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Sensory evaluation of wish-bone products

Abstract

Objectives: This research project will utilize Pinnacle Foods Company resources and use the MSU lab techniques to conduct a sensory evaluation of Wish-Bone products and its competitors to evaluate Wish-Bone's fat, sodium and sugar content, and then provide the appropriate quality improvement to make Wish-Bone customer's first choice.

Methods: Participants recruited from MSU community, an email has been sent to all students who are part of the Department of Health and Sciences. The study included students who are accepted in MSU, aged between 18 and 30 years old, males and females. 20 participants have been recruited; each participant tried 7 different samples from 3 brands including Wish-Bone. This study is an experimental study, participants had to taste 7 different samples and then we compared the outcomes of all 7 samples. The methods included data collection of product's ingredient, calories per serving, fat, sodium and sugar content. In the sensory evaluation process participants had to sit in front of a camera to record them during tasting the samples, samples were passed to participants through a window. After the participants leaves the lab the face reader starts to analyze Participant's face expression during tasting the samples.

Results: The results showed that Wish-Bone Ranch and Hidden valley Light Ranch shows the highest records for neutral face expression, Kraft's Fat free ranch shows the highest record for happy face expression, Wish-Bone Light Ranch and Kraft's fat free Ranch shows the highest record for the sad face expression, Kraft's Fat Free Ranch shows the highest record for the Angry expression, Kraft's Fat Free Ranch shows the highest record for the surprised expression, Kraft's Ranch shows the highest scale for the Scared expression, and Wish-Bone Fat Free Ranch shows the highest scale for the Disgusted expression.

Conclusion: This study helped us find the weaknesses in Wish-Bone Ranch products, the possible quality improvements that we might apply are; reduction in total calories, reduction in total fat, increase sugar content to enhance the flavor.

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Introduction

Pinnacle Foods Inc. is one of the largest companies that work with brand names that customers already know and trust, such as Duncan-Hines, Vlasic, Birds Eye, Wish-Bone, and much more. Pinnacle Foods goal is to innovate those brands and add more values to its product line to meet the consumer's needs by adding nutrition value, taste and convenience. Wish-Bone salad dressing is one of the iconic brands that Pinnacle Foods have been working hard to innovate and improve its quality. There has been an increase of salad dressing brand names in the past 5years due to the increase of customer's demands for new flavors and new choices. Customers get overwhelmed by the number of choices for salad dressing on the shelves of their local supermarket. This research project will utilize Pinnacle Foods Company resources and use the MSU lab techniques to conduct a sensory evaluation of Wish-Bone products and its competitors to evaluate Wish-Bone's fat, sodium and sugar content. The study's hypothesis is that sensory evaluation of fat, sodium and sugar content of Wish-Bone products and its competitors will guide us to provide the appropriate quality improvement to make Wish-Bone consumer's first choice. Consumers have a lot of choices when they get the salad dressing island; in this study we will emphasis on the Ranch flavor of the biggest brand names in the market. Comparing salad dressing will guide us to find the similarities and differences between all samples we provided, these similarities and differences will help us find out the weakness on Wish-Bone salad dressing. After browsing the weakness of Wish-Bone product, we will be able to define the possible quality improvements that we can provide to Wish-Bone products to make them Consumer's first choice. A lot of studies concentrated on the chemicals content of salad dressing and how to increase salad dressing shelf life.[1] Other studies concentrated on salad dressings sodium content and labeling strategies.[2] Moreover, one of the studies was about analyzing salad dressing fat content and how it is related to obesity.[3] This study is comparing different salad dressing brands using face reader technique to find the similarities and differences between them, this comparison will guide us to find the weaknesses in Wish-Bone products and then provide the possible innovations that could be applied to make Wish-Bone consumer's first choice. None of the previous studies talked about comparing different salad dressing brands to find the weaknesses of some other brands. Also, none of previous studies used the face reader technique to analyze participant's preferences; most of the previous studies used a survey questioner to find out participant's preferences which is not precise as the face reader technique.

Literature survey

Customer's preferences among the taste of the food differ according to many factors including culture, lifestyle, eating habits, and food availability.[4] Hong et al.[5] conducted a study to examine the sensory profiles of gochujang dressing that was prepared in different

formulations, and compared the responses in different cultures, the formulas were different in the gochujang and sugar levels, the results showed that the samples with lower sugar levels was preferred by the US consumers whereas the samples with lower gochujang level was unappreciated by Chinese consumers, this study is a proof that there are differences in customer's preferences. Martins et al.[2] analyzed the sodium content and labeling of processed food in Brazil, the results shows that most products had high sodium content, these findings make us look at the idea in producing new formula with lower sodium content that meets consumer's preferences. One of the major causes of obesity is consuming foods with high fat content, Fabiola et al.[3] conducted a study to determine the fat content in mayonnaise and salad dressing, the results shows that products had a widely varying fat content; these findings forced us to rethink about renovating our product's fat content and manage to reduce it while maintaining good taste. On the other hand Jahns et al.[6] conducted a study to assess food being currently consumed by Americans and if it meets the Dietary Guidelines for Americans (DGA) or not, the results shows that most Americans prefer to consume foods that is high in solid fats and added sugar (empty calories) this is an evidence that people prefer the taste of fat and they enjoy it. A lot of studies have been conducted to improve the quality of salad dressing but most of them used new processing techniques not sensory evaluation techniques to enhance the products, for example;[1] conducted a study to evaluate the fortification of Wine grape pomace (WGP) as a source of antioxidant dietary fiber (ADF) in Italians and thousand island salad dressings, the study showed that WGP can be used to enhance consumer's health and to increase product's shelf life but not to enhance the products sensory, also this study didn't use any sensory evaluation techniques that might be applied to enhance product's quality. Bortnowska et al.[7] conducted a study to evaluate the effects of pre-gelatinized potato starch concentration (PSC) on the physical stability, color, rheological, textural, and sensory properties of model salad dressings, the results shows that pre-gelatinized potato starch may be suitable ingredient in low-fat dressings applications, this study didn't provide the side effects of PSC implementation on the sensory of the salad dressing, potatoes are high in starch and it might interfere with the texture as well.

Methodology

Data collection of Wish-Bone products and competitors

Wish-Bone salad dressing is one of the Iconic brands that Pinnacle Foods Inc. working at to innovate and make it more convenient to consumers by improving the flavor, include more nutritional nutrient, and provide new packaging trends. Wish-Bone compete with many different salad dressing brands including Hidden valley, Kraft's, Ken's, Newman's Own and much more. The data we collected included Wish-Bone Ranch, Wishbone Light Ranch, Wishbone Fat Free Ranch, Hidden valley Ranch, Hidden Valley light Ranch, Hidden Valley fat Free Ranch, Kraft's Ranch, Kraft's Light Ranch, Kraft's Fat Free Ranch. During data colleting we used different websites including Wish-bone website, Hidden valley website, Kraft's website, and Google.com. Those websites used to gather most of the data we needed to compare Wish-Bone products with competitors, therefore sometimes we couldn't find the product information on these websites and we had to buy it and take the information we needed.

Data composition

Specifically, data were collected for product's calories, fat, sodium and sugar content, also product's ingredients were gathered including oils that been used, sugar, salt, vinegar, modified corn starch, xanthan gum, garlic powder, sorbic acid and calcium sodium EDTA as preservatives.

Websites reliability

While collecting the data, different websites were looked at to make sure that the data we are collecting is valid and match the real products.

Calories, Fat, Sodium, and sugar content

Calories, Fat, Sodium, and sugar content were gathered by looking at the back label of each product, calories were provided in Kcal, Fats included total fat in grams, Sodium were collected in milligrams, and sugar was collected in grams.

Participants recruitment

20 Participants were recruited from Montclair state university (MSU) community by E-mails, participants were screened to meet the requirements which are; aged between 18-30years old, males and females, and accepted in MSU. Participants came once to the sensory evaluation laboratory in UH room 4058 to taste the samples. The study included 7males and 13females who are accepted in MSU and aged between 18 and 30years old.

Samples preparation

Salad dressing samples were provided with lettuce in a small bowel with fork, we only could get 7 samples from all flavors; Kraft's low fat ranch and Hidden Valley fat free ranch were not available on supermarkets to buy them and include them in the study. 7 samples were given to participants and participants were blinded to the salad dressing name and flavor. Samples took numbers 1 to 7. Samples 1 represent Wish-Bone Ranch, sample 2 represent Wish-Bone Low fat Ranch, sample 3 represent Wish-Bone Free fat Ranch, sample 4 represent Kraft Ranch, sample 5 represent Kraft fat free Ranch, sample 6 represent Hidden Valley Ranch, and sample 7 represent Hidden Valley low fat ranch.

Sensory evaluation process

A camera was presented in front of each participant that is attached to high technique computer that designed as a face reader that will provide us with the participant's face expressions while tasting the samples; also participants gave their feedback on a questionnaire during tasting the samples, the questionnaire included participants feedback according to taste and texture. After participant leaves the lab, the face reader analysis starts.

Statistical methods

For data collection comparison we used the one-way ANOVA to find out the significant differences between Wish-bone calories content and competitors, this statistical procedure allow us to compare 3 different salad dressing calories content and compare calories content of the 3 salad dressing, we used the t test to determine the differences between wish-Bone and competitors, we used 3 different t tests; Wish-Bone Compared o Hidden Valley, Wishbone compared to Kraft's and hidden Valley compared to Kraft's.

For the sensory evaluation process we used the Multivariate Analysis of Variance (MANOVA) the data represent the 7 face

expressions that are expected during tasting the 7samples and the number of participants who gave the same face expression during tasting each sample; Figures1-20 shows the results of each face expression scale by each participant. We used the Analysis of Covariance (ANCOVA) to test the average of each face expression for all participants that presented in Figure 21.

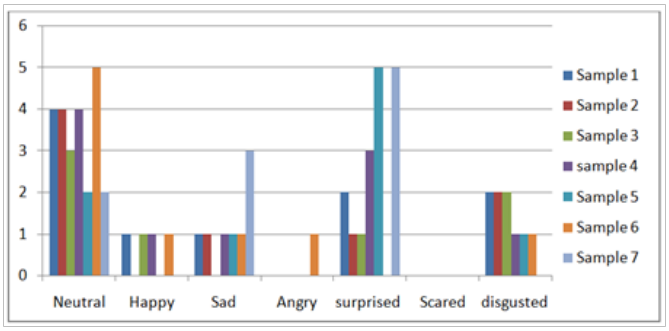

Figure 1 Face expressions of participant #1 while tasting the 7 different samples.

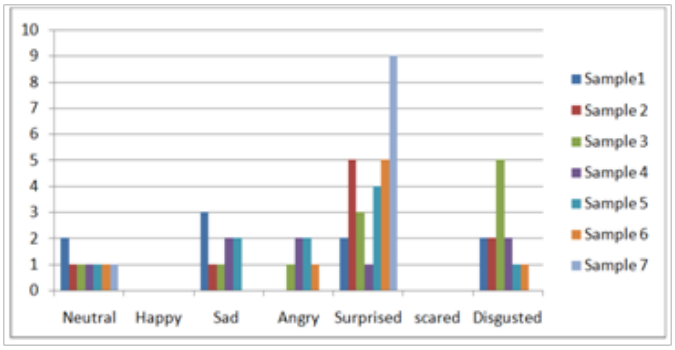

Figure 2 Face expressions of participant #2 while tasting the 7 different samples.

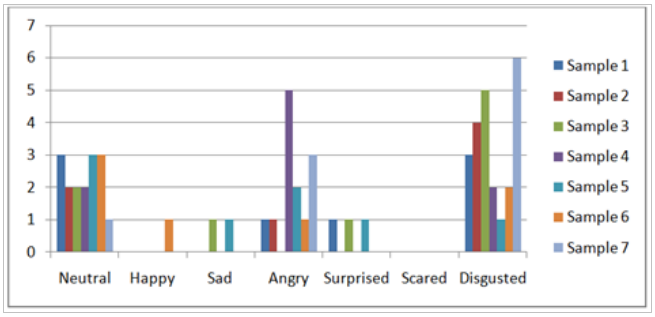

Figure 3 Face expressions of participant # 3 while tasting the 7 different samples.

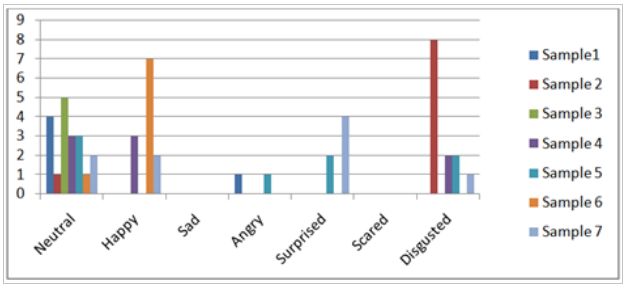

Figure 4 Face expressions of participant #4 while tasting the 7 different samples.

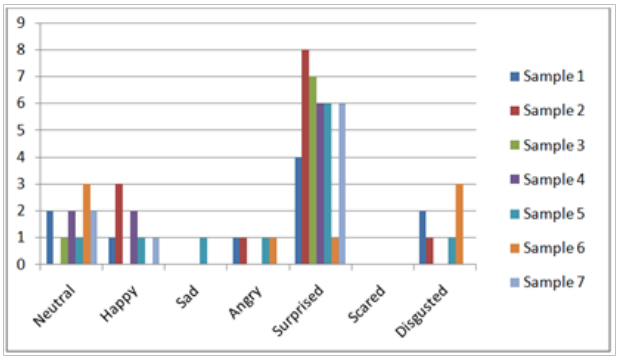

Figure 5 Face expressions of participant #5 while tasting the 7 different samples.

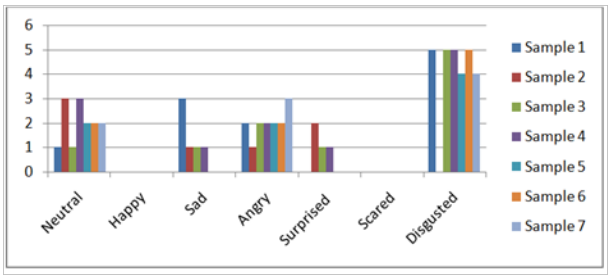

Figure 6 Face expressions of participant #6 while tasting the 7 different samples.

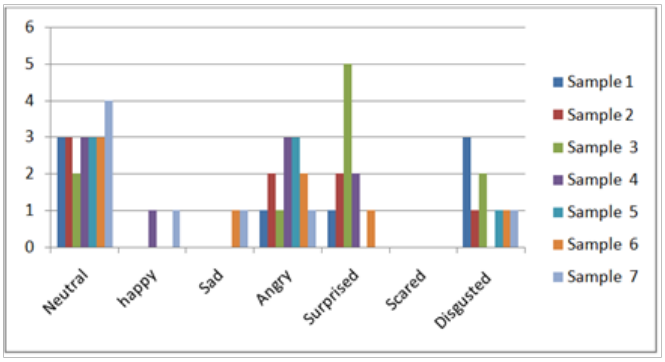

Figure 7 Face expressions of participant #7 while tasting the 7 different samples.

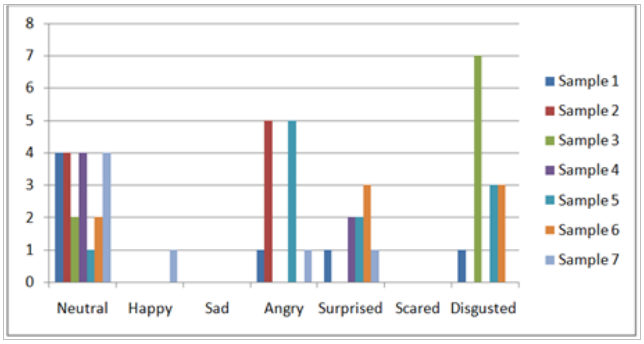

Figure 8 Face expressions of participant #8 while tasting the 7 different samples.

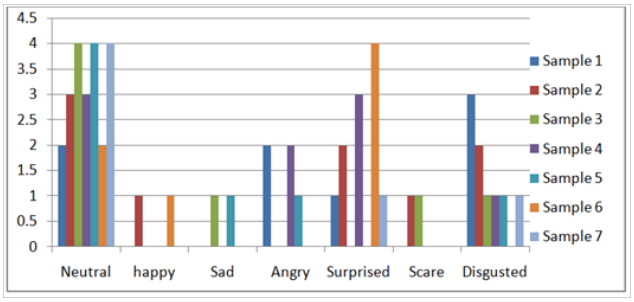

Figure 9 Face expressions of participant #9 while tasting the 7 different samples.

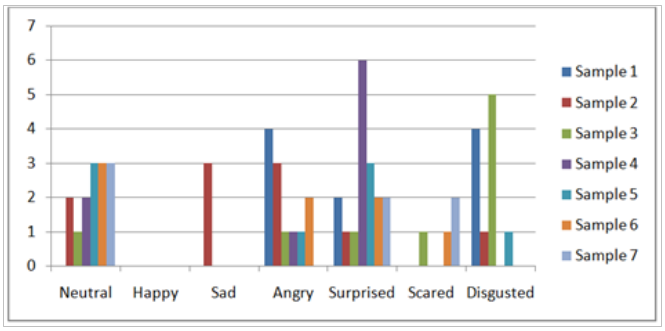

Figure 10 Face expressions of participant #10 while tasting the 7 different samples.

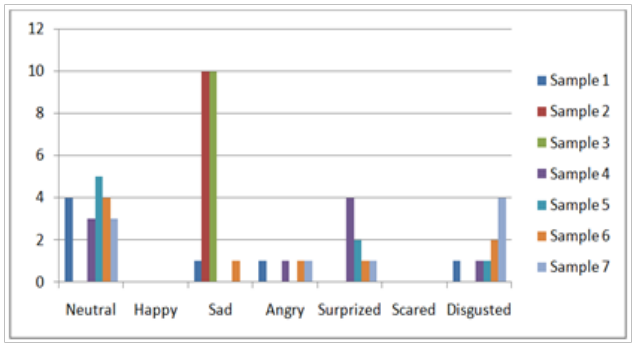

Figure 11 Face expressions of participant #11 while tasting the 7 different samples.

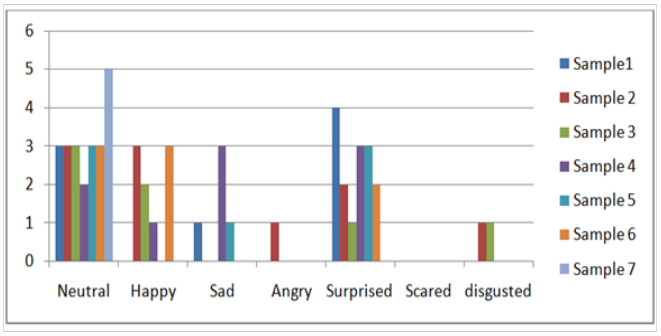

Figure 12 Face expressions of participant #12 while tasting the 7 different samples.

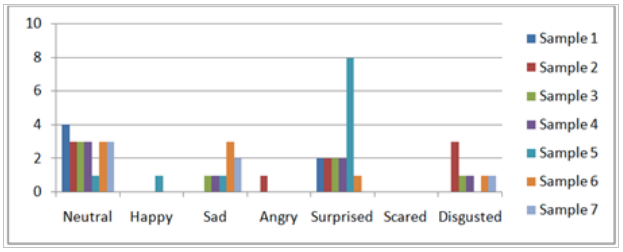

Figure 13 Face expressions of participant #13while tasting the 7 different samples.

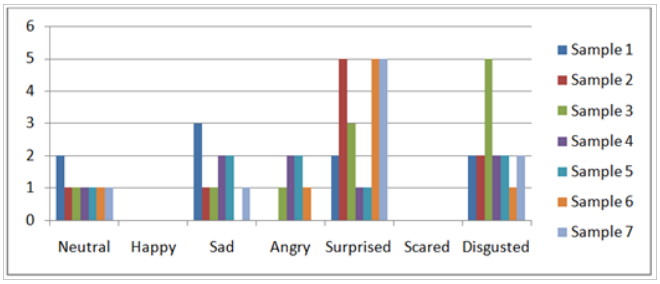

Figure 14 Face expressions of participant #14while tasting the 7 different samples.

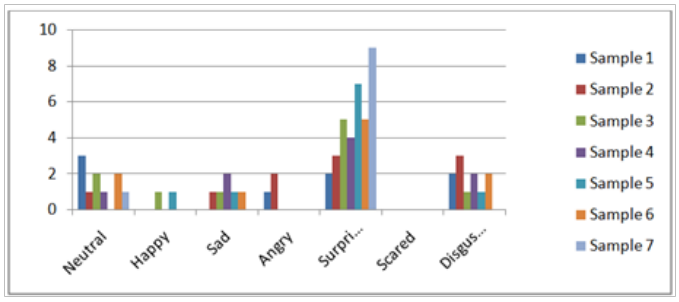

Figure 15 Face expressions of participant #15 while tasting the 7 different samples.

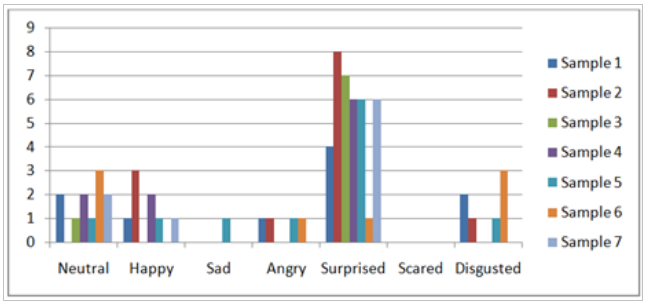

Figure 16 Face expressions of participant #16 while tasting the 7 different samples.

Data analysis

During data analysis we found a lot of differences and similarities between products according to calories, fat, sodium and sugar content, some products were higher in calories because of its total fat content, but some others were high in calories because of its sugar content. Sodium content was varied between products the highest were 350mg and the lowest were 220mg. Fat content was varied between 14

and 0grams. The face reader technique analyzed participant's face expression. The data were analyzed into 7 different face expressions with a scale from 1-10. The face expressions included; Neutral, Happy, Sad, Angry, Surprised, Scared and Disgusted. Also, the data analysis included participant's feedback on the questionnaire, the questionnaire provided a checklist that participant will check underneath the category if they like, dislike, sweet, salty and they were able to provide other comments if they want to.

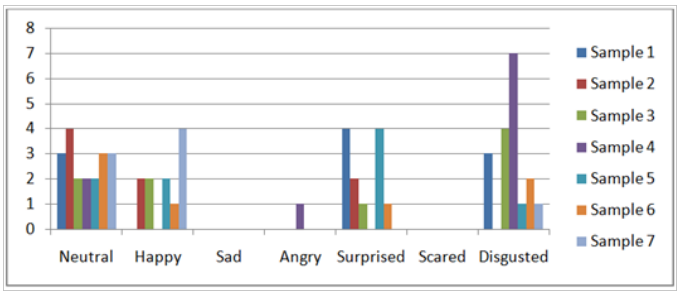

Figure 17 Face expressions of participant #17 while tasting the 7 different samples.

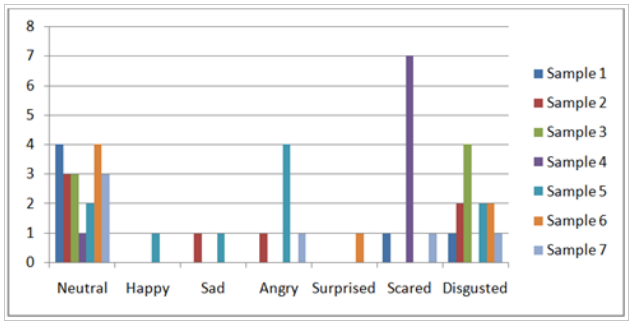

Figure 18 Face expressions of participant #18 while tasting the 7 different samples.

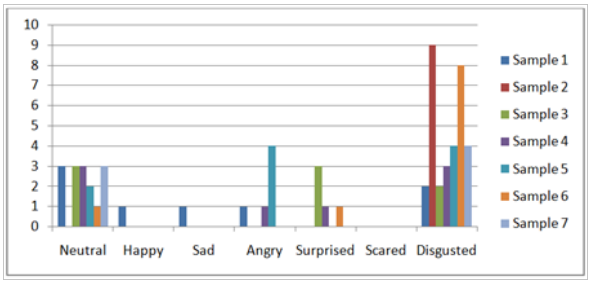

Figure 19 Face expressions of participant #19 while tasting the 7 different samples.

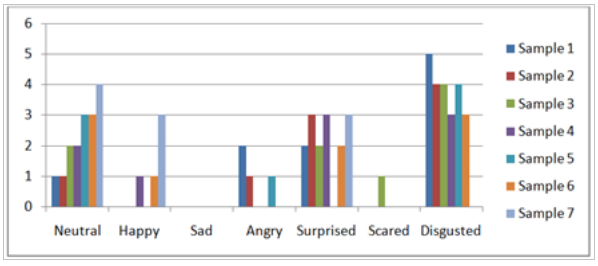

Figure 20 Face expressions of participant #20while tasting the 7 different samples.

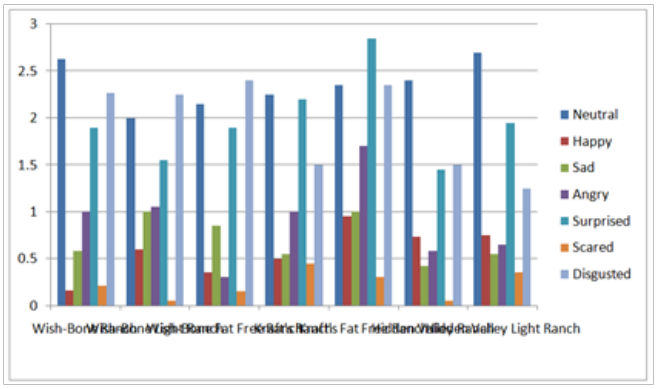

Figure 21 The average of each face expressions for all 20 participants.

Results

Results of data collection

As shown in Table 1 during data collection we found a lot variation between Wish-Bone products and its competitors according to fat, sodium and sugar content. This variation has the most effect on product's flavor and texture. Also the t test shows the significant differences in calories content between Wish-Bone and competitors.

Results of Sensory Evaluation process

During sensory evaluation process, participant's face expressions were analyzed by the face reader technique. This process helped us to compare participant's preferences between different salad dressing brands and different flavors. The results are represented in the Figures 1-20 each figure is for one participant, the figure included the 7 face expressions that are expected while tasting the samples and the face expressions. Also the figure presented the scale of each face expression from 0 to 10. Finally on the side are the colors of each sample that the participant tasted. For example; participant 1 recorded a scale of 4 in neutral expression when tasted sample1. Figure 21 shows the average of each face expression for all 20 participants, the results shows that; Wish-Bone Ranch and Hidden valley Light Ranch shows the highest records for neutral face expression, Kraft's Fat free ranch shows the highest record for happy face expression, Wish-Bone Light Ranch and Kraft's fat free Ranch shows the highest record for the sad face expression, Kraft's Fat Free Ranch shows the highest record for the angry face expression, Kraft's Fat Free Ranch shows the highest record for the surprised face expression, Kraft's Ranch shows the highest scale for the scared face expression, and wish-Bone Fat Free Ranch shows the highest scale for the disgusted face expression.

Conclusion and discussion

In conclusion, Wish-Bone Ranch varied between its competitors according to the face expressions that participants recorded; Wish-Bone wasn't the participant's favorite dressing, participants were the happiest while tasting Kraft's fat free ranch, when we look at Table 1 we can see that Kraft's Fat Free Ranch is higher in sugar than Wish-Bone fat free Ranch, this might be the reason why participant were more happier than when they tasted the other Wish-Bone Ranch flavors. Moreover, Wish-Bone Ranch had the highest record for neutral face expression which indicates that participants are not positively enjoying this salad dressing. Wish-Bone Light Ranch had the highest

record of sad face expression beside Kraft's Fat Free Ranch, which indicates that participants were not happy when tasted those two samples, when we look at Table 1 we can see that Wish-Bone Light Ranch and Kraft's Fat Free Ranch has nothing in common. Wish-Bone light ranch recorded the lowest scale of scared face expression which indicates that participants were more scared with the other flavors. Participants gave the highest scale for disgusted face expression when they tasted wish-Bone fat free Ranch and Kraft's fat free Ranch which indicates that fat free salad dressing is not consumer's favorite dressing. This study helped us find the weaknesses in Wish-Bone Ranch products by comparing it with its competitors, the possible quality improvements that we might apply to make Wish-Bone Ranch consumers' first choice are; reduction in total calories, reduction in total fat, increase sugar content to enhance the flavor.

Table1 Comparison between Wish-Bone products and its competitors according to calories, Fat, sodium and sugar content. T test represents the significant differences in total calories between Wish-bone, Hidden valley and Kraft's products

Products	Calories (Kcal)/2 Tbsp	Fat (g)/2 Tbsp	Sodium(mg)/2 Tbsp	Sugar(g) /2 Tbsp	T Test
Wish-Bone:					0.88456
Ranch	130	13	230	1	
Light Ranch	70	5	280	2	
Fat Free Ranch	30	0	270	2	
Hidden Valley:					
Ranch	140	14	260	1	
Light Ranch	80	7	260	2	1
Fat Free Ranch	30	0	310	3	
Kraft:					0.865789
Ranch	110	11	260	1	
Light Ranch	70	4.5	350	1	
Fat Free Ranch	50	0	220	3	

Recommendations and applications

This study guides us to know what quality improvements we can apply to Wish-Bone Ranch products that will make Wish-Bone consumer's first choice. None of the previous studies used sensory evaluation techniques and none of them used face reader technique to analyze participant's face expressions. On the other hand this study has some limitations which are, the absence of Kraft's light ranch flavor and hidden valley fat free ranch flavor, we would of have more precise data if those two flavors were available. Another limitation is the validity of participants face expression, some people have happy face in nature wish means their face expressions always gives happy face reader even if they are not smiling, other people gives sad face in nature, which means they don't show sad face expression when they are really sad. Another limitation is that the study had a low number of participants; the results would be more accurate if the study had more participants.

Acknowledgements

None.

Conflict of interest

The author declares no conflict of interest.

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