Intergenerational effects of lay beliefs : how parents' unhealthy tasty intuition influences their children's food consumption and Body Mass Index

Intergenerational Effects of Lay Beliefs: How Parents' Unhealthy = Tasty Intuition Influences Their Children's Food Consumption and Body Mass Index

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ABSTRACT

Childhood obesity is a major problem worldwide and a key contributor to adult obesity. This research explores caregivers' lay beliefs and food parenting practices, and their long-term, intergenerational effects on their children's food consumption and physiology. First, a cross-cultural survey reveals the link between parents' belief that tasty food is unhealthy (Raghunathan, Naylor, and Hoyer 2006) and the use of extrinsic rewards to encourage their children to eat healthily, with adverse downstream consequences for the children's body mass indices. Next, two studies demonstrate the mechanism by which this strategy backfires, as providing extrinsic rewards ironically increases children's unhealthy food consumption, which in turn leads to an increase in their body mass indices. The final two studies demonstrate potential solutions for public policy and health practitioners, either by manipulating "unhealthy = tasty" beliefs directly or by breaking the association between these food beliefs and the use of extrinsic rewards through an intervention.

Keywords: Parenting, lay beliefs, obesity, extrinsic rewards, food psychology.

INTRODUCTION

Childhood obesity is a serious problem worldwide and is increasing at an alarming rate. Globally, 380 million children are overweight or obese, with the prevalence increasing from 4% in 1975 to over 18% in 2016 (WHO 2020). Nearly one in five children in the United States is obese, and one in three is overweight (Stierman et al. 2021). Being overweight in childhood sets the stage for a lifelong struggle with weight and eating. It raises the risk of serious health problems, including diabetes, hypertension, and heart disease (Simmonds, Llewellyn, and Owen 2016). Indeed, the American Academy of Pediatrics recently recommended a highly aggressive portfolio of approaches to tackling this issue, including even bariatric surgery (Hampl et al. 2023). Such drastic corrective interventions may well be occasionally necessary. Yet, a key contributing factor to this critical issue stems from consumption of food. Therefore, we argue that consumer research identifying modifiable risks, protective factors, and potential intervention opportunities during infancy and childhood is necessary (Nader et al. 2012).

Research from multiple disciplines has investigated the factors influencing childhood obesity. Given its complex nature, several researchers have shown that a variety of factors within a broader social and environmental context (e.g., familial, educational, and communal characteristics) can increase the risk of obesity (Davison and Birch 2001; Davison, Jurkowski, and Lawson 2013; Harrison et al. 2011; Moore et al. 2017). There is also a broad, ongoing discourse about the role of consumer lay beliefs and their obesogenic consequences, and researchers have called for a greater understanding of these processes and the need for possible corrective actions (Karnani, McFerran, and Mukhopadhyay 2014, 2016). Children may be vulnerable targets of consumer lay beliefs, which play a major role in the formation of attitudes

and behaviors related to food consumption and body weight, and are conveyed and reinforced within children's social networks especially by parents and other caregivers.

Caregivers act as gatekeepers and role models concerning food (McCaffree 2003), and hence their influence is pivotal. However, almost all research on family roles in childhood obesity has been conducted within the fields of pediatric medicine, public health, nutrition, developmental psychology, family studies, genetics, and physiology (McGinnis, Gootman, and Kraak 2006); the topic has been neglected in consumer research. Moore, Wilkie, and Desrochers (2017) proposed a consumer socialization framework for investigating familial influence on childhood obesity based on five contributors: biological predispositions, parent/family inputs, parent-child interactions, child properties, and intergenerational transfers. The present research builds on this framework by investigating how caregivers' food beliefs (i.e., parental input) affect their parenting practices (i.e., parent-child interactions) and the child's eating behaviors and physiology (i.e., child outcomes).

Regarding parent/family inputs, Moore et al. (2017) distinguish between household environments and caregivers' misperceptions and knowledge gaps. Caregivers' lay beliefs, whose effects are yet to be investigated, probably fall in the latter category. Lay beliefs, which can affect children at the socio-cultural level (Wyer 2004), where families and caregivers play major roles (Nussbaum and Dweck 2008), have drawn academic interest because of their immediate and considerable effect on obesity (Mai and Hoffman 2015). For example, McFerran and Mukhopadhyay (2013) show that laypeople who attribute obesity to a lack of exercise are more likely to be overweight because they tend to consume more food than those who attribute obesity to a poor diet. Hence, important psychological antecedents of obesity may be rooted in consumers' belief systems. Building on this, Karnani et al. (2014) show how these lay beliefs

may largely stem from the food industry, whose messaging provides a consistently slanted perspective on the complex issues of nutrition and obesity. We add to this literature by investigating whether the extent to which caregivers believe there is a trade-off between healthiness and tastiness (i.e., the Unhealthy = Tasty Intuition, "UTI"; Raghunathan, Naylor and Hoyer 2006) affects their likelihood to use extrinsic rewards when trying to make their children eat healthily, and how this subsequently influences children's food consumption and body mass index (i.e., BMI).

This research makes important theoretical contributions and provides meaningful insights to our understanding of child obesity. On the theoretical front, it is the first to demonstrate intergenerational effects of caregivers' food beliefs on children's food intake and BMI. It responds to Moore et al.'s (2017) call for more research on parental influences on children's obesity and brings the important dimension of caregivers' lay beliefs to this literature. It also contributes to the literature on consumer socialization. Although the family often plays a crucial role in driving children's values, attitudes, and behaviors (Parke and Buriel 2006), not much is known about how socialization occurs in the context of children's food intake. We extend this literature by demonstrating the consequential role of caregivers' beliefs in their children's (un)healthy food consumption and weight status. To this end, we employ a large cross-cultural survey, a unique primary dataset of parent-child dyads, traditional survey research with parents, and two experimental studies: one in which UTI beliefs are manipulated and one in which parents are followed after an intervention.

On the substantive front, this research has important implications for tackling childhood obesity, which should be of interest to parents, educators, and policymakers. It calls into question the effectiveness of popular cognitive approaches (e.g., interventions that encourage or

discourage the consumption of certain foods by labeling them “good” or “bad”) and the reward systems that incentivize healthy eating. For instance, the number of “diet” claims (such as “low sugar”) in the United States has been increasing since 2010 (Chandon and Cadario 2022), though they have been proven to lead to low taste expectations (André, Chandon, and Haws 2019). Hence, while food marketers may want to guide households by providing claims that their products are healthy, they may also contribute to the further development and transportation of potentially harmful UTI beliefs.

CONCEPTUAL DEVELOPMENT

The Unhealthy = Tasty Intuition Among Parents

Taste is the most important attribute when selecting food (Tepper and Trail 1998; Mai and Hoffmann 2015). Although consumers should probably all care more about healthiness of food, taste remains the primary determining factor in food choice (Glanz et al. 1998). In support, Sullivan et al. (2015) showed that taste, as a more concrete attribute, is processed faster and is a more reliable predictor of food choices than healthiness. Indeed, newborns recognize the good taste of high-calorie foods to ensure their survival, and humans have therefore evolved to prefer the taste of energy-dense foods.

The evolutionary preference for energy-dense foods developed when calories were relatively scarce. However, high-calorie foods are now readily available in many modern societies. Therefore, this innate propensity, which was once key to our survival, may ironically be one of the primary causes of the current obesity epidemic (Pinel, Assanand, and Lehman

2000). Given this link between palatability and caloric density, many people believe that taste and healthiness are negatively correlated. Raghunathan et al. (2006) labeled this belief "the Unhealthy = Tasty Intuition" (UTI).

Holding UTI beliefs makes it difficult to adopt a healthy diet because choosing a healthy food item inherently implies sacrificing tastiness and enjoyment. Furthermore, people with a strong UTI are more likely to face a dilemma between the short-term attraction of tastiness and the long-term goal of health (Metcalfe and Mischel 1999). As the desire for taste often prevails when selecting food, people with a strong UTI are more likely to choose unhealthy foods, thereby contributing to weight gain. In support, Mai and Hoffmann (2015) found that consumers who strongly held UTI beliefs evinced less interest in healthy food items and more in unhealthy items. Similarly, cross-national investigations have shown that stronger beliefs in UTI correlate with increased BMI through a decreased consumption of healthy foods (Briers et al. 2020; Cooremans, Geuens, and Pandelaere 2017).

Parenting Practices

The priority of taste in food choices is even greater for children than for adults. This is partly due to the delayed development of the frontal lobes that control the "cool" cognitive-control system (Metcalfe and Mischel 1999). While adults have the ability to consider non-immediate and environmental cues when choosing food (Tomiyama, Mann, and Corner 2009), children are driven mainly by immediate stimulus properties such as smell and taste (though other factors, such as branding and social considerations, can also play a role; Birch 1981; Campbell et al. 2016; Shutts, Kinzler, and DeJesus 2013).

To prevent children from relying solely on their taste preferences, parents and caregivers often try to encourage them to eat healthily, although not always with success. Pocock et al. (2010) found that while many parents would indeed like their children to eat healthily, they face many obstacles, including struggling with time constraints, feeling undermined by other family members, dealing with the child's preferences, and having to counteract the advertising of unhealthy foods. It is understandably difficult for a parent to prioritize their child's long-term health in the heat of the dinnertime moment when the child is (yet again) throwing a tantrum and the dishes are waiting to be done. Results of a Harvard Public Health (2013) survey confirm these findings: while nearly all parents (95%) agree that it is important that their children eat healthily, 44% say it is challenging to succeed.

The Food Parenting Practices (FPPs) literature has described many different strategies by which parents and caregivers try to induce healthy eating (e.g., DeCosta et al. 2017; Patel et al. 2018). In this literature, FPPs are typically described using three higher-order constructs: coercive control, structure, and autonomy support/promotion (Patel et al. 2018). Coercive control involves FPPs such as restrictions, pressure to eat, threats and bribes, and the use of food to control negative emotions. Structure involves FPPs such as rules and limits around food, limiting/guiding food choices, monitoring, meal and snack routines, modeling, food availability, food accessibility, and food preparation. Autonomy support or promotion involves FPPs such as nutrition education, encouragement, child involvement, praise, reasoning, and negotiation. One set of common coercive control FPPs is instrumental feeding—the use of food and non-food rewards and punishments (threats and bribes) in a feeding situation. The use of instrumental feeding has been documented across Europe, Australia, and the United States (Sherry et al., 2004), and research suggests that parental use of extrinsic rewards and instrumental feeding is

omnipresent (Beckers et al. 2021; Cooke et al. 2011; Russell, Worsley and Campbell 2015).

Despite its prevalence, parents are often informed that using extrinsic rewards is a kind of bribery and should not be relied upon (Cooke et al. 2011). The popular press discusses the potential harm of offering extrinsic rewards (e.g., sending the wrong message that the target food is unpleasant; Komninou 2017; Boothby and Campbell 2019; Anderson 2023). Research has also shown that although parents often use rewards and bribes, they are less convinced by the long-term effectiveness of such rewards to change their child's food preferences (Russell et al. 2015). Notably, according to a recent systematic review of 12 separate FPPs and children's weight outcomes (Beckers et al. 2021), instrumental feeding (i.e., using both food and non-food rewards) was the only strategy positively associated with higher weight over time. Hence, parents should know that it is better not to employ extrinsic rewards for eating. This difference, between knowing what is appropriate and doing something else, may be viewed as the difference between having an "assessment" mindset at a broad "cool" level (Metcalfe and Mischel 1999) and a "locomotion" mindset at the time of "hot" implementation (Kruglanski et al. 2010). Parents may intend to create positive eating situations and avoid using certain strategies, but may at times end up doing otherwise (Larsen et al. 2018) and fall back on extrinsic rewards to get their children to eat healthily (Beckers et al. 2021; Cooke et al. 2011; Russell et al. 2015). Given the harm that extrinsic rewards can cause to children's weight (Beckers et al. 2021), it is important to investigate what factors drive parents' or caregivers' decision-making at the locomotion stage.

Much research has examined factors driving parents or caregivers to use instrumental feeding. Some researchers have linked parenting styles (e.g., authoritarian parenting, mindful parenting; Vereecken et al. 2004; Gouveia, Canavarro, and Moreira 2019) to instrumental feeding, while others have examined demographic variables, such as SES (Orrell-Valente et al.

2007). Thus far, no research has looked at whether beliefs held by parents or caregivers, such as UTI beliefs, may also influence their likelihood to use extrinsic rewards (food or non-food related) to incentivize their children's healthy food consumption.

While many parents feel that it is a challenge to make their children eat healthily and use a variety of strategies to induce healthy eating (as described above), our key premise is that parents with higher UTI beliefs may do so in a systematically different way than parents with lower UTI beliefs. Taste is the primary driver of food choices for people in general and especially for children. However, people with stronger UTI beliefs believe that the healthier a food item is perceived to be, the worse its taste and thus attractiveness. The parent's own dislikes create the expectation that the child is not going to like it either (Komninou, 2017). Therefore, when in a situation where the child does not finish his/her healthy food, it is more likely that parents with higher UTI beliefs will feel the need to provide extra incentives to compensate for the food's lower tastiness and attractiveness. Given the urgency to get the job done when in a locomotion mindset, they should be more likely to rely on external motivators (e.g., promises of candies or screen time; Roberts, Marx, and Musher-Eizenman 2018) compared to parents with lower UTI beliefs[1]. Thus, formally, we hypothesize that parents and caregivers who hold a stronger UTI would be more inclined to offer their children extrinsic rewards for eating healthily compared to parents and caregivers with weaker UTI beliefs.

Some evidence supports this link between UTI and the use of extrinsic rewards. For example, Americans, who generally hold stronger UTI beliefs than French people (Werle et al. 2013), tend to offer their children extrinsic rewards (e.g., dessert) for finishing what they ought

[1] Consistent with the FPP literature which often groups food and non-food incentives together (DeCosta et al. 2017; Patel et al. 2018), our theorizing does not assume any difference in the association between UTI beliefs and food and non-food extrinsic rewards. We discuss this in detail in subsequent paragraphs.

to eat (Ochs, Pontecorvo, and Fasulo 1996). To provide further insight into this link, we conducted a pilot study (N = 208) in which we presented parents with a scenario where their child would not finish his/her vegetables at dinner and asked which of a given list of strategies, including offering food-related rewards (e.g., having some dessert) and non-food rewards (e.g., getting a sticker), they thought would be effective in *making* the child finish the vegetables. Results revealed a significant positive relationship between the strength of UTI beliefs and the perceived effectiveness of extrinsic rewards to get the job done in the heat of the moment (β = .17, $p < .001$): parents with higher UTI beliefs tended to perceive both offering food-related rewards (β = .23, $p < .001$) and non-food rewards (β = .12, p = .05) to be effective in making children finish vegetables than those with lower UTI beliefs.

However, in a separate pilot study (N = 203) where parents were instead put in an assessment mindset and asked to indicate the extent to which they believed that each of these strategies would be effective in *motivating* children to eat healthy food *in general*, there was no significant relationship between the strength of UTI beliefs and the use of extrinsic rewards (see Web Appendix A for both studies). This is consistent with the earlier observation that there seems to be a difference between some parents' intentions when they are in an assessment mindset, and what they may actually do (Larsen et al. 2018). These results provide initial evidence that although parents with higher UTI beliefs do not necessarily believe that extrinsic rewards motivate their children to eat healthy food in general, they are more likely to use them when in a locomotion mindset.

Children's Food Consumption and BMI

By providing an extrinsic reward for eating healthy food, caregivers send the message that the extrinsic reward is more valuable than the healthy food itself. Ironically, this may cause the child to eat less healthily. Research has shown that parents' use of extrinsic rewards does not successfully encourage healthy food consumption because it generally leads to a decreased liking of the food (Birch et al. 1982; Birch, Marlin, and Rotter 1984; Lepper et al. 1982; Newman and Taylor 1992). For example, Birch et al. (1982) showed that children preferred juice less when it was presented as instrumental for a rewarding activity (e.g., "drink this juice and you get to play") than when it was not presented as instrumental. Indeed, when food is used as a reward (e.g., "No dessert until you finish your vegetables"), children may eat more vegetables on that occasion, at the cost of a lower preference for them years later (Birch et al. 1984). Rewarding a child for eating a particular food thus appears to work against establishing a preference for it (Birch et al. 1982). This is consistent with Lepper et al. (1982), who found that intrinsic preference is reduced when a child perceives an extrinsic reason (e.g., a bribe) for performing some action. In contrast, when a target food is used as a reward ("if you do X, I will give you a string bean"), the target food becomes enhanced in value (Birch et al., 1982).

Further, besides offering direct extrinsic rewards, merely presenting food as instrumental to achieving a health goal (e.g., "this food makes you strong") can be enough for pre-schoolers to start disliking the food and to consume less of it (Maimaran and Fishbach 2014). The same results hold when food is made instrumental to other types of goals (e.g., presenting food as a means to improve intellectual performance), not just health.

More generally, Richins and Chaplin (2015) showed that parents who induce behaviors with material rewards create a focus on the reward rather than the desired behavior. Such inferences based on causal discounting are not limited to children; it has been extensively

demonstrated that extrinsic goals are less effective than intrinsic goals in motivating desired behaviors (Deci and Ryan 1985). This can have longitudinal effects, as people with an extrinsic goal tend to settle for achieving the goal at best, whereas those with an intrinsic goal try to go above and beyond on future occasions (Wang and Mukhopadhyay 2012). Taken together, these findings suggest that the more caregivers use extrinsic rewards to incentivize healthy eating, the more unhealthily their child is likely to eat.

Importantly, this theory does not predict different effects of food and non-food rewards. Conceptually, any reward, whether food or non-food, serves as an extrinsic incentive that may crowd out intrinsic motivation (Rodriguez-Planas 2012). Indeed, the FPP literature often groups food and non-food rewards and demonstrates how instrumental feeding *in general* can increase children's weight over time (Beckers et al. 2021). At the same time, recent research has provided a more nuanced perspective and examined the difference between food and non-food rewards. While food rewards generally negatively affect healthy food intake, research so far has shown more mixed findings for non-food rewards (Becker et al. 2021; Cooke et al. 2011; DeCosta et al. 2017). The effectiveness of non-food rewards depends on a number of factors, such as age and the operationalization of non-food rewards (see Web Appendix B for a review). Further, in much research as in reality, parents offer food and non-food rewards together. Since our main focus is to understand the effect of caregivers' UTI beliefs on their usage of extrinsic incentives, it is beyond the scope of the current research to delve into the possible different effects of food and non-food rewards. Moreover, our pilot study found no difference in the association between UTI beliefs and both types of extrinsic rewards. For all these reasons, we draw on the FFP literature that has consistently shown a negative effect of instrumental feeding and argue that extrinsic rewards, both food and non-food, can crowd out intrinsic motivation and increase unhealthy food

consumption. We return to this matter in the General Discussion.

To summarize, we predict that caregivers who hold strong beliefs in UTI will be more likely to use extrinsic rewards to encourage their children to eat healthily. However, as this strategy often backfires, providing extrinsic rewards should ironically increase the child's unhealthy food consumption, leading to an increase in the child's BMI.

OVERVIEW OF STUDIES

We now report five studies that test our predictions. Study 1 provides cross-cultural evidence for the link between parents' UTI beliefs and the use of extrinsic rewards to encourage children to eat healthily and shows the downstream consequences for children's BMI. Studies 2 (parent-child dyads) and 3 (parents) test the effect of parents' UTI beliefs on their children's food intake and BMI, as mediated by the parenting practice of extrinsically rewarding healthful consumption. Using a sample of non-parents in a caregiver scenario, Study 4 provides causal evidence and suggests that extrinsic rewarding practices can be attenuated by manipulating UTI beliefs. Study 4 also shows the conceptually important boundary condition that the effect of UTI on extrinsic reward usage is not evident for food that is not perceived as healthy. Finally, Study 5 uses a short longitudinal design to test an intervention that weakens the association between UTI beliefs and extrinsic reward usage.

We used consistent screening procedures across the studies. First, in all studies that sampled parents, participants were at the outset asked whether they had a child between the ages of 6 and 12 living in their household and whether they were the child's primary caregiver. If they had more than one child, we asked them to fill in the survey for the child that had the next

birthday. In Study 1, participants were also asked whether they could indicate the height and weight of their child. Parents who had no child between 6 and 12, who were not the primary caregiver, or who could not indicate the child's height and weight, could not proceed. Second, to increase data quality, we included attention-check items that required participants to ignore an ostensible question and select an unrelated option. Participants who failed the attention-check item could not proceed to the survey. In addition, for Studies 3-5, which were conducted on Amazon Mechanical Turk (MTurk), we restricted participants to workers located in the US with an approval rating of at least 98% and screened out duplicated IP addresses. Finally, for all studies that calculated BMI based on the reported height and weight for parents and children (Studies 1-3), we screened out participants who entered unrealistic values (e.g., 20 kg for 150 cm yields a BMI of 8.88). To be consistent across studies and not select participants based on subjective inspection, we applied the same rule in all studies and excluded participants who entered heights and weights resulting in a BMI of under 10 or over 50. A BMI of 12 is considered as the lower limit for human survival[2] (e.g., Henry 1990), and a BMI of over 40 is categorized as morbid obesity (e.g., Sturm and Hattori 2013). We set a margin for error and the bars at 10 and 50 respectively. Web Appendix D reports sample sizes and the number of datapoints in each analysis.

In all studies (except Study 4), we assessed the use of multiple strategies that parents commonly use to encourage their children to eat healthily (Roberts et al. 2018; Vereecken, Rovner, and Maes 2010). These include strategies that are not extrinsic rewards, such as praising the child or distracting him/her. While we found some effects of UTI on these other strategies, the patterns were not consistent. Substantively, the use of extrinsic rewards during feeding is a

[2] The limits of human starvation. Field Exchange 15, April 2002. p4. www.ennonline.net/fex/15/limits

common practice that has been demonstrated to increase children's weight (Beckers et al. 2021), and it is therefore important to investigate potential drivers of such practices. Conceptually, this research focuses on the association between UTI beliefs and the use of extrinsic rewards. Therefore, for both conceptual and substantive reasons, we focus our reporting on the extrinsic rewarding strategies and refer interested readers to Web Appendix M for the other strategies. Moreover, it is important to note that children's BMI is multiply determined and not solely dependent on their parents' use of extrinsic rewards.

STUDY 1: CROSS-CULTURAL EVIDENCE

Study 1 aimed to provide an initial test of the robustness and universality of the relationship between parents' UTI beliefs and extrinsic reward practices, and the downstream consequences for children's BMI. We conducted a web-based cross-cultural study using Qualtrics Panels. To capture sufficient cultural variation, we selected two typical Western and two typical Eastern countries: the United States, the United Kingdom, China, and Japan. In terms of the prevalence of adult obesity (BMI > 30)[3], the US ranks 12th (36.2%) and the UK 36th (27.8%), versus China 169th (6.2%) and Japan 186th (4.3%).

Method

Participants. According to a simulation study of statistical power in mediation models (Fritz and MacKinnon 2007), a sample size of 462 is required to achieve a power of .80 and

[3] The World Factbook – Central Intelligence Agency. Downloaded on 2023-01-30 from: https://www.cia.gov/the-world-factbook/field/obesity-adult-prevalence-rate/country-comparison

detect small effects for both *a* and *b* paths in a bias-corrected bootstrap mediation model. Thus, we recruited a minimum sample size of 500 per country. A total of 2,025 respondents (70.6% female; M_{age} = 37.35 years, *SD* = 7.21) participated (N_{China} = 505, N_{Japan} = 506, N_{UK} = 510, N_{USA} = 504). The study was conducted online using Qualtrics Panels and administered in English in the UK and the US, in Japanese in Japan, and in Simplified Chinese in China.

Procedure. After the screening questions and consent form, participants were told that the survey would cover perceptions of food and eating habits of themselves and their child. If they had more than one child who fit the criteria for this study, participants were instructed to answer questions about the child whose birthday was coming up next to ensure that the target child was chosen randomly. As an introduction to the parental strategies, we asked the parents to reflect back on the last dinner that their child had eaten. Some specific questions were added to aid recall and mimic a food diary study (e.g., Where did your child eat the last dinner? What specific foods were served?"). Then, we asked them, "If your child did not finish the vegetables, did you do anything to make your child finish them? If so, what did you do?" Parents could write down their initial thoughts in the provided text box.

Next, participants were asked to recall again what they did to make their child finish the vegetables and rate how much they agreed with each of the presented 12 statements. As in the pilot studies, four statements included offering extrinsic rewards to make the child finish the vegetables (α = .90), which were: (1) using food as a reward ("I promised my child a dessert or snacks that he/she likes if he/she would finish the vegetables"); (2) using food as a threat ("I told my child that he/she couldn't have any dessert or snacks if he/she would not finish the vegetables"); (3) using a reward that is not food-related ("I promised my child a desired sticker, activity, or other small favor if he/she would finish the vegetables"); and (4) using a threat that is

not food-related (“I told my child that he/she would not get a desired sticker, activity, or other small favor if he/she did not finish the vegetables”). For completeness, we included eight other strategies, identified from the parenting literature (e.g., Roberts et al. 2018; Vereecken, Rovner, and Maes 2010), that parents commonly use to encourage their children to eat healthily. These items tapped into praise, scolding, distraction, disguising the vegetables, making eating the vegetables fun, telling the taste benefits, telling the health benefits, and preparing the food in a tastier way (see Web Appendix C).

In the final block, we administered the three-item UTI scale (Raghunathan et al. 2006; $\alpha = .84$): “Things that are good for me rarely taste good;” “There is no way to make food healthier without sacrificing taste;” and “There is usually a trade-off between healthiness and tastiness of food” (1 = strongly disagree, 5 = strongly agree). The same scale was used in all other studies reported here.

TABLE 1

WITHIN-COUNTRY DESCRIPTIVE STATISTICS (STUDY 1)

	China	Japan	UK	US
N	505	506	510	504
Age				
mean	35.60	40.40	36.80	36.60
SD	5.08	6.67	6.93	8.75
Gender				
Male	26.7%	33.4%	20.4%	37.3%
Female	73.3%	66.6%	79.6%	62.7%
Parents’ UTI beliefs				
Mean	3.12	2.18	2.44	2.88
SD	1.04	.85	1.08	1.27

Parents' Extrinsic Rewards Practices				
Mean	3.83	1.79	2.42	2.85
SD	.82	1.03	1.19	1.35
BMI child*				
Mean	18.81	16.87	18.65	20.38
SD	5.48	3.02	5.94	6.72

* For all studies, we only included respondents for which the caregiver's and child's BMI ranged between 10 and 50 (N_{China} = 494, N_{Japan} = 505, N_{UK} = 484, N_{USA} = 442; Web Appendix D for sample size information for all studies).

Results

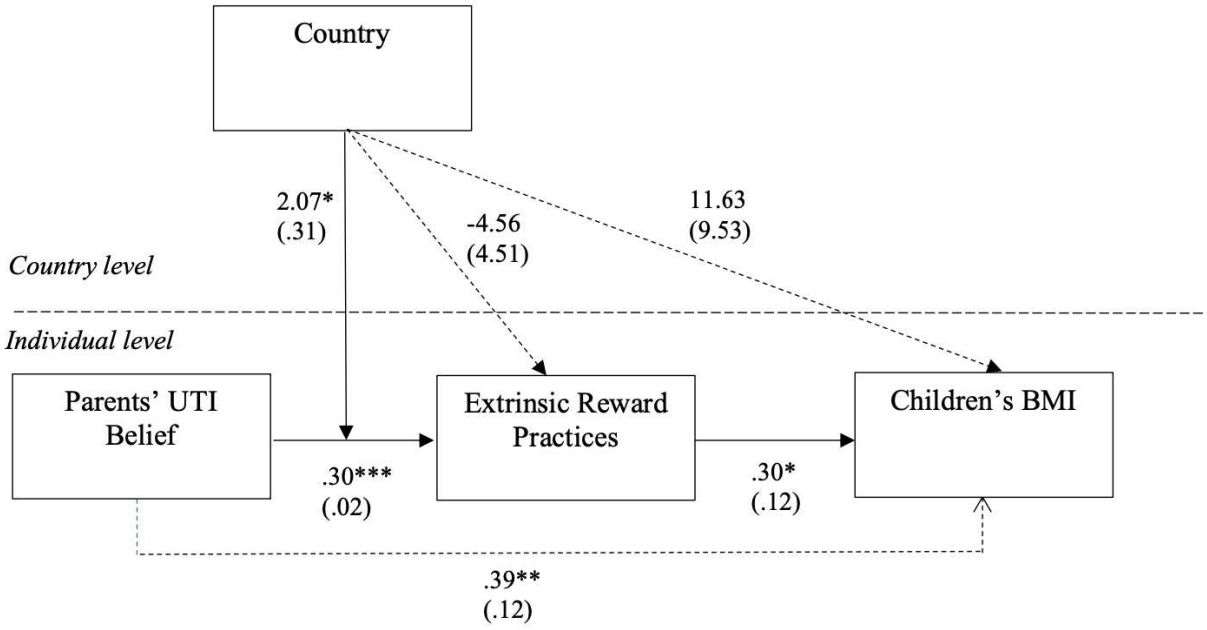
Belief in UTI. A one-way ANOVA examined between-country differences in the UTI belief. The result revealed significant between-country differences ($F(3, 1921) = 74.07$, $p < .001$; all Bonferroni pairwise comparison tests $p < .01$). Respondents in China showed the strongest UTI belief, followed by respondents in the USA, UK, and Japan (Table 1).

Association between Parents' UTI and Children's BMI. Considering the nested feature of the data (i.e., the sample consists of parents from four countries), we conducted a multilevel modelling (MLM) analysis. The model was tested with the MLmed Beta 2 macro for SPSS (Hayes and Rockwood 2020). In a 1-1-1 multilevel mediation analysis, level-1 within-variable refers to an attribute of an individual nested in a particular cluster, while level-2 between-variable refers to an attribute that applies to all the level-1 observations nested in a particular cluster. Applied to the current data set, level-1 within-variables include the UTI belief as an independent variable, extrinsic reward practices as the mediator, and children's BMI as the dependent variable, while the level-2 between-variable refers to the countries. To rule out alternative explanations related to genetic predisposition (e.g., Bouchard 2009) or lower SES (e.g., Andreasen 1975) as possible contributors to weight problems, we also controlled for

parents' BMI and level of education (see Web Appendix E). Using this model, the within-level mediation effect of parents' UTI beliefs on children's BMI through extrinsic reward was positive and significant (indirect effect = .09, *SE* = .04, *Z* = 2.49, *p* = .01, Monte Carlo CI = [.02 to .16]). The between-level mediation effect was not significant (indirect effect = -9.44, *SE* = 9.53, *Z* = -.99, *p* = .32, Monte Carlo CI = [-29.20 to 8.42], see Figure 1), indicating that the strength of the mediation effect did not differ among the four countries. The detailed output and additional analyses with food and non-food rewards separately are available in Web Appendix F.

FIGURE 1

MULTILEVEL MEDIATION ANALYSIS (STUDY 1)



*$p < .05$; **$p < .01$; ***$p < .001$

Discussion

Across four countries, Study 1 showed the robustness of the predicted relationship

between parents' UTI beliefs and children's BMI through extrinsic reward practices. This is despite the cultural differences in obesity prevalence and UTI strength that have been previously described (Werle et al. 2013). In both Eastern and Western countries, caregivers with stronger beliefs in a trade-off between healthiness and tastiness of food are more likely to use extrinsic rewards when trying to make their child eat healthily, which sequentially increases their children's BMI.

At the country level, caregivers vary in how strongly they subscribe to the UTI belief. Part of this country variation may be caused by differences in response tendencies or social desirability when reporting on health-taste trade-offs. Looking at Table 1, we note that the strength of the UTI belief across countries is fairly weak. This is consistent with previous literature suggesting that the UTI belief (in France; Werle et al., 2013), as well as subjective judgments of health and taste in food (Haasova and Florack, 2019), tend to be weak overall (Cooremans et al. 2017). At variance with past research (Sulmont-Rossé et al. 2019), UTI beliefs were strongest in China. It is possible that Chinese respondents in Qualtrics Panels are more Westernized than average, but this is speculative and needs further investigation.

Importantly, we found caregivers' UTI beliefs to be consistently associated with their children's BMI via the use of extrinsic rewards across different food cultures. This is critical because it shows that our hypothesis holds despite differences in UTI beliefs. While the variations in the strength of the UTI belief are interesting, our focus is on highlighting the striking similarity in their downstream consequences for parental food practices, and children's BMI. Studies 2 and 3 seek to investigate the underlying mechanism.

STUDY 2: PARENTS' UTI BELIEFS PREDICT CHILDREN'S FOOD CONSUMPTION

THROUGH EXTRINSIC REWARD PRACTICES

The aim of Study 2 was to provide initial evidence for the underlying mechanism of the intergenerational effect of UTI beliefs. We tested whether the association between parents' UTI beliefs and their children's unhealthy food consumption is mediated by the extent to which parents use extrinsic rewards to encourage healthy eating. To this end, we conducted paired surveys of children and their parent or caregiver in five different elementary schools. The survey for the parents or caregivers measured their UTI beliefs, their reward practices to encourage healthy eating, and some demographics. The survey for the children measured their food consumption habits and demographics.

Method

Participants. Paired surveys, of children and their parent/caregiver, were conducted in five elementary schools in a continental European city. In line with Study 1, we aimed to recruit a minimum paired sample size of 500. Of the 552 packages we received, we were able to match 508 children's responses (49.1% boys and 50.9% girls; M_{age} = 8.97 years, SD = 1.80) with their caregiver's responses (80.9% mother, 16.8% father, and 2.4% other caregiver; M_{age} = 39.44 years, SD = 5.73), with no missing values for UTI beliefs, reward practices, children's food consumption, and the focal control variables.

Procedure. Teachers distributed the questionnaires in all classes from Grades 1 to 6 (children between 6 and 12 years old). All materials were in the local language. The oldest child from each household represented in the school also received a survey for their parent or

caregiver together with a large envelope, in which all members of the same household could put their completed surveys. This procedure enabled us to match parents' responses with those of their children without asking for any names. The teachers explained that the children could fill in this survey at home and bring it back together with all other surveys from their household in the provided envelope. They also explained that only the oldest child from each household had received the materials for the family. Parents received the informed consent together with a general introduction of the study and were explained that they could help the child if needed. After one week, the teachers reminded the children to complete and hand in the surveys. After two weeks, all completed surveys were collected.

Measures

Parents. The parents' survey started with an introduction about the purpose and context of the study. It stressed that there were no right or wrong answers and that all responses would be treated completely anonymously. After the introduction, we first assessed UTI beliefs using the same measure as before (Raghunathan et al. 2006; $\alpha = .87$).

Participants were then asked to imagine their child not eating healthily and reflect on what they would do in such a situation. For this purpose, they were presented the following scenario: "When you get home today, you start preparing the evening meal. As soon as the food is ready, everyone goes to the table. Tonight, there is pasta with chicken and broccoli on the menu. Your child likes to eat the chicken and pasta but refuses to eat the broccoli (If your child likes broccoli, replace it with a vegetable s/he doesn't like). How would you try to motivate your child to eat the broccoli? What would you do?" To increase involvement, participants were

provided a text box in which to write their initial thoughts. Based on popular press, broccoli is often used as an example of a disliked vegetable (Anderson 2023).

All participants then rated their likelihood of using each of 12 different parenting strategies they might use to encourage the child to eat the broccoli. As previously, the four items of our main interest were related to providing an extrinsic reward ($\alpha = .87$; see Web Appendix C for all strategies).

After a set of unrelated filler items, we asked the parents/caregivers to provide their initials, date of birth, and gender of their child(ren) so that we were able to match the surveys of parents and children, even if they were not returned in the same envelope. Finally, we collected demographics information, including respondents' age, education (coded from 1 = primary school … 5 = postgraduate; Web Appendix E), height and weight (used to calculate BMI), as well as their role in the family (i.e., mother, father, or other caregiver).

Children. The children first received two tasks that were unrelated to the purpose of this study. Then we measured their consumption habits in five categories: fruits, vegetables, snacks (e.g., cookies, chips), soft drinks, and fast food (e.g., McDonalds, Pizza Hut). Specifically, we asked them to indicate how often per week they consumed each of these (0 = never, 1= once a week … 7 = daily; Web Appendix G). Finally, we also asked the children to provide their initials, gender, age, height and weight.

Results

Effect of Parent's UTI on Children's Unhealthy Food Consumption. Because extrinsic rewards can influence the consumption of both unhealthy foods (i.e., the reward) and healthy

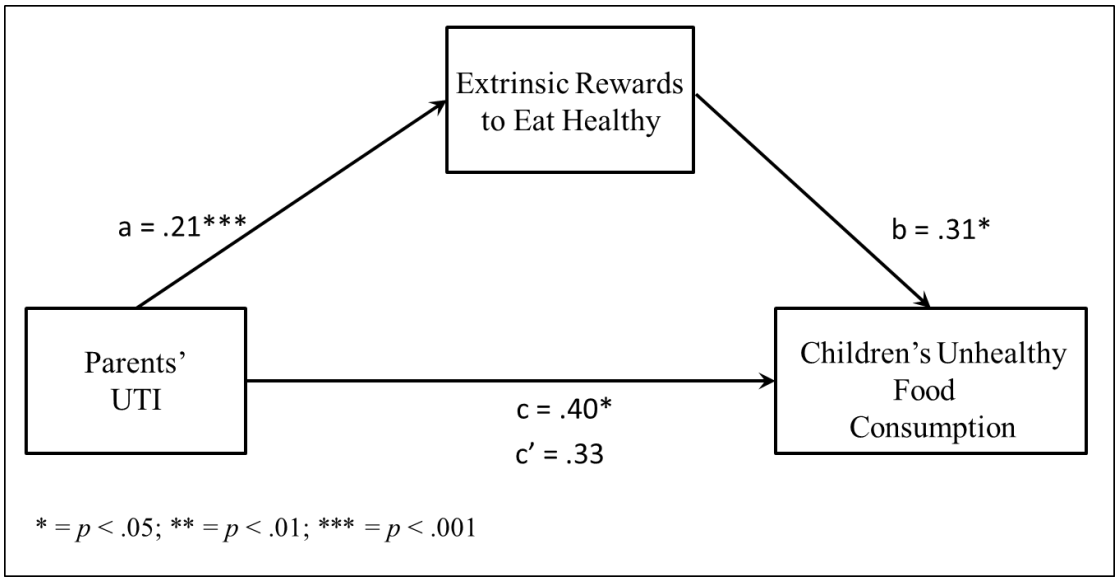
foods (i.e., the target), we constructed an index of children's unhealthy food consumption by subtracting the reported consumption frequency of the healthy food items (fruit and vegetables) from the reported consumption frequency of the unhealthy food items (snacks, fast food, and soft drinks) [4]. We regressed this index of children's unhealthy food consumption on parent's UTI and children's age and gender, again controlling for parents' BMI and level of education. As predicted, there was a positive relationship such that the more strongly a parent believed in the trade-off between health and taste in food, the more unhealthy food their child consumed (β = .40, SE = .18, t = 2.19, p = .03). In addition, there was a negative effect of parents' education (β = -.95, SE = .18, t = -5.36, $p < .001$) and a marginally significant positive effect of parent's BMI (β = .93, SE = .06, t = 1.66, $p < .10$). Children's age and gender did not significantly predict their eating habits.

Mediation through Extrinsic Rewards on Unhealthy Food Consumption. We tested whether the relationship between parents' UTI and children's unhealthy food consumption was mediated by the parent's reliance on extrinsic rewards for healthy food consumption, using Model 4 of Hayes (2013). The average of the four extrinsic reward-related items (α = .87) was entered as the mediator. Bootstrap analysis (5000 samples) revealed a significant mediation (a x b indirect effect = .07, SE = .04, bias-corrected CI [0.0011; 0.15]). Controlling for the mediator, the direct effect of the UTI beliefs on unhealthy food consumption dropped in significance (c' path, ß = .33, se = .18, t = 1.80, p = .07, 95% CI [-.03; .69]; Figure 2). The detailed output, correlation matrix, and additional analyses with food and non-food rewards separately are available in Web Appendix G.

[4] We obtained similar results using total food consumption as the dependent variable.

FIGURE 2

MEDIATION EFFECT OF PARENTS' BELIEFS ON REWARD PROVISION AND CHILDREN'S INTAKE (STUDY 2)



Serial Mediation through Extrinsic Rewards and Unhealthy Food Consumption on Children's BMI. Finally, we tested whether the effect of parents' UTI on the use of extrinsic rewards and children's unhealthy food consumption, has implications for children's BMI (M = 16.62, SD = 2.86)[5]. This analysis was conducted on 470 observations because of missing values for children's BMI. Using Model 6 of Hayes (2013), we tested for this serial mediation effect. Bootstrap analysis (5000 samples) revealed no significant mediation (a_1 x d_{21} x b_2 indirect effect = .0001, SE = .0033, bias-corrected CI [-0.0065; 0.0076]).

Discussion

[5] In this study, no further screening of BMI was required: min = 11.11 – max = 37.49.

Study 2 showed that the effect of parents' UTI on the use of extrinsic rewards to encourage healthy eating has downstream consequences for children's food consumption. This effect holds irrespective of other factors, such as parents' BMI and education level, that could also influence children's eating habits. Children of parents with stronger UTI beliefs reported more unhealthy eating habits, mediated by the parents' use of extrinsic rewards.

From a methodological perspective, it is important to note that these results were obtained using measures collected from both parents/caregivers and children: the independent variable and mediators were measured from the parents, while the dependent variable was measured from the children. This may also be why we did not find an effect on children's BMI. We had asked the children to indicate their own height and weight, which many of them might not know, might not know accurately, or might not have reported accurately. Indeed, the number of usable observations dropped from 508 to 470 because of missing values for children's BMI. In Study 3, we address this limitation.

STUDY 3: PARENTS' UTI BELIEFS PREDICT CHILDREN'S FOOD CONSUMPTION AND BMI THROUGH EXTRINSIC REWARDS PRACTICES

The aim of Study 3 was to probe the process further, to replicate and extend the findings of Studies 1 and 2 by testing whether the effect of parents' UTI beliefs extends to children's BMI, and whether this relationship is serially mediated by the extent to which parents use extrinsic-reward feeding strategies and children's unhealthy food consumption respectively. This time, we conducted the survey only with parents. Similar to Study 1, we measured parents' health-taste trade-off beliefs, their reward practices to encourage healthy eating, their child's

unhealthy food consumption, and demographics including their own height and weight and that of their children. We used the same dinner scenario as in Study 1.

Method

Participants. We conducted a Monte Carlo power analysis for serial mediation models to determine sample size (Schoemann, Boulton, and Short 2017). With targeted power set to .80 and estimates that we obtained from Studies 1 and 2 and a supplementary study (see Web Appendix H), the analysis revealed that a sample of 1,000 participants was needed. This is in line with the previous studies which showed that 500 respondents may not be enough to detect a significant effect on BMI. The survey was distributed via MTurk, where 1,000 participants signed up over three days.

Procedure. After the screening questions and consent form, participants were informed that the survey would cover perceptions of food and eating habits, of themselves and their child. As previously, in case they had more than one child who fit the criteria for this study, they were asked to answer the question about the child whose birthday was next. We then asked them to indicate the child's age, gender, school grade, birth order, and food consumption habits. As in Study 2, we assessed food consumption habits by asking them to indicate how often their child ate each of the following: fruits, vegetables, snacks, soft drinks, and fast food (1 = never, 2 = 1-3 times per month, 3 = 1 time per month, 4 = 2-4 times per week, 5 = 5-6 times per week, 6 = 1 time per day, 7 = more than 1 time per day).

Next, we asked the parents to reflect back on the last dinner that their child had eaten, similar to Study 1. After the introduction and free recall of initial thoughts, participants were

asked to think again what they did to make their child finish the vegetables and rate how much they used the different parenting strategies to induce the child to eat the vegetables. As in the previous studies, four questions were related to providing an extrinsic reward ($\alpha = .92$).

In the final block, we assessed the parent's UTI beliefs (Raghunathan et al. 2006; $\alpha = .88$) and collected demographic information, including the child's height and weight, and parent's age, gender, education, and height and weight.

Results

Data exclusion. Seven participants did not provide responses for our key variables, and 117 participants indicated unrealistic heights or weights for themselves or their child (e.g., 40 cm, 8 kg), resulting in BMIs of under 10 or over 50. These participants were excluded from our analyses (see general screening criteria), resulting in a final sample of 868 respondents. There were no duplicate responses based on IP address.

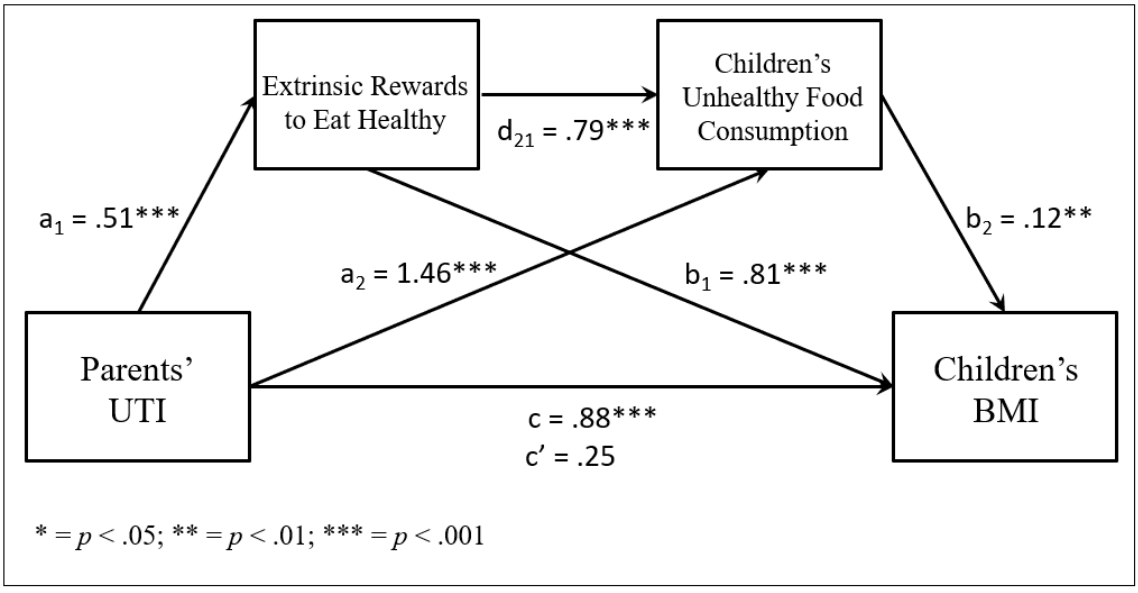
Effect of Parent's UTI on Children's BMI. We ran a linear regression on children's BMI, with parent's UTI and children's age and gender as predictors, controlling for parents' BMI and level of education (see Web Appendix E). As predicted, there was a positive relationship such that the more strongly a parent believed in the trade-off between health and taste in food, the higher their child's BMI was ($\beta = .88$, $SE = .17$, $t = 5.28$, $p < .001$). In addition, there was a positive effect of parents' BMI ($\beta = .12$, $SE = .03$, $t = 3.48$, $p < .001$) and a positive effect of the child's age ($\beta = .09$, $SE = .04$, $t = 2.30$, $p = .02$). The parent's education level and the child's gender did not significantly correlate with the child's BMI.

Serial Mediation through Extrinsic Rewards and Unhealthy Food Consumption on

Children's BMI. Using Model 6 of Hayes (2013), we tested whether the relationship between parents' UTI and children's BMI was serially mediated by the extent to which the parent offered extrinsic rewards for healthy food consumption and their child's unhealthy food consumption (using the same subtraction score as before). Bootstrap analysis (5000 samples) showed a significant mediation (a_1 x d_{21} x b_2 indirect effect = .05, SE = .02, bias-corrected CI [0.012; 0.09]. Controlling for both mediators, the direct effect of the UTI on children's BMI disappeared (c' path, ß = .25, se = .19, t = 1.28, p = .20, 95% CI [-.13; .63]; see Figure 3 for paths and coefficients and Web Appendix I for detailed output and additional analyses).

FIGURE 3

SERIAL MEDIATION EFFECTS OF PARENTS' BELIEFS ON REWARD PROVISION, CHILDREN'S INTAKE, AND CHILDREN'S BMI (STUDY 3)



Discussion

Study 3 supports our main premise and provides mediational evidence that parents' UTI positively affects their children's BMI through the extent to which they use extrinsic rewards in their feeding strategies and how often their children eat unhealthily. These findings hold irrespective of other parental influences such as parents' BMI and education level. By asking parents for their child's height and weight rather than relying on children to accurately report this information (as in Study 2), Study 3 was able to replicate and integrate the earlier findings and show the important downstream consequences on children's food consumption and BMI. While the estimated effect for this last link is weaker than the other relationships in the model (see the cross-cultural study for a similar pattern), it is of similar magnitude to other belief-BMI associations reported in the literature (e.g., McFerran and Mukhopadhyay 2013). We note that BMI is multiply determined, and self-reports of weight and height may be noisy (e.g., Townsend, Rutter, and Foster 2015). Indeed, it should be stressed that this parameter estimates the effect of one person's beliefs on another person's BMI. Importantly, the focal relationship between parents' UTI-beliefs and their extrinsic reward practices showed to be stronger in all studies.

So far, Studies 1-3 demonstrated the robustness, across three different contexts, of the link between parents' UTI beliefs and the likelihood to use extrinsic rewards to encourage children to eat healthy foods and the consequent risk for their weight. Studies 2 and 3 shed light on the underlying mechanism through unhealthy food consumption. Next, we further delve into the focal relationship between parents' UTI beliefs and their extrinsic reward practices and examine how this can be changed by either modifying UTI beliefs (Study 4) or breaking the link between UTI beliefs and reward practices using an intervention (Study 5).

STUDY 4: MANIPULATED UTI BELIEFS CHANGE THE USE OF EXTRINSIC REWARDS ONLY FOR HEALTHY (VS. UNHEALTHY) EATING

While prior research has generally demonstrated that lay beliefs can be situationally manipulated (e.g., McFerran and Mukhopadhyay 2013; Nussbaum and Dweck 2008), it is not yet known whether UTI beliefs can be manipulated in a similar fashion. Belief primes work best in contexts that are ambiguous (Wyer 2004). However, in the context of food parenting practices, habit is a key factor (Larsen et al. 2018). Hence, it is possible that even after an experimental UTI manipulation, parents may revert to their usual feeding practices when thinking about food interactions with their child. This renders experimental tests of intergenerational influences particularly challenging. To be able to test whether UTI beliefs can be attenuated while controlling for these idiosyncratic practices, we followed Mukhopadhyay and Yeung (2010) by recruiting childless adults and utilizing a scenario in which participants imagined being a caregiver (babysitter) who needs to motivate a child to eat vegetables. We primed UTI beliefs by using purported scientific articles highlighting either a negative (UTI) or positive (no-UTI) associations between healthiness and tastiness. Manipulating UTI beliefs would provide causal evidence for our hypothesis and illustrate a potential means of reducing parents' likelihood of using extrinsic rewards.

A second goal of Study 4 was to further specify our mechanism by testing whether UTI beliefs also increase the use of extrinsic reward strategies to encourage children to eat relatively less healthy food. So far, our studies have only looked at healthy food consumption because our theorizing suggests that people holding UTI beliefs should perceive that the healthy food is less tasty. As a result, extrinsic rewards may be seen as necessary to motivate a child to consume

more healthy food. By this logic, if the food is perceived to be relatively less healthy, people holding UTI beliefs should perceive the food to be sufficiently tasty to not require additional incentive for the child to consume. Together, we predicted that priming UTI beliefs should increase caregivers' likelihood of using extrinsic rewards to motivate children's healthy eating, but it should not have such an effect for relatively unhealthy food.

Method

Design and participants. The study used a 2 (UTI vs. no-UTI) x 2 (target food: healthy vs. less healthy) between-subjects design. A power analysis with power set at .80 and a Type I error rate set at .05 revealed that it is necessary to have a sample size of 787 participants to detect a small effect ($f = .10$). To account for potential exclusions and maximize power, we opened the study for 1,200 MTurk workers, and eventually recruited 1194 participants. We pre-specified that participants should be adults who did not have any children. Before they entered the study, participants were asked whether they had any children, along with attention-check items as in the previous studies. Those who had any children or those who failed an attention-check question were not allowed to proceed.

Procedure. After completing a consent form, participants were told that they would participate in two short studies. The first study was presented as a reading comprehension study. Following the lay theory literature, we manipulated UTI beliefs using articles explaining purported scientific research (e.g., McFerran and Mukhopadhyay 2013). We titled the article "the relationship between healthiness and tastiness in food." Participants in the UTI condition read an article that highlighted the negative association between health and taste. The article briefly

described research that stated that “there is a negative association between healthiness and tastiness in food,” “eating healthy means sacrificing taste,” and “healthy food is generally less tasty.” The article in the no-UTI condition stated the opposite: “there is a positive association between healthiness and tastiness in food,” “eating healthy does not mean sacrificing taste,” and “healthy food is generally tasty.” In keeping with the cover story, participants in both conditions were asked to generate their own title for the article, and name one or two examples of healthy food being either tasty or not in correspondence with their experimental condition.

Following this, participants moved to an ostensibly different study, where we measured food parenting strategies with a similar dinner scenario as before but now in a babysitting context. Specifically, respondents were introduced to the dinner scenario, in which they had been asked to babysit their neighbor’s six-year-old child. Participants read that they had met the child before, but it was their first time babysitting the child. They needed to have dinner with the child, play a little, and put the child to bed. The scenario stated that “The dinner is ready and just needs to be heated in the microwave. You will be having chicken with pasta and broccoli.”

Orthogonal to the UTI belief manipulation, half the participants read that the child finished the pasta but refused to eat the broccoli, whereas the other half read that the child finished the broccoli but refused to eat the pasta. This procedure manipulated the food that participants needed to motivate the child to finish to be either relatively healthy (i.e., broccoli) or less healthy (i.e., pasta; Irmak and Vallen 2011). As before, we increased the vividness of the scenario by asking participants to elaborate on how they would try to make the child finish this food. Next, we used the same four items to measure participants’ use of extrinsic reward strategies, namely, to what extent they would use food and non-food items as a reward or threat to make the child finish the food ($\alpha = .79$). Since Studies 1-3 did not find consistent effects of

UTI on other motivating strategies, we only asked about extrinsic-reward strategies in this study (see Web Appendix C). Next, participants responded to the same 3-item UTI scale as a manipulation check ($\alpha = .91$), which was administered after the measurement of our main dependent variable to preclude confounds. Finally, we collected participants' demographic information (e.g., age, gender, having children or not).

Results

Data exclusion. Although we had specified at the outset that participants could not have any children, thirty-nine participants later admitted that they had children. Moreover, 90 participants had duplicated IP addresses. Following the criteria detailed in our Overview of Studies, we excluded these participants[6], resulting in a final sample of 1065 participants (M_{age} = 34.45, SD = 11.39; 50.1% female).

Manipulation checks. We analyzed UTI beliefs in a 2 (UTI vs. no-UTI) x 2 (broccoli vs. pasta) ANOVA. As predicted, results only showed a significant main effect of UTI ($F(1, 1061)$ = 34.32, $p = .001$, $\eta_p^2 = .03$). Participants who read the article about the reversed association between health and taste reported a stronger belief in UTI than those who read the article that negated this association (M_{UTI} = 3.05; SD = 1.14; M_{NO_UTI} = 2.63, SD = 1.25). Neither the main effect of food type ($F(1, 1061) = .77$, $p = .38$) nor the interaction ($F(1, 1061) = 2.23$, $p = .14$) was significant. A separate post-test with 103 respondents confirmed that participants in the UTI condition reported a stronger belief in UTI than those in the no-UTI condition (M_{UTI} = 3.27; SD = 1.10; M_{NO_UTI} = 2.45, SD = 1.08; $F(1, 101) = 14.60$, $p < .001$). Importantly, the same post-test

[6] Including all 1194 participants did not change either the significance or the patterns of results (see Web Appendix J.3 for the analysis).

showed no significant difference in perceived believability of the article (3 items; from -2 = strongly disagree to 2 = strongly agree; $\alpha = .92$; $M_{UTI} = .99$, $SD = 1.02$; $M_{NO\_UTI} = .73$, $SD = 1.06$; $F(1, 101) = 1.53$, $p = .22$). The means in both the UTI and no-UTI conditions were significantly above the mid-point of the scale (UTI: $t(1, 52) = 7.04$, $p < .001$; no-UTI: $t(1, 49) = 4.87$, $p < .001$), suggesting that the articles in both conditions were deemed equally believable (see Web Appendix J).

Use of extrinsic rewards. A 2 (UTI vs. no-UTI) x 2 (broccoli vs. pasta) ANOVA on the use of extrinsic reward strategies yielded the predicted two-way interaction ($F(1, 1061) = 4.85$, $p = .03$, $\eta_p^2 = .005$). Neither the main effect of UTI ($F(1, 1061) = 1.01$, $p = .32$) nor food type ($F(1, 1061) = .001$, $p = .97$) was significant. Planned contrasts revealed that participants who were primed with UTI were more likely to use extrinsic rewards to make the child eat broccoli than those who were not primed with UTI ($M_{UTI} = .11$, $SD = 1.10$; $M_{NO\_UTI} = -.11$, $SD = 1.11$; $F(1, 1061) = 5.12$, $p = .02$). In contrast, priming UTI beliefs did not significantly affect participants' use of extrinsic reward strategies when they had to make the child finish the pasta ($M_{UTI} = -.03$, $SD = 1.15$; $M_{NO\_UTI} = .05$, $SD = 1.12$; $F(1, 1061) = .72$, $p = .40$).

Discussion

Study 4 provided causal evidence that manipulating UTI beliefs can increase or decrease caregivers' use of extrinsic rewards to encourage children to eat healthily. Importantly, this study validated our theorizing that as people holding UTI beliefs perceive the healthy food (i.e., broccoli) to be less tasty, they tend to use extrinsic rewards to compensate for the taste. However, when the food is perceived to be relatively unhealthy (e.g., pasta), people holding UTI

beliefs are less likely to use extrinsic rewards as the relatively unhealthy food is perceived to be already tasty and hence rewarding enough.

This finding creates possibilities for health practitioners and policymakers who can try to change parental food beliefs to optimize healthy food consumption. That said, this study involved non-parents. A more heavy-handed manipulation may be needed for parents, possibly with repeated exposure, since parents may tend to fall back on their idiosyncratic parental practices. Separately, and in addition to attenuating UTI beliefs, another possibility to decrease parents' likelihood of using extrinsic rewards might be to break the link between UTI beliefs and extrinsic reward practices. Study 5 investigates this possibility.

STUDY 5: INTERVENTION WITH IMPLEMENTATION INTENTION BREAKS THE LINK BETWEEN UTI BELIEFS AND EXTRINSIC REWARDS

In Study 5, we designed and tested an intervention to weaken the association between UTI beliefs and the use of extrinsic rewards. Hence, rather than changing people's lay beliefs about the relationship between healthiness and taste in food (as in Study 4), we aimed to develop an intervention targeted at the person-situation interaction, namely, the high-UTI parent in the heat of the moment. To this end, we employed a short longitudinal design, that is, an experimental survey with two waves (i.e., Time 1 and Time 2).

Our pilot tests had found that parents' UTI beliefs are predictive for the use of extrinsic rewards in a locomotion mindset, but not in an assessment mindset (Kruglanski et al. 2014). Because of this tension between parents' evaluative judgments in the abstract and their concrete practice of food strategies, we tested an intervention that would activate an assessment mindset,

to supplant the habitual locomotion, when confronted with a difficult dining situation. At Time 1, parents in the experimental intervention (but not control) condition were trained with an assessment mindset, to be implemented during such dining situations, and asked to rehearse it over the next two days. At this time (Time 1), we also measured their UTI beliefs. Two days later (at Time 2), we measured their likelihood of using extrinsic rewards when motivating their child to eat healthily. We hypothesized that in the intervention condition, the association between UTI beliefs and intended usage of extrinsic rewarding strategies would be weaker than in the control condition.

Method

Design and participants. The study employed a 2 (intervention: control vs. intervention) x continuous (UTI belief) between-subjects design, where intervention was manipulated and the UTI belief was a measured variable. We followed Perugini, Gallucci, and Costantini's (2018) procedure to conduct a power analysis for moderated regression. Based on the observed correlation between the UTI and the likelihood of offering extrinsic rewards in Study 3, we estimated an interaction effect size (f^2) of .08. Power analysis with power set to .80, a Type I error rate of .05, the expected f^2 of .08, and three predictors revealed that we needed a minimum of 101 participants. To maximize the power to detect the interaction, we aimed to recruit 200 participants at Time 2. To account for dropouts between Time 1 and Time 2, we opened the T1 study for 300 participants on MTurk.

Using the same screening procedures as before, 306 workers from MTurk completed the survey at Time 1 in return for $0.70 and were randomly assigned across the intervention and

control conditions. Two days later, those who took the survey at Time 1 were invited to participate in a second survey, which was open to 200 participants. One hundred and ninety-eight workers (114 women and 84 men; M_{age} = 36.33 years, SD_{age} = 9.66) completed this second survey for $1.30. Time 1 and Time 2 data were matched using MTurk identifiers.

Procedure. At Time 1, we first measured participants' UTI beliefs using the same scale (Raghunathan et al. 2006; α = .86; M = 2.56, SD = 1.05). All participants were then told that they would be contacted again after two days and were requested to do a simple task in the meantime. The tasks varied across the control and intervention conditions but were equated along dimensions such as simplicity and valence, and both included specific triggers. In the control condition, participants were told that when they brushed their teeth, they should "think about the 3Rs: R1 = Reduce waste, R2 = Reuse product/parts, and R3 = Recycle materials." In contrast, participants in the intervention condition were asked to "do the 3Ts" when they would like their child to finish his or her vegetables at mealtime. Specifically, they were asked to: "T1 = Count to Ten, T2 = Take a Time-Out, and T3 = Think what action is right (i.e., think and do what you believe is the right thing to do)." By making parents reflect about what is right, we intended to induce an assessment mindset (Kruglanski et al. 2010) in a situation where locomotion mindsets are likely to predominate. In line with Gollwitzer's (1999) recommended practice for implementation intentions, all participants were asked to rehearse the sequence of the tasks (i.e., 3Ts or 3Rs) and, in an open-ended response format, describe what they would do or think about.

At Time 2 (two days after Time 1), participants were asked with an open-ended response format to recall and describe their assigned 3-step sequence[7]. They were also asked to identify

[7] As this measure was intended to be a manipulation check, we did not announce it as a screening procedure to the participants, and hence we retained all participants in the analysis. Excluding respondents who did not correctly

the 3-step sequence from four named options (i.e., 3Ps, 3Qs, 3Rs and 3Ts).

All participants were then presented with a dinnertime scenario similar to Studies 1 and 3, where their child refused to eat vegetables. As before, participants described what they would do to make their child finish the vegetables, and then rated their agreement with the same set of twelve motivating strategies. As before, four items tapped into providing an extrinsic reward (α = .76; Web Appendix C). Finally, we collected basic demographic information (e.g., age, gender, ethnicity, and income).

Results

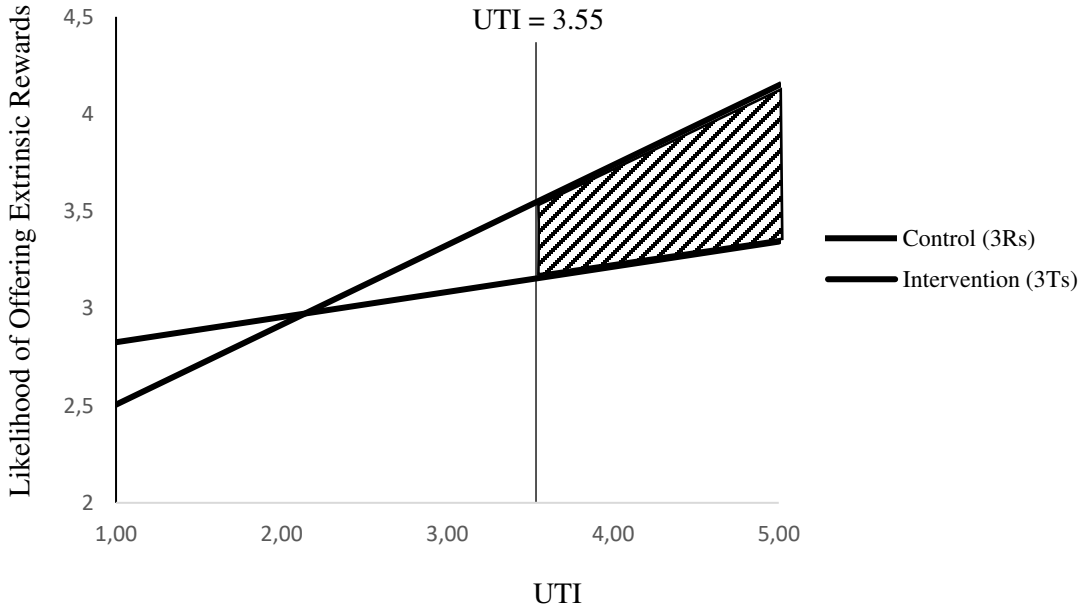
We assessed whether the intervention moderated the effect of UTI on offering extrinsic rewards for vegetable consumption. We conducted a regression analysis where the independent measures were the intervention condition (dummy-coded: control = 0, intervention = 1), the mean-centered UTI score, and the interaction of the two with the likelihood of offering extrinsic rewards as the dependent measure. The result revealed a significant simple effect of UTI (b = .41, SE = .10, $t(194) = 4.09$, $p < .001$, 95% CI[0.21, 0.61]), qualified by an interaction with the intervention (b = -.28, SE = .14, $t(194) = -2.04$, $p = .04$, 95% CI [-0.55, -0.01]; Figure 4). Slopes analyses revealed that increasing strength of belief in the UTI was likely to be associated with the usage of extrinsic rewards in the control condition (b = .41, SE = .10, $t(194) = 4.09$, $p < .001$), thereby replicating the previous results. However, as predicted, this effect was greatly mitigated in the intervention condition; here, belief in the UTI did not significantly influence the likelihood of offering extrinsic rewards (b = .13, SE = .09, $t(194) = 1.37$, $p = .17$). Above UTI

recall the intervention (3Ts versus 3Rs) made the predicted effect stronger (Web Appendix L). We report the results here based on the full sample.

values of 3.55, participants in the intervention condition were significantly less likely to offer extrinsic rewards relative to those in the control condition (see Web Appendix L for additional analyses; the effect strengthened for those who accurately articulated the 3-step sequence).

FIGURE 4

LIKELIHOOD OF OFFERING EXTRINSIC REWARDS AS A FUNCTION OF THE UTI



Discussion

In Study 5, we were able to weaken the association between parents' UTI beliefs and their likelihood to use extrinsic rewards when motivating healthy eating. It is important to note that our manipulation was not heavy-handed. At Time 1, we did not talk about the different parental strategies, nor did we say anything about the potential harm of providing extrinsic

rewards. The implementation intention just invited parents for two days to take some time out and reflect on what is right. This intervention was enough to induce parents to adopt an assessment mindset and rely more on what they believe is effective instead of what they are drawn to (i.e., extrinsic rewards) when motivating their child to eat healthily. It is possible that our intervention also affected parents' UTI beliefs, or could affect them in the long run, but because we did not want to make the UTI salient nor the potential link with extrinsic rewards, we decided not to measure UTI beliefs in the second wave.

This promising intervention provides a potential alternative to the current trend in public policy, where health practitioners and popular press are trying to warn parents about the potential harm of providing extrinsic rewards to push healthy eating. It is possible that when parents do not have strong prior beliefs regarding what they think is right, a more heavy-handed intervention might be necessary. Subtle interventions may not scale as successfully (List 2022), and we leave this interesting question for future research. Future research could also be aimed at investigating the long-term effects of this intervention, but so far our results are promising, and related literature has shown positive effects of implementation intentions after longer periods (Conner and Higgins 2010).

GENERAL DISCUSSION

The prevalence of childhood obesity continues to increase around the world and has gained much attention from policymakers and the general public. This research studies the role of caregivers' UTI beliefs as one of the drivers of children's obesity. The five studies presented here suggest that parents' or caregivers' UTI beliefs can increase children's BMI due to the use of feeding strategies that employ extrinsic rewards, which inadvertently increase children's

unhealthy food consumption.

This research contributes to the literature on lay beliefs by showing the far-reaching intergenerational implications of UTI beliefs. There is insufficient research on inter-generational outcomes of lay beliefs in general and of food beliefs in particular (Moore et al. 2017). Given that what people do is often guided by what they believe (Molden and Dweck 2006), it is important to examine how caregivers' beliefs about food influence their food parental practices with their children.

Second, our study contributes to the literature on childhood obesity. By focusing on the role of parents and caregivers, we address a recent call for more research on the influence of parents and family (Moore et al. 2017) on children's weight status and life course possibilities. Our study demonstrates that caregivers' UTI is a noteworthy predictor of how they interact with children during food consumption. Examining the links from caregivers' beliefs in UTI to their food practices, their children's food consumption, and ultimately their children's BMI, provides a comprehensive picture of intergenerational obesity transmission. Importantly, we show the omnipresence of this intergenerational obesity transmission from the East to the West. This is quite new because, overall, research on parental food practices and children's weight outcomes is dominated by a Western perspective (Beckers et al. 2021).

Third, we demonstrate how an inverse inferential association between food taste and healthiness reflects a cognitive approach to food that has developed recently. This approach induces consumers to focus more on what one "should" eat rather than enjoying tasty food. In line with previous research, our results demonstrate the downsides of offering children extrinsic rewards for eating healthily. Ironically, rewarding a child for eating healthy food works against developing a preference for it, and may even entail an increased risk of obesity.

Finally, this research theoretically integrates research on lay theories, parenting, and consumer socialization. This allows us to present a unifying framework of the stream of influence: caregivers' beliefs → caregivers' actions → children's consumption behaviors → children's health outcomes. Although many parents, caregivers, educators, and policymakers are interested in motivating children to eat healthier, not much is known about the interplay between parental beliefs, parent-child feeding interactions, and the childhood development of unhealthy food consumption habits and consequent outcomes. Being the first to provide evidence for the direct link between caregivers' UTI beliefs and extrinsic feeding practices, we shed light on an important first step that can trigger important downstream effects on children's health.

Limitations and Future Research

This research provides a strong starting point for a more comprehensive psychological understanding of the consumer socialization of food—how caregivers' beliefs about the inverse correlation between tastiness and healthfulness can influence the development of their children's food consumption and BMI through different FPPs. A key limitation, which applies to most research in parenting and caregiving, is that in-depth experimental investigations are not feasible or make use of non-parent samples (Study 4). Developmental and consumer psychologists thus often rely on correlational data as we did (Chaplin et al. 2020). For example, Study 2, which features dyads of caregivers and children, follows best practices in the field. That said, it is important to note the limitations of this paradigm to assess the evidentiary value of our study.

Causality. The evidence for the intergenerational transmission of UTI beliefs to children's eating behavior (Studies 2 and 3) and BMI (Studies 1 and 3), while extensive, is

correlational and not causal. While this by itself should not detract from its "quality" (Lynch et al. 2012), we would like to make the following four points. First, much research has demonstrated robust causal relationships between lay theories and behavior in multiple domains (e.g., Molden and Dweck 2006). Moreover, important and seminal research on consumer socialization is often correlational (e.g., Chaplin et al. 2020; Cotte and Wood 2004; Moore, Wilkie, and Lutz 2002; Richins and Chaplin 2015). Our research follows these established traditions and is analogous to the association between smoking and cancer, which relies on decades of non-experimental evidence. In our case, as discussed earlier, much research has demonstrated how lay beliefs influence eating behavior (e.g., McFerran and Mukhopadhyay 2013; Raghunathan et al. 2006), which makes reverse causality (i.e., children's BMI influencing caregivers' UTI beliefs) less plausible. Third, we have been careful throughout to state that a parent's UTI belief "predicts" their child's BMI, rather than "causes" it. We believe our evidence on children's BMI is strongly suggestive of causality, but not conclusive. Finally, to address the issue of reversed causality in the survey studies, the most plausible direction of influence is from adults' beliefs to adults' parenting practices employing extrinsic rewards, to children's eating behavior, to children's BMI. One may argue for the reverse path such that caregivers only use extrinsic rewards if their children do not consume enough healthy food. In response, for both studies 2 and 3, we ran additional analyses reversing extrinsic rewards and unhealthy food consumption in the causal chain. The results were inconsistent: for Study 2 (parent-child pairs), the reversed mediation was not significant, while for Study 3 (MTurk parents) it was. Further, in Studies 4 and 5, we directly demonstrate the influence of UTI beliefs on the use of extrinsic rewards by either manipulating UTI beliefs or breaking the link between UTI beliefs and extrinsic rewards. For a final argument, we refer to extant literature (Birch et al. 1982; Birch et

al. 1984; Lepper et al. 1982, Maimaran and Fishbach 2014; Newman and Taylor 1992), including experimental studies, which indicate that an instrumental focus on healthy food leads to decreased liking and consumption of the food—thereby supporting our suggested direction of influence. Taken together, we believe that our evidence suggests a new causal mechanism from UTI beliefs to extrinsic rewarding practices, while acknowledging that reverse causality might be at play in Studies 1-3.

Measurement. Another possible limitation is that we always assessed the belief in UTI using an explicit measure. Although this practice aligns with previous literature on UTI (e.g., Mai and Hoffmann 2015; Cooremans et al. 2017; Briers et al. 2020), an interesting question remains regarding how UTI beliefs operate at an implicit level. Raghunathan et al. (2006) showed that people generally hold stronger UTI beliefs at an implicit than an explicit level, such that unhealthy food was inferred to taste better even among those who explicitly disagreed with UTI. This could be driven by social desirability bias, which may be in line with the somewhat weak reported UTI beliefs in all our studies. This also implies, however, that our explicit measure of UTI is a more conservative test of the intergenerational effects. Nevertheless, measuring UTI implicitly might provide a more nuanced picture.

The same social desirability bias could play a role in our measurement of extrinsic rewarding practices. Even though we tried to formulate the measures in line with a locomotion mindset (after the pilot study), they may still trigger some social desirability if parents are reluctant to acknowledge that they use rewards or threats to stimulate healthy eating. Therefore, the use of extrinsic rewards in reality may be greater than we found. Also, in all our studies, we measured caregivers' likelihood to use extrinsic rewarding strategies using a similar set of scale items. To address this limitation, we conducted some supplementary analyses on respondents'

initial thoughts provided after reading the dinner scenario. Two blind coders coded the responses to the open-ended question as providing an extrinsic reward (1) versus not (0). In each study, the responses to the open-ended question mirrored responses to the scale-based measure of motivating strategies (Study 2: $r = .29$, $p < .001$; Study 3: $r = .36$, $p < .001$; Study 4: $r = .32$, $p < .001$; Web Appendix K).

Finally, to assess unhealthy food consumption, we subtracted the consumption frequency of the healthy food items (fruit and vegetables) from that of the unhealthy items (snacks, fast food, and soft drinks). We did this for two reasons. From a practical perspective, to ensure that their children follow a healthy diet, caregivers care not just about increasing healthy food consumption, but also limiting unhealthy intake. A difference score addresses this balance. From a theoretical perspective, a difference score can better capture the effects of both types of extrinsic rewards—food and non-food. Our theorizing does not differentiate between these two types of rewards. Conceptually, rewards, be they food or non-food, serve as extrinsic incentives that may "crowd-out" an intrinsic motivation for healthy consumption (Rodriguez-Planas 2012). As a child's liking of healthy food decreases, s/he becomes increasingly favorably inclined to unhealthy eating—a process that is accentuated if caregivers offer unhealthy foods as rewards. A difference score can account for this dual effect whereby extrinsic rewards can influence both unhealthy and healthy food consumption.

That said, parallel analyses on the total consumption of both healthy and unhealthy food items in studies 2 and 3 revealed substantively identical patterns: parents' UTI beliefs are positively related to their children's overall food intake (studies 2 and 3) and BMI (study 3), and this relationship is mediated by parents' usage of extrinsic rewards to stimulate healthy eating. Looking at healthy and unhealthy food consumption separately, though, we found that the results

are stable for unhealthy food consumption but not for healthy food consumption. Part of this larger effect for unhealthy versus healthy food consumption may be driven by the use of extrinsic food rewards which are often unhealthy and thus can increase the child's unhealthy food consumption directly. So, we also analyzed extrinsic food and non-food rewards separately, but the pattern of results was inconsistent: in study 1 (cross-cultural study), only the mediation through non-food rewards was significant; in study 2 (parent-child pairs), only the mediation through food rewards was significant; in study 3 (MTurk parents) both food and non-food rewards were significant mediators (see Web Appendices G and I). Future research needs to disentangle these types of rewards better and assess their possibly unique effects on unhealthy food consumption.

Alternative explanations. Finally, this research examined the role of caregivers' food-related belief in children's food consumption and BMI development. However, childhood food consumption and obesity, similar to other important phenomena, are multiply determined, with socio-economic status being one of the most plausible alternative explanations. In studies 1-3, we controlled for parental education as a proxy for socio-economic status. Although education had a significant and negative effect on the children's unhealthy food consumption in both studies, it did not directly predict the children's BMI. Furthermore, including it in the analysis did not substantively change our findings. It is noteworthy that, beyond the influence of parent's education, in all our studies, parental UTI beliefs are a reliable and strong predictor for the use of potentially harmful extrinsic rewards.

It is also important to acknowledge that our research does not aim to measure an exhaustive list of caregivers' factors that can potentially affect childhood obesity. Instead, we aim to suggest a crucial variable—namely caregivers' beliefs in UTI—that is overlooked by the

literature and show how it influences caregivers' interactions with their children during food consumption, potentially thereby contributing to childhood obesity. Future research can examine the relative influences of different social and environmental factors and provide a more thorough picture of the factors influencing childhood obesity.

Practical Implications

Questions about how food lay beliefs steer interactions during food consumption are not only intriguing but are important to a wide range of constituents, such as parents, educators, public policy officials, and consumer researchers. Addressing these questions holds the promise of providing insights into children's food consumption, how beliefs and practices develop in families and communities, and how children become socialized as consumers in contemporary society. Unfortunately, relative to its importance, research on consumer socialization is relatively scarce (John 1999). Notable exceptions include studies of television advertising (e.g., Gorn and Goldberg 1982), status consumption (Belk, Bahn, and Mayer 1982), and materialism (e.g., Chaplin et al. 2020). Caregivers clearly play key roles in development (Degner and Dalege 2013; Parke and Buriel 2006), and the specific question of parental influences on consumer socialization has been studied in the domains of brand equity (Moore et al. 2002), innovativeness (Cotte and Wood 2004), and materialism (Richins and Chaplin 2015), among others, but surprisingly little is known about its long-term effects. Early experiences and habits of shopping, spending and saving, and consumption, may lay important foundations for beliefs and behaviors that are carried into adulthood.

Our studies illustrate an important antecedent of caregivers' tendency to apply extrinsic

rewarding strategies to encourage healthy eating among children. We focus on extrinsic rewards, not only because they are often used by caregivers and have been demonstrated to increase children's weight (Beckers et al. 2021), but also because they are relatively precisely operationalized in the literature. Extrinsic incentives may "crowd-out" intrinsic motivation (Rodriguez-Planas 2012), and we demonstrate the potential danger of extrinsic rewards in crowding out the internal motivation for healthy food consumption: the more likely the caregivers were to use extrinsic rewards, the more likely the children were to eat unhealthily. Research has shown that extrinsic rewards cannot successfully encourage healthy food consumption because they generally lead to a decreased liking for the food (Birch et al. 1982; Birch et al. 1984; Lepper et al. 1982; Newman and Taylor 1992), often for many years to come (Batsell et al. 2002). Hence, using intrinsic rewards to encourage healthy eating might seem to be the better option (Deci and Ryan 1985). However, it is not clear whether intrinsic motivation can be cleanly operationalized (Deci and Ryan 1985). For instance, one may engage in a behavior after examining its value and internalizing it. Such "integrated regulation," whereby previously external values become fully integrated into the self, is a type of extrinsic motivation, but it is very similar to intrinsic motivation.

Due to these ambiguities, intrinsic rewards were not the focus of this research. Nevertheless, we ran some additional exploratory analyses, for studies 2 and 3, to test our framework (caregivers' beliefs → caregivers' actions → children's consumption behaviors → children's health outcomes) but with intrinsic instead of extrinsic rewards (see Web Appendices G and I). In both studies, we found no evidence for alternative routes through either intrinsic rewards or distraction. This may be because, as argued, the construct validity of intrinsically rewarding strategies is less clear. Factor analysis (see Web Appendix G) on all feeding strategies

revealed three factors, one of which we labelled as intrinsic rewards. This consisted of three items: tapping into praise, promoting the healthiness of broccoli, and promoting the tastiness of broccoli. It is not clear whether these three items represent purely intrinsic motivation. Using "praise" to incentivize children to eat healthily might resemble integrated regulation more than intrinsic motivation, as children are motivated by a non-tangible external reward. Also, in the FPP literature, praise is usually categorized as autonomy support or promotion rather than a coercive strategy such as threats and bribes (see introduction). Similarly, "promoting the healthiness of broccoli" focuses children's attention on the instrumental value of healthy food rather than its inherent enjoyment. Hence, additional research is needed to conceptualize and measure intrinsic motivation related feeding strategies more precisely, and to test this potential parallel route more directly.

An interesting question here is how FPPs that employ extrinsic rewards can shape children's perceptions of food in the long run. Prior research on socialization has focused mainly on actively shaping children's behaviors and values, purposive socialization, so that children eventually adopt what their caregivers want them to have (Grusec 2011). Future research could investigate how caregivers' implicit UTI beliefs and food related behaviors may lead their children to develop comparable psychological profiles in adulthood, which could be linked to undesirable health outcomes. There could be direct implications for the types of beliefs that policymakers would want people to hold, and the types of parenting practices that should be implemented or discouraged.

From a practical point of view, UTI beliefs and related self-control problems make healthy eating a challenge for many people around the world. In response, food marketers frequently claim that their products are healthy in one way or another. For example, 95% of

breakfast cereals marketed to children in the USA make at least one nutrition-related claim on the packaging (Harris et al. 2011). Within nutrition-based claims (for a classification see Chandon and Cadario 2022), especially in the United States, “diet” claims (such as “low sugar”) are used more frequently than “enriched” claims (such as “added calcium”), which is not aligned with consumer preferences: Americans tend to prefer claims about the presence of positives rather than the absence of negatives. More importantly, for nutrition-based claims, André et al. (2019) found lower taste expectations for “diet” claims (such as “low sugar”) than for “enriched” claims (such as “added calcium”). This overuse of nutrition-based and absence-focused “diet” claims may thus further increase the development of consumers’ UTI beliefs if a product’s health claim is associated with lower taste.

Educators and policymakers should thus pay extra attention when encouraging consumers and their children towards healthier diets. Our research provides direct implications for which intuitive belief systems to advocate and which types of practices to discourage. For example, policymakers and educators can focus more on endorsing the good taste of healthy foods. In support, recent research has demonstrated that a pleasure-oriented approach, in which the good taste and enjoyable attributes of vegetables are highlighted, can enhance overall vegetable intake (Turnwald et al., 2019). Instead, though, like food marketers, policymakers generally adopt a more cognitive approach by providing nutritional information and indications about which types of food are “good” or “bad” for health (Marty et al. 2018). Motivating children to eat healthily by using extrinsic rewarding strategies also fits this category. Our findings illustrate that this is more likely to happen when their caregivers believe that health and taste in food do not go together.

Finally, while our findings demonstrate that caregivers’ UTI can have detrimental effects

on their children's healthy eating and even their BMI, our last two studies also convey an optimistic message. Studies 4 and 5 give clear directions on how to attenuate the use of extrinsic rewards. We show in Study 4 that UTI beliefs can be manipulated, alike other lay beliefs. Participants who read an article highlighting the positive relationship between health and taste reported a weaker belief in the UTI. Indeed, when participants were asked to generate examples to support the article, they mentioned a variety of healthy and tasty food (e.g., eggs, apples, and salad). Tackling UTI beliefs directly might provide long-term benefits, as these beliefs are not only associated with individuals' own BMI but may also have consequential intergenerational implications. At this stage, however, we cannot predict how easily this can be achieved with parents. In addition to tackling UTI beliefs directly, in Study 5, a simple intervention asking parents to take some time out in difficult feeding situations was enough to break the link between UTI beliefs and the likelihood of using extrinsic rewards. These findings suggest that it is possible to break their habit of falling back on extrinsic rewards each time they want to encourage their children to eat healthily.

Conclusion

Obesity is a major issue in the modern world. It is complex and multiply determined, and there is a surfeit of information about how it may be avoided, counteracted, and reversed. Consumers are inundated with facts, quasi-facts, and falsehoods, and there is little guidance on how to identify, leave alone separate, the wheat from the deceptive chaff (Karnani et al. 2014; 2016). It is possible that science may yet deliver the perfect pill that cures hunger while delivering nutrition, taste, and satisfying the other socio-cultural functions that food plays in

society. However, and even if this does happen, the obesogenic environments that most modern consumers live in will predominate for some time yet.

In this context, Pollan's (2008) exhortation to "Eat Food. Not Too Much. Mostly Plants." stands as a simple and succinct homily. But how ironic if the very ways in which we are socialized to eat plants teach us to dislike, devalue, and avoid them. Our beliefs, like much else, are heavily influenced by our parents. And as parents, how bitter if we were to devalue the very behaviors that we wanted to teach our children, thereby weighing them down for life.

DATA COLLECTION STATEMENT

The data for Study 1 (February and March 2022) were collected by Qualtrics, using Qualtrics Panels. The data for Study 2 (January 2020) were collected in five Belgian elementary schools (Basisschool de Driesprong at Maldegem, GeBo Gemeentelijke Lagere School at Bonheiden, the Basisschool Vennebos at Schilde, the Sint-Maartensschool at Loppem and the Go! Basisschool´t Park at Malle) by the first author. The data for Study 3 (May 2020), Study 4 (August and September 2020), and Study 5 (March 2022) were collected by the second author, using Amazon Mechanical Turk. The first, second, and third authors jointly analyzed these data. All experimental data and study materials are available on the Open Science Framework: https://osf.io/gxnu4/?view_only=f77779bcc67241cc872a8c62b03177a1.

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