

**AN INVENTORY TO MEASURE  
STUDENTS' ATTITUDES**

by

D. S. ANDERSON and J. S. WESTERN

DEPARTMENTS OF GOVERNMENT AND HISTORY

Volume 1

Number 3



UNIVERSITY OF QUEENSLAND PRESS  
ST. LUCIA

# An Inventory to Measure Students' Attitudes

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*Price: \$1.00*

University of Queensland Papers

Departments of Government and History

Volume I

Number 3

UNIVERSITY OF QUEENSLAND PRESS

St. Lucia

15 December 1967

WHOLLY SET UP AND PRINTED IN AUSTRALIA BY  
WATSON FERGUSON AND COMPANY, BRISBANE, QUEENSLAND  
1967

REGISTERED IN AUSTRALIA FOR TRANSMISSION BY POST AS A BOOK

## **PREFACE**

The final version of the Inventory, the construction of which is described in this report, may be found in Table 20, pp. 202–4. The scales are: Academic Activities, Intellectual Interests, Political-Economic Liberalism, Social Liberalism, Dogmatism, and Cynicism. The sequence of sections in the report follows more or less the stages of construction.

Part I, the Introduction, describes the aspects of university education about which we wished to test students' attitudes.

Part II lists the items which were allocated to the rationalized dimensions, and, for the provisional scales, the item-total correlations, the results of a cluster analysis, and inter-scale correlations.

Part III describes a factor analysis used to verify the provisional item structure, and subsequent modification to the scales. Reliabilities and inter-scale correlations for the final version are reported.

The Inventory is intended for research purposes only. Enquiries are welcome and, in particular, the authors would appreciate hearing from workers intending to use it. Supplies of the Inventory in a form suitable for administration are available at cost from:

Australian Council for Educational Research,  
Frederick Street,  
Hawthorne,  
Victoria.

D. S. Anderson  
J. S. Western

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## **AN INVENTORY TO MEASURE STUDENTS' ATTITUDES**

### **INTRODUCTION**

It is frequently claimed that a university should not only produce a competent professional practitioner—doctor, lawyer, teacher, historian—but that it should also influence a student to, in the words of Ortega y Gasset,<sup>1</sup> “live according to the dictates of his intelligence”.

This idea that university education should be more than the preparation of apprentices for professional practice can be found in numerous pronouncements by leading university educationalists in Australia, Europe, and America.

A sample from Australian sources includes A. P. Rowe,<sup>2</sup> former Vice-Chancellor of the University of Adelaide, who believes that universities are expected by the community to turn out men of high intellectual and cultural attainment and of great moral courage and integrity. The Murray Report on Australian Universities<sup>3</sup> states that universities should be judged by the bearing of their graduates

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<sup>1</sup> J. Ortega y Gasset, *Mission of the University*, trans. H. L. Nostrand (London: Routledge and Kegan Paul, 1952).

<sup>2</sup> A. P. Rowe, *If the Gown Fits* (Melbourne: Melbourne University Press, 1960).

<sup>3</sup> Committee on Australian Universities, *Report and Submissions (Murray Report)* (Canberra: Government Printer, 1957), p. 9.

and that "university education has to be a preparation for a vigorous life in a free society". Sir Mark Oliphant<sup>4</sup> speaks of the "scholar's task . . . to inform the public mind" and "the shaking of a student's assurance in the existing state of affairs". H. C. Coombs,<sup>5</sup> Pro-Chancellor of the Australian National University, states that from universities there should flow into society young men and women who have "intellectual curiosity and the moral resolution to question the unstated assumption" and that "a university man should have learnt to look objectively at complex situations". Sir Fred Schonell, Vice-Chancellor of the University of Queensland,<sup>6</sup> believes that the university has to develop in students "social values and a measure of social responsibility".

Similar views can be found in the critical literature on English universities, Moberly's *Crisis in the University*<sup>7</sup> being an early example of an examination of the problems of Redbrick. Recently in a book about the new University of Sussex, J. P. Corbett<sup>8</sup> has written that all students should experience teachers who play the Socratic role. These teachers must

bring all faiths and assumptions into the open. They are there to challenge, to provoke, to raise doubts and difficulties, to prevent thoughtless acquiescence in current assumptions, to awaken students to that sense of the precariousness of human thinking that should always inform and enliven advanced study and research, and to do what can be done to awaken in them that critical sympathy for men's diverse convictions that is the stuff of civilized life.

In the United States, colleges are widely held to be agents of value and attitude change. Much recent research by social scientists working on American universities has been concerned with how the values and attitudes, which it is agreed distinguish the college-educated, are transmitted. A large number of studies of the effect of instructions on the development of values in college students have been summarized by Philip Jacob.<sup>9</sup> He concludes that, except in a few "peculiarly potent" colleges, value changes in students during college years are negligible. Publication of his findings has been followed by a great deal of methodological criticism,<sup>10</sup> and by many new studies attempting to discover the processes whereby colleges influence students' attitudes and values. Some of these more recent studies suggest that many colleges do, in a variety of ways, influence the values and attitudes of their students.<sup>11</sup>

Throughout this voluminous literature on the American college there are assumptions that colleges should produce students who have liberal attitudes on social and political questions, who value the life of the mind, and who will use rational processes in solving problems of society.

In Britain and Australia there has not been this widespread reflection on university education. In part this is due to the specialized and professional nature of the training which occurs in many university courses from the outset, and to the fact that, in Australia at least, these objectives are usually unofficial statements couched in very general terms and perhaps not meant very seriously.

<sup>4</sup> Mark Oliphant, "University and the Community", *Tasmanian University Gazette*, August 1956, p. 7.

<sup>5</sup> H. C. Coombs, "Universities in Contemporary Society", *Gazette of the University of Western Australia*, X, no. 2 (June 1960), 23.

<sup>6</sup> F. J. Schonell, "Student Adaptation and its bearing on Achievement", *Australian University*, I, no. 1 (1963), 73.

<sup>7</sup> Walter Moberly, *The Crisis in the University* (London: S.C.M. Press, 1949).

<sup>8</sup> J. P. Corbett, "Opening the Mind", in *The Idea of a New University*, ed. David Daiches (London: Andre Deutsch, 1964), p. 36.

<sup>9</sup> P. E. Jacob, *Changing Values in College* (New York: Harper and Bros., 1957).

<sup>10</sup> e.g. Allen H. Barton, *Studying the Effects of College Education, A Methodological Examination of Changing Values in College* (Connecticut: Edward Hazen Foundation, 1957).

<sup>11</sup> Nevitt Sanford (ed.), *The American College* (New York: John Wiley and Sons, 1962).

Partridge<sup>12</sup> has argued that the Australian university system encourages professionalism and specialization at the price of universities playing an inconspicuous part in the more general moral, cultural, and social life of the community. The few studies made of Australian students show that their expectations about university training are consistent with a vocational emphasis. The dominant aim of students entering universities is to obtain a qualification for professional practice.

Nevertheless it would be surprising if they remained completely impervious to an academic environment. The critical approach to problems which creeps into even the most applied of subjects and the spirit of enquiry which even the most mundane student develops some commitment to, will have some effect on the attitudes and values held. And, of course, outside the formal curriculum, in the Union, in residential communities, and to some extent in faculty-based groups, there is a great deal of undergraduate activity ranging all the way from competitive sport to intense philosophical discussion. In these informal and unofficial contexts also students may have old values modified and acquire some that are new.

As part of a long-term study of professional socialization we faced the problem of measuring the effects of university experience on students in various courses. As well as trying to assess the impact of a particular professional training, such as Medicine, Law, or Engineering, we wished to develop some measures of the results of exposure to the more intangible facets of a university education which have been briefly alluded to above. This paper is concerned with the construction of some scales for this purpose.

Our examination of the literature and our own reflections on the problem suggested that a university education is likely to influence both the issues or problems that concern a person and the manner in which he comes to grips with them, or, as one of our colleagues put it, "what he thinks about and how he thinks". We felt that there were three areas in which attitudes should be examined. One concerned intellectual, philosophical, and cultural matters; the second concerned problems in society; the third concerned characteristic ways of thinking about problems. Within each of these three areas we have attempted to define separate dimensions, and it is these that have guided our attempts at item construction.

The first area (intellectual, philosophical, and cultural matters) could, we felt, be divided into two main dimensions. The first we called *Intellectual Interests*. This involves an appreciation and enjoyment of cultural pursuits and an interest in philosophical discussion and discourse. The second, *Academic Activity*, refers to a more specific preference for an academic way of life—a liking for intellectual problems, sustained thought, and research. The emphasis in the second of these dimensions is on more than a passive interest in the subject; hence it is described as *academic activities*. In the first dimension the emphasis is on a liking for, but not necessarily sustained activity in, certain pursuits—hence *intellectual interests*.

The second area (attitudes to problems in society) presented us with certain problems. It is not uncommon to find in a university setting a critical examination of the beliefs, assumptions, and practices that are widespread in society, and it is sometimes stated that universities have a "progressive" rather than a "traditional" orientation, or a "radical" or "liberal" rather than a "conservative" climate. Very commonly when attempts are made to move from the organizational level to the student level it is done so by assessing students in terms of their "radical", "progressive", or "liberal" attitudes. However, to do so obscures one quite important fact. It is possible, for example, for a person to have liberal attitudes on political matters (supporting government social welfare programmes) on the one hand, and to support laissez faire economic policies (which today are conservative) on the other. Furthermore, nonconformist views about the freedom of man in society—attitudes to laws on censorship and sexual behaviour are examples—can be held independently of beliefs about the political and economic system.

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<sup>12</sup> P. H. Partridge, "The University System", in *Melbourne Studies in Education*, 1960 61, (Melbourne: Melbourne University Press, 1962).



In this area there are at least three main dimensions. One is concerned with political issues, another with economic issues, and a third with social issues. In this investigation we have decided to examine all three. The first we called *Political Liberalism*. This entails support for community rather than personal interests in politics. At the extreme of this dimension is the person who is likely to support left-wing causes, oppose privilege and tradition, and be internationalist in outlook. The second is *Economic Liberalism*. This involves support for planned and controlled economic development, the expansion of the public sector of the economy, and increased government regulation of the private sector. The third, *Social Liberalism*, entails a belief that individuals should be subject to minimum constraint by society. At one extreme of this dimension is the person who values variety in human experience highly and who questions conventional social mores.

Within the third area (characteristic ways of thinking about problems), we identified four main dimensions. The first we called *Pragmatism*. This means a preference for an empirical and pragmatic rather than a theoretical approach. At one extreme is the person who dislikes theories and theorizing, who values ideas according to their usefulness, and who, in problem solving, prefers trial and error to the application of principles and experimenting with innovating procedures. One would expect to find the theoretical "end" of the Pragmatism dimension emphasized in universities. The second dimension is *Tolerance of Complexity*. This refers to an interest in complex issues and an avoidance of over-simplifications. At the extreme of this dimension is the person who is fond of novel situations and ideas, can tolerate ambiguities and uncertainties, and does not always reduce complex issues to black and white categories. Thirdly, there is *Dogmatism*, which means a closed-mindedness when faced with new issues. At one extreme of this dimension is the person who interprets events in terms of preconceived ideas and rejects proposals inconsistent with his ideas, and who asserts conclusions without detailed examination of the evidence. This dimension is closely related to Rokeach's concept of closed-mindedness.<sup>13</sup> The final dimension in this area is *Scientific Orientation*. This entails a concern with a scientific and rational approach to problems as contrasted with an empathic, intuitive approach. This dimension was discarded early in the analysis of data as the items comprising it failed to exhibit a satisfactory level of homogeneity.

One further dimension which we have called *Cynicism* was added to the above list. This refers to a predisposition to account for men's behaviour in terms of their personal satisfactions and interests. The cynic does not take the actions of persons at face value and denies altruism, co-operation, and responsibility as motives. The notion of cynicism was not, of course, found in any of the statements concerning university objectives, but we decided to include it for comparative purposes since several American studies in the field of adult socialization have made use of this and related notions.<sup>14, 15, 16</sup>

Several of the other dimensions have also formed the basis of attitudes studies of American college students. The "Omnibus Personality Inventory", which is being used in the Eight Colleges Study by the Center for the Study of Higher Education, includes scales called pragmatism, tolerance of complexity, and involvement in intellectual activity.<sup>17</sup> Jacob<sup>9</sup> describes a number of studies focussing on liberalism-conservatism. An examination of the American literature reveals, however, that American students are apparently submissive to quizzes of 500 or more items,

<sup>13</sup> M. Rokeach, *The Open and Closed Mind* (New York: Basic Books, 1960).

<sup>14</sup> H. S. Becker, *Boys in White* (Chicago: University of Chicago Press, 1961).

<sup>15</sup> L. D. Eron, "Effect of Medical Education on Medical Students", *J. of Medical Education*, X (October 1955), 559-66.

<sup>16</sup> R. Christie and R. K. Merton, "Procedures for a Sociological Study of the Values Climate of Medical Schools, Part 2", *J. of Medical Education*, XXXIII, no. 10 (1958).

<sup>17</sup> P. Heist and Phoebe Williams, *Manual for the Omnibus Personality Inventory* (Mimeo) (Berkeley: University of California, Center for the Study of Higher Education, 1957).

taking two hours or more. Our problem was to devise an instrument which in content and length would be suitable for Australian conditions. We aimed at an instrument of not more than fifty to sixty items which could be completed in about twenty minutes. The choice of items was guided by reference to the above descriptions. Validation against independent criteria will be undertaken later. The necessarily prior stage has been to ensure that the sets of items (scales) defining the dimensions are both statistically reliable and homogeneous.

We began with ninety-three items; analysis of the correlation between separate items within scales resulted in the elimination of the items intended for "Scientific Orientation" and of ten other items which did not correlate with items in the scales to which they were assigned, or with any of the other scales.

The chosen items were included in a questionnaire completed by 392 first-year Law and Engineering students at an Australian university. Students were asked to answer by choosing a category which indicated their degree of agreement, or the extent to which a statement was true for them. Where statements commenced with the pronoun "I", the true-untrue formulation was used; for example:

- |     |          |       |      |          |          |
|-----|----------|-------|------|----------|----------|
| (i) | I        | II    | III  | IV       | V        |
|     | Strongly |       | Not  |          | Strongly |
|     | Agree    | Agree | Sure | Disagree | Disagree |

It is the responsibility of the government to ensure that everyone has a secure job and a good standard of living (from Political Liberalism)

- |      |            |            |            |            |
|------|------------|------------|------------|------------|
| (ii) | I          | II         | III        | IV         |
|      | Definitely | More True  | More False | Definitely |
|      | True       | than False | than True  | Untrue     |

I don't like things to be uncertain or unpredictable (from Tolerance of Complexity)

Strongly Agree and Definitely True responses were given a weighting of 1; Agree and More True than False were given a weighting of 2; Disagree and More False than True were given a weighting of 4; Strongly Disagree and Definitely Untrue a weighting of 5; Not Sure responses and "no answer" (never more than 4 per cent) received a weighting of 3.<sup>18</sup> In the following tables items are marked + if "agree", or "true" answers are positively associated with the named attitude, and - if they are negatively associated with it. The score of each student on each item was punched into a separate column on an IBM card. Product-moment correlations were calculated for each pair of items and a cluster analysis<sup>19</sup> made to determine the groupings within the alleged scales. Corrected item-total correlations, computed according to the technique specified by Guilford,<sup>21</sup> provided further evidence of the scalability of the items.

<sup>18</sup> It will be noted that in the second form a "not sure" category was not provided. The effect of this difference in procedure, as can be seen from the later tables, is to reduce the proportion of respondents falling in the third category. However, it does not appear to have affected either the inter-item correlations or the item total correlations. Correlations between items allowing "not sure" responses and those that do not are no different from correlations between items which do or do not provide for "not sure" responses; item total correlations of items allowing a "not sure" response are not different to the item total correlations where such a response was disallowed.

<sup>19</sup> The cluster analyses were carried out by Mr. J. Sutton following a method described by Tryon.<sup>20</sup>

<sup>20</sup> R. C. Tryon, "Community of a Variable: formulation by cluster analysis", *Psychometrika*, XXII (1957), 241-60.

<sup>21</sup> J. P. Guilford, *Fundamental Statistics in Psychology and Education* (3rd ed.; New York: McGraw Hill, 1956), p. 327.

The next section presents the items in each scale, the per cent responses over each of the five-point answer categories (based on 392 cases), inter-item correlations and item-total correlations. On the basis of these data, inferences are made about the structure of each dimension.

## THE SCALES—PROVISIONAL VERSIONS

### Involvement in intellectual activity

Initially two components were rationalized in the area of intellectual, philosophical, and cultural matters: academic activities and intellectual interests. However, following the item analysis it appeared that the correlations between items within the components were just as high as the correlations between items across the components. Consequently the two sets of items have been combined and will be referred to as Involvement in Intellectual Activity.

The items, the distribution of responses over them, and the corrected item-total correlations are shown in Table 1, and the inter-item correlations in Figure 1. There is no apparent clustering within the scale, and the overall pattern of relationships shows all the items except the first as having a number of quite high inter-item correlations. Only those inter-item correlations which are significantly different from zero at the 5 per cent level of confidence or better are shown in the diagrams of clusters.<sup>22</sup> It appears from the data that there are three aspects to the Involvement in Intellectual Activity complex of items: the first concerns interest in research and intellectual and academic matters related to university study; the second implies an interest in social and epistemological matters; and the third concerns philosophical and cultural pursuits. Involvement in Intellectual Activity as assessed by this scale seems to describe individuals who enjoy intellectual enquiry and have philosophical and cultural interests.

The corrected item-total correlations, given in Table 1, are all significant at the .001 level or better. Even so, the values are distributed over quite a wide range, and the items which seem best to represent the scale are: 6,8,5,4,9,7,12,2,13. The pattern of responses over these items suggests an interesting trend.

The three most frequently endorsed items (4, history of human thought; 6, the nature of the ideal society; and 7, causes and solutions of national and international problems) all focus on the second aspect of the dimension mentioned earlier: an interest in social and epistemological matters. Three items which are slightly less "popular" than the above, 2, 12, and 13, all have a decided academic content: writing papers on important topics in one's own field, examining theories, and working on problems. The three remaining items 5, 8, and 9, which are least commonly endorsed, focus on more general cultural matters: philosophy, art, and poetry.

Looking at Involvement in Intellectual Activity developmentally, then, it would seem that individuals first acquire an interest in social and epistemological problems, next they develop a concern for academic matters (particularly those that are related to their field of study), and finally they acquire an interest in broad cultural issues.<sup>23</sup>

<sup>22</sup> For 350 cases, correlations of .098, .128, and .131 are significantly different from zero at the 5 per cent, 1 per cent, and .1 per cent levels of confidence respectively.

<sup>23</sup> Briefly, the reasoning on which inferences about the structure of the scales is based is as follows. If a set of items have relatively high and constant item total correlations, it can be assumed that they are all equally representative of the dimension to which they are related. From the distribution of responses over these items we can determine which items an individual located at any point on the dimension is likely to endorse. This in turn provides us with some knowledge of the structure of the attitude. Individuals "low" on the dimension might endorse only items "a", "b", and "c", while individuals "high" on the dimension will endorse items "a", "b", "c", "d", "e", and "f". This approach to scaling and its relation to latent structure analysis and cumulative scaling procedures are to be dealt with in a later paper.

**TABLE 1**  
**Involvement in Intellectual Activity Scale: Distribution of responses and item-total correlations**

		Per Cent Level of Agreement					Item Total Corre- lations	
		Most		Least				
		I	II	III	IV	V		
1	I enjoy tackling problems of the type found in mathematics, philosophy, or logic	+	31	38	1	19	8	0.179
2	I would enjoy writing a paper on the long term effects or outcomes of a significant discovery or contribution in my field of specialization	+	23	35	4	23	11	0.310
3	I often find myself questioning the statements and ideas expressed by my teachers	+	20	47	1	28	1	0.149
4	I would like to learn more about the history of human thought	+	30	36	2	22	8	0.422
5	I enjoy reading essays on serious or philosophical subjects	+	14	28	2	37	16	0.430
6	I am interested in discussions about such topics as the ideal society, freedom, etc.	+	29	34	2	25	8	0.515
7	I have frequent discussions with friends about the causes and possible solutions of various national and international problems	+	26	33	1	29	8	0.385
8	I enjoy reading about artistic or literary achievements	+	15	29	2	32	18	0.445
9	I like to read poetry	+	16	21	1	28	33	0.407
10	I have spent a lot of time listening to serious music	+	19	22	1	32	24	0.128
11	The idea of engaging in research for any lengthy period of time does not appeal to me	-	13	31	2	30	22	0.256
12	All things considered I would prefer to have a principle or theory explained to me than attempt to understand it on my own	-	10	31	2	38	17	0.329
13	I dislike spending a lot of time on any one problem	-	9	36	2	33	17	0.303
14	My conversations with friends usually deal with such subjects as mutual acquaintances and social activities	-	10	43	1	35	9	0.184
15	Although many details still remain to be worked out, we now have definite answers to the major problems in my field	-	5	30	17	28	18	0.182

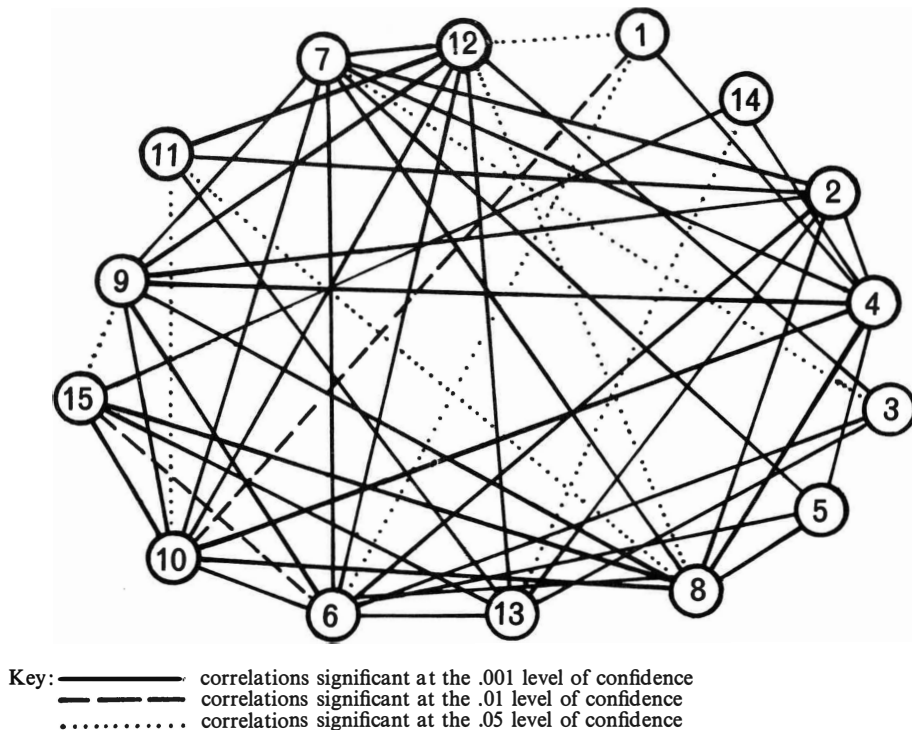


Fig. 1. Item Cluster: Involvement in Intellectual Activity Scale

Note: Items represented by numbers in Figure 1 are as follows (see Table 1 for full description):

- 1 Enjoy tackling mathematical problems
- 2 Enjoy writing research paper on discoveries
- 3 Often question ideas
- 4 History of human thought interesting
- 5 Involvement in philosophical issues
- 6 Discussions of ideal society
- 7 Discussions about international affairs
- 8 Artistic achievements interesting
- 9 Enjoy poetry
- 10 Listen to serious music
- 11 Research unattractive
- 12 Prefer theories explained
- 13 Dislike spending time on one problem
- 14 Conversation concerns mutual acquaintances
- 15 Definite answers to major problems

### Political liberalism

This scale was initially composed of nine items. Following the item analysis, one of these was discarded.<sup>24</sup> The remaining items, together with the distribution of responses over them, are shown in Table 2.

The pattern of relationships between the items is shown in Figure 2. Items 4, 5, 6, and 7 form a tightly knit cluster to which items 1 and 2 are quite strongly related. Items 3 and 8 are attached to the main cluster, but the relationships are not strong. The items comprising the core of this scale concern international and industrial matters. The political radical does not subscribe to the view that troubles

<sup>24</sup> The item was: It is only to be expected that in these complex times it will sometimes be necessary to curtail the freedom of particular individuals to ensure the security of the whole society.

both at home and abroad are due to the work of Communist agitators. He feels too that an accommodation with the Soviet on disarmament is possible if the West is willing to take the initiative.

The item-total correlations are presented in Table 2. Six of the eight are significantly different from zero at the .1 per cent level or better; the remaining two are significant at the 1 per cent level and the 5 per cent level respectively.

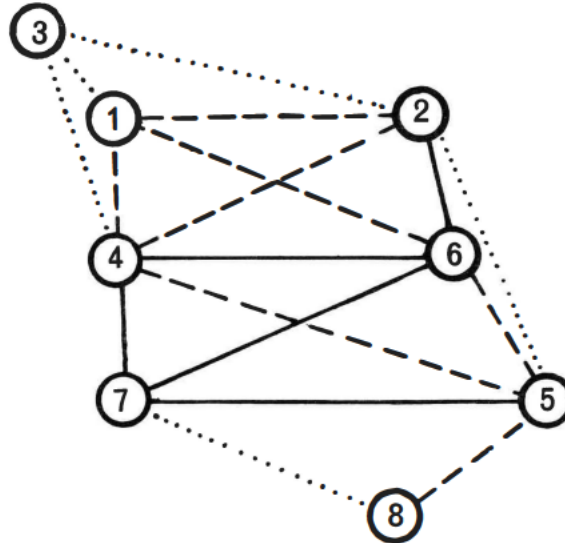
Further evidence for the view that items 4, 5, 6, and 7 are the basis of the scale is provided by the fact that these items have the four highest item-total correlations—they are all above 0.300.

It seems that one of the first indications of a liberal orientation is endorsement of the view that social unrest in the underdeveloped parts of the world is due more

**TABLE 2**  
**Political Liberalism Scale: Distribution of responses and item-total correlations**

		Per Cent Level of Agreement					Item-Total Corre- lation	
		Most				Least		
		I	II	III	IV	V		
1	It is the responsibility of the government to ensure everyone a secure job and a good standard of living	+	16	43	6	28	5	0.216
2	The best way to provide adequate medical care for the entire population is through a government-run national health scheme	+	18	46	15	14	5	0.296
3	It is a fallacy to suggest that large-scale government planning will result in any real loss of individual liberties and freedom	+	5	37	21	29	5	0.148
4	The social unrest found in the underdeveloped parts of the world today is due more to the enormous differences in living standards among the people concerned than it is to the work of Communist agitators	+	22	42	12	17	3	0.325
5	In the present impasse in the disarmament negotiations, the West should take the initiative by making several concessions, since such a procedure could produce reciprocal concessions from the Soviet Union and a return to negotiation	+	6	25	20	35	13	0.319
6	Industrial stoppages at the present time generally result from the genuine grievances of workers; Communist and other radical elements play a relatively minor role in provoking stoppages	+	5	20	16	39	18	0.413
7	The danger of Communist infiltration into the union movement is great, and the government should take whatever steps are necessary to ensure that it does not become widespread	—	19	42	11	19	7	0.392
8	While not condoning censorship of the press, radio, or television, it seems clear that the mass media must be subject to some form of government supervision; otherwise the national security may be endangered or our allies misrepresented	—	6	45	8	27	10	0.107

to social factors than to the work of Communist agitators (item 4). A more developed stage of liberalism also includes the views that progress might be made in disarmament negotiations if the West took the initiative (item 5), and that industrial unrest stems primarily from worker grievances (item 6). The wholly committed political liberal supports these views and also rejects the twofold notion that there is Communist infiltration into the union movement which should be controlled by government action (item 7).



Key: ————— significant at the .001 level  
 of confidence  
 - - - - - significant at the .01 level of  
 confidence  
 ..... significant at the .05 level of  
 confidence

Fig. 2 Item Cluster: Political Liberalism Scale

Note: Items represented by numbers on Figure 2 are as follows (see Table 2 for full description):

- 1 Government responsibility for job security
- 2 Government run national health scheme
- 3 Individual liberties not lost through government planning
- 4 Social unrest in underdeveloped countries not due to Communist agitators
- 5 Concessions to Soviet Union in disarmament negotiations
- 6 Industrial stoppages due to worker grievances
- 7 Danger of Communist infiltration into union movement
- 8 Mass media subject to Government control

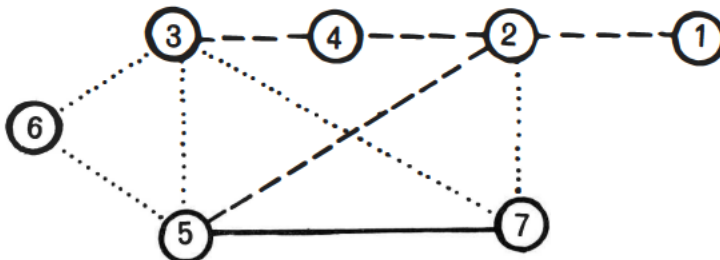
### Economic liberalism

All items of this scale survived the statistical analysis. The items and the distribution of responses over them are shown in Table 3.

The pattern of relationships between the items is shown in Figure 3. The core of the scale comprises items 2, 3, 4, 5, and 7. Item 6 is related to items 3 and 5, items 1 and 2 are related, and item 2 is related to the main cluster through item 4. The relationships are not as strong as those in earlier scales. Economic Liberalism as represented by this scale concerns government control and regulation of business and industry. An economic liberal would like to see the government engaging in more economic planning and feels that the government should be more active in regulating the activities of both domestic and foreign companies.

**TABLE 3**  
**Economic Liberalism Scale: Distribution of responses and**  
**item-total correlations**

		Per Cent Level of Agreement					Item-Total Corre- lation	
		Most				Least		
		I	II	III	IV	V		
1	We need a system of price controls on most goods used by consumers and in industry in order to prevent unjustified price increases	+	12	55	11	17	2	0.133
2	It is quite untrue to suggest that the nationalization of industries such as steel would lead to inefficiency, bureaucracy, and stagnation	+	6	39	21	26	6	0.158
3	The Federal Government should impose some limits on the profits that foreign companies like General Motors are permitted to take out of the country	+	25	49	8	11	4	0.205
4	Our economy would function much more smoothly if the government engaged in more economic planning than it does at present	+	11	39	27	19	1	0.228
5	If the way in which business firms amalgamate is to be subject to regulation, then industry itself should develop the regulatory mechanisms; government should not interfere	-	1	14	26	48	8	0.251
6	National development would probably take place at a more rapid rate if taxes on business profits were to be lowered	-	2	12	23	51	9	0.175
7	It would be a mistake for the government to attempt to regulate the activities of financiers; if needed, such regulations should come from the business community itself	-	2	23	28	36	8	0.229



Key: ————— significant at the .001 level of confidence  
 - - - - - significant at the .01 level of confidence  
 ..... significant at the .05 level of confidence

Fig. 3. Item Cluster: Economic Liberalism Scale

Note: Items represented by numbers in Figure 3 are as follows (see Table 3 for full description):

- 1 Price controls to prevent price increases
- 2 Nationalization of industry an advantage
- 3 Federal government to limit profits leaving the country
- 4 Government engage in economic planning
- 5 Government not to interfere with business firm amalgamation
- 6 Lowered taxes on business profits to speed national development
- 7 Government not to regulate activities of financiers



All item-total correlations are significantly different from zero at the 1 per cent level of confidence, and the four items most representative of the scale are the four that comprise the main cluster described above. From the pattern of responses to these items we can again get some idea of the structure of the attitude.

The first sign of Economic Liberalism, it seems, is acceptance of the view that some control over the profits of foreign companies is desirable (item 3). Those who are slightly more liberal are likely to favour some form of government planning (item 4) as well. The most liberal, while endorsing these two views, also see a need for government control over the activities of local business firms and financiers (items 5 and 7).

**TABLE 4**  
**Social Liberalism Scale: Distribution of responses and item-total correlations**

		Per Cent Level of Agreement					Item-Total Corre- lation	
		Most				Least		
		I	II	III	IV	V		
1	In illegitimate pregnancies, abortion is in many cases the most reasonable alternative	+	10	23	11	21	32	0.463
2	A person should be free to take his own life if he wishes to, without any interference from society	+	5	22	9	36	25	0.425
3	Mutual incompatibility should be sufficient grounds for a divorce	+	8	32	15	25	16	0.477
4	No matter what the modern trend is, young people should be discouraged from having sexual relations before marriage	-	28	29	10	20	10	0.488
5	No matter how strongly we may feel about taking human life, capital punishment is still the best deterrent against crimes of extreme violence	-	11	25	8	28	25	0.082
6	It is unwise to encourage marriage between individuals of different races	-	6	26	15	36	14	0.161
7	While internal censorship may not be desirable, there should be government regulations prohibiting the importation of obscene and pornographic books and materials	-	14	49	7	22	6	0.428

## Social liberalism

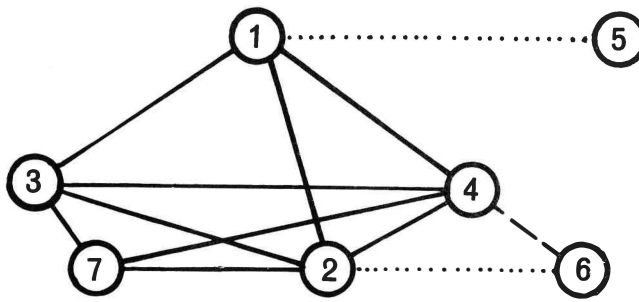
The Social Liberalism scale was initially composed of ten items. Following the item analysis three of these were discarded;<sup>25</sup> the remaining seven, together with the distribution of responses over them, are shown in Table 4.

<sup>25</sup> The three items discarded were: Compulsory Chest X-rays are an infringement of individual liberties. Compulsory fingerprinting for the entire population, while it might have some points in its favour, is too great an infringement of individual liberties to be allowed. No matter how much is done for them, the Australian Aborigines are never likely to adjust satisfactorily to our society.

The relationships between these items are presented in Figure 4. Items 1, 2, 3, 4, and 7 form a tightly knit cluster to which items 5 and 6 are weakly related. Social Liberalism as measured by this scale involves the questioning of some conventional moral norms. The social liberal rejects conventional sexual morality. He holds that the individual alone can determine the course of his own life and he rejects the view that governments can institutionalize morality.

The corrected item-total correlations for the five core items are all above 0.42 and are significantly different from zero at well beyond the .1 per cent level of confidence. Items 5 and 6, which in the inter-item analysis are only weakly related to the main cluster, have considerably lower corrected item-total correlations.

Considering the five core items, it would appear from Table 4 that one of the first signs of Social Liberalism is acceptance of the view that mutual incompatibility should be sufficient grounds for divorce. The next sign is a willingness to accept abortion in illegitimate pregnancies and to reject the view that premarital sexual intercourse should be discouraged. Finally the extreme social liberal, while accepting these views, is opposed to the censorship of pornographic books and materials and feels also that individuals should be free to take their own lives if they wish.



Key: ————— significant at the .001 level of confidence  
 - - - - - significant at the .01 level of confidence  
 ..... significant at the .05 level of confidence

Fig. 4. Item Cluster: Social Liberalism Scale

Note: Items represented by numbers in Figure 4 are as follows (see Table 4 for a full description):

- 1 Abortion in illegitimate pregnancies
- 2 Free to take own life
- 3 Mutual incompatibility grounds for divorce
- 4 Premarital sexual relations discouraged
- 5 Capital punishment deterrent against violent crimes
- 6 Discourage marriages between individuals of different races
- 7 Obscene books prohibited

## Pragmatism

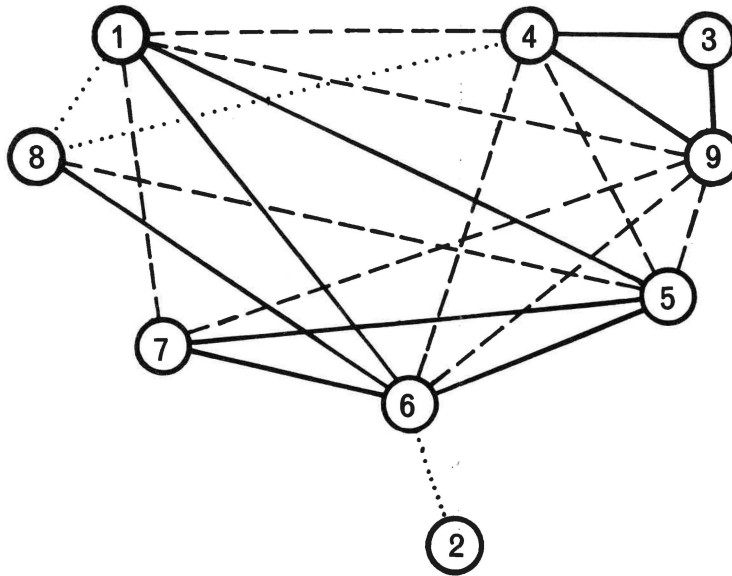
The nine items originally included in this scale all survived the item analysis. They are presented in Table 5. Figure 5 shows the pattern of relationships between items. Item 2 (results are achieved largely by trial and error) is the only item that is not strongly related to others. Pragmatism as measured by this scale implies a preference for the practical over the theoretical, for well-tried over new ways, for a practical rather than a theoretical orientation to education and research, and a preference for persons with these ideas. The corrected item-total correlations shown in Table 5, are, with the exception of item 2, all relatively high and different from zero at the .1 per cent level of significance. Again the pattern suggested by the inter-item correlations has been confirmed.

The distribution of responses over the six items with the highest inter-item correlations suggests a structure within the dimension. Low levels of Pragmatism,

it seems, involve a preference for activities which are likely to yield definite results rather than those from which no definite results will necessarily appear. A more pragmatic attitude is associated with the rejection of two notions: that the critical consideration of theories is intrinsically more interesting than their practical application, and that university subjects dealing with theoretical matters are of greater value to the student than those dealing with practical considerations. In its most developed form, Pragmatism entails as well endorsement of the view that there is too much emphasis in university training on theoretical topics, a preference for the practical man as opposed to the man of ideas, and also for practical rather than analytic subjects. Only in its most developed form does Pragmatism imply a conscious selection of the practical and the concrete (ignoring item 5 which is overwhelmingly endorsed). In its less developed form Pragmatism is simply a refusal to put theoretical matters ahead of the practical.

**TABLE 5**  
**Pragmatism Scale: Distribution of responses and item-total correlations**

		Per Cent Level of Agreement					Item-Total Corre- lation	
		Most		Least				
		I	II	III	IV	V		
1	There is too much emphasis in the University on intellectual and theoretical topics and not enough on the application of theory to practical matters	+	10	30	10	38	8	0.356
2	Although theoretical principles may serve as a guide to our work, it is largely by trial and error that our results are achieved	+	10	52	8	26	2	0.117
3	Scientific research should be more concerned with the discovery of knowledge than with the practical application of such discoveries	—	3	11	10	52	20	0.169
4	University subjects which deal with theoretical principles are generally of greater value than those which provide information which has a direct practical application	—	1	19	17	50	10	0.275
5	I prefer to engage in activities from which I can see definite results rather than those from which no tangible or objective results are apparent	+	29	53	1	12	3	0.442
6	I prefer the practical man any time to the man of ideas	+	11	34	6	32	14	0.536
7	I prefer subjects which present a body of factual material to those which elaborate a particular point of view	+	15	32	5	34	10	0.319
8	Usually I prefer known ways of doing things to trying out new ways	+	5	40	4	36	13	0.264
9	I am more interested in the critical consideration of principles and theories than in their practical application	—	3	20	4	54	17	0.320



Key: ————— significant at the .001 level  
 - - - - - significant at the .01 level  
 ..... significant at the .05 level

Fig. 5. Item Cluster: Pragmatism Scale

Note: Items represented by numbers in Figure 5 are as follows (see Table 5 for full description):

- 1 Emphasis on application of theory
- 2 Results due to trial and error
- 3 Theory the concern of science
- 4 University emphasis on theory
- 5 Prefer activities with definite result
- 6 Prefer practical man
- 7 Prefer factual material
- 8 Prefer known ways
- 9 Interest in principles not application

### Tolerance of complexity

Initially, this scale consisted of eight items. One of these was discarded<sup>26</sup> following the item analysis, and one was transferred to the Cynicism scale. The remaining six items and the distribution of responses to them are presented in Table 6.

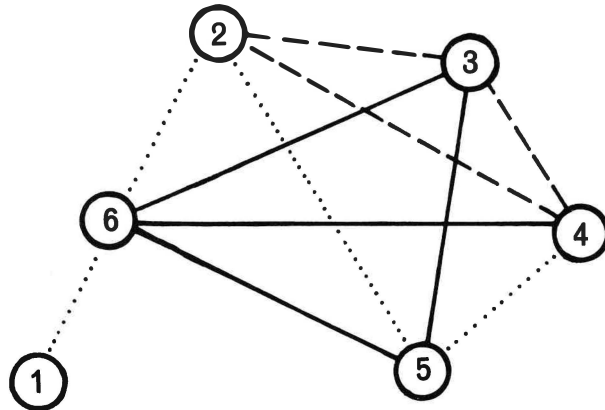
The relationship between these items is shown in Figure 6. Items 3, 5, and 6 form the core of the scale. Items 2 and 4 are tied into this core quite strongly, but item 1 is not. From a substantive point of view, then, Tolerance of Complexity means acceptance of uncertainty, a willingness to examine problems for which there may be no clear cut and definite answers, and finally agreement with the view that it may not always be possible to come to firm decisions on complex issues.

The corrected item-total correlations are included in Table 6. The three items with the highest correlations—all above 0.300—are the three that we have suggested form the core of the scale. Although somewhat lower, items 2 and 4 also have item-total correlations which are different from zero at the .1 per cent level of confidence. From a statistical point of view, Tolerance of Complexity is quite a strong scale. The structure of this dimension may be inferred from the four items

<sup>26</sup> It generally takes me quite a while to make up my mind on issues that I feel are important.

**TABLE 6**  
**Tolerance of Complexity Scale: Distribution of responses and item-total correlations**

		Per Cent Level of Agreement					Item Total Correlation	
		Most				Least		
		I	II	III	IV	V		
1	Diversity of experience is highly desirable even at the cost of personal confusion and doubt	+	12	38	22	24	2	0.104
2	Our thinking would be a lot better if we would just forget about words like "probably", "approximately", "perhaps"	+	2	13	11	56	15	0.198
3	It is annoying to listen to a lecturer who seems unable to make up his mind about what he really believes	+	20	37	11	26	3	0.309
4	I don't like to work on a problem unless there is a good possibility of coming out with a clear-cut or unambiguous answer	-	11	33	2	34	17	0.255
5	I like people to be definite about things	-	43	44	2	8	1	0.339
6	I don't like things to be uncertain and unpredictable	-	18	44	2	24	10	0.376



Key. ————— correlations significant at the .001 level of confidence  
 - - - - - correlations significant at the .01 level of confidence  
 ..... correlations significant at the .05 level of confidence

Fig. 6. Item Cluster: Tolerance of Complexity Scale

Note: Items represented by numbers in Figure 6 are as follows (see Table 6 for full description):

- 1 Diversity of experience desirable
- 2 Reject imprecise words: "perhaps", "probably"
- 3 Lecturer unable to make up his mind annoying
- 4 Reject complex problems
- 5 Like people to be definite
- 6 Dislike uncertainty and unpredictability

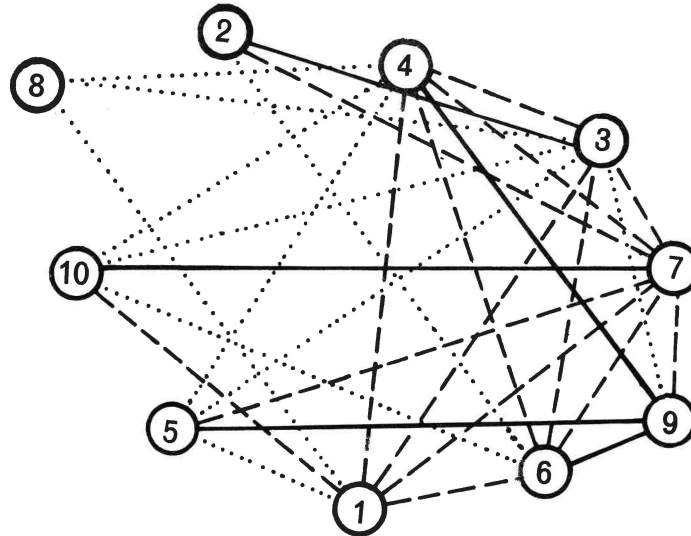
with the highest item-total correlations (the three core items plus item 4). The distribution of responses over these indicates that the first sign of Tolerance of Complexity is the rejection of the notion that the most attractive problems are those which lead to clear-cut and unambiguous answers. The next stage is a tolerance for the uncertain and unpredictable as well as an acceptance of speakers who appear uncertain about their beliefs. Finally, as well as agreeing with these opinions, those most tolerant of complexity do not necessarily prefer people to be definite about things.

### Dogmatism

This scale originally comprised twelve items. Following the item analysis two

**TABLE 7**  
**Dogmatism Scale: Distribution of responses and item-total correlations**

		Per Cent Level of Agreement					Item Total Correlation	
		Most				Least		
		I	II	III	IV	V		
1	It is only natural that a person will have a better acquaintance with ideas he believes in than with ideas he opposes	+	4	49	7	34	3	0.264
2	Of all the different philosophies that exist in the world, there is probably one which is more in accord with reality than any of the others	+	9	26	31	25	6	0.217
3	Young people should not have too easy access to books which are likely to confuse them	+	2	22	8	42	24	0.301
4	A group which tolerates too much difference of opinion among its members can not exist for long	+	5	34	9	38	10	0.303
5	There are irreconcilable differences between the West and the Soviet Union which make it virtually impossible for the two sides to co exist for long	+	5	22	7	52	11	0.268
6	The person who is extremely tolerant of widely different and even conflicting view points probably has few opinions of his own	+	3	19	8	44	22	0.293
7	In the long run, the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own	+	4	32	8	43	10	0.350
8	In this very complicated modern age, the best way to know what's going on is to rely on leaders and experts who we know can be trusted	+	2	37	9	38	10	0.149
9	To compromise with our opponents is generally dangerous, because it could lead to the betrayal of our own side	+	2	19	16	55	5	0.303
10	I don't have much inclination to get to know people who hold views that are completely contrary to my own view	+	2	16	1	30	48	0.233



Key: ————— correlations significant at the .001 level of confidence  
 - - - - - correlations significant at the .01 level of confidence  
 ..... correlations significant at the .05 level of confidence

Fig. 7. Item Cluster: Dogmatism Scale

Note: Items represented by numbers in Figure 7 are as follows (see Table 7 for full description):

- 1 Better acquaintance with believed ideas
- 2 One true philosophy
- 3 Access to confusing books unwise
- 4 Opinion divergence dangerous to group cohesion
- 5 Irreconcilable differences between Soviet and West
- 6 Tolerance of differing opinions due to few personal opinions
- 7 Friends have same beliefs as self
- 8 Rely solely on leaders
- 9 Dangerous to compromise with opponents
- 10 Dislike those disagreeing with own ideas

of these were discarded.<sup>27</sup> The remaining ten and the distribution of responses over them are presented in Table 7.

The pattern of inter-item correlations is shown in Figure 7. It is clear that these items do not cluster to the same extent as did those of the last scale. The core of the dimension consists of items 1, 3, 4, 6, 7, and 9, all of which are quite highly inter-correlated. Dogmatism, as measured by this scale, seems to involve the belief that people will be better acquainted with the ideas they believe in than with those they oppose, and have a preference for the company of others whose views and opinions are similar to their own. As well, individuals tolerant of widely differing viewpoints are regarded as having few opinions. Compromise is viewed with suspicion, consensus of opinion is held to be important for group stability, and young people, it is felt, should be protected from books which might confuse them.

The corrected item-total correlations (Table 7) are all different from zero at the .1 per cent level of confidence and, although not as high as those for several of the earlier scales, they are high enough for statistical confidence in the scale. The six items with the highest correlations with total score are, with one exception, those which the cluster analysis suggested were the basis of the scale. Items 5 and 1

<sup>27</sup> The two items were: I either like a person or I don't, I seldom have mixed feelings about them. I am nearly always willing to change my mind about things that are important to me if someone puts forward a convincing argument for doing so.

alternate sixth and seventh position in the inter-item and item-total rankings. The difference between the item-total correlations of these two items is negligible. From a statistical point of view the items contribute equally to the scale, and both are considered in discussion of the structure of this dimension.

It can be seen from Table 7 that, of the seven core items, item 1 is the most frequently endorsed. Consequently it would appear that the first sign of Dogmatism is agreement with the view that it is natural for people to be better acquainted with the ideas they believe in than with those they oppose. The next step is the opinion that it is desirable for one's associates to have the same attitudes and beliefs as oneself (items 4 and 7). Finally, the high scorers, while holding these views, will also reject the idea of attempting to compromise with opponents, and the suggestion that conventional beliefs of many kinds should be questioned (items 3, 5, 6, and 9).

## Cynicism

This scale originally comprised eleven items. Following the item analysis a further item was added to these from the Tolerance of Complexity scale. The

**TABLE 8**  
**Cynicism Scale: Distribution of responses and**  
**item-total correlations**

		Per Cent Level of Agreement					Item Total Corre- lation	
		Most				Least		
		I	II	III	IV	V		
1	Anyone who trusts anyone else completely is looking for trouble	+	8	23	6	42	18	0.300
2	It is hard to get ahead without cutting some corners here and there	+	6	42	17	30	3	0.313
3	Most people inwardly dislike putting themselves out to help other people	+	1	26	9	52	9	0.212
4	Never tell anyone the real reason you did something unless it is in your interests to do so	+	2	18	9	55	13	0.393
5	No matter how they seem to act, men are interested in women for only one reason	+	4	14	9	47	23	0.258
6	When you come right down to it, it's human nature never to do anything with out an eye to one's own profit	+	4	32	7	45	9	0.352
7	It is a good rule to accept nothing as certain or proved	+	4	23	10	48	12	0.111
8	It is a mistaken belief that men won't work hard unless they are forced to do so	—	18	46	5	22	6	0.150
9	There is seldom any excuse for lying to someone else	—	8	36	8	40	5	0.320
10	One should take action only when it is pretty certain that it is morally right to do so	—	5	22	7	52	11	0.141
11	Honesty is the best policy in all cases	—	20	34	13	27	2	0.346
12	The fact that people do act altruistically suggests that it is not only self interest that governs their behaviour	—	9	41	38	8	1	0.215



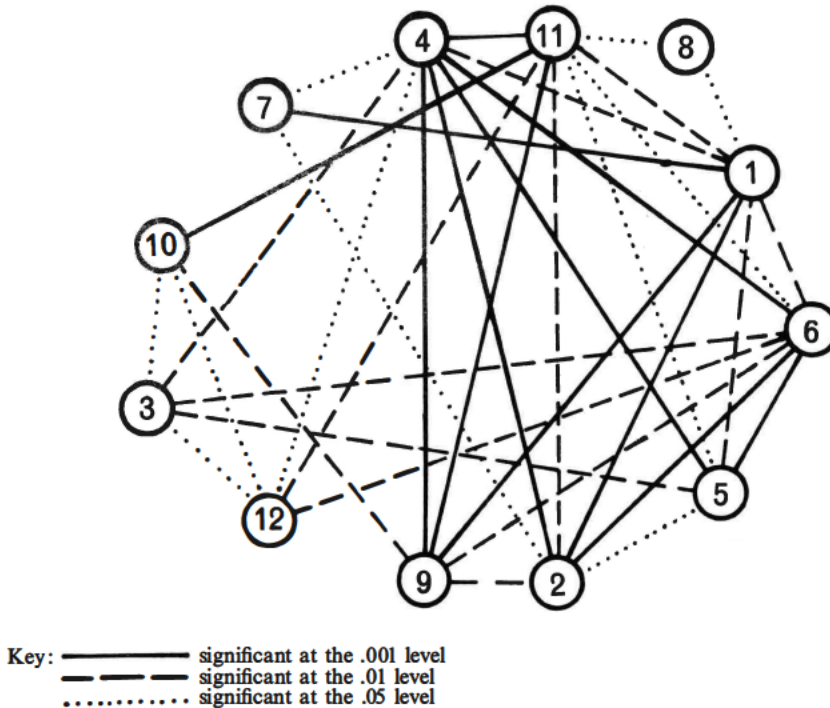


Fig. 8. Item Cluster: Cynicism Scale

Note: Items represented by numbers in Figure 8 are as follows (see Table 8 for full description):

- 1 Asking for trouble by trusting others
- 2 Cut corners to get ahead
- 3 Dislike helping others
- 4 Never tell real reasons for actions
- 5 Men interested in women for one reason only
- 6 Actions governed by self interest
- 7 Never accept anything
- 8 Force unnecessary for hard work
- 9 Seldom lie
- 10 Take action only when morally right
- 11 Honesty always best policy
- 12 Altruism a determinant of behaviour

addition was item 7: "It's a good rule to accept nothing as certain or proved." The items and the distribution of responses over them are in Table 8. The pattern of inter-item correlations is shown in Figure 8. Cynicism as measured by these items involves an endorsement of self-interest, an acceptance of ends as justifying means, and a scepticism of the idea that there are unselfish motives.

The corrected item-total correlations shown in Table 8, are, with the exception of item 7, different from zero at the .1 per cent level of confidence. Statistically, Cynicism is a strong scale. The six items which best represent the scale are 4, 6, 11, 9, 2, and 1. From the distribution of responses to them it appears that the first signs of Cynicism are agreement with the view that it is difficult to get ahead without cutting corners, and rejection of the idea that there is seldom excuse for lying to others (items 2 and 9). Somewhat more cynicism also involves the view that behaviour is always governed by self-interest (item 6). Still further along the scale is a refusal to trust others and rejection of the idea of complete honesty (items 1 and 11). The complete cynic on this scale endorses the above and also considers that an

individual should never reveal the motives for his actions unless he judges it is in his interest to do so (item 4).

## INTERCORRELATIONS BETWEEN THE SCALES— PROVISIONAL VERSIONS

In the last section the substantive independence of the scales was described. It does not follow from this of course that they are statistically independent. In fact, as the present analysis will show, there are quite strong relationships between certain of them.

It will be remembered that item responses were scored over five points; a score of 1 was a "low" score indicating a negative response, and 5 was a "high" score indicating a positive response. Scores on each scale therefore could range from a minimum equal to the number of items in the scale to some multiple of five, again dependent on the number of items in the scale. For instance, scores on Involvement in Intellectual Activity, which contains fifteen items, could range from 15 to 75. Distributions of responses over each scale were approximately normal, and on the basis of the scores product-moment correlations were calculated between each pair of scales. The correlation matrix is presented in Table 9, and the strongest relationships are illustrated in Figure 9.

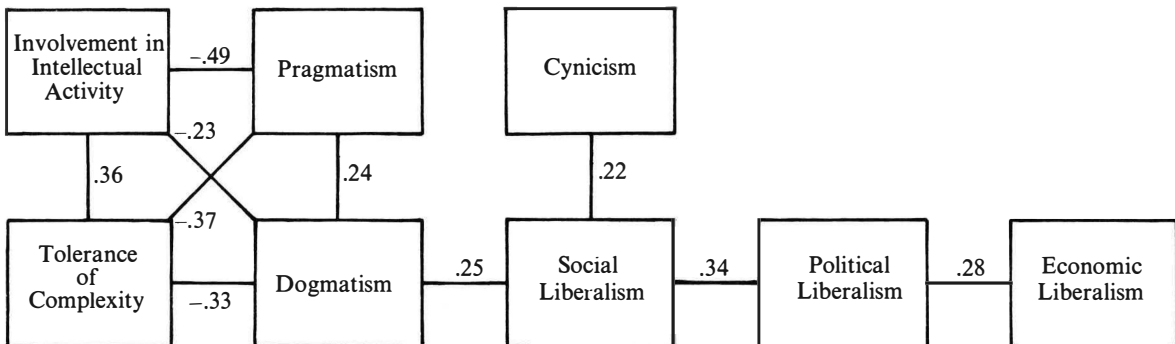


Fig. 9. Representation of the Inter Scale Correlations (only coefficients greater than .2 included)

The highest correlations are between Involvement in Intellectual Activity, Pragmatism, Tolerance of Complexity, and Dogmatism. These form a set of quite highly related scales. Tolerance of Complexity "goes with" Involvement in Intellectual Activity, and both are negatively related to Dogmatism and Pragmatism, which are also quite highly correlated. We have already suggested that these four scales focus on issues which can be regarded as central to a university education: a concern for, and interest in, intellectual activities, and an approach to problems that is flexible, abstract, and theoretical. It is encouraging therefore, and in a sense an indirect measure of the validity of these scales, to find them clustering as they do.

The other scales are selectively related to these four, although in most cases the relationships are not as strong as within the cluster. Social Liberalism and Political Liberalism are quite strongly related, and both are negatively correlated with Dogmatism, while Social Liberalism is also correlated, although not as strongly, with Tolerance of Complexity. A liberal or "progressive" outlook in political and social matters, it seems, is related to open-mindedness, to use Rokeach's term. This relationship does not hold for Economic Liberalism, however,

**TABLE 9**  
**Inter-scale correlations**

	Dogmatism	Tolerance of Complexity	Pragmatism	Social Liberalism	Economic Liberalism	Political Liberalism	Cynicism
Intellectual Activity	228	361	491	148	149	167	195
Dogmatism		332	240	248	052	194	166
Tolerance of Complexity			372	187	125	151	043
Pragmatism				169	106	136	196
Social Liberalism					027	342	218
Economic Liberalism						276	076
Political Liberalism							018

NOTE: Decimal points have been omitted.

which is strongly correlated with Political Liberalism only.<sup>28</sup> Cynicism is positively associated with Social Liberalism: the person who wishes to allow individuals greater freedom in society tends to be the one who is least likely to admit altruism as a motive or that others can be trusted.

## FACTOR ANALYSIS OF RESPONSES TO ITEMS— FINAL VERSIONS

The procedure adopted in constructing the foregoing scales was first to identify the areas of interest, to describe these in general terms, then to assemble a series of items which focussed on these areas, and finally to employ conventional scaling procedures to test the scalability of the items. Initially there were ten areas and ninety-three items; after cluster analysis and the calculation of item-total correlations this was reduced to eight scales and seventy-four items. What follows is a process of verification: we want to know whether the factor pattern produced by a factor analysis will confirm the pattern derived by the above procedures.<sup>29</sup>

If the factors extracted by a factor analysis showed little resemblance to the scales, interpretations, other than those we have rationalized, of the relationships between the items would be necessary. A different pattern is possible of course

<sup>28</sup> The correlations between the three Liberalism scales and Dogmatism and Tolerance of Complexity are interesting. The notion of Dogmatism was first examined systematically by Milton Rokeach several years ago in his book *The Open and Closed Mind*. In this book Rokeach tries to demonstrate that closed mindedness is as much a characteristic of the extreme left as it is of the extreme right. In support of his contention he showed that there was no difference on a scale of Dogmatism between extreme left wing and right wing groups, and as well that there was little relationship between scores on a Liberalism Conservative scale and scores on the Dogmatism scale. The present findings suggest that if we separate Liberalism into social, political, and economic components then the lack of relationship between Dogmatism and Liberalism is only apparent when our concern is solely with economic issues.

<sup>29</sup> The factor analysis was carried out by Dr. D. Fitzgerald, Education Research Office, University of Melbourne.

because the factor analysis operates on the complete matrix of inter-item correlations, whereas in the scaling procedures we were mainly interested in the correlations between items within the hypothesized scales and the item-total correlations of the scales. We were not concerned with correlations between items from the different scales, nor with obtaining item-total correlations for larger combinations of items.

To determine whether in fact the scales were related to a smaller number of more general factors, a factor analysis of all ninety-three items was carried out. A principal components analysis was employed with quartimax solution. This, of course, restricted us to an orthogonal rotation and an approximation to simple structure which probably is not quite as good as that produced by the varimax methods.<sup>30</sup> The Appendix shows the forty largest eigen values. Of these, fifteen were rotated to the orthogonal analytic solution suggested by Carroll.<sup>31</sup> Fifteen was the number chosen for rotation to allow for unsuspected factors in addition to the original ten which had been rationalized. The loadings after rotation are set out in Table 10.

To check the degree of correspondence between scales and factors, the six items with the highest loadings on each factor were listed. Any item among the top six on

**TABLE 10**  
**Sum of squares of factor loadings after rotation**

Factor	Sum of Squares of Factor Loadings After Rotation	Per Cent of Variance Taken Out by Factor
1	3.701	9.94
2	3.687	9.90
3	3.055	8.20
4	2.797	7.51
5	2.789	7.49
6	2.579	6.92
7	2.239	6.01
8	2.176	5.84
9	2.142	5.75
10	2.115	5.68
11	2.106	5.65
12	2.082	5.59
13	2.037	5.47
14	1.894	5.08
15	1.849	4.96
Total variance of items:	37.248	100

<sup>30</sup> H. H. Harmon, *Modern Factor Analysis* (Chicago: University of Chicago Press, 1960).

<sup>31</sup> John B. Carroll, "An Analytical Solution for Approximating Simple Structure in a Factor Analysis", *Psychometrika*, XVIII (1953), 23-38.

more than one factor was allocated to the factor on which it loaded highest. Subsequently all remaining items were allocated to the factor on which they had highest loadings.

Table 11 presents the nine items with the highest loadings on factor 1. The first six of these, can, in a sense, be thought of as the items defining the factor; the remaining three were added "the second time around". All the items come from the Involvement in Intellectual Activity scale. It will be remembered that the original rationalization was of two components in this main area: a general component called Intellectual Interests, and a more specific component called Academic Activities. As a result of our scaling procedures these two sets of items were combined to form one scale. However, the seven items presented in Table 11 all come from the original Intellectual Interests scale; in fact they represent seven of the eight non-specific items that survived the scaling. The eighth, item 14 in Table 1, had its highest loading, 0.31, on factor 15. The specific items, focussing more on intellectual problems and academic matters (see below), all have higher loadings on factor 4. These results seem to suggest that we were premature in combining the two components of this dimension.

**TABLE 11**  
**Items with highest loadings on factor 1**

Item	Factor Loading
1 I like to read poetry	0.64
2 I am interested in discussions about such topics as the ideal society, freedom, etc.	0.64
3 I enjoy reading about artistic or literary achievements	0.63
4 I have frequent discussions with friends about the causes and possible solutions of various national and international problems	0.60
5 I have spent a lot of time listening to serious music	0.59
6 I would like to learn more about the history of human thought	0.57
7 I enjoy reading essays on serious or philosophical subjects	0.41

The seven items with the highest loadings on factor 2 are presented in Table 12. With the exception of the seventh, originally a Dogmatism item, and the sixth, originally discarded from Cynicism, they are all from the Social Liberalism scale. Two Social Liberalism items without high loadings on the factor are items 5 and 6 from Table 4. Item 5, which was only weakly related to the other items in the scale, has a relatively high loading on factor 6, which resembles Dogmatism (see below), while item 6 has few high loadings, its highest, 0.36, being on factor 14.

**TABLE 12**  
**Items with highest loadings on factor 2**

Item	Factor Loading
1 Mutual incompatibility should be sufficient grounds for a divorce	0.67
2 In illegitimate pregnancies, abortion is in many cases the most reasonable alternative	0.63
3 No matter what the modern trend is, young people should be discouraged from having sexual relations before marriage	0.61
4 A person should be free to take his own life if he wishes to, without any interference from society	0.61
5 While internal censorship may not be desirable, there should be government regulations prohibiting the importation of obscene and pornographic books and materials	0.59
6 One should take action only when one is pretty certain that it is morally right to do so	0.47
7 Young people should not have too easy access to books which are likely to confuse them	0.39

There is not as close a correspondence between the third factor (Table 13) and one of the scales, although of the six items, three (1, 3, and 4) are from Pragmatism.

Two of those remaining (5 and 6) are from the discarded scale of Scientific Orientation and one (2) is from Tolerance of Complexity. We could perhaps describe the factor as referring to a scientific tough-mindedness (to use Eysenck's term, although not perhaps entirely in his sense), of which Pragmatism was a component. That Pragmatism is an important element in factor 3 is brought out still further by the fact that all but two of the remaining Pragmatism items (see Table 5) have high loadings on this factor although they have their highest loading on the uninterpretable factors 9–12. (Items 2 and 8 in Table 5 are the two without high loadings on this factor.)

**TABLE 13**  
**Items with highest loadings on factor 3**

Item	Factor Loading
1 I prefer to engage in activities from which I can see definite results rather than those from which no tangible or objective results are apparent	0.72
2 I like people to be definite about things	0.49
3 I prefer the practical man any time to the man of ideas	0.48
4 I prefer subjects which present a body of factual material to those which elaborate a particular point of view	0.39
5 Although novelists and philosophers frequently have rich insights into human behaviour, social scientists are more likely to contribute to our understanding of it	0.33
6 The findings of science are showing that many strongly held beliefs are wrong	0.33

The eight items with highest loadings on factor 4 are given in Table 14. Items 1, 2, 5, 6, and 7 come from the Involvement in Intellectual Activity scale, and were in the original Academic Activities component of this scale. Items 4 and 8 are from Tolerance of Complexity, and item 3 is from Pragmatism. Of the remaining two items from Academic Activities, one loads highly on factor 6 which closely resembles Dogmatism, a scale to which this item might be more logically related. The other, item 3 from Table 1, has a moderately high loading on factor 4 but loads somewhat higher on factor 12. It seems clear that factor 4 and the original Academic Activities set of items are quite closely related.

**TABLE 14**  
**Items with highest loadings on factor 4**

Item	Factor Loading
1 I dislike spending a lot of time on any one problem	0.60
2 The idea of engaging in research for any lengthy period of time does not appeal to me	0.55
3 Usually I prefer known ways of doing things to trying out new ways	0.53
4 I don't like things to be uncertain and unpredictable	0.43
5 I would enjoy writing a paper on the possible long term effects or outcomes of a significant discovery or contribution in my field of specialization	0.38
6 I enjoy tackling problems of the type found in mathematics, philosophy, or logic	0.36
7 All things considered I would prefer to have a principle or theory explained to me than attempt to understand it on my own	0.35
8 I don't like to work on a problem unless there is a good possibility of coming out with a clear cut and unambiguous answer	0.34

The nine items defining factor 5 are presented in Table 15. Six of these (1, 2, 4, 5, 6, and 9) come from the Political Liberalism scale, two (3 and 8) are from Economic Liberalism, and number 7 is from Dogmatism. There is, it appears, quite a close resemblance between this factor and Political Liberalism. Of the two Political Liberalism items not included in Table 15 (items 3 and 8 from Table 2), one, item 3, has a relatively high loading on the factor, 0.26, while the other, item 8, has a relatively low loading. It is worth recalling that this latter item had the smallest item-total correlation of any in the scale. The fact that two of the Economic Liberalism items appear in this factor is also worthy of note. These are,

in a sense, the only two items from this scale "surviving" the factor analysis. The other items occur one to a factor in factors 11 to 15. It will be remembered that, from a statistical point of view, Economic Liberalism was one of the weaker scales. We might interpret the factor analysis therefore as throwing some doubt on the separate existence of a scale of Economic Liberalism, and if we keep in mind that two of the items defining factor 5 were from the original Economic Liberalism scale we can see that it may be more accurate to speak of a scale of Political-Economic Liberalism.

**TABLE 15**  
**Items with highest loadings on factor 5**

Item	Factor Loading
1 In the present impasse in the disarmament negotiations the West should take the initiative by making several concessions since such a procedure could produce reciprocal concessions from the Soviet Union and a return to negotiations	0.57
2 The social unrest found in the underdeveloped parts of the world today is due more to the enormous differences in living standards among the people concerned than it is to the work of Communist agitators	0.49
3 It is quite untrue to suggest that the nationalization of industries such as steel would lead to inefficiency, bureaucracy, and stagnation	0.47
4 The danger of Communist infiltration into the union movement is great, and the government should take whatever steps are necessary to ensure that it does not become widespread	0.47
5 The best way to provide adequate medical care for the entire population is through a government run national health scheme	0.39
6 It is the responsibility of the government to ensure everyone a secure job and a good standard of living	0.35
7 There are irreconcilable differences between the West and the Soviet Union which makes it virtually impossible for the two sides to co-exist for long	0.34
8 We need a system of price controls on most goods used by consumers and industry in order to prevent unjustified price increases	0.28

Factor 6 contains six items (Table 16). Three of these come from Dogmatism (3, 5, and 6); one comes from Social Liberalism (4); one from Involvement in Intellectual Activity (1); and one from the discarded scale, Scientific Orientation (2). Clearly there is not as close a correspondence between a factor and a scale in this instance as there was in the last. However, if we look at the content of these last three items it would seem that they could be interpreted as tapping some aspect of Dogmatism or closed-mindedness. If this is so, we would expect the remaining items from the Dogmatism scale to load relatively highly on the factor, although of course their highest loadings will be on some other factor. We have already seen that one of the Dogmatism items (item 3 from Table 7) loads most highly on factor 2, while another, item 5 from the same table, loads most highly on factor 5. Neither of these items which have high loadings on interpretable factors have high loadings on factor 6. However, of the remaining 5 items, all of which have their highest loadings on virtually uninterpretable factors (9, 13, and 14) that account for comparatively little variance, four have loadings of 0.16 or better on factor 6, suggesting that there is at least some relationship between this factor and the scale of Dogmatism.

Factors 7 and 8 are the last of the interpretable factors (Tables 17 and 18) and both draw very heavily from the Cynicism scale. Of the six items with highest loadings on factor 7, the first three and the last come from Cynicism, the fourth is from Involvement in Intellectual Activity, and the fifth is an item included in the original item pool but not thought to be related to any of the hypothesized scales. The seven items loading highest on factor 8 all come from Cynicism. In fact the only Cynicism item not accounted for by either factor 7 or 8 is item 10 from Table 8, which we have already seen has a high loading on factor 2.

The remaining factors are virtually uninterpretable and account for successively smaller and smaller amounts of the total variance. Items discarded in the scaling procedures, while appearing only infrequently in the first eight factors, are found quite commonly in the last seven. It seems clear, therefore, that the factor analysis

**TABLE 16**  
**Items with highest loadings on factor 6**

Item	Factor Loading
1 Although many details still remain to be worked out, we now have definite answers to the major problems in my field	0.59
2 For most questions there is only one right answer once a person is able to get all the facts	0.50
3 I don't have much inclination to get to know people who hold views that are completely contrary to my own	0.41
4 No matter how strongly we may feel against taking human life, capital punishment is still the best deterrent against crimes of extreme violence	0.36
5 In the long run, the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own	0.36
6 It is only natural that a person will have a better acquaintance with ideas he believes in than with ideas he opposes	0.32

**TABLE 17**  
**Items with highest loadings on factor 7**

Item	Factor Loading
1 Anyone who trusts anyone else is asking for trouble	0.61
2 It's hard to get ahead without cutting corners here and there	0.43
3 It is a mistaken belief that men won't work hard unless they are forced to do so	0.37
4 I am bored by discussions of what life will be like a hundred years from now	0.37
5 Education for a degree in engineering could be provided in an independent scientific and technological institute as adequately as in a traditional university	0.33
6 It's a good rule to accept nothing as certain or proved	0.32

**TABLE 18**  
**Items with highest loadings on factor 8**

Item	Factor Loading
1 There is seldom any excuse for lying to someone else	0.52
2 Honesty is the best policy in all cases	0.50
3 Most people inwardly dislike putting themselves out to help other people	0.46
4 The fact that people do act altruistically suggests that it is not only self interest that governs their behaviour	0.45
5 When you come right down to it, it's human nature never to do anything without an eye to one's own profit	0.45
6 Never tell anyone the real reason you did something unless it is in your interests to do so	0.42
7 No matter how they seem to act, men are interested in women for only one reason	0.33

and the scaling procedures have produced substantially similar results.

There are minor differences of course. In the first place the factor analysis produced two factors to account for Involvement in Intellectual Activity, factor 1 bearing a close resemblance to the original Intellectual Interests component of that scale, and factor 4 bearing an equally close resemblance to the Academic Activities component. Secondly, Economic Liberalism and Tolerance of Complexity virtually "disappeared" in the factor analysis. It is worth noting that from a statistical point of view these were two of the weaker scales. Finally, there were seven instances when an item's loading on a factor and position in a scale did not agree. For instance, the item with the sixth highest loading on factor 2, the Social Liberalism factor, was originally a Dogmatism item.

These findings from the factor analysis are of more than academic interest and because of them we have made four modifications to the scales. Firstly, Involvement in Intellectual Activity has been restored to its two-component form. Secondly, Economic Liberalism and Tolerance of Complexity have been discarded. Thirdly, Political Liberalism has been renamed Political-Economic Liberalism, and the two items from Economic Liberalism which had high loadings on factor 5, the factor on which the Political Liberalism items had high loadings, have been added to it.



Finally, when there was a discrepancy between an item's position on a factor and a scale, a substantive and a statistical criterion were used to determine whether the item should be moved from its original location. Items were transferred if, from a substantive point of view, they did not appear inappropriate in their new location, and provided that there were at least three items in the original scale with higher corrected item-total correlations than the item in question. The seven discrepant items discussed at various points in this section all meet these two criteria and so have been transferred from their original scales. A summarized version of these changes is presented in Table 19.

**TABLE 19**  
**Scales to which discrepant items have been allocated**

Item	Original Allocation	Revised Allocation
Young people should not have too easy access to books which are likely to confuse them	Dogmatism	Social Liberalism
While not condoning censorship of the press, radio, or television, it seems clear that the mass media must be subject to some form of government supervision otherwise the national security may be endangered or our allies misrepresented	Political Liberalism	Social Liberalism
University subjects which deal with theoretical principles are generally of greater value to the student than those which provide information which has a direct practical application	Pragmatism	Academic Activities
There are irreconcilable differences between the West and the Soviet Union which makes it virtually impossible for the two sides to co exist for long	Dogmatism	Political Economic Liberalism
I am more interested in the critical consideration of principles and theories than in their practical application	Pragmatism	Intellectual Interests
I like people to be definite about things	Tolerance of Complexity	Pragmatism
I don't like things to be uncertain or unpredictable	Tolerance of Complexity	Academic Activities

**TABLE 20**  
**Final version of attitude scales and scale reliability**

(The numbers following each item signify the item's position in the inventory. For items marked "+", "agree", or "true" responses are positively associated with the named attitude; for those marked "-", "disagree", or "untrue" responses are similarly associated.)

I. *Academic Activities* (.57)

I enjoy tackling problems of the type found in mathematics, philosophy, or logic. (36, +)

I would enjoy writing a paper on the possible long term effects or outcomes of a significant discovery or contribution in my field of specialization. (40, +)

I often find myself questioning the statements and ideas expressed by my teachers. (44, +)

I don't like to work on a problem unless there is a good possibility of coming out with a clear cut and unambiguous answer. (37, )

I dislike spending a lot of time on any one problem. (48, )

I don't like things to be uncertain and unpredictable. (51, )

The idea of engaging in research for any lengthy period of time does not appeal to me. (54, )

All things considered I would rather have a principle or theory explained to me than attempt to understand it on my own. (56, )

TABLE 20 (continued)

II. *Intellectual Interests* (.73)

- University subjects which deal with theoretical principles are generally of greater value to the student than those which provide information which has a direct practical application. (20, +)
- I am more interested in the critical consideration of principles and theories than in their practical application. (38, +)
- I would like to learn more about the history of human thought. (42, +)
- I enjoy reading essays on serious or philosophical subjects. (45, +)
- I enjoy reading about artistic or literary achievements. (47, +)
- I am interested in discussions about such topics as the ideal society, freedom, etc. (49, +)
- I have spent a lot of time listening to serious music. (50, +)
- I like to read poetry. (53, +)
- I have frequent discussions with friends about the causes and possible solutions of various national and international problems. (55, +)

III. *Political Economic Liberalism* (.55)

- The social unrest found in the underdeveloped parts of the world today is due more to the enormous differences in living standards among the people concerned than it is to the work of Communist agitators. (2, +)
- In disarmament negotiations the West should take the initiative by making concessions since such a procedure could produce concessions from the Soviet block. (5, +)
- We need a system of price controls on most goods used by consumers and industry in order to prevent unjustified price increases. (6, +)
- Industrial stoppages at the present time generally result from the genuine grievances of workers; Communists and other radical elements play a relatively minor role in provoking stoppages. (13, +)
- It is the responsibility of the government to ensure everyone a secure job and a good standard of living. (16, +)
- The best way to provide adequate medical care for the entire population is through a government run national health scheme. (19, +)
- It is a fallacy to suggest that large scale government planning will result in any real loss of individual liberties and freedom. (26, +)
- It is quite untrue to suggest that the nationalization of industries such as steel would lead to inefficiency, bureaucracy, and stagnation. (34, +)
- The danger of Communist infiltration into the union movement is great and the government should take whatever steps are necessary to ensure that it does not become widespread. (24, )
- There are irreconcilable differences between the West and the Soviet Union which makes it virtually impossible for the two sides to co exist for long. (27, )

IV. *Social Liberalism* (.65)

- In illegitimate pregnancies, abortion is in many cases the most reasonable alternative. (4, +)
- Mutual incompatibility should be sufficient grounds for a divorce. (9, +)
- A person should be free to take his own life if he wishes to, without any interference from society. (31, +)
- Young people should not have too easy access to books which are likely to confuse them. (7, )
- While not condoning censorship of the press, radio, or television, it seems clear that the mass media must be subject to some form of government supervision otherwise the national security may be endangered or our allies misrepresented. (8, )
- No matter what the modern trend is, young people should be discouraged from having sexual relations before marriage. (12, )
- While internal censorship may not be desirable, there should be government regulations prohibiting the importation of obscene and pornographic books and materials. (22, -)

V. *Pragmatism* (.68)

- There is too much emphasis in the university on intellectual and theoretical topics and not enough on the application of theory to practical matters. (1, +)
- I prefer to engage in activities from which I can see definite results rather than those from which no tangible or objective results are apparent. (35, +)
- I prefer the practical man any time to the man of ideas. (43, +)
- I prefer subjects which present a body of factual material to those which elaborate a particular point of view. (46, +)
- I like people to be definite about things. (41, +)

TABLE 20 (continued)

VI. *Dogmatism* (.58)

Of all the different philosophies that exist in the world, there is probably one which is more in accord with reality than any of the others. (3, +)

In the long run, the best way to live is to pick friends and associates whose tastes and beliefs are the same as one's own. (10, +)

The person who is extremely tolerant of widely different and even conflicting viewpoints probably has few opinions of his own. (17, +)

It is only natural that a person will have a better acquaintance with ideas he believes in than with the ideas he opposes. (21, +)

Our thinking would be a lot better if we would just forget about words like "probably", "approximately", "perhaps". (28, +)

It is annoying to listen to a lecturer who seems unable to make up his mind about what he really believes. (33, +)

I don't have much inclination to get to know people who hold views that are completely contrary to my own. (39, +)

Although many details still remain to be worked out, we now have definite answers to the major problems in my field. (52, +)

For most questions there is only one right answer once a person is able to get all the facts. (57, +)

VII. *Cynicism* (.60)

It is a good rule to accept nothing as certain or proved. (11, +)

It is hard to get ahead without cutting corners here and there. (14, +)

No matter how they seem to act, men are interested in women for only one reason. (15, +)

Most people inwardly dislike putting themselves out to help other people. (18, +)

Never tell anyone the real reason you did something unless it is in your interests to do so. (25, +)

When you come right down to it, it's human nature never to do anything without an eye to one's own profit. (29, +)

The fact that people do act altruistically suggests that it is not only self interest that governs their behaviour. (23, )

There is seldom any excuse for lying to someone else. (30, -)

Honesty is the best policy in all cases. (32, )

As a result of the factor analysis the number of items was further reduced, from seventy-three to fifty-eight. The final set of scales and the items defining them are shown in Table 20. Reliability coefficients were obtained from responses to the items from a new sample of first-year Law and Engineering students at five Australian universities. The reliability estimate is the ratio of the differences between the total and error variances to the total variance of the scores of 480 individuals on the items comprising each scale.<sup>32</sup>

## INTERCORRELATIONS BETWEEN THE SCALES— FINAL VERSIONS

The final step in our analysis was to intercorrelate the seven scales we had derived. Item responses were scored on a five-point system: 1 for "strongly disagree" or "definitely false" through to 5 for "strongly agree" or "definitely true" for items marked + in Table 20, and the reverse for items marked -. Items not answered were given a score of 3. The maximum possible score for a scale is 5 by the number of items and the minimum 1 by the number of items.<sup>33</sup>

<sup>32</sup> F. N. Kerlinger, *Foundations of Behavioral Research* (New York: Holt, Rinehart and Winston, 1965), p. 435.

<sup>33</sup> This scoring procedure, it will be noted, reverses the procedure described in the first section. High scores on the various scales are now associated with the named attitude: the pragmatists, for example, now get high scores on the pragmatism scale.

The scores for 1,300 Engineering and Law students in six Australian universities on each of the seven scales were intercorrelated. The correlation coefficients are presented in Table 21 and the strongest associations are illustrated in Figure 10.

**TABLE 21**  
**Inter-scale correlations**

	Social Liberalism	Cynicism	Pragmatism	Dogmatism	Academic Activities	Intellectual Interests
Political Economic Liberalism	15	05	01	00	08	09
Social Liberalism		30	15	21	06	06
Cynicism			13	16	13	04
Pragmatism				45	36	—37
Dogmatism					—34	25
Academic Activities						35

NOTE: Decimal points have been omitted.

There is a marked similarity to the structure of the scales before they were modified (see Fig. 9). Involvement in Intellectual Activity now has two components—Academic Activities and Intellectual Interests. These are correlated +.35. Pragmatism and Dogmatism are also strongly related: +.45. Across these pairs are all negative correlations ranging from —.25 between Intellectual Interests and Dogmatism to —.36 between Academic Activities and Pragmatism. The four scales forming this intercorrelated cluster are all in areas relevant to university education: interest in sustained intellectual enquiry and cultural pursuits on the one hand, and on the other a disposition not to prejudge issues and to work from principles in the solution of problems. Only one other scale is associated with the above cluster: Social Liberalism is negatively associated with Dogmatism. Thus open-mindedness

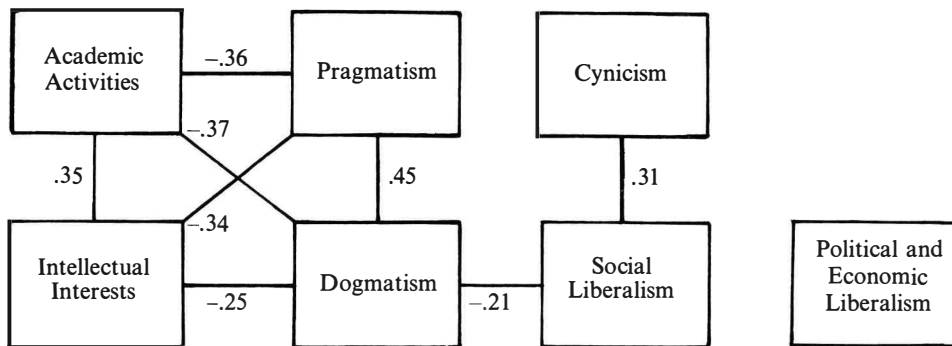


Fig. 10. Representation of Inter Scale Correlations (only coefficients above .2 included)

is apparently related to attitudes favouring minimum restrictions on personal liberty. Social Liberalism is also quite strongly related to Cynicism.

Subsequent reports will deal with a validity study using external criteria and with the results of using the Inventory in a study of professional socialization. In the latter, correlates of scale scores will be made with sociological data, and with the course in which students are doing their professional training. Changes which might occur during training are also to be examined.

## ACKNOWLEDGMENT

The authors would like to acknowledge the help received from Dr. D. Fitzgerald and Mr. J. Sutton with the statistical analyses which form a major part of this monograph.

## APPENDIX

First Forty Eigen Values (= sums of squares of unrotated Principal Axes)

6.949	4.079	3.276	2.843	2.239
2.210	2.008	1.914	1.846	1.750
1.707	1.681	1.638	1.571	1.537
1.486	1.466	1.438	1.415	1.396
1.331	1.282	1.237	1.210	1.201
1.189	1.144	1.110	1.092	1.086
1.074	1.022	1.017	0.996	0.987
0.965	0.937	0.932	0.909	0.868

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