Motivational Theater To Increase Consumption Of Vegetable Dishes By Preschool Children

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Novel Interventions with Children and Youth
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Funding

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Trial Registration

ClinicalTrials.gov; Identifier: NCT02216968
Background

- By 3 years of age, many children have developed a dislike for certain foods, particularly vegetables.

- 75% of young children consume less than the recommended amounts of vegetables.
Objective

- To demonstrate the impact of an innovative approach to increase consumption of vegetable dishes by minority preschool children attending Head Start in a randomized feasibility intervention.
- The one strategy most relevant to this intervention was the incorporation of vegetables into mixed dishes which is also one of the tips cited in USDA’s ChooseMyPlate.gov.
- Approximately 59% of total vegetable intake among children and adolescents come from whole forms of vegetables with 41% coming from a mixed dish.

Transportation Into a Narrative World

To the extent that individuals are absorbed into a story or transported into a narrative world, they may show effects of the story on their real-world beliefs.

Conceptualization of transportation was based on Gerrig's (1993) description:

Someone ("the traveler") is transported, by some means of transportation, as a result of performing certain actions. The traveler goes some distance from his or her world of origin, which makes some aspects of the world of origin inaccessible. The traveler returns to the world of origin, somewhat changed by the journey.

Transportation Into a Narrative World

*We conceptualized transportation into a narrative world as a distinct mental process, an integrative melding of attention, imagery, and feelings.

The major dimensions included:

• Feelings of suspension.
• Lack of awareness of the surroundings.
• Existence of mental imagery.
Transportation Into a Narrative World

Briefly the audience becomes immersed in a story.

Followed by character modeling of vegetable consumption and virtual tasting of vegetables.

With increased vegetable preference leading to increased vegetable consumption.
Motivational Theater

Qualitative Assessment (Program Development)

• Semi-structured, individual interviews
• Conducted at six HS centers.
• 30 teachers (50% AA and 50% Hispanics)
  30 parents (50% AA and 50% Hispanics).
• Opinions about healthy/nonhealthy eating, media, and cooking.
• Feedback, specifically addressing cultural and ethnic differences for development of the characters and storylines for the puppet shows.
Development of Characters

**Reggie Veggie** – a high energy, humorous, and slightly bubbly hero/creator/warrior and a strong mentor.

**Judy Fruity** – intelligent, clever and a teacher portrayed as a “sleeper” sidekick supporting Reggie Veggie and to change Bag Boy and make him healthy.

**Bag Boy** – a “wanna be loser” underdog who refuse to eat vegetables and wanted only candy and chips.
Bag Boy tries the vegetables and is miraculously transformed into a “superhero”!
Puppet Shows

1) Vegetables that **“Crunched”** (carrots and sweet potato fries) and were a good source of vitamins A & C.

2) Vegetables that **“Pop and Roll”** (cherry tomatoes and peas) and were a good source of lycopene of B vitamins.

3) Vegetables that were **“Cool Veggies”** (green beans and lettuce) and were a good source of vitamins C & K.

4) Vegetables that were used for a **“Craft Day”** (broccoli and squash) and were a good source of vitamins A & C.
Development of Storyline

• Each puppet show had a story to tell with a repetitious, engaging song.
  o Repetitious theme was that eating vegetables “Gave You the Power to Play”.

• Four behavioral strategies were incorporated into each of the 4 puppet shows (20 minutes puppet shows):
  o Role modeling
  o Reinforcement
  o Encouragement
  o Rationale/Reason
Intervention

• Conducted in 11 classrooms for four consecutive weeks (3 interventions, 3 controls).

• Prior to lunch each show was shown for five consecutive days and a minimum of once in the home.

• Each intervention child took home a bag including the DVD video for that week, a pamphlet, main ingredients to prepare a simple vegetable snack, crayons, and a disposable camera (if parents did not have a smart phone) to use as instructed in the booklets.
Intervention

• The pamphlet materials included positive feeding practices, instructions on snack recipe preparation, content information contained in the videos, in-home instructions on taking and sending pictures of the children preparing and tasting the snack, and questions for parents about the video content.

• The questions on the video content could be answered correctly only if the parent had watched the video.

• As an incentive, each time a family returned a completed pamphlet, they were entered into a drawing to have a professionally taken family portrait.
Flowchart of Final Sample Selection

- Accessed for eligible Participants from 6-schools
  - n = 392
- Excluded (n = 139)
  - Declined to participate (n = 138)

**Allocation**
- Intervention group baseline
  - 128 randomized
  - 128 completed baseline
- Control group baseline
  - 125 randomized
  - 125 completed baseline

**Follow-up**
- Intervention group: follow-up
  - 128 completed
- Control group: follow-up
  - 125 completed

**Analysis**
- Completed follow-up
  - n = 253 (100%)
Quantitative Assessment of Parent Component

Parent Questions

After watching the video in its entirety answer the following questions:

1. Name something that cherry tomatoes have in them?

2. Name a vitamin that peas have?

3. What was 1 of the 2 highlighted vegetables in the video?
Quantitative Assessment of Consumption of Vegetable Dishes
Digital Photography
Comparison of Data Plate Pictures to Reference Pictures

Motivational Theater

Quality Assessment (Program Feedback)

• Focus Groups: 4 with parents (n= 14)
  3 with teachers (n= 22)

• Parents: reading and following instructions in each booklet, watching the videos and preparing the vegetables snack.

• Teachers: children’s reactions to the characters, video content, and what they thought the children learned from watching the videos.
Analytical Procedures

- Significance was set at $p < 0.05$.
- Numerical and graphical methods were used to test for data normality.
- Baseline demographic characteristics were examined for differences between groups by using a chi-square analysis for the categorical variables and an analysis of variance (ANOVA) for continuous variables.
- Intent-to-treat analysis assessed the influence of dropouts on the effect of the intervention.
- The multilevel mixed-effect model was used to account for the clustering of individuals within schools.
- The model was adjusted for child’s gender, age, and ethnicity.
# General Demographic Characteristics of Subjects at Baseline

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Control</th>
<th>Intervention</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample, n (%)</strong></td>
<td>253 (100.00)</td>
<td>125 (49.41)</td>
<td>128 (50.59)</td>
<td></td>
</tr>
<tr>
<td><strong>Gender, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td>0.658</td>
</tr>
<tr>
<td>Boys</td>
<td>125 (49.41)</td>
<td>60 (48.00)</td>
<td>65 (50.78)</td>
<td></td>
</tr>
<tr>
<td>Girls</td>
<td>128 (50.59)</td>
<td>65 (52.00)</td>
<td>63 (49.22)</td>
<td></td>
</tr>
<tr>
<td><strong>Race/Ethnicity, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td>0.065</td>
</tr>
<tr>
<td>Hispanics</td>
<td>166 (65.61)</td>
<td>89 (53.61)</td>
<td>77 (46.39)</td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>87 (34.39)</td>
<td>36 (41.38)</td>
<td>51 (58.62)</td>
<td></td>
</tr>
<tr>
<td><strong>Age, mean ± SD</strong></td>
<td>4.43 ± 0.65</td>
<td>4.38 ± 0.69</td>
<td>4.47 ± 0.54</td>
<td>0.261</td>
</tr>
</tbody>
</table>
### Evaluation Results of the Parent Component

<table>
<thead>
<tr>
<th>Videotape 1 (Crunch) Questions</th>
<th>%Correct Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name a vitamin that carrots are an excellent source of?</td>
<td>98.0</td>
</tr>
<tr>
<td>Which disease can eating carrots help prevent?</td>
<td>87.2</td>
</tr>
<tr>
<td>Sweet potatoes are good for which body organ?</td>
<td>76.1</td>
</tr>
<tr>
<td>What was 1 of the 2 highlighted vegetables in the video?</td>
<td>95.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Videotape 2 (Pop and Roll) Questions</th>
<th>%Correct Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name something that cherry tomatoes have in them?</td>
<td>88.0</td>
</tr>
<tr>
<td>Name a vitamin that peas have?</td>
<td>87.5</td>
</tr>
<tr>
<td>What was 1 of the 2 highlighted vegetables in the video?</td>
<td>97.7</td>
</tr>
</tbody>
</table>

*Approximately 79% response rate*
Evaluation Results of the Parent Component

<table>
<thead>
<tr>
<th>Videotape 3 (Cool Veggies) Questions</th>
<th>%Correct Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name a nutrient that green beans have?</td>
<td>84.4</td>
</tr>
<tr>
<td>What nutritional benefit does romaine lettuce have on the body?</td>
<td>9.4</td>
</tr>
<tr>
<td>What was 1 of the 2 highlighted vegetables in the video?</td>
<td>96.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Videotape 4 (Craft Day) Questions</th>
<th>%Correct Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name a nutrient in broccoli?</td>
<td>93.3</td>
</tr>
<tr>
<td>Name a mineral that squash has?</td>
<td>90.0</td>
</tr>
<tr>
<td>What was 1 of the 2 highlighted vegetables in the video?</td>
<td>96.3</td>
</tr>
</tbody>
</table>

*Approximately 79% response rate*
Within group: Intervention group had increased consumption of vegetable dishes from baseline to follow-up (p<0.0001)
Between group: at follow-up, Intervention group had significantly higher consumption of vegetables dishes than the control group at follow-up (p=0.022)
Program Feedback from Parents

Videos

• 100% responded their child viewed at least three of the puppet shows.

• Helped children understand that eating vegetables would make them strong and healthy.

• Children learned that vegetables provided vitamins and energy.

• Children could identify junk food and that junk food made them tired.

• Mothers were educated on the health benefits of vegetables.
Program Feedback from Parents

Videos

• Mothers were motivated to cook, eat, and serve more of the vegetables shown in the video.

• Liked the positivity and energy of characters and the upbeat song which the children memorized quickly.

• The videos accomplished the goal of getting children to eat more vegetables.

• Parents would purchase the videos in stores if they saw them at a reasonable price.
Program Feedback from Parents

Booklets

• A way to inform them and their children about vegetables.

• Questions in the booklet were simple and filling them out was informative.

• Children enjoyed coloring the vegetables and characters.
Program Feedback from Parents

Snack Preparation

- Most reported, they prepared the snacks.
- Created more interaction and bonding with their child.
- Children enjoyed helping in the preparation of the vegetables because it made them feel “big”.
- After watching the videos the children were more willing to try vegetables, especially when they helped in the preparation of the snack recipe.
Program Feedback from Teachers

• To summarize, teachers understood that the purpose of the intervention was getting the children to eat more vegetables to be healthier.

• They thought the videos were a great idea to promote vegetable consumption and teach the children new vocabulary.

• Teachers expressed that the videos had an effect not only on the children but also on the teachers.

• Watching the videos made them aware that in order to get their children to eat vegetables, role models (teachers and parents) need to be better educated on vegetables and they need to eat them as well.
Conclusion

• This study provides data supporting the use of videotaped puppet shows using a storyline, a repetitious song, and three well-tested characters with their own personality profiles to change eating behavior.

• The videotaped puppet shows, shown on repeated occasions, significantly increased consumption of vegetable dishes by preschool children.

• The present results add to the body of literature showing that multiple exposures to a theatre intervention with a strong theoretical framework can have a significant impact on young children’s consumption of vegetable dishes.

• The use of puppet shows is an appropriate medium of intervention to use with preschool children based on their level of cognitive development.
Conclusion

• Using theory-based motivational theater with multiple exposures and related activities may be an effective behavioral intervention to increase consumption of vegetable dishes by preschool children that can be easily disseminated to a large sample.

• Additional research is needed to determine whether the positive gains from theatrical interventions targeting preschool children, with a sound theoretical framework, and observed short-term, are sustained over time.
Any Questions?

Thank you!!!