



## What does it mean to eat an appropriate amount of food?



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### ABSTRACT

Norms of appropriateness have been used to account for the influence of a variety of external eating cues (e.g., social factors, portion size) on people's food intake. What is less clear is what, exactly, "appropriate" means. This study explored participants' conceptions of appropriate food intake. Two separate samples were included in this study: 121 university students (73% women) and 107 community members (100% women). Participants were asked to rate the extent to which several statements reflected the concept of "appropriate food intake" or "normal food intake" (1 = *Does not capture the definition at all*; 7 = *Captures the definition perfectly*). These statements included items referring to external eating cues (e.g., "Eating as much as other people", "Eating the entire portion of what you are served") and items referring to internal eating cues (e.g., "Eating an amount that will make you feel satisfied") or nutritional needs (e.g., "Eating a healthy amount"). Repeated measures ANOVAs indicated that participants consistently defined appropriate/normal intake in terms of internal eating cues and nutritional needs. In contrast, despite evidence indicating that perceptions of how much is an appropriate amount to eat are affected by external eating cues, external eating cues were ignored in participants' definition of appropriate/normal intake. The disconnect between how people define appropriate intake (i.e., in terms of internal cues) and what research shows affects norms of appropriateness (i.e., external cues) may reflect people's general unwillingness to acknowledge the influence of external eating cues on their food intake.

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### 1. Introduction

Normative explanations have been used to account for the influence of a variety of external eating cues on people's food intake. The essence of the normative account is that, in many situations, the appropriate (i.e., normative) amount to eat is unclear, and internal signals (e.g., hunger and satiety) are often unreliable guides (Herman & Polivy, 2005). In these situations, people rely on external cues to help guide their food intake. For example, Herman, Roth, and Polivy (2003) argued that social factors (i.e., other people's eating behavior) affect the amount that people eat because they provide information about how much is appropriate to eat in a particular situation. Others have made similar arguments for the effects of portion size (e.g., Herman, Polivy, Pliner, & Vartanian, 2015; Marchiori, Papies, & Klein, 2014; Rolls, Morris, & Roe, 2002), the way the food is segmented (Geier, Rozin, & Doros, 2006), and the eating environment more broadly (e.g., proximity to food, lighting; Wansink, 2004).

There have been a few studies that have directly tested the notion that appropriateness norms influence how much people eat. For example, in a series of experiments, Vartanian, Sokol, Herman, and Polivy (2013) exposed participants to a confederate who ate very little or who ate a lot, and found that participants ate more when they were

exposed to a high-intake confederate than when they were exposed to a low-intake confederate (a typical modeling effect). Participants in those studies were also asked to indicate how much was an appropriate amount to eat, and Vartanian et al. found that perceived appropriateness mediated the effect of the social model on participants' food intake. That is, being exposed to the high-intake model led participants to believe that it was appropriate to eat more compared to being exposed to the low-intake model, and believing that it was appropriate to eat more led participants to eat more. Similar mediating effects of perceived appropriateness were found for portion size and for the way that the food is segmented (Kerameas, Vartanian, Herman, & Polivy, 2015).

Although these studies provide evidence that appropriateness norms can influence how much food people eat, what is less clear is what, exactly, "appropriate" means. Social psychologists (e.g., Cialdini, Kallgren, & Reno, 1991) draw a distinction between descriptive norms (what other people do) and injunctive norms (what other people approve of), and both of these types of norms could provide information about how much is appropriate to eat. Furthermore, in the context of food intake, "appropriate" could also refer to one's nutritional needs or to internal sensations (such as fullness). Thus, questions remain about what participants think of when they are asked to indicate how much it is appropriate to eat in a particular situation. The purpose of the present study was to explore how people conceive of "appropriate" food intake.

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## 2. Method

### 2.1. Participants

To increase the generalizability of our findings, data were collected from two separate samples. The first sample consisted of 121 students (73% women; mean age = 19.01 years,  $SD = 1.92$ ; mean body mass index [BMI;  $\text{kg}/\text{m}^2$ ] = 21.41,  $SD = 3.16$ ) from a large Australian university. The second sample consisted of 107 community members (100% women; mean age = 26.24 years,  $SD = 2.92$ ; mean BMI = 24.93,  $SD = 6.83$ ) residing in the United States who were registered with Amazon's Mechanical Turk (MTurk). MTurk is a crowdsourcing website where registered users have access to a range of tasks that they can complete for a small monetary incentive. Participants in the MTurk sample completed the survey as part of a larger study on women's food perceptions. This study was approved by the university's ethics committee.

### 2.2. Materials and procedure

The student sample completed the study as a pen-and-paper questionnaire in the laboratory, and the community sample completed the study online. All participants provided informed consent prior to completing the questionnaire. Participants were asked to rate the extent to which several statements reflected the concept of appropriate food intake. Because some researchers (e.g., Wansink, 2004) tend to use the terms "appropriate" and "normal" interchangeably, half of the participants were asked about appropriate intake and the other half were asked about normal intake. The specific wording of the question stem was as follows: *What does the statement "eating an appropriate [a normal] amount" mean to you? For each of the items below, please indicate the extent to which it captures the essence of what "eating an appropriate [a normal] amount" means to you.*

Participants then rated eight separate definition items on a 7-point scale anchored by 1 = *Does not capture the meaning at all* and 7 = *Captures the meaning perfectly*. Three of the definition items referred to external eating cues ("Eating as much as other people", "Eating what other people think is the right amount", and "Eating the entire portion of what you are served"). Four of the definition items referred to nutritional needs or internal eating cues ("Eating a healthy amount", "Avoiding eating excessively", "Eating an amount that will make you feel satisfied", and "Eating until you feel full"). The final definition item was the complementary term for the specific version of the questionnaire that participants completed: for the appropriate version, the item was "Eating a normal amount"; for the normal version, the item was "Eating an appropriate amount". Finally, participants reported some basic demographic information, including their sex, age, and height and weight (used to calculate their BMI).

## 3. Results

Means for the definition items are displayed in Fig. 1, separately for each sample and for each version of the questionnaire. Repeated measures ANOVAs revealed significant differences among the definition items for each group: Student/Appropriate,  $F(7, 399) = 48.52$ ,  $p < 0.001$ ,  $\eta^2_p = 0.46$ ; Student/Normal,  $F(7, 420) = 61.00$ ,  $p < 0.001$ ,  $\eta^2_p = 0.50$ ; MTurk/Appropriate,  $F(7, 371) = 44.70$ ,  $p < 0.001$ ,  $\eta^2_p = 0.46$ ; MTurk/Normal,  $F(7, 364) = 31.33$ ,  $p < 0.001$ ,  $\eta^2_p = 0.38$ . Follow-up contrasts using a Bonferroni correction for multiple comparisons revealed that, in all cases, internal/nutritional definitions (eating a healthy amount, avoiding eating excessively, and eating an amount that would make you feel satisfied) received the highest ratings, whereas external definitions (eating as much as other people, eating what other people think is the right amount, and eating the entire portion) received the lowest ratings. Results were less consistent across samples for the item "eating until you feel full" and for the complementary definition

term (normal for appropriate and appropriate for normal). Controlling for gender, age, and BMI did not change the pattern of results.

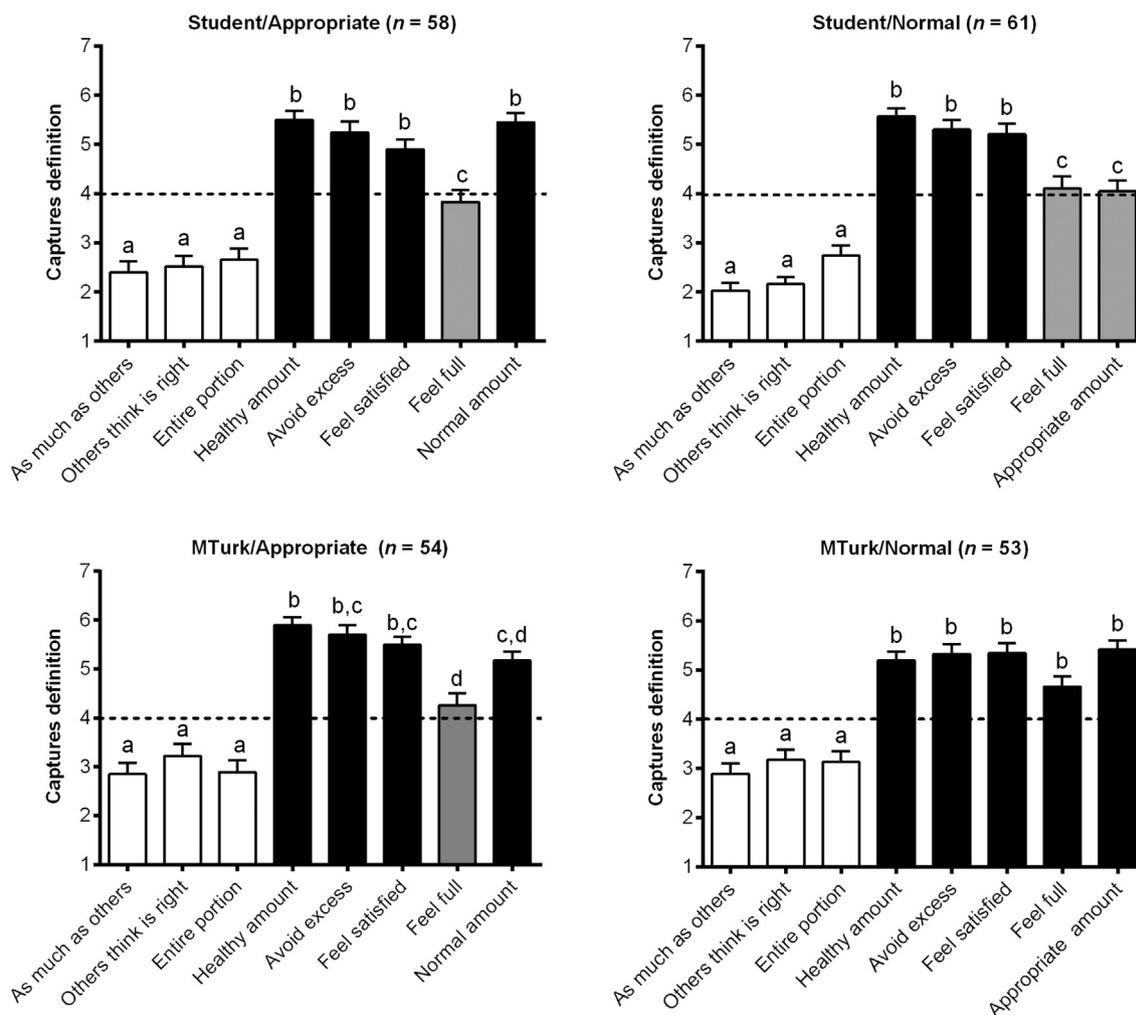
We next conducted a series of one-sample *t*-tests to determine whether a specific definition was significantly different from the mid-point of the scale (i.e., a rating of 4). These analyses provide an indication of whether the definition items are considered relevant or irrelevant (rather than just more or less relevant) to the concept of appropriate/normal food intake. Ratings for eating a healthy amount, avoiding eating to excess, and eating an amount that would make you feel satisfied were significantly above the mid-point of the scale in all analyses ( $ps < 0.001$ ); ratings for eating as much as other people, eating what other people think is the right amount, and eating the entire portion were significantly below the mid-point of the scale in all analyses ( $ps < 0.004$ ). The remaining two items were less consistent. The complementary item was rated significantly above the mid-point of the scale in all cases ( $ps < 0.001$ ) except for the Student/Normal group ( $p = 0.82$ ). The item "eating until you feel full" was rated as significantly above the mid-point of the scale only for the MTurk/Normal group ( $p = 0.003$ ; all other  $ps > 0.28$ ).

## 4. Discussion

The present study provides some insights into the psychological representation of appropriateness norms regarding food intake. Participants defined appropriate/normal intake in terms of nutritional needs (e.g., avoid eating excessively, eating a healthy amount) and internal eating cues (e.g., an amount that would make you feel satisfied), whereas external eating cues (portion size and social cues) were not included in people's definitions of appropriate/normal intake. The pattern of results was very similar across the two samples (a student sample from Australia and a community sample from the United States), indicating that the findings are quite robust. Furthermore, the pattern of results was the same when the question was framed in terms of what is an "appropriate" amount to eat and what is a "normal" amount to eat. Participants also rated "a normal amount to eat" as being strongly related to the concept of appropriate intake (and rated "an appropriate amount to eat" as being strongly related to the concept of normal intake). The similarities between how participants conceive of normal and appropriate intake is consistent with the interchangeable use of "appropriate" and "normal" by some researchers (e.g., Wansink, 2004). Overall, there is a great deal of consistency in how people define appropriate or normal food intake.

The omission of external cues from people's definitions of appropriate/normal intake is particularly notable given that previous studies have consistently found that participants' ratings of how much is an appropriate amount to eat are affected by external eating cues (Kerameas et al., 2015; Vartanian et al., 2013). Herman et al. (2003) likewise argued that, in attempting to avoid excess intake, people use other people's intake as a boundary beyond which one enters the zone of excess; thus, excessive intake is defined externally rather than internally. The disconnect between how people define appropriate intake (i.e., in terms of internal cues) and what research shows affects ratings of appropriateness (i.e., external cues) may reflect people's general unwillingness to acknowledge the influence of external eating cues on their food intake (Spanos, Vartanian, Herman, & Polivy, 2014, 2015; Vartanian, Herman, & Wansink, 2008).

It is also possible, however, that external eating cues influence how much people eat by directly affecting what they view as nutritionally appropriate or how much food they think they would need to feel satisfied (cf. Burnstrom, Shakeshaft, & Scott-Samuel, 2008). For example, in modeling studies, it may not be that participants are simply eating as much as they believe is socially acceptable; rather, it may be that a social model's greater or lesser intake leads participants to believe that it is nutritionally appropriate to eat a larger or smaller amount. Similar processes might also be involved with portion size. Future research should further explore the psychological dimensions of "appropriateness" that



**Fig. 1.** Mean ratings for the definition items, separately for each sample and for each version of the questionnaire. Errors bars represent the standard error of the mean. Bars with different superscripts are significantly different at  $p < 0.05$ . The dashed horizontal line represents the mid-point of the rating scale. White bars are significantly lower than the mid-point of the scale at  $p < 0.05$ ; black bars are significantly higher than the mid-point of the scale at  $p < 0.05$ ; gray bars are not significantly different from the mid-point of the scale.

are affected by external eating cues in order to better understand exactly how those cues drive people's food intake.

One strength of the present study is that we had two distinct samples (a student sample and a community sample) that show very similar results. However, in both samples, participants were predominantly young women with a BMI in the healthy range. It is possible that definitions of “appropriate” and “normal” food intake would be different in other populations (e.g., individuals with eating pathology, individuals who are obese, individuals from different cultural backgrounds), and this should be explored in future research.

#### 4.1. Conclusion

Overall, the present study provides some insights into how people conceptualize “appropriate” or “normal” food intake. Given that participants' own definitions of appropriateness (focusing on internal cues or nutritional needs) do not accord with what has been shown in past studies to influence perceptions of appropriateness (mainly external cues), future research is needed to develop a more refined understanding of how perceptions of appropriateness are actually formed and how they influence people's food intake. Understanding the precise mechanisms involved can in turn facilitate the development of interventions to reduce the negative impact of some external influences on food intake (e.g., larger portion size) and to enhance the benefits of other external cues in promoting healthy eating (e.g., healthy social models).

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#### Contributors

All authors contributed to the design of the study. LRV conducted the analyses and wrote the first draft of the manuscript. All authors contributed to and have approved the final manuscript.

#### Conflict of interest

All authors declare that they have no conflicts of interest.

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