



**Supplemental results from a Garden To Café scannable taste test survey
for snack fruit administered in classrooms
at PSABX on 12/14/2017**

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2/14/2018

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Executive Summary

Continued analysis of the Garden To Café snack fruit taste test data from PSABX on 12/14/2017, at which taste test students tried one kind of apple and one kind of pear, revealed:

- 1) 86% of the student respondents found at least one fruit they thought tasted delicious.
- 2) 31% of the students reported they thought two fruits tasted delicious.
- 3) 88% of the students were willing to try different kinds of at least one of the fruits at least once.
- 4) 50% of the students reported they were willing to try different kinds of two fruits at least once each.
- 5) The results suggest that
 - a. Prior taste test experience positively influences students' taste responses: the more students try new foods, the more likely they are to like them.
 - b. Prior taste test experience increases willingness to try new foods in the future.
 - c. Both of these results are with the caveat that the sample sizes for the sub-groups were small, so these results should primarily be used for hypothesis generation, to be tested in future taste tests with a larger sample size.

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Photos of the fruit



Introduction

The Garden To Café (GTC) program's goals include helping students find healthy food they think tastes delicious, and challenging students to try foods that they haven't tried before and that take them out of their comfort zone. When students find a healthy food they think tastes delicious, they are more likely to eat that healthy food again, in and out of school.

Students who found at least one or two fruits they thought were delicious

In terms of students who thought that a food in the taste test was delicious, two measures can be derived from the survey results: the percentage of students who found at least one fruit they thought was delicious, and the percentage of students who found two fruits they thought were delicious.

As shown in the table below, of the students who answered both questions, 86% of the students found at least one fruit they thought tasted delicious, and 31% of the students reported they thought two fruits tasted delicious (highlighted in the table below in green).

			I think these pears taste...				Total	
			Didn't try it	Nasty	Okay	Delicious		
I think these apples taste...	Didn't try it	Count	3	0	0	1	4	
		% of Total	7.1%	0.0%	0.0%	2.4%	9.5%	
	Nasty	Count	1	0	0	1	2	
		% of Total	2.4%	0.0%	0.0%	2.4%	4.8%	
	Okay	Count	0	1	1	2	4	
		% of Total	0.0%	2.4%	2.4%	4.8%	9.5%	
	Delicious	Count	2	9	8	13	32	
		% of Total	4.8%	21.4%	19.0%	31.0%	76.2%	
Total		Count	6	10	9	17	42	
		% of Total	14.3%	23.8%	21.4%	40.5%	100.0%	
At least one fruit "Delicious" - #			2	9	8	17	36	
			% of total	4.8%	21.4%	19.0%	40.5%	85.7%

Table 1: Crosstab of taste responses to apples versus pears.

Students' willingness to try different kinds of fruits

In order for GTC to be successful, students participating in a GTC event should come away wanting to try other kinds of the foods that were served at the event. A willingness to try is like an open door through which GTC can enter. Over time, that willingness to try door should open wider.

A crosstab was run of willingness to try different kinds of apples versus willingness to try different kinds of pears. Two measures were derived: willingness to try different kinds of at least one fruit at least one time, and willingness to try different kinds of two fruits, at least one time each.

As shown in the table below, of the students who answered both questions, 88% of the students were willing to try different kinds of at least one fruit at least once, and 50% of the students reported they were willing to try different kinds of two fruits at least once each (shown in green in the table below).

I would like to try different kinds of apples... * I would like to try different kinds of pears... Crosstabulation							
		I would like to try different kinds of pears...				Total	
		Never	1 time	2 times	3+ times		
I would like to try different kinds of apples...	Never	Count	5	1	1	1	8
		% of Total	11.9%	2.4%	2.4%	2.4%	19.0%
	1 time	Count	1	0	2	2	5
		% of Total	2.4%	0.0%	4.8%	4.8%	11.9%
	2 times	Count	3	1	0	0	4
		% of Total	7.1%	2.4%	0.0%	0.0%	9.5%
	3+ times	Count	9	0	4	12	25
		% of Total	21.4%	0.0%	9.5%	28.6%	59.5%
Total	Count	18	2	7	15	42	
	% of Total	42.9%	4.8%	16.7%	35.7%	100.0%	
Will try at least one fruit, 1+ time - #			13	2	7	15	37
		% of total	31.0%	4.8%	16.7%	35.7%	88.1%
Will try two fruits, 1+ time each - #			0	1	6	14	21
		% of total	0.0%	2.4%	14.3%	33.3%	50.0%

Table 2: Crosstab of willingness to try different kinds of apples versus pears.

Summary of multiple fruits delicious analysis and willingness to try different fruits analysis

The four measures are summarized in the table below.

Measure	Number of students	% of total
Students who found at least one fruit to be "Delicious"	36	85.7%
Students who found two fruits to be "Delicious"	13	31.0%
Students who would like to try at least one different kind of fruit, at least 1 time	37	88.1%
Students who would like to try two different kinds of fruit, at least 1 time for each fruit	21	50.0%

Table 3: Summary of taste responses to apples and pears, and willingness to try different kinds of the tasted fruits.

Gender

Girls were more likely than boys to think the apples and pears were delicious. Boys were more likely than girls to be willing to try different kinds of apples at least once. Girls were more likely than boys to be willing to try different kinds of pears at least once. Except for the response to the taste of pears, overall the percentages of students of each gender were close enough to say that boys and girls were responding similarly. The sub-group Ns are fairly small, so it would be best to only use these results for hypothesis setting, and not to put much weight on these gender results themselves.

Measure	% of Boys	% of Girls	Difference (B - G)	N, Boys	N, Girls
I think these apples taste Delicious	73.9%	78.9%	-5.0%	23	19
I think these pears taste Delicious	31.8%	47.4%	-15.6%	22	19
I would like to try different kinds of apples 1+ times	81.8%	78.9%	2.9%	22	19
I would like to try different kinds of pears 1+ times	54.5%	57.9%	-3.4%	22	19

Note: For taste questions, the sample for the percent of boys and girls includes all response options, including Didn't try it, but not missing responses.

Table 4: Results for taste responses to apples and pears, and willingness to try different kinds of apples and pears, by gender.

Prior taste test experience

Taste responses

When crosstabs were run dividing students into those who reported having participated in a taste test before and those who hadn't participated in taste tests before, the following results were obtained.

Measure Sub-groups by "Have you taken part in a taste test before?"	Number of students	% within sub-group	Sub-group N	Difference (Yes - No)
I think these apples taste Delicious, No	15	71.4%	21	
I think these apples taste Delicious, Yes	16	88.9%	18	17.5%
I think these pears taste Delicious, No	8	38.1%	21	
I think these pears taste Delicious, Yes	8	47.1%	17	9.0%

Table 5: Results for taste responses to apples and pears, by prior taste test experience, Yes vs. No only.

Looking at results within each sub-group, more students who had prior taste test experience thought the apples were delicious compared to students who did not have prior taste test experience. The same pattern favoring prior taste test experience was also true for thinking the pears were delicious. These results suggest that prior taste test experience positively influences students' taste responses: the more students try new foods, the more likely they are to like them. The differences were 17.5% and 9.0% in favor of students with prior taste test experience for apples and pears respectively.

The results in the above table ignore the few students who responded Maybe to the question "Have you taken part in a taste test before?" The Maybe option was offered because we wanted to give students who felt uncertain if they had participated in something that met the definition of a taste test a way to respond to the question confidently and quickly. ("Confidence in one's uncertainty" sounds a little like a paradox such as "The sound of one hand clapping", but it underpins much of statistics.)

In this case, for this analysis, I would argue that if students are uncertain about whether they participated in a taste test before, they probably have not, or the experience wasn't memorable enough to have any impact. Therefore, I recoded the No and Maybe responses into a new variable with No and Maybe consolidated into one option and Yes as the other option.

When crosstabs were run again with No and Maybe grouped into one value, the following results were obtained.

Measure Sub-groups by "Have you taken part in a taste test before?"	Number of students	% within sub-group	Sub-group N	Difference (Yes - No)
I think these apples taste Delicious, No or Maybe	17	68.0%	25	
I think these apples taste Delicious, Yes	16	88.9%	18	20.9%
I think these pears taste Delicious, No or Maybe	9	36.0%	25	
I think these pears taste Delicious, Yes	8	47.1%	17	11.1%

Table 6: Results for taste responses to apples and pears, by prior taste test experience, Yes vs. No or Maybe.

With the inclusion of the students who answered Maybe to the prior taste test experience question, the results for the No+Maybe group declined slightly compared to the No group, and the differences between Yes and No groups widened by about 2 to 3% for both apples and pears. It is hypothesized that were inference tests run, these differences would be significant and meaningful. The differences are already meaningful in an intuitive, practical sense: if 10% to 20% more students will discover they like a food simply because they have more taste test experience, that would suggest that taste testing is a low cost and effective way to expand students' taste palettes.

Willingness to try different kinds of apples and pears

When willingness to try different kinds of apples and pears was examined by prior taste test experience, 17% to 33% more students who had prior taste test experience expressed willingness to try pears and apples compared to students who did not report prior taste test experience. These results are shown in the two tables below. The results suggest that previous taste test experience increases willingness to try new foods in the future. (As above, these analyses were run with both No Only and No or Maybe groupings for the prior taste test experience question.)

It should be emphasized that while these results support the idea that taste test experience makes it more likely that students will find a fruit they like, and also makes students more likely to be willing to try different kinds of those fruits in the future, this support should be primarily for hypothesis generating purposes, even if inference tests did find significant differences. The sub-group Ns are too small to put any substantial weight on them.

Measure Sub-groups by "Have you taken part in a taste test before?"	Number of students	% within sub-group	Sub-group N	Difference (Yes - No)
I would like to try different kinds of apples 1+ times, No	14	70.0%	20	
I would like to try different kinds of apples 1+ times, Yes	18	100.0%	18	30.0%
I would like to try different kinds of pears 1+ times, No	9	45.0%	20	
I would like to try different kinds of pears 1+ times, Yes	12	66.7%	18	21.7%

Table 7: Results for willingness to try different kinds of apples and pears, by prior taste test experience, Yes vs. No only.

Measure Sub-groups by "Have you taken part in a taste test before?"	Number of students	% within sub-group	Sub-group N	Difference (Yes - No)
I would like to try different kinds of apples 1+ times, No or Maybe	16	66.7%	24	
I would like to try different kinds of apples 1+ times, Yes	18	100.0%	18	33.3%
I would like to try different kinds of pears 1+ times, No or Maybe	12	50.0%	24	
I would like to try different kinds of pears 1+ times, Yes	12	66.7%	18	16.7%

Table 8: Results for willingness to try different kinds of apples and pears, by prior taste test experience, Yes vs. No or Maybe.

Prior Garden To Café event experience

When crosstabs were run dividing students into those who reported having participated in a Garden To Café event before and those who hadn't participated in Garden To Café events before, the following results were obtained, for both taste response and willingness to try, and also for No Only and No or Maybe groupings.

In all of the four analyses below, students with prior Garden To Café event experience were more likely to think the apples were delicious and were more likely to want to try different kinds of apples, than students with no previous Garden To Café event experience. In contrast, the opposite was true for response to the pears: students with no previous Garden To Café event experience were more likely than those with GTC experience to think the pears were delicious and to want to try different kinds of pears.

To some degree, these results contradict the results of the prior taste test experience analysis. It should be noted, though, that the sub-group Ns for the prior GTC experience groups are lower than the sub-group Ns for prior taste test experience. The results are worth pondering, but the same caution that the results should only be used for hypothesis generation applies. Twelve out of 16 analyses did show support for the idea that prior taste test or GTC event experience leads to better results, so the results may very well be real, but the four analyses that run in the opposite direction should temper the temptation to declare we have found a universal truth about the impact of prior taste test and GTC event experience. To know the impact of prior taste test experience, and prior Garden To Café event experience, with greater confidence, we need more taste tests with larger samples.

Measure Sub-groups by "Have you taken part in a Garden To Café event before?"	Number of students	% within sub-group	Sub-group N	Difference (Yes - No)
I think these apples taste Delicious, No	6	54.5%	11	
I think these apples taste Delicious, Yes	23	85.2%	27	30.7%
I think these pears taste Delicious, No	6	54.5%	11	
I think these pears taste Delicious, Yes	9	34.6%	26	-19.9%

Table 9: Results for taste responses to apples and pears, by prior GTC event experience, Yes vs. No only.

Measure Sub-groups by "Have you taken part in a Garden To Café event before?"	Number of students	% within sub-group	Sub-group N	Difference (Yes - No)
I think these apples taste Delicious, No or Maybe	9	60.0%	15	
I think these apples taste Delicious, Yes	23	85.2%	27	25.2%
I think these pears taste Delicious, No or Maybe	7	46.7%	15	
I think these pears taste Delicious, Yes	9	34.6%	26	-12.1%

Table 10: Results for taste responses to apples and pears, by prior GTC event experience, Yes vs. No or Maybe.

Measure Sub-groups by "Have you taken part in a Garden To Café event before?"	Number of students	% within sub-group	Sub-group N	Difference (Yes - No)
I would like to try different kinds of apples 1+ times, No	6	54.5%	11	
I would like to try different kinds of apples 1+ times, Yes	24	92.3%	26	37.8%
I would like to try different kinds of pears 1+ times, No	8	72.7%	11	
I would like to try different kinds of pears 1+ times, Yes	13	50.0%	26	-22.7%

Table 11: Results for willingness to try different kinds of apples and pears, by prior GTC event experience, Yes vs. No only.

Measure Sub-groups by "Have you taken part in a Garden To Café event before?"	Number of students	% within sub-group	Sub-group N	Difference (Yes - No)
I would like to try different kinds of apples 1+ times, No or Maybe	9	60.0%	15	
I would like to try different kinds of apples 1+ times, Yes	24	92.3%	26	32.3%
I would like to try different kinds of pears 1+ times, No or Maybe	10	66.7%	15	
I would like to try different kinds of pears 1+ times, Yes	13	50.0%	26	-16.7%

Table 12: Results for willingness to try different kinds of apples and pears, by prior GTC event experience, Yes vs. No or Maybe.

Next steps

One next step in analysis would be to look at responses to the willingness to try other kinds of fruit (as opposed to different kinds of the fruit tasted in the taste test), and willingness to try vegetables the students haven't eaten before, by sub-groups.

For expanded taste test data collection, we should attempt to use the scannable taste test survey at a regular Garden To Café event during lunch. We should also explore ways to conduct more snack fruit taste tests, as these could be a cost-effective way to both expand GTC itself, expand students' taste test opportunities, and expand data collection.

Appendix A: Gender options on surveys

A gender question has until recently been a standard and uncontroversial part of the demographics questions on surveys. Today, gender questions have the potential to become complicated because there are active arguments in society about how gender is or ought to be determined, and whether there are or are not more than two genders. For examples of how different major organizations ask gender questions, the New York State Education Department uses the response options of Male and Female on their surveys. Google+ and the Apple Watch offer Male, Female and Other on their set up screens. LabCorp, a medical services company, gives response options of Male, Female and "I'd rather not say" (in this case, the gender question is a required question, but in many other cases respondents can skip the gender question if they choose to). Facebook has been reported to offer as many as 71 gender options (<http://www.telegraph.co.uk/technology/facebook/10930654/Facebooks-71-gender-options-come-to-UK-users.html>). The New York City Department of Education's (NYC DOE) Research and Policy Support Group (RPSG), the unit within the NYC DOE Headquarters that interfaces with external researchers who want to conduct research within NYC DOE schools, has no policy or guidance on how researchers should ask gender questions. Other researchers leave gender questions off of surveys entirely.

In the case of GTC surveys, there are two main reasons to include gender questions. First, we want to check that our sample for any given survey does not skew too far in one direction or the other from the general student population, which, in terms of a biological definition of gender, is approximately 50/50. Second, there are longstanding and known differences in the ways that boys and girls approach food, so examining results by gender is potentially valuable: if both boys and girls are responding to the GTC food in about the same proportions, we can be confident the program is serving all students equally, but if the responses of boys and girls diverge significantly, we could take that into account as decisions are made for GTC's continuous quality improvement.

Given the debates about gender taking place in society, GTC, and any other similar programs, are placed in a difficult position. If we ask a gender question in the traditional way with response options of Boy or Girl, those who identify as Other could feel left out. On the other hand, if we were to offer response options of Boy, Girl or Other, there may be groups of students, teachers and parents who have traditional views, and might object to, or be confused by, the existence of the Other option on surveys.

The GTC surveys give the students agency, in the sense that on the surveys students are not told how to define gender, and can choose any response they wish. They can also choose to skip the gender question. The GTC surveys are anonymous, so we have no way of knowing which student completed which survey, and this should also free students to exercise their agency. Because the students have agency when responding to the survey, the potential for problems is much less than in some other contexts.

Nonetheless, since knowing the gender of each survey respondent is not critical to the GTC survey results, since gender is currently not a settled question in the research community, and to allow stakeholders time to participate in discussions about gender questions on surveys, the gender question will be removed from future GTC taste test surveys at least until those discussions have taken place.