Intervention Effects and Mechanisms of Information Nudging Strategies on Consumer Food Waste Behavior

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Abstract

Food waste is a critical issue that must be resolved to ensure food security and achieve sustainable development of resources and the environment. Information nudging represents a key mechanism and instrument for reducing consumer food waste. This study incorporates information nudging into the investigation of consumer food waste behavior: on one hand, it examines the intervention effects and boundaries of behavioral information nudging on consumer food waste behavior from the perspective of unconscious behavior intervention; on the other hand, it explores the effectiveness of pressured versus spontaneous cognitive information nudging strategies from the perspective of conscious cognitive guidance, reveals both positive and negative internal mechanisms through three pathways—information processing, self-regulation, and social influence—and investigates boundary conditions from the dimensions of information characteristics, individual traits, and situational features. The research aims to construct a multi-dimensional model of how information nudging strategies influence consumer food waste behavior, thereby proposing effective information nudging strategies to reduce consumer food waste.

Full Text

The Effect and Mechanism of Information Nudging Strategies on Consumer Food Waste Behavior: A Research Proposal

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Abstract

Food waste is a critical issue that must be addressed to ensure food security and achieve sustainable resource and environmental development. Information nudging serves as a key mechanism and tool for reducing consumer food waste. This study introduces information nudging strategies into research on consumer food waste behavior. On one hand, it explores the intervention effects and boundary conditions of behavioral information nudging on consumer food waste from the perspective of unconscious behavioral interventions. On the other hand, it investigates the efficacy of pressure-based and spontaneous cognitive nudging strategies through the lens of conscious cognitive guidance, revealing both positive and negative underlying mechanisms via three pathways: information processing, self-regulation, and social influence. Additionally, boundary conditions are analyzed from informational, individual, and situational perspectives. This study aims to establish a multidimensional model illustrating how information nudging strategies influence consumer food waste behavior, thereby proposing effective informational interventions to reduce food waste.

Keywords: food waste behavior, information nudging, information processing, psychological mechanism
Classification Number: B849

1. Problem Statement

Food waste not only exacerbates global food shortages and security concerns but also severely impedes the sustainable utilization of natural resources and environmental protection. The European Union generates 153 million tons of food waste annually, with associated greenhouse gas emissions accounting for over 6% of total emissions. The United States wastes approximately 60 million tons of food each year, representing 22% of municipal solid waste. Given China's fundamental national condition of long-term tight balance between food supply and demand, food waste represents a critical challenge that must be resolved to safeguard food security and achieve sustainable resource and environmental development. General Secretary Xi Jinping has consistently emphasized the importance of addressing food waste, issuing multiple directives since January 2013 to promote "strict food conservation and curb food waste." The 2024 Central Committee Document No. 1 also reaffirmed the significance of tackling food waste, calling for continuous deepening of food conservation actions, effective reduction of grain loss and waste, and establishment of long-term working mechanisms. The document highlights that grain conservation efforts must address the entire chain, with the consumption stage being a crucial link. According to the UNEP Food Waste Index Report, 17% of food is wasted at the retail and consumption stages. The 2023 China Food and Nutrition Development Report similarly reveals that consumer-end food waste accounts for 57.3% of total losses—the highest proportion across all stages. Therefore, targeting the consumer end with effective measures and establishing long-term mechanisms to address consumer food waste and foster a sustainable social atmosphere of con-

scious food conservation represents a key pathway for implementing the Party Central Committee' s "grain conservation action" deployment and advancing China' s food security and sustainable development strategy.

Food waste has garnered global attention, with governments and social sectors implementing various countermeasures. The EU' s Waste Framework Directive prioritizes food waste reduction in waste management, while the U.S. Food Donation Act provides legal protection for donors. Japan has set a target to halve food waste by 2030 and enacted relevant laws including the Food Recycling Act and Food Donation Promotion Act. Among various governance approaches, information nudging strategies offer advantages of low cost and implementation difficulty, serving as a long-term mechanism and key tool for reducing consumer food waste. Information nudging refers to an information transmission mechanism that subtly influences consumer decision-making and cognition regarding food waste through information design and provision in decision-making environments, without interfering with consumer choice freedom or providing economic incentives. On one hand, nudging can directly influence consumer behavior decisions through adjustments in decision contexts, yielding immediate effects. Existing research suggests that strategies such as providing information, changing plate materials, portion sizes, and menu composition all demonstrate significant effectiveness in reducing food waste [**?**, **?**]. On the other hand, compared to mandatory prohibitions or economic incentives, information nudging is more cost-effective and easier to implement while effectively influencing consumer food waste behavior, exerting a subtle impact on consumer attitudes and cognition toward food waste. For instance, the U.S. "Food Waste Reduction Initiative" encourages consumers and businesses to reduce waste through advocacy and education. The UK' s nationwide "Love Food, Hate Waste" campaign aims to raise public awareness, while Singapore actively promotes its "Clean Plate, Zero Waste" program through educational campaigns in schools and restaurants to encourage food cherishing.

Information nudging has received widespread attention in research on consumer decision-making, overcoming undesirable behaviors, and promoting prosocial/pro-environmental behaviors [**?**, **?**, **?**, **?**]. While existing studies have begun exploring how information nudging can reduce consumer food waste [**?**, **?**], most examine direct policy intervention effects with limited exploration of feasible nudging tools. Research questions regarding the integration of food waste behavior characteristics into nudging strategies, multi-angle design and testing of nudging effects, potential positive or negative impacts (i.e., dual mechanisms), and boundary conditions require deeper investigation.

Although real-world marketing contexts employ information nudging as an effective intervention for consumer food waste, several issues persist: First, current food conservation nudging tools are monolithic, focusing primarily on guiding conservation cognition while rarely intervening directly in behavior. Unconscious behavioral interventions, which bypass cognitive change, can effectively and rapidly suppress food waste. Therefore, there is an urgent need to develop ef-

fective behavioral information nudging strategies tailored to food waste behavior characteristics. Second, the effectiveness of current nudging strategies in guiding public food conservation cognition needs improvement. While information nudging can be beneficial, it may also generate negative effects. For example, negatively valenced information can trigger negative emotions and require greater cognitive effort and resources, potentially causing consumer resistance. When consumers hold low efficacy beliefs about their ability to address food waste, emphasizing negative behavioral outcomes may elicit negative coping tendencies beyond individual capacity. Moreover, when consumers associate moderate ordering or takeout packaging with social status or face-saving, conservation reminders may backfire by triggering identity threats. Neglecting these negative effects and their connections with other influencing factors leads to suboptimal nudging outcomes. Therefore, elucidating the dual mechanisms of information nudging, revealing boundary conditions that amplify positive effects or mitigate negative ones, and designing targeted effective nudging strategies represent not only an academic research focus but also critical questions for unlocking the potential of nudging in addressing food waste and enhancing its effectiveness.

Consequently, this study follows the progressive stages of behavior guidance from "unconscious behavior to conscious cognition," exploring information nudging strategies to reduce consumer food waste through behavioral and cognitive pathways. On one hand, from the perspective of unconscious behavioral intervention, it investigates the intervention effects and boundaries of behavioral information nudging on consumer food waste, aiming to directly induce food conservation behaviors through information cue design without significantly altering consumer cognition. For example, set meal options allow consumers to directly select portions better matching their needs, reducing waste. On the other hand, it further examines the effects of cognitive information nudging strategies on consumer food waste, their mechanisms, and boundary conditions, aiming to increase or change consumer cognition regarding food waste through information provision, thereby driving conservation behaviors through cognitive influence. This study systematically constructs a multidimensional model of how information nudging strategies influence consumer food waste, explores more feasible nudging tools, reveals underlying mechanisms, identifies boundary conditions that enhance nudging effectiveness, and designs multi-path, diversified, and targeted food conservation nudging strategies, providing theoretical foundations and practical measures for effectively reducing consumer food waste.

2.1 Drivers of Consumer Food Waste Reduction Behavior

Existing research has extensively examined consumer motivations for reducing food waste, forming three main research directions (Table 1). The first direction analyzes individual trait factors, suggesting that differences in consumer characteristics such as attitudes, personal norms, values, and behavioral awareness are key psychological drivers for forming positive attitudes toward avoiding food waste. Scholars have first explored and tested the validity of classical behavioral

theories in the food waste domain. The Theory of Planned Behavior is a classic theory for predicting individual behavior. Based on this theory, existing research indicates that attitudes and subjective norms are significantly positively associated with consumer food conservation behavior. Regarding behavioral attitudes, consumers with negative attitudes toward food waste or positive attitudes toward food conservation are more likely to reduce their own food waste, with this positive association validated in both online and offline contexts [**?**, **?**]. Additionally, since food waste causes economic and resource losses, consumers' economic attitudes and thriftiness serve as key drivers for practicing food conservation [**?**, **?**]. Research suggests that concern about monetary loss influences food waste behavior more than environmental concern [**?**, **?**]. As another important psychological factor in the Theory of Planned Behavior, subjective norms also positively influence food waste reduction. Strong subjective norms make consumers feel responsible for acting in specific ways, increasing their willingness to constrain waste behavior [**?**, **?**]. Similarly, consumers avoid food waste because they want to do the "right" thing [**?**, **?**]. Second, specific values and individual traits can influence food waste reduction. For instance, consumers with mindfulness, frugal values, or frugal self-identity desire consistency between behavior and values or self-perception, leading to positive attitudes toward food conservation and greater spontaneous practice [**?**, **?**]. Furthermore, consumer behavioral awareness is an important driver for avoiding food waste. Consumers' sense of behavioral responsibility creates awareness of behavioral consequences, providing greater motivation to constrain food waste. Food waste involvement and behavioral awareness enable consumers to recognize the negative consequences of food waste and the adverse impacts of their own behavior, thereby driving conservation [**?**, **?**].

The second research direction examines the driving effects of social, moral, and environmental responsibility from a moral and altruistic perspective. Food waste not only causes natural resource loss but is also a major source of carbon emissions. Consumers with strong environmental concern, awareness, and resource scarcity consciousness resist behaviors with negative ecological impacts, showing higher willingness to reduce food waste [**?**, **?**, **?**]. Food waste not only creates socioeconomic losses but also exacerbates hunger and food shortage issues. Therefore, humanitarian consumers concerned with social problems (such as hunger and poverty) and those with social responsibility are more attentive to the social impacts of food waste and conserve food out of altruistic motives [**?**, **?**]. In resource-scarce contexts, consumers with interdependent personalities also actively reduce food waste out of sharing obligations [**?**, **?**]. Food waste is also considered immoral, so consumers with higher moral consciousness are more likely to avoid it [**?**, **?**]. On the other hand, reducing food waste and practicing conservation are socially accepted behaviors; the stronger the perceived social norms, the more likely consumers are to constrain their food waste behavior [**?**, **?**].

The third research direction highlights the positive role of emotional factors in reducing consumer food waste. First, food waste behavior that violates social or

personal norms often generates negative emotional experiences, making avoidance of negative emotions a key driver for waste reduction. For example, guilt and regret from discarding food can drive consumers to reduce waste [?, ?]. Negative emotions such as shame [?, ?] and guilt [?, ?] induced by wasting food under social norms can also prompt consumers to adjust their behavior to meet normative requirements. Second, performing socially and personally desired behaviors generates positive emotional experiences, thereby increasing food conservation behavior. Reducing food waste can bring happy and pleasant experiences, with the acquisition of hedonic value motivating conservation behavior [?, ?]. Similarly, anticipated pride from food conservation is also considered an important driver for waste reduction [?, ?].

Table 1 Drivers of Consumer Food Waste Reduction Behavior

Research Direction	Key Factors	Representative Literature
Attitudes/Personal Norms/Values/Behavioral Awareness	Food waste attitudes/economic attitudes; Subjective norms/Desire to do the "right" thing; Frugal values/Horizontal individualism; Food waste involvement, etc.	[?, ?]; [?, ?]; [?, ?]; [?, ?]; [?, ?]
Social/Moral/Environmental Responsibility Awareness	Environmental concern/Resource scarcity awareness; Humanitarian concern/Sharing obligations; Moral identity/Social norms	[?, ?]; [?, ?]; [?, ?]
Emotional Factors	Guilt/Regret/Shame/Guilt/Depression; Pleasure/Pride, etc.	[?, ?]; [?, ?]

2.2 Information Nudging Strategies and Consumer Food Waste Behavior

Countries worldwide have implemented various measures against food waste, including macro-level strategic plans (e.g., UN SDG 12.3, EU Waste Framework Directive), legal policies restricting waste and encouraging donation (e.g., France' s Anti-Food Waste Law), and educational programs promoting anti-waste initiatives (e.g., Singapore' s "Clean Plate, Zero Waste" program, Italy' s school-age children anti-food waste education project). However, existing research suggests that consumer food waste may be influenced by multiple factors including individual psychology, behavioral habits, external environment, and social interactions, with this complexity likely constraining the effectiveness of legal policies and educational activities [**?**, **?**] and making it difficult for relevant legislation to play a guiding role or for policies to achieve synergistic effects across different sectors and the entire industrial chain [**?**, **?**]. Therefore, to implement low-cost, easily executable measures targeting the consumption end and encourage voluntary waste reduction, existing research has begun examining the important role of nudging in the food waste domain. The nudging concept, proposed by Thaler and Sunstein (2008), refers to "adjusting people' s behavior in a predictable direction through choice architecture design, without prohibiting any options or altering economic incentives." Nudging comprises three main aspects: first, its essence lies in adjusting option content and architecture in decision environments to intervene in individual behavior predictably; second, nudging design does not involve prohibiting options; third, nudging implementation does not change economic incentives or penalties associated with each option. Therefore, consumer behavior intervention strategies outside decision contexts, as well as economic incentives and penalties, do not belong to nudging strategies, such as consumer behavior skills training or education outside decision contexts, or increasing economic costs or providing incentives for specific behaviors.

Based on this foundation, information nudging influences consumer behavior decisions directly or indirectly by providing and designing information cues in decision environments. Available information cues include peripheral cues that indirectly transmit information, such as tableware and menu design, as well as central cues that directly transmit information to guide consumer cognition, such as information labels and prompts. Previous research categorizes information nudging strategies into behavioral and cognitive types based on their direct or indirect influence on consumer food waste, with cognitive nudging further divided into information provision and architecture adjustment (Table 2). Behavioral information nudging refers to changing certain information cues in consumer decision contexts to directly guide decisions. Behavioral nudging primarily focuses on dish, container, and menu settings. For example, adjusting portion sizes to smaller servings can significantly reduce consumer food waste [**?**, **?**]. However, changing portion sizes is costly, so altering plate sizes can create an illusion of larger portions, increasing purchase intention while reducing

portion taken [?, ?]. Tableware-related nudging also includes reducing plate numbers [?, ?] and adjusting plate materials [?, ?]. Additionally, adjusting menu composition and default takeout options are effective interventions for consumer food waste [?, ?, ?]. Behavioral nudging strategies encompass both environmental design and information transmission functions—for instance, set meal options indirectly convey portion information, and plate size can influence portion judgment through visual illusion. Therefore, this study includes these environment-based nudging strategies with information transmission functions within the category of behavioral information nudging.

Cognitive information nudging aims to supplement or change consumer cognition and attitudes through information cues, indirectly guiding target behaviors by triggering cognitive responses. Research on the relationship between cognitive nudging and consumer food waste follows two main threads: information provision and information architecture. Information provision includes prompts about social and environmental costs of food waste, personal behavioral consequences and capabilities, and normative information. Some consumers lack clear and accurate cognition about the social costs and environmental impacts of food waste. Describing the economic, social, and environmental problems caused by food waste and emphasizing the severity of consequences and significance of reduction can effectively reduce consumer food waste [?, ?]. On the other hand, consumers' lack of awareness about their own food waste quantities, behavioral consequences, and behavioral influence also constitutes a major barrier to waste reduction. Therefore, studies have proposed cognitive nudging methods such as disclosing personal food waste quantities, self-recording waste behavior, and emphasizing personal impact and others' efforts to reduce waste by increasing problem awareness and outcome awareness [?, ?]. Furthermore, individual behavior is constrained by social norms; emphasizing food waste-related social norm information [?, ?] and providing reference points [?, ?] can also effectively constrain waste behavior.

Information architecture influences consumer food waste behavior. Information framing is a commonly used architectural method to increase information persuasiveness. When providing self or other reference points, gain framing can reduce consumer food waste [?, ?]; gain-loss framing can also interact with numerical precision to influence waste [?, ?]. Architecting the same information from positive or negative perspectives also produces differential effects [?, ?]. Among strategies transmitting information through peripheral routes, cool anthropomorphism can indirectly reduce waste by promoting purchase of suboptimal food [?, ?].

Table 2 Information Nudging Strategies in the Food Waste Domain

Nudging Type	Nudging Tools	Representative Literature
Behavioral Nudging	Portion reduction/providing samples, etc.	[?, ?]; [?, ?]
	Plate size/material/quantity, etc.	[?, ?]; [?, ?]; [?, ?]
	Restaurant environment	[?, ?]; [?, ?]
	Menu composition/default takeout, etc.	[?, ?]; [?, ?]
Cognitive Nudging	Social and environmental information (social/environmental costs/environmental consequences/significance of reducing waste); Personal relevance (personal behavioral consequences/personal impact/others' efforts); Social norms, etc.	[?, ?]; [?, ?]; [?, ?]; [?, ?]; [?, ?]
	Anthropomorphism; Visual/verbal design; Information framing (gain-loss/positive-negative); Communication quality, etc.	[?, ?]; [?, ?]; [?, ?]; [?, ?]

2.3 Literature Review

Food waste is a globally significant issue. Governments worldwide have made substantial efforts to reduce food waste through macro-level strategies, legal policies, and educational programs. However, existing interventions face various challenges: policies may be difficult to apply across entire industries and supply chains, economic incentives involve high implementation costs, and educational programs have limited reach. Consequently, research has begun focusing on nudging strategies that are low-cost, widely applicable, and fast-acting.

Compared to other interventions, information nudging can be embedded in daily activities with high flexibility and adaptability; it requires lower human and material costs than policy restrictions or economic incentives; and through effective information presentation, it can subtly promote behavioral change without affecting choice freedom, offering greater immediacy and effectiveness. Existing research exhibits the following characteristics and future issues:

First, exploration of information nudging tools for waste reduction remains limited, and how to design effective nudging strategies integrated with food waste behavior characteristics remains a key marketing research question. While various behavioral domains have extensively validated information nudging, the effectiveness of some tools in the food waste domain remains untested. For example, default options and option positioning in behavioral nudging, and pressure nudging and self-guarantee nudging in cognitive nudging, could all be tailored to food waste behavior characteristics and Chinese marketing contexts. Second, discussion of underlying mechanisms is insufficient, primarily focusing on positive mechanisms while neglecting potential negative ones. Information nudging may have a double-edged sword effect; deeply exploring its dual effects and mechanisms can facilitate further adjustments to food conservation nudging strategies to strengthen positive effects, reverse negative ones, and amplify intervention impacts. Finally, discussion of boundary conditions for information nudging' s influence on consumer food waste remains inadequate. Nudging effectiveness may vary across different information characteristics, receiver traits, and decision context features. Therefore, nudging transmission methods, audience individual characteristics, and dining context differences may all influence effectiveness. Uncovering boundary conditions is key to integratively designing nudging strategies that maximize impact.

3. Research Framework

This study proposes two research components: Study 1 on the intervention effects of behavioral information nudging on consumer food waste, and Study 2 on the influence and mechanisms of cognitive information nudging. Study 1 explores intervention effects and boundary conditions from an unconscious behavioral intervention perspective, where unconscious behavioral intervention directly influences consumer behavior decisions through information cues without attempting to change cognition about food waste, such as setting set meal options, default takeout, and changing tableware. Behavioral nudging-related information cues are primarily peripheral, acting during behavioral decision-making with relatively low cognitive effort and shallow information processing depth. Study 2 examines cognitive information nudging from a conscious cognitive guidance perspective, constructing a multidimensional model of its effects. Unlike unconscious behavioral intervention, conscious cognitive guidance does not directly affect behavior but supplements or changes consumer attitudes and cognition toward food waste through information cues, driving conservation behavior through cognition, such as using labels, posters, or digital screens to

convey emotional appeals, behavioral outcomes, and social norms. Cognitive nudging cues primarily act before behavioral decision-making, requiring consumers to fully understand information content with greater cognitive effort and deeper processing.

3.1 Study 1: Intervention Effects of Behavioral Information Nudging on Consumer Food Waste

Based on dual-system theory, this study constructs a multidimensional model of information nudging effects on consumer food waste from both peripheral and central information processing pathways. Study 1 focuses on unconscious behavioral intervention from the perspective of consumers' System 1, analyzing how behavioral information nudging influences food waste. Unconscious behavioral nudging aims to directly influence consumer behavior decisions by intervening in unconscious behavioral reactions without attempting to change consumer cognition or emotional experience [**?**, **?**]. In food waste interventions, strategies that directly intervene in behavioral outcomes without cognitive processes often achieve better immediate results [**?**, **?**]. When consumers evaluate portion sizes for ordering and leftovers, they often rely on specific standards such as portion size and number of diners—demonstrating anchoring effects. Without influencing deep understanding or cognition of food waste, we can design the "anchor" for consumer decision-making judgments, directly intervening in behavior by influencing intuitive judgments. Therefore, Study 1 focuses on consumers' peripheral information processing in dual-system theory, examining how three behavioral information nudging strategies—default set meal options, tableware coverage rate, and individual serving options—influence consumer food waste, and explores boundary conditions from the perspective of restaurant brand positioning.

3.1.1 Direct Effects of Behavioral Information Nudging

First, we examine how default set meal options influence consumer food waste. Default options are an important and widely discussed tool in nudging theory, typically manifested as consumers being pre-selected for a certain option—usually the desired choice or behavior—while retaining the freedom to easily opt out at any time [**?**, **?**]. A major source of consumer food waste is irrational pre-meal purchasing, stemming from both lack of knowledge about appropriate portions and choice difficulty due to dish variety [**?**, **?**]. Based on default option strategies with contextual adjustments for the food waste domain, this study proposes setting default set meal options corresponding to different group sizes during consumer ordering, such as prioritizing set meals with designed dish contents based on group size on menu homepages/front ends in restaurants, or prominently displaying set meal options at the top of food delivery apps. Default set meal options leverage the "default effect," where consumers tend to accept preset choices rather than actively make changes [**?**, **?**]. By setting default set meals for different group sizes, consumers unconsciously rely on presets matching their

group size during selection, reducing cognitive burden from active choice [**?**, **?**]. This behavioral pattern may lead consumers to accept more appropriate food quantities without deliberation, thereby reducing waste. Additionally, default set meals work through "anchoring effects," becoming immediately available options that drive decision-making. Therefore, when restaurants offer reasonable set meals and consumers have certain trust in the restaurant, consumers may directly select appropriate set meals based on group size, reducing the risk of over-ordering.

Proposition 1a: When consumers have high trust and satisfaction with a restaurant, default set meal options can reduce consumer food waste by effectively decreasing over-ordering.

Second, we examine how tableware coverage rate influences consumer food waste behavior. As mentioned, portion size is an important factor influencing consumers' food purchasing and discarding decisions [**?**, **?**]. However, changing suppliers' portion sizes may incur substantial economic costs and implementation difficulty. The tableware coverage strategy aims to adjust tableware size without changing dish portions, altering visual perception of portion size [**?**, **?**]. Based on "anchoring effects," tableware coverage sets a visual "anchor," causing consumers to unconsciously tend toward portion judgment based on provided tableware to complete their selection. Without others' advice, consumers facing these visual cues can form limited expectations without deep thinking, unconsciously deciding portion size based on tableware size, thereby reducing over-ordering risk and potential waste.

Proposition 1b: Indirectly manipulating portion perception through visual changes can reduce consumer food waste.

Finally, we analyze whether individual serving options can influence consumer food waste decisions. This study designs individual serving options from two angles: First, marking suitable group sizes next to whole portions provides simple quantitative decision information—an anchoring cue—prompting consumers to intuitively follow this quantitative guidance to select appropriate portions. As mentioned, food portion size is an important factor in food waste, and individual serving options can indirectly prompt ordering based on need without changing unit prices. Second, adding options for ordering by individual portions (e.g., providing single-person portions or pre-dividing meals by headcount) leverages the convenience principle, allowing consumers to make decisions without deep analysis, directly selecting based on need and effectively reducing food intake. Meanwhile, consumers who avoid personal responsibility may attribute food waste to others [**?**, **?**], especially in group dining situations where consumers are more likely to shift leftover responsibility to others. The individual serving context assigns meals to individuals, making each consumer more directly aware of their own leftovers and implicitly distributing behavioral responsibility for food waste to individuals.

Proposition 1c: The setting of individual serving options can effectively reduce

consumer food waste.

3.1.2 Boundary Effects of Restaurant Brand Positioning

Behavioral information nudging strategies must also align with restaurant positioning. Brand positioning can lean toward high-end quality or mass-market affordability. High-end positioning brands provide products with not only utilitarian value but also emotional and social value, commanding higher brand premiums. Mass-market positioning brands focus more on product utilitarian attributes and cost-effectiveness [**?**, **?**]. Therefore, applicable behavioral nudging strategies differ for restaurants with different positioning orientations. On one hand, information strategies implemented by restaurants should align with the product value and brand image they intend to convey. On the other hand, the value attributes consumers seek differ across restaurant positioning, requiring nudging strategies to match consumer value needs. First, set meal options provide more precise portion information, often associated with value attributes like cost-effectiveness and affordability, making them more suitable for mass-market restaurants. Second, for mass-market restaurants, reducing tableware size to increase coverage rate can create visual illusions that make consumers perceive larger portions for individual dishes [**?**, **?**], thereby reducing the number of dishes ordered. For high-end restaurants, larger tableware better fits their premium positioning, and consumers dining at high-end establishments pursue additional attributes like social value. Larger tableware can increase dish quantity while maintaining total food volume, providing social value for consumers. Similarly, individual serving systems providing single portions may better align with high-end restaurant service styles. Therefore, this study posits that restaurant positioning plays a boundary role in how behavioral information nudging influences consumer food waste.

Proposition 2: Restaurant brand positioning can influence the intervention effects of behavioral information nudging strategies on food waste.

3.2 Study 2: Influence and Mechanisms of Cognitive Information Nudging on Consumer Food Waste Behavior

Behavior change may involve two pathways: unconscious behavioral intervention and conscious cognitive guidance. Building on Study 1' s promotion of consumers' "thoughtless" behavioral decisions, Study 2 further focuses on "conscious cognitive guidance" to nudge food conservation, exploring how to "move them with emotion and persuade them with reason" to ultimately achieve spontaneous conservation practice. Based on previous nudging tool classifications, this study focuses on two classification dimensions: source of influencing factors and source of behavioral motivation. Dimension 1 is the source of influencing factors, moving from internal to external individual perspectives and focusing on "emotion, behavioral outcome, and group" to concentrate on individual internal emotions, cognition, and group effects. Dimension 2 is the source of behavioral

motivation. On one hand, stress cognitive appraisal theory proposes that individuals generate cognitive appraisal responses based on perceived external stress and adopt coping strategies—i.e., seeking and addressing stress sources [**?**, **?**]. In food waste contexts, enhancing perceived stress related to food waste can activate consumers'coping processes, reducing waste to alleviate stress. On the other hand, goal framing theory suggests that goal activation and pursuit determine individual behavioral motivation; the higher the expected reward for a goal, the stronger the commitment to achieving it [**?**, **?**]. Based on these theories, this study respectively focuses on external pressure and internal goals as two motivational sources, further dividing cognitive nudging tools into pressure-driven and goal-oriented types. Study 2 integrates these two dimensions to propose six cognitive information nudging strategies for reducing food waste (Figure 1 [Figure 1: see original paper]), focusing on how to effectively nudge food conservation by changing consumer cognition and emotional experience, and analyzing the effects, dual mechanisms, and boundary conditions of cognitive information nudging on consumer food waste behavior. Pressure-driven strategies include using food waste-related negative emotional appeals, prompting negative environmental consequences of waste, and displaying directly observable others' behavior information, aiming to apply pressure sources through different information prompts that make consumers want to avoid potential or expected negative outcomes, thereby reducing waste. Goal-oriented strategies include normative goals (guiding personal moral norms), gain goals (emphasizing personal resources and economic benefits), and hedonic goals (expected positive emotional appeals), activating consumers' social, extrinsic, and intrinsic motivations for conserving food through different goal settings, making consumers want to obtain expected positive outcomes and actively reduce waste.

3.2.1 Cognitive Nudging from Emotional Perspective and Its Mechanism

(1) Influence of Emotion-Based Cognitive Nudging on Food Waste

Emotional experience is an important behavioral driver and an effective tool widely concerned in the nudging field. First, from a stress coping perspective, information containing negative social emotions can create emotional pressure, driving consumers to take actions to alleviate or avoid negative emotions. In nudging to reduce undesirable behaviors (such as unethical or environmentally harmful behaviors), arousing negative emotions plays a key role. Consumer food waste behavior has social and environmental harm and is often considered socially and morally unacceptable. Using emotional appeals in nudging information to emphasize strong associations between food waste behavior and expected negative emotions can increase consumers' pressure perception from wasting food, making them adopt coping measures to avoid potential negative social emotions and constrain waste behavior. For example, guilt-related information can awaken anticipated guilt from food waste; shame-related information can convey social condemnation, emphasizing anticipated shame from

violating social and personal morals; or from an emotional resonance perspective, emphasizing others' efforts in food production and associating waste with disrespect. Emphasizing potential negative social emotions from food waste can make consumers reduce corresponding waste behaviors to avoid future negative emotions.

Second, from a goal guidance perspective, positive emotional experiences can be designed as cognitive nudging strategies to effectively guide consumer conservation. Based on previous goal type classifications [**?**, **?**], this study explores how goal setting influences consumer food waste from three dimensions: gain, hedonic, and normative. Gain goals stimulate consumers' extrinsic motivation for conscious conservation from an economic benefit perspective; hedonic goals stimulate intrinsic motivation from an expected emotional perspective; normative goals stimulate social motivation for conservation behavior that aligns with social and personal norms. Among these, hedonic goals relate to direct or expected positive experiences from reducing food waste [**?**, **?**] and may indirectly arise from gain and normative goals. To distinguish hedonic goals from others, hedonic goal settings will directly include emotional appeals in information content. Goal framing theory suggests that when hedonic goals are emphasized, individuals focus more on enhancing satisfaction and positive emotions, thereby stimulating intrinsic motivation for relevant behaviors [**?**, **?**]. The stronger the anticipated positive experience, the stronger the drive to execute target behavior. Hedonic goal settings can emphasize anticipated positive emotional experiences from conservation (such as glory from socially approved behavior, pleasure/satisfaction/achievement from lifestyle recognition or environmental contribution) through external information, stimulating consumers' intrinsic motivation to conserve food for positive emotional experiences.

Proposition 3a: Negative social emotions can reduce consumer food waste behavior.

Proposition 3b: Hedonic goals (positive emotional experiences) can reduce consumer food waste behavior.

(2) Boundary Effects of Individual Cognitive Resources and Mechanisms

Cognitive nudging information can stimulate consumer behavioral motivation to reduce food waste, with the key lying in consumers effectively receiving and processing information and generating motivation and decisions to reduce waste based on content. However, differences exist in cognitive resources available to information recipients for processing information, thereby influencing nudging effectiveness. Limited Capacity Theory proposes that individuals need to invest and consume cognitive resources for information processing, but resources available for processing information are limited [**?**, **?**]. Moreover, the Elaboration Likelihood Model suggests that when cognitive resources are sufficient, individuals can fully process complex information and tend to think deeply—i.e., process information through central routes [**?**, **?**]. When cognitive resources are

depleted, individuals have limited resources to invest in information processing, insufficient for central route processing and understanding, and tend to process simple, superficial cues through peripheral routes or make decisions based on atmospheric cues [?, ?]. Therefore, under different individual cognitive resource levels, the intervention effects of negative social emotions and positive emotional experiences on food waste behavior differ.

Proposition 4: When individual cognitive resources are high, negative social emotions more effectively reduce food waste; when cognitive resources are low, positive emotional experiences more effectively reduce food waste behavior.

Effective consumer information processing is a prerequisite for cognitive information nudging to play a positive role. Greater information processing depth means higher degrees of processing, deeper understanding and memory of content, thereby enhancing information impact [?, ?]. Negative social emotions contain more negative information; for consumers with sufficient cognitive resources who can fully process information, negative information can exert "negativity bias" influence, resulting in higher information processing depth [?, ?]. On the other hand, when cognitive resources are sufficient, individuals tend to process negative information through central routes and positive information through peripheral routes [?, ?]. According to the elaboration likelihood model, central route processing yields greater depth [?, ?, ?]. Therefore, under high cognitive resource conditions, negative social emotion-related information has higher processing depth than positive emotional experience-related information due to its negative valence.

However, for consumers with depleted cognitive resources, negative information is more likely to trigger information resistance due to information overload, thereby weakening the promotion of food conservation. On one hand, when cognitive information nudging strategies contain large amounts of information while consumers have low cognitive resources, consumers are more likely to experience information overload, reducing processing willingness or even generating aversion. Compared to positive emotional experience information, negative social emotion information contains larger information volumes [?, ?]. On the other hand, compared to positive information, individuals may also resist current nudging information due to avoidance or resistance to negative information, limiting its waste-reduction effectiveness. For example, reducing consumer food waste by arousing guilt may lead consumers to deny the severity of the problem or their personal responsibility [?, ?]. Therefore, when individual cognitive resources are low, negative social emotion-related information is more likely to cause information resistance compared to positive emotional experiences. Positive emotional experience nudging strategies, focusing more on atmospheric cues than complex information transmission, can achieve better effects for consumers with depleted cognitive resources.

Proposition 5: When individual cognitive resources are high, negative social emotions effectively reduce food waste due to higher information processing depth; when cognitive resources are low, positive emotional experiences effec-

tively reduce food waste by decreasing information resistance.

3.2.2 Cognitive Nudging from Behavioral Outcome Perspective and Its Mechanism

(1) Mechanism and Boundary Conditions of Environmental Outcomes on Food Waste

From a pressure-driven perspective, environmental consequences of food waste behavior constitute an important source of external pressure when consumers waste food. Environmental appeals play important roles in promoting sustainable consumption and green product purchase behavior. Marketers often enhance consumer environmental cognition and increase pro-environmental behavior willingness by emphasizing environmental problem severity or stating product/behavior environmental impacts [**?**, **?**]. Similarly, food waste behavior has significant negative impacts on resources and ecological environment, and information prompts about its environmental consequences can become key tools for promoting behavior change [**?**, **?**]. On one hand, some consumers lack cognition about environmental consequences of food waste, and relevant information prompts can supplement this cognitive deficiency [**?**, **?**]. Environmental issues can also increase consumers' environmental pressure cognition, driving conservation to alleviate ecological pressure. On the other hand, environmental appeals about food waste can highlight and emphasize individual behavioral environmental responsibility, making consumers reduce waste to alleviate responsibility pressure. Therefore, this study proposes from a behavioral outcome perspective that environmental consequences of food waste can serve as a pressure source driving consumers to reduce waste, and relevant nudging information can reduce consumer food waste behavior.

Proposition 6a: Providing information about environmental outcomes helps reduce consumer food waste behavior.

Stress Cognitive Appraisal Theory posits that stressors activate cognitive appraisal and drive individuals to respond, with coping strategies including positive and negative types that lead to different subsequent behaviors [**?**, **?**]. Descriptions of food waste environmental consequences can make consumers treat food waste as an external stressor. Whether consumers adopt positive or negative coping when facing stressors may be influenced by individual efficacy beliefs. Individual efficacy beliefs refer to individuals' evaluations and beliefs about their own efficacy—i.e., whether they believe they have the ability to influence or control specific environments and events [**?**, **?**]. Self-efficacy theory suggests that only when people believe their actions can achieve expected results and prevent harmful outcomes do they have motivation to take action to solve difficulties [**?**, **?**]. This study focuses on situational individual efficacy in the food waste context—i.e., whether consumers believe they have the ability to help alleviate food waste problems. When individual efficacy beliefs are low, consumers believe their actions cannot solve food waste problems and are more likely to adopt neg-

ative coping tendencies when facing environmental outcome stressors. Rather than taking conservation action, they may employ negative coping strategies such as responsibility avoidance or intentional information neglect to reduce psychological load. Conversely, strong efficacy beliefs enhance conservation motivation. For consumers with strong efficacy beliefs, environmental outcome information can strengthen conservation motivation and activate positive coping tendencies, actively participating in solving food waste problems through their own conservation behavior. Thus, this study posits that individual efficacy beliefs moderate the influence of environmental outcome information on consumer food waste behavior.

Proposition 6b: When individual efficacy beliefs are high, environmental outcome information can stimulate consumers' positive coping tendencies, thereby conserving food and reducing waste; when efficacy beliefs are low, environmental outcome information may trigger negative coping tendencies, weakening or eliminating intervention effects on food waste behavior.

(2) Mechanism and Boundary Conditions of Personal Outcomes on Food Waste

From a goal guidance perspective, personal behavioral outcomes from food conservation can become effective cognitive nudging strategies for reducing waste. Food waste not only causes social resource losses but also creates personal economic losses. Social Cognitive Theory suggests that self-regulation processes provide strong drivers for behavior change, with behavioral value determining self-regulation emergence [**?**, **?**]. Individuals care more about their performance in activities meaningful or beneficial to themselves and rarely expend energy on worthless activities—i.e., when events are important to self-concept and personal interests, consumers are willing to adjust behavior. Goal Framing Theory suggests that gain goals increase relevance between behavioral outcomes and self, motivating through personal resource enhancement [**?**, **?**]. Personal outcome information emphasizes personal economic benefits from reducing food waste, strengthening the association between food conservation and personal benefits, stimulating intrinsic behavioral motivation from gain goals, and making consumers adjust waste behavior for economic benefit objectives.

Proposition 7a: Providing information about personal outcomes helps reduce consumer food waste behavior.

Designing cognitive information nudging requires not only determining information types and content but also considering how to organize and transmit information. Therefore, this study explores the boundary role and corresponding mechanisms of two different communication forms—verbal and written—in the influence of personal outcome information on consumer food waste behavior. Information intervention form is crucial for influencing consumer behavior. Research in the food waste domain also suggests that written forms better reduce waste among consumers with low mindfulness, while verbal forms work better for high-mindfulness consumers [**?**, **?**]. This study argues that communication

form selection should consider not only consumer traits but, more importantly, match information content. Verbal communication, typically expressed orally by service staff, creates a decision context with others present. Under the influence of face consciousness and status pursuit, some consumers perceive personal benefit information about conservation as threatening their identity and social status [**?**, **?**], especially when others are present or when the relationship between food conservation and money is activated [**?**, **?**]. Consumers are more likely to perceive identity threats and thus ignore or even dislike prompts to maintain identity status. Conversely, written communication is more objective and formal, not only avoiding others-present decision contexts but also increasing the authenticity and persuasiveness of personal outcome information [**?**, **?**], thereby enhancing consumers' positive outcome expectations and amplifying nudging persuasiveness.

Proposition 7b: When using written intervention, personal outcome information increases consumer goal expectations, making them more willing to conserve food and reduce waste; when using verbal intervention, personal outcome information may trigger identity threats, weakening or eliminating intervention effects on food waste behavior.

3.2.3 Cognitive Nudging from Group Perspective and Its Mechanism

(1) Influence and Mechanism of Group-Based Cognitive Nudging on Food Waste

Humans have strong social attributes and form different social groups in any cultural context. The need for group belonging is also one of individuals' most basic needs and can become an important behavioral driver [**?**, **?**]. First, in food waste contexts, enhancing relevant group pressure can activate consumers' coping processes, reducing waste to alleviate pressure. Therefore, from a group perspective, group demonstration can serve as a pressure-driven nudging strategy to effectively reduce consumer food waste. Conformity behavior theory suggests that individuals tend to follow the crowd, and observing others making the same decisions leads to conformity [**?**, **?**]. In different behavioral contexts, individuals engage in behaviors similar to the majority due to conformity psychology and desire to integrate into specific groups [**?**, **?**]. Group demonstration strategies can inform consumers about conventional food conservation behaviors of other customers or local residents, focusing on influencing individual behavioral choices through observable others' behavior information. Such demonstration behaviors are often concrete, imitable, and can form certain behavioral patterns within groups. For example, physical or digital labels or server suggestions can indicate others' conservation behaviors (e.g., "X dishes for X people in our restaurant," "95% of our customers take leftovers home"). Consumers may make similar decisions out of conformity psychology or to obtain group belonging.

Second, social groups' moral norms also internalize into personal norms, playing an important role in reducing food waste [**?**, **?**]. Normative goals are one of

three goal types in Goal Framing Theory, referring to individuals' expectations to take appropriate actions based on moral positions [**?**, **?**], aiming to stimulate consumers' social motivation to practice conservation to achieve normative goals. Compared to group demonstration, normative goals more reflect the guidance of social or moral value positions on individual behavior, typically expressed as abstract principles or standards for judging whether individual behavior meets social expectations or personal moral norms. Previous research suggests that status motivation and face consciousness hinder consumer food waste reduction [**?**, **?**]. Normative goal settings can decouple the negative association between conservation and status/face by emphasizing moral and social norms for conservation, constructing symbolic meaning of conservation behavior as moral and social status, making consumers conserve food to align with social group behavioral norms.

Proposition 8a: Group demonstration can reduce food waste by increasing group belonging.

Proposition 8b: Normative goals can reduce food waste by increasing group belonging.

(2) Boundary Effects of Dining Context Privacy

Dining venue privacy influences consumer focus, thereby affecting how group perspective cognitive information nudging influences food waste behavior. In public dining contexts, consumer focus likely shifts to others. Consumers can more directly observe others' behavior, and their own behavior is more easily noticed by others, amplifying social pressure and better activating motivation to achieve group belonging through behavior consistent with others, making group demonstration information more effective. In private contexts, consumer behavior is unobserved by others, focus is more on self, and direct social group influence cannot be formed. Here, behavioral decisions are more determined by internal motivation, making normative goals as spontaneous cognitive nudging more effective in driving conservation.

Proposition 9: In public dining contexts, group demonstration more effectively reduces food waste; in private dining contexts, group belonging more effectively reduces food waste.

4. Theoretical Framework

Food waste is a critical issue that must be resolved to ensure food security and achieve sustainable resource and environmental development. Among various measures to address food waste, information nudging subtly influences consumer food waste behavior through information provision and design in decision environments [**?**, **?**], without providing economic incentives or penalties, offering advantages of low implementation difficulty and cost. However, marketing practice and theoretical research using information nudging to intervene in food waste still face unresolved issues: effective information nudging tools in the food waste

domain remain limited, requiring enrichment and expansion of diversified, targeted food conservation nudging strategies integrated with food waste behavior characteristics and Chinese marketing contexts; existing research mostly focuses on direct positive effects, with insufficient exploration of underlying mechanisms, especially potential negative impacts and boundary conditions. Yet information nudging may also bring negative effects such as information aversion and negative coping while playing positive roles. Dialectically analyzing the dual mechanisms of information nudging' s influence on food waste and deeply exploring boundary conditions that amplify attraction and reverse repulsion is necessary to unlock the potential of nudging in reducing consumer food waste. Thus, this study, based on previous nudging strategy classifications and following the "unconscious behavior-conscious cognition" research route, focuses on intervention effects and mechanisms of different nudging information strategies on consumer food waste behavior (Figure 2 [Figure 2: see original paper]).

First, it constructs an intervention mechanism for consumer food waste behavior from an unconscious behavioral nudging perspective. Behavioral information nudging can directly influence consumer behavior decisions without affecting cognition, attracting widespread attention across behavioral domains for its direct effects [**?**, **?**, **?**, **?**, **?**]. However, in food waste interventions, marketing practice and theoretical research still inadequately explore effective behavioral information nudging strategies. To further supplement and enrich effective behavioral information nudging strategies and address their intervention effects, Study 1 designs food conservation behavioral nudging strategies from three entry points—default set meal options, tableware coverage rate, and individual serving options—based on consumers' peripheral information processing, exploring their intervention effects on consumer food waste. Cognitive deficiencies regarding dish portions and personal behavioral responsibility are key factors hindering waste reduction [**?**, **?**, **?**]. Default set meal settings and tableware coverage can supplement or change consumers' portion perception through intuitive portion prompts and indirect visual effects, thereby reducing waste. Individual serving systems can not only supplement portion cognition but also reduce waste by distributing personal behavioral responsibility. Simultaneously, considering boundary effects of contextual heterogeneity, it explores how restaurant brand positioning amplifies or weakens intervention effects. Restaurants or brands with different positioning should select behavioral nudging strategies matching their value positioning—for example, default set meal settings may better fit mass-market restaurants' high cost-effectiveness characteristics, while high-end restaurants using individual serving systems can better provide social attribute value.

Second, it constructs a conscious cognitive guidance model of cognitive information nudging effects on consumer food waste behavior. Based on the progressive path of consumer behavioral motivation and combining pressure-driven and spontaneous pathways with three levels of influencing factors—emotion, behavioral outcome, and group influence—it designs food conservation cognitive information nudging strategies and explores their effects on consumer food waste.

It discusses the dual effects of cognitive information nudging from three levels —information processing, self-regulation, and social influence—to reveal mechanisms. It further explores differential effects of cognitive nudging on food waste from heterogeneous perspectives of information, individual, and dining context characteristics, deeply analyzing boundary mechanisms that amplify positive nudging effects and reverse negative ones.

Specifically, from the emotional perspective, negative social emotions can drive consumers to reduce waste through emotional pressure, while positive emotional experiences can guide conservation as hedonic goals. Meanwhile, positive and negative information have different valences that may bring different levels of information processing depth and resistance [**?**, **?**]. Therefore, information processing depth and resistance can become information processing mechanisms through which emotion-based cognitive nudging influences food waste behavior. During information processing, individual cognitive resource levels influence preferences and processing abilities for different valence information [**?**, **?**]. For example, high cognitive resource consumers have sufficient capacity to process negative valence information, enabling negative social emotions to exert better intervention effects, while low cognitive resource consumers prefer positive valence information, making hedonic goal information more effective.

From the behavioral outcome perspective, prompting environmental consequences of waste or conservation can drive waste reduction by creating environmental cognition pressure [**?**, **?**]. However, whether consumers actively respond to pressure information may depend on their individual efficacy beliefs [**?**, **?**]. When efficacy beliefs are high, consumers trust they can bring positive environmental outcomes through their own behavior, showing positive coping tendencies. Low efficacy beliefs are more likely to cause negative coping, reducing intervention effects of environmental outcome information. Prompting personally relevant behavioral outcomes can guide consumers to spontaneously conserve food as gain goals [**?**, **?**]. When behavioral outcomes enhance relevance with individuals, consumers have higher goal expectations and thus stronger behavioral drive. However, this positive effect exists primarily in written communication contexts. Verbal oral communication creates an others-present situation, where prompting personal outcomes from waste reduction and conservation may trigger identity threats.

From the group effect perspective, each consumer exists in social groups, and the need for group belonging provides important behavioral drive [**?**, **?**], making them want to behave consistently with group behavior or norms. Food conservation-related group demonstrations and personal norms can respectively reduce consumer food waste from group pressure and self-goal guidance directions. However, the intervention effects of the two strategies are influenced by dining context privacy. In public contexts, others' behavior is more observable and personal behavior is more noticeable, enabling group demonstration to work better. In private contexts, consumer behavior is more driven by internal motivation, allowing normative goals to exert better guidance.

This study has the following theoretical significance: First, it explores the influence of behavioral information nudging on consumer food waste from an unconscious behavioral intervention perspective, enriching research on behavioral nudging tools in the food waste domain. Examining differential effects of behavioral nudging based on restaurant characteristics can also compensate for insufficient boundary condition research. Second, it designs feasible cognitive information nudging strategies from pressure-driven and spontaneous perspectives, integrating key influencing factors at emotional, behavioral outcome, and group levels, helping expand the existing cognitive information nudging research framework. It deeply analyzes dual mechanisms of cognitive information nudging from information processing, self-regulation, and social influence levels, compensating for insufficient research on internal mechanisms of nudging' s influence on food waste. Further discussion of boundary conditions from information communication methods, individual psychological characteristics, and dining contexts also provides new perspectives for exploring how to enhance food conservation nudging effectiveness.

Furthermore, this study' s exploration of the relationship between information nudging strategies and consumer food waste can provide low-cost, easily executable measures for reducing food waste from the consumer end and building long-term mechanisms for practicing conservation and opposing waste. The investigation of mechanisms and boundary conditions for nudging strategies to reduce food waste can also provide strong foundations and feasible solutions for comprehensively considering information characteristics, consumer traits, and contextual features to design and adjust nudging strategies and build long-term effective mechanisms for reducing food waste through information nudging.

References

曹芬芳, 张晋朝, 李力等. (2022). 施引文献视角下国外从众行为研究述评, 情报科学, 40(3), 183-192.

戴佳彤, 盛光华. (2024). 公益广告信息框架对食物节约意愿的影响: 基于焦虑感视角, 心理科学, 47(2), 424-

张伟华, 刘小祎, 李玉峰. (2024). 面子意识对食物浪费的影响：促进还是抑制？干旱区资源与环境, 38(2),

段锦云, 卢志巍, 张涵碧. (2016). 权力感对风险决策框架效应的影响, 心理科学, 39(2), 412-417.

黄元豪, 李先国, 黎静仪等. (2023). 饱腹感标签对“眼大肚小”餐余浪费的影响及机制研究, 管理科学, 36(2),

李伟娟, 林升栋, 农婷等. (2017). 社会公德角度的对错判断: 公益传播中正负激励效果的调节变量, 心理科学, 40(5), 1202-1207.

王兆华, 陆彬, 王博等. (2022). 节能信息曝光度对绿色消费行为影响的实证分析——来自电商数据平台大规模文本数据的判据, 中国管理科学, 30(1), 241-251.

吴月燕, 彭璐珞, 严露娜等. (2019). “阳春白雪”还是“下里巴人”——消费者对文雅和通俗广告语体的态度, 南开管理评论, 22(1), 213-224.

张盼盼, 白军飞, 成升魁等. (2018). 信息干预是否影响食物浪费?——基于餐饮业随机干预试验, 自然资源学报, 33(8), 1439-1450.

Ang, W. Z., Narayanan, S., Hong, M. C. (2021). Responsible consumption: Addressing individual food waste behavior. British Food Journal, 123(9), 3245-3263.

Bandura, A., Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. Journal of Personality and Social Psychology, 45(5), 1017-1028.

Bandura, A., Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. Journal of Applied Psychology, 88(1), 87-99.

Boto-García, D., Baños-Pino, J. F. (2022). Social influence and bandwagon effects in tourism travel. Annals of Tourism Research, 93, 103366.

Cadario, R., Chandon, P. (2020). Which healthy eating nudges work best? A meta-analysis of field experiments. Marketing Science, 39(3), 465-486.

Casonato, C., Garcia-Herrero, L., Caldeira, C., et al. (2023). What a waste! Evidence of consumer food waste prevention and its effectiveness. Sustainable Production and Consumption, 41, 305-319.

Ellison, B., Savchenko, O., Nikolaus, C. J., et al. (2019). Every plate counts: Evaluation of a food waste reduction campaign in a university dining hall. Resources Conservation and Recycling, 144, 276-284.

Fazal-e-Hasan, S. M., Mortimer, G., Ahmadi, H., et al. (2024). How tourists' negative and positive emotions motivate their intentions to reduce food waste. Journal of Sustainable Tourism, 32(10), 2039-2059.

Folkman, S., Lazarus, R. S. (1985). If it changes it must be a process -study of emotion and coping during 3 stages of a college-examination. Journal of Personality and Social Psychology, 48(1), 150-170.

Gao, H. C., Jia, H., Guo, B. X. (2023). Resources available for me versus us: Implications for mitigating consumer food waste. Journal of Marketing Research, 61(4), 619-637.

Garske, B., Heyl, K., Ekardt, F., et al. (2020). Challenges of food waste governance: An assessment of European legislation on food waste and recommendations for improvement by economic instruments. Land, 9(7),

Graham-Rowe, E., Jessop, D. C., Sparks, P. (2014). Identifying motivations and barriers to minimising household food waste. Resources Conservation and Recycling, 84, 15-23.

Habib, M. D., Kaur, P., Sharma, V., et al. (2023). Analyzing the food waste reduction intentions of UK households. A value-attitude-behavior (VAB) theory

perspective. Journal of Retailing and Consumer Services, 75,

Huang, Y. H., Ma, E., Wang, D. N. (2021). Message framing strategies, food waste prevention, and diners' repatronage intentions: The mediating role of corporate social responsibility. Journal of Sustainable Tourism, 29(10), 1694-1715.

Ingendahl, M., Hummel, D., Maedche, A., et al. (2021). Who can be nudged? Examining nudging effectiveness in the context of need for cognition and need for uniqueness. Journal of Consumer Behaviour, 20(2), 324-

Jabeen, F., Dhir, A., Islam, N., et al. (2023). Emotions and food waste behavior: Do habit and facilitating conditions matter? Journal of Business Research, 155, 113356.

Jaiswal, J., Aagja, J. (2023). Influence of scarcity and environmental consciousness on food waste behaviour. Journal of Consumer Behaviour, 23(3), 1057-1069.

Kaur, P., Dhir, A., Talwar, S., et al. (2021). Systematic literature review of food waste in educational institutions: Setting the research agenda. International Journal of Contemporary Hospitality Management, 33(4),

Khalil, M., Septianto, F., Lang, B., et al. (2021). The interactive effect of numerical precision and message framing in increasing consumer awareness of food waste issues. Journal of Retailing and Consumer Services, 60,

Lang, A. (2006). Using the limited capacity model of motivated mediated message processing to design effective cancer communication messages. Journal of Communication, 56, S57-S80.

Laran, J., Janiszewski, C., Salerno, A. (2019). Nonconscious nudges: Encouraging sustained goal pursuit. Journal of Consumer Research, 46(2), 307-329.

Lazarus, R. S., Folkman, S. (1984). Stress, appraisal, and coping. Springer.

Lindenberg, S., Steg, L. (2007). Normative, gain and hedonic goal frames guiding environmental behavior. Journal of Social Issues, 63(1), 117-137.

Maheswaran, D., Meyerslevy, J. (1990). The influence of message framing and issue involvement. Journal of Marketing Research, 27(3), 361-367.

McCarthy, B., Liu, H. B. (2017). 'Waste not, want not' : exploring green consumers' attitudes towards wasting edible food and actions to tackle food waste. British Food Journal, 119(12), 2519-2531.

Nguyen, T. T. T., Malek, L., Umberger, W. J., et al. (2023). Motivations behind daily preventative household food waste behaviours: The role of gain, hedonic, normative, and competing goals. Sustainable Production and Consumption, 43, 278-296.

Nunkoo, R., Bhadain, M., Baboo, S. (2021). Household food waste: Attitudes, barriers and motivations. British Food Journal, 123(6), 2016-2035.

Olavarria-Key, N., Ding, A. N., Legendre, T. S., et al. (2021). Communication of food waste messages: The effects of communication modality, presentation order, and mindfulness on food waste reduction intention. International Journal of Hospitality Management, 96, 102962.

Pelt, A., Saint-Bauzel, R., Barbier, L., et al. (2020). Food waste: Disapproving, but still doing. An evidence-based intervention to reduce waste at household. Resources Conservation and Recycling, 162, 105059.

Petit, O., Velasco, C., Spence, C. (2018). Are large portions always bad? Using the delboeuf illusion on food packaging to nudge consumer behavior. Marketing Letters, 29(4), 435–449.

Qi, D. Y., Li, R., Penn, J., et al. (2022). Nudging greater vegetable intake and less food waste: A field experiment. Food Policy, 112, 102369.

Reynolds, C., Goucher, L., Quested, T., et al. (2019). Review: Consumption-stage food waste reduction interventions –what works and how to design better interventions. Food Policy, 83, 7–27.

Sarial-Abi, G., Ulqinaku, A. (2020). Financial constraints influence how consumers evaluate approach-framed versus avoidance-framed messages. Journal of Advertising, 49(3), 270–291.

Shen, L. J., Dillard, J. P. (2009). Message frames interact with motivational systems to determine depth of message processing. Health Communication, 24(6), 504–514.

Talwar, S., Kaur, P., Kumar, S., et al. (2022). The balancing act: How do moral norms and anticipated pride drive food waste/reduction behaviour? Journal of Retailing and Consumer Services, 66, 102901.

Thaler, R. H., Sunstein, C. R. (2008). Nudge: Improving decisions about health, wealth, and happiness. Yale University Press.

Van Bavel, J. J., Swencionis, J. K., O'Connor, R. C., et al. (2012). Motivated social memory: Belonging needs moderate the own-group bias in face recognition. Journal of Experimental Social Psychology, 48(3), 707–

van der Werf, P., Seabrook, J. A., Gilliland, J. A. (2021). "Reduce food waste, save money" : Testing a novel intervention to reduce household food waste. Environment and Behavior, 53(2), 151–183.

Visschers, V. H. M., Wickli, N., Siegrist, M. (2016). Sorting out food waste behaviour: A survey on the motivators and barriers of self-reported amounts of food waste in households. Journal of Environmental Psychology, 45, 66–78.

Watson, M., Meah, A. (2012). Food, waste and safety: Negotiating conflicting social anxieties into the practices of domestic provisioning. Sociological Review, 60, 102–120.

Wilken, R., Schmitt, J., Dost, F., et al. (2024). Does the presentation of true costs at the point of purchase nudge consumers toward sustainable product options? Marketing Letters, 35(4), 589–602.

Xu, Z. G., Zhang, Z. L., Liu, H. Y., et al. (2020). Food-away-from-home plate waste in China: Preference for variety and quantity. Food Policy, 97, 101918.

Zhang, J., Huang, Y. D., Zhu, J. M., et al. (2023). A meta-analysis on the effectiveness of food-waste reducing nudges. Food Policy, 120, 102480.

Zou, H., Wang, H., Li, J., et al. (2024). Ordering alone or together? The effect of ordering situation on over-ordering behavior. Journal of Retailing and Consumer Services, 77, 103658.

Note: Figure translations are in progress. See original paper for figures.