

## ATTITUDES TO NUCLEAR ENERGY: BELIEFS, VALUES AND FALSE CONSENSUS

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### Abstract

Attitudinal differences regarding the use of nuclear energy were investigated. Results obtained in a random sample drawn from the population of four communities in The Netherlands within 30 miles of a nuclear power plant showed a strong relationship between subjects' attitudes towards nuclear energy and their perceptions of the possible consequences of nuclear energy. 'Pro'- and 'con'-subjects showed marked differences in the importance attached to the different possible consequences and their endorsement of the salience of more general social issues. Results provide support for the view that individuals perceive a false consensus with respect to the relative prevalence of similar attitudes among other people. Finally, subjects' perceptions of others with similar or opposing attitudes towards the issue of nuclear energy showed marked differences in evaluation especially for the extreme attitude groups.

A dramatic increase in public concern about nuclear energy, over the last decade, has resulted in the entrance of 'the public' into the once-exclusive domain of policy-making. It has become recognized that the future of nuclear energy will not only depend on technical and economic factors, but that public acceptability of the use of nuclear power for civil purposes will play a crucial role in energy decisions.

This increase in public concern is accompanied by a burst of research activity concerning social and psychological factors underlying public responses to nuclear energy. A number of studies focus on people's perception of technological risks (e.g. Fischhoff *et al.*, 1981; Slovic *et al.*, 1981; Vlek and Stallen, 1981). These studies have shown that nuclear energy, as compared with other technologies, elicits an extraordinary level of concern—particularly because of its catastrophic and involuntary nature.

Others attempt to analyse the *structure* of people's attitudes towards nuclear energy from the point of view of social psychology (e.g. Otway and Fishbein, 1976; Otway, *et al.*, 1978; Sundstrom *et al.*, 1981; Woo and Castore, 1980). Most of these studies of attitudes towards nuclear energy are applications of Fishbein's (1963) model of attitude formation, which basically assumes that the more a person believes that the attitude object has good, rather than bad, consequences or attributes, the more favourable will his or her attitude tend to be.

One of the conclusions of these studies was that separate dimensions of the issue of nuclear energy appear differentially salient for different attitude groups. Eiser and van der Pligt (1979) argued that differences in saliency or importance (in terms

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of contribution to the prediction of overall attitude) have important practical implications for communication between the various sides in the nuclear debate. Different attitude groups will tend to disagree, not only over the likelihood of potential consequences of nuclear power, but also over the *importance* of the various consequences. A further finding of the Eiser and van der Pligt (1979) study was that people holding different attitudes towards nuclear energy also differ widely in their attitudes on a variety of more general social issues. This analysis of public attitudes in the wider context of more general social issues enhances one's understanding of the priorities of both proponents and opponents of nuclear power.

The first purpose of the present study was to replicate and extend the Eiser and van der Pligt findings mentioned above. The major changes in the present study are (a) the use of a substantially larger and more representative sample and (b) a focus on slightly different issues, i.e. the building vs. closing of existing nuclear power stations rather than the building of a nuclear re-processing plant.

A further purpose of the present study is to investigate how the two attitude groups see each other. One way of dealing with others who disagree with one's own opinions is to discount one's opponents through imputations of evaluatively negative attributes. Of relevance to this process is one's perception of the prevalence of one's own opinion among other people. Recent research (Fields and Schuman, 1976; Ross *et al.*, 1977) provided strong evidence for the view that people show a tendency to perceive a 'false consensus' with respect to the *relative commonness* of their own responses, i.e. people over-estimate the commonness of their own behaviour/attitude, relative to other behaviours or attitudes. Such estimates play an important role in people's interpretation of social reality. More specifically, these estimates are related to processes of stereotyping (see e.g. Hamilton, 1979). Ross *et al.* (1977) argued that individuals judge those responses that differ from their own to be more revealing of the other's personality traits than those responses which are similar to their own. In other words, people tend to ascribe relatively simplified personality traits to people holding different attitudes towards an issue. This is one way of discounting one's opponent, and can be regarded as the basis of social stereotyping (Tajfel, 1969, pp. 81-2).

Finally, it is relevant to provide some information concerning the context in which this study was conducted. Since the late seventies, the public in The Netherlands has adopted an unmistakably anti-nuclear stance (see, e.g. Niehaus and Swaton, 1980; NIPO, 1979, 1981; Wentholt, 1980). At the time of the study, Dutch Parliament showed no clear majority either for or against increasing the number of nuclear power plants. This led to the decision to hold a Public Inquiry into the issue of energy. This Inquiry started in October 1981 and the final report should be published in November 1983. Parliament will not make any major decisions concerning the existing nuclear power stations or possible new nuclear stations until the final report has been published.

## Method

### *Subjects*

A random sample ( $n = 1362$ ) was drawn from the telephone directories of four communities within approximately 30 miles of a nuclear power plant; two communities were situated in the south-west of Holland and two communities in the

East of Holland.\* In January 1981 respondents received a questionnaire by mail. Two weeks later, the non-respondents received a reminder, followed by a second reminder and a questionnaire another two weeks later. Of this sample, 38 persons had moved house. A total of 638 subjects returned a questionnaire (a response rate of 48%). Thirty-eight respondents who returned incomplete questionnaires were excluded from the analyses. In comparison to probability or quota samples obtained by polling organizations, our sample represents more heavily the middle age categories and has a higher proportion of males. Nearly 70% of the respondents were male. The average respondent was 42.6 years of age: 25% were 30 years old or younger; nearly 59% was between 30 and 60 years of age, and the remaining 16% were older than 60 years of age.

### Questionnaire

In assessing subjects' attitudes towards nuclear energy, we asked two questions:

- (a) Are you in favour of, or against, building more nuclear power stations in The Netherlands? and,
- (b) Are you in favour of, or against, closing down the existing nuclear power stations in The Netherlands?

Subjects' attitudes were assessed in terms of five categories ranging from 'strongly opposed' (1) to 'strongly in favour' (5).

A further four questions asked subjects to estimate:

- the percentage of the Dutch population in favour of increasing the number of nuclear power plants;
- the percentage of Members of Parliament in favour of increasing the number of nuclear power plants;
- the percentage of the Dutch population that would not object to living near a nuclear power plant; and
- the percentage of residents from their local community that would not object to living near a nuclear power plant.

Next, subjects were asked to indicate whether they preferred, did not object to, or preferred *not* to live near a nuclear power plant. In the following section subjects were asked to select from a list of twelve trait-descriptive terms, any that they thought best described firstly a typical pro-nuclear person, and then a typical anti-nuclear person. This list contained, in a random order, six adjectives relatively positive in evaluation (*responsible, realistic, environment-conscious, level-headed, humanitarian and rational*) and six relatively negative adjectives (*ill-informed, short-sighted, weak-willed, complacent, selfish and alarmist*). The selection was based on words used in various publications for and against nuclear power and on the Eiser and van der Pligt (1979) study. Then subjects were presented a list of eight possible consequences of nuclear energy and asked to rate how likely they thought each of these consequences to be. The eight consequences were rated on a 4-point scale ranging from 'very likely' and 'very unlikely'. Subjects were then asked to rank three of the eight

\* According to 1980 census data between 85% and 87% of Dutch households have a telephone. The four communities were not located at equal distances from a nuclear power station; this variable, however, was not included in the present analyses.

consequences which they personally thought were the most important. Subjects were then asked to select three out of nine issues which, in their opinion, should receive most attention in order to secure the future of The Netherlands. Finally, subjects were asked to indicate their age, sex and political preference.

### Results

Subjects' attitudes towards increasing the number of nuclear power plants were as follows: 30% of the subjects were moderately or strongly in favour; 12% were undecided, and 58% were moderately or strongly opposed. The mean age of the 'pros' was 46.9 years; of the neutrals, 48.5 years and of the 'antis' 40.7 years. Subjects' attitudes towards the closure of the existing nuclear power plants were: 48% of the subjects were strongly or moderately opposed; 12% were undecided, and 40% were strongly or moderately in favour. Ratings on this question correlated  $-0.73$  with subjects' attitudes towards increasing the number of nuclear power plants.

For the first set of analyses the sample was split into three groups on the basis of subjects' answers to the question concerning the building of more nuclear power stations in The Netherlands:

- (i) those strongly or moderately opposed to building more nuclear power stations;
- (ii) those who were undecided/neutral, and
- (iii) those who were strongly or moderately in favour.

Table 1 presents the mean ratings by the 'pro-', neutral and 'anti-' group of the eight possible consequences of nuclear energy.

Results clearly show that the likelihood estimates of the possible consequences are related to subjects' attitudes towards nuclear energy. The 'pro'-group estimated the economic benefits of nuclear power more likely and were also of the opinion that the development of nuclear energy would result in an increasing independence of other countries. The 'anti'-group saw nuclear power as more likely to produce serious accidents with negative consequences for both the environment and public health. Furthermore, the 'anti'-group thought it more likely that the storage of nuclear waste would become a major problem. We next computed an index score along the lines of Fishbein's (1963) expectancy-value model. These  $\Sigma b_i e_i$  scores (likelihood ratings, weighted by evaluation, summed over items) were calculated by taking into account only the presumed sign and not the *degree* of evaluation. In other words, the ratings of the four benefits (*a, c, e* and *g*) were multiplied by  $+1$  and the four adverse consequences (*b, d, f* and *h*) by  $-1$ . The score thus obtained correlated  $+0.80$  ( $n = 600$ ,  $P < 0.0001$ ) with subjects' ratings on the scale extremely opposed/extremely in favour of increasing the number of nuclear power plants, and  $-0.68$ ,  $P < 0.0001$  with subjects' attitudes towards closing the existing nuclear power plants.

Table 1 also shows which possible consequences were chosen as being among the three most important by the three attitude groups. The results provide strong support for the findings obtained by Eiser and van der Pligt (1979), i.e. 'pro'-subjects regard economic aspects of nuclear energy as most important, while 'anti'-subjects rate the risk of nuclear accidents and the adverse consequences for the environment as most important. In addition, the undecided group considered *both* economic and environmental aspects to be relatively important.

We then calculated subjects'  $\Sigma b_i e_i$  score for only those beliefs which they

TABLE 1  
*Estimated likelihood and importance of potential consequences of nuclear energy*

	Mean score*				$F(2,597)†$	Percentage‡		
	Pro- subjects ( $n = 179$ )	Neutral subjects ( $n = 72$ )	Anti- subjects ( $n = 349$ )	Pro- subjects ( $n = 179$ )		Neutral subjects ( $n = 72$ )	Anti- subjects ( $n = 349$ )	
(a) Increasing the strength of the Dutch economy	1.31	1.72	2.72	0.65	146.96	0.25	0.09	
(b) A serious nuclear accident in The Netherlands	2.99	2.19	1.34	0.07	239.05	0.21	0.68	
(c) Securing The Netherlands' future energy demands	1.71	1.89	2.89	0.64	90.04	0.33	0.08	
(d) Serious health consequences due to storage of nuclear waste	2.50	1.74	1.18	0.35	179.42	0.35	0.86	
(e) Reduction of the level of unemployment in The Netherlands	2.33	2.75	3.48	0.25	89.61	0.18	0.06	
(f) Restrictions on individual civil liberties due to extensive security measures	2.99	2.38	2.22	0.12	26.12	0.29	0.20	
(g) Increasing the independence of other countries	1.44	1.72	2.80	0.66	115.41	0.42	0.10	
(h) Negative consequences for the environment	3.11	2.22	1.30	0.12	300.92	0.36	0.74	

\*Possible range of scores from 1 (very likely) to 4 (very unlikely).

† All obtained  $F$ -values were significant at the 0.001 level.

‡ The scores represent the proportion of subjects selecting each factor among the three most important. The columns do not add up to 300 because of the inclusion of subjects who chose fewer than 3 consequences.

TABLE 2  
*Importance of various social issues as a function of own attitude*

	Pro- subjects ( <i>n</i> = 179)	Neutral subjects ( <i>n</i> = 72)	Anti- subjects ( <i>n</i> = 349)	<i>F</i> (2,597)†
(a) Maintaining the present material standard of living	0.31*	0.33	0.28	.42
(b) Improvement of the strength of trade and industry	0.76	0.63	0.37	43.27‡
(c) Conservation of the natural environment	0.28	0.31	0.58	27.02‡
(d) Reduction of the level of unemployment	0.64	0.75	0.71	2.23
(e) A stricter criminal law	0.35	0.42	0.24	6.25§
(f) Providing a less complex society	0.17	0.17	0.29	5.92§
(g) Greater public participation in decision making	0.03	0.01	0.12	9.54‡
(h) Increase of defence spending	0.24	0.11	0.03	33.51‡
(i) Reduction of energy use	0.16	0.18	0.26	4.16¶

\*Scores represent the proportion of subjects selecting each issue among the three most important.

†The *F* values refer to an orthogonal contrast between the pro- and anti-group.

‡*P* < 0.001, § *P* < 0.005, ¶ *P* < 0.05.

Note: the three columns do not add up to 300 because of the inclusion of subjects who chose fewer than three issues.

individually selected among the three most important. Subjects who failed to select three consequences were excluded from this analysis. The correlation between the scores based on the three most important consequences and subjects' attitudes towards increasing the number of nuclear power plants was +0.83 (*n* = 526, *P* < 0.001). A similar calculation on the remaining (less important) consequences resulted in a significantly lower correlation (+0.65, Hotelling's *t* = 7.34, *d.f.* = 523, *P* < 0.001).

We next compared the three groups in terms of which factors they felt should receive most attention in order to secure the future of The Netherlands. The percentages of 'pro-', neutral and 'anti'- subjects choosing each factor among the three most important are shown in Table 2.

The factors most frequently chosen by 'pro'-Ss were 'improvement of the quality of trade and industry' and 'reduction of the level of unemployment', whereas 'anti'-subjects put more emphasis on 'conservation of the natural environment' and 'reduction of energy use'. It is interesting to note that *all* three groups rate the 'reduction of the level of unemployment' as a very important issue. Two remaining clear differences between the two groups are related to public participation in decision-making (rated as more important by 'anti'-subjects) and defence spending; the latter issue is hardly mentioned by 'anti'-subjects while 24% of the 'pro'-subjects include it in their list of important issues. A stepwise discriminant analysis was conducted on these scores to find the factors that most distinguished the 'pro'-group from the 'anti'-group—the neutrals were excluded from the analyses.

The results of the stepwise solution (with Rao's *V* used as the stepwise criterion) revealed three factors producing a reasonable degree of separation as indicated by Wilkes' Lambda (0.753) and a canonical correlation of 0.50 for the discriminant function. These three factors were, 'improvement of the quality of trade and industry', 'increase of defence spending', and 'conservation of the natural environment'. In

order to test whether a political left-right dimension was related to the above differences between the two groups, respondents were split into two groups on the basis of their indicated political preference. Inclusion of this right vs. left dimension in the discriminant analysis showed that this variable added significantly to the discriminant function, but less so than the above three factors (change in  $V = 10.17$ ,  $P < 0.005$ ). Further analysis revealed that political preference was also directly related to respondents' attitudes towards increasing the number of nuclear power stations. Of the respondents classified as 'rightists', 50% were in favour of building more nuclear power stations, 15% were neutral, and 35% were opposed—while the 'leftists' showed a clear 'anti' majority (87%), with 6.5% being neutral. These percentages were based on the subjects who indicated their political voting behaviour ( $n = 481$ ) and the intergroup difference was highly significant (Chi-square = 122.6,  $P < 0.0001$ ). Recent opinion poll surveys conducted in the Netherlands confirm this relationship between political preference and attitudes towards nuclear energy (NIPO, 1979, 1981; Wentholt, 1980).

The false consensus proposition implies that subjects' estimates of the percentage of the Dutch population in favour of increasing the number of nuclear power plants should be influenced by one's attitude; i.e. the more 'pro' one's attitude towards building more nuclear power stations in the Netherlands as indicated on the 5-point scale, the higher the estimated percentage. Results confirm this prediction: percentages were 58, 48, 41, 34 and 29, respectively, a significant linear effect ( $F(4,543) = 214.45$ ,  $P < 0.0001$ ). The influence of one's own position upon the estimated percentage of Members of Parliament in favour of increasing the number of nuclear power plants was less marked. Percentages were 56, 50, 46, 46 and 43, respectively, for the five attitude groups. The range of these estimates is less than twice the range of subjects' estimates of the percentage of the Dutch population in favour of nuclear power plants (13 vs. 29). The effect of one's own opinion upon the estimated percentage of Members of Parliament was still significant ( $F(4,543) = 27.23$ ,  $P < 0.001$ ).

Next we considered subjects' estimates of the percentages of the Dutch population and of the residents from their community who would not object to living near a nuclear power plant. These estimates were related to subjects' responses to the question whether they preferred (not) to live near a nuclear power plant, or would not object. Only 13 (2%) of the total sample indicated that they would prefer to live near a nuclear power plant. This insufficient number forced us to exclude these subjects from the analysis. Of the remaining subjects, 341 indicated that they preferred not to live near a nuclear power plant, while 210 subjects would not object. The latter group estimated that 55% of the Dutch people would not object to living near a nuclear power plant while the first group estimated this percentage much lower (25%). This difference is in accordance with the false consensus hypothesis ( $F(1,549) = 232.69$ ,  $P < 0.0001$ ). Estimates of the percentages of the inhabitants of one's own home town who would not object to living near a nuclear power plant show the same pattern. Percentages were 78.4 and 34.5 for the 'would not object to' group and the 'preferably not' group, respectively, ( $F(1,554) = 342.29$ ,  $P < 0.0001$ ). The above results support the view that people perceive a false consensus. In all four cases subjects' estimates of the consensus were significantly influenced by their own attitude towards the issue in question.

Subjects' selections of trait-descriptive terms to describe the typical 'pro'- and 'anti'-nuclear person revealed, as predicted, a strong tendency to describe their 'own

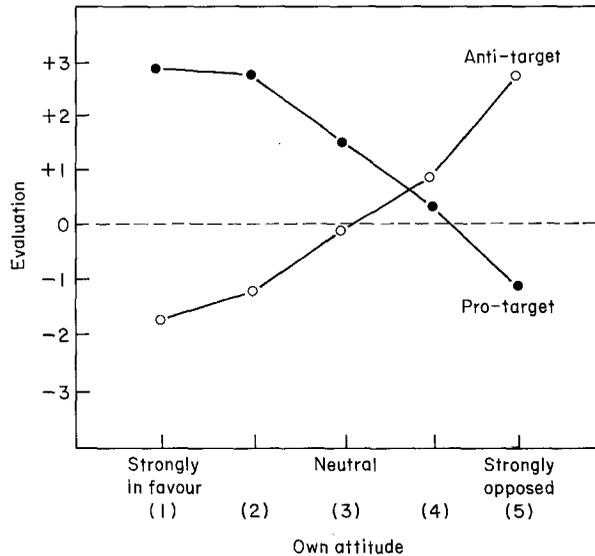


FIGURE 1. Evaluation of a pro-nuclear and an anti-nuclear target-person as a function of own attitude.

side' positively and the opposition negatively. A composite score was calculated by counting the number of positive adjectives minus the number of negative adjectives attributed to the two target persons. Results of this evaluative score are shown in Figure 1, with subjects' attitudes towards building more nuclear power stations indicated on the 5-point scale ranging from strongly in favour to strongly opposed on the horizontal axis.

These results show clear differences in evaluation as a function of own attitude. This difference in subjects' evaluation of the two sides of the debate was tested for each of the 5 attitude groups with paired *t*-tests. The two 'pro'-nuclear groups, (1) and (2), show a clear negative evaluation of a typical 'anti'-person and a positive evaluation of a typical 'pro'-person. The difference in evaluation being significant for both groups,  $t(68) = 13.8$ ,  $P < 0.001$  for group (1) on  $t(111) = 18.3$  for group (2).

This evaluative difference was less marked for the neutral subjects ( $t(71) = 5.5$ ,  $P < 0.001$ ) and nonsignificant for the moderately opposed group ( $t(81) = 1.6$ , n.s.). The strongly opposed group showed a clear evaluative difference ( $t(279) = 23.8$ ,  $P < 0.001$ ). These findings show that the extreme attitude groups have relatively polarized views on the two sides in the nuclear debate. Furthermore, results show an asymmetry in these evaluations. Both the neutral and moderately opposed subjects show less clear-cut evaluative differences, while even the subjects who are moderately in favour show a clear negative evaluation of the 'antis'.

Table 3 shows subjects' preferences for each of the presented adjectives. The three adjectives most frequently selected by the 'pro'-group to describe a typical 'pro'-person were *level-headed*, *rational* and *realistic*—while this group described a typical 'anti'-nuclear person as *short-sighted*, *alarmist* and *ill-informed*. The most frequently selected trait-descriptive terms chosen by the 'anti'-group to describe a 'pro'-person were *short-sighted*, *ill-informed* and *level-headed*. A typical 'anti'-person was described

TABLE 3

*Adjectives describing pro target-persons and anti target-persons as a function of own attitude*

Adjective	Pro-target		Anti-target	
	Pro-subjects (n = 178)	Anti-subjects (n = 348)	Pro-subjects (n = 178)	Anti-subjects (n = 348)
Responsible	43%	8%	16%	64%
Rational	67%	45%	1%	5%*
Weak-willed	1%	8%	16%	1%
Complacent	3%	11%	15%	4%
Realistic	56%	12%	4%	33%
Environment-conscious	36%	5%	25%	72%
Selfish	1%	30%	23%	5%
Ill-informed	3%	51%	46%	6%
Level-headed	70%	13%	2%	31%
Short-sighted	5%	59%	60%	6%
Humanitarian	5%	1%*	11%	50%
Alarmist	1%	6%*	57%	10%

Note: All differences were significant at 0.001, except \* which were significant at 0.025.

as *environment-conscious*, *responsible* and *humanitarian*. These results show that the two attitude groups have very different 'images' of one another and that descriptions of one's 'own side' and the 'other side' are largely determined by the evaluative aspects of the adjectives.

### Discussion

At a general level, the results of the present study provide strong support for the view that individuals' attitudes towards nuclear energy are closely related to their perceptions of its potential consequences. Our findings similar to those obtained by Sundstrom *et al.* (1977, 1981), Woo and Castore (1980) and Eiser and van der Pligt (1979), and show that individuals approach the issue of nuclear energy in terms of various potential positive and negative consequences.

Our results provide strong support for the view that individuals with opposing attitudes tend to see different aspects of the issue as salient, and hence, will disagree not only over the likelihood of the various consequences but also over their importance. In other words, each group has its own reasons for holding a particular attitude; the 'pro'-group saw the potential economic benefits as most important, while the 'anti'-group attached greater value to environmental and public health aspects. The undecided group showed a more balanced view and rated both aspects as relatively important. A further indication of the importance of belief saliency is provided by the finding that the correlation between subjects' utility scores and their attitudes was considerably higher when considering only those consequences selected among the three most important, than when only less important consequences were considered.

Results concerning subjects' perception of the importance of more general social issues were in line with the above findings. The major difference between the two attitude groups being that the 'pro'-group attached more importance to economic

issues and defence spending, while the 'anti'-group stressed the importance of the conservation of the natural environment. Further analyses showed that both respondents' attitudes towards nuclear energy and their perception of the importance of various social issues are clearly related to their political stand. Similar findings were obtained by Lindell *et al.* (1980). These results clearly indicate that attitudinal differences towards nuclear energy are embedded in a larger context of attitudes towards more general social issues. Public thinking on nuclear energy is not simply a matter of perceptions of risks but is also related to more generic issues such as the value of economic growth, high technology and centralization (see also Kasperson *et al.*, 1980; Otway and Thomas, in press). It seems impossible, therefore, to detach the issue of nuclear energy from questions of the kind of society in which one wants to live.

Inspection of the kind of attributions made by the different attitude groups revealed marked differences. First, evaluative factors played an important role in subjects' selections of trait-adjectives. Subjects generally attributed evaluatively positive traits to their own side while the opposing side was described in more negative terms. Especially the more extreme attitude groups showed marked differences in their evaluation of others with similar and those with opposing attitudes.

Next are the results relating to the predictions derived from the 'false consensus' hypothesis. Our data provide strong support for the view that people perceive a false consensus, i.e. people's tendency to overestimate the commonness of their own response. Furthermore, the present findings suggest that the amount of information available is an important variable in this context. The estimated percentages of Members of Parliament in favour of increasing the number of nuclear power plants were much less influenced by one's own opinion than the three remaining estimates. At present there is no clear majority for either option in Dutch Parliament, which led to the decision to hold a Public Inquiry into the issue of nuclear energy. The latter received widespread attention in the media, which could have resulted in a reduced influence of one's own opinion upon subjects' estimates of the percentage of Members of Parliament in favour of increasing the number of nuclear power plants.

Summarising our findings demonstrate the complexity of public thinking on the issue of nuclear energy. Acceptability of nuclear energy is not simply a matter of the public's perception of risk, but is also related to the beliefs and, more importantly, the values associated with the possible consequences of nuclear energy. A closer examination of these beliefs and values should improve our understanding of public reaction to nuclear power.

### References

- Eiser, J. R. and van der Pligt, J. (1979). Beliefs and values in the nuclear debate. *Journal of Applied Social Psychology*, **9**, 524-36.
- Fischhoff, B., Lichtenstein, S., Slovic, P., Derby, S. L. and Keeney, R. L. (1981). *Acceptable Risk*. Cambridge: Cambridge University Press.
- Fields, J. M. and Schuman, H. (1976). Public beliefs about the beliefs of the public. *Public Opinion Quarterly*, **40**, 427-48.
- Fishbein, M. (1963). An investigation of the relationship between beliefs about an object and the attitude towards that object. *Human Relations*, **16**, 233-40.

- Hamilton, D. L. (1979). A cognitive-attribitional analysis of stereotyping. In L. Berkowitz (ed.), *Advances in experimental social psychology*, Vol. 12. New York: Academic Press.
- Kasperson, R. E., Berk, G., Pijawka, D., Sharaf, A. B. and Wood, J. (1980). Public opposition to nuclear energy: Retrospect and prospect. *Science, Technology and Human Values*, **5**, 11-23.
- Lindell, M. K., Earle, T. C. and Perry, R. W. (1980). *Social Issues and Energy Alternatives: The Context of Conflict over Nuclear Waste*. Battelle Memorial Institute, Human Affairs Research Centers, Seattle, Washington, June 1980.
- NIPO (1979). (Netherlands Institute for Public Opinion) Onderzoek-serie Energie-problemen (report no. A-407), Amsterdam: NIPO.
- NIPO (1981). (Netherlands Institute for Public Opinion) *Bericht no. 2149*.
- Otway, H. J. and Fishbein, M. (1976). The determinants of attitude formation: An application to nuclear power (*Research Memorandum RM-76-80*). Laxenburg, Austria: International Institute for Applied Systems Analysis.
- Otway, H. and Thomas, K. (1982). Reflections on risk perception and policy. *Journal of Risk Analysis* (in press).
- Slovic, P., Fischhoff, B. and Lichtenstein, S. (1981). Perception on acceptability of risk from energy systems. In A. Baum and J. E. Singer (eds), *Advances in Environmental Psychology*, vol. 3, Hillsdale, N.J.: Lawrence Erlbaum.
- Sundstrom, E., De Vault, R. C. Peele, E. (1981). Acceptance of a nuclear power plant: Applications of the expectancy-value model. In A. Baum and J. E. Singer (eds), *Advances in Environmental Psychology*, Vol. 3. Hillsdale, N.J. Erlbaum.
- Sundstrom, E., Lounsbury, J. W., Schuller, C. R., Fowler, J. R. and Mattingly, T. J., Jr. (1977). Community attitudes toward a proposed nuclear power generating facility as a function of expected outcomes. *Journal of Community Psychology*, **5**, 199-208.
- Tajfel, H. (1969). Cognitive aspects of prejudice. *Journal of Social Issues*, **25**, 79-97.
- Thomas, K. and Baillie, A. (1982). *Public Attitudes to Risks, Costs and Benefits of Nuclear Power*. Paper presented at a Joint SERC/SSRS seminar on research into nuclear power development policies in Britain. London, June, 1982.
- Vlek, C. and Stallen, P. J. (1981). Judging risks and benefits in the small and in the large. *Organizational Behavior and Human Performance*, **28**, 235-71.
- Wentholt, H. (1980). *Meningen over kernenergie*. Hilversum NOS, Netherlands Broadcasting Foundation.
- Woo, T. O. and Castore, C. H. (1980). Expectancy-value and selective exposure as determinants of attitudes toward a nuclear power plant, *Journal of Applied Social Psychology*, **10**, 224-34.

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