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Interest and Response- Times - Measures of Consumer Responses to Concepts

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Abstract: This study presents a case history showing two aspects of consumer reactions to concepts. The approach used conjoint analysis to measure the impact of each concept element on two variables; interest, and response-time. The response-times were allocated to two hypothesized processes; a primary stage (not traceable to elements), and to a secondary stage (traceable to elements). Across seven countries there are clear country-to-country differences in the proportion of the response-time allocated to the primary and secondary stages.

Key words: Conjoint measurement, IdeaMap®,Response-time, Cross-cultural research, Concept testing, Utility values

Introduction

Most concept testing executed for commercial purposes is designed to address a specific marketing issue (e.g., the need to launch a new product or service). The increased use of consumer research by the global business community has spurred interest in measuring concepts on consumer interest as well as communication. Researchers use standard scales to measure interest (e.g., the five point purchase interest scales) and appropriate scales or open-end questions to assess communication. Quantitative concept testing augments the widely used method of focus groups (McCarte and Hedges ,1970), a mainstay of concept evaluation for thirty years. Not much has been written in the academic literature about concept testing in different countries (Lorimer and Dunn, 1967) except for perhaps caveats on testing concepts internationally. The emphasis in international work has been primarily on execution and experiences.

Response-time – A Neglected Dimension of Concept Evaluation: The subjective 'processing' of concept information can be assessed from a variety of different aspects, beyond expressed interest and received communication. Indeed, reaction time, the topic of this study, is one of the oldest topics of experimental psychology. Response-time as measured by tachistoscope, has long been a staple research tool in experimental psychology. Response-time is very important as a dependent measure for package research where the objective is to determine how quickly the package can be discovered on a crowded shelf. Response-time is also important in advertising testing (Aaker *et al.*,1980; Lancaster and Lomas, 1977; McLachlan and Myer,1983; Rhodes *et al.*, 1979 and Taylor, 1970). There may be a place for response-time in concept testing as well, but the usefulness remains to be demonstrated. That usefulness is the topic of this study.

Respondents do not react instantaneously to concepts; rather they process the information and respond. The time to process the information may be just as important as the reaction to the concept for process time may inform us about the nature of the stimulus. Two concepts generating equally high ratings of interest and similar communication profiles may, in fact, differ quite substantially in terms of the amount of time it takes for the consumer to react, and to assign a rating. Differences between concepts in response-time suggest that the consumer needs more time to understand the messages in one concept than to understand the messages in the other. In some cases, the response-time may be due to other interfering processes, such as an inhibition set up because of the nature of the content in the concept.

Conjoint Measurement, and The Analysis Of Interest And Response-times: During the past three decades researchers interested in consumer reactions to concepts have been better able to understand the specific features of the concepts that drive interest. The necessity of experimental design and analytics beyond paired comparison was understood 35 years (Blankenship, 1966). Using 'conjoint measurement designs' (e.g., Green and Krieger 1991; Green and Srinivasan, 1990) the researcher creates concepts comprising systematic variations of features, obtains reactions to these concepts, and then estimates the marginal or part-worth contribution of every concept element. In most conjoint measurement tasks the respondent rates overall interest or intent to purchase. In more recent approaches (Moskowitz, 1994) the respondent rates the concept on a variety of attributes as well. These attributes may include the degree to which a product fits Brand X Vs Brand Y, or the degree to which a concept communicates a specific image (e.g., more for men versus more for women).

Conjoint measurement provides a useful framework with which to investigate response-time. With experimental design it is easy to relate the presence / absence of concept elements to the time it takes the consumer to rate the concept. Although each respondent may adopt an individual style in reading concepts and evaluating them (e.g., some individuals react quickly in general, others sit and think), the researcher can create a model for each individual. The model reveals what elements require a long time to process and what elements require little time to that was run across seven countries.

Method

Stimuli: The stimuli comprised 237 elements, all dealing with coffee. Thirty-eight of these 237 elements were pictures. The stimuli were divided into different categories as shown in Table 1. Categories are 'silos' that comprise elements sharing a common theme (e.g., aroma). Table 2 shows four categories and two elements from each category. The 237 elements provided a wealth of different ways to present the same message, as well as a variety of different messages to present.

Table 1 : The 21 categories for the coffee study and the number of elements in each category

Aroma	12	Coffee Imagery	9	Waking up Theme	6
Beans	6	Convenience	6	Coffee Descriptors	7
Country of Origin	8	Ways to be Served	7	Morning theme	7
Benefits		Ways to be Preserved	8	Taste	12
Accompaniment	6	Relaxing	6	Flavors	16
Dinnertime	9	Anytime of the Day	6	Warm/Rewarding	15
Varieties	23	Sociable/Friendly	14	Pictures	38

Table 2: Four categories of concept elements, four specific concept elements per category, and the number of characters in the concept element (when translated)

Category	Element	France	Germany	Hong Kong	Italy	Norway	USA England
Flavors	Mysterious flavor	18	31	10	16	12	17
Flavors	Delicious flavor	17	24	10	15	12	16
Aroma	Rich, flavorful aroma	33	33	18	28	19	21
Aroma	The rich aroma is followed by great taste	36	52	25	41	53	41
Beans	The finest beans, roasted to perfection	45	37	31	43	40	39
Beans	We select only the finest beans	46	41	24	42	33	31
Energy	Boost your energy	22	28	12	15	21	17
Energy	Revitalizing	25	38	8	19	15	12

Experimental Design, Stimulus Presentation Method, Data Acquisition : The stimuli were combined, according to an experimental design, into small, easy to read concepts. The design structure (Plackett and Burman, 1946) uses five variables (categories), and five levels per variable (level = element). The fifth element of each category was defined as the null element (viz., the category did not appear in that concept). The experimental design generated 25 combinations, comprising 20 concept elements (rather than 25 elements, since one element in each category was defined to be the null element). Each concept element appeared four times in the 25 concepts. A concept could contain only one element from a category. This experimental design allows the researcher to create a dummy variable model relating the presence/absence of a concept element to the respondent's rating. The presentation program that generated the experimental design for the concepts ensured that pair-wise, incompatible elements never appeared together. Prior to the actual study, a small group of 5-7 consumers in each country rated every one of the concept elements on a series of eight semantic scales. This process, "dimensionalization", enables the researcher to estimate the responses to untested elements on a respondent by respondent basis using numerical analysis. The respondents participating in dimensionalization were recruited using the same criteria as those respondents who would later participate in the full study.

Additive Models For Interest and For Response-time : The concepts are only vehicles by which to understand the properties of the elements. The two properties of interest are the ability of the concept element to drive concept acceptance (interest) and the response-time (in tenths of seconds) that can be traced to the element. Since each respondent evaluated different combinations of concept elements according to an experimental design, it is straightforward to create an individual pair of equations relating the presence / absence of concept elements to consumer to interest and to response-time.

The two dependent variables were defined as follows:

Interest – defined as 0 if the concept was rated as 1-6, and 100 if the concept was rated 7-9. [This re-coding of the nine point scale into a binary scale follows conventions adopted by market researchers, who analyze the *percent* of consumers interested in a concept, rather than analyzing the average degree of interest in a concept].

b) Response-time, defined as the number of tenths of seconds from the presentation of the stimulus concept to the rating of interest.

Since each respondent evaluated 100 concepts with 80 elements that appeared independently, it was straightforward to create an individual regression model relating the presence / absence of each element to both the binary interest rating (0, 100) and the response-time, respectively. The model comprises a set of coefficients for each respondent for each of these two dependent variables. A respondent could not test all elements, and thus there were many other elements not tested. The 'data imputation' method presented by Moskowitz and Martin (1993) estimated the interest coefficient and the response-time coefficient for each remaining untested elements. The data imputation method does not change the estimated coefficients for elements directly tested. [Details of the approach appear in the Moskowitz and Martin article].

Results

Additive Model: The additive model comprises a set of 237 coefficients and an additive constant, similar to that shown in Table 3 for US versus France (partial data), one model per person each for response-time and interest, respectively. The models can be averaged by country. The model can be expressed by the simple additive expression: Interest = k_0 + k_1(Element 1) + k_2(Element 2) ... k_n(Element n). Interest here is defined as the proportion of respondents who find a concept interesting (viz., rate it 7-9), as a function of the presence of an element (viz., the element takes on the value 1). The additive constant, k_0, shows the estimated interest if all elements are absent from the concept. The additive constant reflects basic interest in the concept in the absence of additional information. The additive model is, of course, an estimated value since no concepts appeared without elements.

A similar equation and interpretation holds for response-time, measured in tenths of seconds. The additive constant shows the estimated number of tenths of seconds required by a respondent to rate a concept that has no elements. The coefficients show the additive number of tenths of seconds contributed by a specific concept element. Both sets of equations were computed using dummy variable regression analysis (where the independent variable was either 1 or 0, depending upon the presence or absence of the concept element in the particular concept).

Table 3: Partial Set Of Coefficients For Interest (IN) And Response-time (RT) For Aroma Elements; The US Vs France (FR) (13 Elements From The Full Set of 237)

	IN US	IN FR	RT US	RT FR
Additive Constant	52	41	37	42
With that irresistible aroma	6	1	7	7
Rich coffee aroma	6	-1	6	8
The rich aroma is followed by great taste	5	6	14	8
Rich, flavorful aroma	4	-1	6	11
Made from the finest coffee beans	4	-1	4	8
Enjoy life -- take time to smell the coffee!	3	1	10	6
The wakeup smell of freshly brewed coffee	3	1	6	2
Aroma comes out and spreads over the whole house		3	1	83
The aromatic and smooth coffee	2	1	8	9
The wakeup smell of brewing coffee	2	1	4	6
Has a rich, singular aroma	2	0	5	10
Dark and rich with an invigorating aroma	2	0	9	11
Inviting aroma	1	3	5	10

Fast-To-Process Versus Slow-To-Process Elements : An easy way to begin to analyze the data across 237 elements compares the fastest processed and the slowest processed text elements for each country. Keep in mind that these elements were translated into the local vernacular. Table 4 shows these initial results, based upon the additive model. The fastest processed are those elements with the lowest coefficient (viz. low processing time), the slowest processed are those with the highest coefficient for time (viz., high processing time). As a first approximation, the slowest processed elements tend to have more letters than do the faster processed elements. Furthermore, several of the slowest processed elements require the respondent to imagine a situation (e.g., the phrase 'Bring that special meal to a perfect close with an outstanding cup of coffee'). These slow-to-process elements do not invoke concrete images of products, but rather invoke general, possibly ambiguous situations, forcing the respondent perhaps to conjure up the idea. In contrast, the fast-to-process elements present short, to-the-point phrases, requiring relatively minimal imagination or image. This is not a hard and fast rule, but just an observation from the elements that show radically different processing times.

Table 4: The two most fast-to-process versus the two most slow-to-process elements by country. Numbers are the coefficients for response-time (large numbers = slower responses)

	FR	GE	HK	IT	NO	UK	US
France							
Colombian Coffee	-1	3	3	11	51	10	6
Perfect during working hours	-1	6	22	15	3	7	8
A deep feeling of satisfaction as you consider a job well-done	15	14	14	13	31	12	13
Bring that special meal to a perfect close with an outstanding cup of coffee	16	15	19	11	29	11	12
Germany							
Bitter	4	0	9	11	24	12	9
Available in Amaretto	2	2	15	1	25	4	9
For the highlights in your life	8	19	24	12	17	9	8
Our flavored coffees are the perfect conversation starters	4	20	18	11	20	12	9
Hong Kong							
Iced coffee	2	9	0	-3	25	3	4
For active people	5	8	2	6	25	3	8
Tastes as good as it smells	10	8	31	11	24	6	11
When you have to be at your best	3	5	34	3	17	12	3
Italy							
Wake-up taste	10	8	13	-4	31	5	3
Iced coffee	2	9	0	-3	25	3	4
Enjoy life -- take time to smell the coffee!	6	8	18	17	31	20	10
The way to end the perfect evening	6	11	15	17	0	6	12
Norway							
It's for a relaxing and enjoyable break	6	6	6	7	-1	12	11
Sit by the fireplace with a cup of coffee	14	11	12	9	-1	10	12
A good cup of coffee makes you get more out of the day	8	9	11	5	50	12	11
Colombian Coffee	-1	3	3	11	51	10	6
United Kingdom							
It's ideal for Mocha coffee makers	3	4	13	13	21	-2	2
Available in Coconut	8	6	4	5	20	1	4
A coffee with a wholesome, well-rounded flavor that will never disappoint you	9	15	19	12	29	18	14
Enjoy life – take time to smell the coffee!	6	8	18	17	31	20	10
United States							
Waker-upper	8	5	6	-1	24	6	1
Available in Peppermint	4	2	10	5	23	8	1
For the total, perfect coffee pleasure	8	13	20	9	26	11	15
Coffee -- quick pleasure for the way you live today	1	10	3	-1	20	9	16

Respondents In Different Countries Require Different Times To Process Text Information : The additive model allows comparison across countries for response-time to text. Each element has a response-time, defined as: Element Response-Time = Additive Constant + Element Coefficient For Response-Time.

Countries differ. The fastest responders showing short low response-times, are French, Italians and Americans. In the middle are the English and the Germans. The slowest responders are Hong Kong Chinese and Norwegians. This is mostly due to the additive constant, but somewhat due to the individual response-time coefficients. Table 5 shows the average time and the standard deviation of the average response-time for the text elements, across the seven countries. For comparison, Table 5 also shows the average utility value for the interest.

There is a clear difference among countries, in terms of the spread of the response-times (see Figure 1). This difference among groups is not due to the additive constant, as is the *average* response-time, but rather due to differences in response-times to the various elements. To the degree that there is a wide distribution of element response-times, we can conclude that the respondents in the particular country differentiate the elements in terms of the rate at which they process the information in the element. We see that respondents in Norway, Hong Kong and Italy show a relative wide range of response-times for text with some text elements taking far longer than others, whereas respondents in the remaining countries show a relatively narrow range of response-times. At a substantive level, these distributions suggest that respondents in Norway, Hong Kong and Italy are more affected by the nature of the elements in terms of processing the information than are the respondents in the other countries. The difference across countries cannot be accounted for simply by the alphabet, since Norway shares the same Latin alphabet as do the other European countries.

Table 5 : Mean and standard deviations of response-times and interest for text elements (computed for all elements, for a given country)

Country	Mean Response-time	S.D. Response-time	Mean Interest	S.D. Interest
France	6.63	3.19	-1.30	4.46
Italy	7.41	4.37	-1.91	7.74
United States	7.77	2.87	-0.82	4.65
United Kingdom	9.11	3.36	-0.89	3.93
Germany	9.64	3.69	-0.91	3.00
Hong Kong	13.36	5.92	0.78	4.39
Norway	22.83	8.94	1.42	4.20

Relation Between Response-time And Interest; Differences by Gender And Country : If the response-times and interest utilities correlate then this may provide indirect evidence that when a respondent finds an interesting element he will stop and read that element more slowly. The simple linear correlations shown in Table 6 reveal that there is a greater likelihood for females than for males to slow their reading when they reach an interesting concept element (at least for all countries but Norway and England). Males tend not to slow their reading (except for England and Norway).

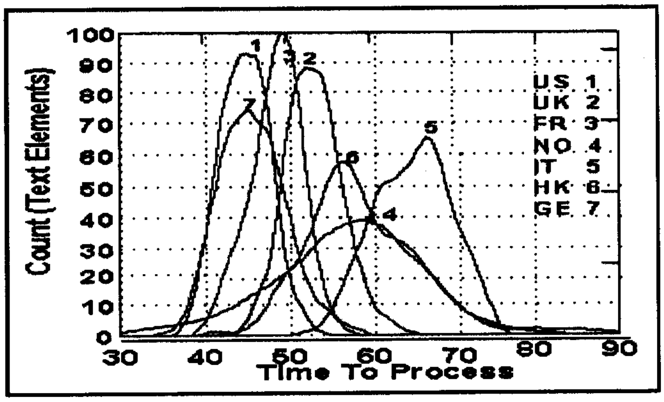

Fig. 1: Distributions (by country) fitted to time to process a single text element. The distributions are based upon the full set of text elements. Each text element generated its own time-to-process (defined as additive constant for time-to-process plus the coefficient of process-time for that particular element).

Although the correlations are relatively low, it is important to keep in mind that these correlations are based upon 199 points, and are all statistically significant.

Table 6 : Simple linear correlation between coefficient (utility) values for interest and for response-time, across the 199 text elements. The correlations are based upon total panel, males and females, respectively, for each country. Correlations of 0.30 and higher are highly significant.

Country	Total	Males	Females
Italy	0.37	0.11	0.42
England	0.31	0.39	-0.04
United States	0.29	0.05	0.33
Hong Kong	0.19	0.13	0.27
Norway	0.14	0.24	-0.14
Germany	0.13	0.04	0.19
France	0.06	-0.09	0.33

Response-Time; Joint relation to Interest and Text Length: What is more critical to response-time; number of characters in the text element or the interest? Do both or either of them even matter? This question can be answered by relating response-time to a weighted combination of the characters and the interest rating. When both independent variables (number of characters in text; interest) are standardized to remove scale size, the results

show dramatic differences between countries.
Table 7 shows the results for the seven countries. The countries have been ranked by the value of the Beta Coefficient for number of characters. We see from Table 7 (columns labeled Beta Coefficient) that the relative importance of number of characters and interest vary by country. Generally, number of characters is more important than the interest value. However, the magnitude of the difference in importance is striking. The Italians appear to vary their response-time by the interest value of the concept element. For Italy, response-time is determined only slightly more by number of characters than by interest. To the German respondent, the task is determined far more by number of characters than by interest. Response-time is virtually entirely a function of the length of the text, without consideration of the interest value of the text.

Table 7 : Response-time as a joint function of the number of characters in the element and interest in the element, respectively

Country	Multiple R	Beta Coefficient Character	Beta Coefficient Interest	B Coefficient Character	B Coefficient Interest
Norway	0.16	0.06	0.14	0.95	2.02
Hong Kong	0.31	0.25	0.13	3.67	1.93
France	0.36	0.34	0.08	5.38	1.19
England	0.44	0.36	0.18	5.80	2.86
Italy	0.53	0.39	0.29	6.62	4.96
United States	0.51	0.43	0.20	7.10	3.25
Germany	0.50	0.48	0.08	8.16	1.34

The country to country differences become even more marked when we look at the data by gender. Since the additive models were created on an individual by individual basis, one can create summary models for females versus males for each country. The coefficients for response-time can then be related to the number of characters in the text and to the interest in the text (viz., single concept element). Table 8 shows the standardized (beta) coefficients for number of characters and interest, for females versus males, for each country.
Some patterns, consistent across country, emerge from a finer-grained analysis, by country and by gender. The model incorporates both the number of characters in the text and the interest utility value.

Effect Of Number Of Characters: Response-time tends to be driven more by number of characters than by interest

Genders Differ, But Not In A Consistent Way: Typically response-time for female respondents is often (but not always) driven by interest as well as by number of characters. In contrast, response-time for males is almost always driven primarily by number of characters. This difference between genders means that, in general, women may pay more attention to what they read than men do.

Interest Does Not Increase Response-Time: Sometimes interesting text decreases response-time (e.g., for women in England and in Norway; for men in France). This means that an interesting text (based upon utility value for interest) does not necessarily lead to slower processing of the information.

Table 8 : How number of characters and interest in the text element drives response-time. The numbers in the body of the table are the standardized (beta) coefficients from the equation that comprises both variables as predictors. The columns marked Male and Female show the proportion of respondents in each gender by country.

	Females Beta Number Characters	Females Beta Interest	Females MultR	Males Beta Number Characters	Males Beta Interest	Males MultR	%Male	%Female	
Norway	-0.05	-0.13	0.14	0.26		0.21	0.35	51%	49%
Hong Kong	0.21	0.22	0.34	0.16		0.07	0.19	67%	33%
France	0.27	0.30	0.43	0.13		-0.11	0.16	23%	77%
England	0.29	-0.11	0.28	0.33		0.35	0.51	48%	52%
Italy	0.36	0.34	0.54	0.35		0.05	0.37	49%	51%
United States	0.39	0.23	0.50	0.36		-0.03	0.36	41%	59%
Germany	0.41	0.15	0.46	0.35		-0.01	0.35	44%	56%

Response-Time To Visuals: Country To Country Differences : Picture elements differ from text because they need not be read and comprehended but merely looked at. To what degree do respondents in the seven countries differ in their response-time to the pictures? Table 9 shows the response-time for the picture elements. It is difficult to partial out the pure effects of pictures from the total model, since the model was based upon reactions to concepts comprising both text and pictures. However, Table 9 shows that response-times for pictures tend to be only slightly lower than for text (average of 1/10 of a second lower) except for Germany. This suggests that, on average, text and pictures are both processed about equally quickly. However, for each country the standard deviation of the response-times is greater for text elements than it is for pictures.

Table 9 : Means and standard deviations for response-time to picture elements versus to text elements, respectively.

	Mean response-time for a concept with one picture	Mean response-time a concept with one text element	Standard Deviation – Picture elements	Standard deviation – Text elements
France	5.46	6.63	2.49	3.19
Italy	5.97	7.41	3.88	4.37
United States	7.66	7.77	2.45	2.87
United Kingdom	8.05	9.11	3.43	3.36
Germany	9.88	9.64	3.17	3.69
Hong Kong	12.58	13.36	4.94	5.92
Norway	20.84	22.83	8.71	8.94

The Two Components Of Response-time : The additive model provides the opportunity to understand more deeply how consumers react to concepts. The average concept in this experimental design comprised 3.5 elements. Although we do not know what concepts were presented to each respondent, we do know the average response-time for each element. We can multiply the average response-time per element by 3.5 in order to estimate the total response-time attributable to elements for a concept comprising 3.5 elements. Call this value E. We also know the additive constant, which represents the numbers of tenths of seconds of response-time not attribute to elements. Call this value A. The total time (A+E) represents the total response-time per concept. The total response-time thus comprises two portions. Does the total response-time show the same structure across different countries?
Table 10 shows the following two key results:

Total Response-Time Differs By Country : The total estimated time for a concept comprising 3.5 elements differs by country, with the United States and France taking the shortest time (6.4 and 6.6 seconds, respectively), and Norway taking the longest (11.6 seconds, or almost five seconds longer)

The Structure Of Response-Time Also Differs By Country : The proportion of the total time devoted to the elements differs. In Italy the elements account for only 32% of the total response-time per concept, suggesting that Italians are much more consistent in the way that they respond to different concepts. Response-time is less affected by the individual concept elements. In contrast, in Norway 70% of the response-time is attributable to the specific elements in the concept. Norwegians thus respond to concepts in a more individualistic fashion. Response-time is far more affected by the individual concept elements.

Table 10: Percent of response-time ascribable to the elements. The constant, average time per element*3.5 and total time are in tenths of seconds. The table is sorted in terms of the % contribution of the response-time ascribable to the concept elements.

	Constant(A)	Average*3.5(E)	Totaltime	% From Constant	% FromElements
Norway	34	81	116	30%	70%
Hong Kong	46	47	93	49%	51%
Germany	36	34	70	52%	48%
England	44	33	76	57%	43%
US	37	27	64	58%	42%
France	42	24	66	64%	36%
Italy	57	27	85	68%	32%

Discussion

Implications – Methodology Development Using Response-time As Another Measure Of Concepts: The results suggest that response-time provides another fertile area to understand how respondents process the information in concepts. With response-time, it becomes possible to partial out the contributory effects of different concept elements (text, visual), by country, and by so doing begin to understand some additional dynamics about how we process concept information. Response-time provides yet another measure of an aspect of communication that can be associated, in a *prima-facie* manner, with mental processing of information about products and services.

Implications – Communication Optimization In The Business Environment: The question is occasionally raised about the meaning of response-time. Practitioners, used to thinking in terms of 'good Vs bad', want to know whether a long response-time means a good element or a poor element. These data suggest no relation between response-time and interest. Response-time provides another, orthogonal measure, probably indicating the length of time it takes the respondent to process the information. One may hypothesize that a long response-time for an element means that the element may be confusing, or that the element may be very long and thus takes more time to process. A short element with few characters but with a long response-time may be an example of either a confusing element, or an element that is complicated intellectually, and takes a long time to process.
From an application standpoint, it also now makes sense to optimize concepts on two aspects; response-time and interest. Optimizing on response-time generates concepts that are quick to read and to comprehend. Optimizing on interest generates concepts that are highly acceptable. Optimizing on both aspects together, e.g., a weighted combination of the two attributes, generates highly acceptable concepts that are quickly comprehended. One could also optimize concepts to generate combinations wherein the text is quickly comprehended, but where the picture is more slowly processed, and keeps the individual's attention focused on it.

Implications – Scientific Understanding Of Individual Differences: It is rather remarkable that the countries differ so dramatically from each other. These differences cannot be ascribed to alphabet or simply to culture. For instance, respondents in Hong Kong and Norway operate in different alphabets. Yet respondents in both countries take the longest time to respond to concepts. These differences in response-time, coupled with the relative importance of number of characters versus interest, begin to provide the researcher with a new way to look at individual differences.
It is worth noting here that experimental psychology began with individual differences in response-time, called 'reaction time' in the psychology literature (Boring, 1929). The first studies in reaction time dealt with the creation of an individual index for a given motor or perceptual task. This index could be compared across different people in order to understand the speed at which individuals performed a task or responded to a stimulus. Later studies used reaction time as a surrogate for mental processes, and built models of cognitive performance based upon reaction time measures. Reaction time here became critical because it was a way of 'tuning into' underlying mental processes. A researcher could vary the nature of the task, measure reaction time, and deduce the presence of, and perhaps speculate about, the nature of additional stages of mental processing needed. These data provide the natural extension of the reaction time studies, applied to more cognitive complex stimuli. As such this research fits into the historical stream of experimental psychology, albeit from the point of view of a modern, cognitive psychology.

References

Aaker, D. A., R. P. Bagozzi, J. M. Carman and J. M. MacLachlan, 1980. On using response latency to measure preference, J Of Marketing Res, 17, pp. 237-244.
Blankenship, A. B., 1966. Let's bury paired comparisons, I Of Advertising Res, 6, pp. 13-17.
Boring, E. G., 1929. Sensation And Measurement In The History Of Experimental Psychology, Appleton Century Crofts, New York.
Green, P. E. and A. M. Krieger, 1991. Segmenting markets with conjoint analysis, J Of Marketing, 55, pp.20-31.
Green, P.E. and S. Srinivasan, 1990. Conjoint analysis in consumer research: Issues and outlook, J Of Consumer Res, 5, pp. 103-123.
Lancaster, G. A. and R. A. Lomas, 1977. Experimental error in T-scope investigation, J Of_Ad Res, 17, pp. 51-56.
Lorimor, E. S. and S. W. Dunn, 1967. Four measures of cross-cultural advertising effectiveness, J of_Ad Res, Vol. 7, pp. 11-13
Macarte, P. and A. Hedges, 1970. A new approach to advertising research, The Advertising Quarterly, 23, pp. 36-43.
MacLachlan, J. and J. G. Myers, 1983. Using response latency to identify commercials that motivate", J Of Ad Res, 23, pp. 51-57.

Moskowitz, H. R., 1994. Consumer driven concept development through a new research paradigm, *CASRO Journal*, Port Washington, New York, pp. 91-99.

Soskowitz, H. R. and J. G. Martin, 1993. How computer aided design and presentation of concepts speeds up the product development process. Proceedings Of The 46thESOMAR Conference, Copenhagen, Denmark, pp. 405 - 419.

Plackett, R. L. and J. D. Burman, 1946. The design of optimum multifactorial experiments, Biometrika, 33, pp. 305-325

Rhodes, E. W., N. B. Leferman, E. Cook and D. Schwartz, 1979. T-Scope tests of Yellow Pages advertising, *Journal Of Advertising Research,* 19, pp. 49-52.

Taylor, D., 1970. A study of the tachistoscope, *British Journal Of Marketing*, 4, pp. 22-28.