Consumer perceptions of indulgence: a case study with cookies

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Abstract

Food indulgence has been widely studied in psychology and related sciences. However, how it is perceived by consumers has rarely been examined in the field of Food Science. This paper presents a case study with 17 different types of cookies. Two different exploratory studies were performed with two groups of consumers. In the first, 90 consumers performed projective mappings, placing the samples according to the similarities or differences they found a) based on the packaging alone and b) based on tasting alone (the tasks were performed one month apart). The consumers were also asked to describe the single packages/cookies and groups of packages/cookies on the map. The maps obtained from the packaging and tasting tasks were fairly similar, indicating that in general the images, information, and package design raised expectations that were confirmed upon tasting the cookies. Qualitative analysis of the terms used to describe the maps of the two scenarios showed that chocolate (dark or milk) and type of cookie were the principal classification factors, while less or no importance was placed on energy content or uses. Consequently, in the second study 8 of the initial 17 cookies were selected as representing the 8 cookie types detected through separate hierarchical clustering analyses of the results from the package and cookie scenarios. A group of 100 consumers tasted each type of cookie, scored them on “acceptability,” “perceived healthiness,” and “familiarity,” and answered a CATA questionnaire listing eating motivations and occasions.

1. Introduction

A food product is not indulgent per se; “indulgence” is related to consumers' inner motivations and is a primary driver of consumption of so-called “indulgent food,” which has its own place in the market. According to Luomala et al. (2004), food is one of the most fundamental sources of hedonic experiences in human life. Even though there is an increased awareness of healthy eating, consumers will always allow themselves to indulge from time to time.

Merriam-Webster's dictionary (Merriam-Webster, 2016) defines indulgence as: 1. the behavior or attitude of people who allow themselves to do what they want; 2. the act of doing something that you enjoy, but that is usually thought of as wrong or unhealthy; 3. something that is done or enjoyed as a special pleasure. Whereas the first meaning does not directly imply any negative connotation, the second one introduces the concept of “despite,” in other words “sacrificing this to obtain that.” Looking at the synonyms for indulgence proposed by the same dictionary (“benevolence, boon, courtesy, grace, favor, kindness, mercy, service, turn”), there seem to be no negative consequences of indulgence, but looking at the antonyms proposed (“basic, essential, fundamental, must, necessity, requirement”), their opposite again presents the item obtained as *unnecessary*. Transferring these concepts to the context of food, indulgence is inescapably associated with unhealthy and caloric, but tasty. Cheng, Huang, Chuang, and Ju (2015) stated that food indulgence is subtle and difficult to observe. While there is no single definition of “indulgent food,” consumers recognize it when they see, smell and taste it (Cargill, 2017), and consider it highly pleasurable. Some concepts that have been related to foods for indulgent consumption are: a way to satisfy cravings, pursue hedonism, splurge on special occasions, enjoy premium products, experiment with food culture, and use food as a status symbol (Palmer, 2008). In turn, indulgence in food products is related to time-pressured, stressed, and tired consumers seeking pleasure, relaxation or self-reward. According to Pool, Brosch, Delplanque, and Sander (2014) stress can increase reward pursuits, traditionally seen as an attempt to relieve negative affect through the hedonic properties of a reward. However, reward pursuit is not always proportional to the pleasure experienced, because reward processing involves distinct components,

including the motivation to obtain a reward (i.e. wanting) and the hedonic pleasure experienced during consumption of the reward (i.e. liking).

In this context, ascertaining the occasions and motivations that consumers identify for food products associated with indulgence could greatly enhance our knowledge concerning this area of food product development.

It is not surprising that a large body of research dealing with indulgence comes from psychology, marketing and related fields. Studies on indulgent consumption have investigated the effect of a number of factors, including the perception of deservingness (Cavannaugh, 2014), the pressure of public scrutiny (Cheng, et al., 2015), the influence of impulsive personality traits (Ramanathan & Williams, 2007), positive or negative mood (Gardner, Wansink, Kim & Park, 2014), and impulsive buying (Miao, & Mattila, 2013), among others.

However, research on food products designed “for a treat” and how consumers perceive them is scarce in Food Science and Technology literature. This may be due to recent and current trends toward the development of healthy options. Nonetheless, indulgence food products occupy a place in the market and their sensory space is worth studying.

Within the framework of qualitative research, projective mapping has become increasingly popular for investigating and trying to understand consumer attitudes (Vidal, Ares, & Giménez, 2013) as it allows (dis)similarities within a set of products to be collected with a holistic sample approach (Dehlholm, 2014). As a case study, the present authors considered it would be interesting to apply this technique to a broad, but deliberate selection of cookies as an example of indulgence products belonging to the same food category. Despite the fact that all the products were considered to be cookies, they constituted a very inhomogeneous sample set due to the variety of their ingredients and compositions. In such cases, it is essential for consumers to have a holistic perception. The dimensions obtained should provide a wealth of information about the structure of the sensory space of cookies for indulgence in the consumers’ minds. In addition, exploring the consumers’ inner motivations and occasions for eating cookies might provide further insight into this food category, which could be a valuable aid to food developers.

Check all that apply (CATA) has been identified as a method that allows multiple options to be selected. Consumers are presented with a list of terms and asked to indicate which words or phrases appropriately describe their experience with the sample being evaluated. The terms might include not only sensory attributes but also emotional responses, purchase intention, potential applications, or product positioning (Meyners & Castura, 2014).

The aim of the present study was to investigate consumer perceptions of a broad set of cookies in two different scenarios: considering only the packaging and tasting the cookies under blind conditions. In addition, analyses of indulgence as a driver of motivations and occasions for cookie consumption, and its relation to acceptability, familiarity, and perceived healthiness would contribute to understanding the sensory space of this food category.

2. MATERIALS AND METHODS

2.1. Samples

The samples consisted of 17 types of cookies, all containing appealing ingredients (chocolate, almonds, cream layers, etc.), bought in several local supermarkets. All the products displayed the nutritional facts and the list of ingredients on the package in accordance with the font size and specifications of current European legislation. Three tables were drawn up to describe the samples. Table 1 lists the denomination, and information for each cookie given by the manufacturer on the front of the package, as well as the images shown (all 17 packages showed pictures of the cookies). In addition, this table gives the simplified codes (from 1 to 17) used to identify the samples throughout the present paper. Supplementary Table A gives any extra description or information about the cookie composition shown on other parts of the package. The 17 packages and 17 types of cookies were used in the two parts of Study 1, respectively (see below).

2.2. Sensory tests

Two studies were conducted.

2.2.1 Study 1. Projective mappings

Study 1 was conducted in two separate parts, one month apart, with the same 90 consumers. In the first part, the participants only assessed the 17 cookie packages. After one month, in the second part of the test, they evaluated the 17 cookies under blind conditions (without the packages). In each part of the test, the samples were coded with random 3-digit numbers and were identified using stickers. The numbers were different in the two parts of the test. The consumers were provided with a pen and a size-A0 sheet of paper and were instructed to examine the packages / taste the cookies and place them on the sheet of paper according to their similarities and differences. They were told to place the samples they considered similar near each other and the samples they perceived as different at a distance from each other. All the participants were instructed to use the entire surface of the paper. They were free to examine the samples (observe, read, and handle the packages in the first part of the test, and observe and taste the cookies in the second part) in any order and as many times as they wanted. After placing the samples on the sheet of paper, the consumers had to write down the terms that described each sample or group of samples, with no time limit for completing the task (Marcano, Ares, & Fiszman, 2015). The consumers took between 15 and 30 minutes to complete each projective mapping task. During the tests, the participants' privacy and comfort were guaranteed in the spaces set aside for the activities. In the second part of the test, bottled water was available for rinsing between samples, but this was not obligatory.

2.2.2 Study 2. Acceptability, familiarity, perception of healthiness, and occasions and motivations for eating cookies

The acceptability and familiarity of 8 selected cookies (samples 3, 4, 5, 7, 8, 10, 11, and 14, representing different types of cookies) (Table 1), and how healthy the consumers considered them to be, were evaluated by 100 consumers (a different group from that in Study 1). Acceptability and perceived healthiness were assessed using nine-point scales (from *Dislike extremely* to *Like extremely* and from *Very unhealthy* to *Very healthy*), and familiarity was assessed on a continuous line scale (from 0 = *Very unfamiliar* to 10 = *Very familiar*). To discover the occasions and motivations for consuming each type of cookie, after observing and tasting the cookie the participants were asked to answer two CATA questions: "Please tick all the motivations for you to

eat this cookie” and “Please tick all the occasions when you would eat this cookie.” The list of terms (Supplementary Tables B and C) was adapted from Jack, O’Neill, Piacentini, and Schröder (1997), who compared the suitability of a number of fruit pieces and savory snacks for different uses. The lists of motivations and eating occasions presented in the CATA questionnaire were randomized across the consumers, but not across the samples.

2.3. Consumers

The consumers who participated in the two studies were recruited from the staff and student body of the Institute of Agrochemistry and Food Technology (IATA-CSIC) and the Polytechnic University of Valencia, who consumed cookies at least twice a week. Study 1 was conducted with 90 consumers, 58 women and 32 men, with ages ranging between 23 and 67 years. Study 2 was conducted with 100 consumers, 68 women and 32 men, with ages ranging from 19 to 63 years, none of whom had participated in Study 1.

2.4. Data analysis

The abscissa (X) and ordinate (Y) values of each sample on each consumer’s sheet of paper were determined, taking the bottom left-hand corner of the sheet as the origin of the coordinates (0, 0). The data from the two sets of 90 projective mappings (packages and cookies) were analyzed separately using Multiple Factor Analysis (MFA) (Ares, Deliza, Barreiro, Giménez, & Gámbaro, 2010). For MFA, the coordinates of each consumer were considered a separate group of variables (Pagès, 2005). The words elicited from the consumers in the descriptive phase were analyzed qualitatively by two independent researchers, grouping words with similar meanings into categories. After evaluating the words individually, the two researchers met to determine the final categories by consensus. The frequency with which each category was mentioned when describing each of the samples was measured; this frequency table was then used as a group of supplementary variables in the MFA (Pagès, 2005). The sample configurations obtained in the first four dimensions of the MFA for each scenario were compared using the RV coefficient. As this coefficient depends on the relative position of the points in the configuration, it is dependent on rotation and translation (Robert &

Escoufier, 1976). Its value is 0 if the configurations are uncorrelated and 1 if the configurations are homothetic. In addition, two hierarchical cluster analyses (HCA) were carried out to identify groups of samples in both the package and cookie evaluations in Study 1. The analyses were performed on sample configurations in the first four dimensions of the MFA, taking into account Euclidean distances and Ward's aggregation criterion.

Mixed ANOVA (consumer as random factor and sample as fixed factor) were applied to the acceptability, familiarity, and perceived healthiness data. Post-hoc Tukey tests were carried out to determine significant differences between samples. For each eating motivation and occasion answer to the CATA questions, Cochran's Q test was performed to determine the significance of differences among samples (Meyners, Castura, & Carr, 2013) (Supplementary Tables B and C).

An MFA was applied to the data from the two CATA questions (cookie consumption motivations and occasions), including acceptability, familiarity, and perceived healthiness as supplementary variables. All these statistical analyses were performed with the XLStat 2016 package (Adinsoft, France).

3. Results

3.1. Study 1. Projective mapping

3.1.1. Projective mapping with the cookie packages (package scenario)

The MFA plots corresponding to the task performed with the cookie packages alone are shown in Figures 1A and 1B (dimensions 1 and 2) and Figures 1C and 1D (dimensions 3 and 4, which accounted for 64.70 % of the variance: 40.82 and 23.88 %, respectively).

The sample configuration (Figure 1A) shows that dimension 1 clearly separates the products containing chocolate (negative), including wafers filled with cocoa cream (sample 14), from the rest (positive). The two exceptions were sample 8, a thin wafer tartlet covered with white chocolate and filled with hazelnut cream, and sample 4, a jam-filled tartlet with dark chocolate topping, which were placed in the positive half of dimension 1 despite containing chocolate. On the far right of the first dimension was a group composed of samples 16 (made of puffed pastry), 7 (a pure butter shortbread cookie), and 17 (a thin butter cookie with almonds).

The positive values of dimension 2 (Figure 1A) show two groups: the group in the left-half (the “chocolate zone”) was composed of samples 1, 2, and 3, all of which were chocolate chip cookies, while the group in the right-half (the “no chocolate zone”) was composed of samples 4, 5, and 6, all of which contained some kind of fruit, whether in jam or dried form.

The remaining cookies, all of which were layered or filled with something other than fruit, were placed in the negative part of the second dimension.

Dimension 3 (Figure 1C) separated the samples with layers, fillings, and coatings (positive) from the rest (negative), which had a more homogeneous structure (even if they contained chocolate chips or almonds, these were evenly distributed throughout the cookie). Dimension 4 separated the three wafer cookie samples — 12 (hazelnut filling and covered with dark chocolate), 14 (cocoa filling), and 15 (cream-flavored filling) — and sample 16 (a traditional Spanish puffed-pastry cookie) from sample 8, an Italian cookie that was possibly not well-known to Spanish consumers.

The description task performed after the projective mapping of the packages generated 90 terms (Table 2, Figures 1B and 1D), which fell into two major categories: *Non-sensory* (66 terms), which with 2127 mentions accounted for the 85.1% of the total mentions, and *Sensory* (24 terms), which were mentioned 373 times, corresponding to 14.9% of the total mentions.

The *Non-sensory* terms were grouped into five subcategories: 1) related to an ingredient, 2) related to cookie type, 3) related to the consumption motivation or occasion, 4) related to the package characteristics, and 5) some hard-to-classify *Other* terms. *Ingredients* generated 14 terms with 1073 mentions, indicating the importance that the consumers placed on some cookie ingredients. The number of mentions of most of the terms differed significantly between samples. Some terms were mentioned many times for certain samples, implying a high contribution to the description of the cookie or group of cookies on the map. Chocolate was an especially important ingredient, since five terms (*Chocolate*, *Dark chocolate*, *White chocolate*, *Chocolate chips*, and *Double chocolate*) were mentioned numerous times for all samples containing chocolate, and *Without chocolate* was likewise mentioned, although less frequently, for cookies that did not contain this ingredient. The term *Fruit/Jam* was also mentioned frequently for the samples containing fruit (4, 5, and 6).

The *Type of cookie* subcategory contained 9 terms (566 mentions), all with a significantly different number of mentions between samples and a high number of mentions for the samples corresponding to each type. Along with chocolate-related terms, *Type of cookie* terms contributed considerably to describing the placement of the cookie or group of cookies on the map. The *Package characteristics* subcategory generated 17 terms, but only 118 mentions, and only *Plastic*, *Paper*, and *Attractive* had significantly different frequencies of mention between samples. None of the *Package* terms was mentioned frequently (i.e. at least 9 times or 10% of consumers for the same sample), indicating that the terms within this subcategory were of little importance in the minds of consumers and contributed little to describing the cookies' positioning on the map. The subcategory *Uses and Occasions* showed the same trend as *Package*: only *For special occasions* was mentioned more than 9 times, for sample 16, a traditional Christmas cookie, by 13% of the consumers.

Finally, the subcategory *Other* brought together terms related to the brand (known, unknown, store brand, high quality), price (expensive, cheap), type of manufacture (artisan, industrial), etc. None of these terms were mentioned a high number of times for any sample, although in many cases the number of mentions differed significantly between samples. It is worth noting that although the energy content of the cookies was high (from 392 to 560 kcal/100 g), the term *High calorie* was not mentioned often (a maximum of 4 for the same cookie). Likewise, a low number of mentions was observed for the terms *Healthier* and *Unhealthy*, with no more than 2 mentions for the same cookie, meaning that these concepts were of no special concern or that little attention was paid to them when describing the samples from the packaging alone.

The *Sensory* category was divided into three subcategories: 1) *Appearance*, 2) *Flavor/texture*, and 3) *Hedonics*. Since the task was performed solely with the cookie packages, it is not surprising that the subcategory *Appearance* generated the greatest number of sensory terms (most likely based on the cookie images, Table 1) and of mentions (Table 2). *Flavor/texture* and *Hedonics* generated 9 and 5 terms, respectively, but *Hedonics* terms were mentioned a greater number of times (145), indicating that the images and descriptions, present on all package samples (Table 1), elicited hedonic expectations. In general, none of the sensory-related terms were mentioned by more than 10% of the consumers for the same cookie (data not shown), which meant that

sensory characteristics did not contribute to the position of any of the samples on the map in the package scenario.

3.1.2. Projective mapping performed while tasting the cookies (cookie scenario)

The MFA plots for the assessment performed while tasting the cookies are shown in Figures 2A and 2B (dimensions 1 and 2) and Figures 2C and 2D (dimensions 3 and 4), which accounted for 63.04 % of the variance (41.82 and 21.22 %, respectively). These values are similar to those for the task performed with the packages alone.

The configuration of the samples on the plots shows that dimension 1 (Figure 2A) again clearly separated the products containing chocolate (negative) from the rest (positive). The three chocolate chip cookies (samples 1, 2, and 3) were placed on the very left of the map, forming a tight group, and the simplest cookies with no chocolate, no layers and no fillings (samples 7, 16, and 17) were placed on the far right of the map.

The positive values of dimension 2 (Figure 2A) separated all the wafer cookies (samples 12, 14, 15, and 8), those with chocolate tablets (samples 9 and 11), and the chocolate sandwich (sample 13) from the chocolate chip cookies (samples 1, 2, and 3) and those containing fruit (samples 4, 5, and 6), following a similar pattern to the map obtained in the package scenario.

Dimensions 3 and 4 (Figures 2C) clearly separated the groups by cookie type: the three layered wafers, regardless of whether or not they were coated in chocolate; the three containing fruit, the two with white chocolate, the two with dark chocolate (tablet and filling), the three chocolate chip cookies, and the three without chocolate.

The description task that followed the projective mapping performed while tasting the cookies generated 80 terms (Table 3, Figures 2B and 2D), which were grouped into the same two categories as in the package scenario: *Non-sensory* and *Sensory*. The former (37 terms, 1770 mentions), corresponded to 65.9% of the total mentions, a lower percentage than for the package task. The *Sensory* category (41 terms, 914 mentions) accounted for 34.0% of the mentions.

The *Non-sensory* and *Sensory* terms were grouped into the same subcategories as those created for the terms identified from the descriptions given in the package task,

except for the non-sensory subcategory "*Package*," which obviously disappeared in this part of study 1.

Within the *Non-sensory* category, the terms included in the *Ingredients* and *Type of cookie* subcategories were the same as in the package task, and the figures (in terms of both number of mentions and total mentions) were also very similar.

The *Uses* subcategory showed the same trend as in the package task. Finally, the *Other* subcategory contained half the number of terms elicited in the package task. None of the terms included in *Other* were mentioned often for any one sample, although the number of mentions for many of them differed significantly between samples.

Within the *Sensory* category, *Flavor/texture* accounted for more than double the mentions of the other two sensory subcategories. It was also the sub-category that elicited the most terms overall. The participants made 501 mentions of 10 taste-related and 17 texture-related terms, whereas in the Package task, fewer terms (9) were elicited overall and they were only mentioned 72 times (Table 2), which makes sense for a task in which the cookies were not tasted. Interestingly, the term *Vanilla*, which received 27 mentions in the package scenario (data not shown), all for sample 10 (where images of a vanilla flower and bean were shown on the front of the package), was not mentioned when consumers tasted the cookie without looking at the package. Regarding *Appearance* and *Hedonics*, the number of terms generated in the cookie description task was similar to those in the package task, but the number of mentions was much higher.

3.2. Comparison between the package and cookie scenarios

To compare how consumers differentiated between the samples in the two scenarios, the configurations of the samples in the first four dimensions of the MFAs were studied.

In the first analysis, RV gave a high value (0.91) between the two data matrices, indicating a high degree of agreement among the two configurations.

Secondly, two separate HCAs were performed (truncation criteria: 8 classes) to compare how the samples were grouped when seeing only the packages and when only tasting the cookies without seeing the package. These groups are given in Table 4.

At first sight, the clusters formed did not seem very different, confirming the general

358 result of the projective mappings, where the criteria for classifying the samples
359 seemed to be fairly similar in the two scenarios. Indeed, a closer comparison of the
360 clusters indicated that three of them were actually identical. The first set of identical
361 clusters contained samples 1, 2, and 3. These samples were all chocolate chip cookies,
362 which were all grouped into one cluster even though one of them had a soft texture
363 (sample 1). The second set of identical clusters was made up of samples 8 and 9, both
364 with a visible amount of white chocolate. In these cases, although the appearance,
365 texture, and kind of cookie were very different, it seems that the presence of white
366 chocolate was enough for consumers to group them together, separate from other
367 cookies with dark chocolate. Finally, the third set of identical clusters comprised
368 samples 11 and 13. Both had a generous amount of dark chocolate, albeit not in the
369 form of chips: sample 11 had a chocolate tablet over a plain cookie and sample 13 was
370 a chocolate cookie sandwich. Here, too, both samples had different appearances and
371 textures, but a large, dark chocolate layer seemed to be the main classifying factor.

372 The cluster composed of samples 4, 5, and 6 in the *package* scenario split into two
373 clusters in the *cookie* scenario. All three of these samples contained some kind of fruit,
374 but sample 4 was the only one with a layer of chocolate on top, so when the
375 consumers tasted it, they perceived it as different from the other cookies containing
376 fruit. Another similar case was that of samples 12, 14, and 15, which were all
377 (different) cream wafer sandwiches. They formed a single cluster in the *cookie*
378 scenario, but two different clusters in the *package* scenario, where samples 12 and 14,
379 both containing brownish creams (cocoa and hazelnut) remained together, but sample
380 15, filled with a whitish cream (dairy-cream flavored) was placed apart. It seems that
381 when the consumers tasted the sample they found the texture (wafer) of these
382 cookies similar, and the flavor of the filling was of secondary importance.

383 The remaining samples were those that contained no chocolate: 7, 10, 16, and 17.
384 These samples were grouped into two clusters, with sample 16 set apart in the
385 *package* scenario, and sample 10 set apart in the *cookie* scenario. As already
386 mentioned, sample 16 was frequently mentioned as “For special occasions” since it is a
387 typical Christmas cookie, so the package probably influenced the consumers in this
388 sense. Sample 10 had a vanilla filling and contained almonds, so when tasted, it was

probably perceived as different from the rest of cookies in this group, which were plainer in both texture and flavor.

3.3. Study 2. Cookie consumption: acceptability, familiarity, healthiness perception, and eating motivations and occasions

Based on the clustering results, 8 different types of cookies were selected as representative of each cluster formed in the *Cookie* scenario (Table 4). The acceptability, familiarity, and perception of healthiness were assessed by 100 consumers. The mean acceptability values ranged from 5.1 to 7.5, with only four samples presenting mean values above 6 (slightly liked) (Table 5). This could be because participants that were not consumers of a specific type of cookie or did not like a specific characteristic or ingredient (vanilla, butter, or fruit) probably gave that cookie lower scores, decreasing its mean acceptability score.

The cookies that received the highest acceptability scores all contained chocolate (or cocoa cream), regardless of being very different cookie types. The pure butter shortbread cookie and the two cookies containing different forms of fruit obtained lower acceptability values, even though one of them (sample 4) had a chocolate topping, indicating that this type of combination is not well-accepted by consumers. The least-liked cookie was a sandwich with vanilla-flavored filling (sample 10).

The mean perceived healthiness values were low, ranging from 2.9 to 5.4. There were few significant differences among samples, the two exceptions being sample 5, considered the healthiest (no chocolate, filled with dried fruit), and the least healthy, sample 8 (a very thin wafer filled with hazelnut cream and covered in white chocolate).

The mean familiarity values covered a very wide range, from 2.9 to 8.5. No identifiable trend related to acceptability or healthiness was found, except that the two cookies that were less familiar to consumers scored low for acceptability. It is well-known that familiarity is one of the most important drivers of preference for food products, mostly because it reduces product uncertainty and leads to a more likely match between expectations and product characteristics (Deliza, & MacFie, 1996).

To gain insight into the eating motivations and occasions that consumers associate with each type of cookie and their relation to acceptability, familiarity and perceived healthiness, an MFA was applied to the CATA question results. Relevant variations

within the products were detected. The first and second dimensions of the MFA plot (Figure 3A, Supplementary Tables B and C) explained 51.64% and 23.80% of the variability, respectively. A high number of motivations ("As a treat," "As a compensation," "As a reward," "To relax," "When I feel depressed") were explained by the first dimension. These motivations were highly correlated both with acceptability and with the occasions "When I am alone," "Leisure," "At home," and "At night." In Figure 3B, which gives the sample distribution, it can be seen that the best-liked cookies (samples 3, 8 and 11, on the right side of the first dimension) were more frequently associated with these motivations than the rest of the samples (which appear to the left on the plot).

In the positive half of the first dimension, but also explained by the second dimension, two separate groups of motivations appeared. The group with positive values in the second dimension contained more practical and utilitarian motivations ("When I want an easy-to-get sweet food," "When I want something filling," "When I want something for energy," and "As a nibble"), and was associated with more common and everyday eating occasions ("At breakfast," "At work," "For mid-morning," "For mid-afternoon," and "With tea or coffee"). They were also correlated with both acceptability and familiarity. These more utilitarian motivations were important for samples 3 and 11 (cookies with chocolate chips and with a chocolate tablet), which were well-liked and highly familiar to consumers. Towards the negative values of the second dimension, a third group of motivations had to do with low affordability ("When I want something exclusive," "To afford a luxury," "When I want something prestigious") and social occasions ("To celebrate," "To share"), and were associated with "As a dessert" and "At night" as eating occasions. These motivations were specifically relevant for sample 8, a very thin wafer cookie filled with hazelnut cream and covered in white chocolate that was one of the best-liked cookies, considered one of the unhealthiest, and showed low familiarity. It was probably perceived as a very luxurious, sophisticated cookie, since it elicited the highest frequency of mentions for exclusiveness-, luxury-, and prestige-related motivations (Supplementary Table B).

The left side of the first dimension contained few motivations (Figure 3A). With positive values in dimension 2 and highly correlated to healthiness, the motivations "After doing exercise," "When I want something cheap," and "When I want something

heathy” appeared. These motivations were especially important for sample 5 (the fruit-filled cookie without chocolate) (Figure 3B), which was considered the healthiest (Table 5). Sample 5, together with samples 7 and 14 (the all-butter shortbread and the wafer filled with cocoa cream, both with significantly lower scores for perception of healthiness than sample 5), in general showed the lowest frequency of exclusivity and social motivation.

Finally, samples 4 (containing a fruit jam and topped with a chocolate layer) and 10 (vanilla cream sandwich) had low mean acceptability scores. In addition, the latter obtained a very low mean score for familiarity (Table 5). Neither seemed to be associated with any specific motivation or occasion compared to the other samples.

4. Discussion

Two studies were performed with cookies that contained especially “appealing” ingredients such as chocolate, almonds, butter, cream layers, etc. (Table 1). In Study 1, projective mapping was performed with 17 different cookies in two different scenarios: 1) looking solely at the cookie packages and 2) tasting the cookies. In Study 2, acceptability, familiarity, and perception of healthiness were assessed for cookies representing the 8 principal cookie types sorted out by the consumers in Study 1.

4.1. Comparison of the projective mapping findings in the two scenarios

The sample configuration plots for the cookie package task and the cookie tasting task were similar.

Both sets of maps (Figures 1 A-D and 2 A-D) showed that, in general, the first dimension separated cookies containing chocolate (or cocoa) from the rest. The participants considered that all these samples possess similarities regardless of the kind of chocolate/cocoa element (cream, tablet, chips) or the type of cookie dough (wafer, normal cookie). For example, the two wafers filled with cocoa cream (samples 12 and 14, one of them covered with dark chocolate) were considered very similar and placed close together (Figure 1A) while the wafer filled with dairy cream-flavored cream was placed on the right side of the map, demonstrating that chocolate/cocoa was a more important classification factor than cookie type in the mind of the consumers.

485 It is worth noting that white chocolate was not considered particularly similar to dark
486 or milk chocolate. In fact, in both the package and cookie scenarios, sample 9 (a cookie
487 with a white chocolate tablet) was placed close to another cookie with white chocolate
488 instead of close to sample 11, which was identical except for having a dark (instead of
489 a white) chocolate tablet.

490 Interestingly, several samples were placed in different halves of the maps (in the first
491 dimension) depending on the scenario. Sample 4, which contained both a fruit filling
492 and a chocolate topping, was placed in the “no chocolate half” of the package scenario
493 map but in the “chocolate half” of the cookie scenario map. The chocolate top layer
494 was probably the decisive factor in its placement when tasted. Similarly, sample 8, a
495 wafer tartlet filled with hazelnut cream and covered with white chocolate, moved into
496 the “chocolate zone” when the chocolate (although white) was perceived. In contrast,
497 the opposite occurred with sample 14, a wafer filled with cocoa cream (but with no
498 chocolate), which moved into the “no chocolate zone” when tasted. Taken together,
499 examples indicate that chocolate renders the samples similar to the consumers, who
500 place them in the same class.

501 The second factor that consumers considered important for grouping samples cookie
502 type. For example, the two samples containing fruit (but no chocolate) were
503 considered similar in the two scenarios regardless of the type or form of fruit (dried or
504 jam) or cookie dough, while the three simplest cookies (no fillings, no layers) formed
505 another group regardless of other characteristics such as dough type or texture.

506 Analysis of the terms used to describe the samples in the two scenarios indicated that
507 their elicitation followed a similar pattern. The kind and frequency of mention of the
508 sensory and non-sensory terms were similar except for a (logical) increase in the
509 number of mentions for sensory terms in the cookie scenario. This result indicated that
510 the images and description given on the packages allowed the consumers to obtain a
511 clear, precise idea of the products. The number of mentions confirmed that the
512 subcategories *Ingredients* (especially chocolate) and *Type of cookie* made an important
513 contribution to the mapping of the cookies in both scenarios.

514 In the cookie scenario, two kinds of terms that were present in the package scenario
515 disappeared: those related to the brand, even where the brand could be read on the

cookie itself, and those related to perceptions of the price (cheap or expensive), as these features are transmitted more efficiently by the package than by the cookie. No mention of *Unhealthy* or *High calorie* was made in either the package or the cookie scenario.

4.2 Study 2. Cookie consumption: acceptability, familiarity, perception of healthiness, and eating motivations and occasions

An interesting finding in Study 1 was that consumers did not spontaneously relate any cookie to specific eating motivations. According to Kivetz & Simonson (2002), in their daily lives consumers distinguish between necessities, such as ordinary food and health, and items that are nonessential and often pleasurable, representing indulgence. This implies that food for indulgence may not be part of the normal, everyday diet and that consequently, its consumption requires special motivations. Many people eat in order to distract themselves from, compensate for, or cope with negative affects such as stress, anxiety, frustration, fear, daily difficulties, sadness, boredom, depression, and fatigue. The foods eaten under these circumstances are sometimes referred to as comfort foods, and most of them are sweet, carbohydrate- and fat-rich foods because such foods can provide immediate satisfaction (Gardner, Wansink, Kim, & Park, 2014).

In Study 2, to gain insight into consumer perceptions of different kinds of cookies, the participants were asked to choose a series of motivations and occasions for consuming each of the 8 cookies presented. The first dimension (Figure 3A) exhibited a concentration of motivations that were highly correlated with each other and are normally related to indulgence (“As a treat,” “As a compensation,” “As a reward,” “To relax,” “When I feel depressed”), suggesting that they are part of the same concept. Cavanaugh (2014) defined indulgence, in the context of consumer choice, as allowing oneself to select and enjoy the pleasure from an option that is considered a treat (that is, a source of special delight or pleasure) compared with the alternative option(s). According to this author, consumers may indulge to enhance the self, to compensate for something, or to ameliorate negative feelings, among other motivations.

The three most-liked (pleasurable) cookies (samples 3, 11, and 8) were placed in the first dimension. As stated by Mehmeti and Xhoxhi (2014), the attributes for indulgence

match those of pleasant foods and greater taste. These three samples all contained chocolate, which is the most frequently craved food/ingredient (Rogers, & Smit, 2000). Craving for chocolate is not hunger dependent (Gibson & Desmond, 1999), nor is it easily satisfied by other foods. Consequently, it was not surprising that chocolate was a much looked-at ingredient when classifying the cookies. According to Marshall (2007), for most people, eating chocolate (including the anticipation of eating it) is highly pleasurable.

The second dimension separated two groups of motivations and occasions. The positive part of this dimension included more utilitarian motivations such as “When I want an easy-to-get sweet food,” “When I want something filling,” “When I want something for energy,” and “As a nibble,” and everyday eating occasions such as “At breakfast,” “At work,” “For mid-morning,” “For mid-afternoon,” and “With tea or coffee,” and were related to familiarity as well as acceptability. Several studies have found that more familiar products were liked more (Kim, Jombart, Valentin, & Kim, 2015). In indulgence-related literature, the terms “indulgence” and “utilitarian” are commonly regarded as opposites. However, Saldanha (2009) stated that for “mixed indulgences” (in which utilitarian attributes were added to hedonic ones), the products were perceived to be just as pleasant, but less sinful than pure indulgences.

The negative part of the second dimension included motivations related to exclusivity and prestige. According to Kivetz and Simonson (2002), indulgence in some products is closely related to both luxury and hedonics, often involving spending on items perceived as luxuries relative to one’s means.

The left part of the map (Figure 3A) showed a few motivations and no eating occasions: “After doing exercise,” “When I want something cheap,” and “When I want something healthy,” all placed in the positive half of the second dimension and related to healthiness. None of the three cookies placed in this area of the map (samples 5, 7, and 14) contain chocolate. The energy content of chocolate is commonly known to consumers because of its fat and sugar levels, but the participants were probably not fully aware of the fat or sugar content of these non-chocolate cookies.

In summary, development of cookies for indulgence should look at ingredients such as chocolate, which is extremely well-liked and is a driver for satisfying indulgence-related motivations. Consumers generally find motivations for indulgence in familiar

products, but in the case of new or unfamiliar products, the elements that appeal because of their exclusivity and luxury are also likely to satisfy consumers' inner motivations for indulgence.

Conclusions

The present exploratory studies of consumer perceptions of cookies with appealing ingredients point to conclusions that merit further research. Study 1 showed that the presence of visible (dark or milk) chocolate was the primary driver of cookie classification, followed by type of cookie, in both the package-examination and cookie-tasting scenarios. The qualitative analysis of the terms elicited from the consumers confirmed this (along with which samples were not very well-liked).

Study 2 confirmed that consumer perceptions of cookies containing visible dark or milk chocolate (the most liked) were related to one major dimension representing indulgence motivations and occasions. On the whole, consumers will choose well-liked cookies to indulge themselves. This applies both to familiar cookies and to exclusive cookies for special eating occasions. In this study, cookies with no chocolate were regarded as healthier, and cookies that were unfamiliar or not very well-liked seemed to elicit the lowest frequency of eating motivations and occasions.

These results should encourage studies of other food categories to gain greater insight into consumer perception of indulgence in relation to food products.

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Figure captions

Figure 1. Multiple factor analysis of the projective mapping data from the cookie packages task; (A) and (C): sample maps; (B) and (D): terms elicited from consumers (n=90); (A) and (B): plots corresponding to dimensions 1 and 2; (C) and (D): plots corresponding to dimensions 3 and 4

Figure 2. Multiple factor analysis of the projective mapping data from the cookie tasting task; (A) and (C): sample maps; (B) and (D): terms elicited from consumers (n=90); (A) and (B): plots corresponding to dimensions 1 and 2; (C) and (D): plots corresponding to dimensions 3 and 4

Figure 3. Multiple factor analysis of the motivations and occasions ticked by consumers (n=100) in the CATA questionnaire for the 8 cookie samples selected from the clustering task. Acceptability, perceived healthiness, and familiarity scores were used as supplementary variables. (A) Map of terms; motivations are in red and occasions in blue letters. (B) Map of samples.

731 Table 1. Information and characteristics of the images on the cookie packages.
732

Code	Name	Image	Ingredients/ composition
1	Soft Baked, Dark Chocolate Chunk Cookies	Broken half cookie (enlarged)	
2	Luxury Cookies	Two cookies (enlarged)	Double chocolate “aux généreuse pépites au chocolat” (in French)
3*	Cookies with chocolate chips	One and a half cookies (real size)	37% chocolate
4*	PIM’S L’Original Orange	One cookie (enlarged)	Since 1846
5*	Fruit & form	Half a cookie and fresh berries (serving suggestion)	Fruit filling 36% Crunchy bars
6	Raspberry tartlets	One and a half cookies (smaller than real size) and two fresh raspberries (serving suggestion)	
7*	Pure butter shortbread	Three cookies (smaller than real size)	Product of Scotland, established 1898
8*	Tortina White	One and a half cookies (real size), a piece of white chocolate and hazelnuts	
9	Cookies with a white chocolate tablet	Three cookies (real size) (serving suggestion)	With authentic Swiss chocolate Nutritional facts
10*	Air Reve de Vanille	Three “floating” cookies (real size), vanilla flower and vanilla bean	Since 1928
11*	Cookie with dark chocolate tablet	Two and a half cookies (smaller than real size)	Crunchy
12	Chocolate coated wafers with hazelnut filling	Two and a half cookies (real size)	Crunchy
13	No description	One broken cookie (smaller than real size) with small pieces exploding	
14*	Cocoa filled wafers	Two cookies (smaller than real size)	
15	Filled Wafers. Cream flavor	Two cookies (smaller than real size)	
16	Puff pastry cookies	Nine cookies (smaller than real size)	
17	Butter cookies with almonds	Three “floating” cookies (real size) and some peeled almonds	Swiss excellence since 1910

733 * Samples selected for Study 2 through hierarchical clustering analysis

Table 2. Examples and number of mentions of the terms generated by the consumers (n = 90) in the description task following the Projective Mapping performed with the packages. The numbers in parentheses are expressed as percentages.

Qualitative categories, subcategories, and examples of terms	Number of terms	Number of mentions
NON-SENSORY TERMS	66 (73.3%)	2127 (85.1%)
Package characteristics <i>Different; Made of plastic; * paperboard, or paper; * Attractive; * Bag; With little information; Big; Weak; Conventional; Color contrast; Dark colors; Intense colors; I like the package; I don't like the package</i>	17 (18.9%)	118 (4.7%)
Ingredients <i>Chocolate; * Chocolate chips; * White chocolate; * Dark chocolate; * Without chocolate; * Fruit/ jam; * Butter; * Nuts; * Vanilla; * Cream; * Sugar on the surface; * etc.</i>	14 (15.6%)	1073 (42.9%)
Type of cookie <i>Wafer; * Chocolate chip cookie; * Tea cookie; * Filled; * Chocolate covered; With a chocolate tablet; * Soft; * Sandwich; * Tartlet*</i>	9 (10.0%)	566 (22.6%)
Uses <i>For breakfast; * As an afternoon snack; * For eating with tea or coffee; * For special occasions; * For children; etc.</i>	7 (7.8%)	82 (3.3%)
Others <i>Traditional; * Different; * Imported; * Luxury; Healthier; Unhealthy; High calorie; * Satiating; * Store brand; * high-quality, known, unknown brand; Cheap; * Expensive; I would buy it; I wouldn't buy it, etc.</i>	20 (22.0%)	288 (11.5%)
SENSORY TERMS	24 (26.7%)	373 (14.9%)
Appearance <i>Rectangular; * Round; * Dark color; * Big; * Without filling; * Light; Small; Thick; Decorated; Without coating</i>	10 (13.3%)	156 (6.2%)
Flavor/texture <i>Light; * Different flavor; * Sweet; Crunchy; Dry; Hard; Spongy; Dense; Different texture</i>	9 (10.0%)	72 (3.0%)
Hedonics <i>I like it; * I don't like it; * Tempting; Attractive; Good flavor</i>	5 (5.6%)	145 (5.8%)
TOTAL	90 (100%)	2500 (100%)

* Terms with significantly different frequencies of mention between samples

Table 3. Categories and subcategories of the terms generated by the consumers (n = 90) in the description task following the projective mapping performed while tasting the cookies. List of terms (non-exhaustive), number of terms, and mentions. The numbers in parentheses are expressed as percentages.

Qualitative category and terms	Number of terms	Number of mentions
NON-SENSORY TERMS	37 (47.5%)	1770 (65.9%)
Ingredients <i>Chocolate; * White, * dark* chocolate; Cream; Butter; * Chocolate chips; * Fruit/ jam; * Nuts; * Vanilla; * etc.</i>	15 (18.8%)	952 (35.4%)
Type of cookie <i>Wafer; * Chocolate chip cookie; * Tea cookie; * Coated; * Filled; * With chocolate tablet; * Soft; * Sandwich; * Tartlet. *</i>	9 (11.2%)	607 (22.6%)
Uses <i>For breakfast; As an afternoon snack; For eating with coffee or tea; For special occasions.</i>	4 (5.0%)	50 (1.9%)
Others <i>Different; I would buy it; I wouldn't buy it; * Traditional; * Imported; Luxury; Healthy; Satiating; not very satiating; Industrially processed.</i>	10 (12.5%)	162 (6.0%)
SENSORY TERMS	41 (52.5%)	914 (34.0%)
Flavor/texture <i>Crunchy; * Sandy; * Dense; * Spongy; * Light; * Brittle; * Cinnamon*, Mint*, Butter, or Honey taste; Dry; Moist; Tender; Fatty; Difficult to chew; Easy to chew; Sweet; Intense flavor; Bitter; etc.</i>	27 (33.8%)	501 (18.7%)
Appearance <i>Big; * Thin; * Without filling; * Rectangular; * Round; * Without coating; Light color; Dark color; Small; Thick.</i>	10 (12.5%)	209 (7.8%)
Hedonics <i>I like it, I don't like it; * Attractive; Not attractive; Good flavor.</i>	5 (6.2%)	205 (7.6%)
TOTAL	80 (100%)	2686 (100%)

* Terms with significantly different frequencies of mention between samples

Table 4. Sample clusters in the *Package* scenario (the samples were packaged, the cookies were not tasted) and *Cookie* scenario (after tasting the cookie samples without seeing the packaging)

Clustered samples	
<i>Package</i> scenario	<i>Cookie</i> scenario *
1, 2, 3	1, 2, 3
4, 5, 6	4
7, 10, 17	5 , 6
8, 9	7 , 16, 17
11, 13	8, 9
12, 14	10
15	11 , 13
16	12, 14 , 15

* Numbers in bold are the cookies selected for the assessment of acceptability, familiarity, and healthiness expectations (see section 3.2)

Table 5. Mean acceptability, perceived healthiness, and familiarity scores of the 8 cookies selected as representative of each type of cookie, as determined by consumers (n=100).

Sample	Acceptability* (9-point scale)	Healthiness* (9-point scale)	Familiarity* (10-cm scale)
11	7.5 (1.5) a	4.3 (1.9) b	8.3 (1.7) a
8	7.4 (1.8) a	2.9 (1.9) c	3.8 (2.9) cd
3	7.3 (1.6) a	3.6 (1.8) bc	8.5 (1.8) a
14	6.5 (1.6) ab	4.4 (1.8) b	8.2 (1.7) a
7	5.9 (2.1) bc	4.0 (1.8) b	4.1 (3.0) c
4	5.6 (2.1) bc	4.0 (1.9) b	5.5 (3.2) b
5	5.6 (2.5) bc	5.4 (1.9) a	2.8 (2.4) d
10	5.1 (2.1) c	3.8 (1.9) b	2.9 (2.3) d
F-ratio	15.6	15.6	72.3
p	< 0.0001	< 0.0001	< 0.0001

*Different letters in the same column denote significant differences according to the Tukey test (p<0.05).

Figures in parenthesis are the standard deviations

(A)

(B)

(C)

(D)

(A)

(B)

(C)

(D)

(A)

(B)