Body perception and meal type across age and gender on a Mediterranean island (Sardinia)

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Abstract

Our aim was to describe the differences in consumption of types of meal (complete/ incomplete) eaten at lunch and dinner by gender in people of different age groups (children, young adults and seniors). In particular, we wanted to investigate the differences in choice of meal based on perceived weight.

A cross-sectional analysis was carried out into the choice of meal type based on the different age groups and genders, on the three Body Mass Index categories (under, normal, overweight), on the three levels of self-perception (slim, normal and heavy) and on the degrees of perception of one's body weight (underestimation, accurate estimation, overestimation).

The study involved 516 participants, of which 156 were children (8-12y), 187 were young adults (19-30y) and 173 were elderly (65-90y). They were from North Sardinia (Italy) and responded to a questionnaire aimed at describing their perceived weight and the type of food eaten during the past week. The food eaten was grouped into three types of daily meal: a) incomplete, b) complete lunch or dinner, c) always complete.

Differences emerged in the type of meal eaten according to age, gender and perceived weight. The results show gender differences in associations with meal type according to the way in which body mass is measured or perceived. The choice of complete/incomplete meal type changes according to whether real weight or perceived weight is considered. Discrepancies between actual weight and perception of weight can be linked to dieting behaviour.

Introduction

Several studies of eating behaviours is related to the associations between the perception body mass index (BMI) categories and the choice of foods. Many studies of eating behaviours have found an age and gender-related associations between dietary intake and self-described weight status (Duncan, et al., 2011; Park, 2011). Inaccurate perception of own body mass is reported by gender and age (Chang & Cristakis, 2001). Under-perception is also reported in adolescents, in the elderly (Nyholm et al., 2007). Many authors suppose that this misperception influences eating behaviour more than real weight status (Martin Ginis, McEwan, Josse, & Phillips, 2012). The discrepancies between actual weight and weight perception can be a significant risk factor for eating disorders (Sonneville, Thurston, Milliren, Gooding, & Richmond, 2016).

The present study, based on this background, wants to make a contribution to this significant problem by examining, in a non-clinical sample, the association of self-perception of body mass (as measured by body weight discrepancy) with meal-type intake (e.g. complete/incomplete).

The aim of our study is to analyse the associations between choice of meal type and age group, BMI category, self-perceived body weight and accuracy of weight perception in the comparison between males and females. More specifically, we would like to check whether the choice of meal type in the two genders is associated with the levels of accuracy of weight perception.

Material and Methods

Participants

A cross-sectional survey according to demographic criteria was conducted recruiting a representative distribution of inhabitants of Sardinia (Italy) using a proportionate geographic cluster sampling method. The proportions distributed across categories of socioeconomic status were: 19% low, 40.1% mid-low, 21.3% mid-high, 19.1% high class. The sample includes 516 participants, 258 male and 258 female, representing the following age groups: children (N =156, 30.2%; M =9.9y); young adults (N =187, 36.2%; M =24.1y); seniors (N=173; M =78.21y).

Informed consent was obtained from each participant (for children from their parents).[1]

Measures

Questionnaire. The questionnaire asked about personal, socioeconomic and sociodemographic data (age, gender, marital status, family, residence), as well as specific questions about eating habits, especially about the consumption of foods and their combination within the categories of complete meal, first course or second course.

Meal type. Respondents were asked to classify frequency and type of meal in the past week. According to the Food-Based Classification of Eating Episodes model, the meals were classified as *complete* or *incomplete* (Lennernäs & Andersson, 1999). According to the schedule used in the Seneca Study of Nutrition (Schlettwein-Gsell, Decarli, & De Groot, 1999), a *complete meal* is the most important source of nutrients, served in more than one course. The first course, consisting of pasta, rice, soup or dried legumes, is the main source of carbohydrates; the *second course* may include meat and meat-based products, fish, eggs and

[1] No Italian Institutional Review Board approval was required for this research, but this paper complies with the rules of the ethical code for research and teaching of the Italian Association of Psychology; it is also in accordance with Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects.

dairy products, generally followed by vegetables and fruit and therefore it serves as a source of proteins.

The participants' answers have been classified into three categories: 1) participants who never eat a complete meal; 2) participants who eat only one complete meal a day; 3) participants who eat a complete meal for both lunch and dinner.

BMI. BMI was calculated using the formula BMI =kg/m^2. The participants were divided into three categories: Underweight were defined as having a BMI of less than 18.5, normal weight were greater than or equal to 18.5 but less than 25, overweight were 25 or higher. Self-reported children's height and weight values were translated to gender and age-adjusted BMI percentiles (WHO, 1995). For the elderly, BMI was calculated according to this index in older people (Cook, Kirk, Lawrenson, & Sandford, 2005) underweight (BMI≤22.9); normal weight (BMI=23-29.9); overweight (BMI>30).

Perceived weight. Respondents were asked to classify their body weight, measured on a 3-point scale varying from '*I am slim'* to '*I am heavy'*. Children were shown pictures that represented three different levels of body mass and had to choose the one they thought was closest to their body image. Responses were collapsed into three categories: slim, normal and heavy.

Estimated weight. Estimation was calculated as follows: Estimation = BMI category *minus* perceived weight category. Three new categories were produced based on the accuracy of their self-evaluation: *Underestimation; Accurate estimation*; *Overestimation*.

Statistical analyses

Chi-square tests were used to compare differences between gender in age groups, SES, BMI category, perceived weight, estimated weight and meal type. An unadjusted multinomial logistic regression model was conducted to investigate associations between genders, with age groups' BMI categories, perceived weight, and estimated weight as independent variables, and choice of meal type as a dependent variable on two levels (incomplete/complete). Within the independent variables, the lower reference categories were chosen to compare with the higher ones.

Results

Descriptive analysis. The characteristics of the sample are shown in Table 1 where the frequencies and percentages are described for each gender according to SES, BMI, perceived body weight, estimation and meal type. The results show significant differences between gender according to the way in which body mass is perceived.

Table 1. *Percentage of sample among Gender, and by Socioeconomic level, BMI categories, Perceived Weight, Estimated Weight and Meal type*

	% (N)	Male	Female	Chi^2	*P*
Socioeconomic level				7.77	.051
Low	19.0 (98)	22.9	15.1		
Mid-low	40.1 (207)	35.7	44.6		
Mid-high	21.3 (110)	20.2	22.5		
High	19.1 (101)	21.3	17.8		

BMI				5.90	.052
Underweight	13.8 (71)	10.1	17.4		
Normal weight	61.2 (316)	63.9	58.5		
Overweight	25.0 (129)	26.0	24.1		
Perceived Weight				22.47	<.000
Too slim	20.2 (104)	24.4	15.9		
Normal	48.6 (251)	53.9	43.4		
Too heavy	31.2 (161)	21.7	40.7		
Estimated Weight				42.06	<.000
Underestimation	23.1 (119)	28.3	17.8		
Accurate estimation	54.2 (280)	60.8	47.7		
Overestimation	22.7 (117)	10.9	34.5		
Meal type				.50	.778
Lunch and dinner incomplete	23.1 (119)	23.7	22.5		
Lunch or dinner complete	47.7 (246)	46.1	49.2		
Lunch and dinner complete	29.3 (151)	30.2	28.3		

BMI, indicates body mass index. *P* values generated through Chi-square analysis for the comparison of proportion of subjects between gender; $P < .05$

Multinomial analysis. The descriptive analyses highlight a fairly even distribution between the genders for SES, BMI categories and choice of meal type, but a significant difference in estimation of body weight.

Compared with reference categories, the association between meal choice and BMI shows that a complete meal occurs especially in normal weight males and females, and in overweight males (Table 2). Perception of body weight does not show the same distribution as BMI. In fact, females who perceive themselves as heavy choose an incomplete meal (O.R.=4.12). The incomplete meals, in relation to estimation weight, show a decrease in males who overestimate themselves.

According to age, complete meals are a prerogative of young adults (O.R.=4.00), senior males (O.R.=2.80) and females (O.R.=2.59).

Regarding perceived weight, in both genders, perceiving oneself as normal weight increases the probability of eating complete meals.

Compared to self-underestimation, accurate estimation of body weight is associated with a higher preference for complete meals in males (O.R.=2.33) and females (O.R.=3.91), however, overestimation is associated with a lower consumption of complete meals only in males (O.R.=.38).

Table 2. *Odds Ratio and 95% CI of Lunch and Dinner Incomplete and Complete among Gender, by Age and BMI categories, Perceived Weight, Estimated Weight*

	Male						Female					
Lunch and Dinner	***Incomplete***			***Complete***			***Incomplete***			***Complete***		
	OR	95% IC	*P*	OR	95% IC	*P*	OR	95% IC	*P*	OR	95% IC	*P*
Age												
Children	1			1			1			1		
Young adults	1.80	1.42 3.11	.035	4.00	2.00 8.00	.000	2.79	1.51 5.13	.001	.71	.34 1.48	.356
Senior	.25	.09 .67	.006	2.80	1.36 5.76	.005	.36	.34 1.48	.048	2.59	1.48 4.53	.001
BMI												
Under weight	1			1			1			1		
Normal weight	7.00	2.74 17.87	.000	9.33	4.02 21.66	.000	3.08	1.61 5.91	.001	3.58	1.89 6.79	.000
Over weight	4.20	1.58 11.14	.004	2.67	1.04 6.81	.040	.75	.32 1.78	.514	1.50	.72 3.11	.277
Perceived Weight												
Slim	1			1			1			1		
Normal	1.65	.90 3.01	.105	2.76	1.59 4.81	.000	2.12	.92 4.92	.079	2.54	1.34 4.82	.004
Heavy	.94	.48 1.86	.862	.824	.41 1.67	.591	4.12	1.90 8.93	.000	2.08	1.07 4.02	.030
Estimated Weight												
Under estimation	1			1			1			1		
Accurate estimation	1.62	.94 2.79	.083	2.33	1.40 3.89	.001	3.33	1.34 8.30	.010	3.91	2.02 7.58	.000
Over estimation	.29	.11 .71	.007	.38	.17 .86	.020	5.33	2.23 12.75	.000	1.73	.82 3.63	.149

CI indicates confidence interval (95%); OR, odds ratio; BMI, body mass index.
P values generated through logistic multinomial regression, in comparison for Age (compared to Children), BMI (compared to Underweight), Perceived Weight (compared to slim) and Estimation (compared to Underestimation).

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Discussion

Our results indicate statistical differences in perceived weight status and estimation of perceived weight. This data confirms statistical gender-related differences in weight status and several discrepancies between BMI categories vs perceived and estimated weight categories. Inaccurate perception is particularly present in females who feel fatter than they are and tend to overestimate themselves more than men (Chau, et al., 2013).

This study was carried out in Sardinia, where the Mediterranean diet is popular, but the complete meal is in decline due to changes in lifestyle (Tessier & Gerber, 2005). However, researchers highlight the decline in the dietary model based on three meals a day (Mestdag, 2005). Other have found that young people are eating less lunch and breakfast (Larson et al., 2013). The positive association with complete meals in both male and female seniors can be explained by psychological factors deriving from their attachment to the traditional Mediterranean diet. On the contrary, the choice of incomplete meals among young adults seems to highlight the change in their dietary habits due to an attraction for the Continental/Western diet (Losasso, et al, 2015; Madrigal, et al, 2000).

Our data are congruent as they highlight gender differences in the choice of complete or incomplete meals (Andersson, Gustafsson, Fjellström, Sidenvall, & Nydahl, 2001). These differences show discrepancies in associations according to the way body mass is measured. According to literature, the discrepancies between actual weight and its perception can have an effect on dieting behaviour (Duncan, et al., 2011). In particular, we can see that in women, it is not the BMI classification of being overweight but rather it is the perception of being overweight and overestimation which lead to incomplete meals.

Results support that complete meals are associated with a balanced diet in people who have an accurate estimation of their body weight. These results suggest that the strategies which encourage weight control and prevention of obesity have to be gender specific and should also encourage the accurate estimation of weight in different age groups (Chang & Cristakis, 2001).

During childhood, the parent-child agreement in children's eating behaviour should be encouraged (Uccula, Nuvoli, & Aiello, 2012), while avoiding parental psychological control (Costa, Hausenblas, Oliva, Cuzzocrea, & Larcan, 2016). In addition, health programs should not consider just BMI, but also weight perception for the prevention of nutritional risk (Park, 2011). In fact, the perception of being overweight inclines to encourage behaviors that reduce calories in meals (Chang & Cristakis, 2003). Our findings show that not only overweight status people tend to eat less, but in particular women who overestimate their weight. So even normal-weight women who perceive themselves overweight risk adopting an inadequate nutrition.

In our study, there are some limits: the questionnaire was not standardized; participants who had illnesses that would interfere with the study (e.g. diabetes) were eliminated from the sample, but we did not considered the occurrence of eating disorders and the influence of personality characteristics (Cuzzocrea, Larcan, & Lanzarone, 2012). Further research can confirm the results with clinical measurements.

Disclosure statement

The authors declare that they have no conflict of interest.

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