Children judge others based on their food choices

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Abstract:

Individuals and cultures share some commonalities in food preferences, yet cuisines also differ widely across social groups. Eating is a highly social phenomenon; however, little is known about the judgments children make about other people's food choices. Do children view conventional food choices as normative and consequently negatively evaluate people who make unconventional food choices? In five experiments, 5-year-old children were shown people who ate conventional and unconventional foods, including typical food items paired in unconventional ways. In Experiment 1, children preferred conventional foods and conventional food eaters. Experiment 2 suggested a link between expectations of conventionality and native/foreign status; children in the United States thought that English speakers were relatively more likely to choose conventional foods than French speakers. Yet, children in Experiments 3 and 4 judged people who ate unconventional foods as negatively as they judged people who ate canonical disgust elicitors and nonfoods, even when considering people from a foreign culture. Children in Experiment 5 were more likely to assign conventional foods to cultural ingroup members than to cultural outgroup members; nonetheless, they thought that no one was likely to eat the nonconventional items. These results demonstrate that children make normative judgments about other people's food choices and negatively evaluate people across groups who deviate from conventional eating practices.

Keywords: Social cognition | Food selection | Social judgment | Disgust | Social norms | Intergroup cognition

Article:

Introduction

Eating is a complex behavior. Preferences for sweet and salty flavors emerge early in development, are present across cultures, and are thought to have evolved to promote physical growth (Birch, 1990, Coldwell et al., 2009, Desor et al., 1973, Mennella et al., 2011, Ventura and Mennella, 2011). Humans also exhibit preferences for familiar flavors, including foods they were exposed to in utero or through their mother's breast milk (Aldridge et al., 2009, Birch, 1990, Birch and Marlin, 1982, Hausner et al., 2009, Mennella et al., 2001, Sullivan and Birch,

1990). In addition, ingesting some items should be universally avoided. Some plants are toxic and would be extremely harmful or fatal if consumed by humans (e.g., Keeler & Tu, 1991), and infants avoid touching plants (Wertz & Wynn, 2014b). Together, this evidence highlights common mechanisms and patterns of human eating behavior across cultural groups.

Amid these similarities in what humans eat, there is also notable cultural diversity. For instance, different religious groups have different rules for what should be eaten; some allow pork but prohibit beef (Doniger, 2017), whereas others allow beef but prohibit pork (Regenstein, Chaudry, & Regenstein, 2006). The historic availability of a food in an environment may also dictate whether it is incorporated into the local culture's cuisine. Chili peppers are a staple in Mexican cuisine because chili peppers originated in this geographic region. Although chili peppers are widely available around the world today, modern cultural cuisines continue to reflect this difference in geographic origins; on average, participants from a small Mexican village could tolerate higher levels of spice than a sample of American college students (Rozin & Schiller, 1980). In addition to cultural influences on food preferences, food selection and eating are inherently social experiences; people often eat with each other, and eating together increases people's perceptions of closeness and tendency to cooperate (Miller et al., 1998, Rozin, 1999, Rozin, 2005, Shutts et al., 2013, Woolley and Fishbach, 2017).

Food choice is embedded in a social context, and research with young children suggests that the cognitive mechanisms supporting this mode of thinking are present early in development. Infants select foods after watching another person put that food in his or her mouth (as opposed to behind an ear), but they do not make similar choices after watching another people put an artifact in his or her mouth (Wertz & Wynn, 2014a). Infants also associate food selection with patterns of social affiliation and cultural groups (Liberman et al., 2014, Liberman et al., 2016). By preschool age, children consider contextual information, rather than just the flavor of a food itself, when selecting foods (DeJesus et al., 2015, Lumeng et al., 2008, Roberto et al., 2010), and they are highly attentive of the food choices of their peers and ingroup members when choosing foods (Birch, 1980, Cruwys et al., 2015, DeJesus et al., 2018, Frazier et al., 2012, Hendy and Raudenbush, 2000). If food choice is imbued with social meaning early in life, do children expect others to adhere to particular food choices? Although past research suggests that food cognition and social reasoning are linked early in life, open questions remain concerning how children judge other people's food choices and whether children negatively evaluate other people who make unusual food choices. The current research examined this question.

One possibility is that children may expect food preferences to be idiosyncratic at the individual level, and therefore they might not hold negative opinions about people who make different food choices than they would make themselves. By 18 months of age, infants understand that other people's food preferences differ from their own. Although children may like Goldfish crackers and dislike broccoli, they could learn that other people might have the opposite preference. When faced with this scenario, children were more likely to give an experimenter the experimenter's preferred food choice (e.g., broccoli) instead of their own preferred food (Repacholi & Gopnik, 1997). Relatedly, 6- to 10-year-old vegetarian children who abstained from eating meat for moral reasons expected only other morally committed vegetarians to adhere to vegetarianism, but they did not judge nonvegetarians (who had not made a moral commitment) for eating meat (Hussar & Harris, 2010). Thus, children's judgments were based on whether people lived up to their

moral commitments, not on their food choices directly. These studies suggest that children view some aspects of food selection as a matter of individual choice and might not negatively evaluate people who make unconventional food choices.

Alternatively, children may view some food choices as wrong rather than as a matter of individual taste. Even among items that are considered to be edible, social conventions often dictate which combinations of foods are considered acceptable to eat. Regional preferences and traditions vary widely and elicit strong opinions—which toppings belong on a pizza or hot dog, the best methods and ingredients for barbecue, whether tacos should include corn or flour tortillas, and the like. Given children's tendency to expect others to follow rules and behave in ways that are consistent with their normative obligations in other domains (Diesendruck and Markson, 2011, Paulus and Moore, 2014, Schmidt et al., 2012, Schmidt and Tomasello, 2012), we might expect children to demonstrate similar patterns of social judgment in the context of food selection.

The current research tackled this question by testing children's thinking about other people's conventional and unconventional food choices. In five experiments, 5-year-olds were presented with information about what other people like to eat. We selected this age based on evidence that children attend to what peers and cultural ingroup members are eating by this age (DeJesus et al., 2018, Frazier et al., 2012, Shutts et al., 2010). In addition, children's recognition and enforcement of cultural norms has been documented during the preschool years (Diesendruck and Markson, 2011, Schmidt et al., 2011), and slightly older children (7-year-olds) demonstrate a tendency to moralize novel behaviors, even those that are not obviously harmful (Rottman and Kelemen, 2012, Rottman et al., 2017). In Experiment 1, children either evaluated conventional and unconventional food choices or evaluated the people who made those choices. In four subsequent experiments, we examined children's thinking about the relationship between food and culture and their judgments about a wider range of food choices, including judgments of native and foreign people who ate conventional foods, unconventional foods, nonfoods, and disgust elicitors. One possibility is that children might not expect outgroup members to follow the same rules as ingroup members (Schmidt et al., 2012), suggesting that food-based judgments should be restricted to cultural ingroup members. Alternatively, children might extend judgments about food selection broadly and negatively judge people (regardless of their cultural background) who make unconventional food choices.

Experiment 1: Conventional versus unconventional foods

In Experiment 1, we tested 5-year-old children's evaluations about other people's conventional and unconventional food preferences. Children viewed photographs of people who reportedly ate different foods, including conventional fruits and fruit parts that are not typically eaten (e.g., apples, bananas; apple cores, banana peels), and conventional and unconventional food combinations (e.g., hot dog with mustard, milk with chocolate syrup; hot dog with chocolate syrup, milk with mustard). Children were either asked to evaluate the food choices of the people presented or asked to evaluate the people themselves.

Method

Participants

Participants in Experiment 1 were 32 5-year-old children (16 male and 16 female; $M_{age} = 5.48$ years, range = 5.06–6.00). In terms of race/ethnicity, 15 children were White, 10 were African American, and 7 were multiracial or other according to parental report. An additional 2 participants were excluded due to exposure to another language ($n = 1$) or opting not to complete the study ($n = 1$).

Participants in all studies were tested in the midwestern United States and recruited from a volunteer database to participate in the laboratory or from local schools. Participants in all experiments were monolingual English speakers with limited exposure to other languages according to parental report.

Materials and procedure

Children were shown pictures of people and foods on a laptop computer. For 12 trials, children saw one face and one food on a white background (see Fig. 1, top) and were told that the person loves to eat that food; for example, "This is Sarah. Sarah really likes to eat apples. It's her favorite thing to eat. She always eats apples." After hearing each person's food preference, in a between-participants design, one group of children ($n = 16$) was asked about their perceptions of the foods:

1. Is that okay or not really?
2. Do you want to be friends with [him/her] or not really?
3. Do most people like to eat [X] or not really?
4. Do you want to try [X] or not really?
5. Is [X] yummy or yucky? Really [yummy/yucky] or a little [yummy/yucky]?

A different group of children ($n = 16$) was asked about the people who ate those foods:

1. Do you like [name of person] or not really?
2. Do you want to be friends with [name of person] or not really?
3. Is [name of person] from around here or from far away?

The face stimuli set consisted of 12 White faces (6 male and 6 female). The food stimuli set consisted of photos of conventional and unconventional foods. Conventional foods included four familiar fruits (apples, bananas, orange slices, and watermelon slices) and eight typical food combinations (e.g., sandwiches with peanut butter and jelly, fries with ketchup). Unconventional foods included four fruit parts (apple cores, banana peels, orange peels, and watermelon rinds), which can be eaten but typically are not eaten in their raw form, and eight atypical food combinations (e.g., sandwiches with peanut butter and ketchup, fries with jelly). The unconventional food combinations included the same ingredients as the conventional combinations but rearranged such that the combination would not be typical of American diets.

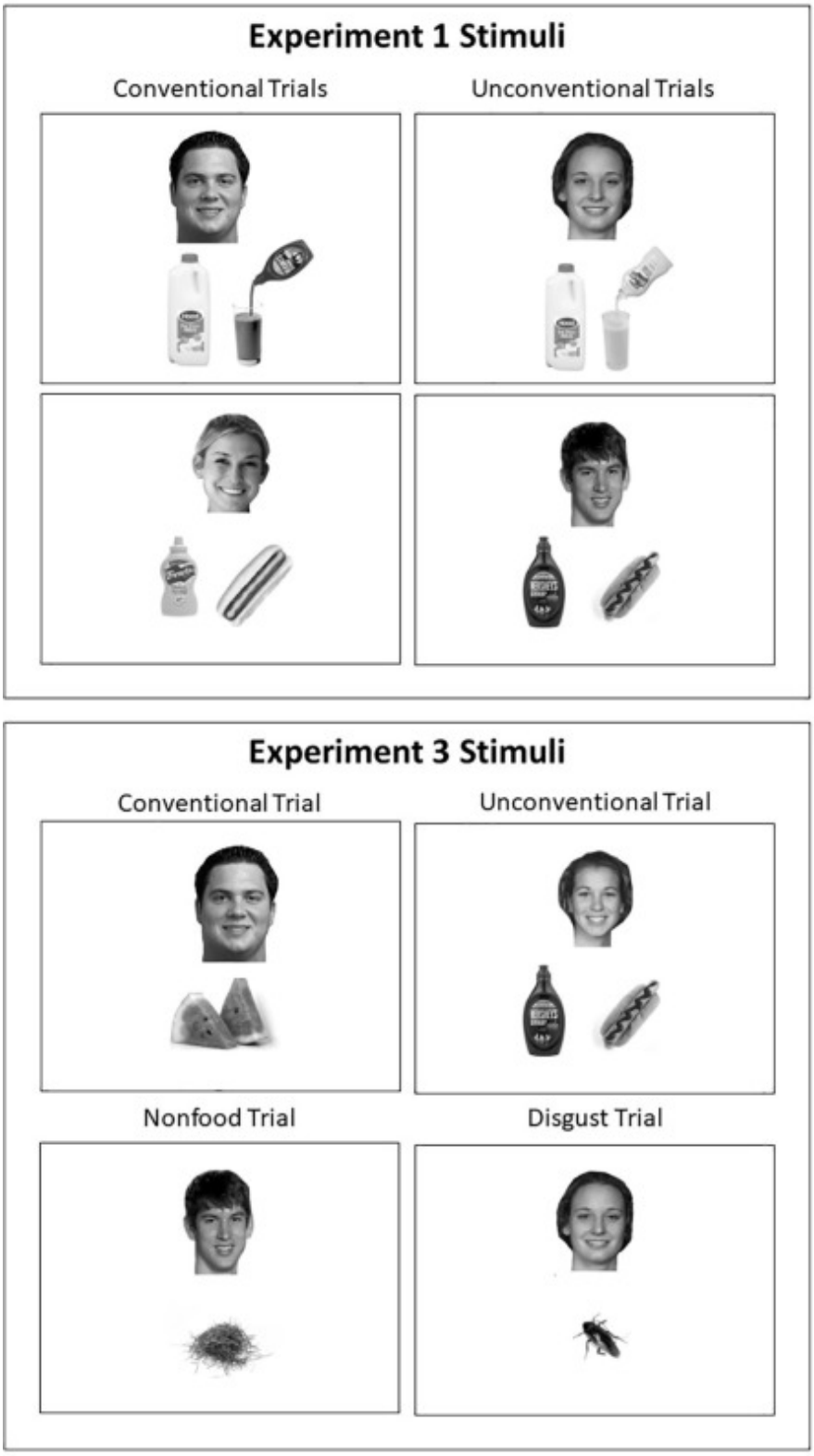

Fig. 1. Example trials from Experiment 1 (conventional: milk with chocolate syrup, hot dog with mustard; unconventional: milk with mustard, hot dog with chocolate syrup) (top) and Experiment 3 (conventional: watermelon; unconventional: hot dog with chocolate syrup; nonfood: grass; disgust: insect) (bottom).

For this and all subsequent experiments, parents provided written consent and completed demographic questionnaires and children provided verbal assent. All procedures were approved by the university's institutional review board (No. H10073, "Food and social reasoning"). Children participated in these experiments between 2013 and 2017. All children participated in only one experiment in the current research.

Design, scoring, and analysis

Stimuli were counterbalanced across participants such that one group of children saw an ingredient presented conventionally (e.g., milk with chocolate syrup, hot dog with mustard) and another group of children saw those same ingredients presented unconventionally (e.g., milk with mustard, hot dog with chocolate syrup). Each child saw two of four fruits, four of eight conventional combinations, two of four fruit parts, and four of eight unconventional combinations for a total of 12 trials per participant. In addition to counterbalancing ingredient status (conventional or unconventional) across participants, the order in which conventional and unconventional foods were presented and the order in which male and female targets were presented were counterbalanced within and across participants. Children received only one question set. In this experiment, question sets were developed sequentially; therefore, participants were not randomly assigned to question sets. In subsequent experiments, children were randomly assigned to question sets (where relevant).

For each question, children's responses were scored as 1 if they responded positively ("okay," "yes," "yummy," or "around here") and 0 if they responded negatively ("not really," "no," "yucky," or "far away"). Scores are presented as the mean proportions of positive responses. Children's scores were averaged across questions and items within each food category to create a *conventional* score and an *unconventional* score for each participant (see Table 1 for children's responses by item). Scores were analyzed using a repeated-measures analysis of variance (ANOVA) with food category (conventional or unconventional) entered as a within-participants factor and question set (food or person) entered as a between-participants factor. Raw data files are available on the Open Science Framework (https://osf.io/5yedk/?view_only=79cab35be4704a999ba7c586e463f456).

Adult judgments

As a manipulation check, a group of parents of similar-age children assessed the foods ($n = 33$). Adults read a written list of the conventional and unconventional foods and assessed whether "most people like to eat" those foods on a scale of 1 (*no, most people do not like to eat this*) to 7 (*yes, most people do like to eat this*) and whether they would try eating those foods on a scale of 1 (*definitely no*) to 7 (*definitely yes*). Adults confirmed our intuitions that people like to eat the conventional foods more than the unconventional foods ($M = 6.06$ vs. 1.59), $t(32) = 18.78$, $p < .001$, $d = 3.27$, and are more willing to try the conventional foods than the unconventional foods ($M = 6.61$ vs. 2.16), $t(32) = 20.69$, $p < .001$, $d = 3.60$.

Table 1. Composites of children's evaluations of the items in Experiment 1 (averaged across questions).

Item	Food [*M* (*SE*)]	Person [*M* (*SE*)]
Conventional		
Apples	.60 (.10)	.83 (.21)
Bananas	.48 (.10)	.88 (.22)
Chips with salsa	.35 (.07)	.71 (.18)
Fries with ketchup	.70 (.09)	.75 (.19)
Hot dogs with mustard	.73 (.07)	.71 (.18)
Mashed potatoes with gravy	.38 (.09)	.50 (.13)
Milk with chocolate syrup	.63 (.09)	.79 (.20)
Orange slices	.85 (.04)	.75 (.19)
Pancakes with syrup	.83 (.05)	.88 (.22)
Sandwiches with peanut butter & jelly	.70 (.08)	.54 (.14)
Watermelon slices	.85 (.04)	.71 (.18)
Yogurt with cereal	.65 (.09)	.50 (.13)
Unconventional		
Apple cores	.10 (.05)	.58 (.15)
Banana peels	.15 (.09)	.50 (.13)
Chips with syrup	.25 (.09)	.54 (.14)
Fries with jelly	.48 (.08)	.63 (.16)
Hot dogs with chocolate syrup	.28 (.09)	.63 (.16)
Mashed potatoes with cereal	.40 (.10)	.46 (.12)
Milk with mustard	.00 (.00)	.58 (.15)
Orange peels	.13 (.07)	.42 (.11)
Pancakes with salsa	.25 (.07)	.67 (.17)
Sandwiches with peanut butter & ketchup	.40 (.07)	.58 (.15)
Watermelon rinds	.45 (.10)	.71 (.18)
Yogurt with gravy	.38 (.06)	.58 (.15)

Note. Mean values reflect how positively participants rated each food/person (possible range: 0–1).

Results

Children rated conventional foods and the people who eat them ($M = .67$, $SE = .04$) more positively than unconventional foods ($M = .42$, $SE = .04$), $F(1, 30) = 29.02$, $p < .001$, $\eta_p^2 = .49$ (see Fig. 2, top). We also observed an effect of question set, $F(1, 30) = 7.91$, $p = .009$, $\eta_p^2 = .84$. Children provided more positive ratings for person questions ($M = .64$, $SE = .05$) than for food questions ($M = .45$, $SE = .05$). There was also a significant Food × Question interaction, $F(1, 30) = 5.41$, $p = .027$, $\eta_p^2 = .15$. To examine this interaction, we computed the difference between children's average conventional and unconventional scores and performed an independent-samples *t*test to compare children who answered food and person questions. This difference was larger for food questions ($M = .35$, $SE = .07$) than for person questions ($M = .14$, $SE = .06$), $t(30) = 2.33$, $p = .027$, $d = 0.85$.

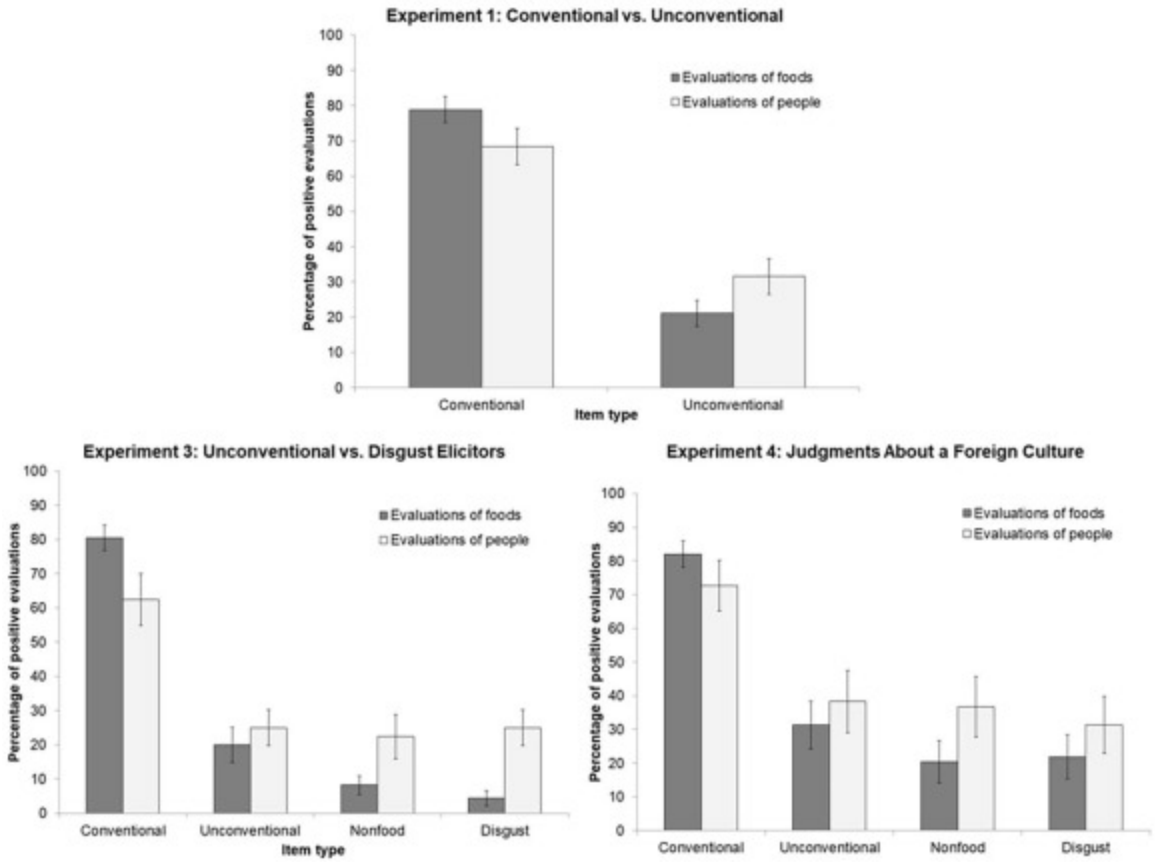

Fig. 2. Children's evaluations of others' food choices and their social judgments in Experiment 1 (top), Experiment 3 (bottom left), and Experiment 4 (bottom right) by item type. Higher scores represent more "yes"/"yummy"/"near" responses (i.e., positive evaluations). Error bars indicate standard errors.

Discussion

Five-year-old children evaluated conventional foods and the people who eat them more positively than they evaluated unconventional foods/eaters. This preference was especially robust for children's assessments of the foods themselves compared with their social evaluations of the people who eat those foods. These findings provide evidence that by 5 years of age children have strong opinions about what should and should not be eaten even when presented with foods that are equally familiar but arranged into conventional and unconventional combinations. This study provides an initial examination of children's reasoning about what is acceptable and unacceptable to eat, but many important open questions remain. First, a key question of interest is whether children link food selection with cultural group membership. Experiment 2 examined this question directly. Second, unconventional food choices might seem noteworthy when compared with familiar and well-liked foods and combinations, but they may seem more acceptable when compared with more extreme choices (e.g., disgust elicitors or nonfoods). Experiments 3–5 examined these possibilities by asking children to evaluate a range of food choices and consider the food choices of people from different cultural backgrounds.

Experiment 2: Associations between culture and food selection

Experiment 2 examined whether children expect ingroup members to be more likely to eat conventional foods and expect outgroup members to be more likely to eat unconventional foods. This pattern would suggest that thinking about the conventionality of food choice is somewhat constrained by group membership. Alternatively, children might over-extend their thinking about conventional food choices to all people without considering cultural background. In an initial test of this question, children in Experiment 2 were presented with a person who spoke in English (participants' native language) and a person who spoke in French (an unfamiliar foreign language) and assigned a conventional food or an unconventional food to each person. We hypothesized that children would be more likely to assign the conventional food to the English speaker and to assign the unconventional food to the French speaker compared with the opposite pattern.

Method

Participants

Participants in Experiment 2 were 32 5-year-old children (16 male and 16 female; M_{age} = 5.45 years, range = 5.03–6.13). In terms of race/ethnicity, 15 children were White, 11 were African American, 3 were multiracial, 2 were Asian, and 1 was Hispanic according to parental report. One additional participant was excluded due to experimenter error.

Materials and procedure

Children were introduced to eight pairs of gender-matched faces presented on a white background on a laptop computer. The face stimuli set consisted of 16 White faces (8 male and 8 female). The experimenter introduced the faces by saying, "Here are two people," and then pointed to each face in turn and said, "This person sounds like this" before playing a voice clip. For each trial, one person spoke English and the other person spoke French. The voice stimuli set consisted of 16 voice clips of child-friendly speech (e.g., "April is a month when it rains a lot") recorded from four bilingual speakers of English and French (two male and two female).

After introducing each pair, the experimenter showed children two food cards simultaneously: one depicting a conventional food combination (e.g., fries with ketchup) and one depicting an unconventional food combination (e.g., pancakes with salsa). Children were asked to place the cards in front of the picture of the person who likes that food (one food per person).

The food stimuli set included the conventional and unconventional foods from Experiment 1 printed in color on 10.5 × 7-cm cards and laminated. Foods with the same components were never paired together (e.g., fries with ketchup and fries with jelly were in different trials because they both include fries).

Design, scoring, and analysis

The lateral position and gender of the English and French speakers and the order in which conventional and unconventional foods were presented were counterbalanced across participants.

Trials were scored as 1 if children matched the conventional food to the English speaker and matched the unconventional food to the French speaker and were scored as 0 if children matched the conventional food to the French speaker and matched the unconventional food to the English speaker. Children's scores were converted to a proportion (possible range: 0–1), with scores above .50 representing more English = conventional/French = unconventional choices and scores below .50 representing more French = conventional/English = unconventional choices. Proportions were compared with chance (.50) using a one-sample *t* test.

Results and discussion

Children were more likely to match conventional foods with the English speaker and to match unconventional foods with the French speaker ($M = .58$, $SE = .03$) than would be expected by chance, $t(31) = 2.30$, $p = .029$, $d = 0.41$.

This pattern reveals an association between cultural group (here denoted by spoken language) and food choice. Rather than randomly assigning foods, children predicted that people who share their native language would eat conventional food items. This study suggests that children view food and culture as related, in line with children's predictions and judgments about foreign-language speakers in other domains, including social evaluations, moral rules, nationality or geographic background, and the types of clothing they wear and dwellings they live in (DeJesus et al., 2018, Hirschfeld and Gelman, 1997, Kinzler and DeJesus, 2013, Liberman et al., 2017, Rhodes and Chalik, 2013, Souza et al., 2013, Weatherhead et al., 2016).

Open questions remain as to the scope and robustness of this effect. Eating an unconventional food might seem problematic when compared with a conventional choice, but unconventional food choices might not seem as noteworthy compared with behaviors that are widely considered to be disgusting or atypical. For instance, eating a hot dog with chocolate syrup might seem unusual when others are eating a hot dog with mustard, but it might not be viewed as negatively compared with eating something not typically considered to be food in Western diets such as an insect (see Van Huis et al., 2013). In contrast, if children view any aberration from the norm negatively, then children may judge people who eat unconventional foods as harshly as people who engage in even more atypical behaviors. In Experiments 3–5, we expanded the types of foods presented to children, including canonical disgust elicitors such as insects and bodily products (Rozin, Haidt, & McCauley, 1999) and other items that are not typically considered to be food, and also explored whether children negatively evaluated both cultural ingroup and outgroup members who were shown to eat nonconventional foods.

Experiment 3: Unconventional foods versus disgust elicitors

Children in Experiment 3 were shown a series of people and the foods they like to eat, including conventional foods, unconventional foods, nonfoods, and disgust elicitors. As in Experiment 1, children were either asked questions about the foods or asked questions about the people who ate those foods.

Method

Participants

Participants in Experiment 3 were 32 5-year-old children (16 male and 16 female; M_{age} = 5.55 years, range = 5.06–6.09). In terms of race/ethnicity, 12 children were White, 11 were African American, 5 were biracial or other, 3 were Hispanic, and 1 was Asian according to parental report. One additional participant was excluded from analysis for opting not to complete the study.

Materials and procedure

Children were shown pictures of people and foods on a laptop computer. For 16 trials, children saw one face and one food on a white background (using the same 12 faces as in Experiment 1 and 4 additional faces; see Fig. 1, bottom). As in Experiment 1, children were told that each person loves to eat the presented food. After hearing each person's food preference, children were either asked questions about the foods (n = 16) or asked questions about the people who ate those foods (n = 16). The test questions were similar to those used in Experiment 1 except that the "friends" question was omitted from the food question set to more clearly delineate questions about foods from questions about people. Children were randomly assigned to question sets.

Table 2. Composites of children's evaluations of items in Experiments 3 and 4 (averaged across questions).

Item	Experiment 3: Food [*M* (*SE*)]	Experiment 3: Person [*M* (*SE*)]	Experiment 4: Food [*M* (*SE*)]	Experiment 4: Person [*M* (*SE*)]
Conventional				
Apples	.89 (.04)	.63 (.10)	.89 (.18)	.66 (.10)
Peanut butter & jelly	.80 (.09)	.73 (.10)	.80 (.31)	.88 (.09)
Watermelon	.92 (.04)	.65 (.09)	.91 (.15)	.75 (.09)
Yogurt with cereal	.61 (.09)	.50 (.10)	.69 (.35)	.63 (.12)
Unconventional				
Banana peels	.22 (.09)	.21 (.08)	.16 (.31)	.28 (.11)
Hot dogs with chocolate syrup	.30 (.09)	.38 (.10)	.55 (.40)	.56 (.12)
Milk with mustard	.03 (.02)	.25 (.08)	.28 (.34)	.28 (.11)
Orange peels	.25 (.10)	.31 (.08)	.27 (.39)	.41 (.11)
Disgust				
Hair	.05 (.03)	.19 (.06)	.14 (.34)	.34 (.11)
Insects	.02 (.02)	.21 (.07)	.14 (.27)	.28 (.10)
Strawberries with mold	.08 (.05)	.31 (.09)	.39 (.43)	.34 (.10)
Worms	.03 (.03)	.29 (.10)	.20 (.32)	.28 (.11)
Nonfood				
Flowers	.08 (.04)	.29 (.09)	.20 (.29)	.41 (.12)
Grass	.11 (.05)	.23 (.08)	.20 (.31)	.31 (.10)
Leaf	.09 (.05)	.25 (.09)	.33 (.37)	.47 (.12)
Newspaper	.05 (.03)	.13 (.05)	.08 (.25)	.28 (.11)

Note. Means reflect how positively participants rated each food/person (possible range: 0–1).

The face stimuli set consisted of 16 White faces (8 male and 8 female). The food stimuli set consisted of photos of conventional foods, unconventional foods, nonfoods, and disgust elicitors (see Table 2). Conventional and unconventional foods were selected from the stimuli sets of Experiments 1 and 2. Nonfoods included items that are not typically considered food (grass, leaves, newspaper, and flowers), and disgust elicitors were selected based on previous research

citing adult disgust reactions to the idea of eating certain animals (insects and worms), bodily products (hair), or foods that demonstrate signs of decay (fruit with mold) (Rozin et al., 1999).

Design, scoring, and analysis

The order in which food categories (conventional, unconventional, nonfood, and disgust elicitor) were presented and the order in which male and female targets were presented were counterbalanced within and across participants. Children's scores were averaged across questions and items within each food category to create a score for each food type (conventional, unconventional, disgust, or nonfood) for each participant. Scores were analyzed using a repeated-measures ANOVA with food type entered as a within-participants factor and question set (food or person) entered as a between-participants factor.

Results

Children's assessments of foods and the people who eat them differed by food type, $F(3, 90) = 68.82$, $p < .001$, $\eta_p^2 = .70$ (see Fig. 2, bottom left). Pairwise comparison with a Bonferroni correction revealed that children evaluated conventional foods/eaters ($M = .72$, $SE = .04$) more positively than all other foods/eaters ($ps < .001$). Children did not differ in their evaluations of unconventional foods/eaters ($M = .24$, $SE = .04$), disgust elicitors ($M = .15$, $SE = .03$), and nonfoods ($M = .15$, $SE = .04$), $ps > .095$. We did not observe an overall difference in children's responses by question sets, $F(1, 30) = 2.12$, $p = .156$, $\eta_p^2 = .07$, but there was a significant Food × Question interaction, $F(3, 90) = 6.77$, $p < .001$, $\eta_p^2 = .18$. To examine this interaction, we conducted independent-samples t tests to compare children's response to each food type (conventional, unconventional, disgust, or nonfood) by question set (food or person). After correction for four comparisons, children's responses to the food and person questions differed only for disgust elicitors (food: $M = .04$, $SE = .02$; person: $M = .25$, $SE = .05$), $t(30) = 3.64$, $p = .004$. All other comparisons were not significant after correction ($ps > .168$).

Discussion

Children's evaluations of a wide range of foods reveal that conventional foods and the people who eat those foods were evaluated more positively than any alternative. These evaluations extended not just to the foods themselves but also to the people who ate the foods. In addition, children's ratings of unconventional foods (and the people who eat them) did not differ from their ratings of food choices that might be considered even more atypical, including disgust elicitors and nonfoods. Children evaluated anyone who did not eat conventional foods more negatively than people who ate what they considered to be more typical foods.

These results provide further evidence that by 5 years of age children already have strong expectations about what should or should not be eaten. Given that children in Experiment 2 associated food choice with cultural group membership, Experiment 4 examined whether children's evaluations of other people's food choices would similarly depend on those people's cultural group membership. Specifically, would children negatively judge cultural outgroup members who make unconventional food choices? In light of the finding that children hold

different normative expectations for ingroup and outgroup members (Schmidt et al., 2012), children might not view the rules of food selection as applying to cultural outgroup members regardless of how children evaluated those foods themselves. Alternatively, children may negatively judge the food choices of outgroup members even if they expect food choice to vary based on cultural groups. Children might not fully appreciate the process of cultural transmission that gives rise to cultural diversity in food selection and instead may view the food choices that are common in their own culture as objectively correct. In many contexts, people assume that current circumstances are stable and can be explained by inherent factors (e.g., it is objectively correct to drink orange juice for breakfast) even though these circumstances change over time and can have arbitrary origins (e.g., a marketing strategy developed by orange growers) (Cimpian and Salomon, 2014, Sutherland and Cimpian, 2015, Tworek and Cimpian, 2016). To examine children's social judgments of outgroup members' food choices, children in Experiment 4 were told that all of the people they would see were from a novel cultural group.

Experiment 4: Judgments about a foreign culture

Children in Experiment 4 were presented with the same procedure as in Experiment 3 but evaluated people who they were told were from a fictitious country called "Cortania," a faraway country where people speak an unfamiliar language (French). We created this fictitious country so that children would not have any previous experience with people or foods from that country. Children were either asked to evaluate the foods or asked to evaluate the people who ate each food.

Method

Participants

Participants in Experiment 4 were 32 5-year-old children (16 male and 16 female; M_{age} = 5.32 years, range = 5.04–5.98). In terms of race/ethnicity, 19 were White, 11 were African American, 1 was Asian, and 1 was multiracial according to parental report. An additional 5 children participated but were excluded from analysis due to language exposure (n = 2), experimenter error (n = 2), or opting not to complete the study (n = 1).

Materials and procedure

Experiment 4 used the same procedure as Experiment 3 with an introduction added to the beginning of the experiment to characterize people as members of another culture. Children were told, "Everyone that we meet today is from a place called Cortania. Cortania is really far away from where we are now." Children were shown a map of Cortania (an outline of Antarctica) and a Cortanian flag (a green and white flag with a crest) (see Fig. 3, top right). Children were told that people from Cortania speak a different language, and the experimenter played four voice clips of "what people from Cortania sound like" (four audio clips of French; two female speakers and two male speakers; children heard either a female French speaker or a male French speaker first).

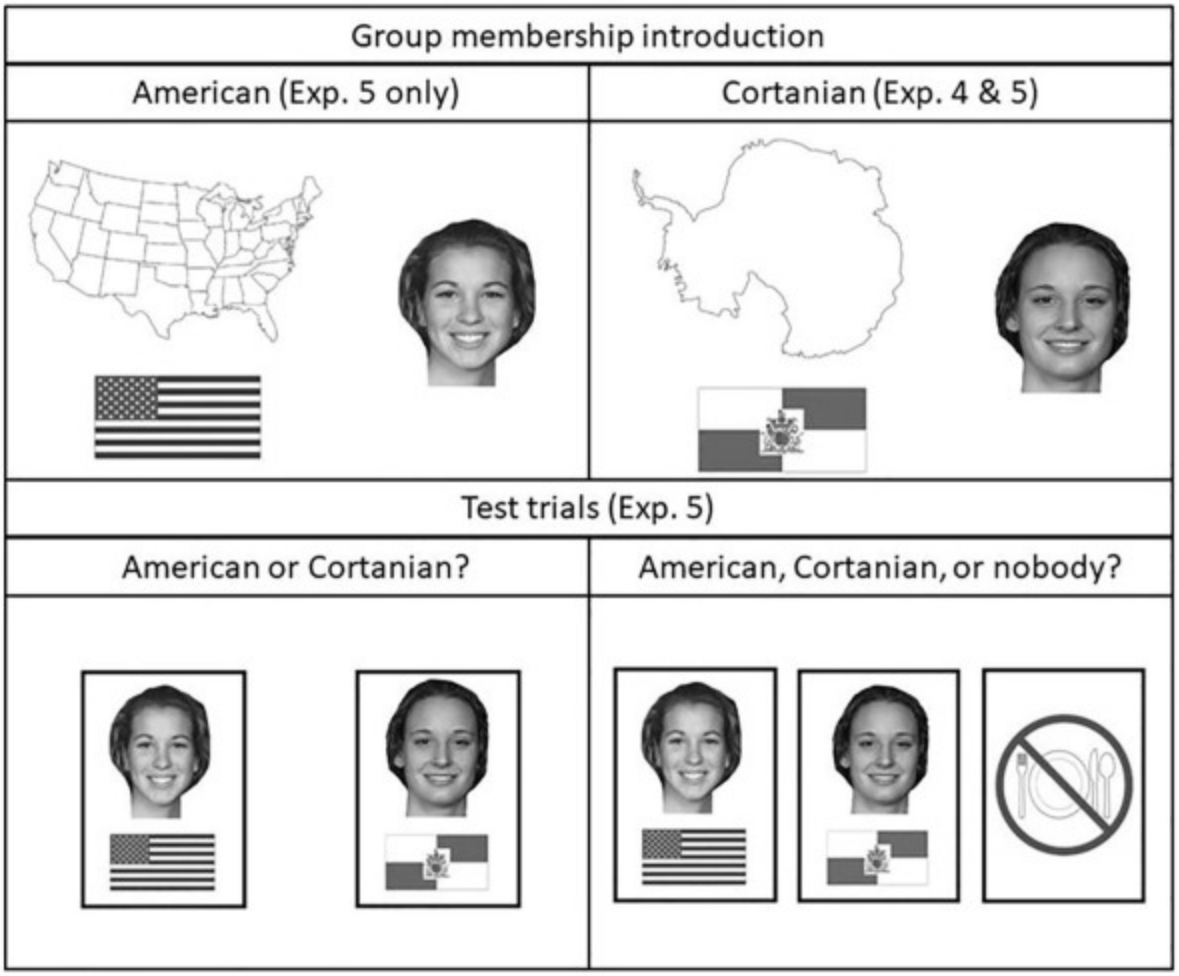

Fig. 3. Example stimuli used to describe people as Cortanian (Experiments 4 and 5; top right) and American (Experiment 5; top left) and to display choice options in Experiment 5 (bottom).

Children were then shown the same stimuli of people paired with conventional foods, unconventional foods, disgust elicitors, and nonfoods from Experiment 3. Each person was described as being from Cortania (e.g., "This is Sally from Cortania. Sally really likes to eat [X]"), and two test questions were adjusted to refer to Cortania ("Is that okay *in Cortania* or not really?" and "Do most people *in Cortania* like [X] or not really?"). Children were assigned to either answer questions about the foods ($n = 16$) or answer questions about the people who ate those foods ($n = 16$).

Design, scoring, and analysis

The design, scoring, and analysis were the same as in Experiment 3 with the exception that the near/far question ("Is [name of person] from around here or from far away?") was excluded from the analysis because children were explicitly told where people were from. Instead, this question was treated as a manipulation check. Children reported that people were from far away ($M = .97$, $SE = .03$), $t(15) = 17.10$, $p < .001$, $d = 4.28$.

Results

Children's assessments of foods and the people who eat them differed by food type, $F(3, 90) = 40.25$, $p < .001$, $\eta_p^2 = .57$ (see Fig. 2, bottom right). Pairwise comparison with a Bonferroni correction revealed that children evaluated conventional foods and conventional food eaters ($M = .77$, $SE = .04$) more positively than all other foods or people who eat those foods (ps $< .001$). Children did not differ in their evaluations of unconventional foods/eaters ($M = .35$, $SE = .06$), disgust elicitors/eaters ($M = .27$, $SE = .05$), and nonfoods/eaters ($M = .29$, $SE = .06$), ps $> .616$. We observed no significant effect of question, $F(1, 30) = 0.50$, $p = .483$, $\eta_p^2 = .02$, or Food × Question interaction, $F(3, 90) = 2.09$, $p = .107$, $\eta_p^2 = .07$.

To compare children's responses in this experiment with those of children in Experiment 3 (who made the same judgments without information about cultural outgroups), we performed a repeated-measures ANOVA with food type entered as a within-participants factor and question set (food or person) and experiment (3 or 4) entered as between-participants factors. We observed significant effects of food, $F(3, 180) = 104.51$, $p < .001$, $\eta_p^2 = .64$, and a Food × Question interaction, $F(3, 180) = 7.48$, $p < .001$, $\eta_p^2 = .11$, but no significant effect of question, $F(1, 60) = 1.72$, $p = .194$, $\eta_p^2 = .03$. Children rated conventional foods/eaters ($M = .74$, $SE = .03$) more positively than the alternatives, ps $< .001$, and rated unconventional foods ($M = .30$, $SE = .03$) more positively than disgust elicitors ($M = .21$, $SE = .03$), $p = .032$. To examine the interaction, we conducted independent-samples t tests comparing children's response to each food type (conventional, unconventional, disgust, or nonfood) by question set (food or person). No significant differences were observed after correcting for four comparisons.

We also observed a significant effect of experiment, $F(1, 60) = 4.92$, $p = .030$, $\eta_p^2 = .08$. Children provided more positive ratings in Experiment 4 ($M = .42$, $SE = .03$) than in Experiment 3 ($M = .31$, $SE = .03$). No significant interactions between experiment and any other factors were observed, ps $> .50$.

Discussion

Children in Experiment 4 evaluated conventional foods and the people who eat them more positively than all other items. Even though all people were described as cultural outgroup members and children confirmed that they lived far away, children viewed some choices (i.e., conventional foods) as inherently correct and more negatively judged people who made different food choices regardless of their cultural background. As such, children's evaluations of foods may play an important role in guiding their social judgments of others (see Hamlin, Mahajan, Liberman, & Wynn, 2013, and Hamlin & Wynn, 2012, for related evidence in infants).

At first blush, these findings seem at odds with the results of Experiment 2, in which children assigned conventional foods to ingroup members and assigned unconventional foods to outgroup members. How can these results be reconciled? One possibility is that children might not expect cultural outgroup members to know the food rules that they know, and consequently they might view outgroup members as more likely than ingroup members to make unconventional food choices (even if children themselves view those choices as wrong). An alternative possibility is that children view some food choices as objectively wrong and think that no humans would eat those foods even if they do associate food choice with cultural group membership. To further

examine these possibilities, children in Experiment 5 were asked to directly report who would be more likely to eat conventional foods, unconventional foods, disgust elicitors, and nonfoods: a cultural ingroup member (American, English speaking) or a cultural outgroup member (Cortanian, French speaking). One group of children was also given the option to say that no one would eat those foods. In this design, children could associate food choice with cultural group membership across conditions. Alternatively, given their robust negative judgments of nonconventional foods in previous experiments, children might expect that no one would eat those items.

Experiment 5: Assigning foods to native and foreign speakers

In Experiment 5, children were presented with one American English-speaking person and one Cortanian French-speaking person. One group of children was asked whether the American or Cortanian person would be more likely to eat each food (conventional, unconventional, disgust elicitors, or nonfoods). Another group of children was explicitly given the option to say that no one would eat those foods.

Method

Participants

Participants in Experiment 5 were 32 5- and 6-year-old children (16 male and 16 female; M_{age} = 5.45 years, range = 5.03–6.06). In terms of race/ethnicity, 11 were White, 11 were African American, 6 were multiracial, 2 were Hispanic, and 1 was Asian according to parental report. One parent did not report the child's race/ethnicity. One additional participant was excluded due to language exposure.

Materials and procedure

Children were shown two faces, gender matched to each participant, on a white background on a laptop computer. The experimenter introduced each face one at a time by saying, "This person sounds like this," and pointed to each face while playing a voice clip. One person spoke English and the other person spoke French from the voices used in Experiments 2 and 4. The English speaker was introduced as being from America and living "right near here," and children were shown a map of America and its flag. The French speaker was introduced as being from the fictitious country of Cortania and was said to live "really far away from here," and children were shown a map of Cortania and its flag (see Fig. 3).

After introducing children to the American and Cortanian people, the experimenter explained that the participants would be shown items on cards, one at a time. Each card depicted an item from the conventional, unconventional, disgust, and nonfood stimuli sets in Experiments 3 and 4. The cards were printed in color on 10.5 × 7-cm cards and laminated. One group of children (n = 16) was then asked whether the American or Cortanian person ate the item on the card (e.g., "This is watermelon. Who eats this? This person [researcher points to left] or this person [researcher points to right]?"; referred to subsequently as *two-choice*). The faces and flags from the introduction remained on-screen during the entire session so that children could point to their

selection. Another group of children ($n = 16$) was asked whether the American, the Cortanian, or nobody ate the item (e.g., "This is milk with mustard. Who eats this? This person [researcher points to left], this person [researcher points to center], or nobody [researcher points to right]?"; referred to subsequently as *three-choice*). In addition to the American and Cortanian faces and flags, children saw a picture of a plate setting with a null sign to represent "nobody" (see Fig. 3, bottom right).

Design, scoring, and analysis

The lateral position of the American, Cortanian, and nobody icons during the test trials and the order in which the American and Cortanian people were introduced were counterbalanced across participants. The order in which the cards were shown to participants was counterbalanced across participants in the same manner as Experiments 3 and 4.

To examine children's categorizations within each choice option, we summed children's categorizations of each food to the American person, to the Cortanian person, and (if applicable) to nobody (maximum = 64). We then performed a chi-square to test for an association between culture (American or Cortanian) and food type (conventional, unconventional, nonfood, or disgust) and binomial tests to directly compare selections for each food type. For the two-choice group, the binomial test compared the American selections with a probability of .50 for each food type. For the three-choice group, the binomials test compared the most selected response with a probability of .33 for each food type.

Results

Two-choice (native or foreign)

When asked to assign foods to a person described as either American or Cortanian, we observed an association between culture and food type, $\chi^2(3) = 49.40$, $p < .0001$ (see Table 3, top). Children distributed more conventional foods to ingroup members ($sum_{American} = 56$) than to outgroup members ($sum_{Cortanian} = 8$), $p < .0001$ (binomial test, .50). Children did not differentiate between ingroup members and outgroup members when distributing unconventional foods ($sum_{American} = 34$, $sum_{Cortanian} = 30$, $p = .71$) or nonfoods ($sum_{American} = 27$, $sum_{Cortanian} = 37$, $p = .26$), but they did distribute more disgust elicitors to outgroup members than to ingroup members ($sum_{American} = 18$, $sum_{Cortanian} = 46$, $p = .0006$).

Table 3. Children's distribution of items in Experiment 5.

Experiment	Selection	Conventional	Unconventional	Disgust	Nonfood	Total
Two-choice	American	56	34	18	27	135
	Cortanian	8	30	46	37	121
Three-choice	American	43	7	0	0	50
	Cortanian	16	7	5	6	34
	Nobody	5	50	59	58	172

Three-choice (native, foreign, or nobody)

When asked to assign foods to a person described as American, to a person described as Cortanian, or to nobody, we again observed an association between culture and food type, $\chi^2(6) = 156.81$, $p < .0001$ (see Table 3, bottom).

For conventional foods, the most frequent response was "American" ($sum_{American} = 43$, $sum_{Cortanian} = 16$, $sum_{Nobody} = 5$), more often than would be expected by chance, $p < .0001$. For all other foods, the most frequent response was "Nobody" (unconventional: $sum_{Nobody} = 50$, $sum_{American} = 7$, $sum_{Cortanian} = 7$; disgust elicitors: $sum_{Nobody} = 59$, $sum_{American} = 0$, $sum_{Cortanian} = 5$; nonfoods: $sum_{Nobody} = 58$, $sum_{American} = 0$, $sum_{Cortanian} = 6$), binomial test (.33), ps $< .001$. Children in the three-choice condition distributed the majority of items to nobody ($sum_{Nobody} = 172$) rather than assigning them to either Americans or Cortanians ($sum_{American+Cortanian} = 84$), binomial test (.50), $p < .0001$.

Discussion

Experiment 5 revealed two key findings. First, children demonstrated some association between cultural groups and food selection when thinking about conventional foods. Children in both the two- and three-choice conditions were more likely to assign conventional foods to ingroup members than to outgroup members, and children in the two-choice condition were more likely to assign disgust elicitors to outgroup members. Second, when explicitly provided with the option to assign foods to nobody, children overwhelmingly selected this option for unconventional foods, nonfoods, and disgust elicitors. Children's unwillingness to assign these options to anyone is consistent with their negative evaluations of those items and the people who eat them in prior experiments; children think that no one would or should eat these items. These experiments suggest that children hold strong beliefs about what should and should not be eaten and negatively judge anyone who eats what children classify as unacceptable to eat regardless of that person's cultural background.

Including both the two-choice and three-choice conditions in Experiment 5 provided a clearer picture of how children think about outgroup members' food choices. When forced to choose who eats what, children only associated disgust elicitors more frequently with the outgroup and distributed unconventional foods and nonfoods nearly equally across the ingroup and outgroup members. Yet, children typically claimed that nobody ate any of the nonconventional options in the three-choice condition. When considering these two conditions together, it appears that children do not believe that anyone will eat any of these nonconventional foods, but they are especially reluctant to entertain the idea that a cultural ingroup member could eat a disgust elicitor. Including only one of these two conditions would not have revealed this nuanced pattern of results.

General discussion

The current experiments provide evidence that children hold strong opinions about what should and should not be eaten and generalize these beliefs to their judgments of other people. Five-year-old children evaluated people who made unconventional food choices more negatively than people who made conventional choices (Experiments 1, 3, and 4). They also evaluated people who ate unconventional foods just as negatively as they evaluated people who ate nonfoods or

disgust elicitors (Experiments 3 and 4). Although children predicted that ingroup members would be more likely than outgroup members to eat conventional foods (Experiments 2 and 5), children negatively evaluated outgroup members who ate nonconventional foods (Experiment 4) and reported that no one would eat those foods when explicitly provided with the option to do so (Experiment 5). Together, these experiments suggest that children view eating unconventional food choices as fairly negative—even somewhat akin to eating disgust elicitors. Although preschool-aged children may accept when outgroup members behave non-normatively in other domains (e.g., when playing a game; Schmidt et al., 2012), children in the current research expected others to eat only what they deem acceptable—even members of cultural outgroups.

Future research could expand on this work by involving a more diverse array of foods, a more culturally diverse sample of participants, and a more nuanced measure to assess children's judgments. First, children in this study were not shown completely unfamiliar foods. The "unconventional" items either included an unusual part of a familiar fruit (e.g., orange peel) or included an unusual combination of familiar foods (e.g., fries with grape jelly). Even the disgust elicitors and nonfoods were likely familiar items, just not ones that children in the United States typically consider to be food. Thus, it is unknown how children would evaluate entirely unfamiliar food items such as dishes from the cuisine of a faraway culture and fruits and vegetables they have never eaten before. Children could also negatively appraise unfamiliar foods and the people who eat them, with previous work demonstrating that children prefer familiar foods (Birch and Marlin, 1982, Rioux et al., 2018). Examining children's beliefs about a wider range of foods and eating practices, therefore, is an important direction for future investigation.

Second, this study focused on monolingual English-speaking children living in one community in the United States. Recruiting participants from diverse backgrounds and measuring more fine-grained aspects of children's experiences would be a productive direction for future research. Examining children's thinking about food across cultural groups, including religious groups with explicit rules about what should and should not be eaten and bicultural children who may have direct experience with different food cultures, would be interesting projects for future research. Children may also vary in the extent to which they are exposed to a diverse set of foods or foods from different cultures. This variability could be examined at the level of parental beliefs (e.g., how important is it to expose children to different cultures?), the extent to which children interact with people from different cultures, whether different cuisines are available in children's neighborhoods, or children's own pickiness. For instance, parents may be less willing to offer children an unfamiliar food if their children are picky eaters. All of these factors, at both the cultural and individual levels, could contribute to children's willingness to eat different foods and their social judgments about other people.

Third, future studies should employ a broader range of measures to examine additional aspects of children's reasoning about other people's food choices. The measures in the current research asked children for a binary response or to associate a food with a specific person. This question style ensured that children understood the questions and could clearly respond but may gloss over subtler differences. Future research could employ continuous measures to develop a more nuanced picture of children's food-related evaluations. For instance, children did not differentiate among unconventional foods, nonfoods, and disgust elicitors. Researchers

employing a continuous scale might observe instances in which children evaluate unconventional foods (all of which still involve food items) more positively than nonfoods and/or disgust elicitors but less positively than conventional foods. In addition, children were shown foods individually rather than as direct comparisons. Children may view unconventional foods as more acceptable when they are directly compared with disgust elicitors, and children may be more willing to affiliate with an unconventional food eater over a disgust elicitor eater.

These findings raise interesting questions regarding how children learn the food rules of their culture and their broader understanding of cultural conventions. These results suggest that, once cultural rules are learned, children apply them widely and inflexibly (even to members of cultural outgroups). Research on children's and adults' thinking about inherence supports this idea; the instinct to assume that conventions are objectively correct and enduring features of our social world, rather than being arbitrary or emerging from idiosyncratic circumstances, is powerful and observed across development (e.g., Cimpian and Salomon, 2014, Sutherland and Cimpian, 2015, Tworek and Cimpian, 2016). For instance, French fries are often eaten with ketchup in the United States, and children in these studies endorsed that practice ($M = .70$, $SE = .09$), but they rated eating fries with jelly less positively ($M = .48$, $SE = .08$) even though ketchup and jelly are both somewhat sweet fruit-based sauces and both pairings could taste good. Nonetheless, by 5 years of age children already view one (ketchup) as the more appropriate choice. Generic language (i.e., language that communicates general truths rather than specific instances) may be especially important to establish conventions and norms (Roberts et al., 2017, Weatherhead et al., 2016). Probing children's explanations for why some foods are more correct choices than others and considering the impact and production of generic language would be productive directions for future research.

Another open question concerns the relationship between children's judgments of other people's food choices and children's own food preferences. Although we cannot answer this question definitively in this design, the extent to which children like a particular food could be related to their evaluations of other people; the more they personally like a food, the better they might evaluate other people who eat that food. This pattern would reveal reciprocal relations between children's own preferences and social interactions. For instance, children eat more food in social contexts compared with when eating alone (Salvy, Vartanian, Coelho, Jarrin, & Pliner, 2008), and they prefer foods that are popular with or have been modeled by peers and cultural ingroup members (Birch, 1980, DeJesus et al., 2018, Frazier et al., 2012, Hendy and Raudenbush, 2000, Lumeng and Hillman, 2007, Salvy et al., 2008). Children may similarly conform to the food choices of their peers or their community, in part to avoid others' negative evaluations, and may negatively evaluate people who do not conform to their own preferences. In contrast, children's third-person evaluations (the focus of the current research) may differ from their own food choices. In our study, children evaluated the unconventional foods negatively. Yet, in another study, a cohort of slightly younger children were willing to eat unusual combinations of two well-liked foods; more than 90% of 43- to 60-month-old children were willing to eat a hot dog with chocolate and a cookie with ketchup (Rozin, Hammer, Oster, Horowitz, & Marmora, 1986). Children's evaluations of others could be more conservative than their willingness to try foods themselves. Understanding relations between children's evaluations of their own preferences and other people's preferences is an important area for future investigation.

Finally, these results suggest that children view unconventional food choices more negatively than conventional choices, but the extent to which children are truly making a moral judgment is an open question. Children could perceive someone's food choices as "wrong" in the sense that the person is having a bad gustatory experience or is unaware of the food rules that children appear to know. Alternatively, children could perceive these choices as "wrong" in a more deeply moral sense—in a way that reflects bad moral character (e.g., someone who eats insects would be more likely to harm another person than someone who eats oranges). Some studies have suggested that, to evaluate a novel action as immoral, children need explicit information that the action is disgusting and unnatural (Rottman and Kelemen, 2012, Rottman et al., 2017). Given that children at this age have probably eaten a food they thought tasted bad, children may automatically make the leap from an eating behavior they view as disgusting to an immoral act. Nonetheless, children may view these actions as restricted to one domain (eating) or diagnostic of a lack of cultural knowledge, rather than a deeper reflection of one's moral character. Further studies examining children's moral reasoning in the food domain are needed to tease apart these possibilities.

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Appendix A. Supplementary material

The following are the Supplementary data to this article:
https://osf.io/5yedk/?view_only=79cab35be4704a999ba7c586e463f456

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