

The Role of Taste in Choice Experiments

**Thomas C Egan, Wade D Jarvis, Mark R Gibberd, Hannah G Williams,
Curtin University of Technology**

Abstract

This paper investigates the role of taste in choice based studies. The literature review examines a number of studies which explore the role of taste. A two tier system is proposed which combines simple hedonic sensory studies with an original 'Discrete Choice Experiment' which includes extrinsic factors and taste-related intrinsic factors. Results from research on the Hong Kong wine market are presented and discussed. The hedonic results show that in Hong Kong, sweeter wine styles are preferred over other wine styles. Findings of the 'Discrete Choice Experiment' showed that including 'sweet' or 'semi-sweet' on wine labels increases the likelihood of selection for a wine. Results indicate that consumers in Hong Kong do have a preference for certain wine styles and this preference influences their wine choice.

Introduction and Literature Review

Taste has been described as 'nothing else than molecules causing a firing pattern of taste sensors in the mouth' (Kircher and Leube, 2003, p. 657). However, preliminary focus group sessions conducted by the authors of this paper with Hong Kong university students, have identified taste as the most important factor relating to wine purchasing. A review of the literature shows that taste can play a large role in the purchase decision (Lee and Lou, 1995; Lange *et al.*, 2002; Enneking, Neumann and Henneberg, 2007). A number of different research methods, including hedonic studies, conjoint analysis and choice based experiments have been used to explore the role of taste in the purchase decision.

Hedonic studies are those which require participants to indicate their preference or acceptance in relation to a stimulus. Traditionally, hedonic studies have been used to fine-tune the taste of products in food and beverage categories (Brickman and D'Amato, 1975; Solheim and Lawless, 1996; Levy and Koster, 1999). The literature shows that hedonic studies have a low repeatability and this is an accepted limitation of the technique (Levy and Koster, 1999; Solheim and Lawless, 1996; Stefani, Romano and Cavicchi 2006; Bartoshuk *et al.*, 1982). Traditionally, hedonic studies have focused on the intrinsic merits of goods. However, when consumers purchase goods, they rely on intrinsic and extrinsic purchase cues (Monroe and Krishnan, 1985). Intrinsic cues relate to the physical attributes of the product. In relation to wine, intrinsic cues refer to the nature of the wine, for example, the level of oak (Lockshin and Rhodus, 1993). Extrinsic cues are "product related but not part of the physical product itself such as brand name, price and country or origin" (Lee and Lou, 1995, p. 22). To properly understand consumer purchase behaviour, the relationship between intrinsic and extrinsic factors must be investigated (Lee and Lou, 1995).

Conjoint analysis is a technique which estimates the structure of a consumer's preferences by inviting them to evaluate different sets of alternative attributes (purchase cues) (Green and Srinivasan, 1990; Solheim and Lawless 1996; Sanchez and Gil, 1998). Conjoint analysis

forces participants to process information and weigh up various options, which creates a realistic purchase decision. In contrast to hedonic studies, conjoint analysis traditionally focused on extrinsic purchase cues. Surprisingly few authors include both intrinsic and extrinsic factors in a conjoint framework (Lange, Rousseau and Issanchou, 1998). The Lee and Lou (1995) paper which investigated shoe purchases, used a large number of stimuli including extrinsic purchase cues of brand name, price and country of origin and intrinsic purchase cues of style, sole cushion and durability. However, it was the Vickers (1993) paper on the yoghurt market which was the first to incorporate taste along with extrinsic factors of brand and price in a conjoint experiment. The Vickers (1993) study showed that taste and 'health claim' can have a larger impact on purchase intent than brand and price which confirms the importance of taste in conjoint studies.

Conjoint analysis has progressed to a choice-based environment, involving selection, rather than hedonic ratings of separate choice tasks (Louviere 1988; Louviere 1994). Surprisingly few authors conducted Discrete Choice Experiments (DCE) involving taste. While developed from economic literature, the method is starting to be utilised by, among others, the food science community to analyze taste (Moskowitz, 2001; Enneking, Numann and Henneberg, 2007). Moskowitz (2001) used a DCE which included descriptive information as a substitute for physical taste, in relation to the hamburger market. This technique allowed more variables to be examined than if the stimuli were physically tasted but neglected extrinsic factors. The Enneking, Neumann and Henneberg (2007) paper included a choice based experiment with extrinsic factors and intrinsic factors which related to taste. The Enneking, Neumann and Henneberg (2007) DCE required participants to physically taste a product while being exposed to brand, labeling and price information. Also included in the choice based study was a description of taste (participants were given a description of the type of sweetener used in a soft drink which gives some clue of taste). Including such a wide range of variables in a DCE was a break-through which provided a great depth of information for marketers.

When conducting a DCE it is important to make conditions as realistic as possible (Lee and Lou, 1995). This presents a conundrum in regards to taste. When consumers make a purchase decision they are not normally able to taste the product. However, we know that taste can be important in regards to the purchase decision. The Enneking, Neumann and Henneberg (2007) paper addressed this problem by including physical taste and a description of taste. However, the taste description in the Enneking, Neumann and Henneberg (2007) only refers to the type of sweetener used and does not tell participants much about the actual taste on the product. This conundrum led to the formulation of a new methodology which explores taste using a unique two tier system.

Methodology

In the wine market a vast number of terms are used to describe the taste of a wine and this information is usually listed on a wine label. As a result, the methodology proposed in this paper places a greater emphasis on taste description. Physical taste and taste description were investigated using a two tier system. The first tier involved a simple hedonic acceptance study which allowed preferred wine styles to be identified. The second tier involved a DCE which included two extrinsic purchase cues and two intrinsic cues that describe the actual taste of the wine. The inclusion of descriptive taste information along with extrinsic information is an original concept which allows the importance of taste description to be compared to extrinsic information such as price and country of origin.

The Enneking, Neumann and Henneberg (2007) paper only measured consumers' responses after they have tasted a product. However, logic informs us that when consumers purchase a product such as wine, they have often not tasted it before purchase or are unable to recall taste from previous purchases (Lockshin and Hall, 2003). As a result, the proposed two tier system is advantageous in that it allows preferred wine styles to be identified while also exploring the purchase decision where the wine has not been tasted before.

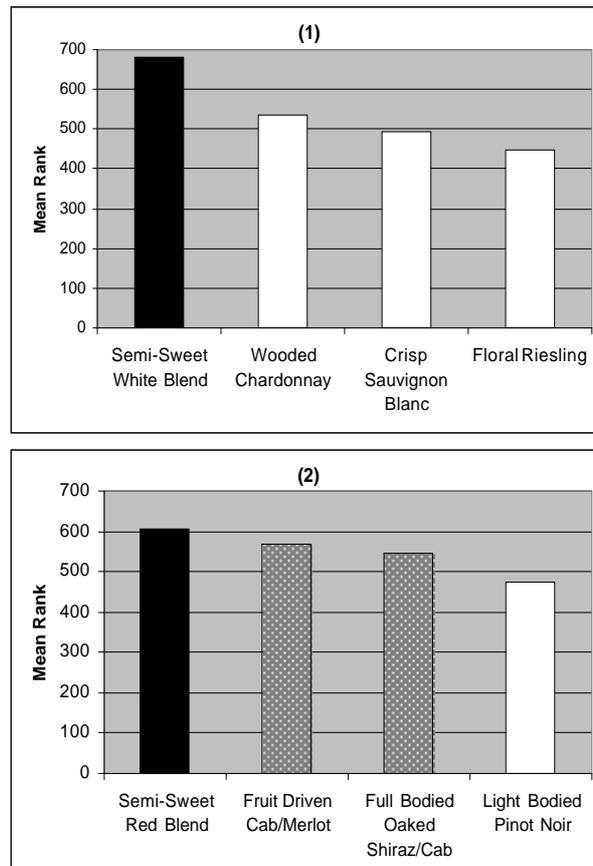
Research was undertaken over a one week period in Hong Kong using a sample of 144 university students and recent graduates. Younger consumers were targeted because this group will drive wine consumption in the future. Both tiers of research were undertaken in the same session. The first tier hedonic study required eight wines to be tasted, similar studies have used 6 to 9 samples (Nurgel and Pickering, 2005; Nygren, Gustafsson and Johansson, 2002; Pena y Lillo *et al.*, 2005; Pickering and Robert, 2006). Wines were selected to represent as wide a range of styles as possible in order to ensure that participants could tell the difference between the wines. Participants were asked to indicate their degree of overall hedonic preference on nine point Likert scales. In order to minimise the effect of a fixed sample order, the serving order was randomized. Carry over effects were minimized by tasting white wines at the start of the session and the red wines were tasted at the end of the session. In order to further minimize carry over effects, participants were asked to rinse their mouth with water between wines. A 15mL wine sample was provided in order to minimise the amount of alcohol provided to participants (Lange *et al.*, 2002). The experiment location was well lit and well ventilated and was secured for the duration of the data collection. This resulted in a close to ideal laboratory setting for sensory studies.

The DCE in the second tier included two extrinsic purchase cues and two descriptive taste related intrinsic purchase cues. The two extrinsic purchase cues related to 'Price' and 'Country of origin'. The intrinsic taste descriptors referred to the "sweetness" and "body" of the wine. The inclusion of extrinsic and descriptive taste related intrinsic information is almost unique. Each purchase cue was assigned three different levels to allow easy comparison (Street, Burgess and Louviere, 2005). Participants were presented with nine choice tasks. Each task included four options, which is a common format when creating choice sets (Street, Burgess and Louviere, 2005). Each option was represented by a full bottle of red wine. Each bottle had information printed on a white label which included a different level for all four purchase cues. Participants were asked to select their preferred options for each choice task. A fractional factorial design from Street, Burgess and Louviere (2005) reduced the 256 possible choice tasks down to 36. This resulted in 1,179 total responses (choice tasks) being collected.

Typically brand would be included in a DCE involving consumer goods, however results from preliminary focus group sessions show that brand is less important to consumer choice than other factors including price, country of origin and taste. Consequently brand was excluded from the DCE. Low reliance on brand could be explained by Lee and Lou (1995) who found that consumers more familiar with a product category tended to rely more on brand (this result is yet to be generalized). In the case of a wine choice experiment in Hong Kong, the market and the sample selected have a low level of familiarity with the product category which would explain the low levels of brand reliance.

Results and Discussion

Results have confirmed anecdotal evidence which suggested that sweet wines are preferred in the Hong Kong wine market. Likert scales were used in the first tier which generated data that strictly speaking is not continuous and as a result violates the stringent assumptions of a one-way ANOVA (Muthen, 1985). Instead, the Kruskal Wallis test was used which is equivalent to the one-way between-groups ANOVA. Kruskal Wallis therefore allowed differences between groups to be examined. The means rank data is shown in Figure One and Two which visualizes mean preference. The main result to come from the sensory analysis is that sweeter wines were statistically significantly preferred over dry wines. Hedonic results produced statistically significant differences at $p < 0.05$. Figure One shows the semi-sweet white wine was statistically significantly preferred over all other white wines styles. Interestingly, the crisper Sauvignon Blanc and Riesling were the least preferred although the difference in preference between these and the Chardonnay was not significant. In Figure Two a similar pattern was observed in relation to red wine whereby the semi-sweet wine was statistically significantly preferred over the light bodied Pinot Noir. Preference for the full bodied Cabernet Merlot and Shiraz Cabernet was somewhere in-between the semi-sweet wine and the Pinot Noir, however these differences were not significant. The fact that sweeter wines are statistically significantly preferred over light dry styles is a significant finding and confirms anecdotal evidence which suggested that sweet wines are preferred in the Hong Kong wine market.



Figures 1 and 2. White (1) and Red (2) Mean Rank Data.

Results from the second tier DCE show the utility generated by each level and are presented in Figure Three. Utility refers to the effect of the purchase cue level on the likelihood of selection in the DCE (or preference likelihood). Utility results are in relation to a constant of Price = \$HK125, Level of sweetness = Dry and Body = Light, Country of Origin = Australia. The terms ‘sweet’ and ‘semi-sweet’ generated the highest amount of positive utility. Results in relation to body showed that ‘medium body’ and ‘full body’ had little impact on utility. Utility results for country of origin show that including France on the label generated high levels of positive utility but including America generates larger levels of negative utility. Utility results in relation to price show that as expected, increasing price resulted in decreasing utility. Overall these results indicate that in relation to wine purchasing in Hong Kong, descriptive taste related intrinsic information can have an important impact on wine choice.

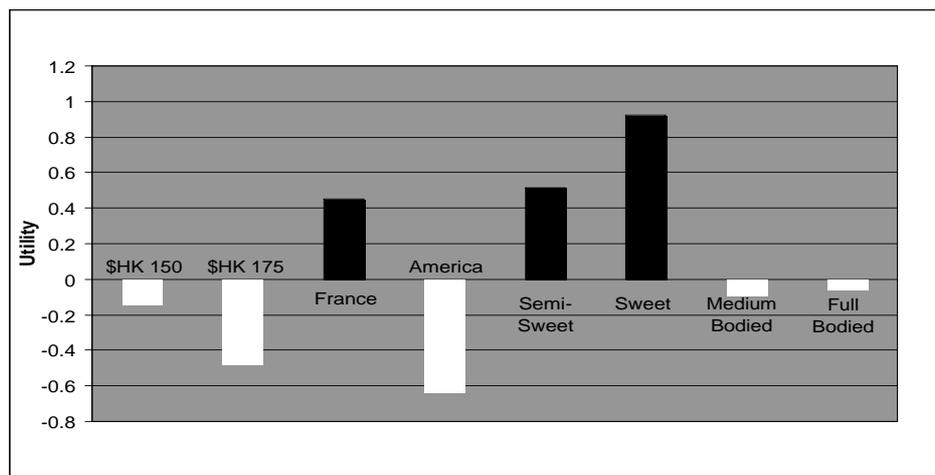


Figure 3: Utility of Purchase Cue Levels Results

Conclusions and Future Directions

By including two tiers, sensory preference can be identified while also investigating the purchase decision. Results from the first tier of research into hedonic sensory preference in the Hong Kong wine market reveal statistically significant trends. The results indicate that sweet wine styles are significantly preferred over other wine styles. This tells us that not only are consumers able to tell the difference between wine styles but they also have a preference for certain styles.

The literature review of DCE identified that little research exists which includes extrinsic information and descriptive intrinsic information. The method used in the second tier of this research places further emphasis on taste by including two extrinsic attributes and two taste-related intrinsic attributes in a DCE. The results show that the purchase cues of ‘sweet’ and ‘semi-sweet’ generate the highest amount of positive utility. This tells marketers that consumers prefer sweeter wine and wants to see this reflected on the label. Research undertaken by Lange *et al.* (2002) stated that the importance of taste in the purchase decision depends on the nature of the product.

The findings from this study suggest that taste is important in the purchase decision of wine in Hong Kong. However, the conditions in this experiment were somewhat removed from reality and future research will endeavor to describe the importance of taste in a more realistic

purchase situation. The next stage of research will also bring together sensory studies and choice based research by using taste preference, involvement, gender and consumption frequency as co-variants in the DCE. This will show whether such groups improve the accuracy of the DCE.

Acknowledgements

With thanks to the Department of Agriculture and Food Western Australia, Australia Post and the Lagan family for their generous support. Special thanks to the Open University of Hong Kong for generously providing research support and co-operation.

References

- Bartoshuk, L.M., Rennert, K., Rodin, J., Stevens, J.J., 1982. Effects on the perceived sweetness of sucrose. *Physiology and Behaviour* 28 (5), 905-910.
- Brickman, P., D'Amato, B., 2003. Exposure effects in a free-choice situation. *Journal of Personal and Social Psychology* 32 (3), 415-420.
- Enneking, U., Neumann, C. Henneberg, S., 2007. How important intrinsic and extrinsic product attributes affect purchase decision. *Food Quality and Preference* 18 (1), 133-138.
- Green, P.E., Srinivasan, V., 1990. Conjoint analysis in marketing: New development with implications for research and practice. *Journal of Marketing* 54 (4), 3-19.
- Kircher, T.J, Leube, D.T., 2003. Self-consciousness, self-agency and schizophrenia. *Consciousness and Cognition* 12, 656-669.
- Lange, C., Rousseau, F., Issanchou, S., 1999. Expectation, liking and purchase behaviour under economic constraint. *Food Quality and Preference* 10 (1), 31-39.
- Lange, C., Martin, C., Chabanet, C., Combris, P., Issanchou, S. 2002. Impact of the information provided to consumers on their willingness to pay for Champagne: Comparison with hedonic scores. *Food Quality and Preference* 13 (7-8), 597-608.
- Lee, M. Lou, Y.-C. 1995. Consumer reliance on intrinsic and extrinsic cues in product evaluations: A conjoint approach. *Journal of Applied Business Research* 12 (1), 21-34.
- Levy, C.M., Koster, E.P., 1999. The relevance of initial hedonic judgements in the prediction of subtle food choices. *Food Quality and Preference* 10 (3), 185-200.
- Lockshin, L., Rhodus, W.T., 1993. The effect of price and oak flavor on perceived wine quality. *International Journal of Wine Marketing* 5 (2-3), 13-26.
- Lockshin, L., Hall, J., 2003. Consumer purchasing behavior for wine: What we know and where we are going. *First International Wine Marketing Colloquium*, Adelaide, University of South Australia, CD Rom.
- Louviere, J., 1988. *Analyzing Decision Making: Metric Conjoint Analysis*, Sage Publications, Newbury Park.
- Louviere, J., 1994. *Conjoint Analysis. Advanced Methods of Marketing Research*, Blackwell Business, Cambridge.

- Monroe, K., Krishnan, R., 1985. The effect of price on subjective product evaluations. In: Jacoby, J., Olson, J., (Eds.), *Perceived Quality: How Consumers View Stores and Merchandise*, Lexington Books, Massachusetts, Toronto, pp. 209-232.
- Moskowitz, H., 2001. Creating new product concepts for foodservice: The role of conjoint measurement to identify promising product features. *Food Service Technology* 1 (1), 35-52.
- Muthen, B., 1985. A comparison of some methodologies for the factor analysis of non-normal Likert variables. *The British Journal of Mathematical Statistical Psychology* 38 (2), 171-189.
- Nurgel, C. Pickering, G., 2005. Contribution of glycerol, ethanol and sugar to the perception of viscosity and density elicited by model white wines. *Journal of Texture Studies* 36 (3), 303-323.
- Nygren, I.T., Gustafsson, I.-B., Johansson, L., 2002. Perceived flavour changes in white wine after tasting blue mould cheese. *Food Service Technology* 2 (4), 163-171.
- Pena y Lillo, M., Latrille, E., Casaubon, G., Agosin, E., Bordeu, E., Martin, N., 2005. Comparison between odour and aroma profiles of Chilean Pisco spirit. *Food Quality and Preference* 16 (1), 59-70.
- Pickering, G.J., Robert, G., 2006. Perception of mouth-feel sensations elicited by red wine are associated with sensitivity to 6-n-propylthiouracil. *Journal of Sensory Studies* 21 (3), 249-265.
- Sanchez, M., Gil, J.M., 1998. Consumer preferences for wine attributes in different retail stores: A conjoint approach. *International Journal of Wine Marketing* 10 (1), 25-38.
- Solheim, R., Lawless, H.T., 1996. Consumer purchase probability affected by attitude towards low-fat foods, liking, private body consciousness and information on fat and price. *Food Quality and Preference* 7 (2), 137-143.
- Stephani, G., Romano, D., Cavicchi, A., 2006. Consumer expectations, liking and willingness to pay for specialty foods: Do sensory characteristics tell the whole story? *Food Quality and Preference* 17 (1-2) 53-62.
- Street, D.J., Burgess, L., Louviere, J.J., 2005. Quick and easy choice sets: Constructing optimal and nearly optimal stated choice experiments. *International Journal of Research in Marketing* 22 (4), 459-470.
- Vickers, Z.M., 1993, Incorporating tasting into a conjoint analysis of taste, health claim, price and brand for purchasing strawberry yoghurt. *Journal of Sensory Studies* 8, 341-352.