Determination of the impact of social cross profiles on sensory perception and perceptual response of the consumer panels

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Abstract
This paper systematically reviews the impact of age, gender, education level, occupation, income level and expectation of the consumers toward the sensory perception and perceptual response for tea, coffee and a selected cola beverage. Study was conducted as a survey and samples of each beverage were tested according to ISO 8589:2007. Collected data were analyzed for multinomial regression by SPSS 22.0 statistical software. Results determines the effect of education level and occupation were insignificant ($P>0.050$) while age, gender, income level and expectation were significant ($P<0.050$). Parameter analysis further found that sensory perception and perceptual response for tea, coffee and cola has a distinct impact from the different ages, genders, income levels and expectations. Overall, the study found that pattern of consumer perception has a correlation with defined factors and the impact fluctuate consumer's perception on beverages according to the social profile.

Keywords: ageing, beverages, demographic factors, perceptual response, sensory perception

1. Introduction
Even though, product development is a mission of designing, determination of the consumer acceptance and preference is truly based on the perception of the consumer [1]. Perceptual response is the mental phenomena which involves with immediate sensory experience to recognize and react on environmental responses. This usually associated with the field of food science and technology, since product purchasing is oriented on the perception of the consumer.

Perception includes five human senses; sight, sound, smell, taste and touch. It also includes proprioception and the cognitive ability where the information gathered is concerned. Apart from environmental stimuli; psychological, physiological and demographical factors are affecting the perceptual response of the consumers [2]. According to previous researches the effect of perception towards products and product development were examined, but studies on the perceptual response and the effect of assessed factors towards food products were very less.

Perception or the perceptual response is related with the perceptual sensitivity. According to the studies individuals are differ in perceptual sensitivity [3, 4]. The decline of the sensitivity causes the deprivation in the perception on flavor, taste and other sensory attributes. Due to many physiological, psychological factors ageing process effect to the perceptual response of the people. It was found that sensory perception is altering with the ageing [2].

Since most of the people have a habitual trend to use caffeinated beverages (natural/artificial) in their life, perceptual response of the respondents were intended to analyze towards the preference for caffeinated beverages. This study identifies the effect of age, gender, education level, occupation, income level and the expectation of the consumer towards the perception of tea, coffee and cola beverages.

2. Methodology
2.1 Participants
Participants for three age groups as 15-30, 30-45, and 45-60 were selected for this study in two gender sub groups; male and female. 205 volunteered participants were engaged for the study but 25 were dropped by the screening [1]. Each group consisted 30 respondents, totally 180 participants were taken after the screening process (n =30, Gender- Male, Age range 15–30 years; n =30, Gender-Female, Age range 15–30 years; n =30, Gender-Male, Age range 30–45 years; n =30, Gender-Female, Age range 30–45 years; n =30, Gender-Male, Age range 45–60 years; n =30, Gender-Female, Age range 45–60 years). All the participants were recruited from a semi urban area of Matara district, Southern province, Sri Lanka. And all respondents selected were having normal, good health condition.

2.2 Task and Procedure
A volume 200 mL Tea and coffee samples were prepared with Ceylon black tea (5g) and instant black coffee separately, by incorporated with hot water. 200 mL of Cola sample was given from a selected Cola brand bottles which were immediately opened. For Tea and Coffee, respondents were given the chance to add sugar according to their preference. And similarly, the temperature condition (Hot/Cool) was provided for the beverages according to the preference of the respondent. Samples were not coded in particular order, but named three samples referring to the beverage as by its common name as the tasting for the survey.

Each panelist was given instructions to perform tasting

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[1] Screening was done to drop the respondents with inappropriate personal behaviors (smoking, chewing beetle, etc.) who regard as unfitting respondents for sensory analysis.

properly. Sufficient volume of the solution was provided from the sample and the solution was tasted and spited out the mouth. Mouth was flushed using clean water between each assessment. A gap of 20 s was maintained between individual taste assessments.

A prearranged questionnaire contained subjects as name, gender and age and other relevant queries was given to the respondents in which first part contains survey based paper questionnaire of perceptual analysis by the ordinary or the unguided method.

2.3 Statistical Model

Using IBM SPSS version 22.0 the Statistical Software package with a significance level of 0.05 was taken into contemplation the relation of perception with defined factors. The relationship of perceptual response with distinct age group respect to the gender was interpreted using the multinomial regression analyses for the factors age, gender, educational level, occupation, income level, and expectation. A significance level of 0.05 was taken into consideration to protect against Type I errors and the lowest level of each factor always considered as the referring category.

3. Results and Discussion

Collected data through the questionnaires was analyzed using SPSS 22, multinomial regression analysis and summarized in the table 1.

Table 1 Summarization of the statistical analysis outputs

Analysis	Sig. value
Model fitting information (sig. value)	0.000
Pseudo R square test (Nagelkerke value)	0.518 (51.8%)
Likelihood ratio test	
Intercept	.
Age	0.000
Gender	0.001
Education level	0.778
Occupation	0.289
Income level	0.008
Expectation	0.031

According to the model fitting information, applied multinomial regression for the study was significant (P<0.050). Since Nagelkerke R^2 value was exceeding 50%, considered factors (age, gender, education level, income level, occupation, expectation) for the perceptual response of the respondents were satisfactorily contribute for the correlation as the major segment of the factors were considered in the study.

Likelihood ratio test shows the relationship in between perceptual response and the factors considered. Results show intercept is insignificant (P>0.050). It depicts that, to initiate a perceptual response an external factor should be influenced the process of perception as it begins with pre-attentive processing [5].

According to the results; age, gender, income level and the expectation are significant (P<0.050) while education level and occupation were insignificant (P>0.050). Age is the key factor which affects the sensory perception, especially to the

perception of the taste with the heterogeneous nature of the older public [2]. It further has found the relationship of the perceiver's attitude as the expectation and external factors combined to the perceptual response.

Further the nature of the correlation with significantly effecting factors was analyzed by the parameter estimates as shown in the table 2.

Table 2: Parameter estimates

	Age	Gender	Income level	Expectation
Tea				
B value [2]	1.861	-2.179	-16.976	-0.436
Sig. value	0.000	0.001	0.000	0.000
Coffee				
B value	1.593	-2.369	-37.499	-0.540
Sig. value	0.001	0.002	0.000	0.001
Cola				
B value	-1.861	2.119	16.976	1.346
Sig. value	0.000	0.001	0.000	0.000

Perceptual response based on the preference of tea and coffee, a positive gradient was showed by the factor age. But gender, income level and expectation showed negative gradients. Overall, income level has the steeper gradient and the expectation has the gentlest. But the gradient of the income level for the preference of coffee has doubled its gradient compared with the preference of tea.

On the facts, mostly middle and older ages, female, lower and middle income levels and expectation for the taste was affecting higher to the perception of tea. Similarly, perception of coffee is influenced highly by Middle Ages, female, middle income levels and expectation towards quality and the taste of coffee. According to the Consumer Survey on Sustainable Tea and Coffee Consumption, same results were obtained [6].

When the perceptual response of the respondents for cola was considered, it shows a diverse result than for the tea and coffee. Age shows a negative correlation while gender, income level, expectation has showed a positive correlation. Gradient for the income level is the steepest for the preference of cola also and it is closer to the value of tea. Lowest gradient is offered in the factor expectation. So that, lower ages, males, high income level and the expectation towards the brand is influence the perception of cola beverage.

A previous study has figured out that, 51% of the male and 49% of the female prefers cola as it doesn't impact by the gender [7]. The variation of the result might be due to the behavioral pattern of Sri Lankan people with Indians. According to some studies, due to ageing older people usually experience a condition of fatigue to cola beverages [8]. A case study on Coca cola has shown same findings, as age 20-29 prefers more cola beverages, but ageing has reduced the preference [9]. This might be the reason of this revolting nature of the perception of cola with the effect of growing older or ageing.

Considered age groups, of the same research shows age below 15, 16-25, 26-35 shows higher response towards but with the ageing the response has declined. While the occupation was not tested statistically, it shows employers prefer more cola

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[2] Statistical term stand for the acceptable probability in the hypothesis test

beverages than employers. The reason to purchase is collaborated on the same study, as it shows taste, brand name and packaging are effecting highly.

4. Conclusion
Perceptual response is a major influence which affects the consumer's sensitivity towards a product. Study shows, the significance of age, gender, income level and expectation towards the perceptual response of the respondents on tea, coffee and cola beverage.

With the ageing, people prefer tea and coffee rather than carbonated cola beverages, and the gender female is prominent in the fact. Lower income levels and the expectations towards taste like sensory attributes were high for natural caffeinated beverages considered. Study identifies the brand plays a major role in perceptual behavior for artificial caffeinated cola beverages. Understanding these influences can use to figure out the market on new product developments and enhancing strategies on persisting products.

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