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ATTRIBUTES OF LOW INVOLVEMENT PRODUCTS – A COMPARISON OF FIVE ELICITATION TECHNIQUES AND A TEST OF THEIR NOMOLOGICAL VALIDITY

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ATTRIBUTES OF LOW INVOLVEMENT PRODUCTS – A COMPARISON OF FIVE ELICITATION TECHNIQUES AND A TEST OF THEIR NOMOLOGICAL VALIDITY

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EXECUTIVE SUMMARY

1. Product attributes are the basic elements in most theories of consumer choice and motivation, and the instruments used in analysing these issues therefore generally focus on product attributes as the pivotal point of investigation. Thus, the identification of the product attributes, which are important to consumers, is the critical first step in the majority of consumer behavior studies.

2. A number of techniques, ranging from the complicated elicitation of idiosyncratic attributes, to simpler techniques, as picking from a pre-specified list of attributes, has been developed to identify important product attributes. The study of potential strengths and weaknesses of these techniques has received only little attention, however.

3. In consumer behaviour theory, products are described as a bundle of attributes; and the influence of a particular attribute on consumer choice is assumed to be determined by this attribute's importance to the consumer and its ability to distinguish between product alternatives. The importance is believed to be positively related to the abstraction level and the cognitive availability of the attribute, whereas the differentiation ability is believed to be related negatively to the abstraction level and the number of attributes involved in the choice task.

4. The purpose of the study presented in this paper is to: (a) compare different elicitation techniques on a number of different criteria, such as: importance to consumers, ability to discriminate between brands, predictive ability, time use, and number of attributes elicited; and to (b) test the nomological validity of the basic assumptions regarding attributes and consumer choices for a low involvement product (vegetable oil).

5. The study presented is part of the project *Rape seed oil for human consumption*. Although modern Danish rape seed oil has nutritional qualities which are comparable to the best vegetable oils on the market, and in spite of the fact that rape seed oil covers as much as one third of the Danish demand for vegetable oil, it still leads an anonymous life in the mind of the Danish food consumer.

INTRODUCTION

Product attributes are the basic elements in most theories of consumer choice and motivation. In these theories, products are described as a bundle of attributes; and the influence of a particular attribute on consumer choice is assumed to be determined by this attribute's importance to the consumer and its ability to distinguish between product alternatives. The empirical evidence for the nomological validity of these assumptions is scarce, however. This is especially true in the case of low involvement products.

Many types of instruments for analysing consumer choice and motivation, eg, attitude, conjoint and laddering studies, focus on product attributes as the pivotal point of investigation. For each of these instruments the identification of the product attributes, which are important to consumers, is the critical first step in the analysis. For this purpose a number of techniques has been developed, ranging from the complicated elicitation of idiosyncratic attributes, eg, triadic sorting, to simpler techniques, as picking from a pre-specified list of attributes.

In spite of the relevance to consumer research, the study of potential strengths and weaknesses of the various elicitation techniques has received only little attention. To the best of our knowledge, nobody has so far studied the issue from a low involvement perspective[1]. As low involvement choices are believed to involve only few and rather concrete attributes, it seems reasonable to speculate whether – and how – the attributes elicited using complex techniques differ from the attributes elicited using simpler techniques.

In accordance with the discussion above, the two-fold purpose of the study presented here is to: (a) compare different elicitation techniques on a number of different criteria, such as: importance to consumers, ability to discriminate between brands, predictive ability, time use, and number of attributes elicited; and to (b) test the nomological validity of the basic assumptions regarding attributes and consumer choices for a low involvement product (viz. vegetable oil[2]).

PRODUCT ATTRIBUTES AND CONSUMER DECISION-MAKING

In broad range consumer behaviour theories, (eg Howard & Sheth, 1988; Engel, Blackwell & Miniard, 1994) a product is conceived as a bundle of attributes, which are the characteristics that consumers *attribute* to products. Which characteristics a consumer attributes to a product is believed to be determined by a consumer's intrinsic and extrinsic motivation. The intrinsic motivation is determined by the consumer's perception of the instrumentality of the characteristic as regards the satisfaction of the consumer's needs; and the extrinsic motivation is associated with the consumer's perception of differences between the set of products available and acceptable to the consumer, ie 'the choice set'.

In other words, according to the theories of consumer behaviour, the consumer's choice between alternative products is based on a comparison of the products in

1 Lines, Breivik and Suphellen (1995) have studied the differences between various techniques with regard to elicitation of the attributes of cellular phones.
2 A focus group study conducted prior to the study presented in this paper showed that consumers process and seek only limited amounts of information when buying vegetable oils.

the choice set with regard to the attributes, which the individual consumer believes to be a) instrumental for need satisfaction, and b) different as regards the products in question. These two points will be elaborated further below, and they will be used as the basis for a nomological validity test.

ad a) According to the means-end chain theory (Gutman, 1982) the instrumentality of an attribute – and consequently its importance to the consumer – depends on the strength and numbers of cognitive links between the attribute, self-relevant consequences and consumer values.

Therefore, an abstract attribute, which is directly linked to self-relevant consequences and personal values, is believed to be more important to the consumer than a concrete attribute, where this link is mediated by an abstract attribute.

The importance of attributes is believed to be related to the cognitive effort the consumer makes in eliciting the attribute. Fazio (1986) states that the smaller the cognitive effort, the greater the influence on consumer behaviour, ie 'top of mind' attributes are the most important ones as regards consumer choice. In a similar vein, Fishbein and Ajzen (1980) postulate a connection between the order in which the consumer mentions attributes when describing an object, and the importance these attributes have for the attitude towards the object. Thus, the five to eight attributes first mentioned are labelled 'salient attributes' (Fishbein & Ajzen, 1980) and are believed to be the most important ones as regards the attitudes and behaviour of consumers.

ad b) As discussed, an important attribute (ie an attribute which is instrumental to the satisfaction of consumer needs) does not necessarily influence choice behaviour. For this to be the case, it is also necessary that the products in the choice set differ on the attribute in question. Whereas abstract attributes are believed to be more instrumental to the satisfaction of consumer needs than concrete attributes, the latter are believed to be more efficient than abstract attributes with regard to differentiation between products in a choice set (Reynolds, Gutman & Fiedler, 1985).

Andersen (1994), extending the work of Nelson (1970, 1974) and Darby and Karni (1973), distinguishes between three kinds of attributes, ie search, experience and credence attributes. For search attributes, which are concrete characteristics like colour or content of fatty acids, information about performance levels can be obtained by the consumer before the purchase. Experience attributes are more abstract and can only be assessed when using the product, ie after the purchase. In the case of credence attributes, the consumer has no chance of direct evaluation of attribute performance. Here, the information has to be inferred from other sources, for example from attributes of other products and/or other attributes of the same product (this is also true for the pre-acquisition evaluation of experience attributes). When information is inferred from attributes of *other* products, the differences between products, as perceived by consumers, must be expected to be small. Likewise, when the attribute information is inferred from other attributes of the same product, it must be expected that the perceived performance levels for the attributes *within* this product tends to be similar.

As a consequence of this discussion, we want to test the nomological validity of three assumptions regarding consumer perceptions and the attributes of low involvement products, ie whether:

(a) abstract attributes are perceived as more important than concrete attributes in explaining consumer preferences,

(b) attributes mentioned first in an elicitation interview are perceived as more important than attributes mentioned later in an elicitation task, and

(c) concrete attributes are perceived as more varied with regard to the products in the choice set as compared to abstract attributes.

To strengthen the reliability of our results these assumptions will be tested across five different elicitation techniques. Furthermore, the potential differences between the elicitation techniques as regards the three assumptions above will be investigated. Before the analysis, we will describe the elicitation techniques that are used in this study as well as our expectations regarding the differences in the results obtained by these techniques.

ELICITATION TECHNIQUES

A number of techniques have been developed for the purpose of identifying important attributes. These techniques range from complex elicitation of idiosyncratic attributes, eg, triadic sorting, to simpler techniques as picking from a pre-specified list of attributes.

Below, we present the five techniques which are compared in the study and later some of the expectations regarding differences between the techniques are discussed.

The five techniques

a) Triadic sorting (Triadic)

b) Free sorting (Free)

c) Direct elicitation (Direct)

d) Ranking (Rank)

e) Picking from an attribute list (Atlist)

The abbreviations in parenthesis will be used in the following sections.

ad a) Triadic sorting is a technique developed by Kelly (1955) with the purpose of mapping cognitive structures. The sorting procedure starts by the respondent being shown triple combinations of the product concerned. For each triple combination, the respondent is repeatedly asked for "an important attribute on which two of the products are alike and at the same time different from the third".

ad b) In free sorting, the respondent forms groups on the basis of all the products presented. The respondent is told to group products which on some important point(s) are the same and at the same time different from the products in other groups. The groups can consist of as many or as few products as the respondent pleases. Then the respondent is asked how the products in the groups are alike, and how they differ from the other groups of products.

ad c) Direct elicitation does not involve a sorting procedure. The respondent is asked to come up with the attributes most important to the respondent when choosing among the assortment of products presented. Thus, this technique is the one that comes closest to a "natural speech" interviewing technique.

ad d) In ranking, the respondents are asked to decide the priority of the products according to preference and to state the causes for the ranking.

ad e) The attributes on the list must be generated in some way. This is often done by the use of a focus group or another qualitative technique. Thus, picking from an attribute list is not based on idiosyncratic wording like the four other elicitation techniques.

The attributes elicited by different techniques potentially differ on a number of dimensions, such as:

1) Number of attributes elicited

2) Perceived importance of attributes elicited

3) Time consumption

4) Abstraction level of attributes elicited

5) Perceived importance of first five attributes elicited

6) Ability to discriminate between alternative products

7) Ability to discriminate within products

8) Predictive ability of attributes elicited

The operationalization of the eight dimensions will be described in the section *Study design and operationalization of variables*. Here we only want to comment briefly on dimensions 6 and 7. 'Ability to discriminate between alternative products', refers to the average across products' variation of the perceived performance of a given attribute. The 'ability to discriminate within products', refers to the respondent's perception of the average within-product variance of the performance levels of the elicited attributes.

Below we will discuss our expectations regarding differences among the five elicitation techniques when comparing them on the eight dimensions.

ad 1) Number of attributes elicited

As the preferential ranking technique emulates a choice situation, it is possible that some of the attributes, which are important to the satisfaction of the needs of the consumers, are left out when using this technique. Not all the attributes important to the consumer are involved in the choice task. For this to be the case, it is also necessary that the products in the choice set differ on the attribute in question. Therefore we expect the ranking technique to generate fewer attributes than the other techniques.

Considering the Atlist technique, it is impossible to list all attributes that are important for all respondents. Because of this, and because of the necessary differences between the wording used in an attribute list and the language of the respondents, the attribute list technique could be expected to generate fewer attributes than the other techniques. Notwithstanding this, Lines, Breivik and Suphellen (1995) found the attribute list technique to result in more attributes than was the case for other elicitation techniques. They explained this result by the recognition task inherent in the attribute list technique demanding less cognitive effort than other elicitation techniques. Another possible explanation of their result is that more irrelevant attributes are registered when using the attribute list technique.

ad 2) Perceived importance of attributes elicited

Since concrete attributes are presumed to be less important to the consumer than abstract attributes, and because triadic sorting (and perhaps free sorting) are expected to make the consumers focus on concrete attributes, we expect the attributes generated by these techniques to be perceived as less important by the respondents than attributes generated by the other techniques.

ad 3) Time consumption

Not taking into account the time spent on generating the attribute list, we expect this technique to be less time-consuming than the other techniques. The sorting techniques and the preferential ranking techniques are expected to be the most time-consuming, because these techniques imply complex sorting procedures.

ad 4) Abstraction level of attributes elicited

According to Gutman and Reynolds (1988), the respondents focus their attention on the concrete aspects of the products in question when using triadic sorting. Therefore we expect triadic sorting and the related free sorting techniques to result in the elicitation of more concrete attributes than the other techniques.

ad 5) Perceived importance of first five attributes elicited

As discussed in the section *Product attributes and consumer decision-making*, the smaller the cognitive effort to elicit an attribute, the greater the influence on consumer behaviour (Fazio, 1986). Therefore, in general, the first five attributes elicited are believed to be more important to the consumer than the attributes mentioned later. (Fishbein & Ajzen, 1980). We must expect, however, that a technique such as triadic sorting, which is very demanding as regards the respondent's cognitive effort, and which focuses the respondent's attention on concrete aspects of the product, will comply less with this assumption than 'natural speech' types of techniques, like eg direct elicitation. We therefore expect the first five attributes generated by direct elicitation to be more important than the first five elicited by triadic sorting.

ad 6) Ability to discriminate between alternative products

Since concrete attributes are expected to be better at discriminating products than abstract attributes, and because triadic sorting (and perhaps free sorting) are expected to make the consumers focus on concrete attributes, we also expect the attributes generated by triadic sorting (and perhaps free sorting) to have better discriminative abilities than the attributes generated by the other techniques.

ad 7) Ability to discriminate within products

Because the performance of the more abstract attributes often has to be inferred from information about the concrete attributes, and because triadic sorting (and perhaps free sorting) are expected to make the consumers focus on concrete attributes, we expect the product scores on the attributes elicited by these techniques to vary more within products (ie, across attributes) than the attributes generated by the other techniques.

ad 8) Predictive ability of attributes elicited

It must be expected that the attributes elicited by techniques involving a preferential component, like the ranking technique, have a higher predictive ability than other techniques. Also, we expect that the predictive ability of the attribute list technique is less than the predictive ability of the other techniques, because it is impossible to list all attributes that are important for all respondents, and because the other techniques generate idiosyncratic attributes which, all other things being equal, must be expected to be better at predicting choices than attributes described in general language.

STUDY DESIGN AND OPERATIONALIZATION OF VARIABLES

In this section we first present the design and the implementation of the study. Then the operationalization of the attribute dimensions used to compare the five elicitation techniques are described in detail.

Design and implementation of the study

The respondents were 150 women recruited to a hall test in a shopping centre near Copenhagen. All of them had bought at least one bottle of vegetable oil in the last three months. The 150 respondents were assigned randomly to five groups. Each respondent (30 respondents in each group) was exposed to one of the five different elicitation techniques. The attributes, and the sequence in which they were mentioned, were carefully registered. The attribute list contained 20 attributes, generated from a focus group interview concerning vegetable oils.

Each interview was initiated by a few questions regarding the consumption of vegetable oil. After this the respondents were shown an assortment of seven different vegetable oils.

Type	Brand	Packaging
Grape seed oil	No name	1 l plastic bottle
Safflower oil	“Aldente”	0.5 l glass bottle
Olive oil	“Borges”	1 l metal container
“Food & Salad oil”	No name	1 l plastic bottle
Sunflower oil	“Provence Regime”	0.5 l glass bottle
Sunflower oil	No name	0.5 l glass bottle
“Food & Salad oil”	No name	1 l metal container

The products differed on many other dimensions, eg price, colour of packaging, content of fatty acids, producer/importer.

Two months later the women were asked to take part in a second interview in their home. This time we wanted to perform a conjoint study. As attributes in the conjoint study we selected the 10 (out of 66 attributes resulting from the content coding) which, on average, were deemed most important by the respondents in the first part of the study. It was only possible to interview 73 persons (approximately half of the respondents, who took part in the first part of the study). The conjoint study is described in more detail later on.

Operationalization of the attribute dimensions

In the first part of the study, the respondents were asked to evaluate the elicited attributes with regard to their importance for buying vegetable oil. Belief scores where gathered for each of the seven products, ie, the products were evaluated with regard to the attributes elicited. The seven products were evaluated with regard to “intention to buy” and “overall preference”. Respondents’ answers were recorded on seven-point Likert type scales (0-6). Finally, the time used to complete the task was registered.

Below, we discuss the measures used to operationalize ‘abstraction level’, ‘predictive ability’, and the ability to discriminate ‘between’ and ‘within’ products.

There is a number of definitions of concrete versus abstract attributes (see eg Gutman, 1982). For our purposes it was expedient to define concrete attributes as the visible characteristics of the product including information specified in the declaration. Examples are price, packaging, and content of fatty acids. This is what Andersen (1994) refers to as search attributes. Abstract attributes were defined as characteristics that cannot be assessed without buying the product, eg taste and odour (ie experience attributes) as well as characteristics that must be inferred from other internal or external information sources (ie, credence attributes), eg, whether the primary produce is conventional or genetically modified.

The predictive ability was measured (a) by means of the calculation of correlations between estimated preference scores as predicted from a multi-attribute model based on the elicited attributes and self-reported product preferences/ intentions to buy, and (b) by means of the conjoint study.

ad a)

Estimated preference for product j, $EP_j = \sum_{i=1}^{m} w_i * x_{ij} / m$

where

m = number of attributes elicited

w_i = attribute i's importance score

x_{ij} = product j's score on attribute i

ad b)

The conjoint study implied a full profile ranking of two orthogonal designs of 20 cards, each containing the description of six attributes with two or three levels each. Two of the attributes in the two designs were the same. The estimations were based on the following formula (all attributes were estimated using a part-worth model).

$$U_i = \sum_k \sum_j \beta_{kj} X_{ijk} + e_i$$

where

U_i the total utility for product i

X_{ijk} dummy variable which represents level k for attribute j, product i

$ß_{kj}$ contribution to total utility from level k, attribute j

e_i error for product i

Because the data collection was based on ranking, it would be correct to base the analysis on a non-metric algorithm (eg, Linmap). But because a metric algorithm is more flexible and because several studies have shown that the resulting differences between metric and non-metric estimations when using ordinal data are small, we decided to use *Conjoint-Analyzer* (Bretton-Clark, 1992), which is based on the OLS-algorithm.

The utility ($ß_{kj}$) of each of the levels of the 10 attributes was estimated using a bridging procedure where the estimated utilities for the two redundant variables were used as the scaling factor.

The predictive ability of the attributes elicited in the first part of the study was assessed by comparing the 'relative importance' of the attributes studied in the conjoint analysis to the importance scores obtained for the same attributes in the first part of the study. The relative importance of an attribute in the conjoint study is calculated as:

$$\text{Relative importance} = \frac{U_{max} - U_{min}}{\sum_{i=1-10} U(i)_{max} - U(i)_{min}}$$

Where U_{max} and U_{min} are calculated as the minimum respectively maximum of utility of the levels of the attribute in question.

The measures used to compare the relative importance and the results of the first part of the study are described in detail in the section *Analysis and results.*

Within-product variance and between-product variance

Within-product variance (WPV) is defined as the score variance across the mentioned attributes within one product for each subject. Between-product variance (BPV) measures the variability of within subject scores on one attribute across products.

Within-product variance $$WPV = \sum_{i=1}^{n}(\sum_{i=1}^{m}(\overline{x}_j - x_{ij})^2 / m - 1)^{1/2} / n$$

Between-product variance $$BPV = \sum_{i=1}^{m}(\sum_{j=1}^{n}(\overline{x}_i - x_{ij})^2 / n - 1)^{1/2} / m$$

where

m	=	number of attributes
n	=	number of products
$\overline{x}_j$	=	product j's average score across attributes
$\overline{x}_i$	=	attribute i's average score across products
xij	=	product j's score on attribute i

Analysis and results

The initial step in the analysis was a content coding of the elicited attributes. The coding of 1262 attributes resulted in 66 different categories. The number of respondents who mentioned these 66 categories in each of the five elicitation techniques is listed in appendix 1. We chose to operate with a relatively large number of categories in order to avoid loosing too much information on the abstractness and precise meanings of the elicited attributes. Below we first discuss the consistency between our data and the theoretical assumptions concerning attributes and consumer choices. Then we compare the attributes elicited by the five techniques with regard to the eight dimensions discussed in the section *Elicitation techniques*.

Nomological validity of basic assumptions regarding attributes and consumer choice between low involvement products

Consistency between theoretical concepts and measures of these are normally referred to as 'construct validity' (Churchill, 1995). According to Peter (1981) 'construct validity' can be split into trait validity and nomological validity. (Trait validity can be further divided into reliability, convergent and divergent validity.) A nomological validity test is performed by comparing the theoretical relationships between different constructs with the empirical relationships between those different constructs; this is the type of test that we are going to conduct in this section.

The three theoretical assumptions we want to test are: (a) whether the attributes elicited first are more important than the attributes elicited later, (b) to which extent abstract attributes are more important for consumer preferences than concrete attributes, and (c) whether the products presented to the respondents are perceived as more different with regard to concrete attributes compared with abstract attributes.

ad a) As discussed in the section *Product attributes and consumer decision-making*, the five to eight attributes first mentioned by each respondent are labelled 'salient attributes' (Fishbein & Ajzen, 1980) and are believed to be most important for the attitudes and behaviours of consumers. This assumption holds true for our data. Thus, the first five attributes mentioned were evaluated as significantly ($F=6.33$; $p=0.01$) more important than the attributes mentioned later (on average, each respondent mentioned 8.43 attributes). Furthermore, the correlation between sequence and evaluated importance is: $r = -0.0839$ (significantly different from zero at the 0.05 level).

ad b) According to means-end chain theory (see section 2) abstract attributes are more important to the consumer than concrete ones. Our data are a strong confirmation of this assumption (one-way anova: $F=85.68$; $p<0.0001$). The average importance of the 587 abstract attributes is 5.12, whereas the average importance of the 675 concrete attributes is 4.30.

ad c) As discussed in the section *Product attributes and consumer decision-making*, concrete attributes are believed to be more efficient than abstract attributes with regard to differentiation between products in a choice set (Reynolds et al., 1985). Therefore we also tested whether the between-product variance of the concrete attributes is higher than that of the abstract attributes. A one-way anova showed no significant differences between BPV for concrete and abstract attributes ($F=3.11$; $p=0.079$), however. The mean BPV for concrete attributes is 1.77, whereas it is 1.66 for abstract attributes. The difference, although not significant, is in the expected direction.

Together, the findings indicate that the nomological validity of the theoretical assumptions of the relation between attributes and consumer choices for low involvement products is satisfactory. Unfortunately we did not have the opportunity to test whether the empirical observations actually represent the theoretical relations we intended to test, or whether the observed relations are due to some other factor, ie whether the empirical observations (a) both measure one of the theoretical constructs or (b) some other construct not accounted for in our discussion. Notwithstanding this, we feel that it is safe to conclude, that the results presented speak for the nomological validity of the relation between attributes and low involvement consumer choices, and consequently for the feasibility of using attribute elicitation when studying low involvement consumer choice.

Comparison of the five techniques

Below, the attributes generated by the five techniques are compared with regard to time consumption, discriminative ability within and across products, level of abstraction, number of attributes elicited and importance of attributes elicited. The predictive ability of the five techniques is compared in the following section.

Number of attributes

The elicitation technique had a significant effect on the number of attributes elicited (one-way anova: F=5.79; p=0.0002). Triadic sorting generated the highest mean number of attributes, the attribute list the lowest. The Scheffe procedure for multiple comparisons between means reveals that triadic sorting and free sorting generate significantly more attributes than the attribute list.

Table 1. Average number of attributes, generated by the five techniques

	Mean number of attributes	Atlist	Direct	Rank	Free	Triadic
Atlist	6.4667					
Direct	7.7000					
Rank	8.6000					
Free	9.5333	*				
Triadic	9.8333	*				

(*) Denotes pairs of groups significantly different at the 0.05 level

Our expectation that the ranking technique compared to the other techniques generated fewer attributes was disproved. As expected the attribute list generated fewer attributes than free sorting and triadic sorting, but not significantly less than direct elicitation and ranking. Thus, the respondent does not seem to "elicit" a lot of irrelevant attributes when using the attribute list technique. This speaks for an acceptable validity of the attribute list technique.

The perceived importance of attributes

The average importance of elicited attributes also differed across techniques (one-way anova: F=4.09; p=0.0036). On average, the attributes generated by the attribute list are perceived as more important than the attributes generated by triadic sorting. A possible explanation for the difference could be that the attribute list generates fewer attributes than triadic sorting. However, the correlation between numbers of attributes generated and average importance ratings for the elicited attributes across the five techniques (-0.12) is not significantly different from zero (at the 0.05 level). An alternative explanation could be that respondents are asked explicitly to pick the most important attributes from the list.

Table 2. Average importance ratings, generated by the five techniques

	Mean importance rating (scale 0-6)	Triadic	Free	Direct	Rank	Atlist
Triadic	4.2640					
Free	4.6593					
Direct	4.7215					
Rank	4.8853					
Atlist	5.0544	*				

(*) Denotes pairs of groups significantly different at the 0.05 level

Time used to complete the task

With regard to the time it takes to perform different elicitation tasks, large differences are found between the various techniques (F=37.2; p<0.0001). Table 3 illustrates the differences. The analysis did not take into account the time used to generate the attributes used in the attribute list technique.

Table 3. Mean time used to complete the task

	Mean time (minutes)	Atlist	Direct	Free	Rank	Triadic
Atlist	3’43					
Direct	6’58	*				
Free	7’30	*				
Rank	10’16	*	*	*		
Triadic	12’8	*	*	*		

(*) Denotes pairs of groups significantly different at the 0.05 level

Not surprisingly, letting respondents mark attributes on a list is by far the quickest technique. The average duration of 3.7 minutes is significantly less than any other technique. The slowest technique to perform is the triadic sorting technique followed close by the ranking technique. These elicitation techniques are significantly more time-consuming than any of the other techniques in our study, probably because they are more complex and therefore require a longer introduction phase on the interviewer side and on the respondent side more elaboration.

That the attribute list technique was the fastest technique does not imply that it was also the cheapest. As mentioned in the section *Study design and operationalization of variables*, the attributes on the list were generated by means of a focus group, and this implies extra costs. On the other hand, we did not use the possibility of distributing the attribute list by mail. This would have lowered the costs of using this technique. Cost is not the only relevant issue with regard to time consumption, however. The time dimension also has potential implications for the quality of the data collected after the elicitation procedure, due to the possible fatigue or busyness of respondents.

Abstraction level of attributes elicited

A one-way anova shows that the number of concrete attributes elicited differs across elicitation techniques (F=10.7, p<0.0001). Triadic sorting and free sorting generate the largest number of concrete attributes, but, according to Scheffe's test, not significantly more than the ranking method (see table 4). It is not surprising that the share of concrete attributes for triadic and free sorting are significantly higher than for direct elicitation and the attribute list. The respondents can be expected to focus more on visible, concrete differences, when the task is to sort the products according to a similarity/dissimilarity criterion than when the task is to elaborate freely on important characteristics of the products.

Table 4. Average number of concrete attributes, generated by the five techniques

	Mean number of concrete attributes	Atlist	Direct	Rank	Free	Triadic
Atlist	2.6000					
Direct	4.1000					
Rank	4.3000					
Free	5.5667	*				
Triadic	5.9333	*	*			

(*) Denotes pairs of groups significantly different at the 0.05 level

The number of abstract attributes, however, does not differ across elicitation techniques (one-way anova: F=0.50, p=0.73). It can thus be concluded that some elicitation methods such as triadic or free sorting generate more concrete attributes than others such as the attribute list and direct elicitation but not at the expense of the abstract attributes which are mentioned in equal numbers across methods.

Perceived importance of the first five attributes

According to Fishbein and Ajzen (1980) the five to eight attributes first mentioned are more important for consumers' attitudes and behaviours than subsequently mentioned attributes. The analysis presented in the section on nomological validity confirms this for the pooled data. As discussed in the section *Elicitation techniques*, however, we expected triadic and free sorting to be less in accordance with this assumption than the less formalised techniques, like direct elicitation. To test whether our data confirmed this expectation the five attributes elicited first were coded as 1 and the others as 0. A one-way anova with this code as independent variable and attribute importance as dependent variable was conducted across all four methods. The attribute list technique was excluded from the analysis because the sequential order of attributes generated by this method depends on the sequence in which the attributes are listed. Across the four elicitation techniques (attribute list excluded) 589 attributes were mentioned as one of the first five whereas 479 attributes were mentioned subsequently.

For each of the four techniques, the first five attributes mentioned were more important on average than attributes with a higher sequential order. The difference was significant only for the free sorting method (see table 5). Thus, our expectation that Fishbein and Ajzen's assumption (1980) that the attributes elicited first are more important than those elicited later, is more valid for the direct elicitation technique than for the sorting techniques, was not confirmed. With regard to the importance of the first five attributes mentioned, no significant differences (using one-way anova) between the four techniques were found. This was also the case for the attributes mentioned subsequently.

Table 5. Average importance of first five and subsequent attributes

	First five	Subsequent
Triadic sorting	4.36	4.29
Free sorting*	4.74	4.34
Direct elicitation	4.85	4.56
Ranking	4.98	4.83

* significant difference at the 0.05 level between the average importance of first five and subsequent attributes.

Ability to discriminate between and within products

Between-product variance differs significantly across techniques, but only barely (F=2.5, p=0.05). No significant differences exist with regard to within-product variance (see table 6).

Table 6. Within-product variance (WPV) and between-product variance (BPV)

Technique	Atlist	Direct	Free	Triadic	Ranking
mean-BPV	1.5330	1.6580	1.7239	1.8240	1.8456
mean-WPV	1.3101	1.3574	1.4638	1.4850	1.5321

As expected, BPV is highest for the techniques which are most formalised (eg, triadic sorting) and lowest for the least formalised. Scheffe's test does not reveal any significant differences in BPV between specific groups, however.

Contrary to our expectations, WPV did not differ significantly across techniques ($F=1.0$, $p=0.39$). Apart from ranking, however, the differences were in the expected directions.

Predictive ability

As discussed, the predictive ability of the attributes elicited by the five techniques were measured in two ways:

a) by means of correlations between estimated (with a multi-attribute model) preference scores based on the elicited attributes and self-reported product preferences/intentions to buy.

b) by means of a conjoint study conducted at a later date with a group of the respondents interviewed during the first part of the study.

Correlations between estimated and self-reported scores

In order to measure predictive ability, two correlations were computed for each respondent. One correlation, r_p, was computed between estimated preference and self-reported preference for the seven products, and another correlation, r_i, was computed between estimated preferences and self-reported scores on intention to buy the seven products.

Before performing a one-way analysis of variance on the correlations these were z-transformed in order to achieve normality. The two one-way anovas with r_p, z and r_i, z as dependent variables and elicitation technique as independent variable do not reveal any significant differences across elicitation techniques (one-way anova (r_p, z): $F=0.1$, $p=0.98$; one-way anova (r_i, z): $F=0.6$, $p=0.66$). Table 7 shows the mean correlations between the estimated preference score and self-reported preference/intention to buy.

Table 7. Mean correlations between estimated preference and self-reported preference

	Triadic	Atlist	Direct	Rank	Free
Real correlations	0.52	0.52	0.55	0.53	0.56
z-transformed	0.71	0.72	0.76	0.78	0.80

Mean correlations between estimated preference and intention to buy

	Triadic	Atlist	Direct	Rank	Free
Real correlations	0.49	0.48	0.50	0.53	0.49
z-transformed	0.63	0.63	0.63	0.81	0.67

In a study of cellular phones, Lines, Breivik and Suphellen (1995) found that the ranking technique was significantly more useful for predicting preferences than other elicitation techniques. As discussed in the section *Elicitation techniques* we also expected the ranking technique to be better at predicting preferences than the other methods. At the same time we expected the direct elicitation technique to be poorer with regard to this dimension.

Buying vegetable oils must be considered a low involvement behaviour – at least in comparison to the acquisition of a cellular phone. High involvement often implies a high level of knowledge with regard to the product (Grunert & Grunert, 1995). With a high knowledge level, ie, a more complex data structure, the potential differences in results when using different elicitation techniques can be expected to be bigger. Thus, the fact that our expectations regarding differences in predictive ability of the elicitation techniques were disproved, maybe due to the fact that vegetable oil is a low involvement product.

Conjoint analysis of the five elicitation techniques

On average each respondent in the first part of the study mentioned four out of the 10 attributes included in the conjoint study.

In order to see if there was a relationship between the estimated utilities of the conjoint study and the importance ratings of the elicitation study, we coded the importance ratings, a, as follows: if an attribute is not mentioned in the elicitation study, a=0, if the attribute is judged as not important a=1, ..., ..., if the attribute is judged as very important, a=7. The overall correlation between estimated utilities and importance ratings coded in this way is r=0.16, which is significant at the 1% level.

To investigate if there are differences across elicitation methods, individual z-transformed correlations between utilities and importance ratings were computed. These correlations do not differ significantly across elicitation techniques, however (one-way anova: F=0.70; p=0.59).

As attributes in the conjoint study we selected the 10 (out of the 66 attributes resulting from the content coding, see appendix 1) which on average were deemed most important by the respondents in the first part of the study. The 10 attributes and the levels used to operationalize those attributes are listed in appendix 2.

Table 8. Correlation between estimated utilities in conjoint experiment and self-reported importance ratings in elicitation experiment

	mean r z-transformed	mean r real	# of respondents in group
– Rank	0.27	0.24	14
– Triad	0.27	0.24	11
– Direct	0.25	0.22	16
– Free	0.14	0.13	20
– Attribute list	0.11	0.09	12
		Total	73

Although the differences are not significant, the correlations for the ranking methods are highest and the correlations for the attribute list are lowest, as we expected.

To study the external validity of the elicitation techniques, we tested whether the attributes mentioned by the individual respondent in the elicitation study (four on average) were the most important ones for the same respondent's preferential ranking in the conjoint study.

To this end we coded the 10 attributes of the conjoint study – for each respondent – so that the attributes mentioned were coded as 1 and the attributes not mentioned as 0.

A one-way anova with mentioned/not mentioned as independent variable and utilities as dependent variable showed significant differences in utilities between the two groups (F=14.4, p=0.0002). The average utility of attributes also mentioned in the elicitation experiment is 0.12, whereas the average utility of the attributes not mentioned is 0.08. An investigation of the average utility of mentioned attributes across elicitation techniques showed no difference between techniques (one-way anova: F=0.11, p=0.98).

CONCLUSIONS AND IMPLICATIONS

As discussed in the section *Predictive ability*, the average utility of attributes mentioned by each respondent in the elicitation study had a significantly higher utility for the same respondents in the conjoint study compared to the attributes which had not been elicited in the elicitation study. This speaks for an acceptable external validity across all the elicitation techniques. That also the internal validity of the elicitation study is acceptable is indicated by the fact that the correlations between estimated and self-reported preference/intention to buy the seven products used in the study lie in the interval from 0.48 to 0.56 for all the five elicitation techniques.

Figure 1 juxtaposes the significant (+) and insignificant (-) differences (at the 0.05 level) with regard to the eight dimensions on which the five elicitation techniques were compared. For the dimension 'Ability to discriminate between brands', in the pairwise comparison no significant differences between the techniques were found, although the test across all the five techniques showed that significant differences exists.

As discussed in the section *Elicitation techniques*, significant differences were expected to exist with regard to all of the eight dimensions. In the following we therefore first concentrate on the dimensions where our expectations were disproved, ie predictive ability and within-alternative variance. Then we discuss the implications of the results as regards research in consumer behaviour.

In the *Analysis and results* section, the low involvement status of vegetable oil was mentioned as a possible explanation for the lack of differences with regard to predictive ability of the five techniques. The substantial argument is that low involvement often implies a low level of knowledge with regard to a product type (Grunert & Grunert, 1995). With a low knowledge level, the data structure and contents are less complex than with a high knowledge level. Consequently, the potential differences in results when using different elicitation techniques with high involvement products are bigger than when the same techniques are used with low involvement products.

Figure 1. Significant differences between the five techniques

	Overall[1]	Pairwise[2]
Numbers of attributes elicited	+	Atlist <Free, Triad
Importance of attributes elicited	+	Atlist >Triad
Time used to complete the task	+	Atlist < All others
Relative number of concrete attributes	+	Triad, Free>Dir, Rank
Importance of first five attributes[3]	+	Triad, Free <Dir, Rank
Between-product variance	+	
Within-product variance	-	
Predictive ability of attributes elicited	-	

1) Anova with the five techniques as independent variables
2) Scheffe procedure for multiple comparisons between means
3) Attribute list excluded

As discussed in *Study design and operationalization of variables* we expected the attributes elicited by triadic sorting and free sorting to vary more within and between products than the attributes generated by the other techniques. The substantial reason for this expectation was that triadic sorting and free sorting were expected to generate relatively more concrete attributes (this was actually seen to be the case, see figure 1), and that the 'halo-effect' is expected to be less when consumers assess the performance levels of concrete attributes than when they assess more abstract attributes. Although not significant, the differences between the techniques were in the expected directions.

Since concrete attributes are presumed to be less important to the consumer than abstract attributes, and because triadic sorting (and perhaps free sorting) were expected to make the consumers focus on concrete attributes (this was actually the case, see figure 1), we also expected the attributes generated by these techniques to be perceived as less important by the respondents than attributes generated by the other techniques. As illustrated in figure 1, however, only the attribute list technique resulted in attributes that was perceived as more important than the attributes generated by triadic sorting. The other differences, although not important, were also in the expected directions.

Implications for consumer research

The data collected in the study were found to be in accordance with three basic theoretical assumptions of the relations between attributes and consumer choices. This speaks for an acceptable nomological validity of the study, and lends credibility to the belief that the attribute is a basic element in low involvement consumer choices. However, because our results are based on one study only, and because we chose the theoretical assumptions to be studied, our results cannot be used to assess the construct validity of the attribute model. Our data do not allow us to assess whether the reductionistic attribute model is a more precise conception of real low involvement consumer choices than other descriptions, eg holistic models. Our data do allow us to conclude, however, that the attribute concept and the elicitation of attributes are an appropriate groundwork, for the study of low involvement consumer choices.

If the attribute concept and the elicitation of attributes are chosen as the groundwork, the next relevant question to ask is: Which technique should be chosen when studying low involvement consumer choices? According to our results the differences between the elicitation techniques with regard to predictive ability are not significant. Thus, at first glance the answer to the question seems to be rather straightforward: Pick the cheapest or the least complex technique. But, 'predictive ability' is not always the main focus of consumer research. If the purpose of the research is to map consumers' cognitive structures, eg with the aim of collecting data which can be used in product or copy development, it is important to elicit the total array of complex product meanings, not only the attributes that determine choices. An important attribute (ie an attribute which is instrumental to the satisfaction of consumer needs) does not necessarily influence choice behaviour. For this to be the case, it is also necessary that the products in the choice set differ on the attribute in question. Thus, when the researcher is interested in cognitive structures, it cannot be recommended just to pick the cheapest or least complex technique.

In the section *Product attributes and consumer decision-making*, the distinctions between search experience, and credence attributes (see also Andersen, 1994), are described. Experience and in particular credence attributes do not easily lend themselves to an investigation based on a simple elicitation technique like the attribute list. The roles and meanings of abstract attributes like these cannot be studied satisfactorily without probing further into the cognitive structures of the consumers.

When the purpose of the study is exploration of new areas of consumer behaviour, we also warn against picking the cheapest or least complex technique. The results of our study suggest that techniques like direct elicitation, which to a very limited degree constrain and guide the answers of the respondent, result in attributes, which, perceived by consumers, are more important than attributes generated by techniques, like triadic and free sorting, which are characterised by a higher degree of guidance and formalization. Furthermore, as recommended in the literature concerning consumer analysis, (eg Churchill, 1995), the research of unexplored aspects of consumer behaviour, should preferably be initiated with interviews, which are based on unstructured formats.

Hence, in general the selection of which elicitation technique to use, should depend on the purpose of the research. The study allow us to make the following recommendations.

Figure 2. Selection of elicitation techniques for low involvement products

Purpose of the study	*Recommended technique*
prediction of choice	attribute list
cognitive structure	free sorting
exploration	direct elicitation

One of the most commonly used elicitation techniques is triadic sorting (Reynolds & Gutman, 1988). Our results, however, suggest that complex methods like triadic sorting are more time consuming, and that they do not in any way outperform the less complex free sorting technique. Thus, in general there seems to be little reason to apply complicated sorting procedures like triadic sorting, when eliciting attributes for low involvement products. When the researcher is interested in eliciting attributes, which could be used as the basis of probing further into the consumers' cognitive structures of low involvement products, we recommend the free sorting technique.

When prediction is the only purpose of a study, we recommend the attribute list technique in the elicitation task, because this technique is the cheapest and least complex. In the case of mail or telephone interviews the attribute list technique can be used directly. The results of the attribute list technique are also easier to quantify and to use as input for the available set of market-analytic instruments. The attribute list should, however, not be used without prior data collection by a focus group or a similar technique. Although ranking did not differ significantly with regard to predictive ability, the difference in the conjoint study was in the expected direction. Therefore, we recommend some kind of ranking task in connection with the focus group study.

In conclusion, our results suggest that cognitive attribute theory and elicitation of attributes is an expedient and nomological valid groundwork for the study of consumer preferences for low involvement products. The choice of elicitation technique should depend on the purpose of the particular study, however.

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APPENDIX 1

Attribute frequency for the individual methods

Abstract/invisible attributes	Triadic sorting	Direct elicitation	Free sorting	Ranking	Attribute list	Total	In % of all
Quality	17	8	10	12	0	47	31%
Healthy and nutritious	16	15	13	12	19	75	50%
Knowledge	11	8	10	17	13	59	39%
Exotic, special, new, exciting	5	3	6	3	3	20	13%
Less fat	3	0	1	0	0	4	3%
Taste	13	14	14	19	20	80	53%
Several uses	5	7	1	4	14	31	21%
Ecological, free of additives, natural	6	10	8	12	0	36	24%
Good for frying/cooking	11	13	13	14	0	51	34%
Good for baking	5	3	5	3	0	16	11%
Good for dressings/marinades	10	10	13	10	0	43	29%
Vitamins, iron	2	1	0	1	0	4	3%
Minus allergi	1	0	0	0	0	1	0%
Pure raw material, unmixed product, know what it is	3	4	7	4	16	34	23%
Concentrated, economical	1	0	0	1	3	5	3%
Good texture	1	3	6	5	9	24	16%
Strong taste	1	0	0	2	7	10	7%
Neutral taste	1	3	2	2	0	8	5%
For everyday cooking	1	0	0	0	0	1	0%
Easy to digest	1	0	0	0	0	1	0%
Pleasant associations	1	0	0	2	0	3	2%
No sizzling	0	1	1	1	0	3	2%
Good for the dog's coat	0	1	0	0	0	1	0%
Good for spaghetti and other dishes	1	1	1	1	0	4	3%
Place of purchase	0	1	0	0	0	1	0%
Habit	0	1	2	1	0	4	3%
Good as furniture polish	0	0	1	0	0	1	0%
Nice odour	0	1	2	1	12	16	11%
Sells well	0	0	0	1	0	1	0%
Good for deep-frying	0	3	0	0	0	3	2%
Number of abstract attributes	116	111	116	128	116	587	

Attributes that are visible or that can be seen from the consumer information

Price	18	22	16	16	7	79	53%
Fatty acids	9	7	10	6	15	47	31%
Raw material, kind	19	16	19	17	9	80	53%
Consumer information	12	3	6	7	0	28	19%
Glass bottle	6	2	2	0	0	10	7%
Environmentally safe packaging	4	2	3	2	12	23	15%
Cold pressed, pressing	9	6	6	5	0	26	17%
Vegetable oil	3	1	1	1	0	6	4%
Practical packaging	9	7	11	5	13	45	30%
Pretty packaging, nice design, inviting	10	8	11	8	0	37	25%
Shape of packaging	3	0	3	1	0	7	5%
Type of packaging material	13	11	20	13	0	57	38%
Size, volume	7	5	10	5	0	27	18%
Label design	8	5	5	5	0	23	15%
Country of origin	5	3	6	4	0	18	12%
Processing method	4	3	4	6	0	17	11%
Looks expensive, luxury	9	0	7	5	0	21	14%
Opaque bottle	3	2	0	1	0	6	4%
Cork - lid	2	1	0	0	0	3	2%
Content clearly labelled	3	2	2	2	0	9	6%
Nice bottle	4	1	4	3	3	15	10%
Foreign	2	1	2	1	0	6	4%
Dark packaging, protected from light	2	2	1	0	0	5	3%
Danish product	1	0	1	0	4	6	4%
Brand, importer	4	2	1	4	1	12	8%
Practical spout	3	3	5	3	0	14	9%
Shelf life	1	2	0	0	0	3	2%
Colour of oil	1	0	4	1	6	12	8%
See through bottle	1	0	0	0	0	1	0%
Not plastic, estrogen free	1	0	0	2	0	3	2%
Low in cholesterol	1	3	2	4	8	18	12%
No salt added	1	0	1	0	0	2	1%
No rub-off from packaging	0	1	2	2	0	5	3%
Takes up little space	0	2	0	0	0	2	1%
Easy to discard	0	0	1	0	0	1	0%
Plastic bottle	0	0	1	0	0	1	0%
Number of concrete attributes	178	123	167	129	78	675	
Total number of attributes	294	234	283	257	194	1262	
Share of concrete attributes	60.5%	52.6%	59.0%	50.2%	40.2%	53.5%	

APPENDIX 2

Attributes and levels used in the conjoint study

Attributes	*Levels*
Price in DKK	(9.95, 19.95, 29.95)
Raw material	(olive, rape seed, grape seed)
Taste	(strong, mild)
Packaging	(plastic bottle, glass bottle, metal container)
Suitable for	(dressings, frying/baking, all cooking purposes)
Fatty acids	(high content of: poly-unsaturated, mono-unsaturated, saturated fatty acids)
Origin	(French, Danish, Spanish)
Sealing	(screw cap, cork, pull-up spout)
Colour of oil	(light yellow, greenish, golden)
Processing method	(cold pressing, extrusion)