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Economic Constraints on Taste Formation and the True Cost of Healthy Eating

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Abstract

This paper shows how an interaction between economic constraints and children's taste preferences shapes low-income families' food decisions. According to studies of eating behavior, children often refuse unfamiliar foods 8 to 15 times before accepting them. Using 80 interviews and 41 grocery-shopping observations with 73 primary caregivers in the Boston area in 2013–2015, I find that many low-income respondents minimize the risk of food waste by purchasing what their children like—often calorie-dense, nutrient-poor foods. High-income study participants, who have greater resources to withstand the cost of uneaten food, are more likely to repeatedly introduce foods that their children initially refuse. Several conditions moderate the relationship between children's taste aversion and respondents' risk aversion, including household-level food preferences, respondents' conceptions of adult authority, and children's experiences outside of the home. Low-income participants' risk aversion may affect children's taste acquisition and eating habits, with implications for socioeconomic disparities in diet quality. This paper proposes that the cost of providing children a healthy diet may include the possible cost of foods that children waste as they acquire new tastes.

Keywords

United States; food choice; taste formation; food cost; family; waste; health disparities

1. Introduction

Diet-related diseases have attracted considerable attention from scholars, governments, and the public. Concern centers both on increases in health problems such as obesity and diabetes and on social disparities in these conditions, including socioeconomic disparities. Some scholars argue that social class inequities in diet quality and dietary health stem from the prohibitive cost of healthy eating (Darmon & Drewnowski, 2008). Other analysts contend that a more salubrious diet is affordable, depending on how food cost is measured (Carlson & Frazão, 2012). But scholars and advocates in both camps overlook a hidden cost

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of providing children with healthy foods: the waste associated with children's aversion to and frequent rejection of new foods.

Using 80 interviews and 41 grocery-shopping observations with 73 primary caregivers, I find that many low-income respondents base food decisions on their children's preferences in order to minimize the waste that results when children reject unfamiliar items. High-income respondents with greater economic resources are more likely to provide foods that their children initially may not like. Economically constrained families' risk aversion may shape children's taste acquisition in ways that contribute to socioeconomic disparities in diet quality.

I propose that accounting for food waste that children create when acquiring new tastes may yield more accurate estimates of the cost of healthy eating. While some researchers allege that food-cost analyses based on price per calorie may overstate the expense of a healthy diet (Carlson & Frazão, 2012), claims that the poor can make more salubrious choices may underestimate this cost because they do not account for waste. These findings can inform policies designed to improve the diets of low-income children.

2. Background

2.1 Socioeconomic Disparities in Diet Quality and Health

Diet quality is consistently linked to health, including obesity, type II diabetes, cardiovascular disease, and several cancers. Obesity and diabetes have become more prevalent across the socioeconomic spectrum since the 1970s (Chou et al, 2004; Kanjilal et al, 2006), but rates are typically higher among low-income individuals (Kanjilal et al, 2006), with some variations by race and gender in the case of obesity (Ogden et al, 2010).

Socioeconomic disparities in diet-related health stem in part from differences in diet quality (Darmon & Drewnowski, 2008). Although Americans on average do not meet dietary guidelines (Wang et al, 2014), poverty is consistently associated with lower fruit and vegetable consumption, less healthy food purchases (Turrell et al, 2002), and worse overall diet quality (Darmon & Drewnowski, 2008). American adults' diets improved modestly between 1999–2000 and 2009–2010, but low-income individuals saw no improvement, and initial socioeconomic disparities grew (Wang et al, 2014).

Scholars trace socioeconomic disparities in diet quality to sources ranging from biological mechanisms (Bjorntorp, 2000) to structural constraints (Caspi et al, 2012). This paper addresses economic explanations. On average, a healthy diet costs \$1.48 more per day than an unhealthy one (Rao et al, 2013). Energy-dense foods, which contain many calories per gram and often have added fat and sugar, typically cost less per calorie than nutrient-dense foods such as produce, whole grains, and lean proteins (Darmon & Drewnowski, 2008). For example, Romaine lettuce provides 72 calories for \$1, whereas Doritos supply 385 calories for \$1. I calculated these values based on prices of an 11-ounce bag of Doritos (\$4.29) and a head of lettuce (\$1.50) at Market Basket supermarket in Somerville, Massachusetts in June 2013. Some scholars posit that poor people extend scarce resources by selecting foods with

cheap dietary energy, but these foods can lead to overeating and are linked to diet-related disease (Drewnowski & Specter 2004).

Researchers and advocates disagree about how much healthy food costs and whether low-income households can improve their diets. Debate centers largely on how food cost is measured. United States Department of Agriculture (USDA) analysts find that when measured by price per calorie, fruits and vegetables do cost more than less healthy options. When price is measured by serving or by edible weight, however, many healthy items cost less than foods containing added sugar, saturated fat, and/or salt (Carlson & Frazão, 2012). For example, a serving of lettuce (25–30 cents) costs less than a serving of Doritos (39 cents). USDA analysts consequently suggest that the price-per-calorie metric overstates the cost of many healthy foods (Carlson & Frazão, 2012). Additionally, within certain categories of food and drink, healthy and unhealthy items have comparable costs (Bernstein et al, 2010; Rao et al, 2013). Some researchers claim that, with careful budgeting, Supplemental Nutritional Assistance Program (SNAP) recipients can satisfy dietary guidelines for fruits and vegetables (Stewart et al, 2011). Similarly, some food justice advocates contend that “junk food” and fast food seem cheap, but actually cost more per meal than simple home-cooked dishes (Bittman, 2011).

2.2 Children’s Neophobia and Taste Formation

Despite attempts to specify the economic burden of healthy eating, researchers have overlooked how children’s rejection of unfamiliar foods may contribute to the cost of providing them a healthy diet. Searches in Google Scholar and PubMed combining the terms [child*], [food OR diet], and [cost OR price] yielded no studies on this question. Children tend to be neophobic, or wary of novel foods, which they often reject. Psychologists posit that children’s neophobia is an evolutionary adaptation to humans’ condition as omnivores who need a range of nutrients but lack inborn knowledge of which potential edibles contain toxins (Rozin, 1976). For children, all food is initially new and possibly dangerous, making their aversion to unfamiliar items especially pronounced (Birch 1999).

Although humans innately prefer sweet and salt, while disliking bitter and sour, most tastes are learned (Beauchamp & Mennella, 2011). Children acquire food preferences in various ways. Through associative learning, children link the sensory characteristics of food—such as taste, smell, and texture—with the physiological effects of eating (Birch, 1999). Thus, children quickly come to prefer calorie-dense foods that produce pleasing feelings of satiety (Johnson et al, 1991). Through repeated exposure, however, infants and children learn to like foods that are not inherently palatable or calorific (Birch 1999; Wardle et al, 2003). Typically, children must try foods eight to fifteen times before their acceptance increases (Sullivan & Birch 1990). Additionally, children with greater dietary variety accept novel foods more readily than do children with less exposure (Mennella et al, 2008).

Repeated and varied exposure can affect children’s present and future eating habits. Children acquire tastes more quickly than adults do (Beauchamp & Mennella, 2011). Food intake often tracks from infancy to middle childhood (Grimm et al, 2014), and preferences formed in childhood persist into late adolescence, if not longer (Kelder et al, 1994). Consequently, it is important to foster healthy eating habits early in life. Researchers and

governments recommend repeatedly exposing children to disliked foods in order to increase their acceptance of healthier items (Wardle et al, 2003; USDA, 2014).

2.3 Family Influences on Children's Intake and Preferences

Parents' diet also influences children's intake and preferences. Amniotic fluid and breast milk contain flavors from the mother's diet, which fetuses and infants sense. Exposure to these flavors is associated with infants' subsequent acceptance of foods that their mothers ate regularly (Beauchamp & Mennella, 2011). Social learning, including observing esteemed others select and consume a given food, also shapes children's preferences. Scholars posit that children infer from others' actions which foods are safe and even desirable (Wertz and Wynn 2014). Additionally, when caregivers purchase foods they like, their tastes can influence children's intake and opportunities for taste formation because these items become available at home (Skinner et al 2002). This paper builds on these studies by highlighting how material conditions influence children's taste acquisition in interaction with parents' tastes.

2.4 Waste Avoidance

Previous qualitative research has noted briefly that economically disadvantaged individuals avoid waste in food purchasing (DeVault 1994) and that low-income mothers see children's food waste as a concern (Reed, 1996), which some address by providing foods that their children prefer (Dowler, 1997; Bowen et al, 2014). I extend this research by examining these tendencies in greater depth and comparing how low-income and high-income parents think about the cost of food waste. Most fundamentally, I examine the interaction between risk aversion and respondents' own preferences, while extending the implications of economically disadvantaged parents' risk aversion to children's taste formation and to debates about the cost of healthy eating.

3. Data and Methods

This paper draws on 80 in-depth interviews with 73 primary caregivers and 41 grocery-shopping observations with 38 interview respondents. I collected data in the Boston area between summer 2013 and summer 2015 for a parent study of families' food decisions. To qualify, respondents had to live with their children at least half-time and make most of the household's food decisions. Because the broader study examines socioeconomic differences in caregivers' food decisions, there were no income-related inclusion or exclusion criteria. To minimize ethnoracial variation, the study was limited to non-Hispanic white and non-Hispanic Black caregivers who have lived in the United States since early childhood. I also included biracial respondents, provided that at least one of their parents is non-Hispanic white or non-Hispanic Black. I targeted families with children between four and eight years old because children in this age range are still forming food preferences and depend largely on caregivers for food (Birch 1999), but the study was open to families with children ages two to fourteen.

I recruited participants through purposive and snowball sampling. First, I approached caregivers in person and posted flyers at three organizations serving low-income

populations, including a food pantry, a toy and clothing trade-in center, and a family homeless shelter. Additionally, 1000 flyers were sent to non-Hispanic white and Black caregivers with children ages four to eight. Names and addresses came from InfoUSA, which sells contact information. I also posted flyers at businesses and libraries in high-income and mixed-income neighborhoods, and at a fourth organization serving low-income families. Some people distributed flyers themselves; these pamphlets reached both low-income and high-income respondents. A payment of \$40 was offered for the interview; a payment of \$100 was offered for grocery-shopping.

I also interviewed the friends, family, and neighbors of study participants. Subjects construct ideas about food in relation to those around them. Through sampling people who know each other, I observed some social elements of respondents' food environment. I asked both referrers and those they referred the same questions. Referrals were capped at three. Appendix C documents participant recruitment.

Interviews included open-ended questions about respondents' grocery shopping and meal patterns; food-provisioning priorities, constraints, and ideals; and the role of food in their children's lives. Questions focused on, but were not limited to, the youngest child in the target age range; if children fell outside this range, questions centered on the child closest to it. After several low-income respondents discussed risk aversion spontaneously, I added interview questions about repeated introduction and novelty. This paper draws on answers to these questions, found in the section "Tastes, Variety" of the interview guide, and to questions in the sections "Food Shopping," "Priorities," "Food Selection and Routines," "Economic Constraints," and "Overall Evaluation" (Appendix A). I exclude three interviews and three observations that occurred before I added questions about repeated exposure.

Interviews were recorded and transcribed verbatim. I took field notes on respondents' non-verbal communication and demeanor. Most interviews took place in respondents' homes; the remainder occurred in fast-food restaurants, cafes, or parks. Interviews ranged from 1.5 to 3.5 hours, averaging 2.25 hours.

To triangulate interview data and observe caregivers' food selection directly, I followed 38 interview participants on a grocery-shopping trip. To develop a sense of food-shopping patterns, I began by observing the first 23 interviewees, most of them low-income. Thereafter, I approached respondents who differed in ways related to the theoretical motivation the parent study. Specifically, I sought greater economic variation; among low-income respondents, I sought variation in caregivers' approach to healthy eating. Because families often shop periodically and cannot wait long to buy food, observations also depended on scheduling. One respondent declined because she shops frequently for small amounts of food, and planned observations with two high-income families fell through due to ongoing scheduling conflicts.

During the observations, I noted the foods that respondents considered, their reactions to items, and their selections. Unprompted, most respondents narrated their thought process. If participants fell silent, I sometimes asked, "What are you thinking?" or "How does that look?" to jumpstart conversation. Immediately thereafter, I interviewed respondents about

their shopping experience and purchases. Shopping trips ranged from 20 minutes to three hours, typically taking 1–1.5 hours; post-shopping interviews averaged 60–90 minutes. The observation and subsequent interview were recorded and transcribed verbatim. I also took detailed field notes, and all participants gave me their receipt to record their purchases. This analysis uses respondents' narration during food shopping and the sections "Shopping Experience and Purchases," "Budgeting," "Evaluation," and "Constraints Lifted" of the interview guide (Appendix B). The protocol for this study was approved by the Committee on the Use of Human Subjects at Harvard University (#CR-24246-010), and I conducted research accordingly, including obtaining informed consent before the interview and shopping observation.

Table 1 shows the sociodemographic composition and target children's ages for the full sample and the observation subsample. I categorized participants by income level using poverty income ratios (PIR) of <130%, 130–350%, and ≥350%. I label these groupings "low-income," "moderate-income," and "high-income," respectively. PIR is calculated by dividing a household's annual income by the poverty threshold for that household's size. Because the parent study focuses on the varied perspectives of economically disadvantaged families, the majority of the sample is low-income.

Shopping with an observer is somewhat unusual. Although it is possible that I could have influenced participants' decisions, social desirability bias was likely attenuated because buying "better" food to avoid judgment costs extra money, and foregoing habitual purchases requires another shopping trip—an inconvenience for the many respondents who shop outside their neighborhood or who rely on the bus or a ride for transportation. Participants did not refrain from buying unhealthy foods; three respondents stole despite knowing I was watching.

I analyzed data using an abductive approach. Abduction involves turning unexpected findings into a theoretical hunch that is pursued by analyzing variation across a study to develop an emergent theory (Timmermans and Tavory, 2012). I turned an unanticipated observation into a new guiding question: under what conditions do parents defer to their children's preferences to reduce food expenditures? With background knowledge about taste formation and diet cost, I deduced the implications of this theoretical hunch for food cost calculations and diet-quality disparities. Through focused coding (Charmaz, 2006: 57–60), a research assistant and I identified transcript passages about children's tastes, waste, and experimentation. I used constant comparison (Charmaz, 2006: 54) to characterize how and for whom children's food rejections encourage caregivers' risk aversion. I collected and analyzed the data iteratively in order to refine the components and conditions of risk aversion (Timmermans & Tavory, 2012: 171). Finally, I categorized respondents based on whether they see children's food rejection as too costly for their food budget. I categorized respondents who do not see children's food rejection as too costly according the reason they do not find rejected food economically burdensome. These categorizations form the basis of Table 2.

4. Results

4.1 Prioritizing Children's Preferences to Avoid Waste

Often spontaneously, many low-income respondents report choosing foods that their children prefer in order to minimize waste. When I asked Colleen, a low-income white mother, about her grocery-shopping routine, she brought up waste immediately:

I get my food stamps on the 5th and I try to make them last for a month, but that's really difficult, because toddlers waste a lot of food [...] Tryin' to get him to eat vegetables or anything like that is really hard. I just get stuff that he likes, which isn't always the best stuff.

Brittany, a low-income white mother of a six-year-old, responded almost identically when I asked how she “make[s] it all happen with the money part of it [feeding her son].” After explaining that she spends her own money once the monthly SNAP benefits run out, Brittany immediately focused on waste:

I do the best I can. [I get] the things I know that my son will eat and like. I try to mix it up a little bit [...], but I try not to buy things that I don't know if he'll like because it's just, it's a waste.

For many low-income respondents like Colleen and Brittany, children's preferences and economic loss are conceptually linked near-opposites: when children like a food, they will consume it and therefore not generate waste.

In any family, uneaten food costs money, but this concern is pronounced among many low-income respondents. Food-insecure study participants in particular worry that when children turn down items they do not like, other household members may have to eat less. Tracey, a white mother of children ages 8, 12, and 16, makes her food budget “stretch to the penny.” Pre-diabetic, Tracey cannot eat the rice and pasta that she feeds her family. Instead, she consumes beans, vegetables, nuts, and chicken, but can afford only 800–1000 calories of these items per day. Frustrated and incredulous, Tracey recounts throwing away food that her children reject under the pretext that they are not hungry:

I feel like [cooking] is my job, so I go in there, and for them to be like, “I'm not really hungry, I'm gonna put this away now”—and this is the magic trick: it goes to the container, goes to the back of the refrigerator, never gets touched again, even if they say, “We'll eat it tomorrow.” And then it goes in the trash. And then my head explodes, 'cause I'm like, “Do you know what I have to do to get this food up in here?” I go without a lot for myself to make sure they have [enough], and when they're throwin' away food, I'm like, [I] coulda went and bought myself this and that.

Because she cannot eat the foods her children turn down and because she already restricts her intake to ensure her family has enough, Tracey equates the food her children waste with food she goes without. Although not all caregivers have such little leeway, many low-income respondents agree that when children reject food, they erode a scarce household resource.

4.2 Reducing Risk by Avoiding Experimentation and Reintroduction

Unable to afford food their children will not consume, most low-income respondents avoid introducing their children to foods that they may not like. After Trisha, a low-income African-American mother, discussed her seven-year-old's "pickiness" at length, I asked how to deal with a finicky child.

Trisha: Well, you can't force 'em.

Author: Not force 'em. I've heard this advice: try to just let them experiment.

Trisha: That's the couscous with my daughter [which Trisha bought at her insistence]. She tried it, didn't like it—let her experiment on a budget, you know what I'm saying? "Mummy, I want that!" [...] "You're not gonna try that 'cause we can't afford it, and you don't know if you gonna like it. We get that, we're not gonna be eating' for a couple days, so if you want an empty stomach, you go ahead and try that."

For Trisha, money is so scarce that she equates failed food experimentation with going hungry. Her prior experience purchasing couscous, which her daughter swore she would like, only reinforces the sense that novelty presents a financial risk.

Most low-income respondents see the advice to introduce children repeatedly to rejected items as economically unfeasible, even if they want their children to consume a wider range of foods. Brittany worries that her "picky" son eats too few vegetables. Yet when asked what she thought of feeding her son a disliked food ten times to increase his acceptance, Brittany hesitated:

Brittany: Well, yeah and no, because you know those whole ten times that they say, "No, no, no," you're wasting that food. So that's a big thing for me.

Author: So if you knew that after eleven cauliflowers he would finally like cauliflower, would it be worth it?

Brittany: No. No. That's a lot of wasted food. No. Not for me, not for me.

Similarly, other participants immediately equated the food that children go through in the process of taste acquisition with a financial loss they cannot bear.

Even when they want their children to eat more varied and healthier foods, and recognize that children may accept them after repeated exposure, many low-income respondents minimize economic risk by purchasing what their children like—often calorie-dense, nutrient-poor foods. After seeing her children repeatedly throw out leftovers, Tracey resorted to buying Hot Pockets, frozen chicken nuggets, and microwavable beef-and-bean burritos. Pained and embarrassed, Tracey feels she reneged on her commitment to serve "real" food. Yet unable to afford groceries that go uneaten, she began buying the processed items her children do not waste. Alice, a low-income African-American woman who recently adopted teenage boys, loves collard greens. She stopped cooking them altogether after her sons repeatedly turned them down. Natalee, a low-income African-American mother, wants her four-year-old to eat more vegetables. But, she says, "I don't ever just come and make something. [...] I'd rather him say what he wants than me make something

and waste it.” Although low-income respondents provide foods their children like for various reasons—to avoid conflict, to save time, out of habit, and to make their children happy—amidst these motivations, economic concerns loom large.

4.3 Structured Experimentation

To some extent, low-income caregivers do vary their food purchases. They note that children sometimes grow tired of eating the same thing, even losing their taste for foods they consume too frequently. But when low-income respondents branch out, they typically select different items from a preferred *category* of food. For example, Sharonda, an African-American mother of three who has a “bad habit of picking things that they eat a lot,” says, “The only thing different that I might try is cereal. Because they love different kinds of cereal.” By seeking variety within a class of food that their children like, low-income respondents minimize the risk that novelty will generate waste. But this structured, constrained experimentation is unlikely to expose children to varied types of food that would encourage them to acquire new and healthier tastes.

4.4 Moderating Influence of Household Members’ Tastes

Risk aversion operates in interaction with other household members’ tastes. Economically constrained respondents are especially reluctant to provide new foods that they themselves dislike. Kaylee, a low-income white mother who consumes few healthy foods, wants her six-year-old son to eat things that she does not enjoy. When asked what keeps her from offering him more vegetables, Kaylee responded, “I don’t want to waste it and I feel like he’s not gonna eat it. I know I ain’t gonna eat it.” The tastes of other household members define the set of foods that could entail an economic loss. For parents like Kaylee who would like to offer a larger range of healthier options, trying something new is especially risky. If neither caregiver nor child likes the food, it may go to waste entirely.

Economically constrained respondents are more likely to introduce their children to novel or disliked items when another household member eats those foods. Rebecca, a middle-income but food-insecure white mother of three, loves fruits and vegetables. During the grocery-shopping observation, as Rebecca approached her budget, she put back a bag of apples, but hesitated. “I can’t put back the apples.” Rebecca returned a loaf of bread instead, explaining that apples are her “sweet.” When asked if she thinks that repeatedly feeding her children a disliked vegetable would generate waste, Rebecca responded:

For me it would never be thrown away. I would end up eating it, so that wouldn’t be too much of an issue. Whatever they don’t eat, we never try to throw it away, just try to save it either for another time or I’ll eat it

When another household member likes the food in question, families can avoid waste by sharing small portions with the child or by consuming what the child turns down. In these cases, household members’ preferences moderate the relationship between children’s tastes and economic risk by attenuating respondents’ concern that food rejection results in waste.

4.5 Moderating Influence of Conceptions of Adult Authority and Children's Autonomy

Low-income caregivers could conceivably reduce food waste by requiring children to eat what is served instead of acquiescing to their preferences. Several respondents take this approach. Pauline, a white grandmother, ritually admonishes her grandchildren: "You take what you get and you can't get upset—or *you get nothing*." Pauline explains:

I'm not puttin' 48 packs of [ramen] noodles in my [shopping] cart because that's all my grandson will eat. [...] You can't give 'em options, honey. At seven years old, you don't look at a kid and say, "Do you want spaghetti, or do you want—?" Some parents do that shit: "Oh, little Johnny, I'm your best friend..." I'm like, "Michael, eat it."

Pauline frames generalized deference to children's tastes as an abdication of authority. From this perspective, adults know what growing bodies need and consequently should decide what children consume. Other respondents simply take for granted that children eat what they are served. Terri, an African-American mother, states matter-of-factly, "[My four-year-old daughter] eats whatever I eat. I cook, and she eats what I cook. That's what she eats. That's it." In these cases, the link between children's preferences and waste is attenuated because children have little latitude to reject their food.

Although they may cajole their children to consume less preferred foods, most low-income respondents see requiring them to do so as unreasonable. Natalee says:

I hate for a person to make a choice for me, versus me making that choice for myself 'cause that's basically giving all your willpower to that person.

Like Natalee, many low-income respondents see children's desires as worthy of consideration. These caregivers often equate making children eat something with "forcing," implying that this approach involves excessive power and denies children autonomy they should enjoy. Against the implausible alternative of requiring children to eat foods chosen independently of their desires, most low-income respondents see deferring to children's tastes as a more feasible way to avoid waste.

4.6 Moderating Influence of Children's Food Experiences Outside the Home

Some low-income respondents have bought new foods that their children tried outside of the home and liked. Vicky, a low-income African-American mother of two young boys, recounts discovering that her son likes things she had never given him:

My 5-year-old, he likes carrots, raw carrots. [...] He's the one that introduced me to putting peanut butter on the celeries. And blue cheese[dressing] 'cause they teach him that in school.

Knowing that her son will eat this healthier snack, Vicky now purchases it. Similarly, Brittany bought pomegranates and another mother purchased Asian pears after learning that their children tried them at school. Although these mothers could not afford large quantities of these relatively expensive fruits, they show that economically disadvantaged respondents may purchase novel items if they know that their children will eat them.

4.7 Risk Tolerance among High-Income Respondents

Most high-income respondents value introducing their children to varied foods and aspire to raise adventurous eaters. They frame exposure to diverse foods as a source of pleasure, a moral marker, and a cultural competence for future social settings. Although high-income parents have a more elaborated discourse than many low-income respondents, money enables them to provide new foods and repeatedly expose their children to initially disliked items.

Like lower-income study participants, most high-income respondents dislike throwing away food. Unlike economically disadvantaged families, they have greater resources to withstand children's food rejection. Claudia, a white mother of a four-year-old, had recently spent \$5 to try a dragon fruit with her son, without knowing what it was or if he—or she—would like it. Asked whether she sees trying new foods as potentially costly, Claudia replies:

There is a little bit of that for me. I'm lucky. I can take a chance on food that he might not like. He wanted [a peach-poppyseed salad], and I was like, "Okay, I'll buy it, but I'm not sure you're going to like it." And then he didn't like it. [Raises her hands in resignation] Ehh. It's okay. But again, because we're lucky...

For Claudia, buying food that goes uneaten is disappointing, and the cost of rejected food does cross her mind, but she can shoulder this expense.

Similarly, many high-income respondents can afford to reintroduce previously rejected foods. Brenda, a white mother of two, repeatedly gives her three-year-old a fruit he initially disliked. Brenda sends her son to preschool with grapes—which return untouched. "I'm hoping because he's there with all the other kids, he will eventually eat [them]," Brenda explained. When asked about waste, she replied, "I do feel bad about the waste, but I feel worse about my son not eating well." Unlike most low-income respondents, Brenda repeatedly gives her son something he will reject in order to shape his taste for healthy food.

In contrast with low-income participants, many high-income respondents found the idea of reintroducing foods eight to fifteen times financially feasible. For example, Wendy, a biracial mother, wants her four-year-old daughter to eat more protein-rich snacks. Twice, Wendy gave almonds to her daughter, who disliked them. Asked if she could imagine providing her with almonds ten to fourteen times, Wendy replied affirmatively without hesitation. Probed about whether the cost of repeated rejections would deter her, Wendy replied, "No, I don't know if money would be a reason for me not to buy it." While acknowledging the high price of almonds, Wendy did not emphasize cost and waste, as low-income respondents often do.

High-income respondents also expose their children to food by sharing what they themselves eat. "As soon as she could eat," Leslie, a white mother, recounts, "we were like, 'We're having Brussels sprouts, you're having Brussels sprouts.'" If her seven-year-old daughter declines, Leslie says, "We would eat what she doesn't eat." Respondents who already consume what they want their children to eat have ongoing opportunities to reintroduce these items. Furthermore, they face less potential food waste because other household members can share small portions of their food or consume what the child rejects.

Sometimes, high-income respondents provide repeated exposure to foods they already consume while also tolerating waste. Leslie enjoys vegetables and whole grains, but has a life-long fruit aversion. Determined not to pass it on, she has introduced her daughter to a variety of fruits. Probed about her thoughts on offering these foods, Leslie said, “I just wanted her to like them.” When asked about the potential cost of uneaten food—which Leslie did not allude to—she replied, “Honestly, it never crossed my mind.” Unlike low-income respondents like Kaylee, who feel it is costly to provide foods that they themselves dislike, Leslie had few financial concerns about fostering her daughter’s taste for foods that she herself eschews.

High-income parents certainly face challenges in encouraging their children to eat new foods and retry disliked ones. Liz, who comes home from work at 7 PM, has little time at dinner to cajole her daughters to try new foods—or to cook a second meal if they reject a novel preparation. Chrissie, who introduces new items at dinner, does not experiment with bagged lunches for school. For Lucy, repeatedly introducing foods to her 9-year-old son, who is “fairly set in his ways,” proves more difficult than with her toddler daughter. Sally sometimes resorts to offering unpopular foods at bath time, when her four-year-old daughter, distracted, will take a bite. Denise finds it emotionally exhausting to cook meals that her 6-year-old twins meet with disgust.

Challenges like these can frustrate and tire parents across the socioeconomic spectrum. Yet high-income respondents have two advantages over their low-income counterparts. They have greater economic resources to withstand waste generated by food rejections, and to the extent that high-income parents eat healthier foods than their low-income peers (Wang et al 2014), they can expose their children to what they already consume. Table 2 shows that, compared to low-income respondents, a greater proportion of high-income parents report that they can afford food waste and that someone else would eat what their child rejects. The responses of moderate-income respondents fell between those of their low- and high-income peers.

5. Discussion and Conclusion

Children’s taste aversion is one important influence on low-income respondents’ food decisions. Many of these economically constrained parents minimize financial loss in the form of food waste by purchasing what their children will eat, while avoiding experimenting with new items or reintroducing foods that their children initially turned down. Often, low-income respondents report that their children prefer energy-dense, nutrient-poor items. Even when these economically constrained parents may not want to supply such foods, many feel that they cannot afford to risk providing something that their family may not eat.

I build on previous research that notes this tendency in low-income families (Dowler 1997; Bowen et al 2014) by examining this mechanism of food choice in greater depth and showing how it varies across income levels. High-income respondents experience various challenges in feeding their families, but concerns about economic risk are less salient for them than for their low-income peers. Some high-income respondents even reintroduce their children to initially rejected foods in order to develop their taste for healthy items. This

study highlights the material conditions under which an important proximate process of children's taste acquisition—repeated exposure—is likely to occur (Link & Phelan, 1995). To the extent that high-income caregivers have greater economic resources to withstand waste, risk aversion among low-income parents may shape children's taste acquisition in ways that contribute to socioeconomic disparities in diet quality and diet-related health.

Risk aversion is not the only influence on parents' food choice. Rather, it operates in addition to and in interaction with other influences. This article extends previous studies by highlighting how several conditions moderate low-income respondents' reluctance to provide children with new foods, including household-level food preferences, parents' conceptions of children's desires and adult authority, and children's eating experiences outside of the home.

Existing research shows that family-level food preferences also shape proximate mechanisms of taste acquisition. Risk aversion in food purchasing interacts with the composition of household-level tastes in especially important ways. Some parents may select foods that they like—even when the food is for the child—with little consideration of waste. In other cases, low-income parents purchase foods that their children like partly to minimize waste. The tastes of parents and other household members define which foods present the greatest risk: items that no one will eat may go to waste entirely. Thus, economically constrained respondents with restricted preferences face the greatest economic pressure to provide foods that their children will consume. As a result, a concordance between parents' and children's tastes that appears to result from intergenerational transmission may reflect both transmission and economic constraint.

Previous studies have not focused on the cost of children's taste formation. I hypothesize that food-cost calculations would be more accurate if they accounted for the possible expense of children's taste acquisition. Existing estimates often use data on individuals' food intake, thus implying that the food in question is actually eaten. More specifically, analysts multiply the amount of food consumed by the retail price for that quantity, with adjustments for inedible portions such as melon rinds and chicken bones. For example, if an apple costs 60 cents, and a child eats half, the calculated food cost is 30 cents. In these analyses, waste is unobserved. For parents, however, providing half an apple costs 60 cents, not 30 cents, if the other half goes uneaten. Thus, two similarly priced foods may have different perceived costs if a child rejects one item but not the other.

When food goes uneaten, the out-of-pocket cost incorporates both what is ingested and what is wasted. If food-cost estimates included waste, the price per unit of food *consumed* would exceed the price per unit of food *purchased*. Consequently, providing food that goes uneaten costs more than current calculations suggest. Adjusting estimates to reflect children's food waste would parallel existing adjustments for inedible portions, which individuals must purchase in order to consume the edible parts. The global cost of taste acquisition would include waste from the multiple exposures required for children to accept each unfamiliar food. If parents offered foods repeatedly, as pediatricians and government agencies recommend, this expense would likely increase as children grow because younger children acquire tastes most readily (Ahern et al 2014).

This paper has implications for programs and policies designed to improve children's diets. Researchers have called for greater feeding guidance to help families foster healthy eating habits in young children (Grimm et al 2014). If recommendations entail potential waste, such as repeatedly offering healthy foods, economically constrained parents may not provide healthier options. Pediatricians and nutrition professionals consequently should offer guidance that minimizes waste. Suggestions might include purchasing easily divisible foods with a generous shelf life, such as frozen vegetables, so that caregivers can provide small portions repeatedly without throwing away a larger unit of food. Further research is necessary to establish what specific recommendations would appeal to parents.

A wide range of actors recognizes that schools, daycares, and other organizations have the potential to foster healthy eating habits. This study echoes this view, suggesting specifically that organizations can share the potential economic risk involved in developing children's food preferences. Because simply supplying salubrious options may not entice children to try unfamiliar offerings, organizations must structure children's engagement with food in ways that foster young people's taste formation. It is vital that organizations receive the resources to do so.

This paper has several limitations. First, I study two ethnoracial groups in one metropolitan area. Caregivers' approaches to children's food rejection may differ in other regions and ethnoracial groups, as well as across urban, suburban, and rural areas. Second, I do not analyze moderate-income participants separately because their responses fell predictably between those of low- and high-income respondents. Future research should examine moderate-income parents in greater detail. Third, this study has a relatively small sample. By seeking detailed qualitative information on parents' food decisions, I traded depth for breadth. This approach yielded evidence of an understudied mechanism of food choice, but I cannot estimate the mechanism's population-level prevalence. Fourth, I hypothesize that risk aversion among economically constrained caregivers may shape children's taste acquisition in ways that exacerbate socioeconomic disparities in diet quality, but I cannot demonstrate or quantify these possible effects. Fifth, this study does not measure waste and consequently cannot specify how adjusting for children's food rejections would improve diet-cost estimates. Further research is needed to address these questions.

Despite these limitations, I highlight the role of waste in parents' food choices, with possible implications for children's health and policies designed to improve children's diets. This paper also suggests that accounting for the cost of children's taste acquisition helps to bridge competing claims about the affordability of healthy eating. Analyses based on energy cost may overestimate the expense of some items, but they posit correctly, albeit for an unanticipated reason, that healthy eating can burden economically disadvantaged families. Assertions that low-income households can afford healthy diets may overestimate families' ability to provide wholesome food because they do not consider the potential cost of waste accrued from repeatedly exposing children to new foods. Going forward, debates and policies must account for this possibility.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Low-income parents buy foods that their children like to avoid food waste

High-income parents have more money to give children foods they may reject

Parents' tastes attenuate their reluctance to expose children to new foods

Low-income parents' risk aversion may affect children's taste formation

Accounting for waste may yield better estimates of children's diet cost

Table 1
Sociodemographic Information of Participants and Target Children in Full Sample and Observation Subsample

	PIR (%)	N	Age (mean)	Age range	White	Black	Bi-racial	Gender (Women)	Married or Partnered	Single	Divorced or Widowed	Child age (mean)	Child age range	Child ages 4–8
Full sample	<130	45	38.7	21–62	18 24.6%	26 35.6%	1 1.4%	44	10 13.7%	27 37%	8 11%	6.2	2–14	73.3%
	130–350	12	39.6	24–51	6 8.2%	4 5.5%	2 2.7%	11	8 11%	3 4.1%	1 1.4%	7.1	4–14	75%
	350	16	41	28–46	15 20.5%	0	1 1.4%	16	16 23%	0	0	5.75	4–9	93.75%
	Total	73	39.4	21–62	39 53.4%	30 41.1%	4 5.5%	71	34 46.6%	30 41.1%	9 12.3%	6.3	2–14	78%
Subsample	<130	32	39.3	21–62	11 29%	21 55%	0	31	8 21%	17 48%	7 18%	5.5	2–11	75%
	130–350	3	39	24–51	1 2.6%	2 5%	0	3	3 8%	0	0	7.3	4–14	66.7%
	350	3	43	41–46	3 7.9%	0	0	3	3 8%	0	0	5.7	5–7	100%
	Total	38	39.6	21–62	15 40%	23 60%	0	37	14 36.8%	17 44.7%	7 18.4%	5.7	2–14	77%

Note: PIR is poverty income ratio, presented as a percentage of the federal poverty threshold. Table 1 excludes three respondents who were dropped due to missing data.

Table 2**Respondents' Perceptions of the Cost of Children's Food Rejection**

PIR (%)	Costly	Not Costly			Other
		Someone Eats it	Can afford	Child Has Little Choice	
<130	51%	20%	4.4%	13%	24%
130–350	30%	58%	17%	8%	42%
350	0%	87.5%	81.3%	0%	13%

Note: PIR is poverty income ratio, presented as a percentage of the federal poverty threshold. "Other" includes child's openness, confidence in one's cooking ability, child being "too old" to change habits, buying new foods in small quantities, and willingness to seek new foods for child with allergies. Rows do not total 100% because categories are not mutually exclusive.