

The structure of attitudes: Attribute importance, accessibility and judgment

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Two studies related attribute importance to accessibility and speed of judgment. Attitudes were assessed by a direct attitude measure and a modal set of 15 attributes. Attributes were rated in terms of their probability and desirability. Subsequently, participants were required to select the five attributes they considered to be most important. Results of Study 1 (dealing with attitudes towards condom use) show that individually selected, important attributes are more easily retrieved and judged faster than non-selected, less important attributes. Judging attributes took less time than evaluating one's overall attitude, suggesting a bottom-up process in which the various attributes are combined to form an overall attitude. Study 2 (dealing with attitudes towards smoking) extends these findings and also addresses the stability of attitude structure. Important attributes were again associated with reduced response times, and attribute-related judgments took less time than judging one's overall attitude. Accessibility of important attributes remained stable over time as indicated by the results of a lexical decision task one week later. Finally, important attributes were also recalled better than less important attributes. Implications for research on attitude structure are discussed.

Fishbein and Ajzen (1975, p. 218) acknowledge that for each individual only a relatively small number of attributes are likely to determine their attitude. They argue, however, that respondents are not capable of adequate introspection and that direct measures of attribute importance are likely to be unreliable. Fishbein and Ajzen expect such a measure to be redundant because of its close relationship with probability ratings and/or the extremity of evaluations. This view regarding the unreliable retrieval process tends to prevail in attitude research and can also be found in more recent research on context effects on attitude measurement (e.g. Tourangeau & Rasinski, 1988).

Results of a number of studies show that assessing belief or attribute importance (in addition to the likelihood and evaluation of the modal set of attributes) can improve our insight in the structure of attitudes, and result in a more sensitive and

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predictive attribute-based attitude measure (Agnew, 1998; Budd, 1986; Eiser & van der Pligt, 1979; Elliot, Jobber, & Sharp, 1995; van der Pligt & de Vries, 1998a, 1988b; van der Pligt, Eiser, & Spears, 1986). In these studies attribute importance was assessed with a simple selection task which requires respondents to select a subset of important attributes from the larger modal set of attributes. Support for these results is provided by van der Pligt, de Vries, and van Harreveld (1999), who compared various methods to assess attribute importance in the context of expectancy-value approaches to attitude (see also Jaccard & Sheng, 1984; Jaccard, Brinberg, & Ackerman, 1986).

Tourangeau, Rasinski, and D'Andrade (1991) also addressed the issue of attitude structure, and define attitudes as a set of related feelings, memories and beliefs about the attitude object, which can be represented by J. Anderson's (1983) associative network notation. Other related organizational principles are schemata (Fiske & Kinder, 1981; Hastie, 1981) and stereotypes (Hamilton, 1991; Linville & Jones, 1980). Basically, all these solutions represent what Tourangeau and Rasinski (1988) call the static component of attitudes—the component that resides in long-term memory and serves as the basis for answering specific questions about the attitude object. Tourangeau and Rasinski acknowledge that answering questions about an attitude object may be based on existing structures. However, they argued that attribute importance and accessibility¹ are not necessarily related and conclude—referring to Tversky and Kahneman's (1981) availability heuristic—that information retrieval from memory is unreliable and subject to various distortions. As a consequence, Tourangeau and his colleagues focus on immediate context effects such as recency of use, and topical distance between the target and prime (see e.g. Tourangeau *et al.*, 1991).

Thus, although researchers acknowledge the stable or static components of attitudes, the relation between attribute importance and accessibility has not been investigated. Research on accessibility tends to focus on *attitude* importance. Fazio, Sanbonmatsu, Powell, and Kardes (1986) argued that *attitude* importance is related to attitude accessibility. A number of studies in the recent literature supports this suggestion (Boninger, Krosnick, Berent, & Fabrigar, 1995; Fazio, 1989; Krosnick, 1989; Roese & Olson, 1994). The present article investigates whether *attribute importance* is related to accessibility.

Contrary to Tourangeau and Rasinski (1988), the present authors *do* believe that important attributes are more easily retrieved from memory than less important attributes. We focus on the *long-term* strength of attribute–attitude object links and expect shorter response times when important attributes are judged. Important attributes have firmer stimulus–response associations, and hence will be judged more quickly than less important attributes. We expect response time (RT) facilitation beyond that enabled by increased accessibility of a particular attribute. Thus, even after all attributes have been made accessible (e.g. by judging these

¹ The present study refers to concepts as 'accessibility', 'response-time facilitation' and 'speed of judgment'. The authors would like to point out that 'accessibility' refers to the *activation* of a particular node or concept in the mind, while 'response-time facilitation' and 'speed of judgment' refer to processes which do not only involve retrieving the concept from memory, but also *evaluating* this concept. They believe these concepts are fundamentally distinct, although likely to be related.

attributes) we still expect RT-facilitation due to the long-term strength of the association between the attribute and the attitude object.

If attitudes are stable memory structures, the response process might involve such steps as identifying the relevant attitude, retrieving some or all of its contents from memory and integrating what is retrieved into an overall judgment (Tourangeau, 1984, 1987; Tourangeau & Rasinski, 1988; Tourangeau *et al.*, 1991). Both the present approach stressing the enduring elements of attitudes, and the literature that doubts whether attitudes typically consist of stable, enduring evaluative responses, share one important element: that overall attitudinal judgments are not necessarily stored in memory, but important features of the attitude-object (i.e. attributes and feelings associated with the object) are more likely to be stored. Basically, the literature stressing the constructionist nature of attitudes (e.g. Strack & Martin, 1987; Wilson & Hodges, 1992; Zaller & Feldman, 1992) assumes that, when an evaluative attitudinal response is required, people retrieve relevant information and integrate it to form a coherent evaluative judgment. Thus, overall attitudinal responses are assumed to be generated by a *computational* process rather than a *direct retrieval* process. This computational process underlying attitudinal responses may be influenced by both the external context and by internal introspective processes. The present studies focus on the latter, and expects the overall attitudinal response to take longer than the response to specific beliefs or attributes associated with the attitudinal object. This constructionist view can be contrasted with that of Fazio (e.g. 1993) and Bargh (e.g. Bargh, Chaiken, Gendler, & Pratto, 1992), who argue that overall attitudinal judgments are stored in memory and can be retrieved without any need to recompute this judgment.

Accessibility and speed of judgment of attributes as a function of their subjective importance have hardly been investigated in the context of expectancy-value models of attitudes. One of the exceptions is a study by Ajzen, Nichols, and Driver (1995) in which the accessibility of modal salient attributes was compared with the accessibility of attributes *not* related to the attitude object. They selected sets of 16 beliefs about the consequences of each of six leisure activities by means of free elicitation. These sets included salient and non-salient beliefs (defined in terms of the frequency-of-elicitation in a pre-test). They also tested the effects of response format (binary vs. 5-point scale), type of belief, and belief valence. Overall, their findings revealed the predicted main effect for salience; RTs were shorter for salient than for non-salient beliefs. This applied to both the binary response in which respondents were presented with 16 statements for each attitude-object and were asked to indicate whether they agreed or disagreed with each of the statements, and rated them on the 5-point scale. The present study focuses on modal salient beliefs and tests differences in accessibility and judgment speed of two subsets of the set of modal salient beliefs (i.e. individually selected important vs. non-selected, less-important beliefs).

The purpose of the first study can be summarized as follows: first, it attempts to confirm earlier findings concerning differences in attitude structure as a function of behavioural preference, and assesses the predictive power and the sensitivity of an attribute-based measure of attitude based on a subset of individually selected attributes. Next, it focuses on the RTs of selected important vs. non-selected attributes and tests whether the former have faster RTs than the latter. It also

addresses Fishbein and Ajzen's (1975) view that a measure of attribute importance is redundant because of its close relation to the probability ratings of the attributes and/or the extremity of the evaluation of these attributes. Finally, the study assumes attitudes to be the result of a computational process, and expects RTs for attribute-related judgments to be faster than overall attitudinal judgments about the target behaviour.

STUDY 1

Method

Participants

Seventy-eight first-year psychology students of the Universiteit van Amsterdam participated in the study in return for 10 Dutch guilders (approximately £3). They completed a computerized questionnaire on condom use and sexual risk-taking. Age of respondents varied from 18 to 27 years ($M = 20.56$, $SD = 2.05$), 35 were male and 43 were female.

Procedure and variables

On arrival respondents were seated behind a computer and were guided through the questionnaire. First, participants were presented with four semantic differential scales to assess their attitude (Cronbach's $\alpha = .69$). The four items were bad-good, pleasant-unpleasant, for-against and favourable-unfavourable. This constituted the direct measure of attitude. In order to assess attribute response times, participants were presented with each of the 15 attributes. Ten of these attributes were identical to those of Richard, van der Pligt, and de Vries (1995, 1996) and a further five attributes were added by the present authors. The set, listed in Table 1, constituted a modally salient set and included both positive and negative attributes of condom use. Participants were asked to indicate as quickly and accurately as possible their agreement with each of the 15 possible consequences of condom use by pressing a key labelled 'agree' or 'disagree'. Reaction times to each of these attributes were recorded; this procedure is also used in research on attitude accessibility (Fazio *et al.*, 1986). Subsequently the likelihood (b) and evaluation (e) of these attributes were assessed on scales ranging from 'definitely not' to 'definitely' (b) and from 'very negative' to 'very positive' (e). The response latencies to the likelihood measures were also recorded. This does not represent a measure of accessibility in the true sense of the word, but a measure of processing speed. As an additional measure, the authors examined whether this is related to importance.

Attribute importance was assessed by means of a selection task. Participants were required to select the five attributes they personally considered most important and rank them in order of importance. Additionally, attribute importance was assessed by a direct rating task in which the importance of each of the 15 attributes was indicated on a scale ranging from 'unimportant' to 'important'. After this measure, participants were presented with the same direct measure of attitude as used at the beginning of the experiment. The reason for including this second measure was twofold. First, it enabled the authors to control for any effects of the set of attributes presented on the overall attitude. One could argue that if respondents were presented with attributes they were unfamiliar with, this might influence their overall attitude. Secondly, the authors wanted to compare the RTs on this second measure with those on the first measure and examine whether there was any facilitation of response times. RTs associated with the general attitude measures are also compared with those of the various attributes after both the general attitude and the various attributes had been judged and hence made accessible. Finally, participants were presented with an item regarding their intention to use a condom in casual sex, ranging from 'definitely' to 'definitely not'. For all measures, 101-point scales were used ranging from 0 to 100. Participants were required to indicate the position that represented their opinion on a line drawn between two labelled extremes. To calculate attribute-based attitude scores the evaluative ratings were transformed to scores ranging from -50 to $+50$. Higher scores represent a more positive attitude toward condom use, while lower scores represent a more negative attitude.

The sequence in which the attributes were presented was randomized for the dichotomous

(agree–disagree) task, as well as for the ratings of likelihood, evaluation and importance. The order of the semantic differential items used as a direct attitude measure was also randomized.

Results

First, the differences in attitude *structure* between groups with opposing behaviour or intention are examined. The distribution of the behavioural intention scores was highly skewed with a large majority of respondents having safe intentions. In order to test for differences between respondents with safe vs. less safe behavioural intentions the sample was split into two groups, so that those with a score of 81 or more on the 100-point scale were termed 'safe' ($N = 59$), and those with a lower score as 'less safe' ($N = 20$). The reason for selecting 81 as the cut-off point is that the authors considered 20 participants per condition to be a minimum.

A MANOVA was performed on the selection task to compare the two groups in terms of the perceived importance of the various attributes. The multivariate effect was highly significant ($F(15,78) = 3.33, p < .01$), and inspection of Table 1 shows that the less safe respondents selected hedonic items significantly more often as one of the five important attributes. The corollary prediction that respondents with safe intentions would select risk-related attributes more often was not supported by this analysis. The scores for both groups on the selection measure are presented in Table 1.

Descriptive and correlational analyses

The attitude measure based on the five selected attributes correlated more strongly with the direct measure of attitude ($r = .50$) than the measure based on the non-selected attributes ($r = .27$). The difference between these correlations is significant ($t(77) = 1.72, p < .05$, one-tailed; see Ferguson, 1966). Further results show that the score based on the 10 non-selected attributes did not correlate with behavioural intentions ($r = .04$). Neither was this score based on non-selected attributes correlated with the attitude score based on the five selected important attributes ($r = .13$). The latter score shows a similar correlation with the direct attitude measure as the measure based on all 15 attributes ($r = .52$).

The measure based on the five selected attributes correlated slightly higher with behavioural intentions than the measure based on all attributes, although this difference did not reach significance ($r = .50$ vs. $r = .40$). Correlations with the direct attitude measure assessed at the end of the questionnaire are slightly lower, but show a similar pattern. Table 2 summarizes these results.

To examine whether measuring importance on an individual level actually contributes to the predictive value over and above the assessment of importance on group level (Ajzen *et al.*, 1995), the authors also calculated a measure based on the five attributes that were *modally* considered most important. This measure showed a correlation of .37 with the holistic attitude measure. A t test shows that this is significantly lower than the correlation obtained for the measure based on individually selected attributes ($t(77) = 1.68, p < .05$, one-tailed). The correlation between the modally important attributes and behavioural intention is .33. This is

Table 1. Importance of attributes for safe intentions and less safe intentions (Study 1)

Attribute item	Importance selection ^a	
	Safe % (N = 58)	Less safe % (N = 20)
1. Sex without a condom is more pleasant (–)	24	35
2. Sex with a condom prevents getting HIV (+)	91	75
3. Sex with a condom leads to unpleasant interruptions (–)	22	35
4. Sex without a condom leads to regret the following morning (+)	29	20
5. Sex with a condom is less intimate (–)	10	40**
6. Sex with a condom prevents STD (+)	81	75
7. Sex with a condom is less comfortable (–)	10	45***
8. Sex without a condom leads to feelings of insecurity (+)	40	30
9. Sex without a condom leads to worrying (+)	35	20
10. When having sex with a condom one feels less (–)	7	10
11. When having sex with a condom one feels more relaxed (+)	16	10
12. Sex with a condom helps prevent pregnancy (+)	71	65
13. Sex with a condom is more hygienic (+)	24	20
14. Sex without a condom leads to self-blame (+)	36	15
15. While having sex with a condom, it smells like rubber (–)	3	5

* $p < .05$; ** $p < .01$; *** $p < .001$.

^aScores represent the percentage of respondents who selected the item as one of the five important considerations. Differences between groups were tested with chi-square tests.

significantly lower than that for the measure based on important attributes ($t(77) = 2.17$, $p < .001$, one-tailed). Finally, the high correlation between the two direct attitude measures suggests that there is no reason to assume that encountering unfamiliar attributes has altered the overall attitude of participants in this questionnaire, since the correlation between the two holistic attitude measures is high. Moreover, Table 2 illustrates that the means of the two holistic measures are similar. Finally, the *extremity* of the overall attitude scores did not differ before and after the presentation of the attributes ($t < 1$).

Accessibility

The main purpose of Study 1 was to relate attribute importance to RTs. This would support the view that important attributes are not only more predictive of attitudes and behavioural intentions, but are also more likely to be used because of their increased accessibility. Note that, before analysis, *all* RTs (Study 1 and Study 2) were log-transformed. For the sake of convenience, however, the raw response times are

Table 2. Correlations between various attitudinal measures and behavioural intentions (Study 1).

Attitude measure	1	2	3	4	5	6
1. Direct attitude 1 ^a	1.00	.62***	.52***	.50***	.27*	.47***
2. Direct attitude 2		1.00	.38**	.38**	.17	.51***
3. Measure based on all attributes ^b			1.00	.82***	.67***	.40***
4. Measure based on 5 selected attributes				1.00	.13	.50***
5. Measure based on 10 non-selected attributes					1.00	.04
6. Intention ^a						1.00
<i>M</i>	75.51	76.16	930.25	2016.24	387.26	84.63
<i>SD</i>	17.26	17.42	738.15	1656.62	637.95	17.58

^a Scale range is from 0 to 100.

^b Scale range is from -5000 to +5000.

* $p < .05$; ** $p < .01$; *** $p < .001$.

reported. As predicted, decreased reaction times were found on the dichotomous response measure (agree–disagree) of the important as compared to the non-selected, less important attributes. Means were 3.53 s (important attributes) and 4.03 s (less important attributes; $t(77) = 5.17, p < .001$).

RTs were also assessed for the probability ratings. Means were 4.61 s for the important attributes and 5.54 s for the less important attributes, a significant difference ($t(77) = 3.34, p < .01$).

It was found that mean RTs for the probability judgments were significantly shorter (5.23 s) than the mean RT on the four semantic differential scales at Time 1 (8.36 s, $t(77) = 16.88, p < .001$). At Time 2, participants are significantly faster in responding to the holistic attitude judgment ($M = 5.61$ s, $t(77) = 10.49, p < .001$), but still significantly slower than on the probability ratings ($t(77) = 4.16, p < .001$). These response latencies are presented in Fig. 1.

This suggests that judging the overall attitude is more complex than judging the separate attributes. In other words, this difference suggests a bottom-up process in which attributes are combined to form an overall attitude.

Extremity

The relationship between attribute importance and the extremity of evaluations and/or probability ratings was also examined. The within-subject correlations between the importance measure and the extremity of evaluations ranged from .09 to .51 with an average of .31 ($t(77) = 2.89, p < .05$).² Correlations between the importance measures and the extremity of probability ratings ranged from .03 to .71

² Mean correlations were calculated by transforming correlations to z scores. Subsequently, the mean z score was transformed back to an r score.

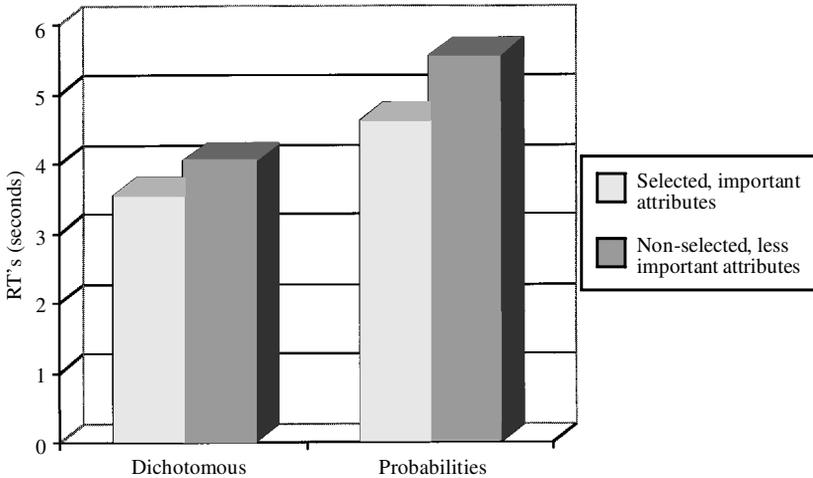


Figure 1. Response times for dichotomous agree–disagree ratings and probability ratings of important vs. less important attributes (Study 1).

with a significant average of $.49$ ($t(77) = 3.75, p < .001$). Correlations between the importance measures and extremity of *bxe* scores ranged from $.15$ to $.69$ with a significant average of $.50$ ($t(77) = 3.79, p < .001$). Although attitude extremity tends to correlate significantly with attitude accessibility (e.g. Downing, Judd, & Brauer, 1992; Judd & Kulik, 1980), the equivalent relation between the extremity of attribute evaluations and attribute accessibility was not found. Correlations between accessibility and evaluative extremity ranged from $-.27$ to $.11$ with a non-significant mean of $-.08$ ($t(77) = .70, p > 1$). Further analysis showed that the average correlation between evaluative extremity and accessibility was $-.25$ for selected attributes and $-.01$ for non-selected attributes, providing some support for the notion that evaluative extremity can be related to increased accessibility.

STUDY 2

In accordance with the hypotheses, the results of Study 1 show that a measure based on individually selected important attributes correlates significantly higher with a direct attitude measure and behavioural intention than a measure based on less important attributes. While the five most important attributes correlate highly with attitude, the 10 remaining (and less important) attributes are not statistically related to the overall attitude. Apparently, people rely on a limited number of important attributes which are more accessible in memory. Only limited support was found for Fishbein and Ajzen's (1975) assumption that a measure of importance is redundant because of a close relationship with the evaluative extremity and/or the likelihood of the attributes.

These findings also confirm the prediction that more important attributes are more accessible, and that judgments about the various attributes underlying the overall attitude are made faster for individually selected, important attributes than for non-

selected, less important attributes. The latter effect indicates RT facilitation beyond that enabled by increased accessibility. Results of Study 1 show shorter RTs for important than for less important attributes, even after all attributes had been judged, and hence had been made accessible. The main point here is that in the context of a particular attitudinal issue, some attributes are *chronically* more accessible than others, are part of a relatively stable structure in memory, and are associated with reduced RTs. Study 2 addresses this issue in more detail.

Study 1 made a distinction between respondents with safe and those with less safe intentions. Unfortunately, the variation in intention with respect to the target behaviour was limited: virtually all respondents had safe intentions. Similar findings have been obtained by other researchers (e.g. Hardeman, Pierro, & Mannetti, 1997). A behavioural domain with a less homogenous behavioural distribution might amplify the differences obtained here. Study 2 focuses on such a domain (smoking cigarettes). Two measures were also added which are *not* related to judgmental processes and directly measure accessibility. To further investigate response latencies of more judgmental processes, RTs of evaluations and importance ratings were also recorded. It examined whether these show the same pattern as the probability ratings. Finally, it explicitly addressed the enduring component of attitude structure by including a follow-up, one week after the initial session.

Method

Participants

Seventy-six first-year psychology students of the Universiteit van Amsterdam participated in the study in return for 15 Dutch guilders (approximately £4). They completed a computerized questionnaire on smoking cigarettes. Age of respondents varied from 18 to 44 years ($M = 22.53$, $SD = 4.39$); 30 were male and 46 were female.

Procedure and variables

For each session 3–11 participants came to the laboratory. On arrival they were each seated behind a computer and were guided through the questionnaire by means of a computer program. First, participants' smoking status was assessed, and they were presented with a direct attitude measure consisting of four semantic differentials ('bad–good', 'pleasant–unpleasant', 'for–against' and 'favourable–unfavourable'; Cronbach's $\alpha = .82$). Subsequently, attitudes were measured with the 15 attribute statements. The attributes used in this questionnaire were based on de Vries and Kok (1986) and van der Pligt and de Vries (1998a) and constituted a modally salient set of attributes related to smoking cigarettes (see Table 4). Probabilities and evaluations were measured in the same manner as in Study 1. Attribute importance was assessed by means of a selection task and direct ratings of importance, similar to those used in Study 1. Response times to probability ratings, evaluations and importance ratings were recorded. The session was concluded with a second direct attitude measure (consisting of the same semantic differentials as in the first measure; Cronbach's α for this measure was .82). For all measures 101-point scales were used ranging from 0 to 100. Participants were required to indicate, on a line drawn between two extremes, the position that best represented their opinion. Evaluative ratings were transformed to scores ranging from +50 to –50. Higher scores indicate a more positive attitude towards smoking, while lower scores indicate a more negative attitude.

The order in which the 15 attribute statements were presented was randomized. To exclude order effects on the other measures, the sequence in which the probability ratings, the evaluative ratings and the importance ratings were presented was also randomized, as well as the order of the semantic differential items used as a direct attitude measure.

A week after the first session participants returned to the laboratory for a follow-up session. This session was designed to examine the relative stability of accessibility. Participants were asked to complete a lexical decision task in which they were sequentially presented with 90 words and were required to determine whether each of these words was either a proper Dutch word or non-existent. The words were visible on the screen until the 'Yes' or 'No' button was pressed on the keyboard. After a short break the next word was presented. Of the 90 presented words, 66 were actually existing words, of which 15 were directly related to the set of attributes of smoking cigarettes. Again, the sequence in which the words were presented was randomized. RT facilitation was expected for words related to consequences of smoking that were selected as important in the previous session. Finally, participants were asked to reproduce three possible consequences of smoking, presented in the session a week earlier, in the order in which they came to mind. Individually selected important attributes were expected to be remembered better than non-selected, less important attributes.

Results

Results of Study 1 showed clear differences in perceived importance between attitudinal groups. This pattern was found again in the present study, but was much more pronounced. Smokers and non-smokers found different attributes important, as indicated by a MANOVA on the selection of the various attributes with smoking status as a between-subject factor ($F(15,76) = 4.26, p < .001$). While smokers focused on the short-term consequences of smoking (multivariate $F(7,76) = 6.55, p < .001$), such as the fact that it helps relaxation and fosters social interaction, non-smokers attached more importance to the long-term health-related consequences and inconvenience to others (multivariate $F(8,76) = 3.94, p < .01$). Table 3 summarizes these results.

Descriptive and correlational analyses

Results confirm those of Study 1 and show that the measure based on the five selected attributes correlates higher with both direct attitude measures as compared to the measure based on the 10 non-selected attributes. Moreover, this measure based on non-selected attributes correlated *negatively*, albeit non-significantly, with both direct attitude measures. The less important attributes showed a highly significant negative correlation with the five important attributes. The differences between the correlations based on the five important attributes and the 10 less important attributes with the attitude measures were significant ($r = .62$ vs. $r = -.10; t(75) = 9.99, p < .001$; and $r = .66$ vs. $r = -.14; t(75) = 9.42, p < .001$). Results further show similar correlations between the measure based on the five selected attributes and the measure based on all attributes with the direct attitude measure (.62 vs. .61 on the first measure ($t(75) = .16, n.s.$) and .66 vs. .62 ($t(75) = .68, n.s.$) on the second measure). The measure based on the five selected attributes and the measure based on all attributes also showed similar correlations with self-reported behaviour (.68 vs. .65 ($t(75) = .80, n.s.$)). These results are shown in Table 4.³

³ To explore these findings one step further, the *bxc* score was also examined based on the attribute that was most important to each individual. Although the *bxc* score based on the single most important attribute did not correlate as highly with the attitude measures as the *bxc* score based on all attributes ($r = .49$ for direct attitude measure 1, and $r = .52$ for direct attitude measure 2), these correlations were still highly significant ($p < .001$). The most important *bxc* score also correlated significantly with behaviour ($r = .62, p < .001$) and negatively ($r = -.34, p < .01$) with the measure based on the less important attributes.

Table 3. Importance of attributes for smokers and non-smokers (Study 2)

Attribute item	Importance selection ^a	
	Smokers% (N = 28)	Non-smokers% (N = 48)
1. Reduces fitness (-)	39	48
2. Reduces nervousness (+)	14	0**
3. Increases coughing	18	19
4. Helps to relax (+)	61	15
5. Increases one's popularity (+)	4	4
6. Causes discomfort to others (-)	25	65
7. Is bad for one's health	57	81
8. Is smelly (-)	11	56
9. Prevents getting too heavy (+)	7	2
10. Is addictive (-)	54	60
11. Leads to tightness of the chest (-)	11	27
12. Increases the likelihood of lung cancer and heart diseases (-)	61	85
13. Increases the ability to concentrate (+)	32	4
14. Fosters social interaction (+)	61	14
15. Helps to conceal one's uneasiness (+)	39	17

* $p < .05$; ** $p < .01$; *** $p < .001$.

^a Scores represent the percentage of respondents who selected the item as one of the five important considerations. Differences between groups were tested with chi-square test.

As in Study 1 the value of assessing attribute importance on an individual level, over and above the importance on group level (Ajzen *et al.*, 1995), was examined. Again a measure was calculated based on the five attributes that were *modally* considered most important. This measure showed correlations of .61 and .62 with the respective holistic attitude measures, and these correlations were similar to those obtained for individually important attributes. However, the correlation between the modally important attributes and behavioural intention is .47, significantly lower than those for the measure based on important attributes ($t(75) = 3.12$, $p < .001$, one-tailed). Table 4 shows that there is no reason to assume that encountering unfamiliar attributes altered the overall attitude of participants in this questionnaire, since the correlation between the two holistic attitude measures was very high. It also shows that the means of the two holistic measures are similar. Finally, the *extremity* of the overall attitude scores did not differ before and after the presentation of the attributes ($t < 1$).

Process measures

The probability ratings (*bs*) for the five most important consequences were made significantly faster than those for the consequences of lesser importance ($M = 4.16$ s vs. $M = 5.08$ s; $t(75) = 5.16$, $p < .001$). The evaluative ratings (*es*) of important

Table 4. Correlations between various attitudinal measures and behaviour (Study 2).

Attitude measure	1	2	3	4	5	6
1. Direct attitude 1 ^a	1.00	.94***	.61***	.62***	-.10	.66***
2. Direct attitude 2		1.00	.62***	.66***	-.14	.66***
3. Measure based on all attributes ^b			1.00	.76***	.22	.65***
4. Measure based on 5 selected attributes				1.00	-.47***	.68***
5. Measure based on 10 non-selected attributes					1.00	-.14
6. Behaviour ^c						1.00
<i>M</i>	31.87	32.17	-974.00	-2124.31	-398.85	1.37
<i>SD</i>	20.45	21.03	563.16	1871.99	627.07	0.49

^a Scale range is from 0 to 100.

^b Scale range is from -5000 to +5000.

^c Scale is dichotomous (1 or 2).

* $p < .05$; ** $p < .01$; *** $p < .001$.

attributes were also made significantly faster than those of the 10 less important attributes ($M = 3.81$ s vs. $M = 4.32$ s; $t(75) = 3.61$, $p < .001$). Participants also rated the importance of the five selected attributes significantly faster than that of the remaining 10 attributes ($M = 3.53$ s vs. $M = 4.31$ s; $t(75) = 6.15$, $p < .001$). Interestingly, the response latencies for the evaluative ratings are considerably lower than those for the probability ratings, suggesting that the latter require more cognitive elaboration. These results are presented in Fig. 2.

As was the case in Study 1, response latencies for the general holistic attitude measures (mean response latency on the four semantic differentials) were slower than for the various attributes. The mean RT on the first holistic attitude measure was 7.80 s. The mean RT of the probability ratings was significantly lower (4.76 s; $t(75) = 15.37$, $p < .001$), as was the mean of the evaluative ratings (4.14 s; $t(75) = 18.06$, $p < .001$) and the mean of the importance ratings (4.04 s; $t(75) = 20.94$, $p < .001$). The mean RT on the second holistic attitude measure was 5.20 s, which is significantly faster than at Time 1 ($t(75) = 12.08$, $p < .001$) but still marginally slower than RTs for the probability ratings ($t(75) = 1.92$, $p < .06$), evaluative ratings ($t(75) = 6.10$, $p < .001$) and the importance ratings ($t(75) = 6.62$, $p < .001$) of the selected attributes. Obviously these differences are even more pronounced when focusing on RTs to *selected* attributes. This suggests that judging the overall attitude is more complex than judging the separate attributes. In other words, this difference suggests a bottom-up process in which attributes are combined to form an overall attitude.

Before analysing the results of the lexical decision task, a transformation of the raw reaction times was executed, taking into account the *length* of the word and the

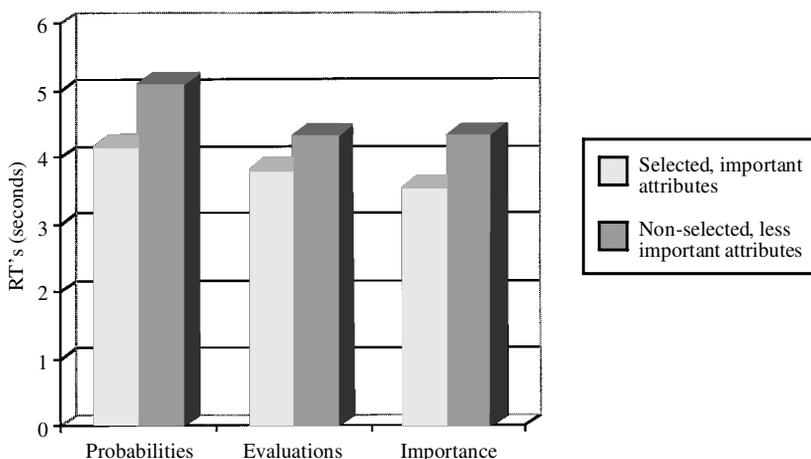


Figure 2. Response times for judgments of probabilities, evaluation and importance ratings for important vs. less important attributes (Study 2).

frequency of the word in the Dutch language (Baayen, Piepenbrock, & van Rijn, 1993). The reaction time for each word was multiplied with the frequency of the word and this product was divided by the length of the word. Subsequently these scores were log-transformed. Results show that the mean transformed reaction times to words related to attributes previously (a week earlier) selected as important are recognized significantly faster than words related to less important attributes ($t(75) = 7.83, p < .001$). Interestingly, when comparing the (transformed) reaction times to the important and less important words with the words not related to the attitude domain, important words are recognized significantly *faster* than the non-related words ($t(75) = 6.97, p < .001$), while the less important words are significantly *slower* than the non-related words ($t(75) = 7.21, p < .001$). One could argue that these less important attributes are *inhibited* from memory and hence less easily activated than 'neutral' words.

Results on the memory task were in accordance with the effects described earlier. There were significantly more consequences previously selected as important among the three remembered consequences ($M = 1.39$) than one would expect by chance (i.e. 1; $t(75) = 3.91, p < .001$). This provides more evidence for the assumption that important attributes are more easily retrieved from memory.

Extremity

As in Study 1, the relationship between attribute importance and extremity of evaluations and/or probability ratings was examined. The correlations between the importance measure and the extremity of evaluations ranged from $-.22$ to $.60$ with a significant average of $.29$ ($t(75) = 2.61, p < .01$). Correlations between the importance measures and extremity of probability ratings ranged from $.16$ to $.66$, with a significant average of $.46$ ($t(75) = 4.46, p < .001$). The correlation between the extremity of the *bxe* ratings and the importance ratings varies from $.15$ to $.74$, with a significant average of $.47$ ($t(75) = 4.58, p < .001$). No significant correlation was

found between attribute accessibility and evaluative extremity. Similarly, correlations between *bx_e* accessibility (the summed response latencies of the probability and the evaluative ratings) and evaluative extremity ranged from $-.42$ to $.05$, with a non-significant mean of $-.12$ ($t(75) = 1.04$, n.s.).

GENERAL DISCUSSION

In general, the correlational analyses of Study 2 corroborate the findings of the first study. Smokers and non-smokers tend to select different attributes as important. As expected, this effect is more apparent in Study 2 than in Study 1 because of increased variance of attitude and behaviour. The five important attributes are clearly predictive of both the direct attitude score and behaviour, while the less important attributes show a negative correlation. In general there is no reason to assume that encountering unfamiliar attributes has altered the overall attitude of participants in this questionnaire, since the correlation between the two holistic attitude measures is high in both studies.

At first sight, the negative correlation between the less important attributes and the direct attitude measure might seem puzzling. A possible explanation is that, for smokers, the non-selected attributes mostly concern negative consequences of their behaviour, while for non-smokers the non-selected attributes refer to positive consequences of behaviour they *do not* perform. The average *bx_e* scores indicate that smokers do not deny the negative consequences of their behaviour. Smokers know that lung cancer is a possible consequence of their habit. Similarly, non-smokers acknowledge that smoking does have some positive consequences. The average *bx_e* scores for non-smokers on these positive attributes are moderately positive. Since non-smokers hold very negative attitudes and smokers hold moderate attitudes towards smoking, both groups might experience both ambivalence and dissonance. One way in which both groups can reduce this dissonance is by denying the relative importance of the consequences which do not support their behaviour and by not including these consequences in their overall attitude.

These results can be related to the cognitive consistency theory (e.g. Rosenberg, 1960). This theory states that people's attitudes tend to be consistent with their beliefs and if there is inconsistency between the two, people will experience this inconsistency as unpleasant and will be motivated to reduce it. Rosenberg (1960) suggests that people can *deny* this inconsistency, or more logically change either their attitudes or their attributes to resolve the inconsistency. Abelson (1959) suggested that people can also bolster their attitudes by adding consonant attributes. Present findings suggest a different way in which people can reduce inconsistency; they do not deny inconsistent attributes, but downplay their relative importance.

With respect to the process measures, Study 2 showed decreased response latencies for ratings of important attributes compared to ratings pertaining to the remaining attributes. This pattern was found on the probability, evaluation and importance measures. The lexical decision task presented a week later showed a similar pattern; words corresponding to the attribute previously selected as most important were recognized faster than the remaining words. On the recall task, participants

mentioned individually important attributes significantly more than would be expected by chance.

Overall, the present studies indicate that a measure of attribute importance can be of considerable value in attitude research. The predictive value of the measure based on individually selected important attributes is as good as that of a measure based on the larger set of all attributes. When examining the predictive value of a set of five modally important attributes vs. that of a set consisting of five individually important attributes, the measure of importance *does* add to the predictive value of the measure. Moreover, both studies show that measures of importance can provide more insight into the structure of attitudes and into differences in attitudinal structure between groups. Measures of accessibility provide further support for these findings.

A measure of attribute importance might also be of considerable value to research on the structural dimensions of attitude strength. For example, the authors examined whether extremity of attribute judgments shows a relation to accessibility similar to that regarding attitude extremity. The data of Study 1 showed that this relation is only apparent for probability ratings regarding *important* attributes. Future research should indicate whether the relation between attitude extremity and accessibility also depends on the importance attached to the attitude object or if this relation only exists at attribute level. Research on attitudinal ambivalence might also benefit from assessing attribute importance, because ambivalence can be viewed as a cognitive state in which attributes of opposite valence are considered important. Hence, a simple selection task like the one used in the present studies might provide a measure of ambivalence.

Furthermore, it seems that a measure of response time can *by itself* provide valuable information regarding the process of attitude formation. This is indicated by the increased response latencies for holistic attitudinal judgments as compared to the probability, evaluative and importance ratings, and especially those of attributes that are important to the individual. This indicates that these ratings require less processing effort, and suggests a bottom-up process through which important attributes are combined into an overall attitudinal judgment. This finding is not in accordance with the 'retrieved evaluation' view of Bargh and colleagues (e.g. Bargh *et al.*, 1992) and Fazio (e.g. Fazio, 1993; Fazio *et al.*, 1986) who agree in their assumption that people's attitudes are often a function of a prior evaluation which is triggered when the attitude object is encountered. The present authors tend to advocate a more constructionist view and believe that in some domains people are inclined to construct an attitude on the basis of a limited number of accessible attributes. Future research should focus on the circumstances under which people are more likely to recompute or to retrieve their evaluative judgment as argued by Fazio (1993)

Previous research on the relationship between attitude-accessibility and the importance of attitudes indicates that important attitudes are more accessible in memory (e.g. Roese & Olson, 1994). The present studies show that, contrary to a suggestion made by Tourangeau and Rasinski (1988), an identical relation seems to hold for the attributes underlying an attitude. Important considerations or attributes are related to the attitude-object faster and are recalled more adequately. Tourangeau and colleagues suggested that if attitudes are memory structures, the response

process is likely to involve such steps as identifying the relevant attitude, retrieving some or all of its contents from memory and integrating what is retrieved into an overall judgment (Tourangeau, 1984, 1987; Tourangeau & Rasinski, 1988; Tourangeau *et al.*, 1991). The present authors would like to add that this seems to apply most clearly to individually selected important attributes. The cognitive structure underlying attitudes consists of a limited number of attributes. This limited number of dimensions or attributes seems to constitute the frame of reference within which the attitude-object is evaluated and can be seen as the prime determinant of the attitude and subsequent behaviour. Knowledge of other possible effects of a certain behaviour may be present or available, but is less accessible and less likely to be used in the construction of an attitudinal judgment (cf. Higgins, 1996).

It is useful to compare the current findings with those obtained by Wilson and colleagues (e.g. Wilson, Dunn, Kraft, & Lisle, 1989; Wilson, Hodges, & LaFleur, 1995) who, like Tourangeau and colleagues, have argued that people have a very limited insight into the reasons underlying their attitude, and stress the instability of perceived attribute importance. Wilson demonstrated that focusing on these reasons can even *alter* the initial attitude and concludes that people when engaging in introspection rely on those aspects that are accessible *at that particular time*. On the basis of the present results the authors would, however, like to advocate the notion that importance and, hence, accessibility *are* relatively stable. The results of Study 2 show that accessibility and importance are related, even a week after the first session, providing evidence for the relative stability of the effect. We agree with Wilson and colleagues, in the sense that accessibility is closely related to (attribute) importance; however, we do not necessarily see accessibility as a predictor of importance. This relates to a discussion between Krosnick (1989) and Roese and Olson (1994) on whether accessibility predicts attitude importance or vice versa.

As argued in the introductory text above, attributing computer-like processing abilities to the human mind may not lead to the most accurate reflection of the human cognitive system. However, the authors believe that the popular assumption that people are dependent to whatever is accessible in their mind does not do justice to the actual process of judgment and decision-making either.

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