Article:
Chan, E and Zhang, LS orcid.org/0000-0002-7512-9605 (2022) Is this food healthy? The impact of lay beliefs and contextual cues on food healthiness perception and consumption. Current Opinion in Psychology, 46. 101348. p. 101348. ISSN 2352-250X

https://doi.org/10.1016/j.copsyc.2022.101348

Is this Food Healthy? The Impact of Lay Beliefs and Contextual Cues on Food Healthiness Perception and Consumption

Abstract

Is this food healthy? Understanding how individuals evaluate food healthiness is important because their evaluation can affect their food choices and consumption quantities, potentially leading to obesity and other health problems. However, individuals often find it difficult to process the health information to evaluate food healthiness, so they rely on their intuition or lay beliefs to make the judgment. This paper reviews recent empirical findings to highlight how individuals use lay beliefs that are based on sensory cues (e.g., visual, taste) and cognitive cues (e.g., nutrition label, price) to infer food healthiness and how this perception of food healthiness affects their food consumption. We conclude by discussing possible future opportunities in the domain of lay beliefs and food perception.

Key words: lay beliefs, food, healthy, contextual cues

Introduction

You go to a grocery store to buy some healthy crackers. You notice that there are many different brands with different packaging. For example, some packaging uses blue color, while other crackers are packaged in red color. Various brands of crackers also have different prices. How do you decide which one is healthier? Research has shown that individuals often rely on their lay beliefs based on different cues (e.g., color, price) to judge the food healthiness.

Individuals hold lay beliefs about how people and the world around them work and use their beliefs to guide their everyday decisions [1,2]. Many of these beliefs are naive intuitions that individuals use to understand their environment [3,4]. Lay beliefs can be acquired from a combination of personal experiences, self-observation, and environmental cues [3,5,6]. These lay beliefs are sometimes accurate and can facilitate individuals to make decisions easier and faster [7,8]. However, individuals tend to overgeneralize these lay beliefs to contexts that might not be objectively applicable, leading to systematic biases and suboptimal decisions [1,9,10].

In this review, we spotlight food-related lay beliefs and demonstrate that individuals hold different lay beliefs based on various contextual cues, which, in turn, influence how they perceive food healthiness and their subsequent food consumption decisions [10,11]. Food healthiness refers to individuals' perceptions about the health benefits of food and the expected influence on their health. Understanding how individuals use lay beliefs to judge food healthiness is important as their judgment can have important downstream consequences, including their food choices [10–13] and consumption quantities [14–18].

Lay beliefs about the perception of food healthiness

Food healthiness, presumably, should be determined by the nutritional facts of the food, such as calories content, nutrients, and the amount of fat and sugar (FDA, 2016) [19]. However, in reality, evaluating food healthiness is difficult and subjective. Individuals are not always given this information (e.g., restaurant menus). Even if the nutrition information is provided, individuals often lack the ability and/or motivation to pay attention to it and

comprehend it [20]. As a result, individuals often resort to their intuition, or more specifically, to their lay beliefs, and engage in heuristic processing to guide their judgment of food healthiness [10,11]. These lay beliefs are generally based on easily observable contextual cues (e.g., packaging, price) in the environment. Following recent research that has studied food from both sensory and cognitive perspectives, this review focuses on how individuals use the sensory and cognitive cues to infer food healthiness [21, see Table 1].

Table 1 Lay Beliefs About the Perception of Food Healthiness

Cues		Specifics	What is considered healthy?
Sensory cues	Visual cues	Color	Blue/green
			Muted color
			Lighter color
		Material	Matte Surface
		Shape	Angular shape
		Anesthetics	Pretty
	Haptic cues	Temperature	Cold
		Weight	Light
	Taste cues	Taste	Less tasty
Cognitive cues	Name		Healthy name (e.g., salad)
	Nutrition and ingredient labels		Organic/low in cholesterol and fat
	Price		Expensive
	Availability		Abundantly available

Sensory cues. Individuals use multiple sensory cues (visual, olfactory, auditory, haptic, and taste) to judge food, and each of these sensory cues provides subjective interpretations. In terms of judging food healthiness, research on lay beliefs has examined the role of visual, haptic, and taste as three major sensory cues about food healthiness [15,22].

One well-known adage is “we eat with our eyes.” Visual elements in the presentation and packaging of food not only attract attention and differentiate products visually, but also convey information. Individuals often rely on package elements (e.g., colors, material, shape, and aesthetic) as sensory cues to derive lay beliefs and draw conclusions about food healthiness [16]. For instance, due to the widespread association between the colors blue/green and safety, individuals have the lay belief that food in blue/green packaging is healthier than food in red packaging (e.g., candy bars) [23,24]. Besides hue, individuals also infer healthiness from color lightness and saturation. Since consumers often see muted packages for healthier food (e.g., diet products) and vivid packages for unhealthy food (e.g., potato chips), they tend to believe that food with lighter colored and less color-saturated packaging is healthier [25–28]. These beliefs also influence how individuals interpret packaging with glossy versus matte surfaces. They believe that food with matte-surface packaging is healthier than food with glossy-surface packaging [29]. Another visual cue that can influence the perception of food healthiness is the shape of the packaging. As a slim (vs. wide) package shape simulates a slim (vs. wide) body shape, individuals believe in an “Angular = Healthy” intuition that food in packages with a slim or angular shape is healthier than food in packages with a wide or circular shape [17,30]. In addition to colors and shapes, individuals also use the overall aesthetics of the food to infer food healthiness. They have the lay belief that “Pretty = Healthy.” Since these aesthetic features make the food appear more natural, food with pretty aesthetics (defined by order, symmetry, and balance) is perceived as healthier [31].

Apart from visual cues, haptic cues can also affect perceptions of food healthiness through food temperature and weight. Individuals believe that cold (warm) food contains fewer (more) calories. The belief that "Warm = Calorie-rich" is due to the deep-rooted association that cold food is less filling and less tasty than warm food [18]. Besides temperature, individuals also infer food healthiness from the haptic sensation of physical weight. As the word "light" can have two connotations (being light in weight and fewer calories), individuals develop the intuition that physically lighter food is healthier than heavier food [32]. Finally, taste, as being one of the most important sensory cues for food choices, can also affect individuals' judgment of food healthiness. Since individuals often adhere to the compensatory heuristic, they believe that taste needs to be sacrificed for another attribute, such as health. As a result, individuals hold the lay belief of "Unhealthy = Tasty," believing that the less tasty the food is, the healthier it is, and vice versa [11].

Cognitive cues. Individuals also develop lay beliefs based on cognitive contextual cues to infer food healthiness. Earlier research has shown how using a relatively unhealthy (vs. healthy) name (e.g., pasta vs. salad) affects the perception of healthiness [33]. Other research has examined different nutrition and ingredient labels and found that individuals believe that food labeled "organic" or "low in cholesterol and fat" is healthier [9,34]. Besides ingredient information, price, as a marketing cue, can also influence perceived food healthiness. Given that marketers often set a higher price for healthier food, individuals develop the lay belief that "Healthy = Expensive," such that the more expensive the food is, the healthier it is believed to be. Finally, recent research has also shown that individuals can infer food healthiness from environmental cues that are normatively irrelevant. For example, individuals believe that food that is limited (vs. abundant) in availability has more calories because they erroneously infer scarce food to be more valuable [35].

The influence of food healthiness on food consumption decisions

Although these beliefs may be accurate in some cases, individuals tend to overgeneralize them to contexts that may not objectively hold, creating systematic biases in estimating food healthiness and subsequently leading to suboptimal food consumption decisions. When health goals are salient, individuals increase their selection of foods that they perceive to be healthy based on their lay beliefs. For instance, individuals holding a health goal prefer to consume food that has a slim (vs. wide) and matte (vs. glossy) package [17,29].

However, the perception of food healthiness can also have an ironic effect on the consumption quantity. When food is deemed healthy, individuals are subject to a health halo effect. They mistakenly believe that healthy food is always good, so they underestimate its calorie content and weight gain potential. As a result, they erroneously consume larger quantities of food that they perceive to be healthy [10–14,18]. For instance, individuals consume more light-colored or lightweight food as they believe it to be healthier and, hence, good for them [28,32]. Another reason for the increased consumption is that individuals subscribe to the "Healthy = Less filling" intuition. Since healthy food is perceived to be less filling, individuals consume larger quantities to feel equally full [14]. Besides showing how food healthiness affects consumption via functional qualities (e.g., calories content), other research examines the role of emotion and demonstrates that consuming seemingly healthy food reduces the anticipated feeling of guilt and licenses individuals to consume more [36].

Taken together, while it is reassuring that lay beliefs can sometimes increase individuals' preference for healthy food, they can also exert paradoxical effects on the consumption quantities, which can potentially lead to an overall increase in calorie intake.

Conclusion and future research directions

This review shows that individuals hold different lay beliefs about food healthiness, which can ultimately impact food consumption decisions, potentially leading to obesity and other health problems. On the positive side, understanding these lay beliefs offers opportunities to develop strategies to nudge individuals toward healthy eating. To encourage healthier food consumption, policymakers have often focused on educating individuals and increasing their awareness of nutritional information [9]. However, this review suggests that instead of relying on objective nutritional information, individuals often rely on their lay beliefs to infer healthiness. Accordingly, policymakers could devise intervention strategies to manipulate various sensory cues (e.g., color, weight) to optimize the perceptions of healthy food and promote healthier consumption. Policymakers should also be cautious of the double-edged nature of classifying food as healthy. Because of the health halo effect, individuals may consume more of the food that they deem healthy [14,29,32].

Given the significant influence of lay beliefs on individuals' food perceptions and consumption, more research is needed to build on the current findings and further our understanding of lay beliefs about food. We suggest some unanswered questions that can be addressed in future research.

What causes different lay beliefs? Although the origin of lay theories may differ, prior research has suggested that lay beliefs are generally grounded in personal experiences, knowledge, and environmental cues [10]. As not all individuals share the same experience, lay theories are likely to vary across different individuals and cultures (e.g. the studies by Mai et al., Irmak et al. [13,33]). Research shows that individuals who are health-conscious and know more about health are less likely to believe in the "Unhealthy = Tasty" belief [13]. On a broader level, there are also substantial cultural differences in lay beliefs. For example, while the "Unhealthy = Tasty" belief has been demonstrated in North America, the opposite belief (i.e., "Healthy = Tasty") holds in some European countries such as France [37,38]. Besides taste, countries may also differ in how they perceive other cues. For example, in Asian cultures, consuming warm food is more likely to be the norm, influencing whether Asians associate warm food with being calorie-rich. Future research can further examine how individuals with different backgrounds and goals (e.g., lower vs. upper social class, dieting vs. non-dieting) adhere to different lay beliefs.

When do lay beliefs apply? While this review highlights how often individuals use lay beliefs to evaluate food healthiness, recent research has suggested that lay beliefs are not applied in all situations. For instance, competing intuitions (e.g., "Heavy = More protein"; "Pretty = Artificial modifications" [31,32]) can challenge individuals' original lay beliefs and reduce their biases in judging food healthiness. Other research has examined how different variables, such as goals (e.g., hedonic vs. health goals [17,18]) and subjective nutrition knowledge [26], influence the use of lay beliefs. Future research can examine other strategies that can attenuate the misapplication of lay beliefs.

How do contradictory sensory and cognitive cues impact individuals' perceptions of food healthiness? Another question is how lay theories derived from different sensory and

cognitive cues combine, interact and influence each other [39]. What happens when individuals encounter a snack option that uses green packaging (i.e., visual cue) but is physically heavy (haptics cue)? The implications from their respective lay beliefs contradict each other (Green = Healthy, but Heavy = Unhealthy). In this case, it is unclear whether individuals would simply use an additive model to arrive at the overall perception of food healthiness. Alternatively, visual cues often dominate one's judgment implying that the visual cues may also be the more dominant driver in the judgment of food healthiness [40]. Future research can explore these more nuanced perspectives and the interaction between different contextual cues.

What are the other lay beliefs? This review focuses on individuals' lay beliefs based only on sensory and cognitive cues. Future research can examine how other cues (e.g., auditory cues) can also be used to derive food-related lay beliefs. For instance, recent research from the sound symbolism literature demonstrates that due to the association between high-frequency sounds and small size, individuals believe that brands using phonemic names with higher frequency (e.g., Sepafi vs. Gupabo) are healthier [41]. Future research can also examine the role of different diets. As individuals are more health-conscious, more diverse diets (e.g., Keto diet, intuitive eating) have been advocated for a healthy lifestyle. These different diets may also influence how individuals perceive what is associated with food healthiness (e.g., protein vs. carbs).

In closing, this review underscores the important role of lay beliefs in guiding individuals' perceptions of food healthiness. These collective findings highlight that researchers, policymakers, and marketers should pay more attention to how contextual cues influence individuals' formation and use of lay beliefs and their perceptions of food healthiness, as they can potentially lead to suboptimal food consumption decisions and consequently hurt one's health.

References

[1] Furnham A (Eds): *Lay Theories: Everyday Understanding of Problems in the Social Sciences*. Pergamon; 1988.

[2] Schwarz N (Eds): **Metacognition.** in *APA Handbook of Personality and Social Psychology, Volume 1: Attitudes and Social Cognition*. Edited by Mikulincer M, Shaver PR, Borgida E, and Bargh JA. American Psychological Association, 2015:203–29.

[3] Ross L, Nisbett RE: *The Person and the Situation: Perspectives of Social Psychology*. McGraw-Hill Book Company; 1991.

[4] Wyer RSJR: *Social Comprehension and Judgment: The Role of Situation Models, Narratives, and Implicit Theories*. Erlbaum; 2004.

[5] Bem DJ: **Self-perception: An alternative interpretation of cognitive dissonance phenomena.** *Psychol Rev* 1967, 74:183-200 https://doi.org/10.1037/h0024835.

[6] Morris MW, Menon T, Ames DR: **Culturally conferred conceptions of agency: A key to social perception of persons, groups, and other actors.** *Personal Soc Psychol R*ev 2001, 5:169–182 https://doi.org/10.1207/S15327957PSPR0502_7.

[7] Kristensen DB, Askegaard S, Jeppesen LH: **'If it makes you feel good it must be right': Embodiment strategies for healthy eating and risk management.** *J Consum Behav* 2013, 12: 243–252 https://doi.org/10.1002/cb.1427.

[8] Lupton D, Chapman S: **'A healthy lifestyle might be the death of you': Discourses on diet, cholesterol control and heart disease in the press and among the lay public.** *Sociol Health Illn* 1995, 17:477–494 https://doi.org/10.1111/1467-9566.ep10932547.

[9] Andrews JC, Netemeyer RG, Burton S: **Consumer generalization of nutrient content claims in advertising.** *J Mark* 1998, 62:62–75 https://doi.org/10.1177/002224299806200405.

[10] Haws KL, Reczek RW, Sample KL: **Healthy diets make empty wallets: The healthy = expensive intuition.** *J Consum Res* 2017, 43:992–1007 https://doi.org/10.1093/jcr/ucw078.

[11] Raghunathan R, Naylor RW, Hoyer WD: **The unhealthy = tasty intuition and its effects on taste inferences, enjoyment, and choice of food products.** *J Mark* 2006, 70:170–184 https://doi.org/10.1509/jmkg.70.4.170.

[12] Nikolova HD, Inman JJ: Healthy choice: **The effect of simplified point-of-sale nutritional information on consumer food choice behavior.** *J Mark Res* 2015, 52:817–835 https://doi.org/10.1509/jmr.13.0270.

[13] Mai R, Hoffmann S: **How to combat the unhealthy = tasty intuition: The influencing role of health consciousness.** *J Public Policy Mark* 2015, 34:63–83 https://doi.org/10.1509/jppm.14.006.

[14] Suher J, Raghunathan R, Hoyer WD: **Eating healthy or feeling empty? How the "healthy = less filling" intuition influences satiety.** *J Assoc Consum Res* 2016, 1:26–40 https://doi.org/10.1086/684393.

[15] Krishna A: **An integrative review of sensory marketing: Engaging the senses to affect perception.** *J Consum Psychol* 2012, 22:332–351 https://doi.org/10.1016/j.jcps.2011.08.003.

[16] Spence C: **Managing sensory expectations concerning products and brands: Capitalizing on the potential of sound and shape symbolism.** *J Consum Psychol* 2012, 22:37–54 https://doi.org/10.1016/j.jcps.2011.09.004.

[17] van Ooijen I, Fransen ML, Verlegh PWJ, Smit EG: **Signalling product healthiness through symbolic package cues: Effects of package shape and goal congruence on consumer behaviour.** *Appetite* 2017, 109:73–82 https://doi.org/10.1016/j.appet.2016.11.021.

[18*] Yamim AP, Mai R, Werle COC: **Make it hot? How food temperature (mis)guides product judgments.** *J Consum Res* 2020, 47:523–543 https://doi.org/10.1093/jcr/ucaa017.

This paper identifies a novel lay belief of "warm = calorie-rich"—individuals believe that warm food contains more calories, more filling, and tastier. This finding provides important implications for food evaluation and consumption as warm food increases food consumption quantity while cold food is often underestimated for its nutritional value.

[19] Fernandes AC, Oliveira RC, Rodrigues VM, Fiates GMR, Proença RP: **Perceptions of university students regarding calories, food healthiness, and the importance of calorie information in menu labelling.** *Appetite* 2015, 91:173–178 https://doi.org/10.1016/j.appet.2015.04.042.

[20] Keller SB, Landry M, Olson J, Velliquette AM, Burton S, Andrews JC: **The effects of nutrition package claims, nutrition facts panels, and motivation to process nutrition information on consumer product evaluations.** *J Public Policy Mark* 1997, 16:256–269 https://doi.org/10.1177/074391569701600206.

[21]** Krishna A, Elder RS: **A review of the cognitive and sensory cues impacting taste perceptions and consumption**. *Consum Psychol Rev* 2020, 1–14 https://doi.org/10.1002/arcp.1069.

The authors review literature on both sensory drivers (vision, olfaction, audition, haptic, and/or taste) and cognitive contextual drivers (social cues, atmospherics, branding, and advertising) of taste perception and consumption in the marketing contexts. This review provides a comprehensive framework of the impact of both cognitive and sensory cues in taste perception and food consumption.

[22] Plasek B, Lakner Z, Temesi Á: **Factors that influence the perceived healthiness of food.** *Nutrients* 2020, 12:1881 http://doi.org/10.3390/nu12061881.

[23] Huang L, Lu J: **Eat with your eyes: Package color influences the expectation of food taste and healthiness moderated by external eating.** *Mark Manag* 2015, 25:71–87.

[24] Schuldt JP: **Does green mean healthy? Nutrition label color affects perceptions of healthfulness.** *Health Commun* 2013, 28:814–821 https://doi.org/10.1080/10410236.2012.725270.

[25] Mai R, Symmank C, Seeberg-Elverfeldt B: **Light and pale colors in food packaging: When does this package cue signal superior healthiness or inferior tastiness?.** *J Retail* 2016, 92:426–444 https://doi.org/10.1016/j.jretai.2016.08.002.

[26] Mead JA, Richerson R: **Package color saturation and food healthfulness perceptions.** *J Bus Res* 2018, 82:10–18 https://doi.org/10.1016/j.jbusres.2017.08.015.

[27] Tijssen I, Zandstra EH, de Graaf C, Jager G: **Why a 'light' product package should not be light blue: Effects of package colour on perceived healthiness and attractiveness of sugar- and fat-reduced products.** *Food Qual Prefer* 2017, 59:46–58 https://doi.org/10.1016/j.foodqual.2017.01.019.

[28] Madzharov AV, Ramanathan S, Block LG: **The halo effect of product color lightness on hedonic food consumption.** *J Assoc Consum Res* 2016, 1:579–591 https://doi.org/10.1086/688221.

[29]* Ye N, Morrin M, Kampfer K: **From glossy to greasy: The impact of learned associations on perceptions of food healthfulness.** *J. Consum. Psychol* 2020, 30:96–124 https://doi.org/10.1002/jcpy.1126.

The authors demonstrate that individuals learned from their consumption experiences that unhealthy (vs. healthy) snacks are usually in glossy (vs. matte) packages, hence they hold the lay belief that food in a glossy package is unhealthy while food in a matte package is healthier.

[30] Wang J, Zhang X, Jiang J: **Healthy-angular, unhealthy-circular: Effects of the fit between shapes and healthiness on consumer food preferences.** *J Bus Res* 2022, 139:740–750 https://doi.org/10.1016/j.jbusres.2021.10.012.

This research demonstrates that individuals associate angular shapes with healthy food and circular shapes with unhealthy food. Furthermore, the fit between food type and its associated shape could increase the preference and consumption of the food due to a sense of feeling right. This research hence provides implications for marketers to increase healthy eating through visual cues.

[31] Hagen L: **Pretty healthy food: How and when aesthetics enhance perceived healthiness.** *J Mark* 2021, 85:129–145 https://doi.org/10.1177/0022242920944384.

This research suggests a novel lay belief that pretty food is healthy. The author demonstrates that pretty anesthetics is related to perceived naturalness, which enhances the perceived healthiness. This study adds to our understanding of how the food anesthetics could influence food consumptions.

[32*] Li Y, Heuvinck N, Pandelaere M: **The light = healthy intuition.** *J Consum Psychol* 2021, 1–10 https://doi.org/10.1002/jcpy.1249.

This paper examined the relationship between the weight of a food product and its perceived healthiness. This paper suggests that individuals believe that physically lighter food is healthier than physically heavier food. This lay belief is based on the semantic meaning of lightness. Individuals believe that the lightness in physical weight is associated with the lightness in calorie content. Consequently, they infer lighter food to be healthier and discredit health claims of a food product if it is heavy.

[33] Irmak C, Vallen B, Robinson SR: **The impact of product name on dieters' and nondieters' food evaluations and consumption.** *J Consum Res* 2011, 38:390–405 https://doi.org/10.1086/660044.

[34] Lee WJ, Shimizu M, Kniffin KM, Wansink B: **You taste what you see: Do organic labels bias taste perceptions?.** *Food Qual Prefer* 2013, 29:33–39 https://doi.org/10.1016/j.foodqual.2013.01.010.

[35] Salerno A, Sevilla J: **Scarce foods are perceived as having more calories.** *J Consum Psychol* 2019, 29:472-482 https://doi.org/10.1002/jcpy.1090.

[36] Wansink B, Chandon P: **Can "low-fat" nutrition labels lead to obesity?**. *J Mark Res* 2006, 43:605–617 https://doi.org/10.1509/jmkr.43.4.605.

[37] Haasova S, Florack A: **Practicing the (un)healthy = tasty intuition: Toward an ecological view of the relationship between health and taste in consumer judgments.** *Food Qual Prefer* 2019, 75:39–53 https://doi.org/10.1016/j.foodqual.2019.01.024.

[38] Werle COC, Trendel O, Ardito G: **Unhealthy food is not tastier for everybody: The "healthy=tasty" French intuition.** *Food Qual Prefer* 2013, 28:116–121 https://doi.org/10.1016/j.foodqual.2012.07.007.

[39] Deval H, Mantel SP, Kardes FR, Posavac SS, Kardes FR, Posavac SS: **How naive theories drive opposing inferences from the same information**. *J Consum Res* 2013, 39:1185–1201 https://doi.org/10.1086/668086.

[40] Hoegg J, Alba JW: **Taste perception: More than meets the tongue.** *J Consum Res* 2007, 33:490–498 https://doi.org/10.1086/510222.

[41] Motoki K, Park J, Pathak A, Spence C: **Constructing healthy food names: On the sound symbolism of healthy food.** *Food Qual Prefer* 2021, 90:104157 https://doi.org/10.1016/j.foodqual.2020.104157.