Appetite 178 (2022) 106262

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

# More value from less food? Effects of epicurean labeling on moderate eating in the United States and in France

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ARTICLE INFO

*Keywords:*
Mindfulness
Marketing
Labeling
Cross cultural analyses
Pleasure
Portion size choice

ABSTRACT

Emerging research has shown that sensory-based interventions (e.g., inviting people to mindfully focus on the multisensory aspects of eating) can be a viable alternative to nutrition-based interventions (e.g., nutrition labeling) to encourage moderate eating. We contribute to this literature in two ways. First, we propose a novel and simple sensory-based intervention to increase the appeal of moderate food portions in commercial settings, epicurean labeling, which consists in emphasizing the aesthetic, multisensory properties of the food when describing it on menus or packages. Second, we show theory-relevant cross-cultural differences in the effectiveness of this intervention between the United States and France, two food cultures at the opposite ends of the hedonic-utilitarian food attitude spectrum. We report the results of a multi-day field experiment at a French cafeteria showing that epicurean labeling, unlike nutrition labeling, reduces intake while increasing the perceived monetary value of the meal thanks to higher savoring. We then show in a matched cross-national online experiment that epicurean labeling is more effective in France than in the United States. We provide additional evidence of this cross-cultural variation in a study of 9154 food products sold in supermarkets in both countries. We find that epicurean labeling is more prevalent, but also more likely to be associated with smaller portions in France than in the United States. While sensory-based interventions are a promising alternative to nutrition-based interventions, it is necessary to develop business-friendly interventions that can be implemented in everyday life, as well as to consider cultural factors that can modulate their effectiveness.

## 1. Introduction

The growing size of food portions eaten in restaurants and at home has been identified as one of the key causes of obesity (Nestle, 2003). To promote portion control, the main strategy of public health authorities has been to extend mandatory nutrition labeling from grocery stores to restaurants (Burton, Creyer, Kees, & Huggins, 2006), even though the effects of nutrition labeling on the actual food choices made by people in real-life conditions have been disappointingly modest (Dubois et al., 2021; Ikonen, Sotgiu, Aydinli, & Verlegh, 2020). In addition, the food industry is fighting these nutrition labeling regulations because of their cost and out of concern that they impair customers' eating experience (Tavernise, 2015).

Recent research has shown that sensory-focused interventions for portion control can provide a promising alternative to nutrition labeling (for reviews, see Bédard et al., 2020; Dijker, 2019). Multiple studies have shown that inviting people to mindfully focus on the pleasurable, sensory properties of food can promote moderate eating and increase the appeal of smaller food portions (Arch et al., 2016; Chang, Mulders, Cserjesi, Cleeremans, & Klein, 2018; Cornil & Chandon, 2016a; Lange et al., 2020; Petit, Spence, Velasco, Woods, & Cheok, 2017; Policastro, Harris, & Chapman, 2019; Seguias & Tapper, 2018).

The fundamental explanation for these effects is that a higher sensory focus increases the impact of hedonic adaptation and sensory-specific satiety (Galak & Redden, 2018; Rolls, 1986), ultimately leading to better portion control. Indeed, sensory pleasure peaks during the first few bites and diminishes with each subsequent bite. Also, because the overall enjoyment derived from eating a food is influenced by the last bites, a small portion can be more enjoyable than a larger portion whose total enjoyment has been diminished by low-pleasure final bites (Garbinsky, Morewedge, & Shiv, 2014; Rode, Rozin, & Durlach, 2007; Rozin & Rozin, 2018; Schwartz et al., 2020). Hence by making the sensory experience of eating more salient, sensory focus leads people to savor (and enjoy) their food more, which makes them satiate faster and eat less

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https://doi.org/10.1016/j.appet.2022.106262
Received 27 March 2022; Received in revised form 30 June 2022; Accepted 28 July 2022
Available online 2 August 2022

(Galak, Kruger, & Loewenstein, 2013; Robinson et al., 2014; Rozin, Kabnick, Pete, Fischler, & Shields, 2003). In addition, sensory focus helps people better anticipate that smaller portions are more enjoyable than they would otherwise think, leading them to choose smaller portions (Cornil & Chandon, 2016a).

An important limitation of most existing sensory-focused interventions is that they require elaborate scripts and human interactions and that their effects have mostly been tested in an online or laboratory context with free food. There is a need for further investigations into how sensory-based interventions could be practically implemented in stores or restaurants, whether they would promote moderate eating in free-living conditions, and how they would influence the perceived value of the eating experience by paying customers. The first goal of this paper is therefore to develop a simple sensory-focused intervention that does not require human interactions and that can be implemented by restaurant managers or food companies, and to test its ability to promote portion control. We call this intervention "epicurean labeling": it consists of emphasizing the aesthetic, multisensory properties of the food on its packaging or on restaurant menus. In order to test the practical effectiveness of epicurean labeling in free-living conditions, we conducted a field experiment in a French cafeteria (Study 1), in which we tested the effectiveness of an epicurean-labeling menu on portion control and on the perceived value of the meal, compared with a nutrition-labeling menu and a control menu. We also conducted an archival study of packaged foods sold in French and American supermarkets (Study 3), in which we tested the association between epicurean labeling, portion size, and price.

Furthermore, a lot of evidence that sensory-based interventions can promote portion control in a laboratory environment was obtained among European (French, French-speaking Belgian, and British) participants (Chang et al., 2018; Cornil & Chandon, 2016a; Lange et al., 2020; Petit et al., 2017; Seguias & Tapper, 2018). There is surprisingly little research on sensory-based interventions among Americans (see Policastro et al., 2019 for a notable exception). It remains to be seen whether the effectiveness of sensory focus is robust across cultures with different approaches to food, pleasure, and health. Hence, the second goal of this paper is to compare the effectiveness of epicurean labeling between France and the United States. We chose these two food cultures because they are at opposite ends of a hedonic-utilitarian spectrum in their attitudes toward food pleasure and health (Rozin, 2005). We demonstrate in Studies 2 and 3 that epicurean labeling is most effective as a portion control intervention in France, where eaters focus more on sensory pleasure and less on utilitarian goals like nutrition than in the United States. Showing cross-cultural variations is important from a practical perspective, but also from a theoretical perspective because it helps better understand the mechanisms underlying the effectiveness of sensory focus.

Overall, this research aims to contribute to the literature on sensory-based interventions by documenting the effectiveness of epicurean labeling in a commercial setting as well as theoretically relevant cross-cultural differences. By showing that food marketing, through epicurean labeling, can promote moderate eating without impairing profits, we contribute to the debate about the role and responsibility of the food industry in the fight against obesity (Ludwig & Nestle, 2008). Finally, showing that country differences moderate the effectiveness of sensory-based interventions reminds us of the importance of considering cultural factors when studying food choices and selecting healthy eating interventions.

## 2. Conceptual development

### 2.1. Epicurean labeling as a sensory intervention

As already mentioned, past research has shown that a sensory focus can increase the appeal of smaller portions and lead people to choose and consume smaller portions than they would normally do. However, most sensory-based interventions designed to promote portion control rely on elaborate, multi-step instructions delivered in person. For example, Cornil and Chandon (2016a) developed an intervention that consists in instructing people to imagine as vividly as possible the various scents, tastes, and texture in mouth of a specific food; rate the vividness of each of these sensations on a 5-point scale; and then repeat this procedure for two other foods before finally choosing the portion size of the target food. Although this intervention can be implemented in a school context, for instance as part of a sensory education program (Lange et al., 2020), it cannot be implemented in a self-service purchase or consumption context.

There is, however, evidence that the benefit of sensory focus may unfold without explicit instructions delivered by researchers, for instance via leaflets educating people about the importance of better taking into account pleasure in food decisions (Trudel-Guy et al., 2019) or, more in line with the present research, via marketing messages emphasizing the food's sensory benefits (Study 5 in Cornil & Chandon, 2016a; Policastro et al., 2019).

In line with this research, we argue that the language used in describing foods on menus or packages can be used to create a simple, practical, and low-cost intervention to promote sensory focus. This intervention, which we call epicurean labeling, can be an alternative to the explicit sensory focus instructions described earlier. Epicurean labeling consists in adding descriptive language emphasizing the aesthetic, multisensory properties of the food in order to create a sensory focus that promotes portion control and increases the valuation of smaller food portions. For instance, a lemon tart can be described as a "Crunchy shortcut pastry garnished with slightly sour lemon juice cream". This type of description is likely to elicit rich, multisensory imagery (Elder & Krishna, 2022), which has been found to increase the appeal of smaller portion sizes by helping people better anticipate that smaller portions are more enjoyable than they would otherwise think (Arch et al., 2016; Chang et al., 2018; Cornil & Chandon, 2016a; Lange et al., 2020; Petit et al., 2017; Policastro et al., 2019; Seguias & Tapper, 2018).

In addition, we expect epicurean labeling to lead people to choose smaller portion sizes, while increasing the perceived monetary value of the food. This higher perceived value may be the result of two mechanisms that are both linked to the fact that sensory pleasure peaks with smaller portion sizes (for a review, see Cornil, 2017). If the perceived value of the chosen food portion is estimated *prior to* consumption, the sensory focus created by epicurean labeling would help people anticipate that, after a certain portion size, the value of their eating experience no longer increases with amount consumed (Cornil & Chandon, 2016a; Schwartz et al., 2020). If the monetary value is estimated *after* consuming the chosen portion, the sensory focus created by epicurean labeling would lead to increased savoring, which improves the eating experience (Areni & Black, 2015; Rozin et al., 2003).

### 2.2. The role of cultural differences

Importantly, most of the evidence that sensory-based interventions promote actual (non-hypothetical) portion control in a laboratory environment was obtained among French, French-speaking Belgian, and British participants (Chang et al., 2018; Cornil & Chandon, 2016a; Lange et al., 2020; Petit et al., 2017; Seguias & Tapper, 2018). There is also evidence that French-speaking Quebecers associate eating pleasure with healthy outcomes (Landry et al., 2018; Trudel-Guy et al., 2019). Although several studies demonstrated that mindfulness interventions lead to healthier eating among Americans (e.g., Kidwell, Hasford, & Hardesty, 2014; Kristeller, 2012; Tapper, 2017), mindfulness is a broader intervention than sensory focus and it is thought to operate via a different mechanism, impulse control, thanks to present moment awareness, acceptance, and decentering. There is surprisingly little research on the effects of sensory-based interventions on the portion size choices of Americans.

This is an important limitation of existing research given the large variations in attitudes toward foods across countries and the fact that France and the United States are at the opposite ends of the hedonic-utilitarian food attitude spectrum. The French food culture is characterized by a strong focus on the hedonic and sensory experience of eating and on the "joys of the moment". In contrast, the American food culture is more focused on utilitarian health and nutrition goals, on food quantity, and on value for money (Rozin, 2005). Southern European and East Asian food cultures are similar to the French one whereas English and Northern European food cultures are in between the French and American archetypes (Fischler & Masson, 2008).

For example, only 27–57% of Americans (depending on age and gender), compared to 70–90% of French and Belgians, would choose to stay for one week in a modest hotel with excellent food rather than staying, for the same cost, in a luxury hotel with average food (Rozin, Fischler, Imada, Sarubin, & Wrzesniewski, 1999). These authors also found that Americans tend to associate "ice-cream" with "fattening" and "chocolate cake" with "guilt" whereas the French associated "ice-cream" with "delicious" and "chocolate cake" with "celebration". More recently, Fischler and Masson (2008) asked 167 Americans and 176 French people to define "eating well". Only 9.6% of the Americans used pleasure-related words (e.g., "pleasure", "enjoy", "fun") compared to 42% of the French respondents ($\chi^2 = 46.6, p < .001$). In a second survey, these authors found that 25.5% of 1501 American respondents, compared to 41.6% of 907 French respondents ($\chi^2 = 67.4$, $p < .001$), totally identified with the "gourmet eater" archetype, described as someone who believes that eating is one of the greatest pleasures of life, who talks often about food, and who pays a great deal of attention to the quality of food. A third survey found that 55% of 167 American respondents, compared to less than 2% of 176 French respondents, take dietary supplements every day, further suggesting that Americans have a more utilitarian (and less hedonic) approach to food.

Researchers have speculated that the stronger focus on eating pleasure in France may be related to the slower eating habits of the French and to the smaller food portions served in France than in the United States (Fischler & Masson, 2008). For example, Rozin, et al. (2003) found that the portions served in 11 American restaurants were 25% larger on average than those served in 11 comparable French restaurants. However, no study has examined whether focusing on eating pleasure would influence preferences for portion sizes or the quality of the eating experience differently in France and in the United States.

Considering past cross-cultural research, we therefore suggest that sensory-based based interventions should be more effective in France than in the United States, insofar as French people are more receptive to—and feel less guilty about—food pleasure than Americans and more likely to associate food pleasure with moderate eating. Epicurean labeling should therefore be more likely to promote portion control among French (vs. American) eaters. On the other hand, we expect epicurean labeling to increase estimates of the fair value of the food in both samples. This is in line with research showing that sensory descriptions increase quality expectations and willingness to pay in both French and Americans (Policastro et al., 2019; Turnwald, Jurafsky, Conner, & Crum, 2017).

### 2.3. Summary and study overview

We hypothesize that epicurean labeling will lead people to choose smaller food portions, while increasing the perceived monetary value of the food (pre-intake, or post-intake via savoring). We also hypothesize that the effect of epicurean labeling on portion control will be stronger in France than in the United States. We test these hypotheses via three studies. Study 1 is a field experiment conducted at a French cafeteria, showing that an epicurean-labeled menu (vs. a nutrition-labeled menu and a control menu) leads both to portion control (more moderate eating) and to a higher post-meal perceived value. Study 2 is an online, cross-cultural experiment, showing that epicurean menu labeling increases portion control and post-meal perceived value among French participants, while it only increases perceived value (without portion control) among American participants. Study 3 is an archival study of 9154 supermarket food packages, which finds that epicurean labeling is more prevalent, but also more likely to be associated with smaller portions (*without* commensurately lower market price) in France compared to the United States. The hypotheses were specified before data collection, approval for Studies 1 and 2 was provided by INSEAD and Institut Paul Bocuse, and Study 2 was pre-registered. Data, code, and online questionnaire are available for all studies on the OSF site at https://osf.io/8qen6/?view_only=8501024734d9469b93e2c7d5a1286a03.

## 3. Study 1: a field experiment of epicurean and nutrition labeling

### 3.1. Method

We collaborated with the cafeteria of a culinary school near Lyon, France, which marketed a special €15 fixed-price, three-course lunch. The participants were informed by email. Although we did not collect detailed sociodemographic data beyond age and gender, the participants are member of the local community who sign up to receive invitations to lunches where they can test, at an affordable price, the culinary creations of the school's students as well as new recipes tested by food companies that partner with the school. One hundred and seven customers participated in the study (see photo in Fig. 1). The number of customers was based on the capacity of the restaurant and was determined before running the study. The participant sat at tables that corresponded to their party size. Two percent of the participants ate alone, 53% sat at a table for two, and 45% sat at a table accommodating three to six people. Customers could attend only one lunch service. Party size did not significantly differ across the experimental conditions described below ($F < 1$; $p = .58$). All participants signed a consent form explicitly mentioning that they would be videotaped, and they were later debriefed by email.

The study was conducted over three midweek days during the same week, during three time slots (11:45 a.m., 12:30 p.m., and 1:15 p.m.). There were three between-subject experimental conditions that manipulated the menus: control, nutrition-labeled, and epicurean labeled, as described hereafter. To avoid contamination (e.g., people exchanging or comparing menus), all the customers in a particular time slot were in the same experimental condition. We eliminated any day-of-the-week or time-of-the-day effects by counterbalancing the three experimental conditions across the three days of the study and the three time slots.

An iPad Mini was set next to each plate on the table, and the waiters explained that customers would answer a few questions about their experience. The waiters first served a complimentary "pea and panna cotta" *amuse-bouche* and described its composition. After the customers had finished the *amuse-bouche*, the waiter brought the menu. In the nutrition labeling condition, the waiter added that the menu contains information about the calories and fat content of each dish. In the epicurean labeling condition, the waiter added that the menu invites the customers to use their five senses to appreciate the flavors of the food.

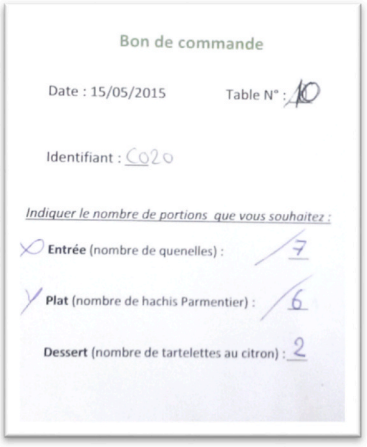
Although the food was identical, we manipulated the menu given to customers across the three experimental conditions (the full menus are available in Appendix 1A). The control menu contained a succinct description of the three-course meal: "Gnocchi, spinach salad, vinaigrette" as a starter, "Beef shepherd's pie, tomato and pesto sauce" as a main dish, and "Lemon tartlets, red berry coulis" as a dessert (translated from French). The nutrition-labeled menu used the same descriptions but added information about calorie and fat content (e.g., "86 kcal per tartlet, 26% fat" for each lemon tartlet). The epicurean-labeled menu included pre-tested epicurean descriptions, such as "Lemon tartlets with red berry coulis: Crunchy pie crust pastry topped with an elegant slightly sour lemon cream, signed with a dark chocolate comma. Smooth seasonal red berry coulis." To increase sensory focus, the epicurean menu

Cafeteria

Starter

Main dish

Dessert




Order sheet

**Fig. 1.** Study 1: Restaurant and stimuli.

also included a short text inviting eaters to "use the five senses to best appreciate the flavors of the meal," and indicating how each sense contributes to the overall sensory enjoyment of the dishes (note that, in Study 2, we tested similar menus but without this additional text in order to remove potential confounding effects).

After the customers had consulted the menu, they were shown a sample plate with one portion of each course (one dumpling, one shepherd's pie, and one lemon tartlet). They were told that they could choose as many portions as they wanted by marking down the number of portions on the order sheet shown in Fig. 1. The customers gave the order sheet to the waiter. The customers received each dish consecutively. After the dessert, and before taking orders for coffee or tea, the waiters set down a sample plate with three sizes of chocolate candy topped with dried fruits and nuts and asked customers whether they desired any with their coffee.

Customers were not able to order additional food after they had started their meal. This way, their portion size choice was not influenced by the taste of the food or by cost considerations since the price of the meal was fixed. Over the course of the meal, customers answered a series of questions on an iPad and were filmed using unobtrusive cameras located in the ceiling of the cafeteria to measure their eating pace. All these measures are detailed in Table 1. Additional, exploratory measures are provided in Appendix 1B. Consistent with French norms when eating out, none of the customers asked to take home the leftover food (there was actually very little leftover, as described below). A video with examples of this procedure across each of the three conditions can be found on the following link: https://tinyurl.com/cafeteriastudy.

**Table 1**
Study 1: Measures.

| Variable | Measure |
|---|---|
| *Meal size* | |
| Calories ordered | The order sheet indicated the number of portions of starter, main dish, and dessert ordered by each customer. We computed the total number of calories ordered from the order sheet. |
| Calories consumed | After the customers finished each dish, the plates were sent back to the kitchen and a research assistant measured the leftover quantity, which was subtracted from the quantity ordered to compute actual calorie intake. |
| *Savoring* | |
| Slow eating | High-definition cameras hidden in the ceiling of the restaurant videotaped the customers throughout their lunch. After the study, a research assistant timed how long customers spent eating by zooming in on each customer. Following earlier studies of eating pace ( Hetherington, Anderson, Norton, & Newson, 2006), we measured the time spent eating from the moment customers put food on their fork or spoon (i.e., just before putting it in their mouth) until the moment they had visibly stopped chewing or had visibly swallowed the food. Thus, our calculation of time spent eating did not include the pauses between each bite. Because the time spent eating is strongly dependent on consumption quantity, we normalized it by measuring "slow eating" as the time spent eating (in seconds) divided by the number of consumed calories. The measure increases when customers eat at a slower rate. |
| Pleasure expectations | Before eating each of the three courses, customers were asked to indicate privately on the iPad how much pleasure they anticipated from eating it on a scale ranging from 1 ("I anticipate no pleasure at all") to 7 ("I anticipate a lot of pleasure," in French). Pleasure expectations for the first dish were measured just after customers submitted their order sheet, and before they received the first dish. |
| *Perceived value* | |
| Perceived monetary value (key measure) | At the end of the meal, we asked the customers: "What would be a fair price for the meal that you just had?" The customers provided their answer on a sliding scale ranging from €0 to €30. |
| Overall evaluation | As an alternative measure of perceived value, we also asked: "If this menu was available at a nearby restaurant for €15, would you be interested?" Participants answered on a scale ranging from 1 ("not at all interested") to 5 ("very interested"). |

### 3.2. Results: main effects

*Data exclusion.* We excluded two customers who had exchanged their iPads, two who requested and obtained additional servings after their initial orders despite the instructions given to the waiters, one who did not answer the questions, and three who were not visible on the videos, making it impossible to estimate their eating pace. This left data for 99 customers (Mean age = 54, SD = 18; 53% female).

*Meal size.* We computed the number of calories ordered and consumed (after subtracting leftover food), which were nearly identical. We excluded the chocolate candies from the analyses of the number of calories ordered and consumed because they did not appear on the menu and were only provided at the end of the meal. We report in Appendix 1C detailed analyses for each dish and for the full meal, with and without the chocolate candies, which yielded similar results. We used ANOVA (Analysis of Variance) for all main effect analyses. The effect of the menu intervention on the number of calories ordered was statistically significant ($F(2, 96) = 7.06$, $p < .01$). As shown in Fig. 2, customers in the epicurean condition ordered 17% fewer calories than those in the control condition ($M = 817$, $SD = 265$ vs. $M = 984$, $SD = 435$; $d = 0.44$, $F(1,96) = 4.16$, $p = .04$). Customers in the nutrition condition ordered 31% fewer calories than those in the control condition ($M = 680$, $SD = 266$; $F(1,96) = 14.08$, $p < .01$), but not significantly less than in the epicurean condition ($F(1,96) = 2.78$, $p = .10$).

*Perceived value.* The two measures of perceived value (see Table 1) were correlated ($r = 0.65$, $p < .01$), and the same results were obtained when averaging both measures as when using perceived monetary value only. We therefore focus on monetary value, which is more directly interpretable and more managerially relevant since it is measured on a Euro scale rather than on a 5-point Likert scale.

The menu manipulation had a statistically significant effect ($F(2,96) = 6.25$, $p < .01$). As expected, customers in the epicurean condition, despite eating less, found the experience worth 16% more than customers in the control condition ($M = €19.69$, $SD = 4.46$ vs. $M = €16.97$, $SD = 4.61$; $d = 0.60$, $F(1,96) = 4.82$, $p = .03$) and 28% more valuable than customers in the nutrition condition ($M = €15.38$, $SD = 5.75$; $F(1,96) = 12.27$, $p < .01$). Ratings of perceived value were not statistically different between the control and nutrition conditions ($F(1,96) = 1.69$, $p = .20$).

*Savoring.* Following prior research (Bellisle, Dalix, & Slama, 2004), savoring was first operationalized as slow eating (see Table 1). The effect of the menu intervention on slow eating was statistically significant ($F(2, 96) = 3.47$, $p = .03$). Customers in the epicurean condition ate at a 22% slower pace than those in the control condition ($M = 1.16$ s per kcal, $SD = 0.26$ vs. $M = 0.95$, $SD = 0.49$; $F(1,96) = 4.08$, $p = .046$). Nutrition labeling also slowed down eating by 26% compared with the control condition ($M = 1.20$, $SD = 0.44$; $F(1,96) = 6.11$, $p = .02$), which is consistent with past research suggesting that people eat smaller meals more slowly (Areni & Black, 2015). Eating pace was not statistically different between the epicurean and the nutrition conditions ($F(1,96) < 1$, $p = .66$).

To distinguish savoring from merely eating slowly, we examined pleasure expectations collected after the menu intervention and before the first course. These expectations were 14% higher in the epicurean condition than in the control condition ($M = 5.84$ on a 1-to-7-point scale, $SD = 1.25$ vs. $M = 5.12$, $SD = 1.24$; $F(1,96) = 4.89$, $p = .03$). Pleasure expectations in the nutrition condition were not statistically different from those in the control conditions ($M = 5.18$, $SD = 1.45$; $F(1,96) < 1$, $p = .86$) but were lower than those in the epicurean condition ($F(1,96) = 4.23$, $p = .04$).

### 3.3. Results: mediation analyses

Perceived monetary value was assessed after eating. It can thus be positively influenced by the quantity of food eaten (i.e., meal size) and by the quality of the experience (i.e., savoring) which may compensate for the lower food intake. Hence, we examined three factors that can mediate the effects of epicurean and nutrition menu labeling (independent variables) on customers' perceived monetary value for the meal (dependent variable). The first two mediators are eating pace and expected enjoyment, which capture savoring and measure the quality of the consumption experience. The third mediator is total food intake, which measures consumption quantity (one of the key dependent variables of the main effect analyses).

*Model.* We used model 4 of version 2.16 of the PROCESS macro with 5000 bootstrap samples and a 95% level for all confidence intervals (Hayes, 2013). As recommended (Zhao, G, & Chen, 2010), we analyzed mediating effects even in the absence of total effect (e.g., there was no difference in perceived value between the nutrition and control menus). All the coefficients were estimated simultaneously in a single mediation analysis using data from all three conditions. To facilitate reporting, Fig. 3 shows three different coefficients, one for each of the three possible contrasts. The top panel contains the coefficient contrasting the effects of the epicurean menu vs. the control menu, the middle panel shows the coefficients contrasting the effects of the nutrition menu vs. the control menu, and the bottom panel shows the coefficients contrasting the effects of the epicurean menu vs. the nutrition menu.

Results. The effects of the menu manipulations on the mediators

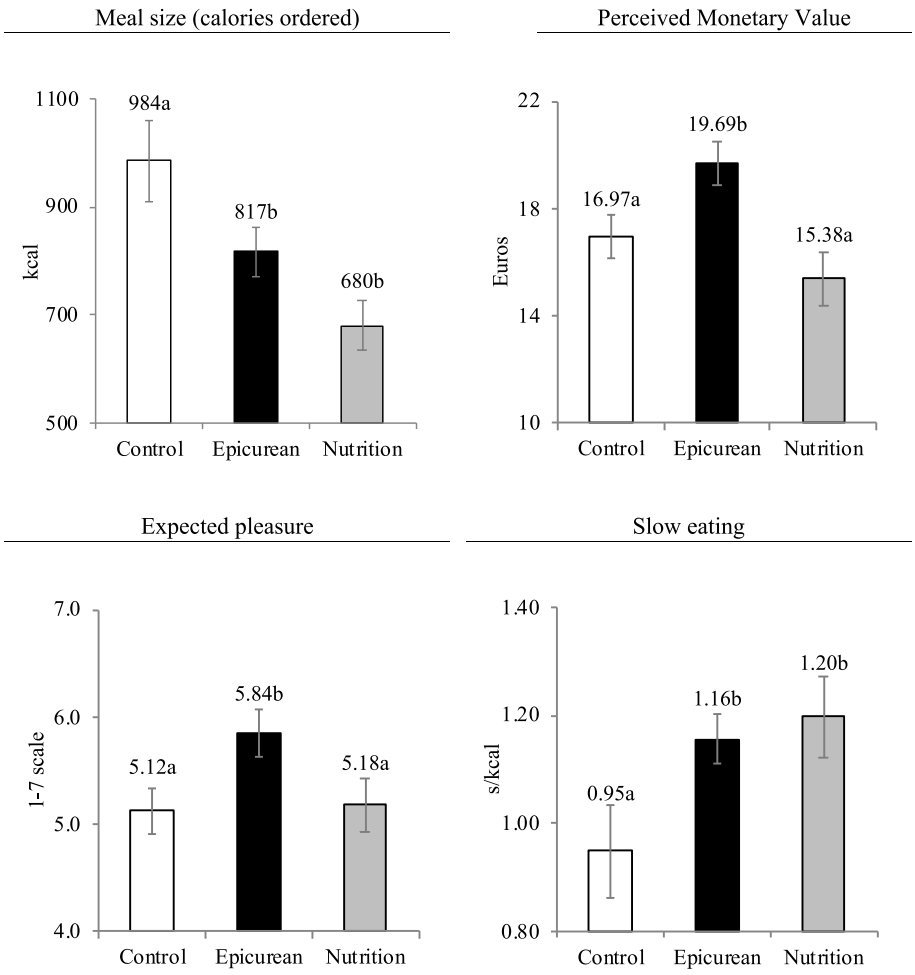



**Fig. 2.** Study 1: Effects of Epicurean and Nutrition Menu Labeling
*Note*: Error bars show standard errors. Means with different letters are significantly different ($p < .05$).

were consistent with the ANOVA results reported earlier. More importantly, all three mediators were significantly associated with the perceived value of the meal. As shown in Fig. 3, consuming 100 extra calories (i.e., about 12% of the average meal) increased the perceived value of the meal by €0.51 on average ($t(93)=3.63$, $p < .001$). Slowing down the pace of eating by taking one extra second per calorie (i.e., a 90% increase over the mean level) increased perceived value by €5.43 ($t(93)=4.61$, $p < .001$). A 1-point increase on the 7-point pleasure expectation scale (i.e., an 18% change from the mean) led to a €1.11 increase in perceived value ($t(93)=3.33$, $p=.001$).

The three factors fully mediated the effects of the epicurean menu (vs. control) and of the nutrition menu (vs. control) on perceived value, as can be seen from the inclusion of zero in the 95% confidence intervals of the direct residual effects ($M=1.64$, $CI=[-0.48; 3.76]$ for epicurean vs. control and $M=-1.45$, $CI=[-3.60; 0.70]$ for nutrition vs. control).

The mediation analyses show that the epicurean menu led to a higher perceived value than the control menu because its two positive indirect effects, one via slower eating ($M = 1.12$, $95\%CI = [0.19,2.29]$) and the other via higher expected pleasure ($M = 0.80$, $CI = [0.19,1.92]$), more than compensated its negative indirect effect via reduced intake ($M = -0.84$, $CI = [-2.21,-0.06]$).

The mediation analyses also explain the lack of difference in terms of perceived value between the nutrition and the control menus. Compared to the control condition, the nutrition menu had a positive effect via slower eating ($M = 1.35$, $CI = [0.25,2.74]$), but no effect via expected pleasure ($M = 0.06$, $CI = [-0.70,0.81]$). These two positive effects were not large enough to compensate for the negative effect on perceived value via reduced intake ($M = -1.54$, $CI = [-3.17,-0.58]$). control) on perceived value.

On the other hand, the mediation analyses cannot explain the difference in perceived value between the epicurean and nutrition conditions because the mediation was only partial, as can be seen from the exclusion of zero from the 95% confidence interval of the direct residual effects ($M = 3.09$, $CI = [0.99; 5.18]$).

### 3.4. Discussion

Compared with a control menu, epicurean labeling reduced the number of calories ordered and consumed over an entire meal by French cafeteria customers by 17% while increasing the perceived monetary value of the experience by 16%. This effect on perceived value measured after the meal occurred because the positive effects of savoring compensated for the negative effect of lower intake.

Nutrition labeling reduced intake but, unlike epicurean labeling, it did not increase perceived value because it did not enhance pleasure expectations the way epicurean labeling did. Consequently, perceived monetary value was €4.31 higher (+28%) with the epicurean menu than with the nutrition menu. In addition, the mediation analyses showed that savoring as well as food intake fully mediated the improvement in perceived value between the control menu and the epicurean menu.

There were several limitations to Study 1. First, the waiters were aware of the different conditions (although they were not aware of its hypotheses). Second, the epicurean menu combined epicurean descriptions with an invitation to use the five senses while eating. These

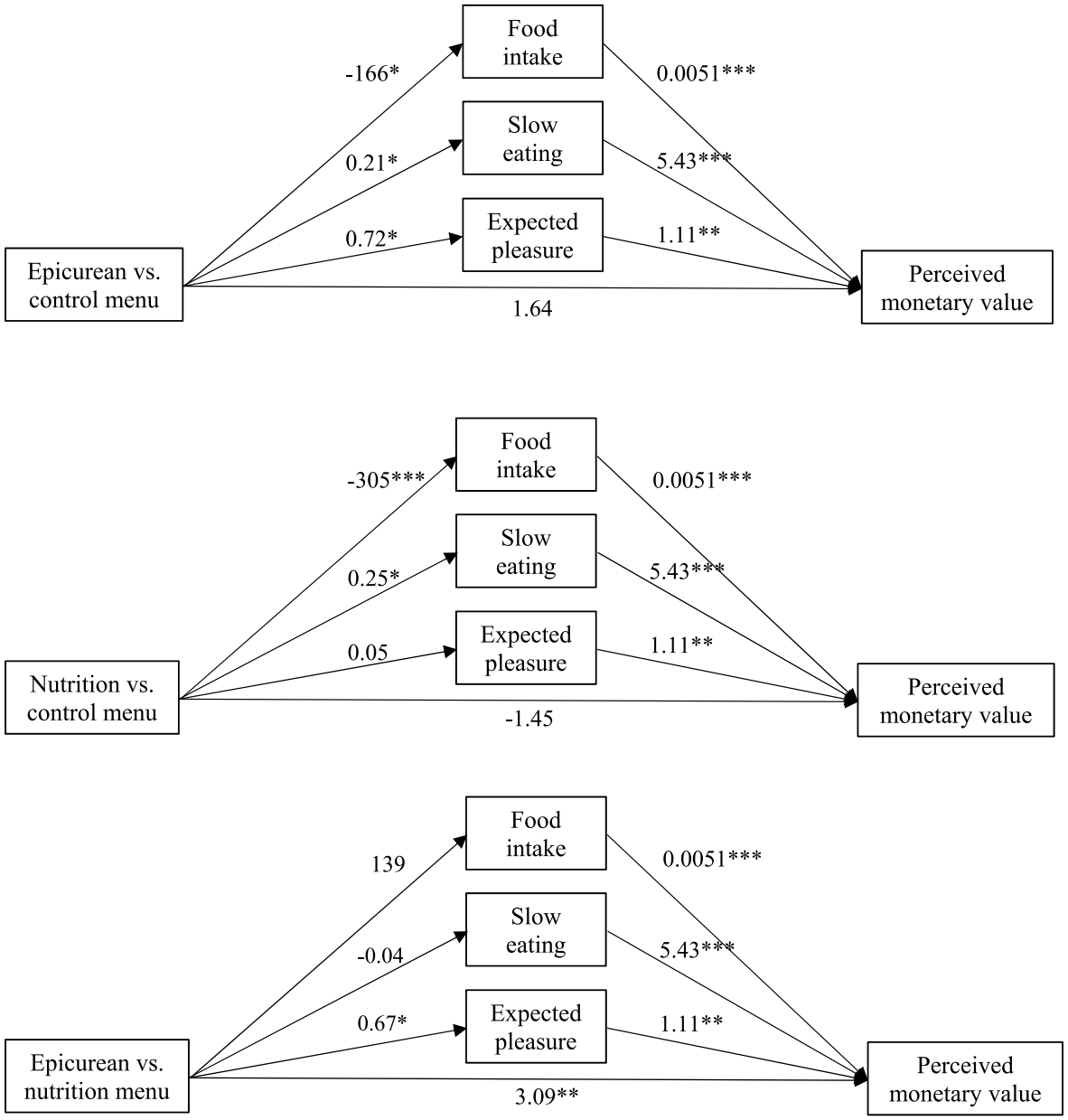



**Fig. 3.** Study 1: Mediation Coefficients for Epicurean Labeling vs. Control (Top), Nutrition Labeling vs. Control (Middle), and Epicurean vs. Nutrition Labeling (Bottom)

*Note*: These unstandardized regression coefficients were obtained from a single model estimated on the data from all three conditions. The coefficients of the variables capturing the effects of epicurean menu labeling (vs. control), nutrition menu labeling (vs. control), and epicurean menu labeling (vs. nutrition) are reported separately for ease of presentation. $^{*}p \leq .05$; $^{**}p \leq .01$; $^{***}p \leq .001$. The confidence intervals are obtained from 5000 bootstrap samples at the 95% level of confidence.

limitations are addressed in Study 2, which also included both American and French respondents.

## 4. Study 2: epicurean labeling effects on French and American eaters

Using the same food as Study 1, but conducted in an online ordering scenario, Study 2 tests whether epicurean descriptions alone can influence portion control and (pre-meal) perceived value for two samples of American and French respondents matched on demographic and socioeconomic characteristics. The matching is important, because the effect of epicurean labeling on portion control could be expected to be stronger among people from a higher socioeconomic status since sophisticated eating is a form of "social privilege".

Study 2 also examines the moderating role of hunger. Indeed, the restaurant patrons in Study 1 were arguably at least moderately hungry when choosing portion sizes, while there should be more variance in hunger among the online participants of Study 2. Past research has shown that the effect of sensory focus on portion control are stronger when people are hungry because hungry people benefit more than sated people from being reminded to consider the sensory experience of eating (Arch et al., 2016; Chang et al., 2018; Cornil & Chandon, 2016a; Lange et al., 2020). Finally, because Cornil and Chandon (2016a) showed that people incorrectly expect sensory focus to increase preferences for larger portions, Study 2 also examines the intuitions of American and French eaters about the effects of epicurean labeling.

Our preregistered hypotheses (https://aspredicted.org/blind.php?x=kj4982) were that (1) epicurean labeling makes French, but not

American participants, choose smaller portions, especially if they are hungry, (2) epicurean labeling increases estimates of the fair value of the meal among all participants, and that (3) participants expect epicurean labeling to make them choose more food, not less food (that is, participants have the incorrect intuition).


**Fig. 4.** Study 2: Control menu (top) and epicurean menu (bottom).

### 4.1. Method

We recruited 410 American and 404 French adults via Qualtrics panels based on matched sociodemographic characteristics. Sample size in each country was determined to achieve a 90% power at a 5% alpha, based on the effect size on calorie intake found in Study 1. The study was approved by the INSEAD committee on studies involving human interactions.

After agreeing to an online consent form, participants evaluated their hunger on a 101-point scale anchored from "not hungry at all" to "extremely hungry." Participants were randomly assigned to see the control or epicurean menus of Study 1, but just with the epicurean labeling of the dishes and without the invitation to use the five senses (see Fig. 4 for the menu in English and Appendix 2 for the menu in French). The stimuli were translated into English for the American participants (the full questionnaire is available on OSF). Participants were told that the meal would cost $15/€15, saw photos of the sample plates shown in Fig. 1, and indicated how many portions, from 1 to 10, they would order for each dish.

After being reminded of their orders, participants were asked to provide a fair price for the entire meal that they had chosen on a visual analogue scale ranging from 0 to 30 ($ or €). To measure participants' intuition about the effect of epicurean labeling, we asked: "If a menu contains details about ingredients, tastes, and food textures, how do you think it will influence the quantity of food you order?" and measured their answers on a scale ranging from −3 ("choosing less food") to +3 ("choosing more food") with a midpoint 0 ("no effect").

To further verify respondent matching (which was, by design, based on age, gender, and household income), we measured their perceived relative socio-economic status, their highest level of education, and their height and weight (to compute their BMI). Finally, to verify that the French participants are more focused on food pleasure than the Americans, we administered the epicurean pleasure-seeking tendency scale (Cornil & Chandon, 2016b) and its French translation (Cornil, Chandon, & Touati, 2018). This scale asks respondents to rate their agreement with 7 sentences such as "more than other people, I value the look, the smell, the taste, the texture in mouth of foods" or "cooking is a major form of art, similar to music or painting".

### 4.2. Results

*Data exclusion.* As preregistered, only people who indicated that they would eat the foods tested were allowed to participate in the study. We excluded 89 participants who either encountered a technical problem (N = 6), failed to recall at least one of the foods on the menu (indicating a lack of attention, N = 75), or both (N = 8), leaving 725 respondents.

*Respondent matching.* The American and French samples were similar in terms of age ($M$ = 47.1 in the United States vs. $M$ = 46.7 in France; $t$(720) = 0.30, $p$ = .76) and gender (resp. 59% women and 0.3% "other" in the United States vs. 53% women in France; $\chi^2(2) = 3.9$, $p$ = .15). Average income converted into US dollars was also similar ($M$ = $48,990 in the United States vs. $M$ = $51,379 in France; $t(679) = 1.25$, $p$ = .21; note that not all participants reported their income). These results show that the matching was successful.

The two samples differed in terms of education ($\chi^2(4) = 28.1$, $p$ < .01), with a higher proportion reporting having a Bachelor's or Master's degree in the American sample (53%) than in the French sample (36%). The results are unchanged when adding education as a control variable. The higher level of education in the American sample allows for a conservative test of our hypotheses, given that the effect of epicurean labelling on portion control could be expected to be stronger among people with a higher education.

American and French participants did not significantly differ in BMI (respectively, $M$ = 27.63 in the United States vs. $M$ = 26.27 in France; $t$(680) = 1.41, $p$ = .16; note that not all participants reported their height and weight). Finally, epicurean pleasure-seeking tendencies were higher among French than American participants ($M$ = 5.23 vs. $M$ = 5.07, $t$(723) = 2.13, $p$ = .03). This analysis, which was listed as exploratory in the pre-registration, shows that the American and French samples differed in terms of hedonic food focus in the expected way.

*Calories.* As in Study 1, we converted the orders into their calorie equivalent, which we analyzed using a two-way ANOVA, with menu condition, country, and their interaction as independent variables. We found no significant main effect of menu ($F$(1,721) = 0.79, $p$ = .37), a significant main effect of country ($F$(1,721) = 3.97, $p$ = .047) indicating that fewer calories were ordered by French than by American respondents, and a marginally significant menu by country interaction ($F$(1,721) = 2.87, $p$=.09). As shown in Fig. 5, epicurean labeling (vs. control) decreased the number of calories ordered by French participants by 10.4%, which was marginally significant[1] ($M$ = 629, $SD$ = 346 vs. $M$ = 702, $SD$ = 395; $F$(1,386) = 3.70, $p$ = .055). In contrast, epicurean labeling did not significantly influence the orders of American participants ($M$ = 733, $SD$ = 380 vs. $M$ = 711, $SD$ = 390; $F$(1,335) = 0.29, $p$ = .59).

*Perceived value.* We converted perceived value in US$ and found a significant main effect of country ($F$(1,721) = 12.91, $p$ < .001): French participants were willing to pay more than Americans. More importantly, there was a significant main effect of epicurean menu labeling ($F$(1,721) = 4.65, $p$ = .03) and no menu by country interaction ($F$(1,721) = 0.01, $p$ = .94). Hence, epicurean labeling (vs. control) increased perceived value by 4.7% (from $M$ = $18.71, $SD$ = 5.68 to $M$ = $19.59, $SD$ = 5.82) across the full sample (both French and Americans), as predicted (see Fig. 5).

*Intuition.* We only found a significant a main effect of country on people's intuition ($F$(1,721) = 16.43, $p$ < .001), but no effect of menu condition and no interaction ($p$'s > 0.29). Both groups were wrong, as predicted. The average prediction was significantly above the midpoint zero among French participants ($M$ = 0.72, $SD$ = 0.94; $t$(387) = 15.33, $p$ < .001), who incorrectly predicted that epicurean labeling would make them order more (not less) food. The average prediction was even higher among Americans ($M$ = 1.05, $SD$ = 1.12; $t$(336) = 17.20, $p$ < .001), who incorrectly predicted that epicurean labeling would make them order more (not as much) food.

*Moderation by hunger.* We performed a three-way ANOVA with calories as dependent variable, and the menu condition, hunger, country, and all two-way and three-way interactions as independent variables. The main effect of country was statistically significant ($F$(1,717) = 4.07, $p$ = .04) and so was the main effect of hunger ($F$(1,717) = 26.23, $p$ < .001). Importantly, the interaction between menu and hunger was also statistically significant ($F$(1,717) = 3.92, $p$ = .048). There was no other significant effect. Of particular interest, the menu by hunger by country three-way interaction was not statistically significant ($F$(1,717) = 1.03, $p$ = .31). A Johnson-Neyman analysis (for details, see Lin, 2020) showed that, across both samples, epicurean labeling (vs. control) significantly decreased ordered calories ($p$ < .05) when hunger rating was above 62 on the scale ranging from 0 to 100. We return to this point in the General Discussion.

### 4.3. Discussion

Replicating the findings of field Study 1, Study 2 showed that a subtler manipulation of epicurean labeling only describing the food using multisensory descriptions (without the invitation to use the five senses), decreased the amount of food ordered by French participants for

[1] Note that we report two-tailed tests throughout the paper although researchers (Cho & Abe, 2013; Lakens, 2017, 2021) have argued that one-tailed tests are adequate for preregistered directional hypotheses. By this standard, the effect of epicurean labeling (vs. control) on calories ordered by French participants would be statistically significant ($F$(1,386) = 3.70, $p$ = .028; one-tailed).

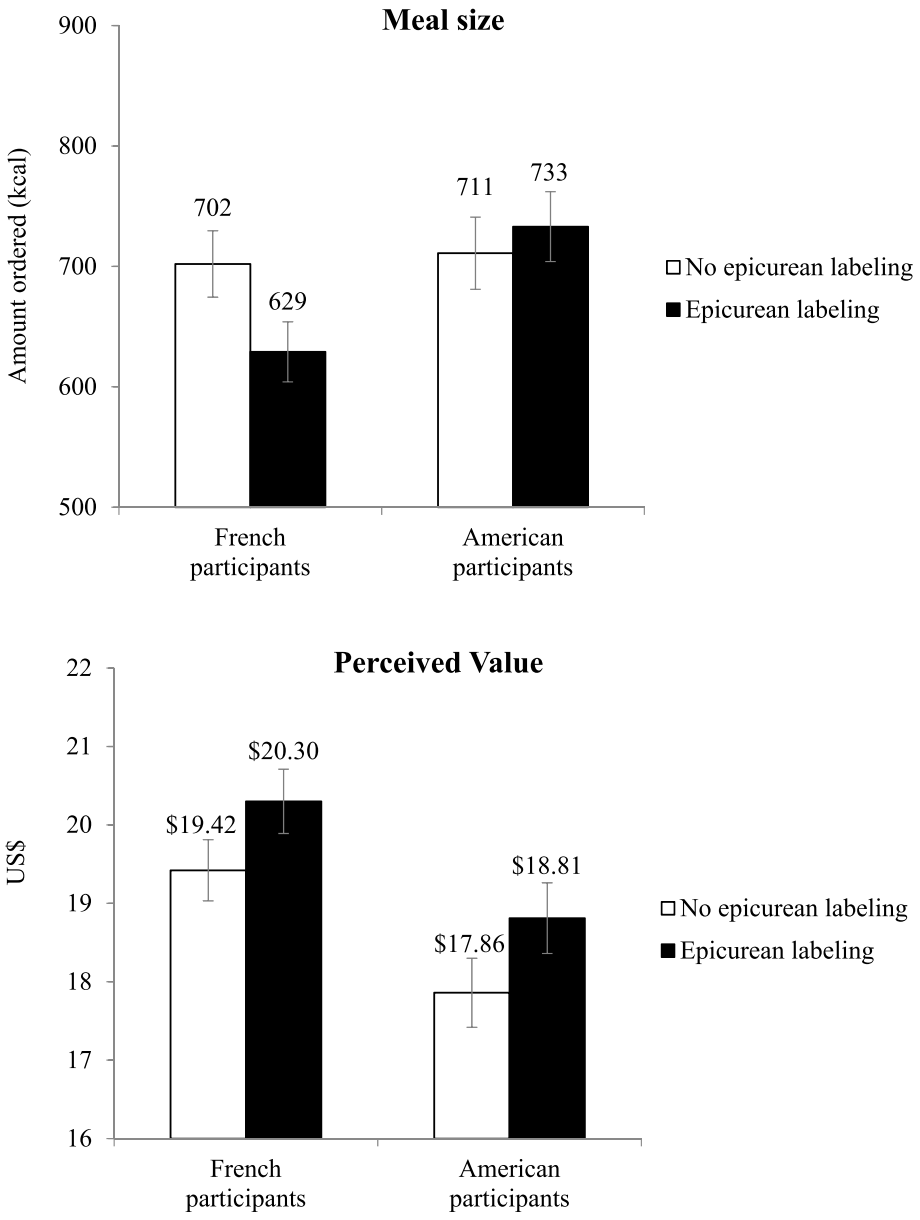



**Fig. 5.** Study 2: Effects of Epicurean Labeling on Amount Ordered (top) and Fair Value Estimation (bottom) Among French and American Respondents
*Note*: Error bars denote standard errors.

a meal and yet increased their perceived monetary value of the meal. As predicted, epicurean labeling had different effects on American participants, who chose a meal of the same size as in the control condition but (like the French) were willing to pay more for it. Still, epicurean labeling did lead to smaller portions when combining both samples and focusing on hungry respondents. In addition, as predicted by the cross-cultural food literature, French respondents ordered smaller meals overall but were willing to pay more for them than the Americans, despite both groups being matched on age and income. Finally, both groups erroneously expected epicurean labeling to increase the amount of food people would order.

One limitation of Study 2 is that it examined the effects of epicurean labeling on consumer demand in a hypothetical restaurant context (whereas Study 1 was conducted in a real restaurant context, although with French participants only). To address this limitation, Study 3 examines epicurean labeling in real-life grocery shopping conditions by studying its prevalence and its association with the price and package size of food products in both American and French supermarkets.

## 5. Study 3: epicurean labeling in French and American supermarkets

Study 3 tests epicurean labeling at the time of purchase (vs. consumption) by comparing the price and package size of food products with or without epicurean labeling sold in American and French supermarkets. In line with research cited earlier (Rozin, 2005; Rozin et al., 1999), we expect epicurean labeling to be more frequent in France than in the United States. More importantly, by making the reasonable assumption that product characteristics reflect consumer demand, we expect that epicurean labeling is more likely to be associated with smaller portion sizes in France, compared to the United States.

Unlike in Studies 1 and 2, which directly measured the perceived monetary price of a restaurant meal, Study 3 relies on supermarket prices as a proxy for perceived monetary value. The competitive context is also different. In restaurants, information on portion sizes is not available and people only choose from a limited set of options. In supermarkets however, there is more competition and, by law, the

product's size and its unit price (price per weight or volume) are clearly displayed. This creates a stronger pressure in supermarkets than in restaurants for prices to be commensurate with sizes, making it more difficult for marketers to simultaneously decrease sizes and increase prices. We therefore make a weaker prediction regarding the effects of epicurean labeling on supermarket prices than we did regarding their effects on the perceived monetary value of the meal collected in Studies 1 and 2. In France, we expect that epicurean labeling is associated with smaller supermarket package sizes but *without* commensurately lower market prices. In the United States, where we do not expect that epicurean labeling leads to smaller sizes (as indicated above), we expect that epicurean labeling is associated with higher prices for similar package sizes.

### 5.1. Method

Study 3 used SKU-level information on the price, size, and product descriptions listed on the packages of foods sold in American and French supermarkets in 2019 in 13 categories provided by Mintel Corporation. Mintel data have already been used in the scientific literature (Lim, Rishika, Janakiraman, & Kannan, 2020). These 13 categories were a mix of indulgent (Sweet Biscuits/Cookies; Cakes, Pastries & Sweet Goods; Baking Ingredients & Mixes; Baby Fruit Products, Desserts & Yogurts; Baby Juices & Drinks) and less indulgent categories (Bread & Bread Products; Hot Cereals, Cold Cereals; Savory Biscuits/Crackers; Baby Savory Meals & Dishes; Baby Formula; Baby Snacks; Baby formula; Growing up Milk; Other Baby foods).

Mintel data are updated at the stock-keeping unit (SKU) level whenever there is a change to any of 80 attributes used in descriptions on packs, including new visuals for limited editions. Because some foods may not have been updated in 2019, we added data from 2014, keeping only 2019 data when we had two observations for the same SKU. This yielded 9154 observations (5373 in the United States and 3781 in France).

To operationalize epicurean labeling, we used a lexicon of 157 sensory descriptors made available by Jurafsky, Chahuneau, Routledge, and Smith (2016). Removing 11 very similar words (like "cheesiest" and "cheesy") left 146 descriptors.[2] In an online pretest, we asked 350 people to rate whether each descriptor reflects the aesthetic, multisensory experience of savoring food (the definition epicurean labeling) on a scale ranging from 1 ("strongly disagree") to 7 ("strongly agree"). All descriptors were rated above the midpoint and their average was significantly above the midpoint ($M = 5.2$, $SD = 0.6$, $t = 23.2$, $p < .001$).

### 5.2. Results: prevalence of epicurean labeling

Only 38.1% of the product descriptions included at least one epicurean word. Among these descriptions, 68.1% included only one descriptor and 31.9% contained more than one descriptor. We therefore dichotomized the epicurean word count to indicate whether the description included at least one epicurean word.

The proportion of products with at least one epicurean descriptor was larger in France than in the United States ($M = 40.5\%$ vs. $M = 36.4\%$, $\chi^2(1) = 15.8$, $p < .01$). These results, just like all the results of all the other analyses, were unchanged when adding the length of the product description as a covariate (measured by the number of characters, as shown in OSF). The higher prevalence of epicurean labeling in France is not driven by differences in flavor or ingredient complexity, since there was no difference across countries in the number of flavors listed on the packages ($M_{FR} = 1.42$ vs. $M_{USA} = 1.45$, $t = -1.61$, $p = .11$), and the number of ingredients was, in fact, lower in France than in the United States ($M_{FR} = 15.4$ vs. $M_{USA} = 21.7$, $t = -20.7$, $p < .001$).

### 5.3. Results: association with package size and price

We conducted a MANOVA with two dependent variables, package size (in grams) and price (in US dollars). The independent variables were epicurean labeling (binary), country, food category type, and all interactions. The interaction between epicurean labeling and country was statistically significant ($F(2,9010) = 8.94$, $p < .01$), indicating that epicurean labeling had a different effect in the United States than in France.

The two-way interaction between country and food type was also statistically significant $F(2,9010) = 10.8$, $p < .01$), but not the three-way interaction ($F(2,9010) = 0.44$, $p = .64$). We therefore conducted separate MANOVAs for each country, with food type as a covariate. Since epicurean labels tend to have more words, we conducted the analyses also with the number of characters of the label as a covariate. All the results were unchanged (the analyses with the covariate are available in OSF).

Fig. 6 shows that, in France, the average package size was 9.1% smaller for products with at least one epicurean descriptor than for those without epicurean descriptor ($M = 264$g, $SD = 205$ vs. $M = 289$g, $SD = 325$, $F(1,3612) = 6.3$, $p = .01$). Despite being significantly smaller, the products with (vs. without) epicurean descriptor were only marginally significantly cheaper ($M = \$4.15$, $SD = 3.21$, vs. $M = \$4.49$, $SD = 3.92$, $F(1,3612) = 3.6$, $p = .06$), not commensurately cheaper. It was different in the United States: Products with at least one epicurean descriptor were more expensive than those without epicurean descriptor ($M = \$4.56$, $SD = 3.85$ vs. $M = \$4.14$, $SD = 4.03$, $F(1,5240) = 21.5$, $p < .01$), but both types of products had similar package sizes ($M = 341$g, $SD = 328$ vs. $M = 350$g, $SD = 360$, $F(1,5240) = 1.0$, $p = .33$).

## 6. Discussion

Study 3 shows that epicurean labeling is more frequent in food products sold in French than in American supermarkets. It also suggests that food marketers use different rules when setting the price and package size of products with epicurean labels in these two countries. In France, epicurean-labeled products (vs. other products) are packaged in significantly smaller containers and these products are also somewhat less expensive, although only marginally significantly. In the United States, epicurean-labeled products (vs. other products) are significantly more expensive but come in similar package size.

Of course, the correlational data used in Study 3 cannot rule out that unobserved differences between French and US products drive these results. In addition, this interpretation relies on the common assumption that food marketers set package sizes and prices as a function of consumer preferences (Wertenbroch, 1998), although prices are determined by many other factors that are not observed in this study. Still, Study 3 provides supply-side evidence consistent with our core hypotheses that epicurean labeling is associated with portion control in France more than in the United States.

[2] Airy, aromatic, astringent, beefy, bitter, bittersweet, blazing, bloomy, boiled, bold, braised, bright, briny, brisk, broiled, burnt, buttery, charbroiled, chargrilled, cheesy, chewy, chocolaty, chunky, citrusy, clean, coarse, colorful, complex, cooked, cool, creamy, crisp, crispy, crumbly, crunchy, crusty, dark, delicate, dense, doughy, dry, earthy, explosive, faint, fatty, fiery, finely, fizzy, flaky, flowery, fluffy, foamy, fragrant, fresh, freshly, fried, frosty, frothy, fruity, fudgy, funky, fuzzy, garlicky, gentle, glassy, golden, gooey, grainy, grassy, grilled, gummy, herbal, hot, icy, juicy, leafy, lemony, light, lightest, luscious, lush, luxurious, malty, meaty, meltingly, mild, mildly, milky, minty, moist, numbing, nutty, pan-fried, peachy, peppery, perfumed, pink, piquant, plump, porky, puffy, rich, richer, richly, ripe, roasted, robust, salty, saucy, sautéed, seared, sharp, sharply, shiny, silken, silky, simmered, slender, smoky, smooth, soft, soupy, sour, spicy, spongy, steamed, stinky, stir-fried, strong, succulent, sultry, supple, sweet, tangy, tawny, tender, tenderly, thinly, toasty, velvety, vibrant, vinegary, warm, warmer, wet, zesty.

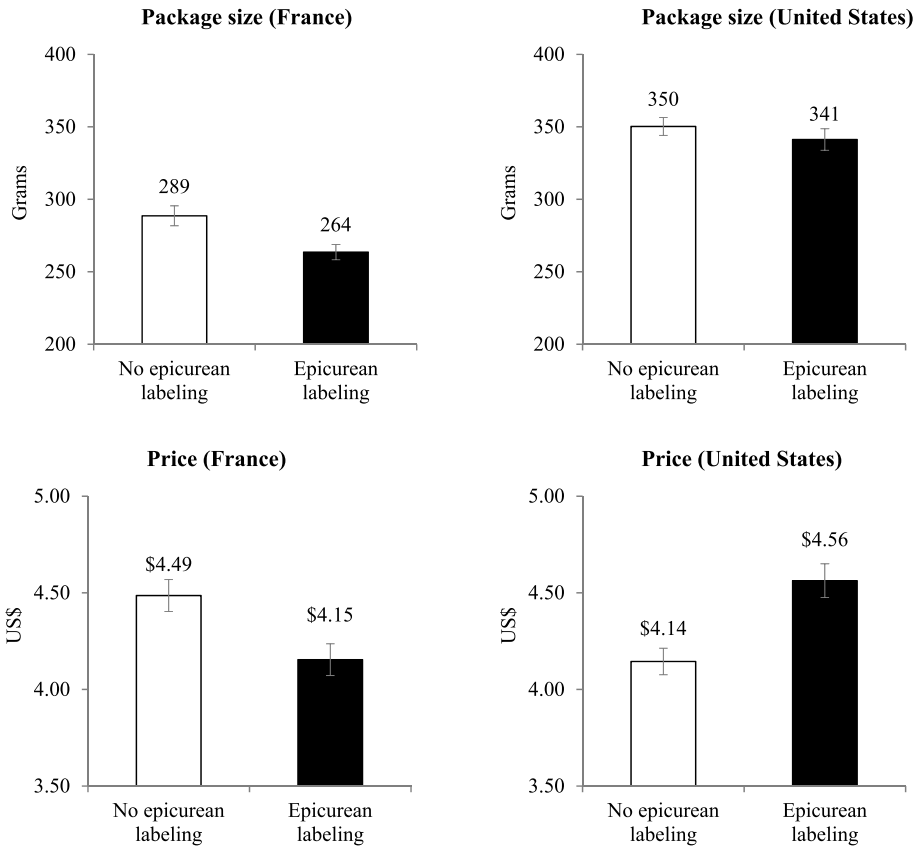



**Fig. 6.** Study 3: Association between Epicurean Labeling and Package Size (top) or Price (bottom) in France (left) and the United States (right)
*Note*: Error bars denote standard errors. Products in the epicurean labeling group have at least one epicurean descriptor. They account for 40.5% of the 3787 products sold in France and 36.4% of the 5367 products sold in the United States.

## 7. General Discussion

### 7.1. Summary of the findings and limitations

We demonstrate that epicurean labeling—emphasizing the aesthetic, multisensory properties of food on menus or packages—can promote portion control and increase the monetary valuation of smaller portions. This was shown a field study in a French cafeteria (Study 1), which further showed that the positive effect of epicurean labeling on post-meal perceived value was due to increased savoring, which compensated for the lower food intake.

Still, the triple win of epicurean labeling may not be universally achievable in the short run. Study 2 found that Americans respond to epicurean labeling by increasing the (pre-meal) perceived value of the meal (like their French counterparts) but do not choose a smaller meal (unlike their French counterparts). Study 3, an archival study, suggests that the association between epicurean labeling and small portions is not restricted to restaurants but can also be found in supermarkets. Epicurean labeling was more frequent in packaged foods sold in French (vs. American) supermarkets. Replicating the cross-cultural effect, food products with (vs. without) epicurean labeling were packaged in smaller containers (for a marginally lower price) in France but sold at higher prices (in similar container size) in the United States.

There are several limitations in this research that warrant further investigations. First, Study 1 showed that epicurean labeling increases quality expectations, a double-edged sword. On the one hand, it may improve the actual experience via expectancy effects (Plassmann & Wagner, 2014) when food quality is at the level expected, as it was in Study 1. On the other hand, raising expectations may be an issue if the food quality is far below expectations, in which case epicurean labeling may even backfire. Thus, future research should examine the effects of epicurean labeling across foods with different quality levels. More generally, more work is needed to compare the effects of nutrition and epicurean labeling, and particularly to contrast consumer preferences for each type of claim with the choices of food manufacturers (Chandon & Cadario, 2022).

Further, our research did not manipulate food healthiness. Studies have shown that sensory focus promotes portion control for indulgent foods (such as chocolate brownies) but a recent study conducted among children also showed that sensory imagery leaves portion choices of fruits unaffected (Lange et al., 2020). Accordingly, it is possible that epicurean labeling presents the double advantage of decreasing the consumption of unhealthy foods but not of healthy foods.

### 7.2. Implications for practice and policy

Policymakers have largely favored nutrition-based interventions such as calorie labeling to fight the obesity epidemic. Seemingly supporting this policy, our field experiment showed that providing calorie and fat information in a menu reduced calorie intake. However, recent meta-analyses suggest that the overall effectiveness of nutrition labeling in restaurants or grocery stores is rather modest and mitigated by a host of contextual factors (Cadario & Chandon, 2020; Ikonen et al., 2020; Long, Tobias, Cradock, Batchelder, & Gortmaker, 2015). More critically, calorie labeling regulations have been met with relentless resistance from the food industry for fear that they would impair the customer experience, and ultimately their bottom lines.

Our results suggest that one of the solutions can be found by better understanding the antecedents and consequences of the pleasure of eating. While pleasure is often portrayed as the enemy of healthy eating, we show that underscoring the aesthetic, multisensory dimensions of pleasure through epicurean labeling can promote portion control (a win

for health), encourage savoring (a win for pleasure), and increase the monetary valuation of smaller portions (a win for business). Importantly, this intervention does not require governmental regulations because it aligns commercial and public health goals (Ludwig & Nestle, 2008).

Our results have implications for food marketing. In particular, our finding that the effects of epicurean labeling are stronger when people are hungry (independently of culture) suggests that it should be primarily targeted at the point of consumption in restaurant, rather than at the point of purchase or for advance ordering (VanEpps, Downs, & Loewenstein, 2016). To evaluate the desirability and perceived feasibility of such an intervention, we administered a short survey to 39 European food marketers with an average of 16 years of experience in the industry. They were asked to rate different business strategies on their desirability (from −2 "not important" to +2 "very important") and feasibility (from −2 "very easy" to +2 "very difficult"). A strategy described as "making consumers pay more for smaller portions" was rated above the midpoint on both desirability and difficulty (respectively, $M = 0.29$ and $M = 0.71$, $N = 30$ responses to this question), suggesting that these managers recognized its importance but would welcome help in implementing it.

Future research is also necessary to examine the socioeconomic boundaries of our findings. There is a concern that epicurean eating reflects a privilege (Bourdieu, 1984), only accessible to people from a higher socioeconomic status who can afford fine food and who have learned to appreciate epicurean eating pleasures through their upbringing and socialization. In line with this argument, research has found that people expect healthier foods to be more expensive, even though these expectations are not necessarily true (Haws, Reczek, & Sample, 2016). If people, especially those with a lower socioeconomic status, also expect epicurean food to be more expensive, this could create a self-fulfilling prophecy dissuading everyone but the rich to sample, and thus appreciate fine foods. On the other hand, past research suggests that preferences for epicurean eating are unrelated to income (Cornil & Chandon, 2016b). Future research should investigate whether epicurean labeling can be a viable solution to promote epicurean eating pleasures to all.

### 7.3. Implications for cross-cultural research and policy

Our results are consistent with cross-cultural studies on eating behavior suggesting that pleasure is a more important criterion of eating decisions for the French than for Americans. That said, we also found that overall (across both samples of American and French participants), epicurean labeling was effective among hungrier participants. This is encouraging, at least in a restaurant context, where consumers are likely to consult the menu while being hungry. It also suggests that stronger sensory interventions could still be effective in the United States, as shown in past research in a university cafeteria (Policastro et al., 2019).

Future research should further investigate the cross-cultural implications of our results. We focused on France and the United States because they are at the opposite ends of a hedonic-utilitarian food attitude spectrum. It would be interesting to study the effectiveness of epicurean labeling in other hedonic food cultures, such as in Southern Europe or East Asia (Rozin, 2005), but also in countries that are in the middle of the hedonic-utilitarian spectrum, such as Great Britain (Fischler & Masson, 2008). More generally, research is needed to investigate the robustness of behavioral interventions across cultures. Although a recent meta-analysis suggests that healthy eating nudges, overall, are more effective in studies conducted in the United States than elsewhere (Cadario & Chandon, 2020), we need more studies directly comparing the effectiveness of specific nudges across countries.

Finally, our findings are consistent with the portion-size explanation of the so-called "French paradox", which is that the French have a lower incidence of heart diseases despite eating a fattier diet because they choose smaller food portions (Rozin et al., 2003). Hence, our findings challenge the pervasive attitude that pleasure is the enemy of healthy eating; an attitude that is more likely to be found in the United States, and which can contribute to eating disorders (Rozin, 2005; Rozin et al., 1999). We believe that this situation is not set in stone and that sensory food education can facilitate attitudinal change about the positive role of please. While sensory education is far less common in American than in European schools (Reverdy, 2011), including sensory education in school curricula is a question of policy-making. A shift from a "food as health" to a "food as well-being" cultural paradigm, helped by sensory education, may be necessary to fully unfold the benefits of pleasure-based interventions for healthier eating across a large spectrum of food cultures (Block et al., 2011).

## Ethical statement

The studies reported in the paper were approved by the Institut Paul Bocuse and by INSEAD.

## Funding and conflicts of interest

This work was supported by a grant from INSEAD to Pierre Chandon, by a Research Project Award from the Institut Benjamin Delessert to Pierre Chandon, and by a grant by the Social Sciences and Humanities Research Council (SSHRC) of Canada to Yann Cornil. The authors declare no conflict of interest.

## Declaration of competing interest

None of the authors have any conflict of interest to declare in relation to this work.

## Data availability

Data, code, and online questionnaire are available for all studies on the OSF site at https://osf.io/8qen6/?view_only=8501024734d9469b93e2c7d5a1286a03.

## Acknowledgements

The authors also thank Anne-Cécile Brit, Estelle Petit, and Agnès Giboreau at the Institut Paul Bocuse for their help with the data collection and Delphine Bellir for outstanding administrative assistance. The authors acknowledge the support of Mintel Information Consulting for providing access to the Mintel Global New Products Database. All the analyses and conclusions represent the author's viewpoint and do not represent any points of view or suggestions from Mintel.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2022.106262.

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