Preferential segmentation of restaurant attributes through conjoint analysis

L.C. Koo
Associate Professor, International Management Centres, Tin Shui Wai, Hong Kong
Fredrick K.C. Tao
Professor, Hong Kong Centre for Management Studies, Hong Kong
John H.C Yeung
Deputy Managing Director, Shun Hing Electronic Trading Co. Ltd, Hong Kong

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Abstract
Conjoint analysis has emerged as a contemporary research technique to reveal consumers' preference towards choosing a particular restaurant. Through some focus group discussions, a list of restaurant attributes was identified as important for restaurant-goers in deciding where to dine. While the research was based on Hong Kong experience, the research technique can be generalised to restaurant choices in other countries. It is possible to segment the restaurant market by different meal purposes (i.e. family meal, business meal and tourists) and employee groups (i.e. service sector, hotels and floating restaurants). The concept of decentring was applied in the study to help reveal restaurant preferences as perceived by the respondents standing in the shoes of others.

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Introduction

Eating is a daily necessity. In a fast paced and affluent society, eating out in restaurants has also become an important social and business occasion. The consumers usually have a wide range of options to choose from. Depending on the purpose of going out to dine, consumers subconsciously evaluate a complex set of attributes before making their "buying" decision. The importance of various restaurant attributes are unique to the individuals concerned.

Apart from serving the local community, restaurants have made an important contribution to the success of tourism in Hong Kong. In Hong Kong tourists can find a huge variety of cuisines.

A brochure prepared by the Hong Kong Tourist Association (1997) says:

> The city's resplendent dining tables offer something for every taste and budget, from European *haute cuisine* with a spectacular view of the harbour, to regional Chinese specialities in tiny two-table establishments frequented by loyal connoisseurs. Some dishes are centuries-old classics served in unassuming surroundings, others are innovative multi-ethnic adaptations presented amidst the very latest in architecture and interior design.

There are restaurants by the thousands offering a full range of food varieties and services. As the number of restaurants has mushroomed, so the business has become much more competitive. Being able to meet consumers' basic expectations in today's situation at best can ensure business survival. To be successful and outstanding, a restaurant has to be able to exceed consumers' expectation by really understanding customers' reasons for selecting a particular type of dining experience.

The use of conjoint analysis is appropriate in measuring the importance level a customer segment attaches to a particular restaurant attribute. Knowing these utilities for different customer groups enables restaurant operators to devise effective business strategies best suited to serve their specific market segments. Conjoint analysis measures how much customer satisfaction a change in product or service attribute will offer relative to another kind of change. It helps determine which of the two potential changes is the more valuable and effective (Toombs and Bailey, 1995).

Conjoint marketing research studies have been made in various specific business sectors, e.g. credit card (Kara *et al.*, 1994), grocery and candy products, life insurance, retailing (Toombs and Bailey, 1995), health club service retailers (Amirani and Baker, 1995), eggs (Ness and Gerhardy, 1994), property (Levy, 1995), wine (Gil and Sanchez, 1997), financial service (Arias, 1996), and beef retailing (Hobbs, 1996). This current research applies conjoint analysis to measure utilities of various restaurant attributes among different customer segments in Hong Kong. Knowing which utility cues are most important to a particular customer group, the restaurant operators can determine what should be promoted in order to lure these desired customers from their competitors. They can also make predictions about consumers' purchase intentions in responses to changes to these utility cues. Using these utilities in conjunction with other customer information (e.g. demographics, psychographics) the restaurant operators can more effectively segment the market (Amirani and Baker, 1995).

Conjoint analysis technique

Traditional research techniques in assessing consumer preference tend to treat each attribute independently and very little information on how consumers are likely to make a favourable or unfavourable buying decision is unearthed using old techniques. Consumers do not consider each attribute of a meal experience singly and independently when making a choice. Instead they consider

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11/5 [1999] 242–250

the whole range of product attributes in totality. The conjoint-based approach can help understand how customers trade off one product attribute against another. Conjoint analysis which engages the respondents in a more realistic judgement stance than do other research methods, can better predict the overall consumer preference through aggregating the utility scores of all individual product attributes (Levy, 1995). It has become a popular method for identifying and understanding the combined effects of product attributes on preferences for a product/service (Hobbs, 1996). It enables not only the assessment of product attributes in a multicue setting, but also the quantification of the effect in terms of dollarmetric (utility) values. The incorporation of customised set of attributes for different respondents enables the impact of different product attributes to be analysed in the context of cues directly relevant to particular market segments (Diamantopoulos *et al*., 1995).

Conjoint analysis is also known as "trade-off analysis" or "utility analysis". Two basic assumptions are made in conjoint analysis (Gil and Sanchez, 1997). First, a product/service can be described as a combination of levels of a set of attributes. Second, these attribute levels determines consumers' overall judgement of the product/service.

The attraction of using conjoint analysis is that it asks the respondents to make choices between products defined by a unique set of product attributes in a way resembling what they normally do – by trading off features, one against the other. When asked which attributes they would like, most customers will choose everything on the wish list. Conjoint can establish the relative values of particular attributes and identifies the trade-offs the customers are likely to make in choosing a product and service and the price they are willing to pay for it (Toombs and Bailey, 1995). The relative importance of each attribute can be calculated as the utility-range (i.e. difference between the highest and the lowest utility for that attribute) divided by the sum of utility ranges of all attributes (Okechuku, 1993). Conjoint analysis produces two important results (Levy, 1995):

1. *Utility of attribute*. [It] is a numerical expression of the value consumers place in an attribute level. It represents the relative "worth" of the attribute. Low utility indicates less value; high utility indicates more value.
2. *Importance of attribute*. [It] can be calculated by examining the difference between the lowest and highest utilities across the levels of attributes.

According to Ness and Gerhardy (1994) conjoint analysis helps identify consumer segments with similar preferences. Arias (1996) suggests that the conjoint-based method of preferential segmentation outperforms other techniques in that it provides a higher level of intra-group homogeneity and inter-group heterogeneity as far as the most preferred product/service design is concerned.

Approaches to conjoint analysis

There are two general approaches to data collection for conjoint – the two-factor-at-a-time trade-off method and the multiple factor full-concept method. The two-factor-at-a-time trade-off method is now seldomly used. The full-concept is more realistic as all factors are considered and evaluated at the same time.

In the full-concept (or full-profile), the respondents are asked to rank or score a set of profiles according to their preference. On each profile, all factors of interest are represented and a different combination of factor levels (i.e. features) appears. The factors are the general attribute categories of the product/service such as colour, size, or price. The factor levels (i.e. product/service features) are the specific values of the factors, such as red, small, and expensive. The possible combination of all factor levels can become too large for respondents to rank or score in a meaningful way. The full-concept approach in SPSS categories conjoint uses fractional factorial designs, which uses a smaller fraction of all possible alternatives. This reduced size subset (orthogonal array) considers only the main effects and the interactions are assumed to be negligible.

The factor levels can be specified as DISCRETE (when factor levels are categorical), LINEAR (when data are expected to be linearly related to the factor), IDEAL, or ANTI-IDEAL (for quadratic function models).

The SPSS conjoint procedure can calculate utility scores (or part-worths) for each individual respondent and for the whole sample. These utility scores, analogous to regression coefficients, can be used to find the relative importance of each factor. SPSS permits the use of simulation profiles to represent actual or prospective products to estimate or predict market share of preference.

Three simulation cases were created in this study. One case simulated the worst scenario by combining the lowest utility scores for all attributes (factors). One simulated the best scenario case which combined all the highest utility scores across all attributes. The last case simulated the floating restaurant from which some respondents came.

International Journal of Contemporary Hospitality Management
11/5 [1999] 242–250

Research design

In order to generate an orthogonal design for the appropriate restaurant factors and factor levels, some rounds of focus group discussions were held. The focus group consisted of six persons from different occupational backgrounds. They all had overseas travelling experience and were frequently entertaining business counterparts in restaurants. The focus group members were selected on the basis that they had plenty of dining and business entertainment experiences. The focus group members discussed in detail their dining experience, both good or bad, from many different perspectives and occasions.

Table I presents the factor and factor levels identified as important by the focus group.

Despite a careful selection of factors, there were still too many ($3 \times 3 \times 2 \times 5 \times 2 \times 3 \times 3 \times 3 \times 3 = 14{,}580$) possible profiles for the respondents to choose from. The SPSS generated a parsimonious orthogonal array of 27 profiles.

It was decided it would be useful to study the utilities for the following three purposes of going to a restaurant:

1 For family meal.
2 For business entertainment.
3 As a tourist in Hong Kong.

Other demographic data were obtained for this study, i.e. gender and employer of the respondents.

Respondents were briefed about the concept of utility and they were promised a copy of their respective utility scores as incentive to complete the form. Respondents were asked to repeat scoring the 27 profiles three times, i.e. one for family meal, one for, business entertainment and one as a tourist to Hong Kong. When completing the orthogonal array form the respondents were asked to think in the appropriate mind set for that specific purpose of selecting a restaurant. In other words they were asked to move away from an egocentric mode (i.e. seeing things from own point of view) and to decentre into that particular role (i.e. seeing things from the viewpoint of others). This is known as "decentring" – a term taken from the child development psychology literature (Webster and Hung, 1994). Decentring (or decentering) is recognition that things look different to different people (Gordon, 1969). Decentring implies the ability to move flexibly from one

Table I
Factors and factor levels used

Factor	Type of data	Factor level
Location	Discrete	Outlying island
		Urban
		Rural
Type of food	Discrete	Chinese food
		Western food
		Seafood
Variety of food	Discrete	Unique speciality
		Traditional choice
Uniqueness	Discrete	Floating restaurant
		Famous tourist spot
		Luxurious Chinese palace
		Chinese cultural dance
		Performance
		Traditional restaurant
Car park	Discrete	With car park
		No car park
Price	Linear	Expensive
		Reasonable
		Cheap
Quality or taste of food	Linear	High quality
		Average quality
		Low quality
Decoration	Linear	Good decoration
		Average decoration
		Poor decoration
Service	Linear	Good service
		Average service
		Poor service

point of view to another – and back again – so as to come closer to an "objective" view of the whole (Donaldson, 1978). The respondents in the current study were mature and experienced enough to decentre from one role to another flexibly.

Research findings

The orthogonal array forms were administered on three separate occasions. The first batch of respondents was from a group of executive participants from a leading hotel group in Hong Kong. The second batch was from a group of staff working in a floating restaurant and the last group was from the service sector. They all had many years of working experience and went to restaurants regularly. They were assumed to be representative of the restaurant-goers in Hong Kong.

There were a total of 30 respondents. Each of them would complete the orthogonal array forms for family meal, business entertainment and as tourists, respectively. Because of some missing values, only 86 cases were available for analysis (Table II). According to Akaah and Korgaonkar (1988) sample size below 100 are typical for conjoint analysis (SPSS, 1994). Thus the sample used in this study is acceptable.

These demographic data (outlined in Tables II, III and IV) facilitate ANOVA or *t*-test analyses on the utility scores (as shown in Figure 1) to discern utility values among different customer groups for market segmentation purposes. The relative importance levels of the various factors for choosing a restaurant are summarised in Figure 2.

Table II
Breakdown of purpose of going to restaurants

Purpose	Counts
Family meal	29
Business entertainment	30
Tourist	27

Table III
Breakdown of employers of respondents

Employer	Counts
Service sector	30
Hotel	35
Floating	21

Table IV
Breakdown of gender of respondents

Gender	Counts
Male	51
Female	35

One-way ANOVA analysis with least significant difference (LSD) Test at 0.05 significance level was performed (Table V). The symbol (~) in Table V signifies no statistical difference at 0.05 significance level. "AB" signifies difference in means at 0.05 level for family meal and business entertainment. Similar symbols like "AC" and "BC" are used.

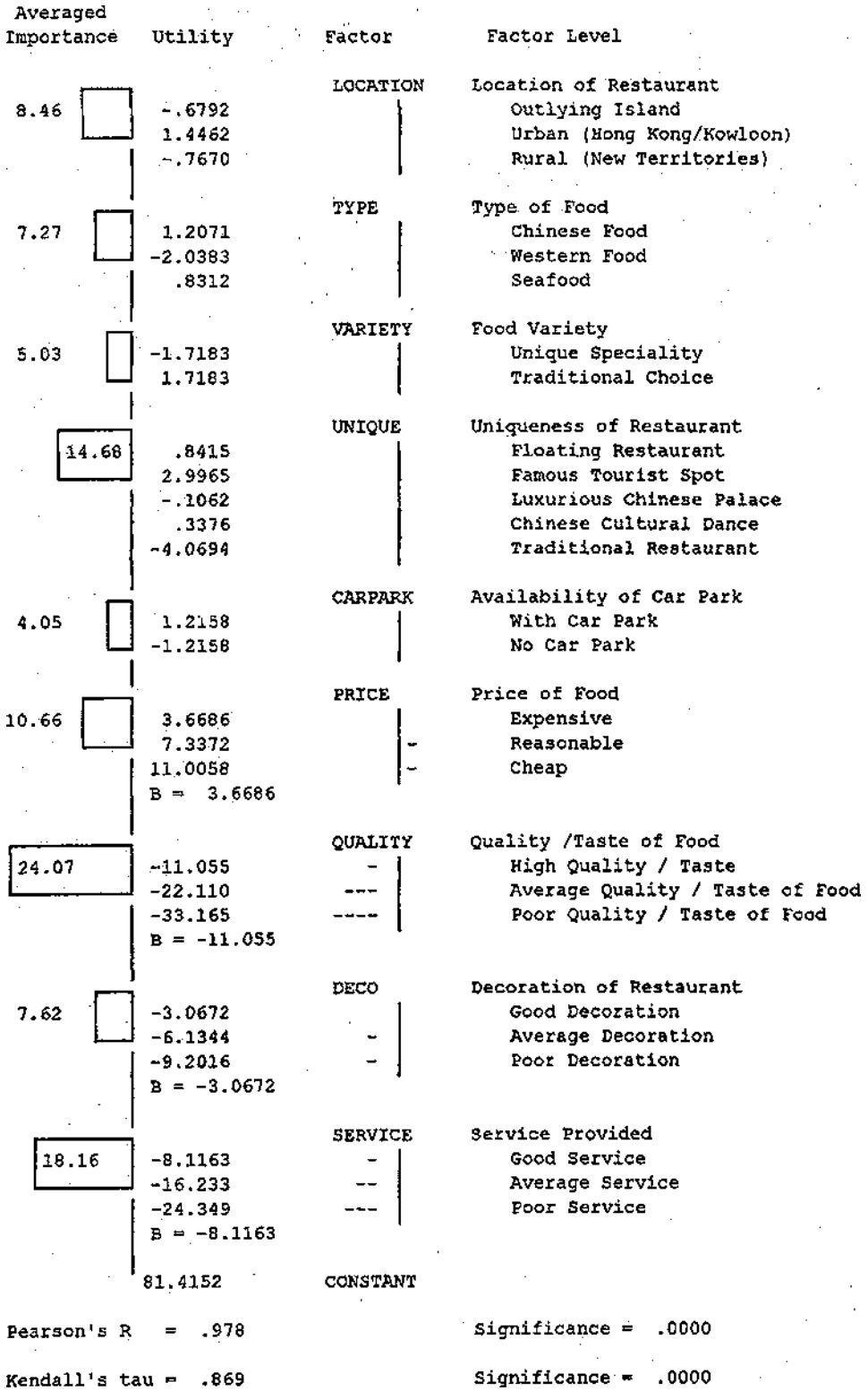
The one-way ANOVA results can be interpreted as follows:

- Constant – In general the respondents attach lower utility scores for family meal. Compared to business entertainment and as a tourist, they have less preference to go to restaurants. (The value of "constant" is unique to a specific respondent. Analogous to the "constant" in regression equation, it is used to calculate the score of the particular profile.)
- Outlying island location – For family meals, people are less willing to go to outlying island.
- Urban location – Compared to tourist, family meal customers prefer to go to restaurant located in urban areas.
- Rural location – Compared to business meals, family meals are more preferred.
- Price – They are all statistically different among all different "purpose" subgroups. Consumers are more concerned with price when they take family meals. They are least concerned with price when taking business meals. This is understandable as most business meals are paid for by their employers.
- Service – They prefer to get better service for family meals than business meals.
- Western food – Western food is more preferred for business meals than family meals.
- Seafood – Seafood is more preferred for family meals than business meals.
- Famous tourist spot – This is distinctly preferred by the tourists.
- Chinese cultural dance – Compared to family meals, tourists prefer to watch dance performance show while taking their meals.

Interpretation of one-way ANOVA results as shown in Table VI:

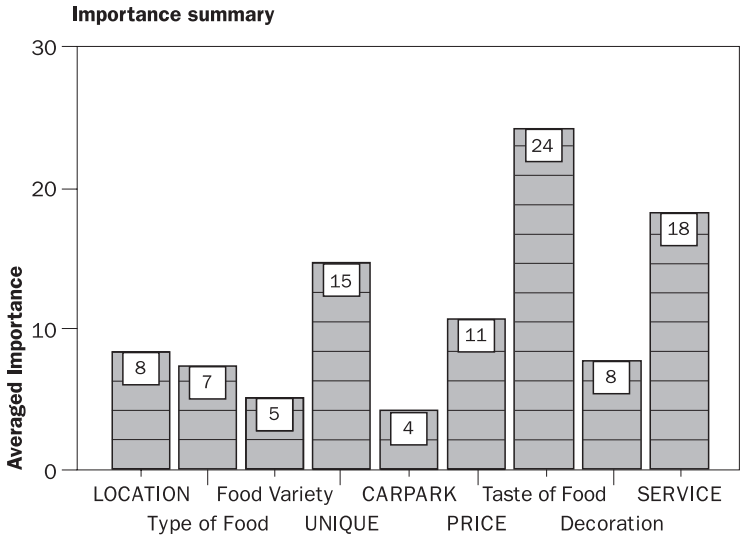
- Constant – Compared to service sector employees, hotel employees had a lower constant value.
- With car park – Hotel employees perceived lower utility on the availability of a car park at the restaurant.
- No car park – Hotel employees had higher utility on restaurant without a car park. Having noted that, the utility score for a car park is relative low. This suggests that

Figure 1
The conjoint summary results



the availability of a car park is not a major consideration.
- Decoration – Compared with service sector employees, the hotel employees preferred better decorations.
- Quality of food – Floating restaurant employees had higher expectation for quality of food than service sector employees.
- Service – Floating restaurant employees had higher expectation for service than service sector employees.
- Famous tourist spot – Service sector employees had a higher utility value than the floating restaurant employees.
- Utility scores for worst scenario – Employees of the floating restaurant had a higher score for the worst case. They were more tolerant than the others.
- Utility scores for best scenario – Hotel employees had lower scores for the best scenario than those from the service sector. This suggests that hotel employees' expectation was much higher.
- Utility of the floating restaurant – Probably because they were employed by the floating restaurant, the employees had higher scores than the hotel employees.

Figure 2
Graph of averaged importance of various factors



For means comparisons between two groups, *t*-test should be used instead of ANOVA as shown in Table VII:
- The female respondents had a higher constant value than the male respondents.
- The female respondents gave a higher score to a "best" restaurant. The ladies attach a higher utility for the best choice than the male respondents.

Table V
Comparison of means and ANOVA results for different meal purposes

Items	Overall average utility score (n = 86)	[A] Av. util. scores for family meals (n = 29)	[B] Av. util. scores for Business meals (n = 30)	[C] Av. util. scores for Tourists (n = 27)	ANOVA LSD Test at 0.05 significance level
Constant	81.42	68.38	91.85	83.83	AC AB
With car park	1.22	1.24	1.31	1.09	~
No car park	-1.22	-1.24	-1.31	-1.09	~
Decoration	-3.07	-2.50	-3.73	-2.94	~
Outlying island	-0.68	-2.85	0.06	0.83	AB AC
Urban (HK/Kowloon)	1.45	2.59	2.10	-0.51	AC
Rural (New Territories)	-0.77	0.25	-2.16	-0.31	AB
Price	3.67	7.20	0.52	3.38	AB AC BC
Quality/taste of food	-11.05	-11.03	-11.30	-10.82	~
Service	-8.12	-6.25	-10.14	-7.88	AB
Chinese food	1.21	0.65	1.70	1.26	~
Western food	-2.04	-2.95	-1.20	-1.98	AB
Seafood	0.83	2.31	-0.50	0.73	AB
Floating restaurant	0.84	2.12	1.21	-0.95	~
Famous tourist spot	3.00	1.69	1.79	5.74	AC BC
Luxurious chinese palace	-0.11	0.77	-0.33	-0.79	~
Chinese cultural dance	0.34	-1.55	0.86	1.79	AC
Traditional restaurant	-4.07	-3.03	-3.52	-5.79	~
Unique speciallty	-1.72	-1.73	-1.81	-1.61	~
Traditional choice	1.72	1.73	1.81	1.61	~
Utility scores for worst scenario	8.56	7.58	6.86	11.50	~
Utility scores for best scenario	78.77	78.11	76.95	81.49	~
Utility of floating restaurant	65.46	62.34	69.52	64.31	~

Table VI
Comparison of means and ANOVA results for different employee groups

Items	Overall average utility score (*n* = 86)	[A] Av. util. scores for service sector employees (*n* = 30)	[B] Av. util. scores for hotel employees (*n* = 35)	[C] Av. util. scores floating restaurant employees (*n* = 21)	ANOVA LSD Test at 0.05 significance level
Constant	81.42	88.24	75.64	81.30	AB
With car park	1.22	1.85	0.34	1.78	AB BC
No car park	-1.22	-1.85	-0.34	-1.78	AB BC
Decoration	-3.07	-4.37	-2.10	-2.82	AB
Outlying island	-0.68	0.24	-1.72	-0.25	~
Urban (HK/Kowloon)	1.45	0.00	2.56	1.66	~
Rural (New Territories)	-0.77	-0.25	-0.83	-1.40	~
Price	3.67	4.93	3.31	2.48	~
Quality/taste of food	-11.05	-12.78	-11.67	-7.57	AC
Service	-8.12	-10.41	-7.82	-5.34	AC
Chinese food	1.21	1.57	1.40	0.38	~
Western food	-2.04	-1.67	-2.42	-1.92	~
Seafood	0.83	0.11	1.03	1.54	~
Floating restaurant	0.84	0.52	0.23	2.32	~
Famous tourist spot	3.00	4.44	3.21	0.59	AC
Luxurious Chinese palace	-0.11	-1.42	0.78	0.29	~
Chinese cultural dance	0.34	0.92	-0.45	0.81	~
Traditional restaurant	-4.07	-4.46	-3.77	-4.01	~
Unique speciality	-1.72	-2.15	-1.46	-1.54	~
Traditional choice	1.72	2.15	1.46	1.54	~
Utility scores for worst scenario	8.56	0.12	5.38	25.92	AC BC
Utility scores for best scenario	78.77	85.45	72.93	78.94	AB
Utility of floating restaurant	65.46	65.93	60.05	73.81	BC

Table VII
Comparison of means and *t*-test results for gender groups

Items	Overall average utility score (*n* = 86)	Av. util. scores for male respondents (*n* = 51)	Av. util. scores for female respondents (*n* = 35)	*T*-test at 0.05 significance level
Constant	81.42	76.82	88.11	Yes
With car park	1.22	0.88	1.70	~
No car park	-1.22	-0.88	-1.70	~
Decoration	-3.07	-2.66	-3.66	~
Outlying island	-0.68	-1.05	-0.14	~
Urban (HK/Kowloon)	1.45	1.92	0.76	~
Rural (New Territories)	-0.77	-0.87	-0.62	~
Price	3.67	3.36	4.13	~
Quality/taste of food	-11.05	-11.13	-10.95	~
Service	-8.12	-7.89	-8.45	~
Chinese food	1.21	1.00	1.51	~
Western food	-2.04	-1.70	-2.53	~
Seafood	0.83	0.70	1.02	~
Floating restaurant	0.84	0.17	1.82	~
Famous tourist spot	3.00	3.14	2.79	~
Luxurious Chinese palace	-0.11	-0.02	-0.23	~
Chinese cultural dance	0.34	-0.23	1.16	~
Traditional restaurant	-4.07	-3.06	-5.54	~
Unique speciallty	-1.72	-1.72	-1.72	~
Traditional choice	1.72	1.72	1.72	~
Utility scores for worst scenario	8.56	6.91	10.96	~
Utility scores for best scenario	78.77	73.87	85.91	Yes
Utility of floating restaurant	65.46	60.44	72.77	Yes

- The female respondents gave a higher score to a floating restaurant. The ladies attach a higher utility than the male respondents.

Discussion and conclusions

This research illustrates the usefulness of conjoint analysis in determining the utility values of restaurant attributes. The utility are subjective measures to each respondents, who without the assistance of conjoint analysis would not know them. Yet in reality consumers make decisions based on the implicit utilities they attach to each factor. The study demonstrates how marketers can use this powerful research technique to reveal and measure the hidden needs of the customers. It also shows that utilities can vary for the same factor under different circumstances (i.e. the purpose of going to a restaurant) for the same individual customer. In other words, utility scores are situational.

The concept of decentring was discussed and applied in this study. With the use of decentring, respondents flex their views from a different perspective. This approach has important implication for future marketing researches. Internal colleagues who know the customers well can be used as a powerful and effective source of customer information. This is particularly important when information is needed speedily and cost-effectively.

The research findings provide much needed information for restaurant operators in Hong Kong. The segmentation of customers into different groups according to the purpose of going to a restaurant has much practical application. Many restaurants tend to cater for some special customer groups by finding a suitable market niche for their operations. Yet very often when asked whether they know what their customers "really" need, they have no confidence and lack reliable answers. Even if they want to develop their business strategies, they have no relevant data to work against. Many managerial decisions to make improvements are based on hunch or on past experience. They cannot reliably predict the likely outcome arising from their decision and action.

A word of caution in using conjoint analysis is the limitation on the selection of factor and factor levels. Even with the help of orthogonal array design, the number of profiles can still be very large. The researchers need to choose the appropriate factors and factor levels. If important factors are omitted then the application of the conjoint analysis findings would be greatly impaired. Therefore proper research planning is vitally important before administrating the conjoint profile cards on the respondents. The other issue relates to the choice of respondents. They should be representative of the population. The sample size should be large enough to give meaningful data analysis.

Combining other research techniques such as cluster analysis, multi-dimensional scaling, the application of using conjoint analysis offers extremely interesting academic as well as business research opportunities.

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