, R. (1997). Acculturation, socioeconomic status, and obesity in Mexican Americans, Cuban Americans, and Puerto Ricans. *International Journal of Obesity, 21,* 91-96.

King, A. C., Castro, C.,Wilcox, S., Eyler, A. A., Sallis, J., & Brownson, R. C. (2000).

Personal and environmental factors associated with physical inactivity among different racial-ethnic groups of U.S. middle-aged and older-aged women. *Health Psychology, 19,* 354-364.

Kumanyika S. (2002). Obesity treatment in minorities. In T.A. Wadden & A.J. Stunkard (Eds.) *Handbook of obesity treatment* (pp.416-444). New York: Guilford Press.

Kurian, A.K., & Cardarelli, K.M. (2007). Racial and ethnic differences in cardiovascular disease risk factors: A systematic review. *Ethnicity & Disease, 17,* 143-152.

Ladrine, H., & Klonoff, E.A. (2004). Culture change and ethnic-minority health behavior: An operant theory of acculturation. *Journal of Behavioral Medicine, 27,* 527-552.

Lau, A.S. (2006). Making the case for selective and directed cultural adaptations of evidence-based treatments: Examples from parent training. *Clinical Psychology Science and Practice, 13,* 295-310.

Lazcano-Ponce, E.C., Miquel, J.F., Munoz, N., Herrero, R., Ferrecio, C., Wistuba, I.I., …Nervi, F. (2001). Epidemiology and molecular pathology of gallbladder cancer. *A Cancer Journal for Clinicians, 51,* 349-64.

Lean, M.E.J., Han, T.S., & Morrison, C.E. (1995). Waist circumference as a measure for indicating need for weight management. *British Medical Journal, 311,* 158-161.

Malcarne, V.L., Chavira, D.A., Fernandez, S., & Liu, P. (2006). The scale of ethnic experience: Development and psychometric properties. *Journal of Personality Assessment, 86,* 150-161.

Mann, T., Tomiyama, A.J., Westling, E., Lew, A., Samuels, B., & Chatman, J. (2007). Medicare's search for effective obesity treatments: Diets are not the answer. *American Psychologist, 62,* 220-233.

Marquez, D.X., McAuley, E., & Overman, N. (2004). Psychosocial correlates and outcomes of physical activity among Latinos: A review. *Hispanic Journal of Behavioral Sciences, 26,* 195-229.

McCaul, M.E., Svikis, D.S., & Moore, R.D. (2001). Predictors of outpatient treatment retention: Patient versus substance use characteristics. *Drug and Alcohol Dependence, 62,* 9-17.

McNeill, L.H., Kreuter, M.W., & Subramanian, S.V. (2006). Social environment and physical activity: a review of concepts and evidence. *Social Science and Medicine, 63,* 1011–1022.

McWilliams, C., & Meier, M.S. (1990). *North from Mexico: The Spanish Speaking People of the United States.* Westport, CT: Praeger Publishers.

Mokdad, A.H., Marks, J.S., Stroup, D.F., & Geberding, J.L. (2004). Actual causes of death in the United States, 2000. *Journal of the American Medical Association, 291,* 1238–1245.

Must, A., Spadano, J., Coakley, E.H., Field, A.E., Colditz, G., & Dietz, W.H. (1999). The disease burden associated with overweight and obesity. *Journal of the American Medical Association, 282,* 1523-1529.

Nagayama-Hall, G. (2001). Psychotherapy research with ethnic minorities: Empirical, ethical, and conceptual issues. *Journal of Consulting and Clinical Psychology, 69,* 502-510.

National Institute of Diabetes and Digestive and Kidney Diseases. (2007).Complications of diabetes. Retrieved April 20, 2007 from http://diabetes.niddk. nih.gov /complications/index.htm.

Neighbors, C.J., Marquez, D.X., & Marcus, B. H. (2008). Leisure-time physical activity disparities among Hispanic subgroups in the United States. *American Journal of Public Health, 98,* 1460-1464.

Neuhouser, M.L., Thompson, B., Coronado, G.D., & Solomon, C.C. (2004). Higher fat intake and lower fruit and vegetables intakes are associated with greater acculturation among Mexicans living in Washington State. *Journal of the American Dietetic Association, 104,* 51-57.

Nicklas, B.J., Wang, X., You, T., Lyles, M.F., Demons, J., Easter, L., ...Carr, J. (2009). Effect of exercise intensity on abdominal fat loss during calorie restriction in overweight and obese postmenopausal women: a randomized, controlled trial. *American Journal of Clinical Nutrition, 89,* 1043-1052.

O'Donohue, W. (2005). Cultural sensitivity: A critical examination. In R.H Wright & N.A. Cummings (Eds.*). Destructive trends in mental health: The well-intentioned path to harm.* New York: Taylor & Francis.

Ostrove, J. M., Adler, N. E., Kuppermann, M., & Washington, A. E. (2000). Objective and subjective assessments of socioeconomic status and their relationship to self-rated health in an ethnically diverse sample of pregnant women. *Health Psychology, 19,* 613-618.

Papas, M.A., Alberg, A.J., Ewing, R., Helzlsouer, K.J., Gary, T.L, & Klassen, A.C. (2007). The built environment and obesity. *Epidemiologic Review, 29,* 129-143.

Park, Y., Zhu, S., Palaniappan, L., Heshka, S., Carnethon, M.R., & Heymsfield, S.B. (2003). Prevalence and associated risk factor findings in the US population from

the third National Health and Nutrition Examination Survey, 1988-1994. *Archives of Internal Medicine, 163,* 427-436.

Perri, M.G., Martin, D.A., Leermakers, E.A., Sears, S.F., & Notelovitz, M. (1997). Effects of a group versus home-based exercise in the treatment of obesity. *Journal of Consulting and Clinical Psychology, 65,* 278-285.

Poston, W.S., Haddock, K., Suminski, R.R., & Olvera, N.E.. (2001). Evaluation of a culturally appropriate intervention to increase physical activity. *American Journal of Health Behavior, 25,* 396-406.

Poston, W.S., Reeves, R. S., Haddock, C.K., Stormer, S., Balasubramanyam, A., Satterwhite, O., … Foreyt, J.P. (2003). Weight loss in obese Mexican Americans treated for 1-year with orlistat and lifestyle modification. *International Journal of Obesity, 12,* 1486-1493.

Powell, L.H., Calvin, J.E., III, & Calvin, J.E., Jr. (2007). Effective obesity treatments. *American Psychologist, 62,* 234-246.

Saelens, B. E., Sallis, J. F., Black, J. B., & Chen, D. (2003). Neighborhood-based differences in physical activity: An environment scale evaluation. *American Journal of Public Health, 9,* 552–1558.

Sallis, J.F., Grossman, R.M., Pinski, R.B., Patterson, T.L., & Nader, P.R. (1987). The development of scales to measure social support for diet and exercise behaviors. *Preventive Medicine, 16,* 825-836.

Schmitt, S.K., Phibbs, C.S., & Piette, J.D. (2003). The influence of distance on utilization of outpatient mental health aftercare following inpatient substance abuse treatment. *Addictive Behaviors, 28,* 1183-1192.

Seeman, T.E., Merkin, S.S., PhD; Crimmins, E.M., & Karlamangla, A.S. (2010). Disability Trends among older Americans: National Health and Nutrition Examination Surveys, 1988-1994 and1999-2004. *American Journal of Public Health, 100,* 100-107.

Singh-Manoux, A., Marmot, M.G., & Adler, N.E. (2005). Does subjective social status predict health and change in health status better than objective status? *Psychosomatic Medicine,* 67, 855-861.

Slattery, M.L., Sweeney, C., Edwards, S., Herrick, J., Murtaugh, M., Baumgartner, K., …Byers, T. (2006). Physical activity patterns and obesity in Hispanic and non-Hispanic white women. *Medicine & Science in Sports & Exercise, 38,* 33-41.

Steidel, A.G., & Contreras, J.M. (2003). A new familism scale for use with Latino populations. *Hispanic Journal of Behavioral Sciences, 25,* 312-330.

Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion, 10,* 282-298.

Stunkard, A.J. (2002). Binge-eating disorder and the night-eating syndrome. In T. A. Wadden & A.J. Stunkard (Eds.), *Handbook of obesity treatment* (pp. 107-121). New York: Guilford.

Sue, S. (1999). Science, ethnicity, and bias. Where have we gone wrong? *American Psychologist, 54,* 1070-1077.

Sundquist J., & Winkleby, M. (2000). Country of birth, acculturation status, and abdominal obesity in a national sample of Mexican-American women and men. *International Journal of Epidemiology*, *29,* 470-477.

Taylor, W.C., Sallis, J.F., Lees, E., Hepworth, J.T., Feliz, K., Volding, D.C.,… Tobin, J.N. (2007). Changing social and built environments to promote physical activity: Recommendations from low income, urban women. *Journal of Physical Activity & Health, 4,* 54-65.

Teeters, J., Yoder, S., Balakrishnan, S., Mackin, M., Velarde, G., & Schwartz, R. (2007). Re-assessing the Hispanic Paradox in women: Comparison of cardiac risk factors and ischaemia by SPECT myocardial perfusion scintigraphy. *Journal of Nuclear Cardiology, 14,* S43-S43.

Teixeira, P.J., Going, S.B., Houtkooper, L.B., Cussler, E.C., Metcalfe, L.L., Blew, R.M.,… Lohman, T.G. (2004). Pretreatment predictors of attrition and successful weight management in women. *International Journal of Obesity, 28,* 1124–1133.

Thompson, J.K., & Altabe, M.N. (1991). Psychometric qualities of the figure rating scale. *The International Journal of Eating Disorders, 10,* 615-619.

Townsend, M.S., Peerson, J., Love, B., Achterberg, C., & Murphy, S.P. (2001). Food insecurity is positively related to overweight in women. *Journal of Nutrition, 131,* 1738-1745.

United States Department of Agriculture. (2001). Household food insecurity in the United States, *Food Assistance and Nutrition Research Report, 29*. Retrieved June 2, 2007 from http://www.ers.usda.gov/publications/fanrr29 /fanrr29.pdf

United States Department of Agriculture. (2006). Household food security in the United States, 2005. *Economic Research Report No. (ERR-29).* Retrieved December 6, 2007 from http://www.ers.usda.gov/Publications/ERR29/ERR29b.pdf

Valsamakis, G., McTernan, P.G., Chetty, R., Al Daghri, N., Field, A., Hanif, W., … Kumar, S. (2004). Modest weight loss and reduction in waist circumference after medical treatment are associated with favorable changes in serum adipocytokines. *Metabolism, 53,* 430-434.

van der Kooy, K., Leenen, R., Seidell, J.C., Deurenberg, P., Droop, A., & Bakker, C.J. (1993). Waist-to-hip ratio is a poor predictor of changes in visceral fat. *American Journal of Clinical Nutrition, 57,* 327-333.

Venkat-Narayan, K.M., Boyle, J.P., Thompson, T.J., Sorensen, S.W., & Williamson, D.F. (2003). Lifetime risk for diabetes mellitus in the United States. *Journal of the American Medical Association, 290,* 1884-1890.

Ventura, S.J., Hamilton, B.E., & Sutton, P.D. (2003). Revised birth and fertility rates for The United States, 2000 and 2001. *National Vital Statistics Reports, 51.* Retrieved May 12, 2007 from http://www.cdc.gov.mill1.sjlibrary.org/nchs/data/nvsr/nvsr51/nvsr51_04.pdf

Wadden, T.A., Berkowitz, R.I., Sarwer, D.B., Pru-Wisniewski, R, & Steinberg, C. (2001). Benefits of lifestyle modification in the pharmacologic treatment of obesity. *Archives of Internal Medicine, 161,* 218-227.

Wadden, T.A., Brownell, K.D., & Foster, G.D. (2002). Obesity: Responding to the global epidemic. J*ournal of Consulting and Clinical Psychology, 70,* 510-525.

Wadden, T.A., & Foster, G.D. (2000). Behavioral treatment of obesity. *The Medical Clinics of North America, 84,* 441-461.

Wadden, T. A., & Osei, S. (2002). The treatment of obesity: An overview. In T. A. Wadden & A. J. Stunkard (Eds.), *Handbook of obesity treatment* (pp. 229-248). New York: Guilford.

Wang, Y., & Beydoun, M.A. (2007). The obesity epidemic in the United States—gender, age, socioeconomic, racial/ethnic, and geographic characteristics: A systematic review and meta-regression analysis. *Epidemiologic Reviews.* Retrieved May 17, 2007 from http://epirev.oxfordjournals.org.libproxy.unm.edu/cgi/reprint/ mxm007v1.

Wardle, J., Waller, J., & Jarvis, M. J. (2002). Sex differences in the association of socio-economic status with obesity. *American Journal of Public Health, 92,* 1299-1304.

Whelton, P.K., Appel, L.J., Espeland, M.A., Applegate, W.B., Ettinger, W.H., Kostis, J.B., Kumanyika, S., … Cutler, J.A. (1998). Sodium reduction and weight loss in the treatment of hypertension of older persons. *Journal of the American Medical Association, 279,* 839-46.

Winkler, M.A. (2004). Measuring race and ethnicity: Why and how? *Journal of the American Medical Association, 292,* 1612-1614.

Yancey, A.K., McCarthy, W.J., Taylor, W.C., Merlo, A., Gewa, C., Weber, M.D., & Fielding, J.E. (2004). The Los Angeles Lift Off: A sociocultural environmental change intervention to integrate physical activity into the workplace. *Preventive Medicine, 38,* 848-856.

Yovel, I. & Sarfen, S.A. (2006). Measuring homework utility in psychotherapy: Cognitive-behavioral therapy for adult attention-deficit hyperactivity disorder as an example. Cognitive Therapy and Research, 31, 385-399.

Table 1. *Weight Loss Programs Culturally Tailored for Hispanic Women*

Author	Sample	Design	Tx Length
Avila	Mexican-American women (n=44); ≥20% overweight. Exclusionary criteria: use of any injectable or oral medication besides hormonal treatment/birth control.	Randomized trial; assigned to: (a) control cancer education group (n=22); (b) diet and exercise program (n=22)	8 sessions over 10 weeks.
Follow-up Rates	Immediate Post-treatment: 95% experimental, 82% control; 3-month post-treatment follow-up: 47% experimental, 44% control.		
Adaptation	Lead by bilingual, bicultural physician; sessions presented bilingually. Each participant was assigned a fellow Hispanic "buddy" to co-participate in exercise.		
Author	Sample	Design	Tx Length
Cousins	Mexican-American women (n=168); 20 to 100% above ideal body	Randomized trial; assigned to: (a) manual only group;	Groups (b) and (c): 24 weekly sessions and 6 monthly sessions.

	weight; 1+ kids. Exclusionary criteria: hypertension, diabetes, or chronic condition with unique physical/ diet needs.	(b) individual weight loss group; (c) family weight loss group.	
Follow-up Rates	Data for 51% of total participants was analyzed. Participants were excluded from data analysis if they missed baseline measurement or a 3-month, 6-month, or 12-month follow-up.		
Adaptation	Manual was culturally adapted to "reflect cultural values of population" (p. 511) and was translated into Spanish; treatment utilized bilingual facilitators; the family treatment (group c) reflected the cultural value familism with partners invited to attend.		

Author	Sample	Design	Tx Length
Poston (2001)	Mexican-American women (n=379); BMI 25≥ but ≤40. Exclusionary criteria: pregnancy, diabetes, BMI ≥ 40.	Randomized block design; blocks assigned to: (a) physical activity program (n=194); (b) wait-list (n=185).	6 months of weekly instructor led meetings, followed by 6 months of peer led meetings along with monthly instructor meetings.

Follow-up Rates	6-month follow-up: 69% experimental, 72.9% control. 12-month follow-up: 52.5% experimental, 72.9% control.
Adaptation	Materials available in Spanish; bilingual, Mexican origin instructors; modification of Mexican foods; use of cultural values (e.g., familism) as source of motivation; use of pre-existing social networks.

Author	Sample	Design	Tx Length
Poston (2003)	Mexican-American women (n=108); BMI≥27. Exclusionary criteria: serious medical condition, lack of physician consent, plans to move.	Randomized trial; assigned to: (a) lifestyle modification + Orlistat (n=56); (b) wait-list control (n=52).	24 weekly sessions, 6 bimonthly sessions, and three monthly maintenance sessions; 12 months of Orlistat.
Follow-up Rates	6-month follow-up: 66.1% experimental, 67.3% control. 12-month follow-up: 57.1% experimental, 65.4% control.		
Adaptation	Materials available in Spanish; bilingual Mexican-American instructor; modification of Mexican/native foods; use of cultural values (e.g., familism) to motivate.		

Note. All articles are listed by first author only. Tx=Treatment.

Table 2. *Demographic Characteristics of Study Participants at Intake (N=100)*

	M	*SD*	Range
Age	45.07	12.06	20-65
Years of Education	15.05	2.81	9-23
Number of Children	1.97	1.14	0-6
Number of Children Living at Home	0.96	1.08	0-4
	Median	SD	Range
Family Income	44,000	37,607	0-160,000
Highest Degree	N	%	
High School, GED, or less	36	36.0	
Trade school certificate	16	16.0	
Associate's degree	10	10.0	
Bachelor's degree or greater	38	38.0	
Spanish Speaker	N	%	
Less than "Well"	50	50.00	
"Well" or better	50	50.00	
Generational Status	N	%	
First (Immigrant Status)	8	8.0	
Second	19	19.0	
Third or Higher	73	73.0	
Marital Status	N	%	
Single (Never Married)	16	16.0	

Table 2., Con't.

Married	56	56.0
Separated (Still Married)	2	2.0
Divorced	23	23.0
Widowed	3	3.0

Note. This table includes all 100 participants, including those who did not attend a single session.

Table 3. *Frequency Table for Participants' Current or Former Occupation (N=100)*

Occupation	Frequency
No Primary Occupation	11
Arts, Design, Entertainment, Sports, and Media Occupations	
Writer	1
Building and Grounds Cleaning and Maintenance Occupations	
Housekeeper	1
Business and Financial Operations Occupations	
Business/System Analyst	7
Business Consultant	1
Community and Social Services Occupations	
Counselor	2
Social Worker/Case Manager	2
Education, Training, and Library Occupations	
Primary or Secondary School Teacher or Teaching Assistant	9
Adult Education Trainer	2
Food Preparation and Serving Related Occupations	
Food Delivery	1
Waitress	1
Healthcare Practitioners and Technical Occupations	
Registered Nurse	3

Table 3., Con't.

Technical Health Specialist	5
Healthcare Support Occupations	
Health Care Assistant	7
Home Health Care Provider	2
Legal Occupations	
Lawyer/Paralegal	2
Management Occupations	
Business/Office Manager	5
Office and Administrative Support Occupations	
Office Assistant/ Coordinator	14
Receptionist or Secretary	3
Bill Collector	1
Personal Care and Service Occupations	
Caregiver	4
Stylist/Beautician	3
Production Occupations	
Factory Worker	1
Sales and Related Occupations	
Retail Sales/Telemarketing	6
Cashier	3
Customer Service Representative	2

Table 3., Con't.

Transportation and Material Moving Occupations

Driver	1

Note. This table includes all 100 participants, including those who did not attend a single session.

Table 4. *Characteristics of Study Participants (N=100) at Intake*

	M	*SD*	Range
Body Mass Index (BMI)	33.04	3.73	25.08-39.97
Waist Measurement	39.37	3.79	27.67-47.17
Hip Measurement	45.95	3.09	39.67-54.20
Waist-to-Hip Ratio	0.86	0.05	0.70-0.97
Body Shape Questionnaire	116.46	29.97	57-187
Figure Rating Scale-Ideal	3.49	0.86	1-7
Figure Rating Scale-Actual	6.39	0.88	4-9
Figure Rating Scale Discrepancy	2.90	1.05	0-7
Beck Depression Inventory-II (BDI-II)	13.31	9.13	0-45
	N	%	
Elevated BDI-II Score Ranges			
Mild symptoms of depression (14-19)	21	21	
Moderate symptoms of depression (20-28)	9	9	
Severe Symptoms of depression (>28)	9	9	
	M	SD	Range
Binge Eating Scale	14.47	7.90	0-33
	N	%	
Binge Eating Scale Scores			
Score > 17	33	33	
Score ≥ 27	8	8	

Note. This table includes all 100 participants, including those who did not attend a single session.

Table 5. *Baseline Demographic, Anthropometric, and Psychological Characteristics Compared for Women with Three Levels of Treatment Attendance (N=100)*

	Non-Attendees (n=18)		Non-Completers (n=42)		Completers (n=40)			
	M	*SD*	*M*	*SD*	*M*	*SD*	*F*	*p*
Income	44,147	38,136	51,943	32,712	66,561	40,640	2.73	n.s
Age	41.89_{a}	9.29	41.93_{a}	13.09	49.80_{b}	10.62	5.61	<.01
BMI	33.23	3.99	33.32	3.88	32.67	3.51	0.33	n.s
WH Ratio	0.86	0.08	0.85	0.05	0.86	0.04	0.65	n.s
BSQ	124.05	29.03	122.29	30.58	106.93	27.80	3.57	<.05
FRS Disc.	3.50_{a}	1.15	2.87	1.16	2.65_{b}	0.74	4.39	<.05
BDI-II	18.61_{a}	11.77	13.93	8.20	10.20_{b}	7.52	5.93	<.01
BES	14.61	9.77	14.04	7.57	14.85	7.50	0.11	n.s

Note. Column means with different subscripts vary at $p<.05$ as per Tukey's corrected pairwise comparisons. All measures are those taken at baseline. Income refers to total mean household annual income reported on the demographic questionnaire in U.S. dollars. Note that income reported in this table is distinct from the median income reported previously. BMI=Body Mass Index. WH Ratio= Waist to Hip Ratio. BSQ= Body Shape Questionnaire. FRS Disc.= Figure Rating Scale discrepancy between ideal and actual figures. BDI-II= Beck Depression Inventory-II. BES=Binge Eating Scale. "Non-attendee" refers to participants who did not attend a single session, "non-completer" refers to individuals who attended half or fewer of the treatment sessions, and "completer" refers individuals who attended more than half of the sessions.

Table 6. *Participant Characteristics by Attendance Group (N=100)*

	Non-Attendees (n=18)		Non-Completers (n=42)		Completers (n=40)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Years of Education	14.44	1.89	14.81	3.18	15.58	2.72
Number of Children	2.00	1.19	1.95	1.27	1.97	0.99
Number of Children Living at Home	1.33	1.24	1.05	1.10	0.70	0.93
	Median	*SD*	Median	*SD*	Median	*SD*
Family Income	32,500	38,163	40,370	37,712	58,000	40,640
Highest Degree	N	%	N	%	N	%
High School, GED, or less	6	33.33	17	40.50	13	32.50
Trade school certificate	5	27.80	7	16.70	4	10.00
Associate's degree	3	16.70	4	9.50	3	7.50
Bachelor's degree or greater	4	22.20	14	33.30	20	50.00
Spanish Speaker						
Less than "Well"	10	55.60	20.00	47.62	20	50.00
"Well" or better	8	44.40	22.00	52.38	20	50.00
Generational Status						
First (Immigrant Status)	2	11.11	4	9.50	2	5.00
Second	2	11.11	13	31.00	4	10.00
Third or Higher	14	77.77	25	59.50	34	85.00

Table 6., *con't.*

Marital Status	N	%	N	%	N	%
Single (Never Married)	3	16.70	7	16.70	6	15.00
Married	8	44.40	24	57.10	24	60.00
Separated (Still Married)	0	0	1	2.40	1	2.50
Divorced	7	38.90	8	19.00	8	20.00
Widowed	0	0	2	4.80	1	2.50
Employment Status						
Works full-time	8	44.40	28	66.70	18	45.00
Works part-time	3	16.70	5	11.90	8	20.00
Not currently employed	7	38.90	9	21.40	14	35.00

Note. Percentages may not add to 100 due to rounding. "Non-attendee" refers to participants who did not attend a single session "non-completer" refers to individuals who attended half or fewer of the treatment sessions, and "completer" refers individuals who attended more than half of the sessions.

Table 7. *Relationship between Depression Symptoms, Body Dissatisfaction, and Attendance*

Predictor	β	*t*	*p*
Beck Depression Inventory-II	-.25	-2.46	<.05
Figure Rating Scale Discrepancy	-.19	-1.87	<.10
Model: R=.36 R^2=.13 Adjusted R^2=.11			p<.01

Note. Criterion variable=number of sessions attended.

Table 8. *Relationship between Body Dissatisfaction and Attendance by Level of Depression Symptoms*

Model 1.

Predictor	β	*t*	*p*
Body Shape Questionnaire	-.29	-2.29	<.05
Model: R=.29 R^2=.08 Adjusted R^2=.07 p<.05			

Model 2.

Predictor	β	*t*	*p*
Body Shape Questionnaire	-.11	-.70	n.s.
Model: R=.11 R^2=.01 Adjusted R^2= -.01 p=n.s.			

Note. Criterion variable=number of sessions attended. Model 1 includes only women with minimal (BDI-II ≤ 13) symptoms of depression and Model 2 includes only women with mild or greater (BDI-II ≥ 14) symptoms of depression.

Table 9. *Pearson Correlations (r) between Variables of Interest and Measures of Adherence (N=100)*

	1	2	3	4	5	6	7	8	9	10	11	12
1. Attendance	-	.64***	.57***	-.15	.14	-.04	-.15	-.07	-.10	.09	.24**	-.10
2. Step Goals		-	.80***	-.20*	.23**	-.12	.03	.01	.04	.14	.03	-.05
3. Calorie Goals			-	-.32***	.19	-.09	.12	-.06	-.03	.16	-.02	-.08
4. Familism				-	-.15	.15	.21**	.18*	-.02	-.03	-.08	.22**
5. Neighborhood					-	.01	-.17*	-.04	.05	.02	-.02	.18*
6. Ethnic Identity						-	.07	.07	.14	.07	.10	.06
7. Food Insecurity							-	.09	-.05	-.05	-.29	-.11
8. Support Eating								-	.60***	.20**	.20**	.19*
9. Support Exer.									-	-.05	.24**	.27**
10. Domestic Hrs.										-	-.01	-.06
11. Income											-	.02
12. BMI												-

*p<.10; **p<.05; *** p<.01

Note. N=100 for all analyses except rows/columns for step and calorie goal completion (n=82). Attendance denotes total sessions attended; Step Goals signifies number of walking goals met and turned into therapists; Calorie Goals signifies number of calorie goals met and turned into therapists; Familism refers to total score on the *Attitudinal Familism Scale*; Neighborhood refers to subjective neighborhood quality as measured by the *Neighborhood Environment Walkability Scale;* Ethnic Identity refers to the subscale score on Ethnic Identity as measured by the *The Scale of Ethnic Experiences;* Food

Table 9., *con't.*

Insecurity refers to total score (continuous) on *U.S. Department of Agriculture Food Security Scale-Adult*; Support Eating refers to encouragement for eating healthier foods by household members as measured by the *Social Support Surveys for Diet and Exercise Behaviors*; Support Exer. refers to the score on mutual household engagement in exercise as measured by the *Social Support Surveys for Diet and Exercise Behaviors;* Domestic hrs. refers to time spent in childcare or housework during week prior to assessment as measured by the *United Kingdom Time Use Survey: Adult One Day Diary*; Income refers to household income in U.S. dollars; BMI refers to Body Mass Index.

Table 10. *Multiple Linear Regression Results for Predictors of Session Attendance*

Predictor	β	*t*	*p*
Familism Score	-.11	-1.02	n.s.
Household/Childcare Time	.08	.79	n.s.
Income	.22	2.16	<.05
Baseline BMI	-.09	-.89	n.s.
Model: R=.28 R^2=.08 Adjusted R^2=.04 p<.10			

Note. Criterion variable=number of sessions attended. BMI= Body Mass Index.

Table 11. *Multiple Linear Regression Results for Predictors of Step Goal Completion*

Predictor	β	*t*	*p*
Familism	-.18	-1.47	n.s.
Household/childcare hours	.15	1.31	n.s.
Ethnic Identity	-.09	-.78	n.s.
Neighborhood satisfaction	.25	2.10	<.05
Family support for physical activity	.01	.02	n.s.
Food Insecurity	.12	1.00	n.s.
Income	.06	.52	n.s.
Baseline BMI	-.05	-.38	n.s.
Model: R=.37	R^2=.13	Adjusted R^2=.04	p<. n.s.

Note. Criterion variable=step goal completion. BMI= Body Mass Index.

Table 12. *Multiple Linear Regression Results for Calorie Goal Completion*

Predictor	β	*t*	*p*
Familism	-.35	-3.03	<.01
Household/childcare hours	-.18	1.63	n.s.
Ethnic Identity	-.04	-.35	n.s.
Family support for healthy eating habits	-.051	-.44	n.s.
Food Insecurity	.20	1.72	<.10
Income	.03	.23	n.s.
Baseline BMI	.03	.23	n.s.
Model: R=. 41	R^2=. 17	Adjusted R^2=.09	p<.10

Note. Criterion variable=calorie goal completion. BMI= Body Mass Index.

Table 13. *Logistic Regression Results for Treatment Completion*

Predictor	B	SE	Wald's χ^2	*p*
Familism	-.01	.01	1.13	n.s
Household/childcare hours	.00	.01	.03	n.s.
Income	.00	.00	2.99	n.s.
Baseline BMI	-.05	.00	.63	n.s.

Note. B= unstandardized coefficient. SE=standard error.

Table 14. *Measures at Pre and Post-Treatment for Treatment Completers (n=38)*

	Pre-treatment		Post-treatment			
	M	*SD*	*M*	*SD*	*t*	*p*
Weight (lbs.)	179.45	18.77	171.66	19.44	6.16	<.001
W-to-H Ratio	0.86	0.04	0.84	0.06	3.30	<.01
BSQ	108.73	27.81	84.97	24.60	5.57	<.001
FRS	2.59	0.73	1.88	0.95	4.79	<.001
BDI-II	9.92	7.55	4.78	4.41	4.18	<.001
BES	14.51	7.51	7.10	5.76	5.82	<.001

Note. "Treatment Completer" refers to an individual who attended more than half of the sessions (>8). W-to-H Ratio= ratio of waist to hip measurement. BSQ= Body Shape Questionnaire. FRS= Figure Rating Scale discrepancy score (*real-ideal*). BDI=II= Beck Depression Inventory-II. BES= Binge Eating Scale.

Table 15. *Treatment Completer and Non-Completer Treatment Response*

	Completer		Non-Completer			
	M	*SD*	*M*	*SD*	*F*	*p*
Weight (lbs.)	7.78	7.78	1.27	6.62	11.51	<.001
W-to-H Ratio	.02	.04	.02	.06	.15	n.s.
BSQ	23.76	26.19	22.00	28.43	.08	n.s.
FRS	.72	.90	.60	.84	.21	n.s.
BDI-II	5.14	7.47	4.52	5.92	.11	n.s.
BES	7.40	7.75	3.18	6.76	4.50	<.05

Note. Means and standard deviations refer to change scores (time 1–time 2). "Treatment Completer" refers to an individual who attended more than half of the sessions (>8). "Treatment Non-Completer" refers to an individual who attended >1≤ 8 treatment sessions. W-to-H Ratio= ratio of waist to hip measurement. BSQ= Body Shape Questionnaire. FRS= Figure Rating Scale discrepancy score (real-ideal). BDI=II= Beck Depression Inventory-II. BES= Binge Eating Scale.

Figure 1. *CONSORT Flow Diagram for Study Participants*

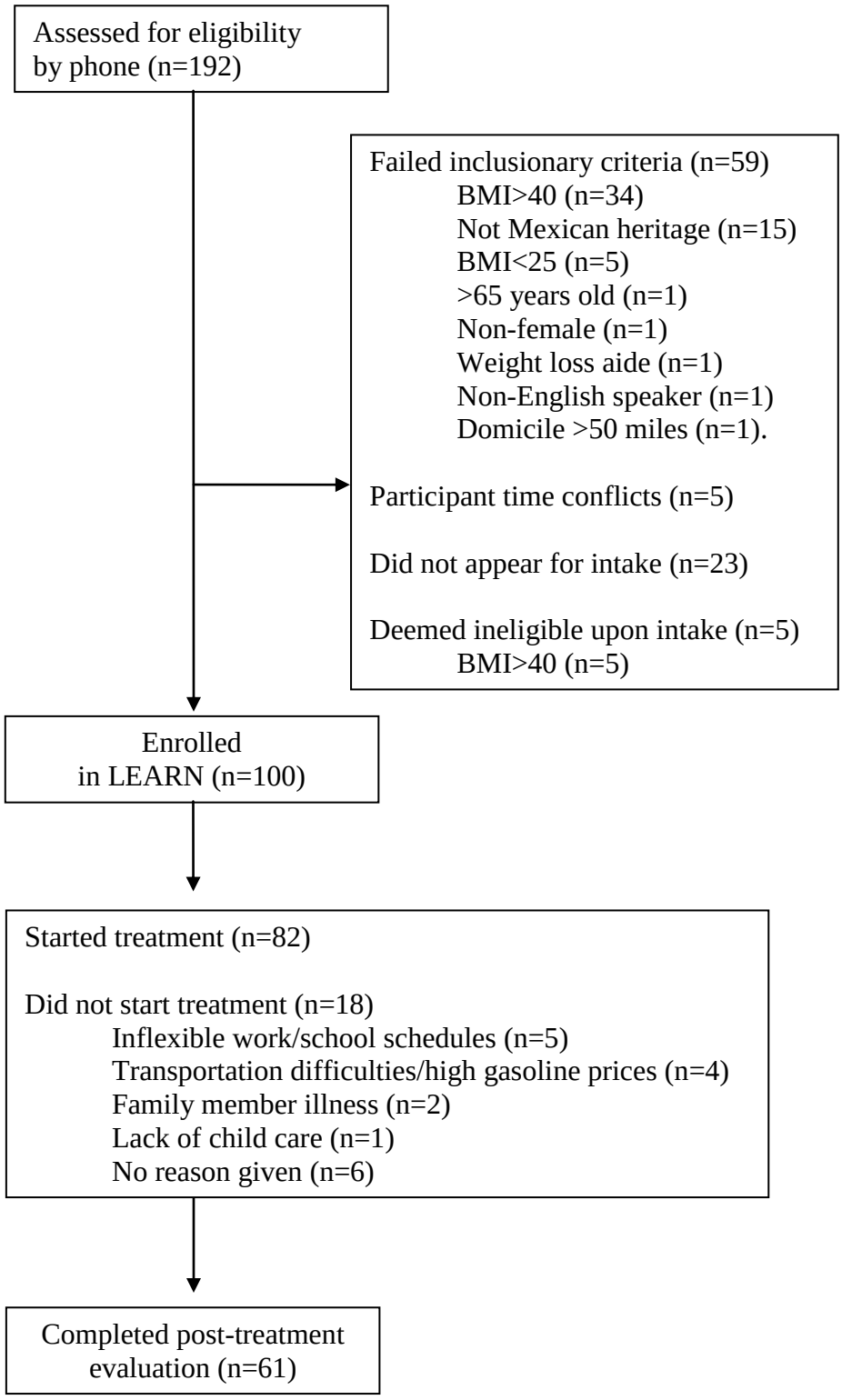

Figure 2. *Study Newspaper Advertisement*

Figure 3. *Study Advertisement Flyer*

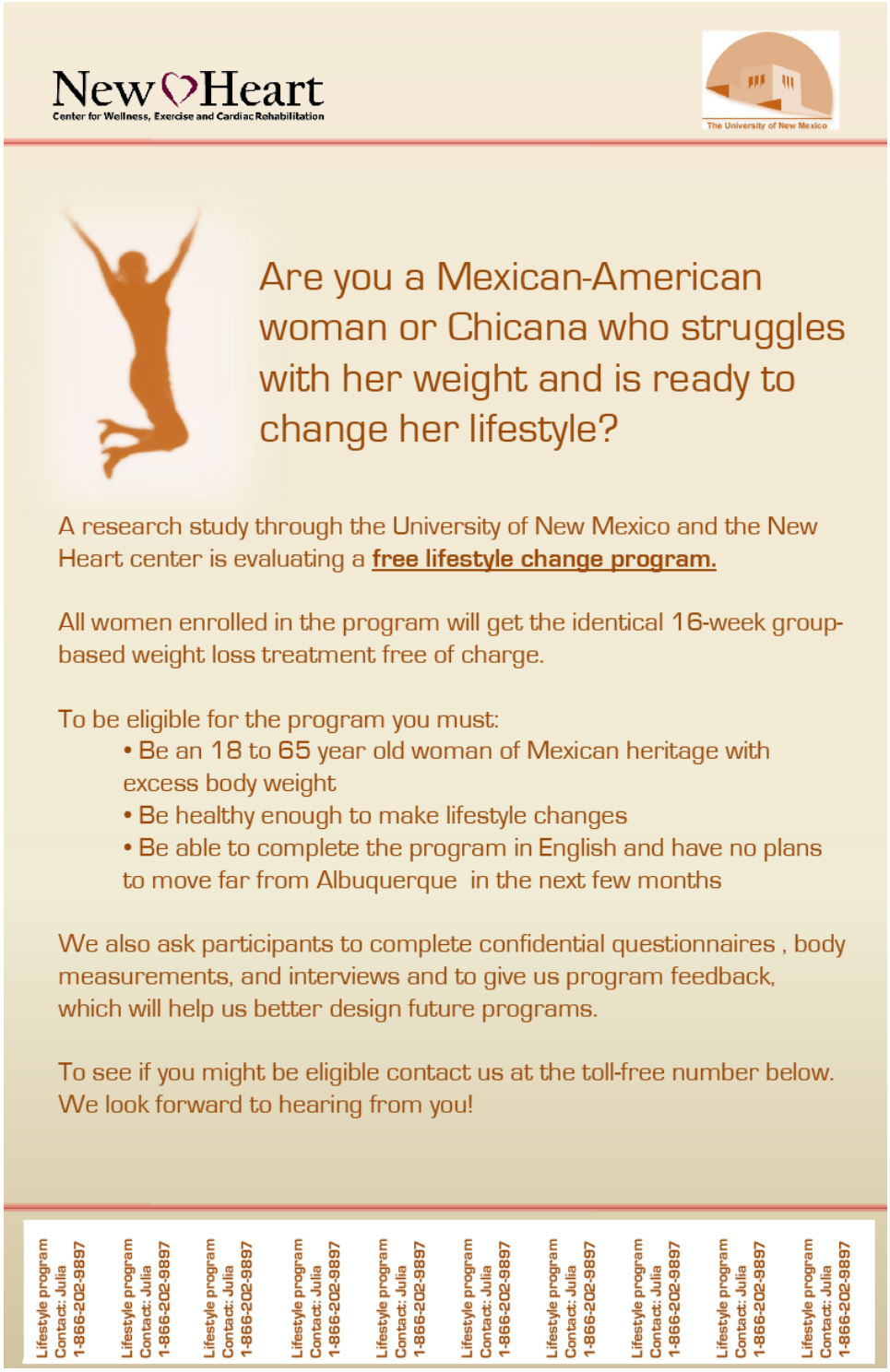

Figure 4. *Diagram of Reported Treatment Goals Met as a Mediator between Attendance and Weight Loss*