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### Authors

Marquez, Becky

Zhang, Xinlian

Huang, Xinyi

et al.

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## Body image and physical activity in Latinas

Becky Marquez<sup>1</sup>, Xinlian Zhang<sup>1</sup>, Xinyi Huang<sup>1</sup>, Andrea Mendoza-Vasconez<sup>2</sup>, Tanya Benitez<sup>2</sup>, Bess Marcus<sup>2</sup>

<sup>1</sup> Herbert Wertheim School of Public Health & Human Longevity Science, University of California San Diego, La Jolla, San Diego, CA, USA

<sup>2</sup> Department of Behavioral and Social Sciences, Brown University School of Public Health, Providence, Rhode Island, USA

### Abstract

Women with negative body image engage in less physical activity. The purpose of this study is to examine the relationship between body image and physical activity in Latinas participating in a lifestyle program. Participants (age  $43.8 \pm 10.1$  years and BMI  $30.4 \pm 5.2$  kg/m<sup>2</sup>) were enrolled in a 12-month culturally and linguistically adapted, individually tailored, intervention focused on increasing moderate-to-vigorous intensity physical activity (MVPA). Longitudinal assessments were conducted on body image dissatisfaction (BID) using the Figure Rating Scale, MVPA using the 7-day PAR interview, and objectively measured body weight. Pre-intervention BID did not significantly predict MVPA change. Participants experienced considerable reduction in BID. Greater MVPA engagement and weight loss were independently related to BID reduction. Acculturation did not moderate these relationships. Body image improved in Latinas participating in a cognitive and behavioral physical activity intervention regardless of weight loss and acculturation level.

### Keywords

Body image; Physical activity; Weight; Latinas; Acculturation

### Introduction

Latinas are less physically active and have higher prevalence of related chronic conditions such as obesity compared to non-Hispanic White women (Go et al., 2014). Lifestyle interventions for Latinas targeting theory informed cognitive and behavioral constructs have produced small to moderate increases in physical activity (Loya, 2018). Identifying factors associated with physical activity outcomes can help inform future interventions to optimize treatment effects.

Individuals with lower body satisfaction tend to have lower levels of physical activity (Neumark-Sztainer et al., 2006). Conversely, those that are more satisfied with their body

<sup>✉</sup> Becky Marquez [bemarquez@ucsd.edu](mailto:bemarquez@ucsd.edu).

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size are more likely to engage in regular physical activity (Kruger et al., 2008). Moreover, individuals who participate in physical activity interventions experience higher physical activity efficacy, which is linked to improved body image (Martin Ginis et al., 2014). The relationship between body image and physical activity is proposed to be bidirectional or reciprocal such that negative body image may be a barrier to physical activity whereas physical activity performance may subsequently reduce negative body image (Sabiston et al., 2019). Similarly, participants in weight loss studies that start with higher body dissatisfaction tend to lose less weight however, improvement in body dissatisfaction occurs among those that lose weight (Stewart et al., 2011; Teixeira et al., 2004). Given that most studies on body image have focused on young White females, it is unknown whether increasing physical activity can benefit body image as much as weight loss particularly among middle-aged Latinas with overweight (Kilpela et al., 2015).

Although Latinas generally report greater body size satisfaction than non-Hispanic White women, this may vary with ethnicity and acculturation level (Kruger et al., 2008). Mexican American women, but not Puerto Rican or Cuban women, report greater body dissatisfaction compared to non-Hispanic White women (Quiñones et al., 2022). U.S. acculturation is associated with greater body dissatisfaction but stronger ethnic identity is associated with lower body dissatisfaction (Bettendorf & Fischer, 2009; Warren, 2014).

The purpose of this study was to examine the relationship of body image with physical activity change in Latinas participating in a 12-month physical activity intervention. We hypothesized the following: (1) Pre-intervention body image dissatisfaction will predict physical activity change (i.e., higher body image dissatisfaction will predict lower physical activity) (2) Body image dissatisfaction will reduce from pre- to post-intervention (3) Change in physical activity will be associated with reduction in body image dissatisfaction independent of change in weight (i.e., higher physical activity will be associated with lower body image dissatisfaction) (4) Acculturation will moderate the relationship of body image dissatisfaction with physical activity change.

## Methods

### Participants

Participants consisted of a community sample from San Diego County, California. Recruitment was conducted via community events as well as mass and social media. Women were eligible for the study if they self-identified as Latino/Hispanic, were 18–65 years old, were able to speak and read Spanish or English, and engaged in less than 60 min per week of moderate-to-vigorous intensity physical activity (MVPA). All participants provided written informed consent. The Institutional Review Board at the University of California San Diego approved the study.

### Measures

**Participant characteristics**—At baseline, data were collected on participant demographic information and acculturation. Demographic factors collected in self-reported questionnaire included age, nativity (U.S. or foreign born), ethnicity (Mexican or other), and

education (Less than high school, high school graduate, or college graduate). Acculturation was assessed using the Brief Acculturation Scale (BAS; Cronbach  $\alpha = 0.93$ ) which is a validated 4-item measure specific to language use with possible scores ranging from 4 to 20 (Norris et al., 1996).

**Body image**—Body Image Dissatisfaction (BID) was determined by the Figure Rating Scale at baseline and 12 months (Stunkard et al., 1983). Participants were asked to select the one of nine images that closely resembles their actual and their ideal body size. BID is calculated from the absolute difference between actual and ideal images resulting in a score of 0 to 8. Higher values reflect greater body image dissatisfaction. The scale has shown good test-retest reliability and validity (Thompson & Altabe, 1991).

**Physical activity**—Physical activity was assessed with the 7-Day Physical Activity Recall (PAR) Interview at baseline and 12 months (Sallis et al., 1985). The PAR is an interviewer-administered measure that assesses performance of MVPA (i.e., aerobic activity ranging from brisk walking to running supported by the body's rhythmic movement of large muscles causing increased heart rate and breathing; U.S. Department of Human Health Services, 2018) over the past week in at least ten-minute bouts. The instrument has demonstrated acceptable reliability, internal consistency, and congruent validity with objective measures (e.g. accelerometers) (Dishman & Steinhardt, 1988; Leenders et al., 2001).

**Weight and height**—Body weight and height were measured using a digital scale and stadiometer, respectively, while participants wore no shoes and light clothing at baseline and 12 months. Body mass index (BMI) was calculated in  $\text{kg}/\text{m}^2$ .

## Intervention

Seamos Activas II was a randomized controlled trial testing two physical activity interventions for underactive Latinas targeting constructs from Social Cognitive Theory and the Transtheoretical Model. Intervention details were previously described elsewhere (Benitez et al., 2020). Briefly, after an initial goal setting session using motivational interviewing principles, participants received individually tailored feedback messages in English or Spanish via computer-generated reports based on monthly questionnaires assessing self-efficacy, stages of change, and processes of change. Both the Original and Enhanced interventions emphasized cognitive and behavioral strategies for increasing physical activity levels such as goal-setting, self-monitoring, problem-solving, and social support. The interventions were delivered through weekly and monthly print-based materials. The Enhanced intervention also provided interactive text messages with weekly tips, more content on exercise enjoyment and social support, and self-monitoring reminders along with phone contacts. Through a process of formative research described elsewhere, the intervention was culturally adapted to address specific attitudes and barriers to physical activity for Latinas (Pekmezi et al., 2009). Both interventions were successful at increasing and maintaining minutes per week of MVPA (Original  $132 \pm 130$  vs. Enhanced  $145 \pm 149$ ) over 12 months with no difference between treatment groups (Marcus et al., 2022).

## Analysis

Data from 199 participants were analyzed. Mean and standard deviation for continuous variables and proportions for categorical variables were used to summarize participant characteristics. Changes in BID and MVPA were calculated directly taking the difference between the 12 month and baseline values. Weight change was calculated with the difference between baseline and 12-month values divided by baseline weight to reflect percent weight loss.

Wilcoxon signed rank test and Wilcoxon rank sum test were used to assess the significance of variable changes pre- and post- intervention and between treatment group comparisons. We used linear regression models to assess the relationship between variables, including the association between pre-intervention BID and changes in MVPA, the association between the changes in MVPA or weight with future BID, and exploring potential moderating effect of BAS. All models controlled for corresponding baseline values. Covariates (i.e., age, education, nativity, and BAS score) were considered. For each outcome (MVPA, weight, or BID change), we included only the covariates that demonstrated a significant coefficient in a univariate regression model with the outcome at significance level of 0.05. For all the outcomes, none of these covariates were retained after the filtering process.

As a sensitivity analysis, we employed the MICE package to perform multiple imputation on all the variables in the dataset. Retention at 12 months was 75% for Original and 69% for Enhanced treatment groups. Only baseline variables were set to predict outcomes. Ten multiple imputations were generated and the results were combined using the pool function in the MICE package based on the Rubin's method (van Buuren & Groothuis-Oudshoorn, 2011).

## Results

A total of 199 participants enrolled in the study. Participants were women (aged  $43.8 \pm 10.1$  years) of predominantly Mexican American ethnicity (89%) with at least a high school education (71%). Most participants were first-generation in the U.S. (82%) and spoke primarily Spanish (72%). At baseline, participants on average had low levels of language-based acculturation (BAS  $7.5 \pm 3.7$ ), reported body dissatisfaction (BID  $2.4 \pm 1.1$ ), were underactive (MVPA  $12.4 \pm 22.5$  min per week), and met criteria for overweight or obesity (BMI  $30.4 \pm 5.2$  kg/m<sup>2</sup>).

### Pre-intervention body image dissatisfaction

Pre-intervention BID was not significantly associated with change in MVPA ( $p = 0.44$ ) or weight ( $p = 0.45$ ). Participants starting the intervention with higher BID scores were just as likely to increase time engaged in physical activity or to lose weight post-intervention as those with lower BID.

### Body image dissatisfaction change

BID was significantly reduced from pre- to post-intervention (Fig. 1). Wilcoxon signed-rank tests showed that BID significantly changed over time overall (mean difference =  $-0.40$ ,  $p <$

0.01) and in both the Original ( $p = 0.04$ ) and Enhanced ( $p = 0.01$ ) treatment groups. There were no differences in BID change between treatment groups based on two sample test or a linear mixed effect model with the time and group interaction.

### Physical activity, weight, and body image dissatisfaction changes

Changes in MVPA and weight were associated with changes in BID (Table 1). Participants who experienced greater increase in minutes per week of MVPA or more percent weight loss reported lower BID post-intervention. Changes in MVPA ( $126.7 \pm 138.1$ ) and weight ( $0.97 \pm 4.9$ ) were similarly predictive of BID as  $R^2$ s in each model were close in magnitude. MVPA ( $p < 0.01$ ) and weight ( $p = 0.02$ ) changes remained associated with BID change in the model controlling for each other.

### Acculturation and outcomes

BAS score did not moderate the relationship between change in MVPA or weight and BID. Regression models were tested that included interaction terms of MVPA or weight with BAS score as predictor and BID as response while controlling for baseline BID value. Wald tests showed that there was no significant interaction between MVPA change ( $p = 0.32$ ) or weight change ( $p = 0.77$ ) with BAS score.

### Discussion

The results of this study indicate that participating in a lifestyle program emphasizing cognitive and behavioral strategies to increase physical activity may improve body image in Latinas. Participants in both physical activity intervention groups reported significantly lower BID at follow-up, compared to baseline, and there was no significant difference between groups. Given that BID has been associated with a host of negative outcomes, including poor quality of life, lower physical activity, eating disorders, depression or negative affect, low self-esteem, and functional impairment (Becker et al., 2019; Gillen, 2015; Rieder & Ruderman, 2001), our results are promising and add to the literature on interventions to improve health behaviors and wellness in high risk Latinas.

Pre-intervention BID did not predict changes in physical activity. This result is encouraging, as it suggests that Latinas entering the intervention with lower body image satisfaction were just as likely to benefit from participation in the intervention as those with higher body image satisfaction. In contrast, a previous behavioral intervention focused on weight management for Mexican American women reported that higher baseline body dissatisfaction predicted lower adherence to physical activity (Austin et al., 2017). The discrepant outcome may be attributed to the current study's specific focus on addressing attitudes and barriers to increase physical activity efficacy. Our finding suggest that poor body image may not necessarily be an obstacle to increasing physical activity for Latinas with overweight when supported by an individually tailored intervention targeting theory-informed constructs.

Physical activity and weight changes equally predicted improvements in BID, such that participants who engaged in more MVPA or experienced greater weight loss reported lower BID. Latinas who increased their MVPA also reported greater reduction in BID, independent

of weight change. It is possible that changes in physical activity and weight involve similar cognitive-behavioral mediators, such as self-efficacy or self-regulation skills, that contribute to body image. Interestingly, acculturation did not moderate the relationship between change in MVPA or weight and BID. It is likely that other factors related to acculturation such as acculturative stress, which was not measured in the current study, may influence BID (Quiñones et al., 2022).

### Limitation and strengths

This study has limitations and strengths to acknowledge. Participants were predominantly middle-aged Mexican American women and findings may not generalize to a broader population of U.S. Latinas. Future studies should examine body image and physical activity among different Latino subgroups and age ranges. Also, data were derived from a randomized trial testing two physical activity interventions and therefore there was no true control group. Additionally, short unidimensional validated measures were used to assess multifaceted constructs of acculturation and body image to minimize participant assessment burden; yet, important psychometric properties may have been missed using these measures. Furthermore, physical activity was measured using a 7-day self-reported instrument, which could have introduced self-report bias and may not be representative of average weekly physical activity performed over a 12-month period. While on average participants increased time engaged in physical activity, the standard deviation indicates intervention responses (i.e., how much time) varied considerably. Nevertheless, a major strength of this study is that it is one of the first to examine the role of physical activity and weight changes on body image in a community sample of Latinas. It also determined that increasing physical activity may improve body image regardless of weight loss, which has public health messaging implications. For example, individuals starting a physical activity program are often motivated by weight loss and stressing related benefits such as improvement in body image may help with long-term maintenance of physical activity in the absence of weight loss (Mendoza-Vasconez et al., 2022).

### Conclusion

Although body image influences engagement in physical activity, there is a paucity of related research in Latina women who are generally disproportionately underactive and therefore at risk for poor health. This study demonstrated that a theory-informed, culturally and linguistically adapted, intervention may increase physical activity even among women starting with poor body image. Moreover, gains in physical activity may help improve body image independent of weight loss and irrespective of acculturation level.

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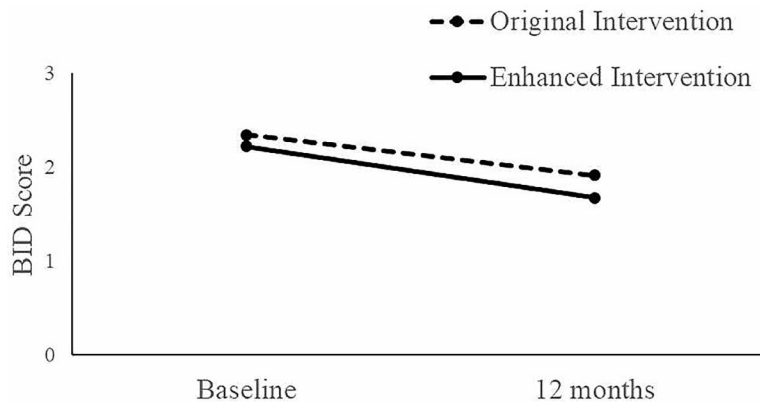
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**Fig. 1.** Intervention effects on body image dissatisfaction (BID)

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**Table 1**

MVPA and weight changes predicting BID at 12 months

Predictor	Coefficient Estimate	Standard Error	Adjusted R <sup>2</sup>	P value
MVPA	-0.002	0.0006	0.26	< 0.01
Weight	-0.05	0.089	0.21	< 0.01

MVPA: Moderate to vigorous physical activity

BID: Body image dissatisfaction

Coefficient Estimate: Coefficient of MVPA change or weight change in a regression model where the BID at 12 months is the response, MVPA change or weight change as key predictor, and BID at baseline controlled as covariate

N= 199 participants

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