

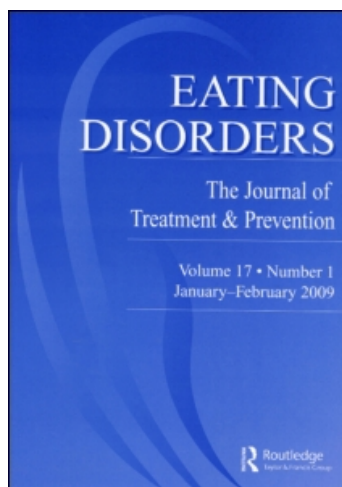
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Tolerance of Larger Body Sizes by Young Adults Living in Australia and Hawaii

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Identifying the barriers to achieving an appropriate body size is important for health. This study investigated young adults' tolerance of excess weight in other adults. Participants were 172 students (65 male, 107 female) with a mean age of 22.24 years ($SD = 1.61$). Half the participants resided in Australia, and half in Hawaii. Students from both countries were found to be tolerant of body sizes larger than those recommended for good health. These results help inform our understanding of the factors that may influence weight gain, and have important implications for the worldwide obesity problem and related health issues.

Obesity has been identified as a significant contributing factor in several highly prevalent diseases such as Type II diabetes, cardiovascular disease (Keller, Fleury, & Mujezinovic-Womack, 2003) and breast cancer (Cohen, 2001). This situation exists despite the fact that obesity is one of the more modifiable predictors of poor health (Coakley et al., 1998). The percentage of overweight Australians has been estimated to be as high as 72% in the general adult population, with 30% falling into the obese category (Janus et al., 2007). Among Pacific Islander men and women, rates of obesity have also been reported to be high (Grandinetti et al., 1999). These figures are of public health significance given the fact that even a small weight loss of 10% by overweight or obese individuals, could lead to significant health gains

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(Chernoff 1999). Increasing our understanding of the barriers to achieving a healthy weight will contribute to the reduction of the disease burden of the community associated with overweight and obesity. One such barrier that needs further investigation is the outcome of social comparison of body size.

Upward and downward social comparison processes are used in evaluating body size acceptability, which forms part of the body image construct (Evans & McConnell, 2003). Upward social comparison refers to the process whereby you make comparisons to people you perceive as better off than yourself. The impact of such comparisons on body dissatisfaction has been well researched (Morrison, Kalin, & Morrison, 2004; Tiggemann, & McGill, 2004). These authors concluded that upward social comparison to fashion thin models can result in pressure to lose weight. However, no literature was identified that investigated the impact of downward social comparison on weight change behaviours. Downward social comparison occurs when you make comparisons to those perceived to be worse off than yourself. This process is believed to enhance subjective well being. In the context of weight change behaviour, downward social comparison would lead you to compare yourself with someone who is more overweight than you are, which may well result in a reduction in body-size dissatisfaction. Having an accurate perception and interpretation of one's own body size is considered to be one of the many important factors that needs to be addressed in relation to weight management (Steenhuis, Bost, & Mayer, 2006). If comparisons are being made against a population standard or norm that is unhealthily large, problems of overweight may emerge through the lack of motivation to reduce weight. Indicative of this is Wardle, Haase and Steptoe's (2006) cross cultural study that showed an increase in the "norm" for body size, resulting in less pressure to reduce weight.

Knight, Illingworth and Ricciardelli (2009) suggested that overweight and obesity in older adults (particularly males) was, in part, the result of individuals' tolerance for a far wider range of body sizes than is considered healthy by the World Health Organisation (WHO) standard (2000). Older adults in Knight *et al.*'s study perceived body sizes that represented individuals with an extremely low BMI (14.35) through to individuals with an extremely high BMI (36.01) as acceptable. Likewise Rand and Resnick (2000) reported that 92% of overweight men and 79% of overweight women rated their actual body size as socially acceptable. They suggested more work needed to be done to establish a conceptual framework for body-size acceptability.

Body image develops within a cultural context (Rucker & Cash, 1992) and as such, it is not unexpected that research has identified differences in body size evaluations across cultural groups, with some groups preferring a body size that is larger than the recommended healthy weight (Craig, Halavatau, Comino & Caterson, 1999). For example, Pacific Islanders are more accepting of a higher body weight and body size than other groups (Brewis, McGarvey, Jones, & Swinburn, 1998; Craig *et al.*, 1999; Metcalf,

Scragg, Willoughby, Finau, & Tipene-Leach, 2000), as are Chamorro females from Guam (Edman & Yates, 2004). Studies of African populations have also indicated that overweight is looked upon positively (Holdsworth, Gartner, Landais, Maire, & Delpuech, 2004).

Given that the social comparison theory is a strongly supported theoretical framework relevant to weight related behaviour (Tiggemann & McGill, 2004) the impact of the exposure to larger body sizes within the general community needs to be investigated. Having a greater tolerance of excess weight might be a barrier to an individual's motivation to maintain their personal weight at a recommended healthy level. In this study we investigated young adults' tolerance of different body sizes some of which were much larger than the body sizes considered healthy. A primary aim of this study was to examine differences in body size tolerance among the young adult participants who were resident in Australia and Hawaii.

METHODS

Participants

A total of 172 students 87 at Deakin University Australia, and 85 at the University of Hawaii, participated in the study. Mean age of the students was 22.24 years ($SD = 1.61$). Gender and body mass index (BMI; kg/m^2) demographics are reported in Table 1.

There was no difference in the mean age of males and females in the sample. However, reflective of typical weight differences between males and females in the general population, a Multivariate Analysis of Variance indicated a significant difference in BMI between males and females ($F_{(1,172)} = 10.28, p = .002$). There was no difference in BMI and age between the students from Australia or Hawaii, and no interaction between gender and country of residence.

TABLE 1 Gender and BMI Details of Participants

Gender	Country of residence	Mean BMI	Standard deviation
Male	Australia ($n = 41$)	23.38	2.95
	Hawaii ($n = 24$)	25.72	5.31
	Total ($n = 65$)	24.24	4.11
Female	Australia ($n = 46$)	22.27**	4.73
	Hawaii ($n = 61$)	22.39	4.24
	Total ($n = 107$)	22.34	4.44
Total	Australia ($n = 87$)	22.79	4.01
	Hawaii ($n = 85$)	23.33	4.78
	Total ($n = 172$)	23.06	4.40

Note. $p < .01$

Although participants from both Australia and Hawaii were from diverse ethnic backgrounds, all were resident in their respective country for more than 2 years.

Materials

A photo library was created by combining seven photos of 16 people (an original photo, plus six size manipulated photos ranging from very thin to very overweight). Of the sixteen, there were eight older adults (four males and four females aged over 65 years) and eight younger adults (four males and four females aged between 18 and 25 years), resulting in four photo cohorts. The 16 photo models were normal weight Caucasian Australian. Using the BMI of the individual depicted in each of the 16 original un-manipulated photos, the estimated BMI value of the figure in each manipulated photo was calculated using Craig and Caterson's (1990) formula.¹ The resultant 112 photos were classified as either underweight, of an acceptable weight or overweight in accordance with the World Health Organisation's (2000) criteria. There was no significant difference in the estimated mean BMI for each weight category (underweight, acceptable weight or overweight) between the older male, older female, younger male and younger female photos. The 112 photos were initially randomly sorted and discretely numbered, so that each participant saw the photos in the same (random) order. A full description of the creation of the photo library can be obtained from the corresponding author.

Procedure

Each participant in the study from both Australia and Hawaii was assessed individually after providing informed consent. Three A4 sized boxes were placed in front of the participant. The boxes were labelled "TOO THIN," "OK," or "TOO FAT." Each of 112 photos in the photo library was handed to the participant in a prearranged random order and they were asked to consider: "if the person in the photo was this size in real life, would you think that they were 'too thin', 'ok' or 'too fat'?" Once the judgement was made the participant placed the photo in the appropriate box. The sorting process took most participants about 15 minutes to complete. The age, gender and BMI value of each photo allocated to the three categories was recorded.

¹ Estimated BMI = Original BMI (Index Size / 100)². Where Index Size = % variation in photo width.

Ethics

The authors certify that all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during this research. Ethics approval was sought and gained from the Deakin University Human Ethics Committee and the University of Hawaii Institutional Review Board.

RESULTS

Upper Limit of Body Sizes Rated as Acceptable

At the upper limit of the “acceptable” category, a repeated measures ANOVA revealed there was a significant difference between the four photo cohorts in the largest BMI value rated as acceptable. The largest body sizes tolerated for the photos of Young Males had a BMI of 37.42, compared to photos of Older Males (37.18), Young Females (32.62), and Older Females (31.20), $F_{(3, 497)} = 51.87, p < .001$ (Huynh-Feldt adjustment; refer to Table 2). Post Hoc comparisons showed that the significant differences between these groups occurred between Male and Female target photos, with no differences between Young and Old photo categories. The differences occurred across the gender of the person in the photo, not across the age of the person depicted in the photo. There were no interaction effects between the independent variables of gender and country of residence of the participants undertaking the evaluation.

Body Size Ratings Compared to WHO Recommendations

One sample t-tests were used to compare the mean BMI of the photos allocated to the “acceptable weight—OK” category using the WHO criteria, with the mean BMI of the photos allocated to that category by the participants. Significant differences were identified for the Older Females ($t_{(171)} = 3.52, p < .01$); Older Males ($t_{(170)} = 13.29, p < .001$); Young Females ($t_{(172)} = 8.44,$

TABLE 2 Comparison of the Upper Limit of Older and Younger, Male and Female Body Sizes Rated as Being of an Acceptable Size

	Mean BMI of the largest body sizes rated as “OK” (<i>SD</i>) students Australia	Mean BMI of the largest body sizes rated as “OK” (<i>SD</i>) students Hawaii	Mean BMI of the largest body sizes rated as “OK” (<i>SD</i>) full sample
Older males	36.72 (7.44)	37.65 (7.75)	37.18 (7.59)
Older females	30.51 (6.13)	31.93 (7.75)	31.20 (6.98)
Younger males	35.96 (6.36)	38.96 (7.78)	37.42 (7.23)
Younger females	32.16 (6.36)	33.11 (7.25)	32.62 (6.80)

$p < .001$), and Young Males ($t_{(170)} = 16.34$, $p < .001$) (Table 2). Similarly, when using the BMI value 24.99 as recommended by the WHO as the upper limit of acceptable or healthy weight, there was a significant difference in the highest mean BMI values classified as acceptable by the young adults for all four photo cohorts; Older Females ($t_{(172)} = 11.27$, $p < .001$); Older Males ($t_{(171)} = 20.99$, $p < .001$); Young Females ($t_{(171)} = 14.14$, $p < .001$), and Young Males ($t_{(170)} = 22.57$, $p < .001$).

Correlation of Body Size Ratings With Rater's BMI

There was a significant positive correlation ($r = .22$, $p < .01$) between the BMI of the participant's providing the rating and the mean BMI of the photos that they allocated to the acceptable "OK" category. The larger the BMI of the person providing the rating, the greater was the mean BMI of the photos they assigned to the acceptable weight category.

DISCUSSION

In this study, participants demonstrated a tolerance for body sizes that are significantly larger than the size considered healthy. This finding was evident for both the male and female participants and for students from both Australia and Hawaii. Both older and younger male body sizes were rated as acceptable at significantly higher BMI levels than were those rated as acceptable for older and younger females. That is, the tolerance for larger body sizes was influenced more by the gender than by the age of the person being evaluated. This finding can perhaps be best interpreted as being reflective of the greater internalization of the social expectation of thinness in females than males (Ogden & Munday, 1999; Piran & Cormier, 2005). The desire for thinness (irrespective of whether a thin body size is actually pursued) may be acting as a modifying influence of any downward social comparison occurring in women, leading to a lowering of their tolerance of overweight compared to males.

Although the participants from both Australia and Hawaii were tolerant of larger body sizes in males compared to females of a similar age, the disparity between *older* males and *older* females, although not significant, was greater (6.2 BMI Units) for the participants resident in Australia compared to those resident in Hawaii (5.8 BMI Units). This was reversed in the younger cohort, with the difference in the rating between the *younger* males and *younger* females being less for the participants resident in Australia (3.8 BMI units) than those resident in Hawaii (5.9 BMI units). Such a trend in the difference in weight tolerance between the two countries is worthy of further investigation.

Of specific concern is the fact that young adults from both Australia and Hawaii evaluated body sizes that were obese (that is they exceeded a BMI of 30 units) as acceptable. This result suggests a general acceptance of very large body sizes and appears to contradict the reported response to the “ideal of thinness” promoted by the media. The finding that males in the study were more tolerant of larger body sizes might explain why males from several cultural and ethnic backgrounds in a study by O’Dea (1999), were found to be three times more likely to be overweight or obese than were the women in the study. The results of this study replicate the earlier findings of Knight et al. (2009) who reported similar weight tolerances shown by older (65+) adults. This suggests that acceptance of larger body sizes is not simply a generalised tolerance of overweight older adults.

The significant positive correlation between participants’ BMI and their tolerance for larger body sizes that was shown in this study, gives no indication of whether overweight people are more tolerant of excess weight because they are overweight, or whether they are overweight because of their more tolerant view of excess weight. The current study did not investigate the reasons for the apparent large body size tolerance. It could be that an underlying “generosity of spirit” adhering to the principle of accepting people for what they are, may have influenced the rating. The only question asked of the participants was “if the person in the photo was this size in real life, would you think that they were ‘too thin,’ ‘ok,’ or too fat?” A different response may have been elicited had the question been more specific to the health of the target person.

Alternatively, this tolerance of unhealthy weight might have resulted because the respondents were unaware of the health issues associated with overweight. This would support Steenhuis et al.’s (2006) findings that only 24% of the overweight male respondents in their study had correct knowledge about a healthy weight range.

A third explanation is that the tolerance of overweight body sizes may have been an expedient response to reality and not indicative of a personally acceptable size. If young people regard the overweight body, which is now so prevalent in a Westernised society (Janus et al., 2007), as the norm, they are likely to judge it as acceptable. This conclusion seems to go against the growing literature on the stigmatisation of obese individuals (Puhl & Brownell, 2001). However, the current results may indicate that either trends towards weight acceptance may be increasing, or that past studies documenting negative reactions toward obese individuals have assessed different aspects of participant’s attitudes from those of the present study.

Irrespective of the underlying cause (or causes) of the observed tolerance, it can be suggested that psychological acceptance of inappropriately large body sizes (Steenhuis et al., 2006) might have the undesired effect of desensitising people to their own overweight body size. Such tolerance might exist despite a preferred thinner ideal size and could result in reduced

motivation to maintain a personally healthy weight. The impact of such tolerance is demonstrated in the current study by the significant positive correlation between the participants' BMI and the average BMI of the photos that they rated as being of an acceptable size. Upward social comparison to a thinner ideal is argued to lead to the adoption of weight loss behaviours (O'Brian, Hunter, Halberstadt, & Anderson 2007), but downward social comparison may result in a disengagement from weight loss behaviours. Although the current obesity epidemic suggests that a greater proportion of the population might be more influenced by downward comparison, investigation into the validity of such a conclusion is needed. Furthermore, determination of the significance of the influence of downward social comparison, compared to the many other factors which contribute to changes in health behaviours related to bodyweight, requires investigation.

Some limitations of the study should be noted. The narrow age range of the participants, typical of undergraduate populations, is problematic in terms of generalisation to the wider population for two main reasons. First, a perception of the acceptability of both body-size and appearance changes across the life span. However, combined with the earlier findings relating to older adults in Knight et al.'s study (2009), assertion that size tolerance is a phenomenon of all ages needs to be considered. Secondly, university undergraduates may be less influenced by traditional cultural ideals than is the general population. This would perhaps have the effect of lessening differences in body size tolerance between the students resident in Australia and Hawaii that other authors (Edman & Yates, 2004; Wang, Abbott, Goodbody, & Hui, 2002) suggested would be apparent.

From a technical perspective, the validity of using small photo images and assuming they would elicit the same evaluation as a "real" person is questionable (Shafran & Fairburn, 2002). Furthermore, the manipulation of a photo image is unable to fully accommodate variation in body shape, which will also impact on size evaluation. The issue of body shape is more of a problem among women than men, and particularly important for cross-cultural studies where body shape preferences are not uniform. Using culturally appropriate photographs would improve the validity of the study.

There have been numerous studies on personal body size estimation and body dissatisfaction, but investigating the range of body sizes that is tolerated in other people has been neglected. This oversight is important as a generalised tolerance of larger than healthy body sizes may influence the outcome of any downward social comparison and resultant weight management behaviours. The results of this study have important health implications in relation to overweight and obesity as the young males and females, from both cultural groups, were tolerant of body sizes larger than the recommended size for good health. While there was evidence of tolerance of overweight and obese body sizes in both older and younger males

and females, greatest tolerance was given to the older males. The ever-increasing obesity problem, particularly among Westernised populations, may indicate that the adoption of the “thin ideal” as promoted by the fashion media, and the “healthy weight” concept promoted by health professionals, are becoming increasingly nullified by a generalised tolerance of larger body-sizes. Future research needs to investigate the relationship between larger body-size tolerance and personal weight management behaviours. Such research will need to be cognizant of the health promotion dilemma inherent in the process of social comparison. On the one hand it may lead to destructive weight management behaviours that promote too much weight loss. The counter concern is that elevated body weight is becoming increasingly tolerated, increasing the risk of obesity. Effective ways of promoting the acceptance of appropriate body sizes for comparison is needed to address this complex issue.

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