



The Algebra of Features in Restaurants: *Homo emotionalis* Versus *Homo economicus*

Howard Moskowitz^{1*}, Martin Topol² and Joanne Mazzio³

¹Mind Genomics Associates, Inc., White Plains, NY, USA

²Pace University, New York, USA

³Independent Researcher, Portchester, New York, USA

*Corresponding Author: Howard Moskowitz, Mind Genomics Associates, Inc., White Plains, NY, USA.

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Abstract

210 respondents in the US each evaluated a unique set of 48 vignettes about restaurants. The elements or messages in the vignettes presented 'top level' information about the different aspects of a restaurant, such as the food, the service, the ambiance, the cleanliness, and so forth. Each respondent evaluated the unique set of 48 vignettes, constructed according to experimental design, with each of the 48 vignettes comprising 3-4 elements, selected from six groups of six elements each dealing with different aspects of the restaurant. The respondent rated each vignette on two attributes, first 'enticing' on an anchored nine-point scale, second 'price would pay' on an anchored seven-point scale. Deconstruction of the ratings by OLS (ordinary least-squares) regression quantified the contribution of the separate elements, first showing the contribution of each element to the feeling of enticing (*homo emotionalis*), and second showing price that the respondent would pay (*homo economicus*). Three mind-sets emerged, one focused on the inner experience, one focused on outer aspects such as restaurant features, and one focused on combinations of the two. The same mind-sets emerged for the two rating scales, but the segmentation into mind-sets were driven by different elements..

Keywords: Algebra; Restaurants; *Homo emotionalis* Versus; *Homo economicus*

Introduction

The world of restaurants sits at the confluence of many social factors, ranging from the desire of people to enjoy 'eating out' to the societal issues of ensuring that the restaurant maintain the proper precautions for the patron's health, and of course the opportunity for those in the restaurant business to support themselves in this endeavor. The foregoing is a simplification of the reality of restaurants, which, like any other business, must adapt to the changing tastes of customers and the changing requirements of economics and government. The question for this paper is how to measure the importance of these factors from the point of view of the customer.

The traditional method to discover relative importance instructs the respondent to rate each feature on a scale, so that the relative values of the ratings represent relative importance [1]. Respondents appear to experience few problems rating single elements. A problem emerges, however, when we think about the rating as an isolated item. What is the reference against which the respondent is judging importance? How important is an attribute when the attribute is presented in general terms (e.g., cleanliness), rather than presented in more specific, granular terms? And, per-

haps most important but quite subtle, does the respondent use the same scale for the different attributes, or does the nature of the sale being used change, changing in such a way as to be subtle, so even the respondent is not aware of the change in criterion?

The Mind genomics approach

With a view to creating a system to uncover the mind of the person making everyday decisions, the emerging science of Mind Genomics was born almost four decades ago, and evolved during those forty years to become simpler, more direct [2,3]. Mind Genomics was based upon the pioneering work in mathematical psychology called conjoint measurement [15], and functional measurement [4]. The idea was to present combinations of ideas to people and obtain their decisions. Business school professors Paul Green and Jerry Wind expanded the use of these approaches, bringing them into the business world and into application [5]. Finally, the author further expanded the approach, developing an entire DIY (do it yourself) research system, which allowed anyone to do these experiments, create the data, have the data analyzed automatically, and in turn allow for the creation of an integrated database on topics relevant to the way people think, and make decisions (see www.bimileap.com and www.pvi360.com).

Experimental design for the evaluation of restaurants and hotels is not new. There is an increasing literature on the topic. The following references represent only a few of the different papers that have appeared in the academic literature. The use of conjoint measurement and its descendant methods is attractive because of the innate nature of aspects of the hospitality industry, many of which oscillate between ‘nice to have’ and ‘absolutely necessary’, depending upon the person, and the situation.

The rest of this paper will present a new study of what people want in a restaurant versus what people will pay for their wishes. In previous papers the author has called the former decisions (wanting) by the term ‘*homo emotionalis*’ because are dealing with feelings, with desires, with emotions revolving around restaurants and restaurant service. The latter decisions, those dealing with money, are called ‘*homo economicus*’ for the same rationale, dealing now with economic, rational issues.

The academic literature on restaurants focuses a great deal on human behavior, on the nature and quality of service. Food is given less focus by academic researchers, although there are numerous papers on the quality of food. For whatever reason, it is the human interactions in the restaurant and the patron-centric focus which interests the academic researchers. In contrast, one needs only to listen to the word of mouth to recognize that most ordinary people focus on the food, with the comment on the service and other aspects playing a minor role [6-8].

It was within this need to change focus that this paper was created. The issue was not the nature of the food, but the ancillary issues, such as cleanliness, which were of interest, but not those alone. The objective was to explore the many different aspects of the restaurant from the type of information that one would read in a review or hear from friends [9-13].

Explicating the topic

We illustrate the approach using a study designed by Professor Martin Topol, in 2017. Professor Topol’s interest was in the features of restaurants that would both motivate interest, as well as be able to command a premium. The Mind Genomics approach was used in this regard. As noted before, the process has evolved into a templated system, allowing any user to create a study, virtually automatically as it was executed in 2017. During the course of evolving into the templated system, some of the features have been changed, the size of the studies reduced, and the analysis made automatic so that what took days in 2010, hours in 2017, now takes minutes in 2023.

Step 1

Decide the topic and develop the raw materials (messages). The topic was features of restaurants. The design in 2017 featured six

questions, each with six answers, or 36 elements (viz., messages). Table 1 presents the questions and answers (elements). It should be noted that it took about a week to develop the questions and answers, with the effort involving a person with experience. Today’s (2023) Mind Genomics has been shortened to four questions, four answers (elements) per question, with artificial intelligence (Idea Coach) embedded to help the research develop the questions and answers. To reiterate, table 1 reflects the effort of an expert and several days’ work.

When looking at table 1 one should keep in mind that there are many questions and many answers that the researcher might provide. Unlike conventional research, the Mind Genomics system is designed to be rapid, inexpensive, and iterative. For the best results. As a consequence, the researcher is freed up to spend time on thinking about framing the topic, thinking of questions, and then coming up with answers containing the relevant information. Furthermore, in the actual experimentation with respondents, the focus is on ‘doing the experiment, not overthinking.’ Since the Mind Genomics system is iterative, one should follow the dictum of French enlightenment philosopher Voltaire, who opined that ‘Do not let the perfect be the enemy of the good.’

	Question 1: For what is the restaurant known?
A1	Explore and experience a new restaurant with friends and family
A2	Meet and catch up with friends
A3	Pleasant atmosphere and delicious food
A4	Good value ... featuring coupons and specials
A5	Great taste...good value ... service... price ... a winning combination
A6	Extensive menu ... popular ... healthy ... and ... interesting choices
	Question 2: How do I find out about the restaurant?
B1	Search for a restaurant ... look online for favorable ratings
B2	Look online at menus
B3	People I am with recommend the restaurant
B4	My trusted friends like the restaurant
B5	A really good restaurant ... but not in my neighborhood
B6	Choose a familiar, favorite restaurant
	Question 3: What kind of food information will I encounter and experience
C1	Eat a healthy delicious meal
C2	Good-for-you and “better-for-you” menu items ... satisfy hunger
C3	Hard to decide ... so many menu options
C4	Diet oriented menus with low-calorie choices ... makes healthy eating easy
C5	Low-fat, no-salt and sugar-free options simplify eating out

C6	Lots of nutrition information on menus ... confuse
	Question 4: I'm into healthy – what does the restaurant feature?
D1	Clean food ... no hormones or antibiotics
D2	Wholesome, natural, unprocessed foods
D3	Foods with no artificial ingredients
D4	Organic ... no pesticides
D5	Food that's all natural
D6	Healthy foods without preservatives
	Question 5: What are the ecological values promoted by the restaurant?
E1	Serve local, organic products ... its healthier
E2	Farm to table ... conserves the earth's resources
E3	Foods prepared by sustainable methods are healthier
E4	Food that's seasonal, responsibly raised and grown
E5	Locally sourced foods are healthier than those from locations further away
E6	Taste, service and atmosphere ... beats sustainability
	Question 6: What is the letter grade of the restaurant?
F1	Restaurant has letter grade "A"
F2	Restaurant has letter grade "B"
F3	Restaurant has letter grade "C"
F4	Restaurant has letter grade "Grade Pending"
F5	Restaurant owners do not care about letter grades
F6	Restaurant letter grades do not matter

Table 1: The six questions and six answers (elements) to each question.

Step 2

Create the rating question. This version of Mind Genomics used two rating questions, rather than one rating question. The rationale for the two questions was the desire to compare the results when the respondent has to evaluate the vignette in two ways, first by what is liked (*'homo emotionalis'*), and second by what the dollar value is (*'homo economicus'*).

Consumer researchers often aver that people will pay more for what they want. Whether or not that is true is a point that can be explored and will be for these data. The best way to answer the question is to obtain ratings of interest and price for many precisely identical stimuli. Table 2 shows the two rating questions. The first is the convention 9-point Likert or category scale, anchored at the top and at the bottom, respectively. The second is a price scale. Instead of the scale progressing in order of price, the seven prices are shown in irregular order, so that the respondent must read the different price points, rather than simply finding a point on the scale. (Note that this irregularity could have been done with the first scale, on rating, with each scale point labelled as a different

level of enticing. It was not, however, for the simple reasons that it is hard to find the appropriate term for each scale point, and it is onerous for the respondent to search around two scales for the right answer.).

1. How enticing is eating at this particular restaurant?
1 = Not Enticed... 9 = Very Enticed

How much would you spend at this restaurant compared to what you usually spend?

1 = 23% More, 2 = 38% Less, 3 = 11% More, 4 = 7% More, 5 = 43% Less,
6 = The Same as Usual, 7 = 19% Less

Step 3

Invite respondents to participate. The Mind Genomics studies are run on the Internet. The respondents can be anywhere. The important thing is to invite respondents who will be interested in participating and honest in their ratings. The latter, interest, ends up being more important because the Mind Genomics studies are designed to prevent 'guessing' and 'cheating.'

In consumer research there has been an ongoing debate about whether one should use panelists who volunteer versus panelists who are paid. The former, volunteers, are becoming fewer in number as the daily life of people becomes increasingly pre-empted by other activities. It is easier to work with panelists who are members of a panel developed for business purposes by a company. These respondents are motivated to participate ad to complete the study.

The study reported here, comprising 210 respondents, took approximately five hours to complete in the field, using the panel company (Luc.id). Luc.id was instructed to provide a panel of males and females, across all ages, in the United States. It is standard operating procedure for Luc.id to fulfill these quotas in an expeditious, cost-effective way. A researcher trying to deal with unpaid panelists would have difficulty doing the study in less than a few weeks if that quickly. (Note that the actual analysis required a few more hours).

Step 4: Present the respondents with different 48 vignettes. The vignettes comprise either four elements or three elements. Thus, by definition, all vignettes are incomplete. Each respondent evaluated the precise set of combinations needed to ensure that the data from the respondent would be amenable to OLS (ordinary least squares) regression analysis.

Each respondent evaluated a unique set of vignettes, different from the set of vignettes evaluated by other respondents. The approach followed the specifications laid out by the work of Gofman

and Moskowitz [16], which recommended permutation of the combinations. With this permutation the respondents would be testing formally 'similar' sets of 48 vignettes, but the actual combinations would change, as a consequence of the permutation. In this way the approach is akin to the MRI (magnetic resonance imaging), which takes many pictures of a tissue from different angles and then combines those images to reconstruct a three-dimensional picture of the tissue.

The strategy of testing a unique set of combinations with each respondent differs dramatically from the conventional approach of presenting one set of vignettes to many respondents, albeit in randomized order, and averaging the ratings assigned to each vignette from the respondents who evaluated that vignette. The conventional approach just described assumes that the vignettes are the correct ones, and that the strategy to replicate the ratings across many respondents is to reduce the variability, allowing the pattern to emerge. In contrast, Mind Genomics creates patterns for each combination. As noisy as these patterns are, the 210 x 48 or more than 10,000 patterns across all the respondents reveals the underlying pattern, without having the research needing to pre-select the most promising area. In other words, Mind Genomics reveals the underlying pattern, even in situations where the researcher is not sure about an appropriate region where the answer might lie.

Step 5

Prepare the database for statistical analysis: The essence of Mind Genomics is to relate the presence/absence of the different elements (answers, messages) to the ratings assigned by the respondent. There are two sets of ratings, direct rating of enticement (tapping into *homo emotionalis*, emotional response) and selection of a price (tapping into *homo economicus*, economic response).

In consumer research the convention has been to transform the Likert scale (1-9 enticement scale) into a binary scale (e.g., 1-6 → 0 = no real enticement; 7-9 → 100 = enticement). The rationale for this transformation is that managers really don't know what the scale values mean. Despite the statistical prowess of the researcher, the actual interpretation of the raw data and even the summarized data remains elusive. Manager after manager inevitably asks '*what does this rating really mean ... what do the data tell me?*' Although the researcher may feel comfortable with the data, and although the data may be powerful, the sheer lack of understanding of how to interpret the data as revealed in meetings with managers suggest the need for a simpler way to treat the data and explain the results in simple language.

Managers understand yes/no. We transform the data from the rating scale into a yes/no scale by transforming the 9-point rating scale. Consumer researchers as well as political pollsters are accus-

tomed to transforming scale ratings to binary in order to make the scale into a 'yes/no' measure. This was done here for the enticement rating, so that ratings of 1-6 were transformed into the value 0, and ratings 7-9 were transformed into the value 100.

A second transformation was made, this time on the second scale. The transformed value was defined from the baseline of 100, corresponding to 'current'. An increase of 20%, for example, would be transformed to number 120. In turn, a decrease of 20% would be transformed into the number 80.

A final transformation was done by adding a vanishingly small random number ($<10^{-5}$) to each transformed value. This small number ensures that the newly created variable exhibits variation, however minor. That variation ensures that hat OLS (ordinary least squares) regression can be used even at the level of an individual respondent, who might have rated all vignettes 6 or below, 7 or above, or assigned each of the vignettes the same price when rating the vignette on the second scale.

Step 6: Run OLS regression on data from total panel, each gender, older versus younger respondents. The OLS regression estimates the following regression equations

$$\text{Binary Enticement Variable} = k_1(A1) + k_2(A2) \dots k_{36}(F6)$$

The price equation is expressed by the same equation.

$$\text{Price} = k_1(A1) + k_2(A2) \dots k_{36}(F6)$$

It is worth noting here that the equations do not have an additive constant. During the years of development of Mind Genomics, the traditional approach has been to use an additive constant, a baseline. Recently, however, efforts to use the modeling without the additive constant seem to have been easier to understand. All of the variation in the dependent variable can be linked to the coefficients themselves, without having to deal with a complicated secondary factor, the additive constant. Thus, this paper works with a new approach, estimating the coefficients without a constant. The Appendix to this paper shows a comparison of the 36 coefficients, estimated without versus with an Additive constant.

Table 2 presents the 36 coefficients for Total Panel, genders, and ages, respectively. Each set of coefficients was estimated using all of the respondent data for respondents belonging to the subgroup. The respondents are clearly able to distinguish among the different elements, with the results making intuitive sense. For example, the highest coefficient comes from element F1 (Restaurant has letter grade "A"). It is important to keep in mind that none of the data could have emerged clearly unless the respondent was actually rating the vignettes in a valid way.

The coefficients have meaning in absolute terms. A 10 means that 10% of the respondents will change their rating of a vignette from a low of 1-6 to a high of 7-9 when the element is incorporated into the vignette. The user of the data can thus move across the different elements for a single group or compare the same element across groups. The number of comparisons can become overwhelming. It is best to consider the data in table 2 as a snapshot of the mind of respondents.

There are no real surprises in table 2. That is, the data make sense. Element F1 scores the highest across all groups 'Restaurant has letter grade A'. What might surprise is the consistency of responses, and the clear face validity of the results, especially when we realize that each respondent was faced with seemingly random sets of three-four elements in a vignette, the vignette in turn being rated quickly on two scales. Although the respondents may say that they felt that their answers were random, the data appear to make a great deal of sense.

	Entice (Top 3)	Total	Male	Female	Age 21-51	Age 52-75
	Base size	210	86	124	112	98
	Elements which clearly drive enticement with the message					
F1	Restaurant has letter grade "A"	30	29	30	28	32
A6	Extensive menu ... popular ... healthy ... & ... interesting choices	19	23	16	19	19
A5	Great taste...good value ... service... price ... a winning combination	18	23	16	16	21
C1	Eat a healthy delicious meal	18	19	18	17	20
A1	Explore & experience a new restaurant with friends & family	17	22	14	19	15
A3	Pleasant atmosphere & delicious food	17	19	16	16	18
C2	Good-for-you and "better-for-you" menu items ... satisfy hunger	17	21	15	16	19
D5	Food that's all natural	17	20	15	16	19
D6	Healthy foods without preservatives	17	19	15	17	18
E1	Serve local, organic products ... its healthier	17	22	15	16	19
A4	Good value ... featuring coupons & specials	16	19	13	18	13
B4	My trusted friends like the restaurant	16	19	14	17	16
D2	Wholesome, natural, unprocessed foods	16	19	14	18	15
E2	Farm to table ... conserves the earth's resources	16	20	14	15	18
B1	Search for a restaurant ... look online for favorable ratings	15	17	14	17	12
B3	People I am with recommend the restaurant	15	18	13	14	16
B6	Choose a familiar, favorite restaurant	15	17	14	14	16
C3	Hard to decide ... so many menu options	15	18	13	17	12
D1	Clean food ... no hormones or antibiotics	15	15	15	15	16
D4	Organic ... no pesticides	15	19	12	17	14
E4	Food that's seasonal, responsibly raised & grown	15	17	14	13	17
A2	Meet & catch up with friends	14	15	13	15	12
B2	Look online at menus	14	20	10	18	10
C5	Low-fat, no-salt and sugar-free options simplify eating out	14	16	14	15	14
D3	Foods with no artificial ingredients	14	15	14	15	13
E3	Foods prepared by sustainable methods are healthier	14	18	11	16	12
E5	Locally sourced foods are healthier than those from locations further away	14	13	14	16	12
B5	A really good restaurant ... but not in my neighborhood	13	16	10	14	11
C4	Diet oriented menus with low-calorie choices ... makes healthy eating easy	13	17	10	14	11
E6	Taste, service & atmosphere ... beats sustainability	13	17	10	13	12
C6	Lots of nutrition information on menus ... confuse	11	16	7	13	8
F2	Restaurant has letter grade "B"	8	11	6	11	3
	Elements which generate small coefficients, even negative ones					
F6	Restaurant letter grades do not matter	1	6	-3	2	-1
F4	Restaurant has letter grade "Grade Pending"	0	2	-2	2	-3
F5	Restaurant owners do not care about letter grades	0	9	-6	5	-6
F3	Restaurant has letter grade "C"	-11	-5	-14	-7	-15

Table 2: Coefficients for the 36 elements for the binary variable 'Top3' (Enticing).

The coefficients emerging from the estimate of relative dollar value appear in table 3. The coefficients for price are much more constricted in range than are the coefficients for enticing. Part of this is the result of the sale. The elements which command the higher price are those which make intuitive sense.

	Relative Price	Total	Male	Female	Age 21-51	Age 52-75
	Base Size	210	86	124	112	98
F1	Restaurant has letter grade "A"	27	27	27	26	29
A3	Pleasant atmosphere and delicious food	26	25	27	27	25
A1	Explore and experience a new restaurant with friends and family	25	25	24	26	23
A2	Meet and catch up with friends	25	24	26	25	24
A4	Good value ... featuring coupons and specials	25	22	27	26	23
A5	Great taste...good value ... service... price ... a winning combination	25	23	26	24	26
B1	Search for a restaurant ... look online for favorable ratings	25	25	25	24	26
B2	Look online at menus	25	23	26	24	25
B3	People I am with recommend the restaurant	25	25	24	24	25
B4	My trusted friends like the restaurant	25	25	25	24	27
B5	A really good restaurant ... but not in my neighborhood	25	24	26	25	24
B6	Choose a familiar, favorite restaurant	25	25	26	24	27
C1	Eat a healthy delicious meal	25	24	26	25	25
C3	Hard to decide ... so many menu options	25	26	25	26	24
D4	Organic ... no pesticides	25	27	24	25	26
D6	Healthy foods without preservatives	25	23	27	25	26
E2	Farm to table ... conserves the earth's resources	25	26	24	23	27
E4	Food that's seasonal, responsibly raised and grown	25	25	25	24	26
A6	Extensive menu ... popular ... healthy ... and ... interesting choices	24	22	26	24	25
C2	Good-for-you and "better-for-you" menu items ... satisfy hunger	24	22	26	23	26
C5	Low-fat, no-salt and sugar-free options simplify eating out	24	23	24	24	24
C6	Lots of nutrition information on menus ... confuse	24	23	25	24	24
D1	Clean food ... no hormones or antibiotics	24	24	24	24	25
D2	Wholesome, natural, unprocessed foods	24	24	24	24	25
D3	Foods with no artificial ingredients	24	23	24	22	26
D5	Food that's all natural	24	26	23	24	25
E5	Locally sourced foods are healthier than those from locations further away	24	25	23	25	22
F2	Restaurant has letter grade "B"	24	24	24	26	22
F4	Restaurant has letter grade "Grade Pending"	24	24	25	26	23
F6	Restaurant letter grades do not matter	24	25	24	24	24
C4	Diet oriented menus with low-calorie choices ... makes healthy eating easy	23	22	23	23	22
E1	Serve local, organic products ... its healthier	23	24	22	23	23
E3	Foods prepared by sustainable methods are healthier	23	24	22	22	23
E6	Taste, service and atmosphere ... beats sustainability	23	24	23	23	23
F5	Restaurant owners do not care about letter grades	23	23	23	23	24
F3	Restaurant has letter grade "C"	21	21	20	22	19

Table 3: Coefficients for the 36 elements for the variable: Relative price willing to pay.

There are few elements which drive higher price willing to pay, and in turn few elements which drive lower price willing to pay. The respondents appear to adopt a more stringent criterion when evaluating vignettes for price than for acceptance (enticing). Other studies in the topic of restaurant confirm that the evaluation of price (*homo economicus*) is more constrained than the evaluation of enticing or liking (*homo emotionalis*; see Ref 11).

Will people pay more for what they want?

A continuing issue in consumer research is the question about whether or not respondents will pay more for what they like. The common assumption is that people will actually pay more when they like something and will pay less or not even consider buying something that they like far less. This study allows us to plot enticement versus price willing to pay. We could plot the data for the 48 vignettes x 210 respondents or plot the 36 coefficients against each other. The latter strategy will more likely reveal the pattern, without overwhelming.

Our scatterplots appear in figure 1. In each of the graphs we show the coefficient for enticement (TOP3) on the abscissa and the estimated dollar value on the ordinate. We have looked at five groups, comprising the Total Panel, Gender, and Age, respectively. Each group generates its own scatterplot. Figure shows the scatterplot, along with the computer-generated ‘smoother’. The smoother is a plot which attempts to fit a straight lien to the data.

Figure 1 shows no strong relation between price and enticing. Rather, we see a noisy plot. We could look at the smoother to give us a general sense of what might be the pattern, once we suspend our desire show a strong relation. We might conclude that the results are noisy, but the pattern is slightly clear for females, for older respondents, and less clear for males and for younger respondents.

Moving beyond self-defined groups to mind-sets for enticing, and to mind-sets for paying.

A key feature of Mind Genomics is that people differ from each other at the level of the granular, everyday experience. These differences manifest themselves in the way people make decisions about products and services, in the way people describe what they like and dislike, and in the myriad ways that people do what they do as they progress through their day. Marketers are well aware of people’s preferences, spending a great deal of money to uncover such preferences in the search for product and service success.

Mind Genomics moves one step away from the standard research approaches, focusing on the understanding of these differences from the ‘bottom up’. In other words, rather than making the search for these people-to-people differences into a massive task, rarely done except in the most important cases, Mind Genomics incorporates into everyday analyses the search for meaningful differences among people. The process is explained below and applied to these data.

The ingoing assumption of Mind Genomics with regard to finding these person-to-person differences is that an important key to these differences comes from the discovery of coherent, interpretable groups of people, based on how they THINK, and not based upon who they ARE. The pattern of HOW ONE THINKS emerges from the pattern of the coefficients. In our case, we will look at thinking by clustering the 36 coefficients, doing it separately for ‘Enticing’ versus ‘Price.’ Our tool will be cluster analysis, specifically k-means clustering’. We look for meaningful groups in our set of 210 respondents Our approach will be completely mathematical. We will settle on a solution that is mathematically best, and only afterwards try to interpret the results [14].

Cluster analysis is a heuristic, which tries to divide a group of items into non-overlapping sets, based upon a profile of numbers. It is up to the researcher to decide the number of clusters or mind-sets to exact, and to label each mind-set. Tables 4 and 5 shows a first pass at naming the mind-sets. What is important to note is that the mind-sets generate systematically higher coefficients than do the subgroups defined by gender or age. This comes about because the Mind Genomics clustering gets at the way people really think about the topic, not about who the people say they are table 4 shows the coefficients of the three mind-sets, based upon clustering the 210 coefficients for enticing. Each of the 36 elements generates a set of coefficients for the three mind-sets. The coefficients of 20 or higher are shaded. Each mind-set is sorted by the coefficients which perform strongest. The mind-sets are labelled MSE1 (mind-set entice 1), MSE2 and MSE3, respectively. The labels come from the attempt to find a common pattern.

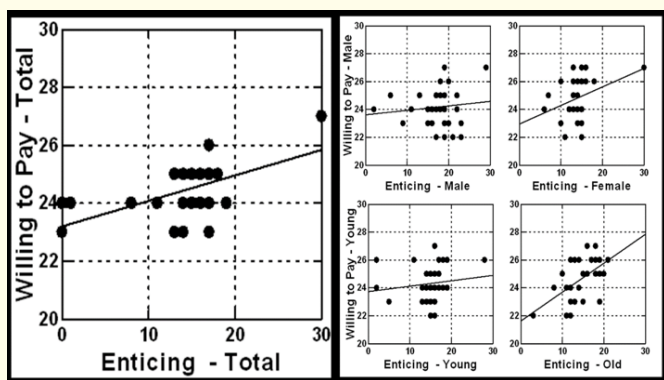


Figure 1: Relation between the coefficients for enticing (Top3; abscissa) and the relative price that the respondent would pay (ordinate).

	Top 3-Clusters based on Question 1 (How enticing)	MSE1	MSE2	MSE3
	Base Size	69	54	87
	Mind-Set Entice1 – Joint outer and inner focus			
C5	Low-fat, no-salt and sugar-free options simplify eating out	39	3	0
C2	Good-for-you and "better-for-you" menu items ... satisfy hunger	37	10	16
B1	Search for a restaurant ... look online for favorable ratings	34	8	7
C3	Hard to decide ... so many menu options	33	7	6
C1	Eat a healthy delicious meal	30	7	16
F1	Restaurant has letter grade "A"	30	44	24
C4	Diet oriented menus with low-calorie choices ... makes healthy eating easy	29	-8	19
C6	Lots of nutrition information on menus ... confuse	27	4	3
B4	My trusted friends like the restaurant	24	11	20
E4	Food that's seasonal, responsibly raised and grown	20	0	29
	Mind-Set Entice 2- Inward Focus on good food, good eating, good experience			
F1	Restaurant has letter grade "A"	30	44	24
F5	Restaurant owners do not care about letter grades	0	32	-22
A1	Explore and experience a new restaurant with friends and family	15	29	19
F2	Restaurant has letter grade "B"	12	29	-2
A1	Explore and experience a new restaurant with friends and family	15	29	19
A2	Meet and catch up with friends	19	28	6
A6	Extensive menu ... popular ... healthy ... and ... interesting choices	18	26	17
A4	Good value ... featuring coupons and specials	8	25	14
F4	Restaurant has letter grade "Grade Pending"	3	25	-19
B2	Look online at menus	13	23	10
A5	Great taste...good value ... service... price ... a winning combination	19	23	16
A3	Pleasant atmosphere and delicious food	10	20	20
D3	Foods with no artificial ingredients	2	20	20
A3	Pleasant atmosphere and delicious food	10	20	20
D3	Foods with no artificial ingredients	2	20	20
	Mind-Set Entice 3 – Outward focus on health, sustainability			
D2	Wholesome, natural, unprocessed foods	1	18	29
E1	Serve local, organic products ... its healthier	17	4	29
E2	Farm to table ... conserves the earth's resources	13	8	28
D5	Food that's all natural	-2	17	27
E5	Locally sourced foods are healthier than those from locations further away	10	-6	27
D4	Organic ... no pesticides	-4	18	25
F1	Restaurant has letter grade "A"	30	44	24
D6	Healthy foods without preservatives	-4	19	23
D1	Clean food ... no hormones or antibiotics	-13	12	22
E6	Taste, service and atmosphere ... beats sustainability	16	-7	22
E3	Foods prepared by sustainable methods are healthier	8	4	20
A3	Pleasant atmosphere and delicious food	10	20	20
D3	Foods with no artificial ingredients	2	20	20
	Does not strongly entice any mind-set			
B3	People I am with recommend the restaurant	17	17	15
B6	Choose a familiar, favorite restaurant	14	11	13
B5	A really good restaurant ... but not in my neighborhood	17	14	12
F6	Restaurant letter grades do not matter	10	16	-22
F3	Restaurant has letter grade "C"	-5	10	-33

Table 4: Coefficients for the elements based upon clustering the 210 respondents on what entices them.

Table 5 shows the results from clustering the same 210 respondents, this time based upon the coefficients for price would pay. The three mind-sets which emerge are similar to the three mind-sets which emerged when the respondents were clustered on the basis

of the coefficient for enticements. Even the base sizes are similar, although the individuals in the mind-sets differ. That is, a respondent can be in one mind-set for enticing, and any of the three mind-sets for price.

	Price	MSP1	MSP2	MSP3
		80	56	74
	Price Mind-Set P1 - Outward focus			
E1	Serve local, organic products ... its healthier	37	21	16
E2	Farm to table ... conserves the earth's resources	37	18	23
E4	Food that's seasonal, responsibly raised and grown	37	15	23
E5	Locally sourced foods are healthier than those from locations further away	37	23	17
E3	Foods prepared by sustainable methods are healthier	33	18	18
E6	Taste, service and atmosphere ... beats sustainability	33	25	16
D6	Healthy foods without preservatives	31	18	29
	Price Mind-Set P2 - Inward focus			
C3	Hard to decide ... so many menu options	20	41	18
C2	Good-for-you and "better-for-you" menu items ... satisfy hunger	18	35	21
F6	Restaurant letter grades do not matter	24	34	21
C6	Lots of nutrition information on menus ... confuse	22	34	18
C1	Eat a healthy delicious meal	21	33	20
F4	Restaurant has letter grade "Grade Pending"	25	32	19
C4	Diet oriented menus with low-calorie choices ... makes healthy eating easy	22	31	13
C5	Low-fat, no-salt and sugar-free options simplify eating out	17	31	22
F3	Restaurant has letter grade "C"	16	31	14
	Price Mind-Set P3 - Outward and Inward focus			
A2	Meet and catch up with friends	25	22	33
B5	A really good restaurant ... but not in my neighborhood	18	20	33
A5	Great taste...good value ... service... price ... a winning combination	24	19	33
B4	My trusted friends like the restaurant	20	17	33
B6	Choose a familiar, favorite restaurant	13	22	32
A4	Good value ... featuring coupons and specials	19	20	32
B2	Look online at menus	18	25	31
A6	Extensive menu ... popular ... healthy ... and ... interesting choices	23	23	31
D4	Organic ... no pesticides	25	17	31
B1	Search for a restaurant ... look online for favorable ratings	20	27	31
A1	Explore and experience a new restaurant with friends and family	21	22	30
D5	Food that's all natural	26	17	30
F1	Restaurant has letter grade "A"	26	29	30
	Not considered for premium pricing			
D3	Foods with no artificial ingredients	29	15	28
D2	Wholesome, natural, unprocessed foods	26	20	29
F2	Restaurant has letter grade "B"	26	29	21
A3	Pleasant atmosphere and delicious food	25	24	28
F5	Restaurant owners do not care about letter grades	22	25	21
D1	Clean food ... no hormones or antibiotics	21	20	28
B3	People I am with recommend the restaurant	20	28	28

Table 5: Coefficients for the elements based upon clustering the 210 respondents on the relative price that they would pay.

How elements drive the segmentation into mind-sets

We know that there are differences in the coefficients of the elements across mind-sets. Tables 4 and 5 show those differences clearly. What we do not see, however, is how strongly each element acts to create two groups of three mind-sets each.

One way to understand the vignettes is to use the notion of the ratio of signal to noise. In statistics this is known as the F ratio, the ratio of two estimates of variability. One estimate comes from the variation across the three mind-sets. The other estimates the unexplained or error variation. The ratio of the two variations is the F ratio. The higher the F ratio, the more the element performance differs across mind-sets.

Table 6 shows the F ratio for each element for each vignette. The third data column in table 6 shows the absolute difference in the two F ratios. Finally, figure 2 shows a scattergram of two sets of F ratios. Each point on the scattergram corresponds to one of the 36 elements. The abscissa shows the value of the F ratios of the elements on ‘enticing.’ The ordinate shows the F ratios of the same elements, but on price. Strong performing elements as differentiators into three mind-sets lie at the highest levels on the scales.

Figure 2 and table 6 suggest that no elements perform strongly as drivers simultaneously of mind-sets for enticing and for price. Perhaps the closest element to a general driver of segmentation across both price and enticing is C4: *Diet oriented menus with low-calorie choices ... makes healthy eating easy.*

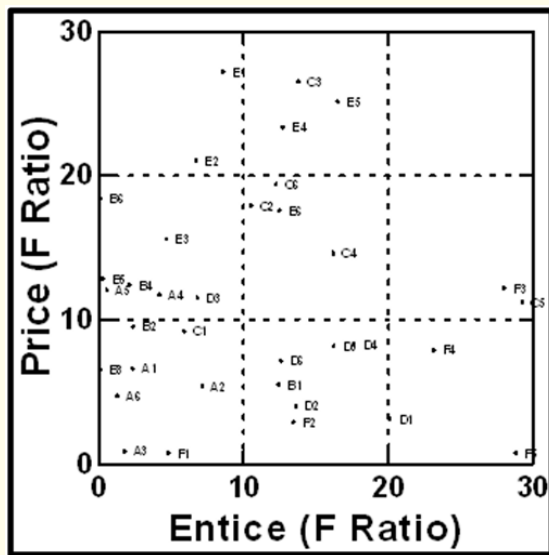


Figure 2: Scatterplot of F ratios. High F ratios mean that the element drives differences across mind-sets.

	Element	F Ratio Entice	F Ratio Price	Absolute Diff
F5	Restaurant owners do not care about letter grades	29	1	28
F6	Restaurant letter grades do not matter	30	8	22
E1	Serve local, organic products ... its healthier	9	27	19
C5	Low-fat, no-salt and sugar-free options simplify eating out	29	11	18
B6	Choose a familiar, favorite restaurant	0	18	18
D1	Clean food ... no hormones or antibiotics	20	3	17
F3	Restaurant has letter grade “C”	28	12	16
F4	Restaurant has letter grade “Grade Pending”	23	8	15
E2	Farm to table ... conserves the earth’s resources	7	21	14
C3	Hard to decide ... so many menu options	14	26	13
B5	A really good restaurant ... but not in my neighborhood	0	13	12
F2	Restaurant has letter grade “B”	13	3	11
E4	Food that’s seasonal, responsibly raised and grown	13	23	11
E3	Foods prepared by sustainable methods are healthier	5	16	11
A5	Great taste...good value ... service... price ... a winning combination	1	12	11
D2	Wholesome, natural, unprocessed foods	14	4	10
B4	My trusted friends like the restaurant	2	12	10
E5	Locally sourced foods are healthier than those from locations further away	17	25	9
D4	Organic ... no pesticides	18	8	9
D5	Food that’s all natural	16	8	8
C6	Lots of nutrition information on menus ... confuse	12	19	7
C2	Good-for-you and “better-for-you” menu items ... satisfy hunger	11	18	7
B2	Look online at menus	2	9	7
B1	Search for a restaurant ... look online for favorable ratings	12	5	7
A4	Good value ... featuring coupons and specials	4	12	7
B3	People I am with recommend the restaurant	0	7	6
E6	Taste, service and atmosphere ... beats sustainability	13	18	5
D6	Healthy foods without preservatives	13	7	5

D3	Foods with no artificial ingredients	7	11	5
F1	Restaurant has letter grade "A"	5	1	4
A1	Explore and experience a new restaurant with friends and family	2	7	4
C1	Eat a healthy delicious meal	6	9	3
A6	Extensive menu ... popular ... healthy ... and ... interesting choices	1	5	3
C4	Diet oriented menus with low-calorie choices ... makes healthy eating easy	16	15	2
A2	Meet and catch up with friends	7	5	2
A3	Pleasant atmosphere and delicious food	2	1	1

Table 6: F Ratios showing the degree to which the elements drive the segmentation.

Conclusion

Mind Genomics provides the researcher with a platform to understand the topics of the everyday. When researchers study people, quite often it is the sheer ordinariness of daily experience that is overlooked as a topic of understanding. Across the different aspects of the studies, products, cleanliness, ambiance, and so forth, there is the deceptive simplicity of this ordinariness. We know, however, that people are different from each other. There may not be profound aspects to studying the grades of restaurant cleanliness, perhaps, but there is the interesting aspect of just why people differ in the way they respond to the quotidian, ordinary aspects of the daily world. It perhaps as a simple exploration, a census of the mind, that we may liken the Mind Genomics study.

This paper might continue with a detailed discussion of the results, and how they fit various theories. Such an approach to discussing the results would be useful, but it would defeat the worldview of Mind Genomics. That worldview is to create a simple database of decision-making for human experience, extract patterns from the database, and from almost the point of view of an impressionist, get a sense of how people think about the issues of the everyday. In other words, it is sufficiently exciting to learn about the 'rules of the everyday', learning that can be applied to the very ordinariness of daily life, and just as easily, to the hard-to-plumb depths of how people think.

Appendix

The coefficients for the 36 elements, estimated without versus with an additive constant

As of the June 2023 the standard OLS regression procedures for Mind Genomics will have changed from estimating the regression coefficients with an additive constant versus estimating the regression coefficients without estimating the additive constant. The rationale is that the additive constant interfere with the researcher's

ability to compare the same coefficient across different groups in the same study, and across different studies having different elements.

The Appendix shows the plot of the 36 coefficients estimated two ways, with versus without the additive constant, and done so with the original ratings, the Top3 Box ratings (used here), and the actual relative price (used here). It is only the actual relative price which shows a bit of noisiness, because of the narrow range of coefficients.

The plot suggests that it is probably of little statistical importance whether we use the coefficients estimated with versus without the additive constant. Thus, we should acceptance with the confidence the change in the form of the estimated regression model.

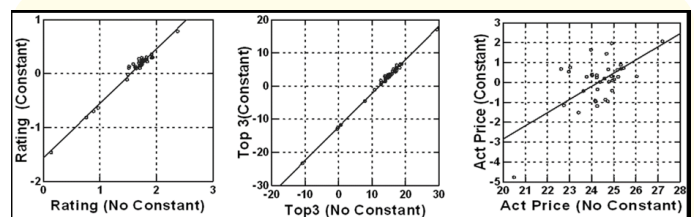


Figure 3

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