

The effectiveness of using food fun facts to increase acceptance of new menu items among
children attending a childcare center: A pilot study

by

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Abstract

Background: Childhood is a time when healthy habits can be created, but it is also a time when picky eating or unwillingness to try new foods can be a challenge. Exposure to new foods plays an important role in acceptance, and childcare centers have a unique opportunity to provide children with new food experiences.

Objective: To test the effectiveness of using exposure in the form of food fun facts to increase acceptance of new menu items among children attending a childcare center.

Methods: Fun facts were created to accompany two new childcare center menu items. A randomized crossover design was used to assign eight childcare classrooms to either receive or not receive pre-meal fun facts. Forty-four children were enrolled in the study, and each new menu item was served four times yielding a total of eight observation days. Researchers recorded whether or not the new food was tried during each individual meal observed (N = 289).

Analysis: Chi squared analysis was used to compare the rate of food trying between observations that were preceded by the fun facts and those that were not.

Results: The rate of food trying was higher ($p = .015$) among observations preceded by the fun facts (74.4%) compared to the observations that were not preceded by the fun facts (60.8%).

Conclusion: Presenting fun facts before introducing new foods led to a higher rate of trying the foods. This finding suggests that fun facts may be a relatively easy and low-cost way of improving new food acceptance.

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Chapter 1 - Introduction and Literature Review

Early childhood

Early childhood is a time of growth and development, and a healthful eating pattern during this life-cycle stage is particularly important to assure children have the adequate energy and nutrients needed for optimal development (Centers for Disease Control and Prevention, 2021). Early childhood, defined as birth to age eight, is also a time noted for important developmental milestones (Feiler & Tomonari, n.d.). During the first two years of life, children progress from immobility to crawling, then to hold themselves upright, and eventually progress to more advanced motor skills such as standing and walking (Centers for Disease Control and Prevention, 2022). Eating and feeding behaviors also evolve during this time as children transition from a feeding pattern consisting exclusively of breast milk or infant formula to a feeding pattern which includes solid foods. During early childhood, a child's exposure to new foods is determined by their caregivers, and it is the responsibility of the caregivers to offer nutritional and age-appropriate foods (Birch & Doub, 2014).

Although the eating patterns of young children are generally healthier than those of their older peers, the diets of many young children fail to meet current guidelines for optimal health (Banfield, et al., 2016). As noted in the 2020-2025 Dietary Guidelines for Americans, children aged two to four years of age should consume one to two servings of fruit and vegetables per day (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020). While 60% of children are eating adequate amounts of fruit, the average vegetable intake is less than one serving per day. The 2020-2025 Dietary Guidelines for Americans also notes that among children aged two to four years of age whole grain consumption is below the recommended level, while intake of added sugar, sodium, and saturated fat exceed the recommended levels.

Young children are dependent on their caregivers to provide for their nutritional needs; however, early childhood is a time when attitudes towards various foods start to develop (De Cosmi et al., 2017). Children's eating preferences are determined by a number of factors, including familiarization with foods, exposure, and environment (De Cosmi et al., 2017). Research supports the idea that acceptance of new foods by children can be achieved through repeated exposure, such as offering the same food on multiple days or on a variety of occasions

(Pietrobelli & Agosti, 2017). This knowledge can be particularly useful when promoting the acceptance of fruits and vegetables, as these are nutrient-dense foods that are crucial for proper development (Pietrobelli & Agosti, 2017).

Increasing acceptance of novel foods

Numerous studies have shown that repeated exposure to target foods increases acceptance of those foods. In one study, researchers recruited mothers of infants who had had little exposure to fruits and vegetables to assess how repeated exposure could impact consumption of a select vegetable (i.e., green beans) and a select fruit (i.e., pears). Researchers initially measured the amount of green beans or pears that participating infants ate, then assigned mothers to various experimental groups for an eight-day at-home exposure period. Following the eight-day intervention, researchers repeated the exposure and found infants who had consistently been offered the target food consumed significantly more of it compared to the initial testing (Mennella et al., 2008).

Research from other parts of the world has also shown that repeated exposure can increase consumption of target vegetables. In the United Kingdom, researchers recruited parents of pre-school aged children through private day care nurseries to participate in a study aimed at assessing the impact of various interventions on vegetable consumption (Caton et al., 2012). Participating children were split into three experimental groups, two of which involved altering the target food in some way to make it more appealing, while the third just used repeated exposure. After ten exposures to artichoke, the novel target food, researchers found that intake increased significantly from baseline to post-intervention across all groups, suggesting that repeated exposure is just as impactful for promoting acceptance of new foods (Caton et al., 2012).

Besides repeated exposure, other interventions have been suggested as a way to positively impact children's acceptance of new foods. One hypothesis proposes that children might be better conditioned to accept a new food by associating the new food with a food they are already familiar with (Anzman-Frasca et al., 2012). According to this hypothesis, familiar food takes away some of the discomfort associated with trying new foods and after many exposures could potentially increase acceptance of the previously disliked food. To test this idea, researchers used a familiar food, in this case a dip, to encourage children to try a new food that they did not

initially like, in this case a vegetable. Results from this study showed that after six exposures children did report liking the vegetable more, however there was not a significant difference between the experimental group who received the vegetable with a dip and the control group who only received the vegetable (Anzman-Frasca et al., 2012). This study suggests that the repeated exposure likely has the biggest impact on acceptance of new foods, however there is room for more research.

In addition to repeated exposure to new food, environmental factors play a role in a child's propensity to accept new foods. One important environmental aspect to consider when food is being offered and consumed, is the presence of others. Children view adults and caregivers as models when developing their own eating behaviors, and research shows that parental engagement in eating affects children's acceptance and willingness to try new foods (Draxten et al., 2014). Harper & Sanders (1975) found that children were more likely to try new foods when they saw their parents eating the food. They tested their hypothesis with other non-parent adults and found that while the effect was less pronounced, having another person in the room who was eating the new food raised the likelihood that the child would also try it. In the control group, parents and non-parent adults simply offered the child the new food but did not eat it with them (Harper & Sanders, 1975). With this knowledge, it is recommended that parent's model fruit and vegetable consumption for their children to promote acceptance and enjoyment of these food groups (Pietrobelli & Agosti, 2017).

Finally, another avenue for increasing children's acceptance of new foods is through nudges. Nudges are a method of subtly encouraging a desired behavior, such as nudging children to try a new target food. Research shows that nudges, particularly in the form of fun facts, can be effective at increasing acceptance of fruits and vegetables (Rajbhandari-Thapa, 2020). Researchers worked with two school districts in Georgia to present students in Grades 1 through 5 with fun facts about fruits and vegetables. The fun facts were printed on table tents and placed on tables in the cafeteria where students would be eating lunch. Plate waste observation was used to assess the number of fruit and vegetables servings the students consumed, and after the intervention period, researchers found that consumption increased by 0.14 servings, equal to 19% growth compared to pre-intervention observations (Rajbhandari-Thapa, 2020). This research shows how subtle pushes, specifically fun facts, can influence children's eating behavior.

Dietary diversity and picky eating

With these methods of familiarization in mind, one big question remains, and that question is, why is it so important for young children to experience a wide variety of foods, especially in early childhood? One reason it is important to encourage consumption of various foods from a young age, especially foods like fruits and vegetables that children are less likely to gravitate towards, is that consumption of these foods increases children's dietary diversity. Minimum dietary diversity is a metric created by the World Health Organization to assess individual or population-level dietary quality (2008). Minimum dietary diversity measures how many food groups a child regularly has access to, with a goal of having at least five of the following eight food groups available: breast milk; grains, roots and tubers; legumes and nuts; dairy products; flesh foods; eggs; vitamin A rich fruits and vegetables; and other fruits and vegetables (Zhao et al., 2020). In a study conducted in rural China, researchers found that children with a higher dietary diversity score were less likely to experience developmental delays, including motor, social and cognitive delays. Researchers assessed dietary diversity through a 24-h recall with the child's caregiver, and they were asked about consumption of eight food groups, including grains, dairy products, fruits, vegetables and meat. The frequency of developmental delays was higher for children who consumed only two food groups on the previous day compared to children who consumed five or more food groups, suggesting that consuming a wider range of food types is protective for children (Zhao et al., 2020). Beyond these developmental delays, other research shows that decreased dietary diversity is associated with higher incidences of stunting, a dangerous form of malnutrition characterized by below normal length-for-age scores (Krasevec et al., 2017). Together these studies demonstrate the way in which dietary diversity in early childhood can have a profound impact on a child's development. However, an important aspect to note is that metrics such as minimum dietary diversity are typically used to assess dietary quality in developing countries, where children and families have extremely limited resources. Research with these metrics often shows severe micronutrient and macronutrient deficiencies, which is not typically the case in the U.S. The findings from these studies are important to consider as they show how important dietary diversity is for development, but it should be noted that the U.S. overall food environment is vastly different than the countries where this research is being conducted.

Dietary diversity is often an issue for families living in low-income areas or with limited resources. However, decreased dietary diversity can also be the result of eating habits that are not focused on nutrient-dense foods. Picky eating, food fussiness and neophobia are all terms used to describe children's unwillingness to try new foods. Many definitions exist to explain the phenomena of picky eating, and many revolve around children, of varying ages, being unwilling or reluctant to try foods that they are unfamiliar with. Goh and Jacob (2012) note in their study on picky eating that "the term 'picky eating' has been described as consumption of an inadequate variety of foods" while Taylor and Emmett (2018) explain that "There is no agreement on a formal definition of picky eating, although it is generally accepted to include rejection or restriction of familiar foods and unfamiliar foods, and thus including an element of neophobia". Unfortunately, the foods that most often fall victim to picky eating are fruits, vegetables, whole grains, and other nutrient-dense foods (Taylor & Emmett, 2018).

While the exact prevalence of picky eating is unknown, 10% of the 2371 toddlers in the 2008 Feeding Infants and Toddlers Study (FITS) were rated by their parents as picky eaters (van der Horst et al., 2016). The researchers in this study did not give a specific definition for picky eating, but rather asked if the parents would describe their children as picky eaters, including components such as texture acceptance, neophobia, how often new foods were offered to the children and how frequently the children only ate foods they liked. In addition to the 10% of children who were rated as picky eaters, another 34% were rated as somewhat picky. Combined, these results suggest that almost 50% of the children exhibited some degree of picky eating (van der Horst et al., 2016). While it may not be possible to generalize these results to the global population of children, or even the U.S. population, these figures suggest that a large percentage of children likely exhibit picky eating behaviors.

Nutritional impact of picky eating

Many studies have been conducted to assess the nutritional effects of picky eating on children. Van de Horst et al. (2016) found that picky eaters consumed significantly less meat and other protein sources, as well as vegetables, than non-picky eaters. Researchers also examined how picky eaters reacted to mixed dishes or those containing multiple food groups and found that picky eaters consumed less energy than non-picky eaters when offered these types of food (Van de Horst et al., 2016).

Other studies exploring the effects of picky eating found that while macronutrient deficiency did not pose a high risk for picky eaters, micronutrient deficiencies could be a result of picky eating. Taylor et al. (2016) conducted parent questionnaires as well as dietary assessments to determine the nutritional impact of picky eating on children when they were two through seven-and one-half years old. The researchers found that energy intake remained high across all groups of children, indicating that they are consuming enough overall calories. However, picky eaters had lower intakes of many key micronutrients, including iron, zinc, and carotene. This difference in micronutrient intake is likely explained by decreased intake of vegetables and fruit and decreased yet adequate intake of meat. All of these foods contain important micronutrients, and reduced intake would impact the nutritional profile of children (Taylor et al., 2016).

Research has established that nutritional deficiencies are a potential consequence of picky eating and that various environmental factors can impact a child's willingness to try new foods. A variety of studies have been conducted to find approaches to decrease picky eating; however, many are limited to the home setting. A child's attitude towards eating while at home with their parents is usually not the same as their attitude when they are at daycare or school. In these settings they are no longer surrounded by their parents and family members, but rather teachers and peers. Luchini et al. (2017) explored the perception of picky eating between parents and caregivers in two different childcare systems. Through questionnaires completed by caregivers and parents, researchers found that parents are 1.4 times more likely to report their child as a picky eater than caregivers in both center-based childcare, where the child is taken to a designated school/center, and home-based childcare, where the child is taken to the home of the childcare provider. The type of childcare setting did not make a difference when comparing perceptions of picky eating, suggesting the difference in perceived picky eating did not depend on the type of childcare setting (Luchini et al., 2017).

Considering children seem to exhibit less picky eating behavior while outside their home, childcare centers and schools have a unique advantage for fostering healthy eating behaviors through nutrition programs. Roughly 70% of children aged 3–5-year-olds that are not yet in kindergarten spend time in some form of weekly childcare. The foods and the manner in which they are served can have a lasting impact on children attending early education and care programs (Benjamin-Neelon, 2018). One way that teachers and caregivers can positively impact

children's eating behavior is by offering novel foods, such as vegetables and fruits the children may not typically eat (Eliassen, 2011). Repeatedly offering foods to children increases the likelihood that they will accept it, which can be particularly important for nutrient-dense foods they might not gravitate towards.

Purpose

With this background information in mind, the purpose of this pilot study was to test the effectiveness of using food fun facts to increase acceptance of new menu items among children attending an early education and care center. Specifically, the study hypothesized that:

Students provided fun facts with the introduction of new foods will be more likely to try the new foods.

Chapter 2 - Methods

Study design and study site

This study was a randomized controlled crossover trial in which classrooms were assigned to provide either the standard meal protocol or the fun facts intervention. The site for this study was the Center for Child Development (CCD) at Kansas State University.

Participants and recruitment

All participants were enrolled at the CCD. A recruitment flyer was created and sent to the CCD staff along with a short descriptive paragraph explaining the study in broad terms. The flyer and the short explanatory paragraph were then electronically forwarded to CCD parents. Interested parents were instructed to sign up directly with researchers during morning drop-off in the CCD lobby. This allowed parents to ask any additional questions they had during the sign-up process.

Children one through six years of age were eligible for enrollment in the study. In order to be enrolled, a child's parents must have been able to understand English and provide written consent. Children with an allergy to a food or an ingredient in the food under study were excluded from the study. All participants were required to have a signed consent form before beginning the study. No incentive was provided for participation, and participation was voluntary. This study was approved by the Kansas State University Committee on Research Involving Human Subjects (see Appendix A) prior to implementation.

At the time of study enrollment, parents were asked to complete a short set of child demographic questions. The demographic questions were limited to age, gender, and race/ethnicity (see Appendix B).

Recipes

Prior to the start of the study, the CCD staff and researchers compiled a list of possible new recipes for inclusion in the Fall 2021 menu. Four new recipes were then selected for use in the study. Selecting recipes that were new to the fall menu ensured that students were not already familiar with the food, which could lead them to be more willing to try the dish. The recipes were also chosen based on novelty of the ingredients and food type, such as pineapple,

broccoli, and frittatas. While four recipes were originally chosen, one item was eventually dropped from the menu due to supply chain issues (fruit pizza). A second item (egg frittata muffin) was dropped because it was served for breakfast which was set up as a buffet-type service and prevented data collection per the study protocol. In the end, the two recipes used in this study were the Hawaiian Turkey and Cheesy Broccoli Rice recipes. The Department of Housing and Dining Services was responsible for menu item production while the CCD kitchen personnel delivered the food to each classroom.

The CCD uses a seasonal four-week cycle menu. The selected recipes were incorporated into the regular fall and winter lunch menus. Aside from the need for accommodations for allergies, all CCD children regardless of participation in the study, were served the same meals. Researchers began observations mid-September 2021 and completed the observations in January 2022. In total, each recipe was served four times, yielding eight observation days.

Fun facts

After finalizing which recipes would be used for the study, researchers created fun facts for teachers to present in their classrooms. The fun facts included information about the ingredients, such as their natural appearance and information about their plant growth, in addition to some cultural facts. The facts presented varied depending on the age of the children and what the teachers deemed appropriate. Language used for the fun facts was intentionally casual, with the intent of incorporating them into a conversation-style presentation before the meal was served.

The facts were provided to the teachers prior to the first day of the study, and while four-five facts were provided for each recipe, teachers were not required to discuss all of them. Multiple facts were also provided to ensure teachers had different facts for each time the recipe was used in the cycle menu. In total, presentation of the fun facts took between five and ten minutes (see Appendix C).

Prior to the first observation, participating classrooms were randomly assigned to either receive or not receive fun facts using a random number generator. For the second observation, the classrooms were reversed, meaning those that did not receive the fun facts during the first observation received them for the second, and vice versa. For the third observation the classrooms were randomly assigned again, and the same reversal method was used for the fourth

observation. This random assignment was done for each recipe separately to ensure each classroom received fun facts equally.

Observations

Teachers were made aware of which students in the classroom were participating in the study and were then able to assist as the researchers arrived. Children were assigned study ID numbers to protect their identity. In some instances, stickers were used to assist researchers in identifying which students were participating in the study. Stickers were placed on the back of participating students' chairs while students were occupied elsewhere in the center.

Observations were recorded by ID number on a standard form (Appendix D). Researchers began the observation before the meal was served and stayed in the classroom until they were finished completing the observation form. For each meal observation, researchers recorded whether the new menu item was served and whether the new item was tried. Only meal observations in which the fun facts item was served were included in the analysis.

Observations were completed for nine meals. However, the observations completed on November 8, 2021, were excluded from the analysis. November 8 was the day after the end of daylight savings time in 2021, and meal service that day was described as hectic, disrupted, and non-standard.

Children were not informed of the reason why researchers were present during their meals, and researchers tried to avoid interactions with children which could draw more attention and potentially influence their eating behaviors.

Statistical analysis

Descriptive statistics were used to quantify the demographic question responses and frequency of trying new menu items. Chi squared analysis was used to compare the rate of food trying between observations that were preceded by the fun facts and those that were not. The level of significance was set at $p \leq 0.05$. Data analysis was performed using IBM SPSS Statistics for Windows, Version 27.0. (IBM Corporation, Armonk, NY).

Chapter 3 - Results

In total, parental consent was received for N = 44 students attending the CCD. Participants were nearly evenly split between male and female, and the majority (61.4%) of participants were White. The ages represented in this study ranged from one to five years of age, and children from multiple classrooms participated.

Table 3.1. Participant Demographics

Characteristic	Category	<i>n</i> (%)
Gender	Male	19 (43.2)
	Female	20 (45.5)
	Missing	5 (11.4)
Race/Ethnicity	Asian	4 (9.1)
	Black/African American	4 (9.1)
	American Indian/Alaska Native	1 (2.3)
	Hispanic/Latino	1 (2.3)
	White/Caucasian	27 (61.4)
	Multi/Biracial	2 (4.5)
	Missing	5 (11.4)
Age	1 year	4 (9.1)
	2 years	6 (13.6)
	3 years	13 (29.5)
	4 years	15 (34.1)
	5 years	1 (2.3)
	Missing	5 (11.4)

Observations for each recipe were compiled for analysis. Results show that on all observation days, more participants tried the food than those who did not. The number of participants who tried the Cheesy Broccoli Rice recipe remained consistent for all observation days, however there were participants missing during each day.

Table 3.2. Number of Participants who were Observed Trying the Cheesy Broccoli Rice New Menu Item on Each Observation Date

Recipe: Cheesy Broccoli Rice

	Tried New Food	Did Not Try New Food	Not Recorded
Observation 1 – September 9 th , 2021	26	11	5
Observation 2 – October 28 th , 2021	27	13	4
Observation 3 – December 2 nd , 2021	26	13	2
Observation 4 – January 25 th , 2022	21	16	1

The same data was compiled for the Hawaiian Turkey recipe. Results from these observations show a non-linear increase in the number of participants who tried the new recipe throughout the observation period. There were also fewer participants who were missed during observation for this menu item.

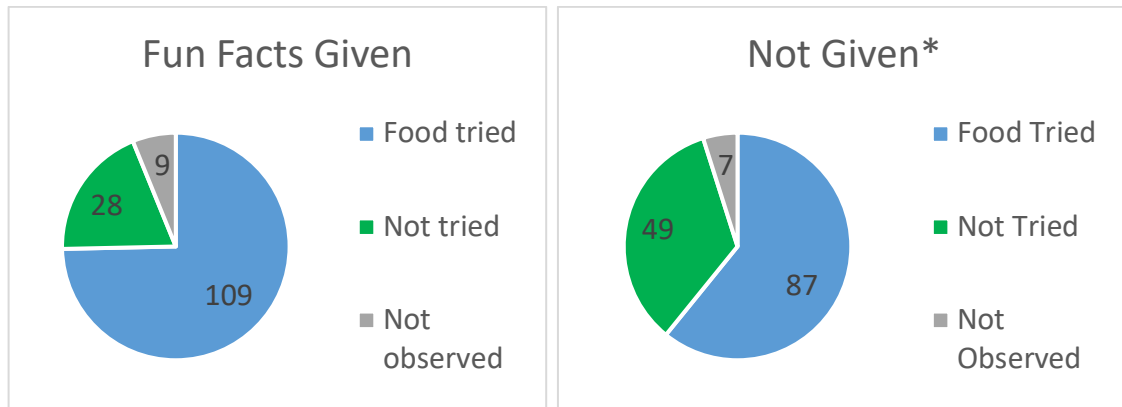
Table 3.3. Number of Participants who were Observed Trying the Hawaiian Turkey New Menu Item on Each Observation Date

Recipe: Hawaiian Turkey

	Tried New Food	Did Not Try New Food	Not Recorded
Observation 1 – September 16 th , 2021	17	16	2
Observation 2 – October 14 th , 2021	26	16	
Observation 3 – November 11 th , 2021	22	15	3
Observation 4 – February 8 th , 2022	32	8	

The chi-Square analysis revealed that the rate of food trying was higher ($p = .015$) among observations preceded by the fun facts (74.4%) compared to the observations that were not preceded by the fun facts (60.8%).

Figure 3.1. *Chi-Square Analysis of Fun Facts Given and Food Tried for School-Aged Children*



***Fun facts given or not given differed ($p=0.015$)**

Chapter 4 - Discussion and Conclusion

Nutrition plays a critical role during early childhood (Centers for Disease Control and Prevention, 2021), and finding novel ways to promote healthful eating behaviors will benefit children throughout their lifetimes. A variety of factors impact children's eating patterns, including parental modeling, peer influence, and meal environment (Draxten et al., 2014; Luchini et al., 2017). In this study, a randomized crossover design was used to measure the effectiveness of using food fun facts as a way to positively impact children's acceptance of novel foods in a childcare setting. The food fun facts were presented by teachers prior to serving new menu items, and the facts were presented in a conversational manner rather than in a more formal instructional manner. Researchers recorded whether or not the new food was tried during each individual meal observed. Results from this study show that the rate of food trying was statistically higher in observations preceded by the fun facts compared to observations that were not preceded by the fun facts.

The findings from this pilot study are congruent with other studies on a number of levels. To start, previous research has shown that repeated exposure to a new food can not only promote acceptance but can also increase reported liking in children (Anzman-Frasca et al., 2012) and consumption in infants (Mennella et al., 2008). Anzman-Frasca et al. (2012) tested the hypothesis that introducing a new food in conjunction with a familiar and liked food could promote liking of the new food. Researchers found that this hypothesis was partially accurate, as liking of new food increased in both the experimental group and the control group who received the new food without the added familiar food (Anzman-Frasca et al., 2012). Another study conducted by Mennella et al. (2008) yielded similar results. After an eight-day intervention in which mother's offered a new vegetable or fruit to their infant, the researchers found that infants consumed significantly more of the new vegetable compared to pre-intervention results (Mennella et al., 2008).

In these experiments and the current study, repeated exposure to the new food proved to be an important factor in acceptance of a new food. In our study, while the rate of trying the new food was higher for the group presented with the fun facts, it is important to note that for one item, the Hawaiian Turkey, food acceptance increased after each exposure. This was true for

both the experimental groups as well as the control groups. These findings suggest that the fun facts impacted the attitude of the children, as well as the repeated exposure.

Another important avenue for research in regard to childhood nutrition is the impact of childcare centers specifically. As discussed earlier in Chapter 1, the majority of children aged 3-5 years of age are enrolled in childcare before beginning kindergarten (Benjamin-Neelon, 2018). Children do not usually eat all of their meals at childcare centers, however for the childcare center used in this study, children regularly consumed lunch, and many also ate breakfast at the center. If we assume children are eating three meals every day, in an average week they could consume ten out of 21 meals while at childcare. Luchini et al. (2017) showed with their research that children tend to display less picky eating behavior while in a childcare setting compared to at home with their parents, and given that children could consume almost 50% of their meals at a childcare center, these meals are a significant opportunity to curb picky eating.

Results from this study did show a statistically significant effect; however, there are some important limitations to take into consideration. Since this was a pilot study, only one childcare center in Kansas was used for testing. The center chosen is located on the Kansas State University campus, and it was chosen because of its nature as a research facility as well as convenience. Additionally, meals provided at the center are coordinated through the Kansas State University Dining Services, which allowed researchers to add new meals to the menu without incurring additional fees. Since this experiment was used as a pilot study, it made sense to start with one facility before scaling to a larger multi-center study.

Aside from the singular childcare center, the sample size was also limited. Forty-four students participated in this study across eight classrooms, and a sample of this size could not be used to generalize to the larger population. One aspect of the study that contributed to this limitation was the sign-up process for participation. To be eligible for participation, researchers attended morning drop-off and receive written permission from parents stating their child could participate. Prior to this event, researchers communicated the goals of the study to parents via recruiting flyers and informed them about how to sign up. For future research, it would be interesting to try other methods of sign-up, such as an online option, to see if that is easier for parents to complete. However, our sample of forty-four participants represents 53.6% of the school enrollment, which is a substantial portion of the total population.

Another limitation with the sample was the limited racial/ethnic diversity of participants. Of the 44 participants enrolled, 27 (61.4%) identified as White, and due to a sign-up issue, researchers were unable to collect demographic information for five participants. Although the demographic profile of the sample appears to be in line with Kansas, where 86% of the population is White, the limited racial/ethnic diversity of the sample makes these findings difficult to generalize to other demographic groups (U.S. Census Bureau, n.d.).

Finally, researchers requested that teachers in the classroom present the fun facts prior to the meal, as it was felt that students could be distracted if a researcher presented the fun facts. All of the teachers were provided the same facts, however since the classrooms varied in ages, some facts had to be altered to ensure they were age appropriate. Researchers could not control the presentation style used by the teacher, and thus could not determine if that impacted student' willingness to try the new foods.

Despite these limitations, the implications of this study are important as they suggest a way in which children's attitudes toward novel foods can be influenced. The results from this study support the hypothesis that students who were provided fun facts with the introduction of new foods are more willing to try the new foods. This study provides a basis for further research into this form of introducing new foods to children, as more research that addresses some of this study's limitations is needed to generalize these results to the broader population. The results of the current study also have the potential to positively impact childhood nutrition in childcare settings. According to the 2020-2025 Dietary Guidelines for Americans, children aged two to four are not consuming adequate amounts of vegetables. Fun facts have the potential to help address this issue by increasing acceptance of novel foods, particularly vegetables. Finally, an important aspect of this research is the low-cost nature of this initiative. Many childcare centers do not have excess funds to spend on expensive new curriculum or programs. Many barriers have been identified to help explain why childcare centers find it difficult to implement healthier eating programs, and one top barrier is lack of funds (Dev et al., 2020). Presenting fun facts prior to a meal does not require any additional material and would only take a few minutes to present.

In conclusion, the purpose of this pilot study was to test the effectiveness of using food fun facts to increase acceptance of new menu items among children attending an early education

and care center. This study's results supported the hypothesis that students provided fun facts with the introduction of new foods will be more willing to try the new foods.

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Appendix A - IRB Approval



TO: Jennifer Hanson
Food, Nutrtn, Dietetics & Hlth
Manhattan, KS 66506

Proposal Number IRB-10780

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 08/26/2021

RE: Approval of Proposal Entitled, "Food fun facts and mealtime responses to new foods in the childcare setting.."

The Committee on Research Involving Human Subjects has reviewed your proposal and has granted full approval. This proposal is **approved for three years from the date of this correspondence.**

APPROVAL DATE: 08/26/2021

EXPIRATION DATE: 08/25/2024

In giving its approval, the Committee has determined that:

No more than minimal risk to subjects

This approval applies only to the proposal currently on file as written. Any change or modification affecting human subjects must be approved by the IRB prior to implementation. All approved proposals are subject to continuing review, which may include the examination of records connected with the project. Announced post-approval monitoring may be performed during the course of this approval period by URCO staff. Injuries, unanticipated problems or adverse events involving risk to subjects or to others must be reported immediately to the Chair of the IRB and / or the URCO.

Electronically signed by Rick Scheidt on 08/26/2021 2:02 PM ET

Appendix B - Participant Demographics Information Form

Participant Characteristic Questions

ID number: _____

1. What is your child's age? (Write in or leave blank if you choose not to answer)

2. What is your gender? (Write in or leave blank if you choose not to answer)

3. Which best describes your child? (Circle all that apply).

White

Black or African-American

American Indian or Alaska Native

Asian

Native Hawaiian or Pacific Islander

From multiple races (please specify): _____

Other (please specify): _____

I choose not to answer

3. Is your child of Hispanic origin?

Yes

No

I choose not to answer

Appendix C - Fun Facts

Fun fact

Hello! Here are some fun facts for the recipes we have created for the new recipes. Feel free to change the wording or use only parts of facts depending on the comprehension level of your students. If you have any suggestions or concerns feel free to contact me about them!

Grace

Hawaiian Turkey:

1. Has anyone here heard of Hawaii? Hawaii is a state, just like Kansas (could substitute another state), but Hawaii is also a group of islands. An island is a piece of land that is completely surrounded by water!
 - Some kids will probably know what an island is but others may not. It would be helpful to show a picture of Hawaii to explain the concept and for engagement.
2. Did you know that people in Hawaii actually have their own language? If you ever go to Hawaii, make sure to say « Aloha! » when you get there because that means hello!
3. Did this food taste sweet at all? If you tasted something a little sweet, that was probably the pineapple! Pineapple is a yellow fruit that looks like this.
 - If available, cooks could bring a pineapple to the classroom, or could show a picture
4. Pineapples are a delicious fruit, but they take a long time to grow! Many fruits take a few months to grow, but it takes about 1 year for a pineapple to grow.
(<https://www.doleplantation.com/resources#resources-tabs|3>)
5. There is one more ingredient from this dish we'd like to show you. Ginger is a spice that we used in this recipe. The ginger we used looks like this (show minced/dried ginger) but when ginger grows it looks like this (show either piece of whole ginger or picture of ginger).

Cheesy Broccoli Rice

1. Our lunch today has a really cool vegetable in it. Has anyone here had broccoli? Broccoli is a green vegetable that grows on the ground and the part we eat look like little trees!
 1. Would be beneficial to have some raw broccoli florets to show
2. The broccoli we used today is green, but sometimes broccoli can be white or even purple!
(<https://www.factsjustforkids.com/food-facts/broccoli-facts-for-kids/>)
3. Another ingredient in our lunch today is rice. Does anyone eat rice at home? Rice plants can be very tall, some are almost 6ft tall! (<http://justfunfacts.com/interesting-facts-about-rice/>)
 1. Could show 6 ft tall either on the wall or compared to a person who is 6ft tall.

4. We eat a lot of rice in the US, and lots of people around the world do too. Rice is actually grown on every continent except for Antarctica! (<http://justfunfacts.com/interesting-facts-about-rice/>)

Appendix D - Mealtime Response Observation Sheet

Recorder: _____ Food: _____ Date: _____

Mealtime Response Observation

ID Number _____

1. Child takes new food. Yes No Unobserved

2. Child tries new food. Yes No Unobserved

Mealtime Response Observation

ID Number _____

1. Child takes new food. Yes No Unobserved

2. Child tries new food. Yes No Unobserved

Mealtime Response Observation

ID Number _____

1. Child takes new food. Yes No Unobserved

2. Child tries new food. Yes No Unobserved

Mealtime Response Observation

ID Number _____

1. Child takes new food. Yes No Unobserved

2. Child tries new food. Yes No Unobserved