

Paths to Healthier Eating: Perceptions and Interventions for Success

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Healthy eating is highly relevant to multiple stakeholders, from consumers to marketers to policy makers. Every consumer makes food decisions daily; food is a \$2.5 trillion industry worldwide (Fortune Business Insights 2022), and promoting healthier eating is a major public policy issue given rising obesity rates in most countries. Interest in understanding, more generally, the role of food decision making in consumers' lives has increased in conjunction with these societal trends.

We believe that consumer research has an important role to play in understanding and shaping food decision making to produce positive outcomes for as many constituents as possible, because of its unique ability to straddle the line between consumer welfare and implications for the producers and marketers of food products. This special issue of *JACR* seeks to add new insights to our understanding of interventions to increase healthy eating by (1) reflecting on what healthy eating means through the lens of consumers' perceptions of what they should do to eat healthy, (2) increasing our understanding of the methods used to test healthy eating interventions, and (3) examining whether and when various healthy eating interventions are actually effective at leading to healthier eating.

Understanding what healthy eating means to consumers is important as consumers use their own interpretations of "healthy" when making daily decisions about food consumption (Ronteltap et al. 2012). Accordingly, we begin with a discussion of how healthy eating is understood, expressed, and operationalized, introducing a framework of key paths to healthy eating and presenting insights from a survey of consumers. We then consider the evidence about which interventions actually work (or do not work) at leading to healthier eating. We present key findings from the special issue articles, which are organized into four

main sets (table 1 contains a summary). We close with a discussion of the challenges that food researchers often face when testing interventions for healthy eating and possibilities for addressing those challenges.

WHAT DOES HEALTHY EATING MEAN FOR CONSUMERS?

A Framework of Three Main Paths to Healthy Eating

We introduce a three-pronged framework to structure our understanding of consumers' perceptions about what healthy eating means. As illustrated in figure 1, these three main paths consist of (1) the type(s) of food that we eat ("type"), (2) the quantity of foods that we eat ("quantity"), and (3) the overall balance in the variety of foods that we eat ("balance"). These three paths are grounded in key themes from prior research on the meaning of healthy eating.

Regarding the type path, particular food groups (such as whole grains, fruits, and vegetables) seem to be widely accepted by consumers as "healthy," whereas others (e.g., red meat, candy) tend to be considered "unhealthy" (Willett and Stampfer 2013). Relatedly, specific nutrients, such as fat, sugar, salt, and protein, are critical to determining food healthiness perceptions (Croll, Neumark-Sztainer, and Story 2001; Paquette 2005). The four type subpaths were adapted from the naturalness-valence framework (André, Chandon, and Haws 2019; Chandon and Cadario 2022), which distinguishes four ways that foods claim to be healthy, depending on whether the focus is on the presence of good (vs. the absence of bad) and the preservation of nature (vs. nutritional improvements).

Regarding the quantity path, portion sizes have been implicated as a major contributor to the obesity epidemic (Young and Nestle 2002); quantity also plays a 1:1 role alongside caloric density in increasing calories, which some consumers

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Published online September 26, 2022.

Journal of the Association for Consumer Research, volume 7, number 4, October 2022. © 2022 Association for Consumer Research. All rights reserved. Published by The University of Chicago Press for the Association for Consumer Research. <https://doi.org/10.1086/721842>

Table 1. Overview of Articles in this Special Issue on Interventions for Healthier Eating

Authors	Title	Type of paper	Interventions	Data source	Healthiness outcomes
Howe, Ubel, and Fitzsimons	Open Science Online Grocery: A Tool for Studying Choice Context and Food Choice	Method/conceptual	Customizable labels, product position	Mock online grocery store	Customizable at the product or basket level
Haws et al.	Examining Eating: Bridging the Gap between “Lab Eating” and “Free-Living Eating”	Method/conceptual	Who, what, where, when, why, and how factors	None	Multiple; emphasis on expanding outcomes
Silverman et al.	Harder Than You Think: Misperceptions about Logging Food with Photos versus Text	Method/conceptual	Logging consumption as text vs. Photos	Field experiment with app company and university lab	Persistence of food logging
Nielsen et al.	Consumption Variety in Food Recommendation	Test of cognitive intervention	Product recommendations algorithm	Simulation using consumption data from weight loss app	Variety of entire diet; links to changes in body weight
Allard and Puntoni	Misunderstood Menu Metrics: Side-Length Food Sizing Leads to Quantity Underestimation and Overeating	Test of cognitive intervention	Display of food size information	Online and university lab	Consumption quantity perception and preferences
Oh, van der Lans, and Mukhopadhyay	Choice Architecture Effects on Indulgent Consumption: Evidence from Combinations of Nudges at an Ice-Cream Store	Test of cognitive intervention	Nutrition labeling and product grouping and position	Field experiment with ice cream store	Consumption quantity and nutritional quality
Malan et al.	Increasing the Selection of Low-Carbon-Footprint Entrées through the Addition of New Menu Items and a Social Marketing Campaign in University Dining	Test of cognitive intervention	Carbon footprint labeling and environmental social messages	Field experiment with university cafeteria	Sales by food type
Poquet et al.	Effect of a Pleasure-Oriented Intervention Conducted at Home on the Energy Intake of Midafternoon Snacks Consumed by Children	Test of affective intervention	Sensory, psychosocial, and interpersonal pleasure family training kit	Field study with families	Snack consumption quantity and nutritional quality
Ceylan, Aydınoğlu, and Morwitz	Embarrassed by Calories: Joint Effect of Calorie Posting and Social Context	Test of affective intervention	Calorie posting in individual or social context	Field experiment with restaurant and online lab	Consumption quantity
Gai, Tuk, and Sweldens	Light or Regular, Now or Later: The Impact of Advance Ordering and Restrained Eating on Choices and Consumption of Light and Regular Vice Food	Test of behavioral intervention	Advance ordering	University lab	Snack consumption quantity and nutritional quality
Monnier et al.	Baking Your Own Cookies: Does Food Self-Production Increase Consumption?	Test of behavioral intervention	Cooking your own food	University lab	Daily cookie consumption

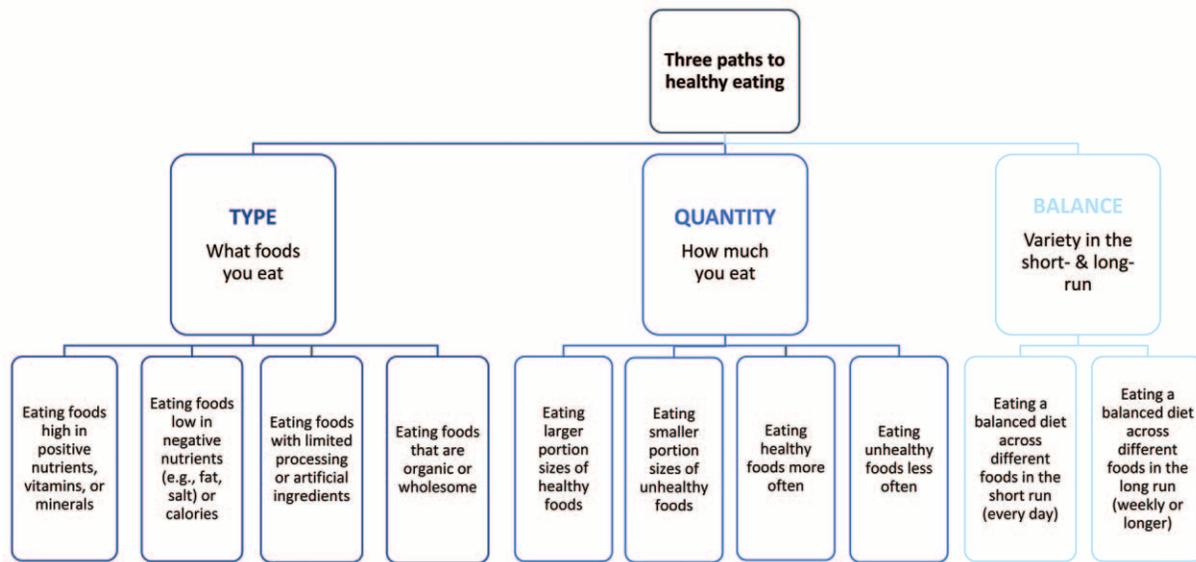


Figure 1. Three paths to healthy eating. This is a nonexhaustive set of potential paths and subpaths to healthy eating. There may be additional paths and subpaths that consumers may take, and consumers may take any combination of paths.

aim to control (Woolley and Liu 2021). Although prior research shows that consumers often neglect quantity in their healthiness assessments relative to type, when quantity is made salient to them, they do recognize that it affects health, and this influences their calorie perceptions and food choices (Chernev and Gal 2010; Liu et al. 2019). The four quantity subpaths were developed from a general notion of different portion sizes of healthy and unhealthy foods and different frequencies of consumption of healthy and unhealthy foods, drawing on the concept of vice-virtue bundles (Liu et al. 2015; Haws and Liu 2016) and research on the frequency of eating different foods (Sussman, Paley, and Alter 2021).

Finally, the balance path is captured by research on the importance of variety as a critical aspect of a healthy diet (Raynor and Epstein 2001; Haws et al. 2017). An optimal diet, from pleasure as well as from health standpoints, requires a balanced variety across food groups. This is underscored in the many scientific and popular eating guides that emphasize the importance of eating across multiple food groups (e.g., MyPlate, Food Pyramid), as well as balancing proportions across food groups. The two balance subpaths were adapted from research on different time-frame levels of variety (Haws et al. 2017).

Altogether, while acknowledging that these three paths are not exhaustive of all possible paths, we suggest that they do comprise three main paths well-grounded in prior research. Using this framework, we conducted a survey to

provide a snapshot of how American consumers think about healthy eating in 2022.

Healthy Eating Survey Findings

Our key survey objectives were to understand (1) how “health” compared to other eating motivations such as taste, (2) what consumers perceive “healthy eating” to mean, and (3) their perception of the importance of the three paths and of their subpaths for healthier eating.

Our respondents consisted of 499 US-based participants recruited from Prolific Academic in 2022 ($M_{age} = 38.78$ years; 59.3% female, 37.9% male, and 2.8% other; median income = \$50,000 – \$59,999; race: 74.9% White, 9.6% Black, 6.8% Asian, 8.7% other; $M_{BMI} = 27.17$). The survey, data, and syntax are posted at <https://researchbox.org/765> and the key measures are also included in an appendix (available online).

First, we assessed the importance of various considerations when making eating decisions, inspired by a large-scale survey ($N = 2,967$) conducted by Glanz et al. (1998), which asked respondents how important taste, nutrition, cost, convenience, and weight control are when purchasing food and eating out. To this list, we added “health” along with six other possible motivations—“social bonding,” “hunger,” “getting energy,” “habit,” “time constraints,” and “religious or cultural issues” (see also Renner et al.’s [2012] Eating Motivation Survey for a larger list of eating motivations). For each

of these 12 considerations (presented in random order), respondents were asked, “How important is each of the following to you when you are making eating decisions?” (1 = *not at all important*, 7 = *very important*).

The results are presented with the considerations listed in order of importance in figure 2. Our results replicated those of Glanz et al. (1998), indicating that the relative importance of these five eating goals have not changed in 25 years: Taste is still (and by a wide margin) the most important consideration, followed by cost, and then by nutrition and convenience (rated as equally important), with weight control being the last of the five goals, with a much lower rating. Among the additional goals that we studied, hunger was second only to taste, and ahead of cost, and health was rated similarly as nutrition. Getting energy was rated between convenience and time constraints. Time constraints and habit were rated similarly as weight control, near the scale midpoint, whereas social bonding and religious and cultural factors were both significantly below the midpoint and were therefore rated as relatively unimportant by most respondents.

Second, we captured participants’ open-ended responses in terms of what healthy eating means to them and why healthy eating matters (i.e., what are the outcomes of healthy eating). The top part of figure 3 contains a word cloud on responses to what healthy eating means to them. The most

popular theme focused on specific food types, defined either as food groups (e.g., vegetables, fruit, grain) or basic nutrients (e.g., sugar, protein, fat), while themes of quantity (e.g., portion control, moderation) and balance (e.g., balanced diet, balanced meal) were also evident. The open-ended responses therefore support the three-pronged paths to healthier eating. The bottom part of figure 3 contains a word cloud on responses to why healthy eating matters, showing more consensus across consumers on the themes of energy, healthy body, weight, and disease.

Third, we captured participants’ beliefs in terms of what healthy eating means to them through a structured approach, mapping onto our framework’s three different paths to healthy eating (fig. 1). First, we asked participants to allocate 100 points across the three main paths to healthy eating—type, quantity, and balance—which we defined for them as (1) *What you eat (Type)*: This refers to the types of foods that you try to include in your diet, based on the nature of the food itself; (2) *How much you eat of the foods you eat (Quantity)*: This refers to the portion sizes for each meal or snack of the various foods that you eat and how often you eat the various foods you eat; and (3) *Balance*: This involves balancing the various types of food you eat over time.

Although consumers saw importance in all three paths, the Type path was the top rated ($M = 40.9\%$, $SD = 15.8$), with both Quantity ($M = 30.8\%$, $SD = 13.2$) and Balance

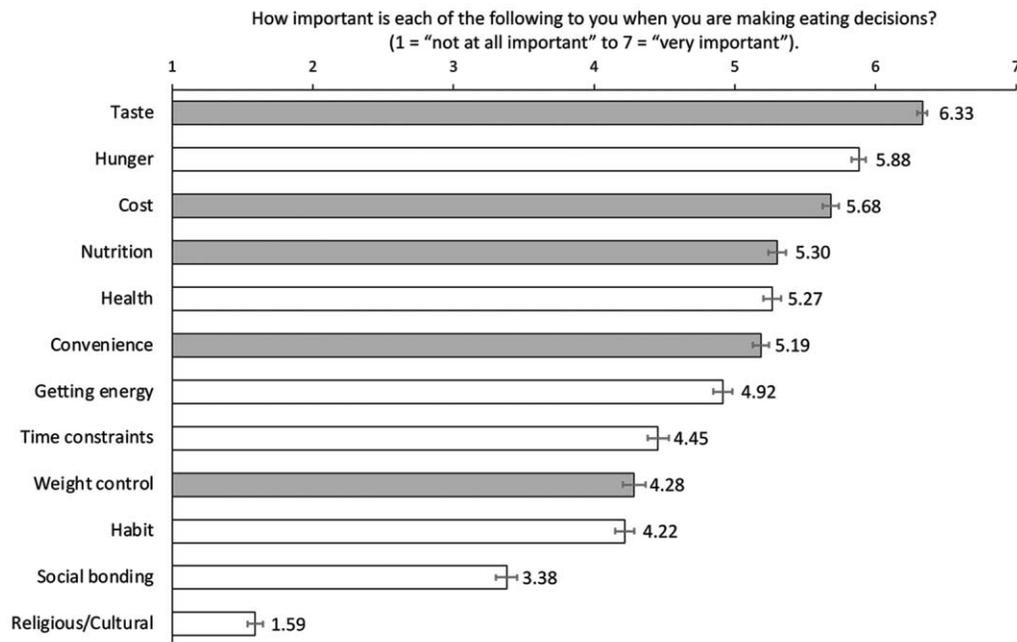


Figure 2. Importance of different considerations for eating decisions. The gray bars denote the five considerations already measured in Glanz et al. (1998). Error bars denote standard errors.

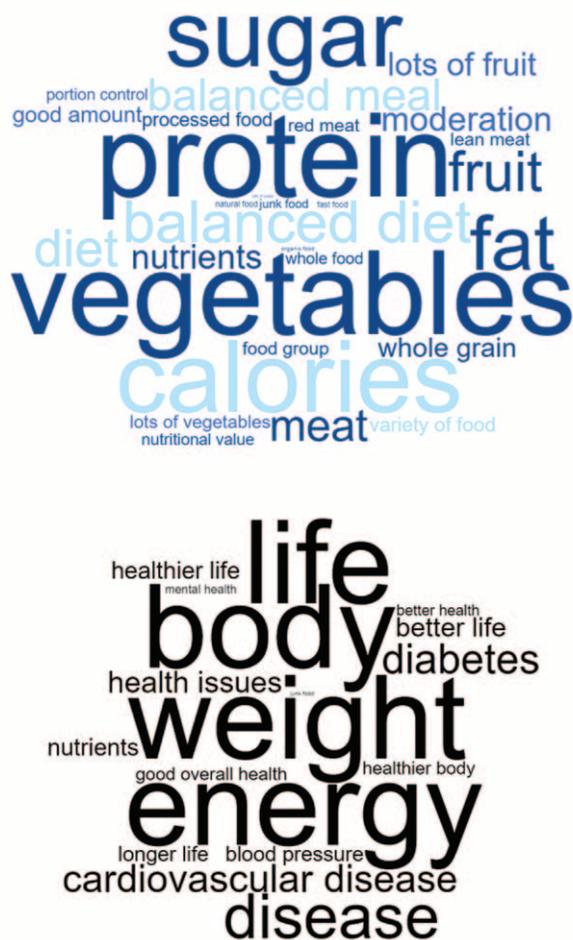


Figure 3. Word clouds for “what healthy eating means” (*top*) and “why it matters” (*bottom*). For the word cloud for “what healthy eating means” (*top*), the dark blue words denote the “type (what to eat)” theme, the medium-toned blue words denote the “quantity (how much to eat)” theme, and the light blue words denote the “balance” theme.

($M = 28.3\%$, $SD = 15.2$) being viewed as similarly important. These results support the contention that food types dominate consumers’ perceptions of the importance of paths to healthier eating (e.g., Liu et al. 2019), while recognizing that quantity and balance are also critical.

Finally, we delved into a more detailed examination of the three main factors, by asking participants to indicate the importance of each of the 10 subpaths to healthy eating, as captured in figure 1. All 10 subpaths were listed in random order, and participants indicated “how important you think each is to *healthy eating*” (1 = *not at all important*, 7 = *very important*).

Figure 4 summarizes the findings, with the subpaths listed in order of importance. The top-rated subpath was a food type one, focused on eating foods with positive at-

tributes. The next two were quantity subpaths capturing the frequency of eating behaviors (rather than the portion sizes consumed), highlighting consumers’ recognition that healthy eating occurs over time, not in single sittings. Two subpaths, “eating foods that are organic or wholesome” and “eating larger portions of healthier foods” received markedly lower ratings than the other subpaths but were still rated above the midpoint of 4. Interestingly, although type was rated as a more important path to healthy eating than quantity and balance, it includes not just the most important subpath (“eating foods higher in positive attributes”) but also the second least-important subpath (“eating foods that are organic or wholesome”). This suggests that a path’s overall importance may be determined by its most important subpath. It also underscores the benefits of examining the specific subpaths to healthy eating.

NEW EVIDENCE ON HEALTHY EATING INTERVENTIONS

Table 1 summarizes the articles in this special issue, organized into four main sets (methodological/conceptual, cognitive interventions, affective interventions, behavioral interventions) and indicates the data source(s), intervention(s) tested, and healthiness outcome(s) examined in each article. Given our findings on what healthy eating means to consumers, we were pleased to note that the articles tackled “healthy eating” in different ways that matter to consumers (table 1’s last column). Next, we summarize key insights from the four main sets of articles, which employed a wide range of different methodologies. The interventions can be categorized using the Cadario and Chandon (2020) framework as cognitive (provision of nutrition, environmental, or size information), affective (emphasis on the sensory or hedonic benefits of food), or behavioral interventions (attempt to directly influence behavior without necessarily changing what consumers think or what they want [e.g., advance ordering or cooking]).

Methodological/Conceptual Insights

Our first set of articles approaches the topic of healthier eating interventions from a methodological or conceptual perspective, focusing on tools or frameworks to guide researchers. First, Howe, Ubel, and Fitzsimons (2022) introduce an open-source online grocery store tool that researchers can use to test a wide range of interventions using a highly realistic online shopping experience. The timing of the introduction of this tool is notable given that the COVID-19 pandemic has accelerated the acceptance of online grocery shopping (Verdon 2022). We see great

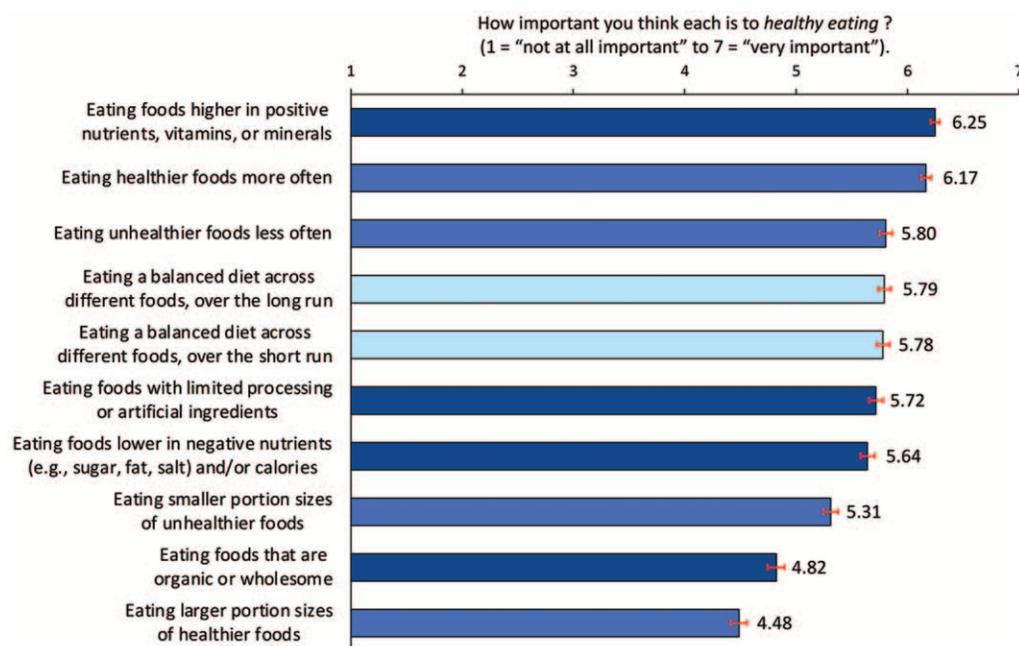


Figure 4. Perceived importance of subpaths to healthy eating. The dark blue bars denote “type (what to eat)” paths, the medium-tone blue bars denote “quantity (how much to eat)” paths, and the light gray bars denote “balance” paths to healthy eating. Error bars denote standard errors.

potential for testing both existing and new interventions, and combinations of interventions, using this flexible and user-friendly resource. Furthermore, this resource allows for operationalizing healthy eating across all three paths, as it has the potential to examine food type, food quantities, and the balance of foods purchased.

Second, Haws et al. (2022) consider the ways in which “lab eating” can differ from the ways people actually eat, which they call “free-living eating.” They offer a framework across key factors, including the who, what, where, when, why, and how of eating, while recommending ways to close the gap between lab eating and free-living eating when testing interventions. They show that striking a crucial balance between isolating psychological mechanisms through lab eating studies and testing interventions in realistic situations through free-living eating studies is crucial to prompting lasting behavioral change. Their framework also prompts greater recognition of different healthy eating paths that shift beyond consumers making choices between two foods in the lab (one prototypically healthy and one prototypically unhealthy) toward accounting for the important role of quantity (including frequency over time) and balance in free-living eating.

The final article with a methodological focus compares the differences in attitudes toward and usage of a smart phone based tool that consumers can use to track their

own consumption (Silverman et al. 2022). Logging one’s consumption is frequently a central tool within dietary change programs (Burke, Wang, and Sevick 2011), so making this process easier and more accurate is paramount. Interestingly, Silverman et al. (2022) show that, although consumers trying to change their eating habits believe that logging consumption using pictures will be easier, they actually track their consumption longer when they use a text-based entry system. Thus, although tracking accuracy is important, the logging tool that gets abandoned will never facilitate healthier eating patterns (e.g., through food types, quantity, and balance over time).

Cognitive Interventions

Four articles in this issue tested cognitive interventions for healthier eating. Once consumers have input the foods and beverages consumed over a period of time, numerous patterns can be revealed, hypotheses tested, and interventions designed. Approaches using such data start with an advantage for capturing free-living eating, to the extent that the food logging has been complete and accurate. Nielsen et al. (2022) present patterns from such data and introduce an algorithm that can provide dietary recommendations reflective of patterns of variety that have been associated with healthier outcomes, shining a light on how eating affects long-term health outcomes.

The next cognitive intervention can be considered a fresh take on a classic issue regarding information provision. Specifically, Allard and Puntoni (2022) focus on side-length metrics, such as “12-inch pizza,” showing that these metrics lead to food quantity underestimation and overeating. Alternate forms of information provision, including number of servings, help to eliminate these biases. Yet in many instances, side-length information continues to be the norm, particularly for relatively less healthy foods for which quantity consumed is of particular importance.

Next, Oh, van de Lans, and Mukhopadhyay (2022) focus on testing combinations of cognitive interventions in field studies conducted at an ice cream store, mapping closely onto free-living eating. They find that combining traffic light labels with the placement/grouping of relatively healthier or less healthy ice creams can nudge consumers toward choosing smaller portion sizes or healthier types of ice cream. Importantly, they simultaneously examine two main paths to healthier eating.

Finally, Malan and colleagues (2022) report on the results of a large-scale field experiment in university dining facilities, testing both low-carbon labeling and a social marketing campaign focused on encouraging choice of foods with lower carbon footprints, again mapping closely onto “free-living eating.” This intervention increased choice of plant-based foods, compared to the control dining site. Although not as directly related to healthy eating, per se, foods with a lower carbon footprint (i.e., many plant-based foods) tend to be more nutritious, providing an innovative path for healthier eating that focuses on sustainability rather than on health (which our survey showed is only the fifth most important consumer consideration when making food choices).

Affective Interventions

The special issue also includes two articles that primarily focus on testing affective-based interventions. First, Poquet et al. (2022) conducted an intervention in French households, which was aimed at encouraging children to recognize the pleasure involved in eating healthy snacks. The authors found that promoting enhanced sensory experiences could help reduce energy intake, especially among children who tend to eat larger snacks. This article builds on a recent approach of encouraging healthier eating by prompting consumers to recognize the heightened pleasure associated with consuming foods in smaller portion sizes (Cornil and Chandon 2016). Interestingly, the affective intervention had no impact on the type of snack chosen, underscoring again

the importance of distinguishing type and quantity paths to healthy eating.

Second, Ceylan, Aydınoglu, and Morwitz (2022) examine what would normally be considered a cognitive intervention (i.e., calorie posting on menus) but with a social twist (i.e., examining the effect of calorie posting when alone vs. with other people) that made the intervention more emotional in nature. Specifically, they find that calorie information leads to anticipated embarrassment for ordering a high-calorie meal when eating with others (vs. alone). This article thus focuses on the number of calories as the healthy eating outcome, consistent with a strong overall policy focus on this metric (Liu et al. 2014), and one that was noted by our survey respondents (see fig. 3).

Behavioral Interventions

The final two articles focus on behavioral interventions. Interestingly, both articles focus on food types generally considered unhealthy (i.e., chips, M&M’s, and cookies). First, Gai, Tuk, and Sweldens (2022) examine the effect of advance ordering on both choices and consumption of snack foods, distinguishing between “light” and regular versions of stereotypically “unhealthy” products. They find that advanced ordering did not influence caloric intake or choice of a “light vice,” but an individual’s dietary restraint did, suggesting a limit to the effectiveness of advance ordering.

Finally, in a series of highly-involved lab studies, Monnier and colleagues (2022) had participants make cookie dough and bake their own cookies (or not), finding that those who made their own cookies ate an average of 11% less over the course of that day than those who did not make their own cookies. These findings indicate that at least in the case of cookies, baking them yourself can reduce consumption, reflecting an approach following the quantity path to healthy eating.

OVERALL INSIGHTS FOR HEALTHY EATING INTERVENTION RESEARCH

Together, these articles raise a breadth of issues that apply not just to testing particular interventions but also to conducting research on interventions to increase healthy eating more broadly. We conclude by highlighting additional considerations for developing new insights into interventions for healthier eating.

Does the Intervention Work in the Real World?

First, we note the wide range of food decision contexts examined in the articles in this special issue. These contexts

include placing orders through an online grocery store, placing snack orders in advance, baking at home, tracking food consumption on apps, ordering in restaurants, ordering in cafeterias, ordering in ice-cream shops (which offer only one category of food), and snacking at home. This breadth is exciting because free-living eating occurs in a wide range of places. We encourage researchers to be open when considering the wide variety of contexts in which they can test interventions for healthier eating. We also encourage researchers to consider testing how interventions might affect multiple paths to healthy eating, across multiple contexts, possibly by leveraging tracking apps that can more easily capture eating behaviors across contexts.

Moreover, the very importance and meaning of healthy eating to consumers may differ depending on which real world context is being examined. For example, the relevance of healthy eating and what healthy eating means may differ substantially when ordering ice cream from an ice cream shop versus when ordering from a restaurant with many different types of food versus when ordering groceries online. We thus encourage all stakeholders (i.e., researchers, marketers, consumers, and policy makers) to consider how the importance of healthy eating itself may vary across contexts (relative to other considerations such as taste, hunger, etc.; see fig. 2) and how the relevance and importance of different paths and subpaths to healthy eating may also vary across contexts (see figs. 1 and 4).

One way in which this can be done is to consider the three possible paths and their subpaths to healthy eating that could be affected by a given intervention and to attempt to measure as many of them as possible. A side benefit of this approach is that we can ideally detect backfire effects or compensation effects that eliminate overall progress toward healthier eating. Considering multiple paths to healthy eating from the onset may be especially important when conducting field experiments, which are very useful for studying free-living eating (Haws et al. 2022) but which are highly effortful.

Indeed, when conducting field experiments, we strongly encourage being ambitious in the size and scope of the study. Even in the best of circumstances, collaborating with a company or outside constituent requires much larger setup costs than running a study online or in a university lab. These could include not only monetary costs, ranging from printing new menus to hiring research assistants, but also hefty coordination costs involved when interacting with non-researchers who have a business to run, much shorter deadlines, and who might be in another position, or another com-

pany, by the time the study ends. In addition, free-living eating is much noisier than lab eating, reducing the power of the study to detect the effects of the intervention. Therefore, these collaborations may be best suited for powerful interventions that have a chance to succeed. This often requires combining multiple interventions, which will be welcome by managers who care more about achieving a strong effect than about identifying the exact source of the effect, but which comes at a cost from a theory-testing standpoint. Measuring multiple healthy eating outcomes may offer one way to increase contribution.

Do Interventions Work beyond the Present Moment with the Present Participants?

One key challenge with many interventions, but especially those that affect healthy eating given the necessarily repeated nature of eating decisions, is that it is unclear how long interventions affect consumers' food behaviors. Are certain types of interventions more likely to endure—perhaps based on which paths to healthier eating are affected and which food decision contexts are affected? When do interventions build healthy habits that are maintained versus losing their effectiveness as consumers adapt to and ignore them?

Additionally, interventions are studied only with a particular set of people and thus it is often unclear whether an intervention will affect behavior beyond that particular group. One approach that future research might take is to consider measuring the importance of healthy eating, alongside other considerations for food decisions, in one's sample, along with measuring the meaning and importance of different healthy eating considerations.¹ Doing so may help facilitate comparisons of tests of interventions across samples.

Finally, we conjecture that of the three main paths to healthy eating presented herein, addressing the frequency subpaths to the quantity path and the balance path may be especially critical in translating to long-term health and well-being improvements, especially as healthy eating does not happen in one meal but across an extended period of time. Steps taken toward testing interventions that keep such paths in mind may be especially beneficial to all stakeholders. We conclude by expressing our gratitude to

1. Our survey included demographic and basic health-related information which were not explored here due to space constraints. We encourage others to examine possible patterns using the materials provided at <https://researchbox.org/765>.

the JACR policy board, the current (Vicki Morwitz) and past (Angela Lee) JACR editors-in-chief, and the managing editor (James Ellis) for their amazing guidance and support; and to the authors and reviewers who made possible this special issue's new insights about interventions for healthy eating and multiple paths forward for healthy eating.

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