Pilot test of a Garden To Café scannable taste test survey for snack fruit administered in classrooms at PSABX on 12/14/2017

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Introduction and summary

A taste test using a scannable survey was administered in two 2nd grade classrooms at a school in the Bronx. The dishes being tested were raw, whole Empire apples and raw, whole Highland pears obtained from local farms. All students who were present in the two classes completed the survey.

Selected results:

1) More students thought the apples were delicious (77% of all students) than thought the pears were delicious (41%).
2) More students were interested in trying different kinds of apples (81%) than in trying different kinds of pears (57%).
3) Most students (85%) were interested in trying kinds of fruit they hadn't eaten before.
4) The students' willingness to try vegetables they hadn't eaten before was considerably lower (54%), but this was still only slightly lower than their willingness to try new kinds of a more challenging fruit (pears, 57%).

From a methodological perspective, the taste test was a success in that it rapidly produced usable results from a sufficiently sized sample of students. Based on this success, Garden To Café taste tests can be scaled up to more schools and tasting events.

Results

Results for all of the students who participated in the taste test are as follows.

I think these apples taste…

Table 1		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Didn't try it	4	9.3	9.3	9.3
	Nasty	2	4.7	4.7	14.0
	Okay	4	9.3	9.3	23.3
	Delicious	33	76.7	76.7	100.0
	Total	43	100.0	100.0	

I think these pears taste…

Table 2		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Didn't try it	6	14.0	14.3	14.3
	Nasty	10	23.3	23.8	38.1
	Okay	9	20.9	21.4	59.5
	Delicious	17	39.5	40.5	100.0
	Total	42	97.7	100.0	
Missing	System	1	2.3		
Total		43	100.0		

I would like to try different kinds of apples…

Table 3		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	8	18.6	19.0	19.0
	1 time	5	11.6	11.9	31.0
	2 times	4	9.3	9.5	40.5
	3+ times	25	58.1	59.5	100.0
	Total	42	97.7	100.0	
Missing	System	1	2.3		
Total		43	100.0		

I would like to try different kinds of pears…

Table 4		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	18	41.9	42.9	42.9
	1 time	2	4.7	4.8	47.6
	2 times	7	16.3	16.7	64.3
	3+ times	15	34.9	35.7	100.0
	Total	42	97.7	100.0	
Missing	System	1	2.3		
Total		43	100.0		

I would like to try other kinds of fruit that I haven't eaten before…

Table 5		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	6	14.0	14.6	14.6
	1 time	2	4.7	4.9	19.5
	2 times	3	7.0	7.3	26.8
	3+ times	30	69.8	73.2	100.0
	Total	41	95.3	100.0	
Missing	System	2	4.7		
Total		43	100.0		

I would like to try vegetables that I haven't eaten before…

Table 6		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	19	44.2	46.3	46.3
	1 time	5	11.6	12.2	58.5
	2 times	4	9.3	9.8	68.3
	3+ times	13	30.2	31.7	100.0
	Total	41	95.3	100.0	
Missing	System	2	4.7		
Total		43	100.0		

Are you a boy or girl? (Gender)

Table 7		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Boy	23	53.5	54.8	54.8
	Girl	19	44.2	45.2	100.0
	Total	42	97.7	100.0	
Missing	System	1	2.3		
Total		43	100.0		

What grade are you in?

Table 8: All students are known to have been in grade 2, although a small number of students marked grade 3.

Have you taken part in a taste test before?

Table 9		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	21	48.8	48.8	48.8
	Maybe	4	9.3	9.3	58.1
	Yes	18	41.9	41.9	100.0
	Total	43	100.0	100.0	

Have you taken part in a Garden To Cafe event before?

Table 10		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	11	25.6	26.2	26.2
	Maybe	4	9.3	9.5	35.7
	Yes	27	62.8	64.3	100.0
	Total	42	97.7	100.0	
Missing	System	1	2.3		
Total		43	100.0		

Discussion

More students thought the apples were delicious (77% of all students) than thought the pears were delicious (41%). As expected, apples functioned as a positive food preference reference level, with pears serving as a more challenging food, no matter how the scale is examined. For instance, both "Nasty" and "Didn't try it" were higher for pears. On the other hand, 21% said the pears were "Okay", so there is potential for students to learn an expanded taste palette. (It can be argued that students who said "Okay" could be persuadable with more tasting opportunities.)

More students were interested in trying different kinds of apples (81%) than in trying different kinds of pears (57%). It is encouraging that these results for willingness to try were higher than results for "Delicious" for the corresponding fruits. It suggests a willingness to try new foods that exceeds the students' immediate experience.

Most students (85%) were interested in trying kinds of fruit they hadn't eaten before. This willingness to try new fruit exceeded their willingness to try new types of apples.

The students' willingness to try vegetables they hadn't eaten before was considerably lower (54%), but this was still only slightly lower than their willingness to try new kinds of a more challenging fruit (pears, 57%). Given that new vegetables are often a major challenge for children, since over half of the students were willing to try new vegetables, this should give the Garden To Café staff confidence that students at PSABX will participate in future tasting events, and will enjoy even more challenging dishes.

Slightly more than half of respondents were boys (55%).

All respondents were in the 2nd grade. (The taste test was administered to two 2nd grade classes.)

Almost half (49%) of respondents had not participated in a taste test before.

Most respondents had participated in a Garden To Café event before (64%).

Students' group discussions of why they rated the fruit the way they did

When students were asked to talk about the fruit, they often used the same words used in the scale, such as "Delicious". We have also seen this in previous surveys. Sometimes the students had difficulty articulating why they liked or didn't like a fruit. When they did have a response, it was often one word, and sometimes a phrase or a sentence.

Students' explanations of their responses to apples and pears during the group discussions included:

Positive comments = Juicy, Sweet, Crunchy, Skin, Watery, The juice made it perfect, Sugary, Feeling the juice trickle down my throat, Apple is healthier than apple juice, Apples healthier because has seeds, Apple has more protein, Pear has more sweetness than apple, Pear crunchier, Pear was softer.

Negative comments = Flavor was weird, Didn't like the texture, Didn't try it because too scared, Didn't try it because hadn't tried it before, Just don't like it, Can't explain it, Afraid of apple seeds getting in throat, Apple hurt teeth to bite into.

The school's 4th graders, as evidenced by examples of student work posted in the hallway, create "In my opinion" writing assignments. These appeared to be about 1 to 2 pages of hand written text. Some of the examples posted were about a food the student really likes. This could be a way of obtaining more detailed, qualitative feedback from students, in a way that is integrated into the school's curriculum - and since this is a major class assignment, it also illustrates why obtaining quality, in depth qualitative feedback from students is a challenge.

Next steps

Given the success of this test of a scannable survey, one next step will be to attempt to administer a similar survey in conjunction with a regular Garden To Café event.

We could also try snack fruit taste tests at other schools.

In terms of analysis of data from this PSABX taste test, crosstabs could be run to find results by gender and previous participation in taste tests. In the interest of speed of reporting, and also because such sub-samples will be small, such additional analyses have been left for a future report.

Appendix A: Methodology

Survey Development

One primary objective of this pilot test of a taste test survey was to find an efficient way to administer surveys to students. The Garden To Café (GTC) team has successfully administered several taste test surveys to students in schools in the past, usually during the GTC event during lunch or sometimes in a class period shortly after lunch, but the need for data entry when using paper surveys has slowed the process of analysis and reporting considerably. We have also made several attempts to administer taste test surveys using a school's classroom computers, but so far these computer based surveys have produced response rates too low for the data to be useful. We had also previously attempted to use a scannable survey, but this also mostly failed - mostly because it was at a public health fair event where we were trying to both collect surveys and collect contact information from attendees who wanted GTC

recipes, and we didn't have enough staffing to do both well, so made a spot decision to focus more on the list of recipe recipients.

For the 12/14/2017 test, we considered computer-based surveys, but, understandably, food is not allowed in the school's computer lab. We also considered tablet-based surveys, but neither the school nor SchoolFood has the 35 tablets that would be needed for a whole class to take a survey simultaneously, and we can't justify a purchase of that many tablets until we confirm that a tablet-based survey would work well.

In order to give this latest survey test the highest chance of succeeding, we decided to administer it in classrooms, rather than during lunch - which is a difficult time to collect surveys because students are, understandably, trying to eat. Because this pilot test was additional to GTC's regular work, we limited the dishes being tasted to whole, fresh fruit, rather than prepared dishes, to limit extra labor required.

The survey was administered to two 2nd grade classes starting around 12:30 pm, which for these students is sufficiently far in time from their regular lunch period (10:00 am) that it would reasonably count as a snack time. The taste tests ended about 1:20 pm, so there was about 20 to 25 minutes per class (one class in period 6 followed by the second class in period 7), including handing out the fruit, surveys and pencils, introducing the taste test activity, completing the surveys, and holding a class discussion after the surveys were completed. The survey was anonymous: it did not ask for either the student's name or ID number.

The teacher identified the apple and the pear first when explaining the survey. This ensured that students knew which fruit went with which survey item. She also read the survey to them. The 2nd graders should have been able to read the survey themselves, and we had made changes to ensure this, such as changing "participated" to "taken part in". Since the survey was a novel task, going over it first as a group helped ensure the students understood what was being asked. Several 5th grade students from the school assisted with handing out surveys and other tasks.

We also limited the survey to whole fruit, in this case one variety of apple and one variety of pear, so that we could eliminate the photos of the dishes we have used on most previous surveys, while still having dishes that are easily identifiable by students from the text alone. Dish photos on taste surveys are a plus, but while we have photos of apples and pears on hand already, we couldn't know exactly which variety of apples and pears we would end up with, potentially until as little as one day before the taste test. This can also be a concern with GTC dishes generally since ingredients or preparations can change at the last minute (for completely valid culinary and seasonal availability reasons). If the photos on the surveys don't match well with what is actually being served, that can be a problem. Especially with a scannable survey, because it requires specialized assistance and printing, the time it takes to format and print a scannable survey is more than we would have if we wanted to ensure an exact photo match.

We also eliminated all open-ended questions from the survey. We currently can capture images of writing on a scannable survey, but we can't convert those to text, so any open-ended responses would still have to be manually entered. Instead, we held a short group discussion with each class of students after the survey was completed to have them explain their choices, during which I took notes. This ended up providing information roughly equivalent to what we have obtained on surveys before.

While creating this scannable survey, I realized that our previous surveys contained a mix of "I" questions, such as "I think this dish tastes … [3 multiple choice options].", and "You" questions, such as "Would you eat this dish again? [3 multiple choice options]". To reduce the cognitive load of the survey, I replaced the "You" questions with "I" questions. Students certainly can switch perspectives, but I think it would be better if they don't have to.

Informal analysis of the responses to the "I think this dish tastes…" questions compared to the corresponding "Would you eat this dish again?" questions on previous surveys has found that students who answer "Delicious" to the first question almost always answer "Yes" to the second question, and similarly for "Okay" and "Maybe", and "Nasty" and "No". This suggests that the two questions are measuring the same thing.

To make the survey more useful, I replaced the "Would you eat this dish again?" question with one that asked about trying different kinds of that dish, in this case apples or pears. This was followed by similar questions about trying fruits and vegetables students haven't had before. The hope is that these questions will differentiate between students more effectively, and will help us measure generalized student willingness to try new foods, beyond their response to the specific dishes served. Encouraging willingness to try new foods is a major objective of GTC, and in some ways is more important than whether students like or don't like any one dish. If we can reliably measure this "willingness to try" at multiple points in time, without needing a separate instrument (like the vegetable neophobia survey we have developed but not piloted yet), that would be helpful.

If these measures, of both specific taste responses and general willingness to try, can be administered efficiently, we will then be in a better position to scale up our data collection to more of GTC's approximately 125 schools. The administration of this survey on 12/14/2017 was efficient, so we should be able to efficiently administer the survey at tastings that fit this survey's pattern of dishes, and which have similar levels of support from school staff. I need to emphasize that the on-site support of the school staff was critically important to the success of this taste test.

Scannable survey technical issues

The kind of scannable survey we are using can be completed in either pencil or pen, but pencil is recommended because sometimes students make a mistake or change their mind and need to adjust their response. The survey was produced using the Flexi Capture software from Scantron.

Curricular relevance of scannable surveys

One of the reasons the teachers at the school appreciated the taste test survey was that it gave students a chance to practice bubble tests. In the first class, 18 students out of 22 filled in the bubbles correctly, and four filled in the bubbles partially correctly. In the second class, all 21 students filled in the bubbles correctly. Partially correct surveys included some questions where the answer was circled, rather than filled in. One survey had the answer filled in correctly, but the non-choices were X-ed out (which makes logical sense, but the scanner might misread those responses). These few non-filled-bubble responses were corrected before scanning. (Whether students should live in a bubble is another question, but the reality is that one has to know how to complete these kinds of tests correctly.)

One concern about data collection in schools regards making sure data collection does not impinge excessively on instructional time. In the case of this apples and pears taste test, it combined the data collection with an integrated mini-lesson and inspiration in ways that were also consistent with

methodological requirements. The students said they had fun doing the taste test and felt lucky to participate. In addition, our goal is to provide the results of the taste test back to the school to support their own programmatic goals and instructional needs.

Evaluating the evaluators

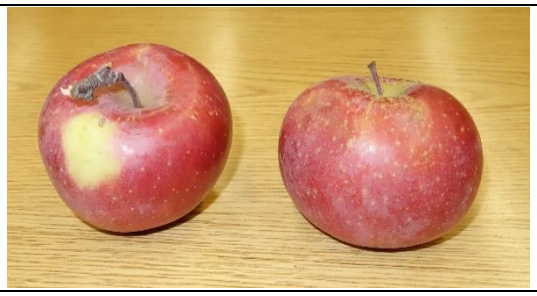
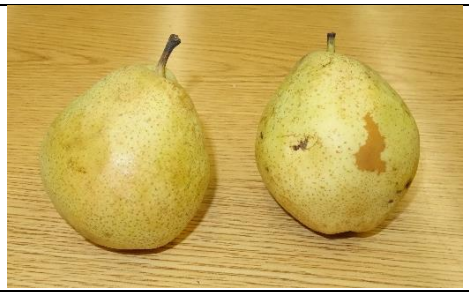
Part of the art of administering surveys is to make sure that one doesn't lead the respondents to one answer. There was one point in the first class where the teacher administering the surveys said "Now take a big, delicious bite of the apple." It would have been better if the word "delicious" hadn't been used in this context, but otherwise I thought the administration of the survey was done well. The students were certainly outspoken during the discussion portion, so I don't think the survey or its administration was interfering with their response to the fruit. Also, survey administration shouldn't be entirely flat either. We want the students to feel some enthusiasm for taking the survey, and we do want to encourage a willingness to try foods. The survey itself is an act of trying, so I think being enthusiastic about trying during survey administration is acceptable. There are people who argue that we shouldn't give negative opinions about foods as a choice, but I don't think that is appropriate when trying to measure taste responses. One can, and probably should, be enthusiastic about food in general during a taste test, but we need to be equally clear that we want to know what students really think, so any response to the food is welcome.

Data collection is, as I said, as much an art as a science. The only way to get better at data collection is to reflect on our work together. I think we had an excellent data collection team at the school.

Inventory control

There was a lot more fruit than we needed for the taste test itself. The teacher told the students they could take some fruit home if they wanted to, which was what we had intended. At this point, I don't know how many students took fruit home, or what was done with any excess fruit beyond that. For budgeting purposes, we probably could have cut the fruit order (from the Greenmarkets' wholesale division) in half and still had fruit for students to take home. We had ordered four bushels of Empire apples and two bushels of Highland pears, planning for 100 students (two classes of 35 students each, plus a margin of error). Of course, fewer students were in attendance on the day of the taste test than were enrolled, so if attendance had been higher, the fruit ordered might have been a closer match to the number of students participating in the taste test. Either way, snack fruit taste tests could be an inexpensive way to expand GTC's number of tastings and impact.

Appendix B: Photos of the fruit

	
Empire Apples	**Highland Pears**

Appendix C: The scannable apples and pears taste test survey

Garden To Cafe Survey

Tell us your opinion of today's Garden To Cafe dishes.

There are no wrong answers. We want to know what you really think.

	Delicious	Okay	Nasty	Didn't try it
I think these **apples** taste...	○	○	○	○
I think these **pears** taste...	○	○	○	○

	Three times or more	Two times	One time	Never
I would like to try different kinds of **apples**...	(3)	(2)	(1)	(0)
I would like to try different kinds of **pears**...	(3)	(2)	(1)	(0)
I would like to try other kinds of **fruit** that I haven't eaten before....	(3)	(2)	(1)	(0)
I would like to try **vegetables** that I haven't eaten before....	(3)	(2)	(1)	(0)

1. Are you a boy or girl? (B) Boy (G) Girl

2. What grade are you in?

K	1	2	3	4	5	6	7	8	9	10	11	12	Adult
○	○	○	○	○	○	○	○	○	○	○	○	○	(A)

3. Have you taken part in a taste test before? (Y) **Yes** (M) **Maybe** (N) **No**

4. Have you taken part in a Garden To Cafe event before? (Y) **Yes** (M) **Maybe** (N) **No**

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