

# Ethnic and Gender Differences in Ideal Body Size and Related Attitudes among Asians, Native Hawaiians, and Whites

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## Abstract

*Often overlooked explanations for the varied obesity rates across ethno-cultural groups include differences in attitudes toward excess weight, with certain populations assumed to have larger ideal body sizes (IBS). Past studies found ethnic and gender difference in IBS across and within different groups. This study examined the effects of ethnicity and gender, and their interaction, in accounting for differences in IBS and attitudes toward those ideals. Multiple regression analyses were used to better understand the effects of ethnicity and gender in accounting for differences in perceived IBS according to ethnic-specific and Western ideals and attitudes in 1,124 people of Native Hawaiian, Filipino, Japanese, and White ancestry. The analyses controlled for socio-demographics, body mass index, health-related behaviors, and psychosocial variables. The results indicated that Native Hawaiians selected larger ethnic IBS, Filipinos selected smaller ethnic IBS, and Native Hawaiians selected slightly smaller Western IBS than other ethnic groups. Overall, males selected larger IBS compared to females. Interaction analyses indicated that the relationship between ethnic IBS and attitude toward that IBS varied as a function of ethnicity, such that Native Hawaiians who selected a larger ethnic IBS held less favorable attitudes toward that IBS. The discrepancy between Native Hawaiians' selection of larger ethnic IBS as ideal and their less positive attitude toward that selection warrants more investigation. However, it does suggest that Native Hawaiians, on a personal level, do not prefer larger body sizes, which contradicts their perceptions of social norms. These findings have important implications for obesity interventions among Native Hawaiians.*

## Keywords

*ideal body size, ethnicity, gender, Filipinos, Native Hawaiians, attitudes*

## Introduction

Ethno-cultural differences in attitudes and preferences that people hold toward body size are often overlooked possible explanations for the observed ethno-cultural group variations in prevalence of overweight and obesity. Some of the differences in attitudes toward larger body sizes across ethno-cultural groups have been theorized to be rooted in differences in beauty ideals and perception of weight, with certain populations having positive perceptions of larger body sizes.<sup>1,2</sup> Research from the 1980s and 1990s found that certain ethno-cultural groups associate large body sizes with marriageability, attractiveness, fertility, and generosity.<sup>3</sup> Becker, et al, reported that, traditionally, some Pacific Islanders associate power and status with large body sizes. In New Zealand, Metcalf, et al, found that Pacific Islanders with higher BMIs, compared to Whites with higher BMIs, were more likely to see themselves as either under or normal weight.<sup>4,5</sup>

Gender differences have also been observed, women report more body dissatisfaction and a preference toward smaller IBS than men.<sup>6,7</sup> Craig, et al, found that White Australian and Tongan

men selected larger ideal attractive female body sizes than their women counterparts.<sup>8</sup> A 2007 study found that females, compared to males, selected smaller IBS regardless of ethnicity.<sup>9</sup> Miller and Halberstadt found that New Zealand women, but not men, selected significantly smaller IBS compared to their perceived actual body size.<sup>10</sup>

## Rationale for Present Study

There is a dearth of research that has examined IBS in Native Hawaiians, despite assumptions that they may have a larger IBS.<sup>11</sup> Therefore, this study examined the IBS endorsed by Native Hawaiians in comparison to three other ethnic groups, Filipinos, Japanese, and Whites, residing in Hawai'i, and their attitudes towards their selections. Specifically, this study examined the differences in perceptions of, and attitudes towards, IBS while controlling for socio-demographics, BMI, dietary and physical activity indicators, and psychosocial variables that may serve as confounders, as suggested by previous studies.<sup>12-15</sup> The influence of both their ethnic culture and the US mainstream society may lead people to hold different opinions of IBS, based on which social group serves as their reference point. The degree of influence these social groups have over peoples' preferred body size may differ across, and by gender, within ethnic groups. It was hypothesized that there would be large ethnic differences in the body size endorsed as the ethnic group's ideal but not in the body size endorsed as the Western ideal; that ethnic groups who select larger ethno-cultural IBS would hold less favorable attitudes toward that selection; and that across ethnic groups, women would select smaller IBS than men.

## Methods

### Participants

Cross-sectional data from the Kohala Health Research (KHR) Project (formerly known as the Native Hawaiian Health Research Project) were analyzed for this study. The KHR Project was a community-based epidemiological study of diabetes and cardiovascular risk factors among adult residents of the North Kohala district on the island of Hawai'i. Data from 1,124 individuals (617 females and 507 males) were included in this study and their ethnic breakdown is as follows: 494 (44.0%) Native Hawaiians, 186 (16.5%) Filipinos, 190 (16.9%) Japanese, and 254 (22.6%) Whites. Table 1 summarizes the socio-demographic characteristics of the participants by ethnic groups and combined group.

Table 1. Participants' Characteristics by Ethnic Group and Bivariate Analyses of Between-ethnic Group Differences					
Characteristics	Filipinos (n=186)	Japanese (n=190)	Native Hawaiians (n=494)	Whites (n=254)	Combined sample (N=1124)
<b>Gender</b>					
Females	114 (61.3)	97(51.1)	270 (54.7)	136 (53.5)	617 (54.9)
Males	72 (38.7)	93 (48.9)	224 (45.3)	118 (46.5)	507 (45.1)
<b>Educational attainment<sup>†</sup></b>					
Less than H.S.	67 (36.0)	25 (13.1)	55 (11.1)	19 (8.2)	166 (15.0)
H.S. graduate	63 (33.9)	92 (48.4)	331 (67.0)	138 (59.2)	624 (56.6)
Some college	33 (17.7)	39 (20.5)	83 (16.8)	37 (15.9)	192 (17.4)
College graduate	23 (12.4)	34 (18.0)	25 (5.1)	39 (16.7)	121 (11.0)
<b>Marital status<sup>*</sup></b>					
Never married	21 (11.4)	25 (13.2)	108 (21.8)	51 (20.1)	205 (18.3)
Currently married	129 (69.7)	132 (69.5)	311 (63.0)	156 (61.4)	728 (64.8)
Disrupted marital status	35 (18.9)	33 (17.4)	75 (15.2)	47 (18.5)	190 (16.9)
<b>Age (years)<sup>‡</sup></b>	53.7 ± 16.2 <sup>a</sup>	58.9 ± 16.4 <sup>b</sup>	44.3 ± 14.6 <sup>c</sup>	47.5 ± 16.5 <sup>d</sup>	49.0 ± 16.6
<b>Body mass index (BMI)</b>	26.1 ± 5.6 <sup>a,b</sup>	25.7 ± 4.2 <sup>b</sup>	30.8 ± 7.2 <sup>c</sup>	27.5 ± 5.5 <sup>a</sup>	28.4 ± 6.5
<b>Kilocalories (Kcal)<sup>*</sup></b>	2369.4 ± 1008.6 <sup>a,b</sup>	2123.8 ± 754.2 <sup>b</sup>	2711.1 ± 1221.9 <sup>c</sup>	2417.6 ± 1078.8 <sup>a</sup>	2488.7 ± 1108.4
<b>Physical Activity (METs)<sup>*</sup></b>	24.1 ± 27.0 <sup>a</sup>	30.8 ± 36.6 <sup>a,b</sup>	37.1 ± 51.2 <sup>b</sup>	38.1 ± 48.8 <sup>b</sup>	34.1 ± 45.4
<b>CES-D scores<sup>†</sup></b>	7.6 ± 6.5 <sup>a</sup>	5.2 ± 5.5 <sup>b</sup>	7.1 ± 6.2 <sup>a</sup>	7.1 ± 6.6 <sup>a</sup>	6.8 ± 6.3
<b>Ethnic identity scores<sup>‡</sup></b>	17.2 ± 2.4 <sup>a</sup>	16.1 ± 2.4 <sup>b</sup>	15.9 ± 2.5 <sup>b</sup>	15.1 ± 2.7 <sup>c</sup>	16.0 ± 2.6
<b>Western identity scores<sup>‡</sup></b>	14.1 ± 3.0 <sup>a,b</sup>	15.0 ± 2.6 <sup>c</sup>	13.9 ± 2.7 <sup>b</sup>	14.8 ± 2.7 <sup>a,c</sup>	14.3 ± 2.8
<b>Ethnic IBS scores<sup>‡</sup></b>	5.2 ± 2.0 <sup>a</sup>	5.8 ± 1.6 <sup>b</sup>	6.9 ± 1.9 <sup>c</sup>	6.2 ± 1.9 <sup>b</sup>	6.3 ± 1.9
<b>Western IBS scores</b>	5.8 ± 2.0	5.9 ± 1.6	5.8 ± 1.7	6.0 ± 1.5	5.9 ± 1.7
<b>Ethnic IBS attitude scores</b>	3.8 ± 0.9	3.7 ± 0.8	3.9 ± 0.4	3.8 ± 0.9	3.8 ± 0.9
<b>Western IBS attitude scores</b>	3.7 ± 0.9	3.6 ± 0.8	3.6 ± 0.9	3.6 ± 0.9	3.6 ± 0.9

Data presented as n (%) or as mean ± standard deviation. Due to missing data, some of the variables totals may not add to the correct column n. MET = Metabolic Equivalent Task. IBS = ideal body size. Chi-square analysis was used to evaluate the association between ethnic groups and categorical variables and analysis of variance (ANOVA) to evaluate differences between ethnic group means of continuous variables. <sup>a,b,c,d</sup>Levels not connected by same letter are significantly different based on Tukey HSD post-hoc analysis. \*P<.05, †P<.001, ‡P<.001

## Measures

**Modified Body Image Questionnaire (MBIQ).** The 24 figures created by Furnham and Baguma, and demonstrated as appropriate for the cross-cultural assessment of body image, were used.<sup>16-18</sup> Twelve female and 12 male figure drawings were shown ranging from slim (extreme endomorph) to obese (extreme ectomorph), and participants were asked to select the picture they saw as the ideal body image for their gender according to Western culture (referred to as Western IBS) and the picture they saw as the ideal body image according to their ethnic group (referred to as ethnic IBS). These items yielded scores ranging from 1 to 12 with higher scores indicating a larger body size. Respondents were then asked, "How do you feel about the image you have chosen above?" and instructed to rate their attitudes towards their selection using a 5-point rating scale, ranging from 1 ("Very Negative") to 5 ("Very Positive").

**Socio-demographics.** Information on gender, age, educational attainment, marital status, and self-reported ethnic ancestry

was collected using a personal history data form. For the purposes of the present study, a Native Hawaiian was defined as any individual who is a descendant of persons residing in the Hawaiian Islands prior to Western contact in 1778.<sup>19</sup> All those who reported any Native Hawaiian ancestry were included as Native Hawaiians in this study. All others were classified as Caucasian, Filipino, or Japanese and included in this study, if they reported only that particular ancestry.

**Health-related Variables.** Clinical and health-related behavioral data were collected using several methods. Participants' height and weight were taken according to standardized protocols, from which body mass index (BMI) was calculated.<sup>20</sup> Participants' physical activity level, measured in weekly average metabolic equivalents (METs), was based on participants' self-report using the Pima Indian Physical Activity Questionnaire, adapted for Hawai'i.<sup>21</sup> Higher weekly average METs indicates a greater amount of energy expenditure. Daily caloric intake (Kcal) was estimated using a semi-quantitative Food Frequency Question-

naire developed by the Cancer Research Center of Hawai'i that assessed the average intake of 166 foods and beverages within the prior week.<sup>22</sup>

**Psychosocial Variables.** The Center for Epidemiological Studies – Depression scale (CES-D) was used to measure depression symptoms.<sup>23</sup> The CES-D is a 20-item self-report measure of cognitive, affective, and behavioral symptoms of depression. Respondents are asked to rate the frequency of symptoms experienced in the last week on a 4-point scale from rarely or none of the time (0) to most or all of the time (3). CES-D scores range from 0 to 60, with higher scores indicating greater frequency of depressive symptoms. The use of the CES-D as a reliable and valid measure of depression symptoms has been supported among different ethnic groups, including those of interest in the present study.<sup>19,23,24</sup>

Ethnic and Western identity were assessed using an 8-item cultural affiliation questionnaire designed for the KHR Project.<sup>25</sup> It assesses cognitive/attitudinal factors of ethnic and Western identity by measuring the degree of identity/affiliation with, feelings toward, and knowledge about each cultural group and the impact each cultural group has on their preferred lifestyle. The questionnaire is comprised of two subscales: an ethnic identity subscale (4 items) and a Western-US identity subscale (4 items). Each item has a 5-point response scale ranging from 1 (very knowledgeable or very positive) to 5 (not knowledgeable at all or very negative). The total scores on each subscale range from 4 to 20, with lower scores on each subscale indicating higher levels of affiliation and identification with that cultural group. This identity scale has been used in previous studies of Native Hawaiians and Cronbach's  $\alpha$  of 0.72, suggesting acceptable reliability, have been reported for each subscale.<sup>25</sup>

The socio-demographic variables, other than ethnicity and gender, were control variables for this study because of their potential confounding effects. Educational attainment was used as an indicator of SES, given that education has been shown to have a stronger and more consistent relationship to health than income or occupation.<sup>13</sup> Depressive symptoms have been associated with perceptions and attitudes toward body image in other studies, and were included as a control variable in the present study.<sup>12</sup> Large ethnic differences in depression have also been reported in Hawai'i, with Native Hawaiians having the highest prevalence.<sup>13</sup> Both ethnic and Western cultural identities were examined as control variables because degree of acculturation has been associated with body image in previous studies and because degree of acculturation varies across and within ethnic groups in Hawai'i.<sup>15,25,26</sup> This helped to ensure that any ethnic differences observed in the present study were not better explained by these other demographic and psychosocial factors.

## Procedures

The KHR Project's design and methods have been described in detail elsewhere.<sup>26</sup> Briefly, participants of the KHR Project were recruited via telephone using a cross-reference directory,

local public television announcements, flyers posted at community centers and stores, and presentations given to community organizations. Eligibility criteria included:  $\geq 18$  years of age, a resident of North Kohala, Hawai'i, and if female, not pregnant at the time of the study. Following informed consent, participants underwent a 2-hour clinical examination and interview at a community clinic. A \$20 gift certificate was given to each participant upon completion of exam and interview.

## Data Reduction and Statistical Analyses

The categorical variables of gender (1= male; 2=female), educational attainment (1=no high school diploma or its equivalent; 2=high school diploma or its equivalent; 3=some college, technical, or vocational training; or 4=college graduate), and marital status (1=never married; 2=current married; or 3=disrupted marital status) were dummy coded for all analyses. The separated/divorced and widowed marital statuses were aggregated and will be subsequently referred to as "disrupted marital status."

Analyses were conducted using JMP Statistical Software (version 9.0.2) with an alpha level of .05. Chi-square ( $\chi^2$ ) analysis or analysis of variance (ANOVA) was conducted. As differences between ethnic groups were found, a Tukey-Kramer HSD post-hoc analysis was done to further elucidate what ethnic groups, specifically, differed from each other on each of the study variables. Multiple regression analyses were then carried out to examine the association of ethnicity, gender, and IBS attitude scores (independent variables) with ethnic and Western IBS scores (dependent variables), separately, while controlling for the effects of socio-demographics (age, education, and marital status), BMI and health-related behavioral indicators (Kcal intake and METs), and psychosocial variables (IBS attitude scores, CES-D scores, and identity scores). To examine the interaction effects among ethnicity, gender, and attitude scores on ethnic and Western IBS scores, further multiple regression analyses were run, separately, with their main effects, their two-way interaction terms, and the control variables. Only the variables found to have a significant association with IBS scores in the previous multiple regression analyses were included in these interaction analyses.

## Results

### Bivariate Ethnic Comparisons

Data on participants' characteristics by ethnic group and their between-ethnic group bivariate analyses are presented in Table 1. Native Hawaiians were significantly younger in age and less likely to have more than a high school education, whereas the inverse was true for Japanese. Compared to the other ethnic groups, Native Hawaiians had a significantly higher average BMI and Kcal intake, Filipinos had significantly lower METs and Japanese had significantly lower mean CES-D scores. Additionally, Native Hawaiians were significantly more likely to endorse a larger body size as their ethnic ideal compared to the other ethnic groups, but the opposite was true for Filipinos. Filipino participants' ethnic identity scores were significantly

higher than those for Native Hawaiians, Japanese, and Caucasian participants, with Caucasians reporting the lowest. Filipino and Native Hawaiian participants' Western identity scores were significantly lower than the scores for Caucasians and Japanese.

### Bivariate Gender Comparisons by Ethnic Group

Data on participants' characteristics by gender across ethnic groups and their between-gender bivariate analyses by ethnicity are presented in Table 2. Across all ethnic groups, males had significantly higher Kcal intake, METs, and Western body size scores than females. Ethnic IBS scores were significantly higher among male than female Filipinos, Japanese, and Native Hawaiians. Japanese males had significantly higher ethnic IBS attitude scores than their female counterparts. Significant gender differences for Western IBS attitude scores were observed for Japanese, Native Hawaiians, and Whites, with males having higher scores.

### Multiple Regression Analyses

Because significant between-ethnic group differences in ethnic IBS scores (Table 1) and significant gender differences within

ethnic groups in Western IBS scores were found (Table 2), their effects in predicting ethnic and Western IBS scores, were further examined, separately, in multiple regression models while controlling for socio-demographics, BMI, Kcal intake, METs, and the psychosocial variables. The results of these analyses are summarized in Table 3.

**Ethnic Ideal Body Size.** Controlling for the aforementioned variables, the effects of ethnicity ( $F=23.08, P<.001$ ), gender ( $F=17.16, P<.001$ ), and ethnic IBS attitude scores ( $F=7.54, P<.01$ ) were significantly associated with ethnic IBS scores. Compared to Whites, Native Hawaiians selected a larger body size as their ethnic IBS ( $t=6.65, P<.001$ ), whereas the inverse was true for Filipinos ( $t=-6.36, P<.001$ ). Males, compared to females, selected a larger body size as their ethnic IBS ( $t=4.14, P<.001$ ). Participants who selected larger ethnic IBS had less favorable attitudes toward their selection ( $t=-2.75, P<.01$ ). Of the control variables, participants with a younger age ( $t=-2.51, P<.05$ ) and a higher BMI ( $t=2.62, P<.01$ ) and Kcal intake ( $t=2.83, P<.01$ ) selected a larger ethnic IBS.

Characteristics	Filipinos (n=186)		Japanese (n=190)		Native Hawaiians (n=494)		Whites (n=254)	
	Male (n=72)	Female (n=114)	Male (n=93)	Female (n=97)	Male (n=224)	Female (n=270)	Male (n=118)	Female (n=136)
<b>Educational attainment</b>								
Less than H.S.	20 (27.7)	47 (41.2)	12 (12.9)	13 (13.4)	27(12.0)	28 (10.4)	11 (10.2)	8 (6.5)
H.S. graduate	25 (34.7)	38 (33.4)	45( 48.4)	47 (48.5)	144 (64.0)	187 (69.3)	62 (57.4)	75 (60.5)
Some college	17 (23.6)	16 (14.0)	19 (20.4)	20 (20.6)	40 (17.8)	43 (15.9)	15 (13.9)	22 (17.7)
College graduate	10 (14.0)	13 (11.4)	17 (18.3)	17 (17.5)	14 (6.2)	12 (4.4)	20 (18.5)	19 (15.3)
<b>Marital status</b>								
Never married	10 (14.1)	11 (9.6)	19 (20.4)	6 (6.2)*	63 (28.1)	45 (16.7)*	26 (22.0)	25 (18.5)
Currently married	53 (74.6)	76 (66.7)	63 (67.8)	69 (71.1)	137 (61.2)	174 (6.4)	70 (59.3)	86 (63.7)
Disrupted marital status	8 (11.3)	27 (23.7)	11 (11.8)	22 (22.7)	24 (10.7)	51 (18.9)	22 (18.7)	24 (17.8)
<b>Age (years)</b>	54.5 ± 18.3	53.2 ± 14.8	59.5 ± 17.4	58.3 ± 15.4	44.4 ± 15.2	44.3 ± 14.2	48.5 ± 16.8	46.8 ± 16.3
<b>Body mass index (BMI)</b>	27.0 ± 5.5	25.6 ± 5.6	26.1 ± 3.1	25.4 ± 4.8	30.8 ± 6.7	30.8 ± 7.3	27.7 ± 4.5	27.3 ± 6.2
<b>Kilocalories (Kcal)</b>	2757.7 ± 1155.9	2124.1 ± 1818.0 <sup>†</sup>	2353.3 ± 762.1	1903.8 ± 680.9 <sup>†</sup>	3165.6 ± 1326.4	2332.7 ± 980.2 <sup>†</sup>	2837.3 ± 1148.4	2051.0 ± 869.1 <sup>†</sup>
<b>Physical Activity (METs)</b>	31.7 ± 32.1	19.3 ± 21.8*	38.8 ± 42.0	23.0 ± 28.4*	50.2 ± 60.6	25.8 ± 37.9 <sup>†</sup>	46.8 ± 59.6	30.1 ± 34.5*
<b>CES-D scores</b>	7.3 ± 5.6	7.9 ± 7.0	5.1 ± 5.7	5.4 ± 5.2	6.8 ± 6.0	7.2 ± 6.5	6.9 ± 6.6	7.1 ± 6.6
<b>Ethnic identity scores</b>	7.0 ± 2.4	6.6 ± 2.3	8.1 ± 2.4	7.7 ± 2.3	8.0 ± 2.5	8.1 ± 2.6	9.1 ± 2.7	8.7 ± 2.7
<b>Western identity scores</b>	9.9 ± 3.0	9.9 ± 3.1	9.1 ± 2.4	8.9 ± 2.5	10.4 ± 2.8	9.9 ± 2.7	9.3 ± 2.8	9.1 ± 2.7
<b>Ethnic IBS scores</b>	5.7 ± 2.1	4.9 ± 1.8*	6.0 ± 1.7	5.5 ± 1.6*	7.1 ± 2.1	6.7 ± 1.6*	6.4 ± 1.8	6.0 ± 1.9
<b>Western IBS scores</b>	6.2 ± 1.9	5.5 ± 2.0*	6.1 ± 1.6	5.6 ± 6.7*	6.2 ± 1.7	5.5 ± 1.7 <sup>†</sup>	6.5 ± 1.5	5.7 ± 1.5 <sup>†</sup>
<b>Ethnic IBS attitude scores</b>	3.9 ± 0.9	3.8 ± 0.9	3.9 ± 0.7	3.5 ± 0.8*	3.9 ± 0.9	3.8 ± 0.8	3.9 ± 0.9	3.8 ± 0.8
<b>Western IBS attitude scores</b>	3.7 ± 0.9	3.6 ± 0.9	3.8 ± 0.8	3.4 ± 0.9**	3.8 ± 0.9	3.5 ± 10.0*	3.8 ± 0.9	3.5 ± 0.9*

Data presented as n (%) or as mean ± standard deviation. Due to missing data, some of the variables totals may not add to the correct column n. MET = Metabolic Equivalent Task. IBS = ideal body size. Chi-square analysis was used to evaluate the association between gender and categorical variables and analysis of variance (ANOVA) to evaluate differences between ethnic group means and continuous variables. \* $P<.05$ , <sup>†</sup> $P<.001$ , <sup>‡</sup> $P<.001$

Table 3. Multiple Regression Analysis Predicting Ethnic and Western Ideal Body Size Scores, Separately, while Controlling for Socio-Demographics, BMI and Health-related Behavioral Indicators, and Psychosocial Variables

Variables	Ethnic Ideal Body Size [R <sup>2</sup> = .17; F(15, 984) = 12.99, P < .001]			Western Ideal Body Size [R <sup>2</sup> = .08; F(15, 1064) = 5.67, P < .001]		
	B	SE B	β	B	SE B	β
<b>Ethnicity</b>						
Filipino	-0.77	0.12	-0.77 <sup>†</sup>	-0.05	0.11	-0.05
Japanese	-0.14	0.12	-0.14	0.14	0.11	0.14
Native Hawaiian	0.65	0.10	0.65 <sup>†</sup>	-0.22	0.09	-0.22 <sup>*</sup>
White (ref.)	—	—	—	—	—	—
<b>Gender</b>						
Male	0.25	0.06	0.25 <sup>†</sup>	0.23	0.06	0.23 <sup>†</sup>
Female (ref.)	—	—	—	—	—	—
IBS Attitude scores	-0.19	0.07	-0.38 <sup>*</sup>	0.11	0.06	0.22
<b>Control Variables</b>						
Age (years)	-0.01	0.00	-0.42 <sup>*</sup>	-0.01	0.00	-0.29 <sup>*</sup>
Education level	-0.04	0.08	-0.05	-0.01	0.01	-0.14
<b>Marital status</b>						
Never married	0.05	0.12	0.05	0.06	0.11	0.06
Currently married	0.01	0.08	0.01	-0.10	0.07	-0.10
Disrupted marriage (ref.)	—	—	—	—	—	—
Body mass index (BMI)	0.03	0.01	0.73 <sup>*</sup>	0.01	0.01	0.34
Kilocalories (Kcal)	0.00	5.69	0.62 <sup>*</sup>	0.00	5.06	0.89 <sup>†</sup>
Physical activity (METs)	0.00	0.00	0.25	0.00	0.00	0.15
CESD scores	0.01	0.01	0.23	0.00	0.01	0.09
Ethnic identity scores	0.02	0.03	0.14	0.02	0.02	0.11
Western identity scores	0.01	0.02	0.10	0.02	0.02	0.15

IBS = ideal body size. Ethnic IBS attitude scores were included in predicting ethnic IBS while Western IBS attitude scores were include in predicting Western IBS.  
\*P < .05, †P < .001, ‡P < .001

**Western Ideal Body Size.** Controlling for the aforementioned variables, the effects of ethnicity ( $F = 2.63, P < .05$ ) and gender ( $F = 16.01, P < .001$ ) were significantly and independently associated with Western IBS scores. Native Hawaiians selected a smaller body size as the Western IBS than Whites ( $t = -2.50, P < .05$ ). No differences were found between Whites and Filipinos or Japanese. Males selected a larger body size than females as their Western ideal ( $t = 4.00, P < .001$ ). Of the control variables, participants with a younger age ( $t = -1.97, P < .05$ ) and a higher Kcal intake ( $t = 4.30, P < .001$ ) selected a larger Western IBS.

### Interaction Analyses

Because significant ethnic and gender effects were found in the previous regression analyses (see Table 3), their interaction effects on ethnic and Western IBS scores were further examined, separately. The two-way interactions among ethnicity, gender, and attitude scores on ethnic IBS scores were considered, controlling for age, BMI, and Kcal intake because of their significant bivariate correlations with ethnic IBS. The two-way interaction with ethnicity and gender on Western IBS scores did not include the effects of the attitude scores. This analysis controlled for

age and Kcal intake. The results of these regression analyses are summarized in Table 4.

**Ethnic Ideal Body Size.** Controlling for age, BMI, and Kcal intake and the main effects of ethnicity, gender, and attitude scores, significant two-way interaction effects of ethnicity and attitude scores ( $F = 3.47, P < .05$ ) and of gender and attitude scores ( $F = 4.66, P < .05$ ) on ethnic IBS scores were found. Although the overall interaction effect of ethnicity and attitude scores were significant, a significant interaction ( $t = -3.22, P < .01$ ) was only evident for Native Hawaiian participants, among whom those who selected a larger ethnic IBS had a less favorable attitude toward their selection than the other three ethnic groups.

**Western Ideal Body Size.** Controlling for age and Kcal intake and the main effects of ethnicity and gender, the two-way interaction effect for ethnicity and gender ( $F = 0.19, P = .91$ ) on Western IBS scores was not significant. A significant main effect was found for gender ( $F = 19.55, P < .001$ ) but not for ethnicity ( $F = 2.28, P = .08$ ) with the inclusion of their interaction term and control variables as shown in Table 3.

Table 4. Multiple Regression Analyses Examining Interaction Effects among Ethnicity, Gender, and Body Size Attitude Scores in Predicting Ethnic and Western Ideal Body Size Scores

Variables	Ethnic Ideal Body Size [R <sup>2</sup> = .18 ; F (18, 1052) = 12.74, P < .0001]			Western Ideal Body Size [R <sup>2</sup> = .08; F(15,1064) = 5.67, P < .001]		
	B	SE B	β	B	SE B	β
<b>Ethnicity</b>						
Filipino	-.074	0.11	-0.74‡	-0.04	0.10	-0.04
Japanese	-0.08	0.12	-0.08	0.08	0.11	0.08
Native Hawaiian	0.67	0.09	0.67‡	-0.18	0.08	-0.18*
White (ref.)	—	—	—	—	—	—
<b>Gender</b>						
Male	0.22	0.06	0.22‡	0.25	.06	0.25‡
Female (ref.)	—	—	—	—	—	—
<b>IBS attitude scores</b>	-0.07	0.07	-.14	—	—	—
<b>Two-way interactions</b>						
Ethnicity × attitudes scores						
Filipino × attitude scores	0.11	0.13	0.23			
Japanese × attitude scores	0.14	0.14	0.27	—	—	—
Native Hawaiian × attitude scores	-0.32	0.10	-0.64*			
White × attitude scores (ref.)	—	—	—			
<b>Ethnicity × gender</b>						
Filipino × gender	0.13	0.11	0.13	0.02	0.10	0.02
Japanese × gender	-0.06	0.11	-0.06	-0.07	0.10	-0.07
Native Hawaiian × gender	-0.01	0.08	-0.01	0.01	0.08	0.01
White × gender (ref.)	—	—	—	—	—	—
<b>Gender × attitude scores</b>						
Male × attitude scores	-0.16	.07	-0.31*	—	—	—
Female × attitude scores (ref.)	—	—	—			
<b>Control Variables</b>						
Age (years)	-0.01	0.00	-0.41*	-.01	.00	-0.29*
Body mass index (BMI)	0.02	0.01	0.66*	—	—	—
Kilocalories (Kcal)	0.00	5.44	0.74*	0.00	4.92	0.85‡

Only the variables found to have a significant independent effect in the previous regression analyses were included here. IBS = ideal body size. Ethnic IBS attitude scores were included in predicting ethnic IBS while Western IBS attitude scores were included in predicting Western IBS. \*P < .05, †P < .001, ‡P < .001

## Discussion

In terms of ethno-cultural ideal body size (IBS), Native Hawaiians selected considerably larger IBS, and Filipinos selected considerably smaller IBS, compared to Japanese and Whites. Native Hawaiians selected slightly smaller Western IBS compared to the other ethnic groups, which remained significant after inclusion of the control variables. Findings of the present study indicate ethnic differences both in perceived ethnic and Western IBS. However, there was less variability across ethnic groups in perceived Western IBS. Additionally, regardless of ethnicity, participants who selected smaller body sizes as their ethnic ideal had more favorable attitudes toward their selection compared to those who chose larger body sizes. However, among Native Hawaiians, larger ethnic IBS selection was associated

with more negative attitudes about the selection. For Western IBS, there was no significant association between participants' size selection and attitudes toward that selection.

The findings concerning men's versus women's IBS are consistent with the findings of past studies.<sup>6,7</sup> Across ethnic groups, males were more likely than females to select larger body sizes when considering both their ethnic group's perceived norms and perceived Western norms. This included Filipino men, which is in contrast to the only other study of IBS in Filipinos in which Filipino men followed a more characteristically female pattern of smaller IBS.<sup>27</sup> An ethnicity by gender interaction was not found, suggesting a similar gender pattern in IBS regardless of ethnicity. There were significant differences in ethnic IBS selection and attitudes toward that selection as a function of

gender. Regardless of ethnicity, men, but not women, who selected larger ethnic IBS had less favorable attitudes toward that selection. This gender difference was stronger for Filipinos than for the other three ethnic groups.

Possible explanations for why Native Hawaiians perceive larger body sizes as their ethnic group's ideal, despite having less favorable personal attitudes toward them, may be related to their assumptions regarding an ethnically-driven genetic component of obesity (ie, a genetic predisposition) or discrepancies between their personal and perceived ethnic group's acceptance of body size stereotypes. It has also been proposed that cultural values play a role: although Pacific Islanders have historically considered large body size a sign of wealth or royalty, it may be that the juxtaposition of that cultural value with Western body size ideals, varying knowledge regarding health risks of obesity, and the variable assimilation of those conflicting standards into one's personal values result in an unresolved paradox.<sup>28</sup> More research is needed to clarify why Native Hawaiians believe that a larger body size is preferred by their ethnic group, even when they may not personally favor that ideal body size.

Filipinos in our study tended to select a thinner body size as their ethnic ideal, even after controlling for the influence of socio-demographics, BMI, overall energy intake and expenditure, and the selected psychosocial variables. Filipino men, like men of the other ethnic groups, were more likely to select larger ideal body sizes compared to their female counterparts, in contrast to the only other study of ideal body size in Filipinos.<sup>27</sup> It is important to note that BMI did not account for the observed ethnic differences in ideal body size selection. It stands to reason that the selection of ideal body size be proportionate to a person's actual body size (ie, BMI), as observed in some studies.<sup>8</sup> However, this was not the case in our study.

The socio-demographic differences and differences in BMI, energy intake and expenditure, cultural identification, and psychological well-being did not account for the observed ethnic differences in our study. This suggests that other factors related to ethnicity may better explain the ethnic differences in the participants' perceptions of their IBS. The smaller ethnic variation in the selection of Western IBS, compared to their ethnic IBS, suggests a shared notion of what constitutes the IBS according to Western expectations. This is not surprising given that all participants are probably heavily exposed to factors that shape this perception, such as television and other media that portray thinner body sizes as desirable.

Native Hawaiians were the only ethnic group in this study to have significant discrepancies between what they believe to be their ethnic ideal body size and their personal preference for that perceived body size. Specifically, the larger the perceived "ideal" Native Hawaiian body size, the more negative their attitude was towards that body size. These findings are somewhat congruent with other studies of Native Hawaiians and of other Polynesian groups regarding personal preferences for smaller body sizes.<sup>3,8,27</sup> Collectively, these findings appear to counter the notion that Polynesians have a personal preference for larger body sizes. Although they may perceive their own ethnic group

as having a larger ideal body size preference, perhaps influenced by stereotypes of them held by non-Polynesians, they do not appear to personally share that same perceived preference.

These findings should be interpreted in the context of this study's limitations. The generalizability of these findings may be limited by the study's population. All participants were residents of the North Kohala district on Hawai'i island. Ethnic and Western IBS may vary across the locations, for instance due to differing dietary and activity patterns as well as differing levels of Westernization. Although the figures used here have been widely utilized in the body image research literature, there are other measures available for use.<sup>29</sup> However, line drawings were chosen for the present study because they are culturally neutral and figure ratings scales have not been developed to represent a Native Hawaiian population.<sup>30</sup> Despite this potential limitation, the authors were able to detect significant relationships between IBS, ethnicity, and gender, suggesting that the MBIQ adequately assessed IBS. In addition to the variables controlled for in this study, there may be other variables that are important in understanding the relationship between ethnicity and IBS. Finally, because ethnicity is most likely a marker for other variables, it is important to identify the mediators of the relationship between ethnicity and body size ideals, such as the influence of stereotypes and body sizes of participants' peers and family members.

Given the higher prevalence of obesity and related medical conditions in the ethnic groups examined in this study, the findings are instructive to our understanding of obesity and weight management in these groups. As previous research has suggested, personal and perceived cultural ideals for body shape may carry important implications for health care providers designing culturally-informed behavioral health interventions and health education campaigns.<sup>30,31</sup> For instance, Native Hawaiians have a high prevalence of obesity, and it is well established that obesity is a significant risk factor for diseases, such as diabetes and hypertension.<sup>31</sup> The finding that Native Hawaiians believe that their cultural group values a larger body size that conflicts with their personal ideals clearly provides insight into this issue and should inform attempts to address their health disparities. Further, our findings also provide evidence for employing a culturally-minded approach in assessing the individual's ideal body shape as well as perceptions of ideal body image according to ethnic culture—knowledge that could inform collaboratively-set weight loss goals in weight management interventions. These inferences have social significance in terms of public policy that guide health education campaigns, for example, in utilizing more accurate depictions and role-modeling of cultural body types in brochures or other visual media so as to displace rather than perpetuate inaccurate stereotypes.

Future research should explore additional psychosocial and socio-cultural factors, ie, culturally-driven beliefs about health and weight, to further explicate the interrelated dynamics that influence differences in body size ideals between ethnic groups. Focus group research may help elucidate influencing factors and generate ideas for culturally-specific etiologies of

IBS. Moreover, it may be instructive to examine interactions between acculturation status and personal body shape preferences or perceived ethno-cultural body size ideals. Longitudinal studies might clarify how changes in BMI and acculturation status might lead to changes in IBS preferences over time.

### Conflict of Interest

None of the authors identify a conflict of interest.

### Acknowledgements

The Kohala Health Research Project was supported in part by grants (G12RR003061, P20RR011091) from the National Center for Research Resources (NCRR) of the National Institutes of Health (NIH). The JMP Statistical Software used for data analysis was also supported by a NCRR grant (P20RR016467). CMT's and JKK's contribution to this article was supported in part by grants (R24MD001660, P20MD000173) from the National Institute for Minority Health and Health Disparities (NIMHD) of the NIH. The content in this paper is solely the responsibility of the authors and does not necessarily represent the official views of the NCRR, the NIMHD, or the NIH. None of the authors identify any conflict of interest.

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