

'Question ordering effects in Inglehart's postmaterial index'

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Abstract

Since the early 1970s, Ronald Inglehart's thesis of generational based values has been highly influential in political science. One of the best known analysts of economic and cultural change in advanced industrial societies, Inglehart has argued that value priorities are shifting profoundly, from concern over economic and physical security toward quality of life and freedom of self-expression.

However, such claims have not passed unchallenged. This paper contributes to the body of critical literature on the value shift thesis, by taking issue with Inglehart on methodological grounds. We argue that a question ordering problem is extant in Inglehart's longer (12 item) values index. To test our hypothesis we designed a split sample 'experiment' for the 2003 Australian Survey of Social Attitudes, and administered two versions of the long values index to separate national probability samples of Australian adults. We detected question ordering effects in Inglehart's longer (12 item) values index - the version used in waves 2-4 of the World Values Survey (WVS).

The question ordering effects we identified have serious implications for the value shift thesis. In his earlier work, Inglehart used the short (4 item) values index to calculate the proportions of postmaterialists and materialists. However, in later research he used the second and subsequent waves of the WVS to estimate value orientations based upon the longer index. We found that in the Australia, the proportion of postmaterialists relative to materialists tends to be overstated using the longer values index.

Our findings suggest that Inglehart's strategy of comparing values estimates based upon the short and long indexes is an unreliable method of measuring the shift in value orientations, and leads to incorrect claims about the rate of value change over time. On the basis on our findings, the strategy of measuring value orientations in the WVS requires serious revision.

Introduction

Ronald Inglehart's thesis of generational based values has been influential in political science since the early 1970s. One of the best known analysts of economic and cultural change in advanced industrial societies, Inglehart has argued that value priorities are shifting profoundly, from concern over economic and physical security toward quality of life and freedom of self-expression.

While Inglehart's thesis of postmaterial value change hardly needs introducing to most political scientists, it is important to reconsider the main points of his argument to set the scene for this paper. Inglehart (1977, 1990, 1997) has claimed that the key to understanding political preferences and behaviour lies in childhood socialisation, because early experiences influence the formation of different value priorities. Growing up under circumstances of relative economic affluence and physical safety leads one to favour quality of life, *postmaterial* issues over materialist (economic) issues. Alternatively, experience of economic hardship, war or major social and political upheaval contributes to the development of *materialist* values (Inglehart 1977, 23).

Since values are formed in childhood and early adolescence, and tend to remain relatively stable over the lifecourse (Inglehart 1997, 34, 46), generation-based value differences should be apparent when examining birth cohorts. According to Inglehart, younger generations - particularly those born after the Second World War - tend to prioritise postmaterialist value as a result of their relative affluence and freedom from external physical threats during their 'formative years'. In a nutshell then, citizens of advanced Western nations are becoming increasingly postmaterialist, as younger postmaterialist 'generations' gradually replace older materialist generations.

Inglehart (1997) based many of his claims regarding intergenerational values shift from materialist to postmaterialist values on analyses of World Values Survey (WVS) data. The WVS were administered in four waves in 1981, 1990, between 1995 and 1998 and 1999 to 2000 (Inglehart et al. 2000). In the first wave of the WVS Inglehart employed the well known short, or four item values battery. With the four item battery (e.g. see Inglehart's 1977, 28), respondents were asked to choose the most important and second most important national goals from the following list of options:

1. Maintain order in the nation
2. Give people more say in important government decisions
3. Protect freedom of speech
4. Maintain a high rate of economic growth

Those who choose options 1 and 3, regardless of the order of their choice are deemed 'materialists', and those who choose any combination of options 2 and 4 are 'postmaterialists'. The largest category is comprised of respondents who choose other combinations – classified as holding 'mixed' values orientations. The short values index has been used extensively by survey researchers in a variety of countries around the world (e.g. Davis and Davenport 1999; Fuchs and Rohrschneider 1998; Blake et al. 1997; Layman et al. 1997; de Graaf et al. 1996; Abramson and Inglehart 1995; Inglehart and Abramson 1994). It has been included in surveys such as the European Community Surveys, the General Social Surveys and National Election Surveys from the US, the International Social Survey Programme, the World Values Surveys, and many others.

The value change thesis has not gone uncontested however. A common theme running through many critical accounts of Inglehart's work, is to attack the validity of his four item values index (e.g. Jagodzinski 1982; Flanagan 1982a; 1982b; 1987; Clarke and Dutt 1991; Duch and Taylor 1993; 1994; Bean and Papadakis 1994; Brown and Carmines 1995; Clarke, Dutt and Rapkin 1997; Davis and Davenport 1999;

Clarke, Kornberg, McIntyre, Bauer-Kaase and Kaase 1999; Clarke 2000).¹ For example, Clarke (2000, 481) suggests that the short 'values battery is a seriously flawed instrument for measuring values and value change in advanced industrial (and other) societies' due to 'the battery's sensitivity to prevailing economic conditions'.² Our research adds to the body of critical literature relating to the short index, and we also question the reliability and validity of Inglehart's longer values instrument.

While the short index has been administered extensively in surveys, Inglehart developed additional questions with the aim of producing a more reliable measure than the short index, particularly when applied in cross-national context (Abramson and Inglehart 1995, 121). The twelve-item values 'index' was first used 'in 1973 in the nine-nation European Community and the United States' (Inglehart 1990, 75). This longer index included three separate batteries of questions, each with four responses.³ Each respective battery contained two materialist and two postmaterialist items, with five of the items often used to form a postmaterial values scale (Inglehart 1997, 389). While six postmaterialist items and six materialist items were included, one postmaterialist item is usually dropped for the purposes of scale construction.⁴

¹ Inglehart and his collaborators have also defended such attacks vigorously (e.g. Inglehart and Abramson 1999; Abramson, Ellis and Inglehart 1997; Inglehart 1997; Abramson and Inglehart 1995; Abramson and Inglehart 1994; Inglehart and Abramson 1994).

² Inglehart (1981, 887) conceded that 'period effects' (e.g. changes in the inflation and unemployment rates) may have short term influences on levels of postmaterial values (i.e. that higher inflation and unemployment rates lead to prioritisation of material over postmaterial values). Critics such as Clarke and Dutt (1991) argue that high rates of unemployment actually lead to increases in relative levels of postmaterial values, rather than decreases, although such criticisms are in turn rebuked by Inglehart and Abramson (1994).

³ Although as Davis and Davenport (1999, 655) note, 'the expanded measure is not an index per se, that is, respondents do not rank all twelve items with respect to one another. Rather, it is a combination of the original four-item index and two additional four-item indices.'

⁴ The postmaterialist items are 'more say about jobs and communities', 'make our cities and countryside more beautiful', 'more say in political decisions', 'protecting freedom of speech', 'progress toward less impersonal and more humane society' and 'progress toward a society in which ideas count more than money'. The materialist items are 'economic growth', 'strong defence forces', 'order in the nation', 'fighting rising prices', 'stable economy', and 'fight against crime'. After examining the structure of these items with principal components analysis, Inglehart (1997, 111) drops the 'more beautiful' option from the postmaterial scale, as it does not load strongly on a postmaterialist factor.

The longer values index is less commonly found in surveys, mainly due to space considerations (Abramson and Inglehart 1995, 22). However, Inglehart and his collaborators did include it in the second and subsequent waves of the World Values Survey (i.e. 1990-91; 1995-98; 1999-2000). The four item index appears in the latter waves of the WVS as well because the original short index is a component of the longer battery. This allows Inglehart to measure the shift of value priorities across the waves of the WVS using the short index (e.g. Inglehart 1997, 157), as well as constructing (allegedly) more reliable value scales.

The point of departure for our research lies in the fact that in the latter waves of the World Values Survey, the original four values items were administered as the second battery of four responses (see Inglehart 1997, 415-6, and our Appendix I). That is, the original four item values responses were directly preceded by, and followed by other questions also designed to measure postmaterial and material value priorities (Inglehart 1997, 108-113). This raises the possibility of question ordering effects, as the responses are correlated. We hypothesise that responses to the short index questions are influenced by responses to the values questions that immediately precedes them, so that the proportions of postmaterial values calculated from the short index are influenced by the other values questions in the longer index.

If we are correct, what are the implications for Inglehart's value shift thesis? We argue that measuring postmaterial values using the short values index, as Inglehart does with WVS data, will misrepresent the magnitude of any values shift that may be occurring. Consequently, values estimates based upon the short values index administered in the second, third and fourth waves of the World Values Survey (e.g. see Inglehart 1997, 157: Table 5.2) are potentially problematic. This has particular implications for the reliability and validity of the four item index when measuring value change over time with the longer values question format. We 'test' our question ordering hypothesis using Australian data below, following a description of our data and analytic strategy.

Data and Method

We analyse data from a new Australian survey, the Australian Survey of Social Attitudes (AuSSA), conducted in 2003 (Gibson *et al.* 2004). The AuSSA was administered as mail out, mail back survey to a sample systematically selected from the Australian electoral roll. It has 4270 respondents. With the kind permission of the principal researchers of the AuSSA, we were able to include an experimental design component in the survey, so that two versions of Inglehart's 12 item index were administered to the Australian adult population.⁵ The 'control' group were presented with values questions in the format they were administered by Inglehart and his collaborators in the second, third and fourth waves of the WVS (see Inglehart 1997, 415 and our Appendix I). The values questions administered to the 'experimental' group differed only in that the original four-item question items appeared as the *first* set of responses in the 12 item battery (see Appendix II).

The result was two large probability samples of the Australian adult population each containing differently ordered values questions that we can compare using statistical analysis. Our question ordering hypothesis and the results of a previous pilot study of students from the University of Tasmania (see Tranter and Western 2003b), suggests that the experimental group should exhibit higher levels of materialism and lower levels of postmaterialism than those in the control group. We expected to find such an association when the original four items are preceded by other values question responses, as in the WVS, as the four-item responses are influenced by responses to prior values questions.

We compare the values responses from the two sub-samples from the AuSSA using cross tabulations and regression analysis. We construct the four item values index following Inglehart (1997, 389) to calculate the percentages of materialists and

⁵ We are grateful to Shaun Wilson and Rachel Gibson for allowing us to include our experimental values questions in the AuSSA, and also thank Sophie Holloway at the Australian Social Sciences Data Archive

postmaterialists, and those with 'mixed' values. Again following Inglehart, we also calculate percentage difference indexes (PDI) that comprise the percentages of postmaterialists minus the percentages of materialists. Positive values on the PDI indicate a higher proportion of postmaterialists over materialists. Regression analyses are presented to control for factors that are claimed to be associated with postmaterial value orientations, such as age, education level, ideology and gender.

In addition, implicit in Inglehart's thesis is the sociological concept of generation (i.e. where different 'generations' are exposed to different formative events - socialisation processes - so that their members tend to hold different values). As it follows that generational based values will differ according to formative events, we may expect these events to differ cross nationally (and perhaps even intra-nationally). We therefore control for the impact of country of birth and contrast Australian born respondents with those born in other countries.

Value Orientations in Australia

Previous Australian research on postmaterial values (Tranter and Western 2003a) indicates that the 1995 Australian sample from the WVS may have been flawed. Extremely high proportions of postmaterialists and low proportions of materialists were found with the 1995 WVS survey compared with other Australian sources (see Table 1). Sampling bias is a possibility with the 1995 data. However, perhaps in addition to problems that may exist with the sample, responses to the values questions in the Australian sample of the WVS are an indication of question ordering effects in the longer values index.

Table 1: Australian Values data for the 4 item values index (per cent)

	1994 ISSP	1995 WVS	1996 AES
Postmaterialists	17.8	35.0	18.5
Mixed	67.4	57.2	62.3
Materialists	14.9	7.8	19.2
PDI	2.9	27.2	-0.7
N	(1143)	(2014)	(1710)

Notes: Percentage Difference Index (PDI) is the percentage of postmaterialists minus the percentage of materialists.

Sources: Australian Election Study (1996); World Values Survey Australia (1995); International Social Science Survey (1994).

Table 2: Australian Values data for the 4 item values index (per cent)

	1988	1990	1993	1994	1996	1998	1999	2001
Postmaterialists	12.2	13.0	14.2	17.8	18.5	17.8	15.4	15.8
Mixed	61.0	61.3	64.3	67.4	62.3	64.3	65.8	62.1
Materialists	26.8	25.7	21.5	14.9	19.2	17.9	18.7	22.1
PDI	-14.6	-12.7	-7.3	2.9	-0.7	-0.1	-3.3	-6.3
n	(1744)	(1979)	(2302)	(1143)	(1710)	(1822)	(2223)	(1913)

Notes: Percentage Difference Index (PDI) is the percentage of postmaterialists minus the percentage of materialists. Ns are weighted for 1993 and 1999 surveys to adjust estimates to be nationally representative.

Sources: Attitudes to State and Private Welfare, Australia, 1988; Australian Election Studies (1990 - 2001); International Social Science Survey (1994); Australian Constitutional Referendum Study (1999).

In Table 2 we show percentages for value orientations from several Australian surveys collected since 1988, and for consistency present the Australian Election Study series and the related Australian Constitutional Referendum Survey. The AES surveys and the 1988 Welfare survey use the short values index, with two exceptions. The 1990 AES administers a version of the longer index with the short index appearing first, followed by the remaining 8 items that all appear together in a second battery (McAllister et al. 1990). The 2001 AES includes the full 12 items in three batteries, although the short index again appears as the first of the three sets of values questions (Bean et al. 2001). We therefore do not expect to find question ordering effects in the 1990 or 2001 AES data, and treat them as comparable with the other survey results presented in Table 2. Indeed, the results from the AES survey appear to show consistent results although they do indicate some change in Australian value orientations over time.

The PDIs in Table 2 show a gradual shift toward postmaterialism from 1988 until 1998, after which there is some evidence of a shift back toward materialist values in 1999 and 2001. The latter results are inconclusive with regard to Inglehart's thesis - they could indicate a shift back toward materialism, or perhaps what Inglehart refers to as 'period effects' (Inglehart 1981, 887). Period effects seem less likely though, as they are usually the result of substantial changes in inflation or unemployment rates, and Australians have not experienced such effects in recent years. We now turn to the results from the 2003 AuSSA survey and our experimental design to examine the influence of question ordering on the short values index.

Testing for Question Ordering Effects

If question ordering effects were apparent, we hypothesised that the PDI should indicate higher levels of postmaterialism for the control group than the experimental group (see Table 3). In the control group where questions were administered in the order used by Inglehart (1990), the PDI for the AuSSA data is 11.5, suggesting that Australians are highly postmaterialist. When the questions from the original four-item battery are ordered first, the PDI drops to 3.3. Again the 'test' sample results suggest that Australia is a somewhat postmaterialist country, but far less so than the control sample. The difference between the two samples is also highly significant ($p < .000$) according to a chi square test of statistical independence.

Table 3: Postmaterial values from the 4 item index, Test and Control Groups (per cent)

	Control	Test	Difference
Postmaterialists	24.2 (515)	19.0 (388)	-5.2
Mixed	63.1 (1343)	65.3 (1330)	+2.2
Materialists	12.7 (270)	15.7 (319)	+3.0
PDI	11.5	3.3	8.2
N	(2128)	(2037)	(4165)

Source: Australian Survey of Social Attitudes 2003.

In the Australia case then, there is strong evidence of the existence of a question ordering effect in the 12 item index that overestimates levels of postmaterialism. That is to say, by estimating the proportions of materialist and postmaterialist values using the long index - the form favoured by Inglehart in the WVS - Australians appear to be more postmaterialist than they otherwise would. By implication, these results suggest that a question ordering problem is also extant in the WVS data. The magnitude of the shift in values when estimated using estimates from the WVS is also likely to be miscalculated. Perhaps the longer index in the WVS also overestimates the PDI in favour of postmaterialism in other countries, as it does in Australia, although without a series of similar experimental designs carried out in other countries, the pattern is not known.

We should note that even with the AuSSA 'test' sample, percentages of postmaterialists are slightly higher (19.0% compared to 15.8% in the 2001 AES), and materialists lower (15.7% compared to 22.1% in the 2001 AES) than the most recent comparable Australian survey. The sampling strategies for the AES surveys are almost identical to the AuSSA, as both sample systematically from the Australian electoral roll, and both use self-completed mail administration. The AuSSA results may indicate a shift back toward postmaterialist values in 2003, although the PDI change from -6.3 in 2001 to 3.3 in 2003 is quite large.

Gender, Generation, Education and Country of Birth

While testing for question ordering we also split the sample by sex (Table 4a) to test for gendered differences in the question ordering effect. While question ordering effects are apparent for among both men and women, the effects for men are stronger. The PDI for men at 10.9 is much larger than the 5.7 for women, with chi-squared test statistics indicating a highly significant question ordering relationship in the population for men ($p < .000$), while the effect for women is not quite significant at the 95% level ($p = .060$). It remains unclear at this stage why the question ordering effect differs according to gender, but this is a finding that requires further analysis.

Table 4a: Postmaterial values from the 4 item index, Test and Control Groups, by Gender (per cent)

	Women			Men		
	Control	Test	Difference	Control	Test	Difference
Materialists	13.3	15.1	+1.8	12.1	16.5	+4.4
Mixed	62.6	64.8	+2.2	63.7	65.8	+2.1
Postmaterialists	24.1	20.2	-3.9	24.2	17.7	-6.5
PDI	10.8	5.1	5.7	12.1	1.2	10.9
N	(1139)	(1062)		(978)	(944)	

Source: Australian Survey of Social Attitudes 2003.

Table 4b: Postmaterial values from the 4 item index, Test and Control Groups, by Generations (per cent)

	1900-1945			1946-1959			1960-1985		
	Control	Test	Diff.	Control	Test	Diff.	Control	Test	Diff.
Materialists	13.3	18.9	5.6	10.9	14.1	3.2	13.6	13.7	0.1
Mixed	65.8	63.3	-2.5	64.4	65.5	1.1	59.4	67.3	7.9
Postmaterialists	20.9	17.9	-3.0	24.7	20.4	-4.3	27.0	19.0	-8.0
PDI	7.6	-1.0	8.6	13.8	6.3	7.5	13.4	5.3	8.1
N	(698)	(683)		(660)	(637)		(756)	(679)	

Source: Australian Survey of Social Attitudes 2003.

Table 4c: Postmaterial values from the 4 item index, Test and Control Groups, by Education (per cent)

	Tertiary			Non-tertiary		
	Control	Test	Difference	Control	Test	Difference
Materialists	9.0	9.6	0.6	13.6	17.6	4.0
Mixed	57.7	61.7	4.0	64.7	66.1	1.4
Postmaterialists	33.3	28.7	-4.6	21.7	16.3	-5.4
PDI	24.3	19.1	5.2	8.1	-1.3	9.4
N	(466)	(439)		(1616)	(1527)	

Source: Australian Survey of Social Attitudes 2003.

Table 4d: Postmaterial values from the 4 item index, Test and Control Groups, by Country of Birth (per cent)

	Born in Australia			Born in UK			Born elsewhere		
	Control	Test	Diff.	Control	Test	Diff.	Control	Test	Diff.
Mat.	13.1	15.5	+2.4	6.4	16.2	+9.8	13.8	17.0	+3.2
Mixed	63.1	64.8	+1.7	61.7	66.5	+4.8	64.4	65.7	+1.3
Postmat	23.8	19.7	-4.1	31.9	17.3	-14.6	21.8	17.3	-4.5
PDI	10.7	4.2	6.5	25.5	1.1	24.4	8.0	0.3	7.7
N	(1570)	(1533)		(188)	(179)		(348)	(300)	

Source: Australian Survey of Social Attitudes 2003.

We hypothesised that education level and generation may have an impact on the size of the question ordering effect (Table 4b and 4c). If the question ordering problem is due at least in part to associating the first and second battery values items, the potentially higher cognitive skills of the tertiary educated (Inglehart 1990) might be expected to reduce the PDI difference between the control and test groups when we control for education. Generational differences may also be expected, although there is little evidence to support this hypothesis here, with only very minimal differences between the magnitude of the PDIs due to generation. Younger, post WWII generations are slightly more postmaterialist than the older generation, but the differences in PDI between the control and test groups are small. However, there is some evidence to support our education hypothesis. The tertiary educated are much more postmaterialist than the non-tertiary educated, as expected following Inglehart (1990), but the PDIs for the non-tertiary educated are somewhat larger, suggesting that question ordering problems may be greater among the less cognitively skilled.

People born in countries other than Australia should have had different 'formative experiences' to Australian born respondents, and, if Inglehart's socialisation hypothesis is correct, may have formed different value priorities. To control for this potentially confounding influence, we split the samples according to country of birth (Table 4d). We use three categories - Australian born, the next largest group comprising those born in the United Kingdom, and a residual category of those born in other countries. We realise that the third category is conceptually less useful, but it is not possible to conduct finer grained analysis of additional countries separately, as even with a large sample such as the AuSSA there are too few respondents from other countries to allow meaningful statistical comparisons.

When we split the samples according to country of birth category, the overall pattern of results remains similar, but was more marked among the overseas born - particularly those from the United Kingdom. The difference in PDIs for the control and test groups for the UK born was substantial, at 24.4 percentage points, compared with 6.5 for the Australian born and 7.7 for those born elsewhere. Once again, the reasons for these interesting patterns are not apparent at this stage, but will be investigated further in subsequent research.

The results presented so far are bivariate and therefore do not control for several factors that may influence variation in value orientations, and may also influence the impact of question ordering. In order to control for some possibly confounding influences, we now turn to the results of a regression analysis (Table 5). We regress a three category values variable (0=materialists; 50 = mixed; 100 = postmaterialists) on sex, age, tertiary education, location in large city, political ideology (left-right), as well as country of birth, and of course, a dummy variable to measure the question ordering effect hypothesised between the control and test samples. We present six models; the first model includes data for those born in all countries from the full AuSSA sample. The remaining five models separate men from women, and each of

the three country of birth categories. This strategy allows us to examine how the effects for each predictor vary across the sub samples.

Table 5: Postmaterial Values (4 item index), Test and Control Groups by Country of Birth (OLS)

	Full Sample	Women	Men	Australian Born	UK Born	Born Elsewhere
Intercept	71.8	72.3	71.9	73.9	77.5	60.0
Women	0.3	-	-	0.9	3.0	-0.9
Aged 18-24	-0.7	0.8	-3.5	-3.3	-2.6	15.3*
25-34	-0.5	-3.0	1.7	-2.1	9.1	4.1
35-44	0.04	-2.5	2.6	-1.6	2.7	5.6
45-54	1.6	0.2	2.7	0.8	1.2	5.7
55-64	3.1*	-0.4	6.6**	1.9	1.9	9.3*
65+	0	0	0	0	0	0
Degree	6.8***	8.7***	4.5**	7.4***	3.4	5.0
Live Inner Metropolitan	2.5*	1.9	3.4*	3.6**	2.0	-1.4
Left-Right (0-10)	-3.5***	-3.4***	-3.6***	-3.8***	-3.5***	-2.2**
Born Australia	0	0	0	-	-	-
Born in UK	3.2	5.2*	1.5	-	-	-
Born elsewhere	-2.5*	-2.7	-2.4	-	-	-
Test group	-4.0***	-3.1*	-4.7***	-3.3**	-10.5**	-3.2
Test group effect without controls	(-4.1**)	(-2.9***)	(-5.5***)	(-3.2**)	(-12.2***)	(-3.9)
Dependent Mean	53.8	53.4	54.0	53.7	56.8	52.2
Adj. R Squared	.07	.07	.08	.08	.08	.03
N	(3953)	(2090)	(1863)	(2995)	(347)	(611)

* p < .05 ** p < .01 *** p < .001

Dependent variable from the 4 item index questions 100 = postmaterialists; 50 = mixed; 0 = materialists.

Source: Australian Survey of Social Attitudes 2003.

The regression estimates in Table 6 assess known predictors of postmaterial value orientations as well as providing a more stringent test of the question ordering effect. There is little evidence of birth cohort differences in value priorities in the AuSSA data, consistent with earlier Australian findings (e.g. Gow 1990; Blount 1998; Western and Tranter 2001; Tranter and Western 2003a). While Inglehart claims that values are generationally based in most advanced industrialised nations, a mounting body of evidence suggests this is not the case in Australia.

Significant differences are apparent for education, although the impact of education on values is much stronger among women than for men. The tertiary educated also score about 7 percentage points higher on the 0-100 postmaterial values scale in the full, and Australian sub-samples, although weaker effects are apparent for the other countries of birth samples. The left-right scale too is an important correlate of postmaterial value orientations, with those who self-locate on the left of politics much more likely than the right to be postmaterialists, across all countries of birth.

Question ordering effects remain when we control for other independent variables, although there are interesting variations in the magnitude of these effects according to gender and particularly country of birth. The bivariate effect for men is somewhat stronger than for women, as we saw in Table 4a, although with the introduction of control variables, the differences in magnitude by gender are reversed. Perhaps the most intriguing finding here is the question ordering effect of over 10 percentage points among those born in the United Kingdom! The effect is smaller among the Australian born group, although is also very likely to hold among the population of Australian adults.

The United Kingdom result is particularly intriguing - perhaps indicating that the question ordering effects are much stronger among citizens of the UK than they are in Australia. Again, it is difficult to speculate why this is the case, with the strong effect remaining even controlling for age, education and ideology, factors on which these migrant groups may vary from the Australian born.

Conclusions

Using an experimental survey design administered to a large probability sample of Australian adults, we find evidence of question ordering effects in Inglehart's extended (12 item) values index. We also identify gender and country of birth as two possibly confounding influences on question ordering effects. Men show stronger evidence of question ordering influences on the short values index than women (at least in the bivariate case), while those born in the United Kingdom exhibit much stronger effects than the Australian born.

These question ordering effects, at least in Australia - and it seems likely from our results that they hold in the United Kingdom as well - result in an over-estimation of the PDI. This problem arises when the short values index is included as the second battery of questions in the longer 12 item index. By implication then, our research also suggests the presence of question ordering effects in the second, third and fourth waves of the World Values Survey where the 12 item values index is administered.

If estimations of value orientations based upon the World Values Surveys are flawed, researchers who use them for the purpose of establishing the extent of the alleged 'value shift' will miscalculate the extent of the shift. This is a particular problem when estimates from surveys that utilise the short values index (such as the first wave of the WVS collected in 1981), are compared with those from surveys that

administer the longer index (such as the subsequent waves of the WVS). If we have discovered a question ordering effect, and the results indicate that we have, this raises problems for Inglehart and other proponents of a values shift, as much of the evidence presented in support of this hypothesis is based upon WVS data. If a large proportion of the evidence Inglehart draws upon to substantiate his claims of a value shift is questionable, the shift from material toward postmaterial value orientations in advanced industrial democracies may be less pronounced than he claims.⁶

Cross-national testing is needed to examine if the question ordering problems uncovered in the Australian case are also apparent in other countries. While to our knowledge such research has not yet been conducted, we suspect that it would challenge the veracity of much of the current research on value change based upon data from the World Values Surveys.

⁶ In their study of postmaterial values, Davis and Davenport (1999, 652) maintained that responses to the four item values index were selected on the basis of chance. Using a variety of data sources from the United States collected between 1972 and 1994, they found that the values estimates from the American 1991 World Values Survey were the only ones to differ significantly from chance. We suspect that this seemingly anomalous result may have been due to the influence of question ordering in the second wave of the World Values Survey.

Appendix I 'Control' Group Questions

A11 Next, a question about what you think the aims of Australia should be for the next ten years. Here is a list of four aims that different people would give priority. If you had to choose among these four aims, which would be your first choice? And which would be your second choice?

Put the letter of the statement in the appropriate box below.

- A. Maintain a high level of economic growth
- B. Make sure this country has strong defence forces
- C. See that people have more say about how things are done at their jobs and in their communities
- D. Try to make our cities and countryside more beautiful

First choice

Second choice

A12 Here is another list of four aims. If you had to choose among these four aims, which would be your first choice? And which would be your second choice?

Put the letter of the statement in the appropriate box below.

- A. Maintain order in the nation
- B. Give people more say in important government decisions
- C. Fight rising prices
- D. Protect freedom of speech

First choice

Second choice

A13 And here is a further list. If you had to choose among these four aims, which would be your first choice? And which would be your second choice?

Put the letter of the statement in the appropriate box below.

- A. A stable economy
- B. Progress toward a less impersonal and more humane society
- C. Progress toward a society in which ideas count more than money
- D. The fight against crime

First choice

Second choice

Appendix II 'Test' Group Questions

- A9** Next, a question about what you think the aims of Australia should be for the next ten years. Here is a list of four aims that different people would give priority. If you had to choose among these four aims, which would be your first choice? And which would be your second choice?

Put the letter of the statement in the appropriate box below.

- A. Maintain order in the nation
- B. Give people more say in important government decisions
- C. Fight rising prices
- D. Protect freedom of speech

First choice

Second choice

- A10** Here is another list of four aims. If you had to choose among these four aims, which would be your first choice? And which would be your second choice?

Put the letter of the statement in the appropriate box below.

- A. Maintain a high level of economic growth
- B. Make sure this country has strong defence forces
- C. See that people have more say about how things are done at their jobs and in their communities
- D. Try to make our cities and countryside more beautiful

First choice

Second choice

- A11** And here is a further list. If you had to choose among these four aims, which would be your first choice? And which would be your second choice?

Put the letter of the statement in the appropriate box below.

- A. A stable economy
- B. Progress toward a less impersonal and more humane society
- C. Progress toward a society in which ideas count more than money
- D. The fight against crime

First choice

Second choice

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