Original Article

The quality of ladders generated by abbreviated hard laddering

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ABSTRACT Laddering is a qualitative measurement technique embedded in means-end chain theory. The fundamental premise of this approach is that consumers learn to associate attributes (A) of products with particular consequences (C), and that these consequences are important because they relate to personal values (V) held by the individual. The A-C-V associations are, therefore, often seen as a representation of the basic drives that motivate consumer behaviour. Laddering is used to elicit these associations from the respondent's cognitive structure, in the form of A-C-V ladders. There are two methods of generating these ladders: Soft laddering (conventional, semi-structured interviews, where the natural flow of speech of the respondent is restricted as little as possible), and Hard laddering, which forces the respondent to produce ladders in a pre-determined sequence. Unfortunately, either procedure is time consuming and requires a considerable physical and mental effort from the respondent. Recently, a method of shortening a laddering survey while controlling the amount of information lost has been proposed in the literature. This article defines and examines the quality of ladders obtained with the abbreviated procedure. It shows that the abbreviated laddering method is likely to lose only a handful of high-quality ladders that might have otherwise been produced by the respondents with the full set of questions.

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INTRODUCTION

According to Freud, 'sometimes a cigar is just a cigar', but, frequently, choosing a product also involves significant deep drivers of consumer decision making.[1] Often, a cigar is more than a cigar! Gutman[2] asserted that one of the deep drivers of individual choice behaviour is the individual's personal values, and, one of the more omnipresent techniques for discovering these drivers, these personal values, is laddering, based on means-end theory (a comprehensive review can be found in Reynolds and Phillips[3]). At its core, laddering is traditionally described as a qualitative measurement technique based on the argument that consumer choice reflects a relationship between product attributes, the consequences of selecting the product, and desired end-states, or values. The goal of laddering is to discover the networks of meaning[3] that link attributes, consequences and values (A-C-V) known as ladders. Our polemic is with the assumption of homogeneity of these ladders. We contend that not all ladders generated in traditional laddering are of equal importance.

The methods of discovering these A-C-V linkages have been categorized by Grunert and Grunert[4] as either soft laddering (conventional, one-on-one, usually tape-recorded, semi-structured interviews), where the natural flow of speech of the respondent is restricted as little as possible,[5] or hard laddering, which forces the respondent to produce ladders in a pre-determined sequence.[6,7] This duality has given rise to significant debate.[8] Whether hard or soft laddering is employed, we suggest that the longer the process, the poorer the quality of the ladders generated later in the process. Kaciak and Cullen[9] demonstrated that there are useful means to shorten the duration of a laddering exercise without seriously detracting from the *quantity* of ladders generated by respondents. One objective of their article was to describe a method of abbreviating a laddering survey while controlling the amount of information lost. They based their method on a hard laddering procedure using a $3\times(1+3+3\times3)$ format (Figure 1): (i) a respondent provides the most important (to her/him) attribute of a product; (ii) the respondent is asked to indicate up to *three* most important consequences of this attribute; (iii) for each of the *three* consequences, the respondent is encouraged to give up to *three* reasons as to why this consequence is personally important. This process would be repeated *two* more times, separately for each subsequent attribute.

The abbreviated laddering method may be outlined as follows: (i) Let items (*p, k, m*) denote the ladders produced in a survey, where *p* relates to an attribute, *k* – to an associated consequence, and *m* – to a reason explaining importance of the consequence. A complete sequence of such items, that the respondent might generate for the *first attribute* can be described as follows: (1,1,1), (1,1,2), (1,1,3), (1,2,1), (1,2,2), (1,2,3), (1,3,1), (1,3,2) and (1,3,3), thus resulting in a theoretical maximum of 27 items for the three attributes. (ii) The abbreviated laddering procedure (Figures 2, 3, and 4) calls for use of only seven (rather than the 27) items: (*1,1,1*), (*1,1,2*), (*1,2,1*), (*2,1,1*), (*2,1,2*), (*2,2,1*) and (*3,1,1*), and will generate app. 80 per cent of the ladders that would have been generated in the full laddering procedure. Five items – (*1,2,2*), (*1,3,1*), (*3,1,2*), (*1,1,3*) and (*3,2,1*) – should be added to the above seven items in order to obtain app. 95 per cent of the ladders.[9]

For the second attribute, ask for the first associated consequence, followed by up to two underlying reasons – thus, items (*2,1,1*) and (*2,1,2*) will be activated. Then, ask for the second consequence, followed by just one underlying reason – this will set off item (*2,2,1*) (Figure 3).

For the third attribute, ask for the first associated consequence, followed by just one, the most important, reason – this will initiate item (*3,1,1*) (Figure 4).

QUALITY OF THE LADDERS RETAINED IN THE ABBREVIATED LADDERING PROCEDURE

The previous section focused on the number of ladders generated by the technique in order to make the case that an abbreviated hard laddering procedure could retain the majority of ladders generated by a full hard laddering technique. In the following sections we move from an

  0967-3237 **Journal of Targeting, Measurement and Analysis for Marketing** Vol. 18, 3/4, 159–166

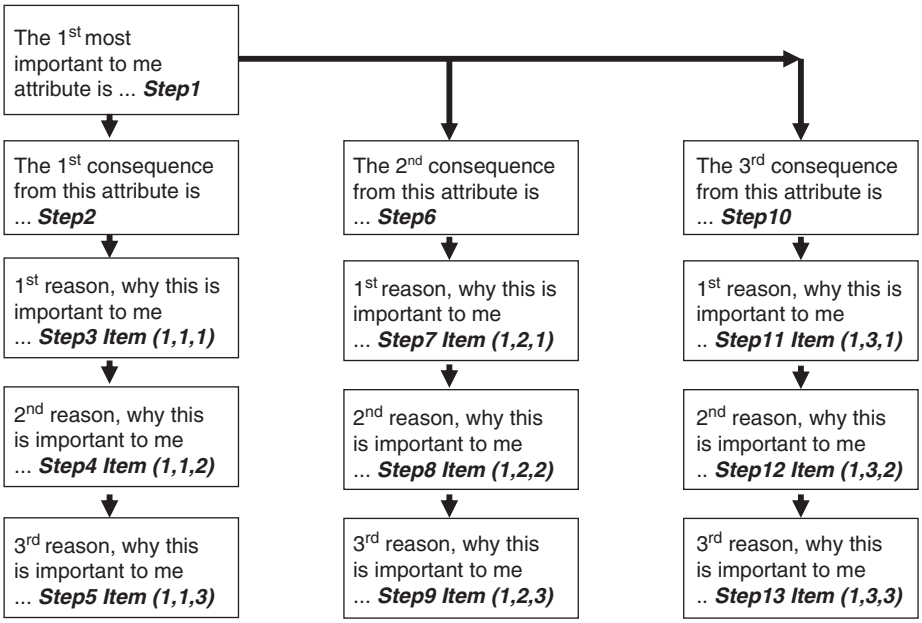

Figure 1: Hard laddering – the *3×(1+3+3×3)* format for Attribute 1 (based on Kaciak and Cullen[9]).
Note: (*) The same format will be repeated for the second and the third attributes, on pages 2 and 3 of the questionnaire, respectively (39 steps in total).

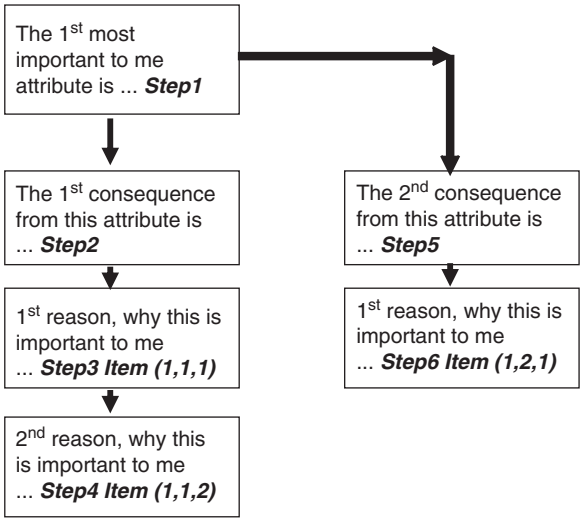

Figure 2: Abbreviated hard laddering – the *3×(1+3+3×3)* format for Attribute 1.

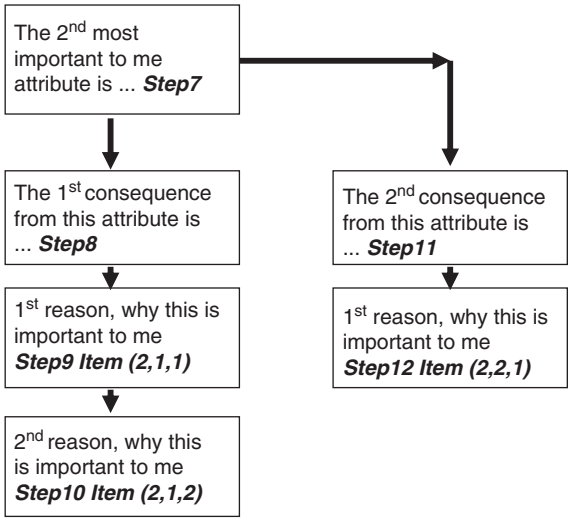

Figure 3: Abbreviated hard laddering – the *3×(1+3+3×3)* format for Attribute 2.

examination of the *quantity* of ladders obtained to a focus on the *quality* of the ladders obtained with the abbreviated method.

Hard laddering is acknowledged to have time and cost efficiencies,[8,10] but is believed to not result in the 'rich, qualitative, and personally meaningful ladders' that result from soft laddering[8] (p. 88). When this issue of the quality of ladders is introduced there is an underlying assumption of the homogeneity of ladders. That is, criticisms of hard laddering techniques, based on the lower quality of the ladders, seem to be missing the point. The criticism appears to be predicated on the notion that anything other than

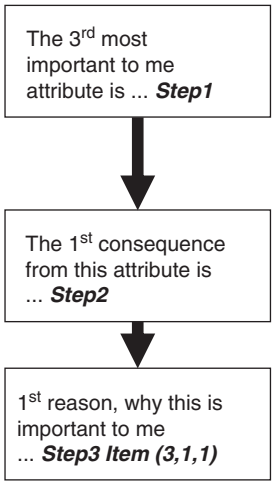

Figure 4: Abbreviated hard laddering – the *3×(1+3+3×3)* format for Attribute 3.

a soft laddering technique violates the basic tenets of the laddering methodology, and therefore cannot generate quality ladders. We contend that lengthy, extended, one-on-one interview sessions lend themselves to numerous biases that may result in low quality data later in the interview session.

Reynolds and Phillips[3] suggested determining the quality of ladders by calculating a ratio of the number of full ladders (that is, ladders comprised of all the assumed category levels) to all the ladders generated by an interview. We propose to address the quality of ladders from yet another perspective.

For this purpose, we will use data from a hard laddering study of consumer perceptions of cigarettes. The laddering data were collected among a quota sample of $n=421$ smokers, through self-administered questionnaires based on the *3×(1+3+3×3)* format. The total number of ladders obtained in the study was 1828.

The prominent *HVM* ladders

The most popular method of analysis of laddering data, beyond question, is the construction of the hierarchical value maps, or *HVM*s.[5] The *HVM* is a graphical representation of the most meaningful (that is, exceeding a certain cut-off level, typically 5–10 per cent of the sample size) relationships among the A, C and V categories in a so-called Summary Implication Matrix, or *SIM*.[5] Thus, the cut-off level determines how many bilateral A-C, C-V and A-V links in the *SIM* will be represented in the *HVM*. Based on the above-mentioned data collected through the 421 hard laddering questionnaires, the following *HVM* was produced (Figure 5).

This map actually shows not only the bilateral connections but also the entire A-C-V ladders. Reynolds[11] asserted that information about the ladders depicted in the *HVM* is very relevant for market segmentation purposes. The *HVM* in Figure 5 shows 33 A-C-V ladders. However, not all of these ladders are necessarily of interest to practitioners. To be of interest, or what we have termed *prominent*, a ladder must be mentioned by a reasonable number of respondents, that is, exceed a certain cut-off number of respondents. Since the *HVM* ladders are generally comprised of at least *three* categories, it is more difficult for them than for the *bilateral* A-C, C-V and A-V associations in the *SIM* to pass the *HVM*'s restrictive cut-off of being mentioned by at least, for example, 8 per cent of the sample. Therefore, we will consider a ladder to be *prominent* if it is generated by *at least 5* per cent of the respondents. It is impossible, however, to determine how many respondents produced each ladder based on the *SIM* for it provides information only about which *pairs* of the laddering categories were elicited from the respondents. Kaciak and Cullen[12] proposed a method for determining a matrix that displays occurrences of all the *trilateral* linkages among the laddering categories. They termed this matrix a Summary Ladder Matrix or *SLM*. The *SLM* obtained in the present study is shown in Table 1.

We matched the ladders in the *HVM* and *SLM* and determined which of them exceeded the cut-off level of 5 per cent, that is, which of them could be considered prominent. We then investigated how many of these prominent ladders were lost due to the described earlier abbreviated procedure.

The results are presented in Table 2 – the prominent ladders $A_iC_jV_k$ have been sorted according to their 'popularity' among the respondents: from the most 'popular' ladder

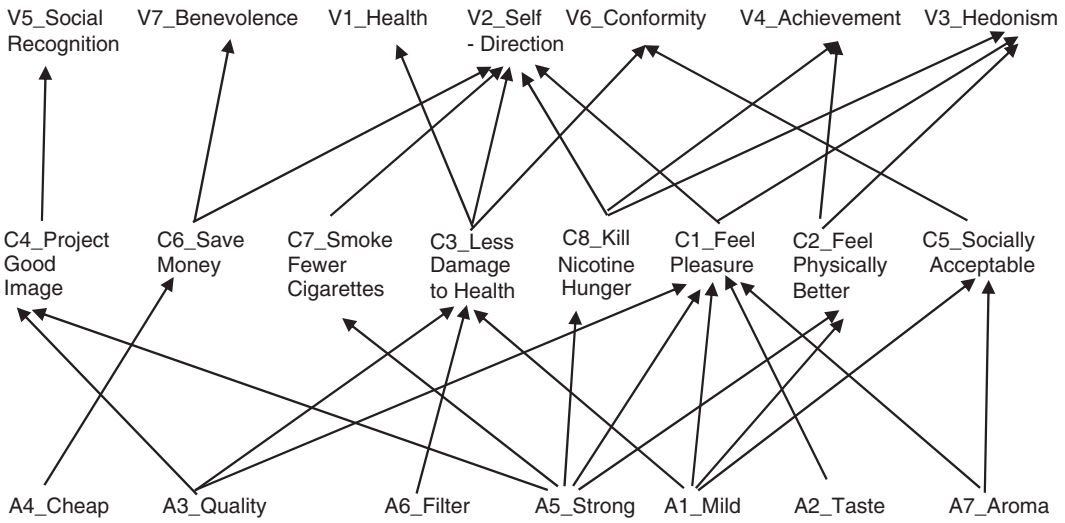

Figure 5: Hierarchical value map (*HVM*) of smokers' perceptions of cigarettes.

Table 1: Summary ladder matrix (*SLM*)

		A1	*A2*	*A3*	*A4*	*A5*	*A6*	*A7*	*CjVk*			*A1*	*A2*	*A3*	*A4*	*A5*	*A6*	*A7*	*CjVk*
C1	V1	1	0	1	0	0	2	0	4	C5	V1	0	0	0	0	0	0	0	0
	V2	9	30	20	2	23	2	21	107		V2	6	0	1	0	0	0	4	11
	V3	29	77	48	2	52	10	69	287		V3	2	0	1	0	0	0	9	12
	V4	0	4	0	0	3	0	1	8		V4	2	0	0	0	0	0	1	3
	V5	2	2	3	0	2	1	3	13		V5	0	0	1	0	0	0	3	4
	V6	2	3	1	0	2	0	13	21		V6	31	0	4	0	0	0	47	82
	V7	0	0	0	0	0	0	0	0		V7	0	0	0	0	0	0	0	0
Total	AiC1	43	116	73	4	82	15	107	440	Total	AiC5	41	0	7	0	0	0	64	112
C2	V1	7	0	2	0	0	0	0	9	C6	V1	0	0	0	0	0	0	0	0
	V2	11	5	3	0	12	0	2	33		V2	9	0	0	107	3	0	0	119
	V3	33	16	3	0	22	0	10	84		V3	5	0	0	7	0	0	0	12
	V4	12	8	0	0	18	0	3	41		V4	0	0	0	0	0	0	0	0
	V5	1	0	0	0	5	0	0	6		V5	0	0	0	0	0	0	0	0
	V6	3	5	2	0	5	0	5	20		V6	0	0	0	6	0	0	0	6
	V7	0	0	0	0	0	0	0	0		V7	0	0	0	83	2	0	0	85
Total	AiC2	67	34	10	0	62	0	20	193	Total	AiC6	14	0	0	203	5	0	0	222
C3	V1	138	2	42	0	0	42	7	231	C7	V1	1	0	11	0	13	0	0	25
	V2	26	0	9	0	0	3	1	39		V2	2	0	8	0	32	0	0	42
	V3	20	0	5	0	0	9	0	34		V3	0	0	0	0	4	0	0	4
	V4	0	0	0	0	0	0	0	0		V4	0	0	0	0	1	0	0	1
	V5	9	0	3	0	0	3	1	16		V5	0	0	0	0	0	0	0	0
	V6	30	0	12	0	0	6	3	51		V6	0	0	5	0	8	0	0	13
	V7	0	0	0	0	0	0	0	0		V7	0	0	4	0	15	0	0	19
Total	AiC3	223	2	71	0	0	63	12	371	Total	AiC7	3	0	28	0	73	0	0	104
C4	V1	0	0	0	0	0	0	0	0	C8	V1	0	0	0	0	0	0	0	0
	V2	3	4	16	0	4	2	4	33		V2	4	2	0	1	40	0	1	48
	V3	0	4	10	0	5	1	1	21		V3	4	4	2	0	82	0	3	95
	V4	0	0	0	0	2	0	0	2		V4	0	1	0	0	25	0	0	26
	V5	11	7	69	0	24	12	11	134		V5	1	0	0	0	3	0	0	4
	V6	2	4	2	0	1	1	2	12		V6	0	0	0	0	11	0	0	11
	V7	0	0	0	0	0	0	0	0		V7	0	0	0	0	0	0	0	1
Total	AiC4	16	19	97	0	36	16	18	202	Total	AiC8	9	7	2	1	161	0	4	184
										Total		416	178	288	208	419	94	225	1828

Table 2: Prominent ladders. *TMA* coefficients

Ladders $A_iC_jV_k$	$A_1C_3V_1$	$A_4C_6V_2$	$A_4C_6V_7$	$A_5C_8V_3$	$A_2C_1V_3$	$A_7C_1V_3$	$A_3C_4V_5$	$A_5C_1V_3$	$A_3C_1V_3$
No. of ladders: from Items 1_7	134	97	82	75	76	67	52	46	39
TMA coeff. 1_7	1.97	3.63	3.77	1.71	2.45	2.88	3.73	2.46	3.44
No. of ladders: from Items 8_12	3	9	0	6	1	2	13	5	6
TMA coeff. 8_12	3.33	7.44	N/A	4.33	8	5.5	5.31	3.8	4.17
No. of ladders: from Items 13_27	1	1	1	1	0	0	4	1	3
TMA coeff. 13_27	4	11	7	6	N/A	N/A	7	5	6
	$A_7C_5V_6$	$A_3C_3V_1$	$A_6C_3V_1$	$A_5C_8V_2$	$A_1C_2V_3$	$A_5C_7V_2$	$A_1C_5V_6$	$A_2C_1V_2$	$A_1C_3V_6$
No. of ladders: from Items 1_7	41	36	39	35	26	24	21	27	22
TMA coeff. 1_7	3.89	2.81	3.87	2.26	1.77	1.92	2.95	3.11	2.5
No. of ladders: from Items 8_12	6	4	3	4	5	6	9	3	7
TMA coeff. 8_12	4.33	7	7.33	3.75	5.6	3.67	3.89	6	3
No. of ladders: from Items 13_27	0	2	0	1	2	2	1	0	1
TMA coeff. 13_27	N/A	7	N/A	4	6	6	6	N/A	4
	$A_1C_1V_3$	$A_1C_3V_2$	$A_5C_8V_4$	$A_5C_4V_5$	$A_5C_1V_2$	$A_5C_2V_3$	$A_7C_1V_2$	*Total*	
No. of ladders: from Items 1_7	27	18	21	20	11	20	16	1072	
TMA coeff. 1_7	2.67	2.33	1.81	2.45	2.18	2.15	3	2.76	
No. of ladders: from Items 8_12	1	7	4	4	12	1	5	126	
TMA coeff. 8_12	3	3.26	4	4.5	4.17	3	6.2	4.71	
No. of ladders: from Items 13_27	1	1	0	0	0	1	0	24	1222
TMA coeff. 13_27	9	6	N/A	N/A	N/A	6	N/A	6.33	

$A_1C_3V_1$ to the least 'popular' ladder $A_7C_1V_2$. We see in Table 2 that the questionnaire items 1 to 7 (the most important items retained for the abbreviated procedure) produced 1072 prominent ladders, that is, 87.7 per cent of all the 1222 prominent ladders mentioned by the 421 respondents. In other words, only 150 prominent ladders (or 12.3 per cent) would be lost if one used in the abbreviated laddering survey only the seven proposed questionnaire items (1,1,1), (2,1,1), (1,2,1), (1,1,2), (2,1,2), (3,1,1) and (2,2,1). The additional five questionnaire items, (1,2,2), (1,3,1), (3,1,2), (1,1,3) and (3,2,1), would reduce the number of missing prominent ladders to 24, or 1.96 per cent.

The 'top-of-mind awareness' coefficients

We also investigated the quality of ladders generated in the abbreviated laddering process from the perspective of a so-called 'top-of-mind awareness' phenomenon. The findings of Ajzen and Fishbein,[13] Bech-Larsen and Nielsen,[14] and Woodside and Trappey[15] suggest that the first five to eight characteristics that come to mind for a given product are the most important ones and are strongly associated with buying behaviour (top-of-mind awareness[16]). Subsequent product-related constructs that respondents attempt to retrieve from their cognitive structures are less relevant. Therefore, we determined, separately for each respondent, the order in which she/he produced the ladders. Thus, the ladders and their corresponding questionnaire items were assigned running ranks. The number of ladders produced by one respondent varied between one and 11. For each prominent ladder, we then calculated the arithmetic averages of the running ranks of the questionnaire items that generated it. We name these averages the *top-of-mind awareness* coefficients, or the *TMA* coefficients. The *TMA* coefficients were calculated separately for each of the three groups of questionnaire items defined in Table 2 – Items 1 to 7, Items 8 to 12 and Items 13 to 27. We believe that such a procedure has never been reported in the literature.

The *TMAs* for Items 1 to 7 are all less than four (with the overall *TMA* coefficient for all the prominent ladders in this group equal 2.76), which indicates that most of the prominent ladders produced by these items were mentioned by the respondents as their first, second or the third

choice. The exact results are as follows: among the 1072 ladders generated by Items 1 to 7, there were 333 ladders given by the respondents as their first choice (with the rank of 1), 255 – with the rank of 2, 189 (rank 3), 109 (4), 86 (5), 51 (6), 29 (7), 12 (8), 5 (9) and 3 (10).

Items 8 to 12 produced an additional 126 ladders, but did not add any ladders with ranks 1 or 2. The best rank generated was that of 3 (for 42 ladders), followed by rank 4 (33 ladders), rank 5 (13), rank 6 (13), rank 7 (14), rank 8 (6), rank 9 (3) and rank 10 (2). The overall *TMA* coefficient for all of the prominent *HVM* ladders in this group was 4.71.

The third group (Items 13 to 27) added 24 more ladders to the previous ones. None of them was mentioned as the first, second, or even the third choice. There were three ladders with rank 4, six – with rank 5, five – with rank 6, six – with rank 7, three – with rank 9 and one – with rank 11. The overall *TMA* coefficient for all of the *HVM* ladders of interest in this group was 6.33.

These results indicate that the method of abbreviating a laddering survey is likely to miss only a handful of 'top-of-mind awareness' ladders that might have otherwise been mentioned by the respondents with the full set of questions. Furthermore, since most of the ladders with undesirable (high) *TMA* coefficients are produced at the end of the survey, eliminating these questions may actually increase the quality of the data.

FINAL CONCLUSIONS AND LIMITATIONS

We have suggested that the quality of ladders be examined from two perspectives. Firstly, we introduced the concept of a prominent ladder, that is, a ladder that meets two criteria: (i) it is depicted in the *HVM*, and (ii) it is mentioned by at least 5 per cent of the respondents. To monitor the numbers of ladders mentioned by the respondents one needs information on *trilateral* linkages among the laddering concepts. Unfortunately, the popular *SIM*s depict only *bilateral* associations between the laddering categories. Therefore, we used an *SLM* that displays occurrences of all trilateral linkages among the laddering categories. Based on this matrix, we found that the number of prominent ladders missed with the shortened questionnaire varied from 2 to 12 per cent only.

Secondly, we return to the primary thesis of this article: that the quality of ladders should not be measured solely in terms of some totemic adherence to the traditional techniques of laddering. Rather, we contend that ladder quality should, at least in part, be considered to be a function of the 'top-of-mind' generation of A-C-V networks. This top-of-mind awareness is a phenomenon which describes the importance of the first several features that come to mind for a given product and are strongly associated with buying behaviour. For that purpose, we introduced the concept of the *TMA coefficients*, taking into account the order in which respondents produce their ladders. We found that the method of abbreviating a laddering survey is likely to lose only a handful of 'top-of-mind awareness' ladders that might have otherwise been produced by the respondents with the full set of questions. Most of the prominent *HVM* ladders (91 per cent) produced by the first seven questionnaire items, as advocated by the abbreviated procedure, were generated by the respondents as their first (31 per cent), second (24 per cent), third (18 per cent), fourth (10 per cent) or fifth (8 per cent) choice. Ajzen and Fishbein[13] label the five to eight attributes mentioned first by a respondent 'salient attributes', which are believed to be the most important ones with regard to the attitudes and behaviour of consumers. Our findings match this postulate very well. We also noted that shortening the questionnaire has an additional beneficial effect in that it eliminates ladders of lesser quality that tend to be produced by the end of the survey. Our research sheds also additional light on the impact of the sequence in which answers at a given level of abstraction are elicited from the respondents. The need for such a study has been emphasized by Grunert *et al.*[17]

In this study, we have focused on the basic component of a laddering process, the ladder itself. In particular, we have determined for each A-C-V ladder its 'biography', stating precisely when and how many respondents were involved

in creating it. Though we do not illustrate such an application, we suggest that these data may be converted to ratings of the A-C-V profiles, at the individual respondent or the aggregate level. Such ratings may then constitute a dependent variable in conjoint analysis of laddering data. The data could then be analysed either at the individual respondent or the aggregate level, and the part-worths and relative importance weights for the category levels could be estimated and used for interpreting the results. Internal validity and reliability of the A-C-V-based models may also be assessed through structural equations modelling.[18]

This study has a number of limitations that one must consider when examining the relevance of the results. The method of shortening the length of a hard laddering survey can be readily applied only by those researchers who decide to use in their research the $3\times(1+3+3\times3)$ format described in this article. We do not know how the results would change if another type of questionnaire was used. Furthermore, the format used in this study assumes only three levels of abstraction, whereas the four levels (attributes, functional and psychosocial consequences, and values) are the standard in modern means-end research.[19] Another limitation of our study is unavoidably related to the very nature of hard laddering based on self-administered questionnaires. In such a case, it is impossible to control for every situational context (time, place, others present, other activities engaged in, and so on) to which a respondent may be exposed.[1,5,20–23] Cigarette smoking behaviour is context dependant (morning coffee versus late night drink, being alone versus being with friends, and so on) and, therefore, the results may vary depending on the mood of the respondent during the study. That is, sometimes a cigarette is more than a cigarette.

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