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Vegetarian and omnivorous diets: A cross-sectional study of motivation, eating disorders, and body shape perception.

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Introduction

In recent years, evolutions in lifestyles and socioeconomic conditions have been followed by a wide range of changes in patterns of food consumption and rhythm (Poulain, 2013). However, while the omnivorous diet, characterized by opportunistic consumption of any type of food without a priori exclusion except for questions of religious or taste preferences (Kirsten et al., 2020), remains the most common diet, it seems that the adoption of a vegetarian diet is becoming more and more frequent in western societies (Lavalée et al., 2019; Rosenfeld & Burrow, 2017).

Vegetarians define themselves by what they do not consume, setting themselves apart by their rejection of a widespread and accepted social norm (Hoffman et al., 2013). Vegetarianism is characterized by a range of diets with varying degrees of restriction of animal products, from most animal products to no animal products (flexitarians, *semi vegetarians*, *pesco vegetarians*, *lacto ovo vegetarians*, vegans) (Forestell et al., 2012; Forestell & Nezelek, 2018; Rosenfeld, 2018; Rosenfeld & Burrow, 2017; Mathieu & Dorard, 2016; Derbyshire, 2017; Hoffman et al., 2013).

Observed rates suggest a trend toward increased prevalence of vegetarianism (between 1% and 9%) over time, especially in rich countries (Radnitz et al., 2015; Rosenfeld, 2018; Olabi et al., 2015). India remains the country with the highest prevalence of vegetarians (40%), mainly due to cultural and religious reasons, thus differing from Western countries (Cramer et al., 2017; Radnitz et al., 2015; Rothgerber, 2015). However, prevalence studies of vegetarianism and veganism raise questions of validity because of the inconsistency in the way individuals identify and attribute diets to themselves. Indeed, several studies have documented that some individuals identify themselves as vegetarians but simultaneously acknowledge that they eat red meat, poultry, and/or fish (Cade et al., 2004; European Vegetarian Union, 2008; Gossard & York, 2003; Kwan & Roth, 2004; Cramer et al., 2017; Hib-

beln et al., 2018). The epidemiological data do not take into account this bias, which is probably underpinned by dimensions of psychological functioning such as motivation.

Indeed, beyond the physiological needs for survival, the choice of daily food consumption depends on various intrinsic motivations related to culture, time period, social context (Cramer et al., 2017; Monteiro et al., 2017; Thomas, 2016), but also on a wide variety of individual psychological motives (Mathieu & Dorard, 2016; Ruby et al., 2016; Keller & Siegrist, 2015). Some of these have been included in a model composed of nine dimensions assessed by the Food Choice Questionnaire (Stephoe et al., 1995). This model encompasses individual and contextual motives for food choice including sensory appeal, healthiness, convenience, price, natural content, mood, familiarity, weight control, and ethical concern. In addition, the sustainability motivation is behind the adoption of a diet that is “protective and respectful of biodiversity and ecosystems, culturally acceptable, accessible, economically fair and affordable; and nutritionally adequate, safe and healthy” (Food and Agriculture Organization (FAO), 2010), and now appears to be a growing consumer concern (Allès et al., 2017). Ethical concerns (cruelty and exploitation of animals) and health benefits are the two main motivations for adopting a vegetarian diet reported in the literature (Hoffman et al., 2013; Rosenfeld, 2018; Zuromski et al., 2015). More precisely, the environmental impact of animal product consumption, the experience of disgust when eating meat and fatty foods, and an altered perception of food (essentially taste, sight and smell) are some arguments commonly expressed by vegetarians (Fox & Ward, 2008; Ruby et al., 2013). However, food price, ecological concerns, and religious, peer, or parental influences have also been reported in studies (Rothgerber, 2014; Ruby et al., 2016).

Although these motivations are less spontaneously and commonly admitted, some authors consider that the willingness to engage in one of these restrictive diets could be related to weight and body appearance concerns (Cramer et al., 2017; Dyett et al., 2013). While some

common foods in the vegetarian diet such as nuts, seeds, and vegetable oils are highly calorific, they are low in saturated fats and high in healthy unsaturated fats, unlike meat, which is high in saturated fats and cholesterol (Worsley & Skrzypiec, 1997). In addition, the vegetarian diet contains high levels of fiber which helps digestion and excretion (Cramer et al., 2017; Rothgerber, 2014). These elements contribute to the perception of the vegetarian diet as one that is low in calories and fat, which may promote health through weight control. In fact, several studies have reported that the Body Mass Index (BMI) of vegetarians was lower than that of omnivores (Berkow & Barnard, 2006; Huang et al., 2016; Tonstad et al., 2009).

However, the evidence in the literature regarding the links between vegetarianism and eating disorders is heterogeneous and the causality of the associations is still being discussed (Bardone-Cone et al., 2012; Bas et al., 2005; Fisak et al., 2006; Forestell et al., 2012; Forestell & Nezlek, 2018; Gonzales & Vitousek, 2004; Klopp et al., 2003; Zuromski et al., 2015). On the one hand, the literature reveals that approximately 50% of anorexic patients declare that they refuse to eat red meat because it is perceived as too high in calories, distasteful, or anxiety-provoking (Bas et al., 2005; Gonzales & Vitousek, 2004). On the other hand, some studies have identified problematic eating behaviors that develop subsequently to a classic vegetarian diet, in the form of significant restrictions on the amount, the frequency, or the variety of food consumed. Six to 34% of adolescents and young adults in the general population who had first adopted a special diet, subsequently developed an eating disorder (Bardone-Cone et al., 2012; Gonzales & Vitousek, 2004; Klopp et al., 2003). It has also been suggested that being vegetarian or vegan contributes significantly to the non-remission of « formerly » anorexic patients (Bardone-Cone et al., 2012). In addition, individuals who adopt a vegetarian diet in order to control weight evoke more semiotic elements classically reported in eating disorders than non-vegetarians (e.g., feeling guilty after a meal, spending time thinking about being thin, eating low-calorie foods; Klopp et al., 2003).

Nonetheless, studies have not found differences in eating disorder rates or symptomatology between individuals with a vegetarian diet (all types) and those with an omnivorous diet (Cicekoglu & Tunçay, 2018; Estima et al., 2012; Fisak et al., 2006). Thus, further studies are needed to clarify these associations, particularly in considering the effect of gender. Moreover, it is plausible that the investigation of other dimensions, such as body dissatisfaction, a core symptom of eating disorders, may bring new insight. Indeed, current Western societal norms sustain contradictory expectations, because they simultaneously promote overconsumption at all levels, while encouraging especially women to remain thin or skinny as a criterion of beauty and social success. Social pressure regarding the body has become a major criterion of self-worth assessments (Valls et al., 2013). For some individuals, vegetarianism may be a response to this unbearable social pressure, a socially acceptable means to control weight, particularly during the onset of adolescence and among women (Fox & Ward, 2008). However, to date and to our knowledge, no study has specifically assessed body shape perception amongst vegetarian participants.

Thus, our first objective was to explore the existence of specificities in vegetarian participants in comparison with omnivorous participants (who by definition eat all types of food without excluding any categories), regarding BMI, eating motivation, body preoccupations, and eating disorder symptomatology, while considering the effect of gender. Given the heterogeneous data in the literature, we had no a priori hypotheses on the differences likely to be observed between vegetarians and omnivores. Our second objective was to determine which dimensions (i.e., current BMI, eating motivation, eating disorder symptomatology, and body shape preoccupations) were the strongest statistical predictors of vegetarianism.

Methods

Participants and procedure

Two distinct groups of participants labeled as “vegetarian group” and “omnivore group” were recruited via an online social network (Facebook) from late December 2014 to May 2015.

To recruit vegetarian participants, we used keywords to find French-speaking vegetarianism groups, including “vegetarians”, “vegans only for food”, and “vegans as a lifestyle”. After receiving an authorization from the network administrator, a message was written on three Facebook community pages. These pages comprised approximately 12 500 followers from France, Belgium, and Canada. Members interested in participating in the study were asked to send their email address to the investigator through a private message. A clear information sheet about the aim and procedure of the study was then provided. Once the consent form had been sent back signed, the investigator sent an electronic version of the questionnaire to the participant to complete and return. For the “vegetarian group”, inclusion criteria were: age ≥ 18 years; fluent French speaker; registered member of a social group about vegetarianism. Sixty members accepted to participate by signing the consent form, but 11 of these subsequently did not return the questionnaires. In the end, the vegetarian group comprised 49 participants (7 males, 42 females).

To recruit omnivorous participants, an announcement regarding the general purpose and procedure of the study was posted by the researchers on a social network (Facebook) requesting information sharing by users. Individuals interested in participating in the study were asked to contact the investigator by email. Then, as for the vegetarian participants, an easily understandable information sheet about the aim and procedure of the study was provided, and participants then returned the consent form before the investigator sent the electronic questionnaire. Inclusion criteria were: age ≥ 18 years; fluent French speaker; following an omniv-

orous diet. Thus, 52 subjects (18 males, 33 females) with an omnivorous diet participated in the study. No participant was excluded from the omnivore group.

This study was conducted in accordance with the Declaration of Helsinki: participants were provided with detailed information on the objectives and procedures of the study, and were required to sign a free and informed consent form to participate in the study. Thus, all participants participated freely and voluntarily in the study.

Measures

Several questionnaires were completed in the order listed below:

Socio-demographic data

An ad-hoc socio-demographic questionnaire investigating age, gender, level of education (less than a high school diploma, high school diploma or equivalent, bachelor's degree, graduate study, master's degree), weighing frequency (every day, once a week, once a month and more, less than once a month), current weight and height, highest and lowest weight ever during the lifetime (at current height and excluding pregnancy for women), the weight they would ideally like to weigh (at current height), type of diet (*lacto ovo* vegetarian, *lacto* vegetarian, *ovo* vegetarian, *semi* vegetarian, *pesco* vegetarian, vegan, omnivore), and length of time as a vegetarian (all vegetarian diets) was collected. From the data obtained on participants' current weight and height, we calculated their BMI (weight in Kg/height in m²) according to the National Center for Health Statistics (Gallagher et al., 1996).

The Food Choice Questionnaire (FCQ)

The FCQ (Steptoe et al., 1995) consists of 36 items assessing the importance of 9 dimensional factors of motivation for food choice. Considering our research interest, only the following subscales were included: "health" (food that provides enough energy (6 items)), "natural content" (free of chemical preservatives (6 items)), "mood" (stress control with food (3 items)), and "weight control" (low-fat food control (3 items)). Participants indicated to

what degree statements about food choices were important to them, on a four-point Likert scale ranging from 1 (not at all important) to 4 (very important). For example, participants had to rate statements such as: “It is important to me that the food I eat on a typical day makes me feel good” (mood subscale). The mean subscale scores range from 1 to 4. [In the present sample, Cronbach’s alpha coefficients were satisfactory for the four FCQ dimensions, ranging from 0.74 to 0.76.](#)

The Eating Attitudes Test (EAT-26)

The EAT-26 (Garner & Garfinkel, 1979) is a 26-item questionnaire using a six-point Likert scale (ranging from 1 = “always” to 6 = “never”), with three subscales measuring “dieting” – a pathological refusal to consume foods perceived as fat and caloric (13 items), “bulimia and food preoccupation” – episodes of binge eating followed by purging behaviors for body weight loss or control (6 items), and “oral control” – food control associated with environmental and social forces promoting food intake (7 items). This questionnaire has been shown to be a valid and reliable measure for determining risk for eating disorders in clinical and non-clinical samples (Leichner et al., 1994). The total score ranges from 0 to 78. A total score ≥ 20 indicates an excessive preoccupation about weight and a risk for eating disorder. [The EAT-26 shows adequate internal consistency in our global sample with Cronbach’s alpha coefficients ranging from 0.74 to 0.76 for the subscales.](#)

The Body Shape Questionnaire (BSQ)

The BSQ (Cooper et al., 1987) is a 34-item questionnaire, divided into four factors, which measures the extent of psychopathological concerns about body shape. Factors are respectively named “social avoidance and shame of body exposure” (SAS; 8 items), “body dissatisfaction related to the lower body parts” (BDL; 11 items), “using laxatives and vomiting in order to reduce body dissatisfaction” (LVU; 3 items), and “unsuited cognitions and behaviors in order to control the weight” (UCB; 5 items). Seven items do not apply to any factor.

Items must be answered on a 6-point scale ranging from “never” to “always”. The total score ranges from 34 to 204. A total score greater than 140 indicates a marked concern about the body. In the current sample, Cronbach’s alpha coefficient was 0.80 for the total score (ranging from 0.68 to 0.80 for the subscores).

Statistical analysis

Descriptive statistics for quantitative measures (mean, standard deviation) and for qualitative measures (percentage) were calculated first. To estimate the group effect regarding socio-demographic and psychological dimensions, Chi-square tests were used for categorical measures and t-tests for continuous ones (vegetarian vs. omnivore). Significance levels were adjusted for multiple testing (Tukey’s post-hoc test). Then, while considering between-group differences for gender, comparisons of the psychological dimensions of vegetarian and omnivorous participants were calculated separately for both gender groups using non-parametric tests (Mann-Whitney U tests).

Next, several distinct models of hierarchical logistic regression analyses were designed with the diet status (vegetarian vs. omnivore) as the dependent variable, the gender and level of education as the first block entered into the model, and in a second block, the BMI, the EAT-26, and the FCQ and BSQ total scores and subscale scores as predictors. Odds Ratios (OR) and 95% confidence intervals (CI) were generated using these logistic regression analyses. Separate models were calculated for each of the EAT-26, FCQ, and BSQ subscale scores. Finally, a multivariate hierarchical logistic regression analysis was designed with the diet status (vegetarian vs. omnivore) as the dependent variable, the gender and level of education as first set of variables, and all the predictors with a significant effect revealed in the previous independent models in the second block.

All analyses were carried out with SPSS-24 and hypotheses were tested with a two-sided significance level of 0.05.

Results

Participants' socio-demographic and dietary characteristics

The final sample comprised 101 participants (26 males; 75 females) with a mean age of 29.5 (SD=12.0), ranging from 18 to 70 years. Their socio-demographic characteristics, presented by diet group, are described in Table 1.

Of the 101 participants, 49 declared themselves to be vegetarian and 52 to be omnivore. There was a significant between-group difference regarding the sex of participants ($\chi^2=6.5, p=.011$).

In the vegetarian group, 39% identified themselves as *lacto ovo* vegetarian, 4% as *ovo* vegetarian, 6% as *lacto* vegetarian, 2% as *semi* vegetarian, 2% as *pesco* vegetarian and 47% as vegans (16% were vegans for food and 31% were vegans as a lifestyle). They had adopted this diet on average 5 years before (SD=8.4), with a range from 3 months to 50 years. The average age of entry into vegetarianism (all types) was 23 years old (SD=11.8), with a range from 1 to 62 years old. Most of the vegetarian participants had adopted this diet during adulthood (n=41), 5 individuals had changed their diet during adolescence (between 11 and 17 years old), and only 3 participants were fed a vegetarian diet from infancy.

In the omnivore group, 3 participants declared that they had once tried to adopt a vegetarian diet (2 females, one for 12 months and one for 6 months; and 1 male for 2 weeks), but all were omnivores at the time of the study.

Body Mass Index

Distribution of the [Body Mass Index \(BMI\) categories](#) is represented in Figure 1, according to the National Center for Health Statistics classification guide (Gallagher et al., 1986). There was no significant difference between the two groups ($\chi^2=5.436, df=3, p=.143$). In contrast, [the t-tests](#) revealed significant differences for ideal, current, and lifetime lowest

BMI values between the two groups. BMIs were significantly lower in the vegetarian group compared to the omnivore group (see Table 1).

Comparison between vegetarian and omnivorous participants on the psychological dimensions

Using the EAT-26 cut-off score, 3 participants from the vegetarian group and 7 from the omnivore group were considered at risk for an eating disorder ($\chi^2=18.4$; $p=.735$).

T-tests revealed that the vegetarians had significantly higher scores than the omnivores on the FCQ “health” ($p=.001$) and “natural content” ($p<.0001$) scales. However, the omnivores had significantly higher scores than the vegetarians on the FCQ “weight control” scale ($p=.015$), on the BSQ total score ($p=.043$), and on the “body dissatisfaction related to the lower body parts” ($p=.023$) and the “Unsuited Cognitions and Behaviors” ($p=.015$) subscales.

Comparisons between vegetarian and omnivorous participants according to gender

In order to clarify the effect of gender on the previously observed between-group differences, Mann-Whitney U tests were calculated separately for both genders (i.e., male vegetarians vs omnivores; female vegetarians vs omnivores).

No significant difference was observed between vegetarian and omnivorous males. In contrast, several differences were observed for women. Mann-Whitney U tests revealed significant differences for current (mean difference, MD=2.58, $p=.017$), ideal (MD=1.14, $p=.007$), and lifetime lowest (MD=2.33, $p=.031$) and highest (MD=1.50, $p=.040$) BMI values between the two female groups, which were significantly lower in the vegetarian group compared to the omnivore group.

Concerning psychological dimensions, Mann-Whitney U tests revealed that the vegetarian women had significantly higher scores than the omnivorous women on the FCQ “health” (MD=3.22, $p=.002$) and “natural content” (MD=2.62, $p<.0001$) scales. Conversely,

the omnivorous women had significantly higher scores than the vegetarian women on the FCQ “weight control” scale (MD=1.34, $p=.025$), on the BSQ total score (MD=20.40, $p=.002$), and on the four BSQ subscales: “Social Avoidance and Shame” (MD=4.35, $p=.001$), “Body Dissatisfaction related to the lower body parts” (MD=8.72, $p=.002$), “Laxatives and Vomiting Use” (MD=0.32, $p=.036$), and “Unsuited Cognitions and Behaviors” (MD=3.6, $p=.015$).

Factors associated with diet status in hierarchical regression analyses

After the variability of gender and level of education was considered, current BMI was significantly but moderately associated with diet group (Wald $\chi^2 = 3.99$, $p=.046$) (see Table 2). EAT-26 subscores were not significantly associated with diet group, but the BSQ “body dissatisfaction related to lower body parts” and “unsuited cognitions and behaviors” scores were negatively associated to the vegetarian diet (respectively Wald $\chi^2 = 5.11$, $p=.024$ and Wald $\chi^2 = 3.98$, $p=.046$). The food choice motivation factors “healthy foods” and “natural content” were positively associated with vegetarianism (Wald $\chi^2 = 8.86$, $p=.003$ and Wald $\chi^2 = 14.65$, $p<.0001$, respectively) whereas the “weight control” factor was negatively associated to vegetarianism (Wald $\chi^2 = 4.43$, $p<.0001$).

In the multivariate global model (see Table 3), all the significant predictors listed above were entered simultaneously, with the diet status group as dependent variable. After the variability of gender and level of education was considered, two significant associations were highlighted. The first one indicated that the “weight control” factor was negatively related to vegetarianism (Wald $\chi^2 = 5.02$, $p=.025$), whereas the second one indicated that the “natural content” food choice motivation factor was positively related to vegetarianism (Wald $\chi^2 = 9.65$, $p=.002$).

Discussion

Considering the ambiguous results of previous literature, the objectives of the present study were i) to explore and compare differences that may exist between vegetarians and omnivores concerning their eating motives, their risk for eating disorders (BMI and standardized measures), and their body shape preoccupations, while considering gender differences; ii) to determine which dimensions (i.e., BMI, eating motivation, eating disorder symptomatology, and body shape preoccupations) were the strongest statistical predictors of vegetarianism. Overall, our results suggest that the vegetarian diet is not associated with an increased risk of eating disorder symptoms, particularly in women. Our results also point to the need to take gender into account when studying the psychological dimensions associated with vegetarianism, even though the heterogeneity of our samples should call for caution. In any case, the differences and associations highlighted in our study encourage the formulation of new hypotheses for further studies.

Firstly, eating motivations and particularly the “health” and “natural content” dimensions were the variables that most strongly differentiated the participant groups: vegetarians were more motivated by a healthy and natural diet than omnivores. However, the “weight control” motivation was negatively associated with vegetarianism. **Vegetarianism may therefore be a health-oriented choice, not associated with the issue of weight control.** At the same time, as previously reported (Bas et al., 2005; Burkert et al., 2014; Rizzo et al., 2013; Berkow & Barnard, 2006), the results indicated that the BMIs (current, ideal, and lowest lifetime BMI) reported by vegetarians, especially female vegetarians, were lower than those of omnivorous participants. These results are not contradictory. Indeed, vegetarians pay more attention than omnivores to the content of the meals they consume, with a preference for local, traditional, organic, natural, and eco-friendly products. In collective representations, and perhaps more so today with the increased presence of the culture of organic and homemade food, products of the food and meat industry are often portrayed negatively. Indeed, these products

can be perceived as unhealthy and fatty, with high salt and sugar content (Dyett et al., 2013), most of the time rightly so. Vegetarians tend to eat more fruit and vegetables than omnivores, and fewer fatty and industrial foods (Barnard et al., 2015). We can therefore make the hypothesis that the dietary motivations of vegetarians have an effect on their weight, without involving a motivational factor specific to its regulation.

However, there are some further considerations about weight and weight management that need to be made, in particular considering that the vegetarian women in our study reported lower ideal BMIs than omnivorous women, which suggests they may have a thinner body ideal. This discrepancy may be explained by the fact that some participants in the vegetarian group were recruited on social media platforms geared toward veganism and abolitionism, which put forward strong ethical convictions. As previously suggested, the desire to lose or control weight may be hidden behind a more socially acceptable justification: the desire to adopt an ethical diet (Curtis & Comer, 2006; Fox & Ward, 2008; Hoffman et al., 2013). Moreover, it should be noted that the vegetarian participants had been following this diet for a significant time period. Their motivations, as well as their body weight and shape, may therefore have evolved since the beginning of their vegetarian diet, leading to an underestimation of the weight control items.

Nonetheless, the BMI values in the vegetarian group did not indicate the presence of eating disorders, there was an absence of significant between-group differences on the EAT-26 subscales, and the frequency of weighing behavior was low. Additionally, the significantly higher BSQ scores (total score and the 3 subscale scores) of omnivorous women compared to vegetarian women, as well as the regression results, also suggest a lack of association between vegetarianism and eating disorder symptomatology. However, the vegetarian group did not differentiate between subtypes of vegetarianism (e.g., ovo-vegetarian, pesco-vegetarian, flexitarian...) and some evidence in the literature suggests that some forms of vegetarianism,

particularly semi-vegetarianism and flexitarianism, are associated with more food symptomatology (Foretell et al., 2012; Timko et al., 2012). As a reminder, the semi-vegetarian diet excludes only some types of meat (generally red meat), and the flexitarian diet just limits meat consumption but does not eliminate certain types of meat (Rosenfeld, 2018), hence the importance of distinguishing the two eating behaviors in future research. It can be questioned whether the motivation behind eating habits in vegetarianism, which is based on strict food selection, should be regarded as a restrictive eating pattern like those observed in eating disorders, particularly anorexia (van Strien et al., 1986). On the other hand, it is possible that vegetarians simultaneously demonstrate cognitive and behavioral restrictive eating patterns and an overall positive psychosocial functioning with low anxiety, a sense of well-being, and life satisfaction. The existence of non-pathological restrictive eating habits deserves further investigation in future studies.

Our findings regarding the predominance of the health motivation in food choices (focus on healthy food and natural content) can raise the question of psychopathology in food habit patterns, such as that observed in orthorexia nervosa. Indeed, the orthorexic psychopathological operating pattern is characterized by an obsession with healthy food and rigid restriction, and is associated with a lack of tolerance of individuals with other diets (Varga et al., 2013). Orthorexic behaviors, although not currently included in the DSM-5 (APA, 2013), could challenge the understanding of some contemporary eating habits and disorders, including vegetarianism (Mathieu & Dorard, 2016).

With regards to the impact of socio-demographic variables, we found that vegetarians were mostly female and that gender was a significant statistical predictor of vegetarianism in our sample. While this represents a limitation for statistical analyses and the representativeness of vegetarian males, this result is consistent with prior studies that have reported that women are more likely to adopt a vegetarian diet than men (Allès et al., 2017; Pfeiler &

Egloff, 2017; Tobler et al., 2011; Rosenfeld & Burrow, 2018; Rozin et al., 2012; Ruby, 2012). It has been suggested that the over-representation of women in vegetarianism (all vegetarian diets) may be due to body image and weight concerns (Bas et al., 2005), but our results do not support this hypothesis. We could therefore refer instead to the question of gender-differentiated representations of food, since meat has long represented male strength and dominance, and is a symbol of masculinity, while fruit and vegetables are generally associated with weakness and a feminine identity (Fraser et al., 2000; Gossard & York, 2003; Rothgerber, 2013; Ruby & Heine, 2011).

The current study has several limitations. The Facebook advertisement seemed to be the most effective form of recruitment but may have led to some selection biases. The use of French groups mentioning the words “vegetarian, vegan for food, vegan for lifestyle” in their title may explain the modest sample size. Indeed, these groups were led by abolitionist vegans (aimed at anti-speciesism, with an aim to bring total abolition of animal exploitation by humans), so they were more morally and ethically oriented in their life choices. This possible bias and the over-representation of women in our sample suggest that our vegetarian participants may not be an appropriate representation of the entire vegetarian community, particularly regarding food choice motivation. In addition, the assessment of dietary motivations, due to our methodological choice to focus on health motivations, does not reflect the full range of motivations as proposed in the Steptoe model (Steptoe et al., 1995) or other more recent models incorporating, for example, sustainability (Sautron et al., 2015). Moreover, all data were obtained after the nominative informed consent form was emailed; this procedure may have caused reluctance to participate for some individuals. An electronic version of the questionnaire with complete anonymity of the data may have allowed for a greater sample size. Among the data collected, weight was investigated via items specifically created for the study. Although these data did not include the time of the day when participants weighed

themselves, some interesting evidence was obtained about weight fluctuation for the same given height. Finally, while the participants were recruited a little over 5 years ago, attitudes towards vegetarianism may have changed in recent years given the increased availability of vegetarian products in supermarkets and the increase in veganism among young people (Adise et al., 2015).

Despite these limitations, our results suggest new research perspectives. Firstly, due to the presence of rigidity and obsessive/phobic tendencies among vegetarians (all types), it would be interesting to study their personality profiles and mechanisms, and compare them to those present in individuals with eating disorders. Future studies should also study the notions of control and personal concern in vegans and relate them to alcohol consumption and drugs, since psychoactive substances are known to create disinhibition. However, control strategies may be more frequent in individuals with stricter diets. Thus, it can be assumed that individuals who undertake this type of food consumption to maintain or to lose weight (vegetarians, vegans for food, and vegans for lifestyle) may have lower festive drug and alcohol consumption (for sensations of relaxation, disinhibition). Thirdly, it would be interesting to study whether individuals with a vegetarian or vegan diet do more sport, because exercising (to build muscle, slim down, or tone) can indicate a bodily concern, just as a diet can.

Finally, weight loss and/or body shape control motivations may be present in other diets besides vegetarianism. For example, although the gluten-free diet is medically recommended for people who are allergic to gluten, some individuals eliminate gluten from their diet without having celiac disease, and/or verbalize gluten intolerance without having been “declared” allergic or intolerant. As with vegetarianism, gluten-free food may be perceived as healthier than an omnivorous diet, and the gluten-free diet may be considered by some to be a way to achieve thinner thighs and lose weight. Similarly, while intermittent fasting is not related to the deletion of food groups, it is a diet that can be used for weight loss by suppressing

meals without distributing the nutritional intakes in the remaining meals. Thus, it would be interesting to continue studies on the motivations for being on other diets than vegetarianism.

Conclusion

In our study, vegetarians expressed a motivation for a healthy and natural diet, and were less concerned with controlling their weight than omnivores. Although vegetarian women had lower BMIs, they had fewer psychological concerns associated with eating disorders than omnivorous women. Thus, vegetarianism appears to be associated with health benefits, and less body and weight concerns, especially among women in the general population. Next, given the motivation for eating healthy and natural products identified among vegetarians, it would be interesting to explore the issue of orthorexia nervosa in vegetarians, thus broadening the spectrum of eating disorders. Finally, according to the literature and to the results brought to light by this study, it appears important on the one hand to consider the different subtypes of vegetarianism associated with various degrees of restriction, and on the other hand to further investigate the question of a differentiated profile between vegetarian women and men.

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Figure 1. Distribution of the Body Mass Index (BMI) among vegetarian and omnivore participants

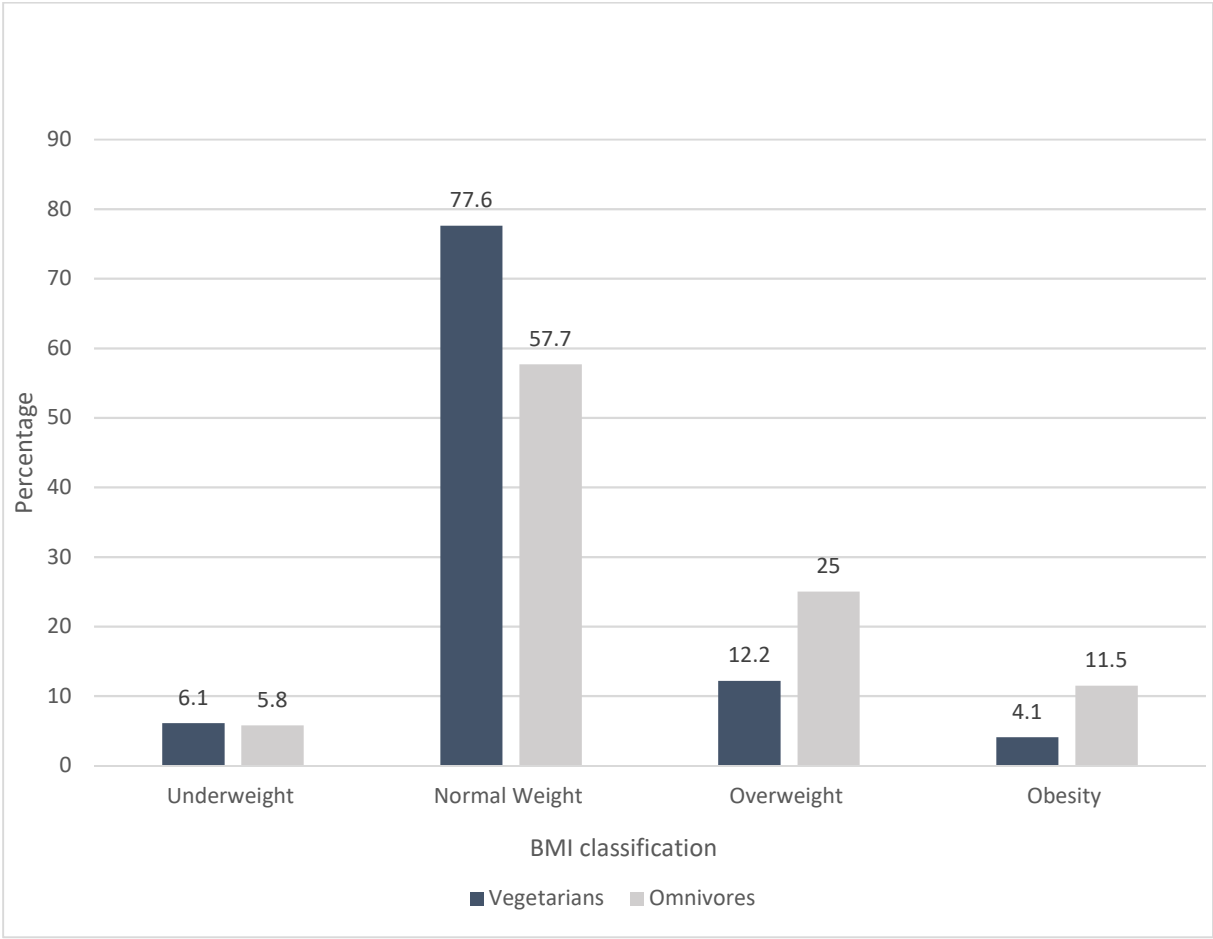


Table 1. Descriptive statistics and group comparisons for sociodemographic and psychological characteristics (N=101)

	All (N=101)	Vegetarians (n=49)	Omnivores (n=52)	t-test or Chi ²	<i>p</i>	<i>Absolute effect size</i> (95% CI)	<i>Cohen's d</i> (95% CI)
Age: mean (SD)	29.5 (12.0)	28.6 (11.6)	30.3 (12.4)	.725	.470	1.73 (-3.01; 6.48)	-1.14 (-.53; .25)
Gender: n (%)				6.5	.011		
<i>Male</i>	26 (25.7)	7 (14.3)	19 (36.5)				
<i>Female</i>	75 (74.3)	33 (85.7)	33 (65.3)				
Education: n (%)				11.626	.040		
< <i>High school</i>	5 (5.0)	2 (4.1)	3 (5.8)				
<i>High school or equivalent</i>	22 (21.8)	17 (34.7)	5 (9.6)				
<i>Bachelor's degree</i>	24 (23.8)	12 (24.5)	12 (23.1)				
<i>Graduate study</i>	19 (18.6)	6 (12.2)	13 (25)				
<i>Master's degree</i>	31 (30.5)	12 (24.5)	19 (36.5)				
BMI: mean (SD)							
<i>Current</i>	22.9 (3.9)	22.0 (3.5)	23.8 (4.2)	2.43	.017	1.88 (.35; 3.42)	-.46 (-.86; -.07)
<i>Ideal</i>	21.3 (2.4)	20.7 (2.2)	22.0 (2.5)	2.66	.009	1.24 (.31; 2.17)	-.55 (-.95; -.15)
<i>Lifetime higher</i>	24.3 (5.1)	23.8 (4.7)	24.8 (5.4)	1.03	.306	1.04 (-.96; 3.04)	.69 (.29; 1.09)
<i>Lifetime lower</i>	20.0 (2.5)	19.2 (2.2)	20.7 (2.8)	2.87	.005	1.45 (.46; 2.45)	-.59 (-.99; -.19)
Freq. weighing: n (%)				1.398	.706		
<i>Every day</i>	7 (6.9)	3 (6.1)	4 (7.7)				
<i>Once a week</i>	14 (13.9)	5 (10.2)	9 (17.3)				
<i>One a month and more</i>	20 (19.8)	11 (22.4)	9 (17.3)				
<i>Less than once per month</i>	60 (59.4)	30 (61.2)	30 (57.7)				
EAT-26: mean (SD)							
<i>Diet</i>	11.3 (6.6)	10.5 (6.3)	12.1 (6.9)	1.24	.219	1.63 (-.98; 4.23)	-.24 (-.63; .15)
<i>Bulimia</i>	6.5 (4.2)	5.7 (3.5)	7.3 (5.3)	1.83	.074	1.62 (-.16; 3.39)	-.35 (-.75; .04)
<i>Control</i>	3.4 (3.0)	3.5 (2.9)	3.2 (3.0)	-.509	.612	-.30 (-1.46; .86)	.10 (-.29; .49)
<i>Control</i>	3.2 (2.6)	3.1 (3.0)	3.3 (2.2)	.357	.722	.19 (-.86; 1.24)	-.08 (-.47; .31)
FCQ mean (SD)							
<i>Health</i>	15.9 (3.8)	17.5 (3.1)	14.3 (4.4)	-3.57	.001	-2.72 (-4.23; -1.21)	.84 (.43; 1.24)
<i>Mood</i>	13.9 (4.6)	13.9 (4.9)	13.9 (4.3)	.092	.927	.09 (-1.75; 1.92)	0 (-.39; .39)
<i>Natural content</i>	9.6 (2.4)	9.8 (2.2)	7.4 (2.6)	-4.84	<.0001	-2.33 (-3.29; -1.38)	.99 (.58; 1.41)
<i>Weight control</i>	6.0 (2.4)	5.4 (2.2)	6.6 (2.5)	2.45	.015	1.17 (.23; 2.11)	-.51 (-.91; -.11)
BSQ mean (SD)							
<i>SAS</i>	74.8 (38.8)	66.9 (39.0)	82.7 (38.5)	2.05	.043	15.85 (.55; 31.16)	-.41 (-.80; -.01)
<i>BDL</i>	15.6 (9.8)	13.9 (9.7)	17.2 (9.9)	1.72	.089	3.35 (-.52; 7.23)	-.34 (-.73; .06)
<i>LVU</i>	26.3 (14.1)	23.1 (13.8)	29.5 (14.3)	2.28	.025	6.4 (.83; 11.97)	-.45 (-.85; -.06)
<i>UCB</i>	4.4 (3.4)	4.2 (3.4)	4.5 (3.3)	.501	.617	.34 (-.99; 1.66)	-.09 (-.48; .30)
<i>UCB</i>	12.3 (6.0)	10.8 (6.0)	13.8 (6.0)	2.47	.015	2.95 (.58; 5.33)	-.5 (-.87; -.10)

BDL: Body Dissatisfaction related to Lower body parts; BMI: Body Mass Index; BSQ: Body Shape Questionnaire; EAT: Eating Attitudes Test; FCQ: Food Choice Questionnaire; Freq. weighing: Frequency of weighing; LVU: Laxatives and Vomiting Use; SAS: Social Avoidance and Shame; UCB: Unsited Cognitions and Behaviors.

Table 2. Univariate hierarchical regression models with BMI and psychological variables as predictors of the diet status

Diet status (dependent variables)		R^2	B	SE	df	p	Exp(B)	95% C.I. for Exp(B)	
								Lower	Higher
Current BMI		.225	-.115	.057	1	.046	.892	.797	.998
Model with total scores (predictors)									
EAT-26		.020	-.038	.031	1	.220	.962	.905	1.023
FCQ		.001	-.005	.015	1	.756	1.01	.975	1.035
BSQ		.055	-.011	.006	1	.048	.989	.978	1.000
Models with subscores (predictors)									
EAT-26	<i>Dieting</i>	.044	-.085	.049	1	.081	.918	.834	1.011
	<i>Bulimia</i>	.003	.035	.069	1	.608	1.036	.905	1.185
	<i>Oral control</i>	.002	-.027	.076	1	.718	.973	.839	1.129
FCQ	<i>Healthy</i>	.152	.188	.058	1	.001	1.206	1.076	1.352
	<i>Mood</i>	.000	-.004	.043	1	.926	.996	.915	1.084
	<i>Natural content</i>	.247	.378	.092	1	.000	1.460	1.218	1.749
	<i>Weight control</i>	.078	-.212	.090	1	.018	.809	.679	.964
BSQ	<i>SAS</i>	.039	-.037	.022	1	.095	.964	.923	1.006
	<i>BDL</i>	.067	-.033	.015	1	.029	.967	.939	.997
	<i>LVU</i>	.003	-.031	.061	1	.615	.970	.861	1.093
	<i>UCB</i>	.078	-.084	.036	1	.019	.919	.857	.986

BDL: Body Dissatisfaction related to Lower body parts; BMI: Body Mass Index; BSQ: Body Shape Questionnaire; EAT: Eating Attitudes Test; FCQ: Food Choice Questionnaire; LVU: Laxatives and Vomiting Use; SAS: Social Avoidance and Shame; UCB: Unsited Cognitions and Behaviors.

Table 3. Multivariate logistic regression model with BMI and psychological variables as predictors of the diet status

Diet status (dependent variable)	<i>R</i> ²	<i>% correct</i>	<i>B</i>	SE	df	<i>p</i>	Exp(<i>B</i>)	95% C.I. for Exp(<i>B</i>)	
								Lower	Higher
Models with subscores (predictors)									
<i>Current BMI</i>	.499	77.2	-.017	.088	1	.846	.983	.827	1.169
<i>Health</i>			.080	.092	1	.382	1.084	.905	1.298
<i>Mood</i>			.036	.068	1	.602	1.036	.907	1.185
<i>Natural content</i>			.446	.143	1	.002	1.561	1.180	2.066
<i>Weight control</i>			-.342	.150	1	.023	.710	.529	.954
<i>BDL</i>			-.057	.038	1	.134	.944	.876	1.018
<i>UCB</i>			.074	.100	1	.456	1.077	.886	1.310
<i>Gender</i>			1.913	.699	1	.006	6.777	1.720	26.693
<i>Education level</i>			-.352	.218	1	.106	.703	.459	1.078

BMI: Body Mass Index; BDL: Body Dissatisfaction related to Lower body parts; UCB: Unsited Cognitions and Behaviors.

