Using Incentives to Influence Children to Bring Fruit and Vegetables from Home for School Snack

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Introduction

Background

Most children and adolescents in the United States consume less than recommended amounts of fruit and vegetables (1, 2). Experts and advocates recognize the school environment as a fundamental setting for providing children access to nutritious food and opportunities to learn about the importance of healthy eating (3, 4, 5, 6). The United States Department of Agriculture (USDA) initiated its Fresh Fruit and Vegetable Program (FFVP) in 2002 as part of a broad effort to address poor nutrition and rising obesity rates among children.

The FFVP began as a pilot and was expanded in 2004 and 2006, eventually becoming nationwide in 2008. This program allocates funding for selected schools to provide students with free fresh fruit and vegetable snacks outside of school lunch. The program aims to identify and develop best practices for increasing consumption of fruit and vegetables in schools to improve nutrition and combat childhood obesity. The history and implementation of the FFVP is described in more detail elsewhere (7, 8, 9, 10).

Previous Research

The research literature examining the effectiveness of the FFVP is small and still developing (11, 12, 13, 14). Given the sizeable resources committed to funding the FFVP, more information is needed to understand the successes, limitations, and potential in meeting its stated goals. Previous research in Wisconsin found a significant increase in fruit and vegetable intake for participating students during school snack compared to control students (14). These results also showed that the FFVP impact on consumption was limited. Even after six months of participating in the program, students did not bring fruit and vegetable snacks from home to eat on days when one was not provided for free through the FFVP.

Current Research

The present study builds on these findings by exploring how to expand the reach of the FFVP beyond the immediate impact of eating the free fruit and vegetable snacks served through the program. Specifically, we investigated whether incentives such as toy prizes, reminders and praise can influence children to bring fruit and vegetables from home to eat on days when they were not served one for free. Teachers exposed students to a variety of incentives and also observed and recorded the frequency with which they brought and ate fruit and vegetables from home over 53 non-FFVP days. We hypothesized that the students would respond positively to the incentives; however, we did not have an exact expectation regarding how often they would bring fruit and vegetables from home to eat for school snack.

Method

Participants

Seventy-six 4th and 5th grade students in four classrooms from one Wisconsin FFVP school participated in this study. The sample was evenly split between male (48.4%) and female (51.6%); however, there were more 4th graders (59.2%) than 5th graders (40.8%). The average age of the sample was 9.6 years old. Just over 95% of students were Caucasian/White, while 3.2% were African American/Black and 1.6% were Hispanic/Latino/Latina. All demographic information was provided by school administration.

Procedure

The FFVP began in this school in October 2009 with free fruit and vegetable snacks served to students three days per week. The snacks were prepared in the school kitchen and distributed to classrooms for an organized afternoon snack shared by teachers and students. Students were allowed to bring snacks from home to eat in the afternoon on non-FFVP snack days, as was the case before the FFVP began. There were six separate incentive phases during this study beginning with phase one with no incentives to serve as a baseline. **Table 1** describes the details of each phase including the number of days, incentives offered and teacher participation.

Data Collection

Teachers in each of the four classrooms were trained to observe and record student behavior during the afternoon snack period on days when no free snack was provided through the FFVP. Each teacher was given a binder of weekly calendar pages with the name of each student. On each non-FFVP day, teachers recorded if students were absent and for students that were present, they recorded the fruit and vegetable items brought to school for snack. In order to be counted, the student had to eat at least half of the fruit or vegetable item. In all, student behavior during afternoon snack was observed and recorded on 53 non-FFVP days.

Table 1: Description of Incentive Phases and Teacher Participation

Phase	Length	Incentive	Description	Teacher Participation
1	6 days	Baseline	No incentives	Teachers 1, 2*, 3 & 4
2	6 days	Charts & Stickers	Students bringing FV from home could put a sticker next to their name on a classroom wall chart	Teachers 1, 2*, 3 & 4
3	4 days	Charts, Stickers, & Toy Prizes	Students bringing FV from home received a toy prize in addition to putting a sticker on classroom wall chart	Teachers 1, 2*, 3 & 4
4	4 days	Return to Baseline	No incentives	Teachers 1, 2*, 3 & 4
5	19 days	Baseline	No incentives	Teacher 2
		Reminders & Praise	No stickers, wall chart, or toy prizes. Students were reminded to bring FV from home and praised for doing so	Teacher 3
		Reminders, Praise & Toy Prizes	No stickers or wall chart. Students were reminded to bring FV from home and received praise and a toy prize for doing so	Teachers 1 and 4
6	14 days	Reminders, Praise & Toy Prizes	No stickers or wall chart. Students were reminded to bring FV from home and received praise and a toy prize for doing so	Teachers 1, 2, 3 & 4

*Reminders and praise were initiated for teachers 1, 3 and 4 during phase 5 in response to our discovery that teacher 2 was using these techniques in phases 1 - 4

Results & Discussion

Table 2: Fruit & Vegetables Brought from Home on Non-FFVP Days Phase One (6 days)

Student Days	Fruit	Veg	Total
394	24	3	27
Average	0.061	0.008	0.069

Table 3: Fruit & Vegetables Brought from Home on Non-FFVP Days Phase Two (6 days)

Student Days	Fruit	Veg	Total
414	40	2	42
Average	0.097	0.005	0.101

Table 4: Fruit & Vegetables Brought from Home on Non-FFVP Days Phase Three (4 days)

Student Days	Fruit	Veg	Total
269	84	14	98
Average	0.312	0.052	0.364

Table 5: Fruit & Vegetables Brought from Home on Non-FFVP Days Phase Four (4 days)

Student Days	Fruit	Veg	Total
292	61	7	68
Average	0.209	0.024	0.233

Table 6: Fruit & Vegetables Brought from Home on Non-FFVP Days Phase Five (19 days)

Student Days	Fruit	Veg	Total
1,333	382	55	437
Average	0.287	0.041	0.328

Table 7: Fruit & Vegetables Brought from Home on Non-FFVP Days Phase Six (14 days)

Student Days	Fruit	Veg	Total
936	292	55	347
Average	0.312	0.059	0.371

Figure 1: Average Proportion of Students Bringing F&V From Home On Non-FFVP Days During Each Incentive Phase

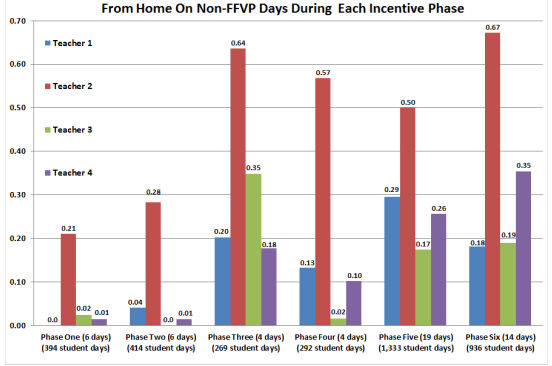

Table 8 Fruit Items Brought From Home

Item	# Times	% Fruit
Apple	298	34.0%
Orange	130	14.8%
Banana	107	12.2%
Grapes	59	6.7%
Tangerine	52	5.9%
Raisins	39	4.4%
Craisins	36	4.1%
Pear	21	2.4%
Mixed Fruit	20	2.3%
Strawberries	20	2.3%
Kiwi	17	1.9%
Watermelon	16	1.8%
Dried Apple	13	1.5%
Pineapple	9	1.0%
Applesauce	7	0.8%
Cantaloupe	6	0.7%
Peach	6	0.7%
Dried Pineapple	5	0.6%
Grapefruit	4	0.5%
Blueberries	3	0.3%
Dried Apricot	3	0.3%
Pomegranate	2	0.2%
Apricot	1	0.1%
Boysenberries	1	0.1%
Raspberries	1	0.1%
Rhubarb	1	0.1%
Total = 877 Fruit 86.1% of all FV Items		

Table 9 Vegetables Brought from Home

Item	# Times	% Veg
Carrots	94	66.2%
Cucumber	13	9.2%
Celery	8	5.6%
Broccoli	6	4.2%
Spinach	5	3.5%
Cauliflower	4	2.8%
Green Pepper	2	1.4%
Jicama	2	1.4%
Lettuce	2	1.4%
Peas	2	1.4%
Tomatoes	2	1.4%
Mixed Vegetables	1	0.7%
Radish	1	0.7%
Total = 142 Vegetables 13.9% of all FV Items		

The hypothesis that students would respond positively to incentives is supported by current findings. **Tables 2-7** show the number of fruit and vegetable items brought from home by students during each phase of the study. The number of student days in a phase is the number of students present in school across all days in that phase. During phase one, students only brought fruit and vegetable snacks from home 6.9% of the time. This rate increased slightly to 10.1% during phase two when students were given stickers as an incentive and increased further to 36.4% when toy prizes were added during phase three.

Phase four returned students to the baseline condition of no incentives. Rather than returning to the baseline outcome from phase one, students brought fruit and vegetables from home 23.3% of the time. This rate increased again to 32.8% and 37.1% in phases five and six as students again responded positively to incentives. The progression of student behavior through all six incentive phases is quite complex and thus requires a more detailed explanation.

Figure 1 shows the rate that students in each classroom brought fruit and vegetables from home during all six phases. The higher rates in phases one through four in Teacher 2's classroom indicate something special was happening. We discovered Teacher 2 was reminding her students to bring fruit and vegetables from home and praising them when they did. In phase five all incentives were removed from Teacher 2's classroom including reminders and praise, while the other teachers were instructed to begin reminding and praising their students and some gave toy prizes as well. In response, Teacher 2's students brought slightly fewer fruit and vegetables from home, while the rate increased in all other classrooms. However, the highest rate during phase five was still in Teacher 2's classroom. All teachers used toy prizes, reminders and praise during phase six and the rate jumped to its highest level for Teachers 2 and 4, while remaining constant for Teacher 3 and falling for Teacher 1. This difference highlights the importance of a teacher's personality, dedication and style in terms of influencing their students as evidenced by the behavior in Teacher 2's classroom.

In conclusion, using toy prizes in combination with reminders and praise influenced students to bring fruit and vegetables from home to eat for school snack when they otherwise would not have done so. **Tables 8 and 9** show students brought over 1,000 fruit and vegetable items from home over the period of study. This is compelling because it provides a framework for schools to expand the reach of the FFVP beyond the availability and accessibility to free fruit and vegetable snacks provided in the classroom. Our most important finding is that a special teacher dedicated to making a difference can significantly influence student behavior. Additional research is needed to identify practical methods of making this significant level of change possible among more teachers given the many constraints facing teachers and schools.

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