

UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

**Healthy Beverage Initiative (HBI) Institutional Responsibility: How Organicity, Locality,
and Caloric Content Impact**

People's Perception and Consumption of Healthy Beverages

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Executive Summary

For our research study, we wanted a better understanding of what factors influence students' healthy beverage choices on UBC campus and how we can generate recommendations and ideas to making healthy beverages more accessible and available to the UBC students. We used students' responses to a survey that measures which combination of factors of a beverage (organicity, locality, and caloric content) do they perceive as being healthy. Depending on each beverages quality, we also measured students' willingness to pay for each condition. Our results showed that students are willing to pay the most for beverages which are organic, locally produced and have low caloric content. As for perceived healthiness, organicity and low caloric content of a drink are the most important qualities and is perceived as being the healthiest. Future suggestions to surrounding UBC with more stores that have organic, low caloric content and locally produced items so that students can make a better-informed healthier lifestyle choice.

Introduction

Healthy beverages are essential in forming good habits to have an efficient mind and a vigorous body, and as a start in creating a wholesome lifestyle. However, as sugar-sweetened beverages (SSB) enter the market and become increasingly popular, obesity is becoming a serious health issue especially among the younger generation. As the obesity numbers increase, there is now a need to change the current lifestyle of the general population to create better habits that can impact the health of the succeeding generation to lead a better lifestyle.

How can we encourage people to purchase healthy beverages instead of unhealthy ones? The healthy beverage is dined in the UBC Health Guidelines as drinks that have little to no added sugar and calories such as water and plain milk. Unhealthy beverages are those that contain added sugar with little to no nutritional value such as 100% fruit juices. Yang, and Chiou (2010) reported that the consumption of healthy beverages among college students increases when the cost of unhealthy beverages increases, and the cost of healthy beverages declines which also emphasizes the claims on health. Health claims evoke students' health concerns, and students who receive health claims have a higher probability of buying healthy beverages (Yang, & Chiou, 2010). Hence, we are wondering how much people are willing to pay, and what factors in health claims are essential in providing a proper price and nudge people into purchasing healthy beverages.

SSB are always a big concern about people health behaviour, which leads to obesity, diabetes, and many other diseases (Williams, Housman, Odum, & Rivera, 2017). One study examined the relationship between energy drinks and high-sugar beverages (Williams, Housman, Odum, & Rivera, 2017). They found that adolescents who consume energy drinks have a higher rate to purchase SSB, while adolescents who consume no energy drinks are more likely to purchase low-or nonsugar beverages (Williams et al., 2010). Another study was done to reduce the teenagers' consumption of SSB by restricting selling SSB in the school (Grummon et al., 2015). The results showed that 1 in 5 students still consumed SSB during lunchtime, despite the fact that there was limited access to SSB in school (Grummon et al., 2015). However, posting beverages' caloric information have an impact on decreasing the consumption of SSB (Grummon et al., 2015).

Besides the sugar and caloric information, there are still many factors that have not been concerned yet. The price of beverages is also necessary to encourage people's purchase. Therefore, our research question is "What factors influence peoples' choice of healthy beverages, and how much are they willing to pay depending on these factors?" In this study, we focus on their factors: organic, locality, and caloric content. Based on our research questions, we have three hypotheses:

- Hypothesis 1: Beverages that are considered organic, locally produced, and low in caloric content would be considered the healthiest.
- Hypothesis 2: People who consider these factors will spend considerably more money in comparison to beverages that are not.
- Hypothesis 3: Drinks that are organically produced will be the most crucial factor for consumers to consider, followed by its locality, and then its caloric content.

Methods

Participants

In our survey, we invited 57 students from University of British Columbia, aged between 18 to 34 years old ($M=23$) to participate our study. The participants were almost equally separated for their gender, in which 51% of participants are male and 45% are female. For ethnicity (in Table 5), most our participants are Asian (59.69%), following by the Caucasian (15.79%).

Conditions

There are three independent variables in our survey: organic (yes vs. no), locality (produced in BC province vs. produced outside of BC province), and calories (low 80 cal vs. high 160 cal). Since we have three variables, we designed a 2x2x2 factorial study that created 8 conditions in the within-subject study.

These 8 conditions are:

1. Organic + Produced in BC + Low calories
2. Organic + Produced in BC + High calories
3. Organic + Not Produced in BC + Low calories
4. Organic + Not Produced in BC + High calories
5. Inorganic + Produced in BC + Low calories
6. Inorganic + Produced in BC + High calories
7. Inorganic + Not Produced in BC + Low calories
8. Inorganic + Not Produced in BC + High calories

We randomized the order of these 8 conditions in our survey to counterbalance the order effect. All participants needed to finish the survey including all of the 8 conditions.

Measures

We have two dependent variables to measure: the wellness to pay, and perception of health on the beverage. To measure these two variables, we designed two questions: How much are you willing to pay for this beverage? (\$0 to \$10); How healthy do you believe this drink is? (scale of 1=not healthy to 10=very healthy).

Procedure

In the survey, we first asked the participants' consent to participate this study and their permission to access and analyze their answers. Then, they needed to answer two questions based on two depending variables under every condition. After that, they need to fill out some demographic questions about their age, gender, and ethnicity.

Participants were introduced through Internet (Facebook, Wechat, and the website of UBC Connect) and face-to-face invitation. All the data was collected in March 2018.

Results

Because of the nature of the study, using a 3-way within-subjects ANOVA was ideal in measuring the significance of the data, and in seeing if there were any relations between any of the factors (organicity, caloric content, and locality). The results show that most people considered beverages that are organic, locally produced, and low in caloric content to be the healthiest among the variations of drinks. Because of this, the participants showed that they are more willing to pay more for these kinds of products in comparison to others that are not organic, imported, or high in caloric content. These two results showed that two out of the three hypotheses were correct. The third hypothesis was only partially correct wherein people did consider the organicity of the product to be the most crucial factor for people to consider in regard to healthiness and price, and then the caloric content, followed by the locality which were the opposite of the hypothesis made.

Willingness to Pay

As seen on Table 1 on the appendix page, the participants were willing to pay more for beverages that were organic than for non-organic ($p < 0.001$, $F = 41.053$, $df = 55$). They were also willing to pay more for beverages that were low in calories than for drinks that were high in calories ($p < 0.001$, $F = 28.363$, $df = 55$). There was also a surprise interaction between locality and calories wherein the difference in willingness to pay between local and non-local for low-calorie drinks is greater than the difference between local and non-local for high-calorie drinks. This means that when the beverage is low-calories, people were willing to pay more for local than non-local drinks; but when the beverage is high-calories, people were equally willing to pay for local or non-local drinks ($p < 0.011$, $F = 6.980$, $df = 55$).

The results seen on Table 2 on the appendix page suggest that people are willing to pay \$5.51 for beverages that are local, organic, and low in calories, which is the most people would pay in comparison to the other conditions. They are willing to pay the least for a product that is not organic and high in calories. The locality does not matter in this regard where in both conditions, the participants were willing to pay only \$2.90. The results also show that people consider the beverage being organic and low in calories in their determination of how much they are willing to pay where in both conditions with the factors of the drink being organic and low in calories, people are willing to spend the most for them regardless of it being local or imported, spending \$5.51 and \$5.18 respectively. It also shows that locality only matters when the calories are low, spending significantly more in comparison to the drinks that are high in calories. There are willing to spend an average of \$5.04 for drinks that are low in calorie and locally made in comparison to spending only \$4.61 due to the fact it was not locally sourced regardless of the drink being organic or not. But if the drink is high in calories, it does not matter if it is local or imported which is evident in spending \$3.26 and \$3.35 regardless of them being organic or not.

Perceived Healthiness

The results are the same as what was found on the Willingness to Pay condition. As seen on Table 3, people perceive organic products to be healthier than non-organic products ($p < 0.001$, $F = 58.622$, $dF = 54$). They also perceived low caloric drinks to be healthier than high caloric drinks ($p < 0.001$, $F = 73.738$, $dF = 54$). There is also a connection between locality and calories which is the same as in Willingness to Pay where the difference between local and non-local for low-calorie drinks is greater than the difference between local and non-local for high-calorie drinks ($p = 0.042$, $F = 4.355$, $dF = 54$).

On Table 4, the results suggest that people perceive drinks that are local, organic, and low in calories to be the healthiest ($M = 6.88$), followed by beverages that are organic, low in calories, and imported ($M = 6.44$). Drinks that are local, not organic, and high in calories are perceived to be the unhealthiest ($M = 2.893$). This shows that locality is not the most important aspect when people are considering the healthiness of a product; they focus more on the organicity and the caloric content of the beverage to determine the healthiness they perceive. And it also shows that locality only matters when the calories are low; when the calories were high, locality did not matter as much as when it was low. The rating for perceived healthiness on both organic and high caloric drinks had a mean of 4.089 regardless of locality, and when the beverage was not organic and high in calories, it was rated with the lowest mean rating for any condition regardless of locality ($M = 2.893$, and $M = 3.089$).

Discussion

The findings of this experiment are consistently with the Aertsens et al.'s research, where beverages that are organic will have a higher price in comparison to those that are not (Aertsens, Verbeke, Mndelaers, & Van Huylenbroeck, 2009) and people tend to feel the organic drinks are healthier than non-organic drinks. Also, low-caloric beverages arouse more incentive for people to buy compare to the high-caloric group. Beverages that are low in calorie will be perceived as healthier than those that have a higher caloric intake. As we predicted, a beverage that is organic, low in calorie, and locally produced will be considered the healthiest and will be spent considerably more money on in comparison to other beverages. However, locality (produced in BC VS. produced outside of BC) is not a main effect that influence people's decision towards beverage. Locality is only effective under the situation that a beverage is low-caloric. In the low-caloric situation, people are more willing to pay for the locally produced drink, and they are willing to spend more money on locally produced drinks. Besides, locally produced beverages are considered as healthier if the drink is low in calories. When the beverage is high-calori, people were equally willing to pay for local or non-local drinks.

Our research suggests that more people are becoming aware of the importance of healthy drinking and are becoming pickier as to what they ingest. They are willing to pay more for the healthier beverage. Although our results seem significant, the importance of locality didn't match our perception. We thought locality was the second important element for people's willingness to pay, but it actually is the least important factor. The cause of this result might be because most of the participants are immigrants (Asian, non-local people), so they do not think locality is that important for them. Thus, in the future, some of the aspects need to be ameliorated to make our research more accurate, such as participants. We don't have enough participants to join in our study and most of them are Asians. Since it is just a survey, students won't have much motivation

and benefits to do this since we also did not give any incentive in doing our survey. Simply most of them aren't going to give genuinely effort in answering the question truthfully and could give fake answers. In addition, Asian people might have different diet from people from other ethnicities, which will cause bias in our result. In our future study, we can give people some benefits if they finish our survey to encourage more people participate in our study. Since we enlarge our sample size, the maldistribution of ethnicity will get mitigation.

On the other hand, without tasting any sample drinks can be difficult for students to accurately list their drink preference order because it is based on past experiences. Nevertheless, by letting them taste the drinks, it can significantly change their perspective for frequency of buying a certain drink and willingness to pay. A healthier drink does not necessarily equal the most popular drink because variables of cost and taste are a significant factor. Besides, we only asked people how healthy they think the drink is but didn't ask them how unhealthy it is. That can be seen as a kind of bias.

The further study can be developed base on the gender difference. Stobbelaar et al. (2007) have found that female pay more attention to health and healthy food compare to male. So, it will be interesting to find whether female will rate organic and low-caloric beverage as healthier than male's rate, and if females are willing to pay more for health beverage than male. This future study will be help with the rationalization of the health beverage production.

Further studies can possibly investigate other 3rd variables that are considerable influence students to purchase healthy beverages such as price, convenience, other nutritional content, and peer recommendation. We believe that price is an important indicator of whether students can consistently purchase drinks if they firstly are able to afford to do so.

Our project shows that people are willing to pay more for organic and low-calorie drinks, the theoretical implications are that we can identify factors that determine consumer preference and decision making in healthy beverage choices, which can lead institutions have better options for drink choices in incorporating organic, locally produced, and low caloric products. Since there can be a large demand for locally produced, organic produce, the findings have a huge impact on BC agriculture. Locality only matters if the calories are low. Therefore, this can have a big impact on local drink industries (such as Happy Planets) if it can reduce its caloric content to appeal to students.

Recommendations for the UBC client

Our study has shown that there is a big demand market for healthy beverages within the school and has significantly shown that students are willing to pay highest value for those with qualities specifically with low calorie content, organicity and local production so we recommend opening more beverage stores with those qualities of products at the campus or giving more drink options to existing cafes around the campus to give students more choices in their drink options. Advertising the drinks' organicity or its caloric content on menus can nudge students in choosing healthier drinks. Most importantly, closing the price margin between healthy and unhealthy drinks such as lowering the cost of the healthy beverages and increasing the prices of unhealthy drinks can give students the ability to choose healthier beverages to jumpstart their healthy living.

Appendix

Table 1: Results for people's willingness to pay: people are willing to pay more for drinks that are organic, and low in calories. There is an interaction between locality and calories: locality only matters if the calories are low.

Within Subjects Effects ▼					
	Sum of Squares	df	Mean Square	F	p
Local	3.336	1	3.336	2.648	0.109
Residual	70.539	56	1.260		
Organic	92.160	1	92.160	41.053	< .001
Residual	125.715	56	2.245		
Calories	261.020	1	261.020	28.363	< .001
Residual	515.355	56	9.203		
Local * Organic	0.371	1	0.371	0.461	0.500
Residual	45.004	56	0.804		
Local * Calories	7.634	1	7.634	6.980	0.011
Residual	61.241	56	1.094		
Organic * Calories	2.388	1	2.388	2.877	0.095
Residual	46.487	56	0.830		
Local * Organic * Calories	0.178	1	0.178	0.086	0.770
Residual	115.197	56	2.057		

Table 2: People are willing to pay the most (\$5.51) for drinks that are local, organic, and low in calories, and the least for drinks that are local, not organic, and high in calories (\$2.90) Table 3: People perceive organic and low-calorie drinks to be healthier than the alternative, and the interaction between locality and calories is the same as seen in the Willingness to Pay condition.

Descriptives

Descriptives					
Local	Organic	Calories	Mean	SD	N
Yes	Yes	Low	5.509	2.700	57.000
		High	3.632	1.410	57.000
	No	Low	4.561	2.536	57.000
		High	2.895	1.532	57.000
No	Yes	Low	5.175	2.529	57.000
		High	3.737	1.866	57.000
	No	Low	4.035	2.096	57.000
		High	2.965	1.511	57.000

Table 3: People perceive organic and low-calorie drinks to be healthier than the alternative, and the interaction between locality and calories is the same as seen in the Willingness to Pay condition.

Within Subjects Effects ▼					
	Sum of Squares	df	Mean Square	F	p
Local	1.877	1	1.877	1.056	0.309
Residual	97.748	55	1.777		
Organic	196.895	1	196.895	58.622	< .001
Residual	184.730	55	3.359		
Calories	615.234	1	615.234	73.738	< .001
Residual	458.891	55	8.343		
Local * Organic	0.806	1	0.806	0.427	0.516
Residual	103.819	55	1.888		
Local * Calories	5.806	1	5.806	4.355	0.042
Residual	73.319	55	1.333		
Organic * Calories	5.806	1	5.806	3.927	0.053
Residual	81.319	55	1.479		
Local * Organic * Calories	0.020	1	0.020	0.010	0.920
Residual	109.105	55	1.984		

Table 4: Results show that drinks that are local, organic and low in calories are perceived to be the healthiest (M=6.875) while drinks that are local, not organic, and high in calories are perceived to be the unhealthiest (M=2.893).

Descriptives ▼

Descriptives ▼

Local	Organic	Calories	Mean	SD	N
Yes	Yes	Low	6.875	2.249	56.000
		High	4.089	1.730	56.000
	No	Low	5.250	2.429	56.000
		High	2.893	1.557	56.000
No	Yes	Low	6.446	2.389	56.000
		High	4.089	1.698	56.000
	No	Low	4.964	2.412	56.000
		High	3.089	1.761	56.000

Table 5: Ethnicity Breakdown

Ethnicity		
Ethnicity	Number	Percentage
White	9	15.79%
Hispanic or Latino	6	10.53%
Black or African American	3	7.02%
Native American or American Indian	3	5.26%
Asian / Pacific Islander	10	59.65%
Others	1	1.75%

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