

Alpha Test of a Videogame to Increase Children's Vegetable Consumption

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Abstract

Objective: This is a report of an alpha test with a computer of one episode of a casual videogame smartphone application, called Kiddio Food Fight™ (Archimage Inc., Houston, TX), targeted at training parents to increase their 3–5-year-old child's vegetable consumption.

Subjects and Methods: This was a qualitative study using semistructured interviews. Sixteen parents from three ethnic groups living with their 3–5-year-old child were recruited. Parents provided screening information and informed consent and played the videogame. Afterward, semistructured intensive interviews were conducted about their experience.

Results: Parents generally liked the game. Their suggestions included a reduced list of values, rewording of reasons statements, an improved storyline, and feedback during and at the end of the game. The scoring system was ignored or confusing. Problems with the tool bar and game navigation caused problems in performance. A tutorial was requested.

Conclusions: Kiddio Food Fight could have positive acceptance among parents with minor modifications. A videogame play could help parents learn effective vegetable parenting practices.

Introduction

A COMMON PARENTAL COMPLAINT is difficulty getting their preschool child to eat vegetables.¹ Parenting practices have been related to children's dietary intake.² Videogames offer a promising channel to change behavior.³ Parents could play the phone applications (apps) at different moments of the day on their cell phones. This study presents the alpha testing of one episode, played on a computer, of a casual videogame smartphone app called Kiddio Food Fight™ (Archimage, Inc., Houston, TX), which simulates a parent–child interaction, targeted at parents of 3–5-year-old children to learn effective vegetable parenting practices.

Subjects and Methods

Sample and recruitment

Parents or guardians with a healthy 3–5-year-old living in the home were eligible. Parents with children who had a medical condition that influenced the child's diet were not eligible. Participants were recruited from March through

April 2011. Participating parents received \$20 for their time. Recruitment ceased when theoretical saturation of statements was reached in the interviews. This study was approved by the Baylor College of Medicine Institutional Review Board.

Game description

In the single episode of Kiddio Food Fight, the parent tries to get the child in the game (Kiddio) to taste a vegetable. The player selected Kiddio's gender, temperament,⁴ and a personal value and reason for their child eating vegetables.⁵ The story included Dottie, a good friend, who has a slightly older child and who provides guidance. The player offers a vegetable (from several choices); Kiddio refuses. The player is offered a selection of vegetable parenting statements (Fig. 1b)⁶ or manipulation of the environment (turning off the TV, taking toys off the table, using time out, closing the door, or changing the vegetable plating) to control the situation or encourage tasting the vegetable. Every effective parenting selection moves the player one stage closer to winning (three steps from neutral). Every ineffective parenting selection

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FIG. 1. Kiddio Food Fight home setting: (left) Male and (right) female 3–5-year-old version. Color images available online at www.liebertonline.com/g4h

moves the player one step closer to losing (three steps from neutral). A win is rewarded with Kiddio tasting the vegetable. A loss is capped with an end depending on temperament. Three scoring systems included the following: (1) a green/red bar that moved toward green when the player selected effective practices and toward red when selecting ineffective practices; (2) number score, based on the effective or ineffective practices; and (3) a number at the end, based on selections made and the time to win or lose.

Procedures

Consent was obtained from participants. Parents played the game on a computer at least three times. Reactions were assessed using a semistructured interview that included 21 open-ended questions, prompts, and probes (Table 1).

Data analysis

Audio-recordings were transcribed; transcriptions were checked against the audio-recording and imported to NVivo (version 9.0, 2010; QSR, Doncaster, VIC, Australia). Responses were thematically classified by question. Codes were derived as the classification proceeded and reviewed by the research group. Discrepancies were resolved by consensus.

TABLE 1. ALPHA TEST INTERVIEW SCRIPT

1. How often do you play computer or videogames?
 - 1.1. What computer or videogames do you play?
 2. How often do you play games on your cell phone?
 - 2.1. What cell phone games do you play?
 3. Is there anything else you'd like to tell me about the videogames or cell phone games you play?
 4. What do you think about the game's name, "Kiddio Food Fight"?
 - 4.1. What other names would you suggest for this game?
 5. What do you think calling the child character Kiddio?
 6. What was the purpose of this game?
 7. How do you win this game?
 8. What, if anything, did you like about playing this game?
 - 8.1. What did you think of the child character?
 - 8.2. What did you think about the selecting "your type of child" descriptions?
 - 8.3. What did you think about responding to Dottie's question on what is most important to you?
 - 8.4. What did you think about completing the sentence with the choices given?
 - 8.5. What did you think of the "Dottie" character?
 - 8.6. What did you think about the "bubble statements" choices to use during the game?
 - 8.7. What did you think about the child's facial reactions to your "bubble statement" choices?
 9. If you had to pick between using the words "veggie" or "vegetable", which one would you prefer?
 - 9.1. Tell me why you prefer (*say the word they preferred*) over (*say the word they discarded*)?
 - 9.2. Do you use the word (*say the word they preferred*) frequently with your child?
 10. What did you think about the overall artwork or graphics for the game?
- Now, let's talk about some feedback from the game...
11. During the game, would you like feedback on your choices you picked in the bubble statements immediately after making your choice?

If no, go on to question 12.
If yes, what would you like?
 12. At the end of the game, would you like feedback on the choices you made to get Kiddio to taste the vegetable?

If yes,

 - 12.1. What kind of feedback would you like?
 - 12.2. How would you like the feedback to be delivered to you?
 - 12.3. When would you like the feedback?

(continued)

TABLE 1. (CONTINUED)

Now let's talk about the scoring and points.

13. What did you think about the "red/green" bar?
 14. What did you think about the game score?
 15. If the game had an optional leader board to compare your game score with other parents, would you use it?
 16. What, if anything, didn't you like about playing this game?
 17. If you had to rate this game how many stars would you give it? For this question, use this scale: 1 = Hated it, 2 = Didn't like it, 3 = Liked it, 4 = Loved it.
 - 17.1. How could we change it to make it a 4 game?
 18. What, if anything, did you learn from playing the game?
 19. How much, if at all, do you think playing this game would show you new ways to help your child to eat more vegetables?
 - 19a. How could we change the game so that you would rate it 4?
 - 19b. What makes it a 4? (*only ask if the parent hasn't answered this question from above discussion*)
 - 19c. If this were a free cell phone game how likely would you download it to play?
 - 19d. If you had to pay for this cell phone game how likely would you download it to play?
 - 19e. If you had to pay for this cell phone game what would be a reasonable price to pay?
 20. How often would you play this game on your cell phone if it had other situations and solutions for dealing with your child? (1, *Never*; 2, *Sometimes*; 3, *Frequently*)
- Before we finish, is there anything else you want to tell me about that you haven't had an opportunity to say?
21. On a scale of 1 to 3, where 1 is "not difficult" and 3 is "very difficult," how difficult is it to get your child to eat vegetables?

Results

Seventeen parents were interviewed. One interview was removed because the mother reported no difficulties getting her child to eat vegetables (Table 2). Reports did not vary by race.

Child temperament selection

Most parents liked selecting their type of child and thought the descriptions were realistic.

Values and reasons statement selection

Some parents thought there were too many options (11 values); others thought the options were appropriate but that it was hard to make one selection.

Characters

Most parents liked the child character, were comfortable with the facial expressions, and said Kiddio's responses were realistic. A few parents thought the character was unattractive: head too big, eyes too far apart, and skin color too pale (Fig. 1).

For most participants Dottie was helpful. Some parents did not like Dottie's trombone voice, saying it was fast, annoying, and distracting while reading and put pressure on parents to complete the task quickly.

Understanding and winning

Most parents thought the purpose of the episode was to have their child eat the vegetable, not just taste it. Most parents understood the parenting practice choices as "positive choices," to have the child eat a vegetable. Almost all parents understood how to win the game by selecting effective parenting practices.

Feedback

Most parents would have liked text feedback on their choices during the game, whereas others preferred it at the end.

TABLE 2. DEMOGRAPHIC CHARACTERISTICS OF PARENTS WHO PLAYED KIDDIO FOOD FIGHT

<i>Characteristic</i>	<i>n (%)</i>
Total	16 (100)
Parent age (years) [mean (range)] ^a	35 (24–43)
Race/ethnicity	
White	5 (31.2)
African American	6 (37.5)
Hispanic	5 (31.2)
Parent's gender	
Male	0 (0)
Female	16 (100)
Child's gender	
Male	6 (37.5)
Female	10 (62.5)
Child's age (years)	
3	5 (31.25)
4	6 (37.5)
5	5 (31.25)
Married status	
Married	13 (81.2)
Single	1 (6.2)
Divorced, separated, or widowed	2 (12.5)
Household income	
< \$30,000	4 (25)
\$30,000–\$60,000	6 (37.5)
> \$60,000	6 (37.5)
Employed	
Yes	10 (62.5)
No	6 (37.5)
Highest household education	
HS graduate or less	1 (6.2)
Some college/technical school	6 (37.5)
College graduate	8 (50)
Postgraduate	1 (6.2)

^aMissing values (n=3).
HS, high school.

TABLE 3. IMPROVEMENTS TO KIDDIO FOOD FIGHT BASED ON ALPHA TESTING RESULTS

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1. Tailoring
 - Reduce list of values
 - Reword some reason statements
 2. Storyline
 - Dottie's role will be a friend.
 - Dottie's trombone voice will be a clear voice.
 - Kiddio character will have more facial reactions and expressions.
 3. Feedback
 - Dottie will deliver feedback.
- During the episode:*
- Kiddio's facial reactions and expressions will be increased.
 - Will be optional, given through the "calling Dottie" icon.
- At the end of the game:*
- Will identify effective and ineffective parenting choices selected.
4. Scoring
 - Remove green/red bar.
 - Remove score during the game.
 - Leave the score at the end, explain how score is achieved, and include as optional leader board.
 5. Technical
 - Remove the soft/firm voice component.
 - Improve the tool bar and navigation of the game by:
 - Highlighting the scrolling icon to make the selections.
 - Making the distractions (TV, toys, and door) more visible.
 6. Tutorial
 - Include tutorial as part of beginning gameplay to learn how to use the basic keys, navigate game, and basic aim.
 - Be accessible during the game by the "?" icon.
-

Scoring and points component

Most parents indicated they did not notice or understand the purpose of the green/red bar or the number. Some parents found it confusing. Most responded they would use an optional leader board to compare themselves with other parents.

Technical aspects of the game

As parents got more familiar with the game, most improved their performance. One of the problems was understanding how to navigate the screen. Most parents did not use the instruction booklet or just glanced at it. Some parents eventually used the environmental changes because they either clicked the "?" or took a glance at the instructions; some did not notice these. To learn about these features parents requested a tutorial, that the "?" tool be improved, and that the "Call to Dottie" phone option be enabled. Based on alpha testing several changes will be made (Table 3).

Overall rating

Most parents liked the game. One parent loved it. In order to rate it "loved it" some wanted the following: Instructions, improved navigation, more interactive game features, more challenging, add levels, add distractions like a dog or pet, give more techniques to help the child taste vegetables, and have more vegetable choices.

Discussion

This is the first report of alpha testing of a videogame episode related to nutrition and verifies its value in the formative stages. The method detected how parents interpreted different selections and were confused by some and the need for instructions and feedback.

Kiddio Food Fight was positively received by the players. Limitations included the following: The videogame was tested on a computer instead of a smart phone. Fathers' viewpoints were not represented. Populations without smartphones will have no access to the videogame. Only one game episode was evaluated: "To get your child to taste the vegetable."

Implications for research and practice

Videogames may provide a creative way to improve parenting practices for encouraging vegetable intake of their 3–5-year-old child.

Acknowledgments

This research was primarily funded by grant HD058175 from the U.S. Eunice Kennedy Shriver National Institute of Child Health and Human Development. This work is also a publication funded in part with federal funds from the U.S. Department of Agriculture (USDA/ARS) under Cooperative Agreement Number 58-6250-6001.

Disclosure Statement

No competing financial interests exist.

References

1. Beauchamp G, Mennella J. Early flavor learning and its impact on later feeding behavior. *J Pediatr Gastroenterol Nutr* 2009; 48:25–30.
2. Cullen KW, Baranowski T, Rittenberry L, et al. Social-environmental influences on children's diets: Results from focus groups with African-, Euro- and Mexican-American children and their parents. *Health Educ Res* 2000; 15:581–590.
3. Baranowski T, Baranowski J, Thompson D, et al. Video game play, child diet, and physical activity behavior change a randomized clinical trial. *Am J Prev Med* 2011;40:33–38.
4. O'Connor T, Watson K, Hughes S, et al. Health professionals' and dietetics practitioners' perceived effectiveness of fruit and vegetable parenting practices across six countries. *J Am Diet Assoc* 2010;110:1065–1071.
5. Sleddens E, Hughes S, O'Connor T, et al. The Children's Behavior Questionnaire very short scale: Psychometric properties and development of a one-item temperament scale. *Psychol Rep* 2012; 110:197–217.
6. Beltran A, Hingle MD, Knesek J, et al. Identifying and clarifying values and reasons statements that promote effective food parenting practices, using intensive interviews. *J Nutr Educ Behav* 2011; 43:531–535.

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