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1 Height, Socioeconomic and Subjective Well-Being Factors among U.S. Women, Ages 49-79

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4 Abstract

5 Background

6 A vast literature has associated height with numerous factors, including biological,
7 psychological, socioeconomic, anthropologic, genetic, environmental, and ecologic, among
8 others. The aim of this study is to examine, among U.S. women, height factors focusing on
9 health, income, education, occupation, social activities, religiosity and subjective well-being.

10 Methods/Findings

11 Data are from the Women's Health Initiative (WHI) Observational Study. Participants are 93,676
12 relatively healthy women ages 49-79; 83% of whom are White, 17% Non-White. Statistical
13 analyses included descriptive statistics, chi-square and multivariable covariance analyses.

14 The mean height of the total sample is 63.67 inches. White women are significantly taller than
15 Non-White women, mean heights 63.68 vs. 63.63 inches ($p=0.0333$).

16 Among both Non-White and White women height is associated with **social** behavior, i.e.
17 attendance at clubs/lodges/groups. Women who reported attendance 'once a week or more often'
18 were taller than those who reported 'none' and 'once to 3 times a month'. Means in inches are
19 respectively for: White women--63.73 vs. 63.67 and 63.73 vs. 63.67, $p=0.0027$. $p=0.0298$; Non-
20 White women: 63.77 vs. 63.61 and 63.77 vs. 63.60, $p=0.0050$, $P=0.0094$. In both White and
21 Non-White women, income, education and subjective well-being were not associated with
22 height.

23 However, other factors differed by race/ethnicity. Taller White women hold or have held
24 managerial/ professional jobs--yes vs. no--63.70 vs. 63.66 inches; $P=0.036$; and given ‘a little’
25 strength and comfort from religion’ compared to ‘none’ and ‘a great deal’, 63.73 vs. 63.66
26 $P=0.0418$ and 63.73 vs. 63.67, $P=0.0130$. Taller Non-White women had better health—excellent
27 or very good vs. good, fair or poor--63.70 vs. 63.59, $P=0.0116$.

28 Conclusions

29 Further research in diverse populations is suggested by the new findings: being taller is
30 associated with social activities –frequent attendance clubs/lodges/groups”, and with ‘a little’ vs.
31 ‘none’ or ‘great deal’ of strength and comfort from religion.

32 Introduction

33 Height has been a subject of interest, discussion and analyses as early as biblical times. For
34 example, “In the first book of Samuel we read the account of Saul being selected king. While
35 Saul's qualifications for the job were not described in any detail, there is one attribute
36 specifically mentioned: he was tall.” (1). In the twenty first century (2012), Ozaltin outlined six
37 mechanisms that account for the association between height and adult outcomes—genetic,
38 biological, psychosocial, biomechanical, epigenetic, confounding or endogeniety (2). Steckel
39 examined the unique and valuable contributions of four biological measures—life expectancy,
40 morbidity, stature, and certain features of skeletal remains—to understand levels and changes
41 in human well-being (3). In 2009 he notes the increasing interest in height (stature): ”Since
42 1995 approximately 325 publications on stature have appeared in the social sciences, which is
43 more than a four-fold increase in the rate of production relative to the period 1977-1994” (4).

44 The body of literature on height is global, vast and increasing (4). Cited here are a selected
45 number of papers that relate to height and a broad range of factors including: genetics, early life
46 development, nutrition, biology, socioeconomic factors (5-9, 14-24, 26-29); medical conditions
47 include infection (6), coronary heart diseases (5), cardiorespiratory disease and cancer mortality
48 (9), dementia (28); economic factors are income (7,10,15), wages (16,21), wealth (25); education
49 (8,10); cognitive skills (7,13); occupation/workplace, (11,12,15,20,21,29); psychological
50 factors—success (1,12), choices (13); for women, reproduction (22) marriage (24), gender
51 inequality (18); comparisons at the country level (7,8,18,25). Height, income and education are
52 the primary variables analyzed from The Gallup-Healthways Well-Being Index daily poll of the
53 US population (10).

54 The general conclusion from the literature cited is: Taller is associated with favorable early
55 environment, nutrition, medical conditions, health, income and education in both men and
56 women. However, there are exceptions: i) the significant association of height and income were
57 not found (14, 16); ii) taller women, but not men, had more upward mobility in both white and
58 blue collar occupations (16); iii) upward mobility was not associated with health (16). By
59 analyzing data from a survey of a diverse group of relatively healthy U.S. women, ages 49-79,
60 this study adds to the substantial knowledge base on height and other outcomes. It suggests areas
61 for further research, particularly by its new findings and insights on height with its associations
62 with religiosity and with social behavior (here denoted by attendance at clubs)—two constructs,
63 to my knowledge not heretofore cited in the literature or among the six mechanisms, outlined by
64 Ozaltin, that account for the association between height and adult outcomes of height (2).

65 Material and Methods

66 My paper is data from the WHI Baseline Data Set of 10/16/2003, Women’s Health Initiative
67 Observational Study, provided by the National Heart, Lung and Blood Institute; the data set was
68 converted to a SAS file in 2013. This study examines the association between height and some of
69 the factors cited in the literature such as demographics—age, gender, ethnicity, income,
70 education, occupation--health, social, subjective well-being, among relatively healthy women,
71 49-79 years of age, who participated in the Women’s Health Initiative’s Observational Study
72 (WHI OS). Its main purpose is to assess a wide variety of important clinical and public health
73 issues. Enrollment was conducted at 40 centers throughout the US. The justification for the WHI
74 study is: “There is a general recognition that few older women have been studied longitudinally
75 and that major questions about prediction of chronic disease in postmenopausal women remain.”
76 “Participants in the observational study were women aged 49-79 (mean age 63.62, standard
77 deviation, 7.37), who were ineligible or unwilling to participate in the clinical trial component or
78 were recruited through a direct invitation for screening into the observational study.” “Many
79 potential participants in the clinical trial component of the study were already undertaking a low
80 fat diet or were using hormone replacement therapy and therefore were excluded or declined to
81 participate clinical trial component. These participants were then enrolled into the observational
82 study. Previous research has demonstrated that at the time of WHI enrollment, women
83 undertaking hormone replacement therapy and/or low fat diets generally had healthier lifestyles
84 than those not possessing these behaviors. The effect of the selection process was that women
85 enrolled in the observational study tended to have healthier lifestyles compared to those enrolled
86 in the clinical trial.” The data set consists of 2022 variables including demographics, eligibility
87 for selection, personal information, medical history, reproductive history, family history,
88 personal habits, thoughts and feeling, and other areas. Participants are 93,676 women—83%
89 (78,013) White, 17% Non-White-- 8% Black (7,639), 4% Hispanic (2,623); the remaining 5%

90 Asian/Pacific Islander, American Indian, and subjects of unknown race/ethnicity. Other
 91 demographic variables are age, employment, region of country, employment. Measurements and
 92 definitions of height, income, wages as well as other variables may vary in the vast literature and
 93 research conducted by economists, social scientists, psychologists, epidemiologists and others.
 94 Therefore, definitions in the WHI OS Data Set questionnaire for the major variables analyzed are
 95 shown as follows:

- 96 • Height, in inches at age 18 or tallest adult height.
- 97 • Income “total family income (before taxes) from all sources within your household in the
 98 last year” Income is coded in 9 categories: 1) less than \$10,000 (4.5%), 2) \$10,000 -
 99 19,999 (11.7%), 3) \$20,000-34,999 (23.3%), 4) \$35,000-49,999 (20.1%), 5) \$50,000-
 100 74,999 (20.2%), 6) \$75,000-99,999 (9.4%), 7) \$100,000-149,999 (6.8%), 8) \$150,000 or
 101 more (3.9%); and 9) “Don’t know” (3%) and a category, missing (4%). The mode is in
 102 the \$20,000-34,000 category, the median in the \$35,000-49,999 category, interpolated
 103 median about \$43,000. The eight categories, excluding missing and “Don’t know” were
 104 condensed to 5—1) less than \$20,000 (16.16%), 2) \$20,000-34,999 (23.31%) , 3)
 105 \$35,000-74,999 (40.24%), 4) \$75,000-99,999 (9.43%), 5) \$100,000 or more (10.86%).
- 106 • Education: 1) Didn’t go to school (.09%) , 2) Grade school (1-4 years) (.38%), 3) Grade
 107 school (5-8 years) (1.20%) 4) Some high school (9-11 years) (3.51%), 5) High school
 108 diploma or GED (16.15%). 6) Vocational or Training School (9.74%), 7) Some college
 109 or Associate Degree (26.49%), 8) College graduate or Baccalaureate Degree (11.39%). 9)
 110 Some Postgraduate or professional (11.76%), 10) Master’s degree (15.73%), 11) Doctoral
 111 Degree (Ph.D., M.D., J.D., etc.) (2.76%), Missing (0.79%). Condensed into 3 categories:

- 112 1) less than high school (22.12%). 2) high school to some college (47.63%) 3) college
 113 graduate or more (30.36%).
- 114 • General health—“In general, would you say your health is—on a five point scale: 1)
 115 excellent’, 17.7%, 2) very good, 40.2%, 3) good, 31.7%, 4) fair, 8.8%, 5) poor, 0.9%),
 116 ‘missing’ 0.7%.”
 - 117 • “Likelihood of Depression”—scaled from 0 to 100—higher more likelihood. Likelihood
 118 of depression, a highly skewed continuous variable was dichotomized at less than or
 119 equal to the median (0.0073)/greater than the median.
 - 120 • “Religion gives strength and comfort”—three categories--none 12.5%, a little 24.0%, a
 121 great deal 63.0%, missing, 0.5%.
 - 122 • “Attend clubs, lodges, etc.”—6 categories—1) not at all in the past month , 43.9%; 2)
 123 once in the past month; 3) 2 or 3 times in the past month; 4) once a week 8.1%; 5} 2 or 6
 124 times a week 5.6%; 6) every day 0.1%; missing 1.4%; condensed—none (43.89%),
 125 monthly (40.91%), weekly or more (13.84%).
 - 126 • Main job—present job or past job held the longest. Defined as “Managerial, professional
 127 specialty (Executive, managerial, administrative, professional occupations. Job titles
 128 include teacher, guidance counselor, registered nurse, doctor, lawyer, accountant,
 129 architect, computer/systems analyst, personnel manager, sales manager, etc.) Missing,
 130 4.7%” No--54.02%, Yes—41.23%.
 - 131 • Pain-- Quality of life subscale on pain. PAIN ranges from 0 to 100 with a higher score
 132 indicating a more favorable health state. From the Rand 36-Item Health Survey (SF-36).
 - 133 • Satisfied with quality of life, analogous to Cantril’s ladder, 0-Satisfied to 10-Dissatisfied.

- 134 • Rate quality of life, analogous to Cantril's ladder, 0-worst, 10-Best. 'Happy': During the
135 past four weeks 'Have you been happy'. Six point scale 1=All, 2=Most, 3=A good
136 bit, 4=Some, 5=A little bit, 6=None of the time. (From 36/37). This scale was reversed:
137 All=6, Most=5, Good Bit=4, Some=3, Little=2, None=1.
- 138 • 'Emotional well-being', ranging from 0 to 100 with a higher score indicating a more
139 favorable health state. The source of the scale is the Rand 36-Item Health Survey (SF-
140 36). Computed from Form 36/37, questions 76, 77, 78, 80, and 82. Source: Rand 36-Item
141 Health Survey (SF-36). Quality of life subscale on emotional well-being ranges from 0 to
142 100 with a higher score indicating a more favorable health state.
- 143 • 'Social support' is the sum of nine components. Scores range from 9 to 45, higher scores
144 more support. The 9 components, each ranging from 1) None, 2) A little, 3) Some, 4)
145 most, 5) All--of the time, are: Someone - a) 'to listen when need to talk', b) 'to give
146 good advice'; c) 'who can take you to the doctor', d) 'to have a good time with', e) 'to
147 help understand a problem when you need it', f) 'to help with daily chores if you are
148 sick', g) 'to share your private worries', h) 'to do something fun with', i) 'to love you and
149 make you feel wanted'.

150 Statistical methods

151 Descriptive statistics (means and standard deviations), chi-square analyses for categorical data,
152 linear regression and multivariable analyses of covariance (GLM) were carried out.

153 Multivariable GLM analyses yielded means, standard errors, and p-values controlling for
154 covariates, and pair-wise p-values by class.

155 Results

156 Descriptive data from univariate analyses are in Table 1. The mean age for all women is 62.62
157 years; for Non-White, 62.32, for White 62.90, a significant difference, $P < 0.0001$. Height in
158 inches differs by race/ethnicity—Non-White 63.63, White 63.67, $P = 0.033$. Compared to Non-
159 White women, White women's income was higher, $P = 0.0128$; self-reported general health was
160 better, $P = 0.0012$; and fewer reported a great deal of strength and comfort from religion—63.6%
161 vs., 62.9%, $P = 0.0290$. Subjective well-being and demographic variables did not differ. (Table
162 1).

163 Univariate and multivariable covariance analyses for height as the outcome were carried out for
164 the 93,676 participants into three groups a) all, b) Non-White and c) White women. Univariate
165 means for height by demographic, behavioral and subjective well-being variables are in Table 2.
166 Income and club attendance were significantly associated with height among all, Non-White and
167 White women. However, in the two lowest income categories— $< \$20,000$ and $\$20,000$ – $\$34,999$ —
168 the height differences were greatest. Means for subjective well-being variables tended to be
169 high among all women—in the top quintile, but they were not related to height.

170 Multivariable analyses included height and seven covariates. Table 3 shows pair-wise P-values
171 as follows: 1) income—all, $< \$20$ vs. $\$20k$ — $P = 0.020$; 2) education—none significant; 3) job—
172 all women $P = 0.0296$, Non-White NS, White, $P = 0.0360$; 4) clubs—all, Non-White, White with
173 weekly attendance were taller than none or monthly—for all, $P = 0.0005$ and $P = 0.0039$; Non-
174 White, $P = 0.0031$ and 0.0201 ; White, $P = 0.0137$ and 0.0357 ; 5) religion—all and White women
175 reporting 'a little' vs. 'none', and 'a little' vs. 'a great deal' were taller—all $P = 0.0522$ and
176 $P = 0.0039$, White $P = 0.0418$ and $P = 0.0130$, Non-White NS; 6) general health—White women NS,
177 Non-White women with excellent very good health were taller, $P = 0.0116$; 7). Taller women had
178 a lower BMI; $P < 0.0001$. Notably, results from univariate covariance analyses (Table 2) and

179 multivariable covariance analyses (Table 3) show minor differences. Full results of the GLM
180 multivariable covariance analyses for all, Non-White and White women are in Tables 4a, 4b and
181 4c. Height and subjective well-being—happiness, emotional well-being, satisfaction with life,
182 quality of life, social support, general health and likelihood of depression—dichotomized at the
183 median were not associated; with the exception, general health among Non-White women.
184 (Table 5).

185 Income and education as predictors of subjective well-being, club attendance and religion
186 revealed both congruencies and differences among Non-White and White women. Among
187 White women, income and the subjective well-being variables—happiness, emotional well-
188 being, happiness, satisfaction with life, quality of life and social support—and general health
189 were significantly associated. These variables were also associated with education, with the
190 exception of satisfaction with life. In contrast, Non-White women’s subjective well-being
191 variables—emotional well-being, happiness, and satisfaction with life—were not associated with
192 income except for quality of life, $P=0.0095$ and social support, $P=0.0007$. Associations with
193 education were significant for variables: happiness, emotional well-being and quality of life;
194 satisfaction with life, but not significant for social support. (Table 6) An additional finding of
195 interest is that measures of the likelihood of depression, unlike general health, showed no
196 disparities by Non-White/White and no associations with height, (Tables 2 and 3) with income,
197 and with education. (Table 6). ‘Strength and comfort from religion’—‘a great deal’--was
198 associated with depression and the subjective well-being variables. Those with ‘a great deal’ had
199 the highest values (means) from the subjective well-being variables. In contrast, those with ‘a
200 great deal’ had poorer general health. (Table 7). Interestingly, income and education were
201 associated with religion among White women. Those with higher income and with higher

202 education were more likely to report ‘none’ and less likely to report ‘a great deal’ (Chi-square
203 $P < 0.0001$). Among Non-White religion and income and religion and education were not
204 significantly associated. (Table 8).

205 In sum, new findings from this study of US women, 49-79, are: a) taller Non-White and White
206 women engaged in more frequently in social activities, e.g., such as club attendance; b) taller
207 White women had reported significantly more ‘a little’ strength and comfort from religion
208 compared to ‘none’ and compared to ‘a great deal’. Other major findings are: c) taller Non-
209 White and Whites did not have higher incomes or more education; d) taller White women with
210 present or past managerial/ professional jobs; e) taller Non-White women had better general
211 health.

212 Discussion

213 A vast and global literature examines the relation of height with numerous factors, including, but
214 not limited to psychological, social, economic, anthropologic, genetic, gender, environmental,
215 ecologic, behavioral, nutritional, infection and other constructs. This study examined data from
216 relatively healthy women ages 49-79, from a range of race/ethnic groups—dichotomized Non-
217 white 17% and White 83% of the sample of 93,676 women. It focused on height and variables
218 including income, education, general health, social activities, and subjective well-being. Two
219 major findings emerge: 1) taller Non-White and White women engaged social activities, viz.
220 attended clubs/lodge/groups, more frequently than those who did not attend or attended less
221 frequently. Attendance at clubs is one among a variety of social activities. Notably, this finding
222 is in accord with Persico et al. (21), who related social activities, such as athletics, to height and
223 wages--one of the few papers to analyze social activities.

224 2) Strength and comfort from religion was associated not only with height, but also with
225 subjective well-being, general health, income and education. (Tables 1—4, 7-8). The association
226 of religion and income has been discussed by Barro and McCleary (30); and religion and health
227 have many citations in the medical literature (31). However, to my knowledge, religion and
228 height have not been investigated.

229 Occupation and height of men and women have been examined by many investigators (7, 10, 14,
230 19, 21), as well as others. In particular, the paper of Case and Paxson, based on data from cohort
231 (longitudinal) studies, concluded that taller adults select into occupations that have higher
232 cognitive skill requirements and lower physical skill demands (7). Case, Paxson and Islam
233 confirm these results using longitudinal data from the BHPS (British Household Panel Survey
234 (32). In this study, taller White women had managerial/professional jobs, and taller Non-White
235 women did not have managerial/professional jobs; but they had better general health--results
236 consistent with the effects of genetics, environment, poverty, medical conditions, nutrition and
237 cognitive skills.

238 However, height was not significantly associated with income nor with education among
239 both Non-white and White. This is in contrast to findings of Deaton and Arora, who analyzed the
240 Analysis of the Gallup-Healthways Well-Being Index daily poll of the US population (10). They
241 reported “taller people lead better lives on average”--findings “almost entirely explained by the
242 positive association between height and both income and education”. These differences in
243 results may be accounted for by social and cultural factors in both White and Non-White women
244 such as: a) in the U.S., women’s incomes continue to lag those of men, for this reason, taller
245 White women may lead better lives by virtue of their managerial/professional positions rather
246 than by income or education; and b) Non-Whites with better health were taller; early

247 environmental or genetics factors may have prevented some Non-Whites from reaching their full
248 physical and mental development (7,10). It is noteworthy that, though not related to height,
249 subjective well-being variables are significantly associated with income and education among
250 White women. Hence, higher income and better educated women may lead better lives, but not
251 because they are taller; findings that differ from Deaton and Arora (10).

252 A new area examined in this study is religiosity as measured as ‘strength and comfort from
253 religion’ classified as ‘none’, ‘a little’ and ‘a great deal’. Overall results are the percentage of
254 women reporting—12% ‘none’, 24% ‘a little’ and 63% ‘a great deal’, and 0.5% missing data.
255 Analyses of this construct, both as a covariate and as a outcome, (to my knowledge has not
256 examined in the literature on height), was related to height, as well as health, subjective well-
257 being, income and education (Tables 2 and 3), Although measures and definitions of
258 ‘religion/religiosity’ may differ among investigators, my findings on religion and income are in
259 accord with Barro and McCleary (30). Their findings reveal an overall pattern in which
260 economic development is associated with less religiosity, measured by church attendance
261 or religious beliefs. They conclude: “This pattern can be seen in simple relations between a
262 measure of religiosity and per capita GDP, which we take as the basic indicator of economic
263 development.” (Their future research plans include an assessment of the effects of
264 religiosity on political and social variables, including democracy, the rule of law, fertility,
265 and health. P 38). To my knowledge height and religion have not been investigated. Health
266 and religion/religiosity are of increasing interest in the medical literature. November 18,
267 2013PUBMED search for ‘religion’ yielded 50054 hits. Koenig, Director, Center for
268 Spirituality, Theology and Health at Duke University. “Reviews. Religion, Spirituality, and

269 Health: the research and clinical implications” (31). Interestingly, while weight is discussed, no
270 mention of height is found in the text or among the 596 references.

271 Further research, suggested by my findings, on height and other factors are the following:

272 1) Occupation--indicated by the finding that taller White women had managerial/professional
273 jobs presently or in the past. In the WHI data ‘managerial/professional job’ covers a range of
274 occupations’. It is defined as “Managerial, professional specialty (Executive, managerial,
275 administrative, professional occupations. Job titles include teacher, guidance counselor,
276 registered nurse, doctor, lawyer, accountant, architect, computer/systems analyst, personnel
277 manager, sales manager, etc.)”. To understand better the association of height and the
278 components of ‘managerial/ professional specialty need more detailed classifications.

279 2) Social activities—here denoted by attendance at clubs/lodges/groups—a construct
280 significantly associated with height among Non-White and White. What constitutes social
281 activities and how to measure them needs further work.

282 3) ‘Strength and comfort from religion’, and important construct in this study, was
283 associated with height, income, education and health. Women who reported ‘a little’ vs.
284 ‘none’ or vs. ‘a great deal’ were taller, had higher incomes and better education, but those
285 with ‘none’ had better health. Importantly, as far as I am aware, religion/religiosity and
286 height have not been previously examined. Replication and validation in other groups are
287 suggested.

288 A possible limitation of this study is that the data are from a cross-section observational study, which may
289 not be sufficient for analyzing changes over time or causal inference. The strengths of this study are
290 the large sample size and reliability and validity of the questionnaire.

291 In conclusion, among relatively healthy U.S. women, 17% Non-White and 83% White, ages 49-
292 79, height and income, and height and education, were not associated.. However, taller White
293 women had better jobs, and taller Non-White had better health. In addition, two new results
294 emerged—first, taller Non-White and White women attended clubs/groups more frequently.
295 Second, taller women reported ‘a little’ comfort from religion (vs. ‘none’ and vs. ‘a great deal’)--
296 they add to the vast literature on height and its relation with human behavior and with well-
297 being. Whether these findings are generalizable globally to diverse populations and a range of
298 demographics-- including age, gender, culture, socioeconomics, psychosocial, among others--
299 raise important questions in search of answers.

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303 Study (WHI OS).

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Table 1 Descriptive Data All Women and by Non-White/White. P-Values denote Non-White vs. White differences

Univariate Means	Means			P-Value#	Categorical Variables	Percentages			P-Value#
	Continuous Variables	All	Non-White			White	All	Non-White	
Age	63.62	62.23	63.90	<0.0001	Income				
Height Inches	63.67	63.63	63.67	0.0330	<\$20k-	16.16	16.85	16.02	
Happy (1-5)	4.55	4.53	4.55		\$20k-	23.31	23.12	23.35	
Emotional Well-being (0-100)	78.57	78.38	78.61		\$35k_	40.24	40.19	40.25	
Satisfied with Life (11 Dissat-Sat)	8.10	8.10	8.10		\$75k-	9.43	15.87	9.41	
Quality of Life (11 Worst-Best)	8.25	8.25	8.25		_ \$100k-	10.86	10.31	10.97	0.0128
Social Support (9-45)	35.92	35.87	35.93		Education				
Pain Construct (0-100)**	74.20	73.90	74.26		< High School	22.12	22.34	22.07	
Likelihood of Depression (0-100)	0.042	0.044	0.042		High Sch--Some College	47.63	47.72	47.61	
* Parentheses show scale					College Grad or More	30.26	29.94	30.32	
** Higher--Less Pain					Health--Exc/VeryGood*	57.92	56.94	58.12	0.0151
# Blank Not significant					Managerial/Professional Job**	41.23	40.75	41.33	
					Clubs				
					None	43.89	43.85	43.90	
					Monthly	40.91	41.01	40.89	
					Weekly	13.84	13.81	13.84	
					Strength/Religion				
					None	12.51	11.86	12.64	
					A Little	24.01	24.01	24.00	
					A Great Deal	62.98	63.60	62.86	0.0209
					Likelihood Depression***				
					None	55.38	55.43	55.37	
					Yes	44.62	44.57	44.63	
					*vs. Good/Fair/Poor				
					** vs No Mang Job				
					***Dichotomized at Median				
					# Blank Not significant				

Table 2 Mean Height in Inches. Univariate Covariance Analyses

Variables	All			Non-White			White		
	Mean	Std. Dev.	P-value#	Mean	Std. Dev.	P-Value#	Mean	Std. Dev.	P-value#
Variables	63.67	2.49		63.63	2.49		63.67	2.49	
Age									
50-59	63.67	2.48		63.62	2.48		63.68	2.48	
60-69	63.66	2.48		63.65	2.52		63.67	2.48	
70-79	63.67	2.50		63.59	2.45		63.68	2.51	
Income									
< \$20k	63.63	2.50	0.0134*	63.53	2.52	0.0489*	63.65	2.49	0.0723*
\$ 20K-	63.70	2.47		63.66	2.48		63.70	2.47	
\$35K-	63.67	2.49		63.64	2.49		63.68	2.49	
\$75K-	63.68	2.49		63.66	2.41		63.69	2.51	
≥\$100K	63.66	2.48		63.60	2.56		63.67	2.46	
Education									
< High School	63.67	2.48		63.62	2.50		63.68	2.47	
High Sch--Some College	63.67	2.48		63.64	2.48		63.67	2.49	
College Grad or More	63.66	2.50		63.61	2.52		63.67	2.49	
Managerial/Professional Job									
Missing	63.66	2.49		63.56	2.51		63.68	2.49	
No	63.65	2.48	0.0723	63.62	2.49		63.66	2.48	
Yes	63.68	2.49		63.65	2.50		63.69	2.49	
Attend Club/Lodges/Groups									
Missing	63.67	2.53		63.86	2.52		63.63	2.53	
None	63.65	2.49	0.0015**	63.60	2.50	0.0050**	63.67	2.48	0.0272**
Monthly	63.66	2.49	0.0023**	63.61	2.50	0.0094**	63.67	2.49	0.0298**
Weekly or more	63.73	2.48		63.77	2.48		63.73	2.48	
Religion--Strength/Comfort									
Missing	63.75	2.69		64.21	2.88		63.66	2.65	
None	63.65	2.49	0.0843^	63.67	2.50		63.65	2.49	0.0398^
A little	<u>63.70</u>	2.48		63.64	2.49		<u>63.71</u>	2.48	
A great deal	63.65	2.48	0.0133***	63.64	2.49		63.66	2.48	0.0175***
General Health									
Excellent/Very Good	63.67	2.48		63.67	2.48	0.0058	63.67	2.48	
Good/Fair/Poor	63.66	2.50		63.56	2.51		63.68	2.50	
Happy									
No	63.67	2.48		63.59	2.51		63.69	2.48	
Yes	63.67	2.49		63.64	2.48		63.67	2.49	
Social Support--Median*									
Above	63.67	2.49		63.61	2.49		63.68	2.49	
At or Below	63.67	2.48		63.66	2.50		63.67	2.48	
Emotional Well-being--Median*									
Above	63.67	2.49		63.59	2.50		63.68	2.49	
At or Below	63.67	2.48		63.66	2.48		63.67	2.48	
Satisfaction with Life--Median*									
Above	63.67	2.49		63.64	2.48		63.68	2.49	
At or Below	63.66	2.49		63.61	2.51		63.67	2.48	

Quality of Life--Median*

Above	63.68	2.49	63.64	2.49	63.68	2.49
At or Below	63.66	2.49	63.62	2.49	63.67	2.48

Blank Not significant ** 'Weekly' taller than 'None' and taller than 'Monthly'

^ A little taller than None

** 'Weekly' taller than 'None' and taller than 'Monthly'

*** A little taller than A great Deal

Table 3 Multivariable Covariance Analyses -- Mean Heights

Multivariable Covariance Analyses -- Mean Heights				
Pair Wise Comparisons				
<u>All Women</u>				
	Mean Height	P-values		
0 Non-White/White				
Non-White	63.669	0.0164		
White	63.724			
1 Income 1-5				
		1 vs 2		
1 < \$20k	63.668	0.0210		
2 \$ 20K-	63.732			
3 \$35K-	63.701			
4 \$75K-	63.709			
5 ≥\$100K	63.687			
2 Education 1-3				
		NS		
1 < High School	63.713			
2 High School--Some College	63.702			
3 College Graduate or More	63.683			
3 Managerial/Professional Job				
		0.0296		
No	63.678			
Yes	63.724			
4 Attend Club/Groups				
		None vs. Weekly	Monthly vs Weekly	
None	63.678	0.0005	0.0039	
Monthly	63.693			
Weekly	63.770			
5 Strength/Comfort Religion				
		None vs Little	Little vs Great Deal	
None	63.673	0.0524	0.0074	
A Little	63.730			
A Great Deal	63.676			
6 General Health				
		NS		
Good/Fair/Poor	63.657			
Excellent/Very Good	63.668			
7 BMI Quartiles*				
		< 0.0001		
1	63.952			
2	63.758			
3	63.619			
4	63.467			
	<u>Non-White</u>	P-values	<u>White</u>	P-values
	Mean Height		Mean Height	
1 Income 1-5				
		NS		NS
1 < \$20k	63.772		63.666	
2 \$ 20K-	63.892		63.718	
3 \$35K-	63.870		63.685	
4 \$75K-	63.889		63.691	
5 ≥\$100K	63.841		63.675	
2 Education 1-3				
		NS		NS
1 < High School	63.875		63.699	
2 High School--Some College	63.861		63.688	
3 College Graduate or More	63.822		63.674	

3 Managerial/Professional Job						
No	63.878	NS		63.657	0.0360	
Yes	63.910			63.705		
4 Attend Club/Groups						
		None vs Weekly	Monthly vs Weekly		None vs. Weekly	Monthly vs Weekly
None	63.793	0.0031	0.0201	63.675	0.0137	0.0357
Monthly	63.833			63.685		
Weekly	63.985			63.745		
5 Strength/Comfort Religion						
		NS			None vs Little	Little vs Great Deal
None	63.813			63.664	0.0418	0.0130
A Little	63.826			63.730		
A Great Deal	63.779			63.675		
6 General Health						
		0.0116			NS	
Good/Fair/Poor	63.594			63.690		
Excellent/Very Good	63.702			63.681		
7 BMI Quartiles*						
		< 0.0001			< 0.0001	
1	64.095			63.942		
2	63.903			63.748		
3	63.756			63.611		
4	63.656			63.448		

* Significant Trend $P < 0.0001$ Lowest BMI Highest Height

Table 4b Results of Multivariable Covariance Analyses--Outcome Height--Non-White Women

Non-White	Class	Levels	Values				Mean Height	Std Error		P-values					
1 Income 1-5	1	5	1 2 3 4 5								1	2	3	4	5
2 Education 1-3	2	3	1 2 3				1 < \$20k	63.7721	0.1073			0.0758	0.1253	0.1848	0.4326
3 Managerial/Professional Job	3	3	0 1 2				2 \$ 20K-	63.8922	0.1043	0.0758			0.6839	0.9706	0.5207
4 Attend Clubs/Groups	4	4	0 1 2 3				3 \$35K-	63.8697	0.1013	0.1253	0.6839			0.7955	0.6917
5 Strength/Comfort Religion	5	4	0 1 2 3				4 \$75K-	63.8892	0.1171	0.1848	0.9706	0.7955			0.6038
6 General Health*	6	3	1 2 3				5 ≥\$100K	63.8405	0.1160	0.4326	0.5207	0.6917	0.6038		
7 BMI Quartiles	7	4	1 2 3 4				2 Education 1-3				1	2	3	4	
	Source	DF	SumSq	MeanSq	F Value	P-value	1 < High School	63.87542	0.10680			0.7945	0.4484		
	Model	19	590.0410	31.0548	5.02	<.0001	2 Hi Schl--Some Coll	63.86066	0.10008	0.7945			0.4747		
	Error	14200	87827.4650	6.1850			3 Coll Grad or More	63.82214	0.10458	0.4484	0.4747				
	CorrTot	14219	88417.5061				3 Manag/Prof Job				1	2	3		
	R Sq	Coeff Var	RtMSE	SumSq			0 Missing	63.76961	0.13465			0.2954	0.1919		
	0.006673	3.9088	2.4870	63.6249			1 No	63.87821	0.09654	0.2954			0.53		
	Source	DF	Type I	MeanSq	F Value	Pr > F	2 Yes	63.91039	0.09782	0.1919	0.53				
1 Income 1-5	1	4	30.8849	7.7212	1.25	0.288	4 Clubs				1	2	3	4	
2 Education 1-3	2	2	2.2607	1.1304	0.18	0.833	0 Missing	63.8000	0.1872			0.973	0.876	0.3996	
3 Managerial/Professional Job	3	2	8.9379	4.4689	0.72	0.4855	1 None	63.7928	0.1131	0.973			0.3712	0.0031	
4 Attend Clubs/Groups	4	3	62.2094	20.7365	3.35	0.0181	2 Monthly	63.8335	0.1137	0.876	0.3712			0.0201	
5 Strength/Comfort Religion	5	3	21.8405	7.2802	1.18	0.31680	3 Weekly or more	63.9847	0.1228	0.3996	0.0031	0.0201			
6 General Health*	6	2	72.8989	36.4494	5.89	0.0028	5 Religion				1	2	3	4	
7 BMI Quartiles	7	3	391.0087	130.3362	21.07	<.0001	0 Missing	63.9935	0.3136			0.6129	0.6371	0.5428	
	Source	DF	Type III	MeanSq	F Value	Pr > F	1 None	63.8126	0.1192	0.6129			0.8534	0.6092	
1 Income 1-5	1	4	22.8336	5.7084	0.92	0.4494	2 A Little	63.8263	0.1104	0.6371	0.8534			0.3414	
2 Education 1-3	2	2	4.1767	2.0883	0.34	0.7135	3 A Great Deal	63.7786	0.1054	0.5428	0.6092	0.3414			
3 Managerial/Professional Job	3	2	10.8563	5.4282	0.88	0.4158	6 General Health				1	2	3		
4 Attend Clubs/Groups	4	3	54.5662	18.1887	2.94	0.0318	1 G/F/P	63.5944	0.0972			0.0116	0.0195		
5 Strength/Comfort Religion	5	3	8.1560	2.7187	0.44	0.7247	2 Exc/VG	63.7019	0.0955	0.0116			0.0498		
6 General Health*	6	2	67.6623	33.8311	5.47	0.0042	3 Missing	64.2619	0.2551	0.0195	0.0498				
7 BMI Quartiles	7	3	391.0087	130.3362	21.07	<.0001	7 BMI Quartiles				1	2	3	4	
							1	64.0951	0.1036			<0.000	<0.000	<0.0001	
							2	63.9033	0.1044	<0.000	1	1	<0.000	<0.0001	
							3	63.7562	0.1047	<0.000	<0.000	1	1	<0.0001	
							4	63.6563	0.1042	<0.000	<0.000	<0.000	1	1	

General Health--Good/Fair/Poor vs Excellent Very Good
 Note: Missing data included in Multivariable Analyses--for *Job, Club, Religion, Health (less than 1% for these variables).

Table 5

Height and Subjective Well-Being Variables

		<u>All</u>	<u>P-value*</u>	<u>Non-White</u>	<u>P-value*</u>	<u>White</u>	<u>P-value*</u>
Happiness	<u>< Median</u>	63.670	0.9734	63.586	0.0318	63.687	0.3905
	<u>> Median</u>	63.665		63.643		63.670	
	<u>Missing</u>	63.666		64.156	^	63.560	
Emotional Well-Being	<u>< Median</u>	63.664	0.8051	63.588	0.0594	63.680	0.8429
	<u>> Median</u>	63.668		63.659		63.669	
	<u>Missing</u>	63.708		63.874		63.672	
Satisfaction with Life	<u>< Median</u>	63.671	0.5363	63.636	0.0582	63.678	0.9280
	<u>> Median</u>	63.661		63.612		63.671	
	<u>Missing</u>	63.755		64.160	^	63.674	
Quality of Life	<u>< Median</u>	63.675	0.2192	63.635	0.0200	63.683	0.7529
	<u>> Median</u>	63.663		63.619		63.672	
	<u>Missing</u>	63.818		64.250	^	63.727	
Social support	<u>< Median</u>	63.668	0.5343	63.607	0.2914	63.607	0.6522
	<u>> Median</u>	63.669		63.658		63.658	
	<u>Missing</u>	63.613		63.520		63.520	
General Health	<u>< Median</u>	63.658	0.3236	63.559	0.0004	63.679	0.9144
	<u>> Median</u>	63.671		63.671		63.671	
	<u>Missing</u>	63.792		64.296	^^	63.686	
Likelihood of Depression	<u>< Median</u>	63.657	0.5345	63.616	0.7771	63.666	0.3590
	<u>> Median</u>	63.675		63.640		63.682	
	<u>Missing</u>	63.651		63.581		63.667	0.6496

* P-values < 0.05 Bold

^ Missing differs from \leq Median and $>$ Median^^ \leq Median and $>$ Median Differ, Missing Differs from $<$ Median and \geq Median

Table 6 Subjective Well-Being Means by Income and Education

Row 1	Non-White	<u>Income</u>					P-Value	< High	<u>Education</u>	College Grad	P-Value
Row 2	White	< \$20K	\$20K-	\$35K-	\$75K-	≥ \$100K		School	High School- Some College	or More	
1	Happy	4.522	4.536	4.533	4.513	4.567	0.6584	4.491	4.545	4.541	0.0299
2		4.516	4.543	4.557	4.549	4.567	0.0019	4.531	4.554	4.552	0.0501
1	Emotional	78.012	78.356	78.462	78.770	78.512	0.6150	77.649	78.708	78.408	0.0027
2	Well-Being	78.059	78.635	78.741	78.576	78.781	0.0006	78.315	78.660	78.736	0.0113
1	Satisfaction	8.030	8.111	8.105	8.083	8.153	0.3637	7.997	8.124	8.126	0.3638
2	with Life	8.043	8.084	8.103	8.120	8.167	0.0003	8.089	8.107	8.091	0.4675
1	Quality of	8.149	8.248	8.262	8.279	8.303	0.0095	8.164	8.266	8.285	0.0008
2	Life	8.191	8.247	8.259	8.283	8.303	<0.0001	8.233	8.263	8.253	0.0169
1	Social	35.299	35.888	36.004	35.797	36.332	0.0007	35.673	35.906	35.969	0.2252
2	Support	35.531	35.753	36.000	36.139	36.294	<0.0001	35.858	35.933	35.961	0.4196
1	General	2.425	2.381	2.345	2.325	2.357	0.0018	2.407	2.361	2.347	<0.0001
2	Health*	2.394	2.351	2.336	2.312	2.293	<0.0001	2.365	2.341	2.325	0.0097
1	Likelihood of	0.0482	0.0433	0.0432	0.0410	0.0462	0.4714	0.0462	0.0427	0.0455	0.4196
2	Depression*	0.0438	0.0435	0.0411	0.0413	0.0413	0.1909	0.0424	0.0420	0.0422	0.9394

*Low values better health -- 1= Excellent-5=Poor

** Low values less likelihood

Table 7 **Subjective Well-Being Variables by Strength
and Comfort from Religion**

Women	All	Non-White	White
	Means	Means	Means
Happy			
None	4.409	4.379	4.415
A Little	4.42	4.402	4.424
A Great Deal	4.621	4.609	4.623
Emotional Well-Being			
None	77.82	77.25	77.927
A Little	76.884	76.592	76.943
A Great Deal	79.364	79.272	79.382
Satisfaction with Life			
None	7.796	7.797	7.796
A Little	7.788	7.784	7.789
A Great Deal	8.277	8.271	8.278
Quality of Life			
Life			
None	7.796	8.056	8.05
A Little	7.788	8.023	8.016
A Great Deal	8.277	8.37	8.385
Social Support			
None	35.097	35.094	35.097
A Little	34.945	34.89	34.956
A Great Deal	36.456	36.397	36.468
General Health*			
None	2.143	2.15	2.142
A Little	2.316	2.31	2.317
A Great Deal	2.397	2.428	2.391

Likelihood of Depression**

None	0.044	0.0452	0.0438
A Little	0.0474	0.0498	0.0469
A Great Deal	0.0403	0.0421	0.0399

*Low values Better. General Health 1=Excellent--5=Poor

** Low values less likelihood

N.B. P <0.0001 for all groups and variables
except Non-White Likelihood of Depression--P =0.0334

Table 8 Strength and Comfort from Religion by Income and by Education for All, Non-White, White Women

Percentages for None, A Little and A Great Deal

	Income					Education		
	< \$20k	\$20k-	\$35k	\$75K	≥ \$100k	< High School	High School Some College	College Grad or More
All Women								
None	11.72	12.37	12.5	13.54	13.68	11.76	12.36	13.30
A Little	23.37	23.46	24.25	24.19	25.01	24.06	23.9	24.12
A Great Deal	64.43	63.58	62.77	61.71	60.92	63.66	63.24	62.08
		Chi-square	P < 0.0001				P < 0.0001	
Non-White								
None	11.33	12.22	11.58	12.95	12.63	11.69	11.91	11.78
A Little	23.16	22.72	24.8	25.54	25.07	24.58	23.59	23.95
A Great Deal	64.89	64.37	63.23	61.00	61.63	63.33	63.87	63.73
		Chi-square	P = 0.1272				P = 0.6029	
White								
None	11.80	12.4	12.69	13.66	13.88	11.78	12.46	13.57
A Little	23.42	23.61	24.14	23.92	25.00	23.95	23.97	24.10
A Great Deal	64.34	63.42	62.67	61.86	60.79	63.73	63.11	61.83
		Chi-square	P < 0.0001				P < 0.0001	