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AN EVALUATION OF A COGNITIVE THEORY OF RESPONSE ORDER  
EFFECTS IN SURVEY MEASUREMENT

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ABSTRACT

Previous research has documented effects of the order in which response choices are offered to respondents using closed-ended survey items, but no theory of the psychological sources of these effects has yet been proposed. This paper offers such a theory drawn from a variety of psychological research. Using data from a split-ballot experiment in the 1984 General Social Survey involving a variant of Kohn's parental values measure, we test some predictions made by the theory about what kind of response order effect would be expected (a primacy effect) and among which respondents it should be strongest (those low in cognitive sophistication). These predictions are confirmed. We also test the "form-resistant correlation" hypothesis. Although correlations between items are altered by changes in response order, the presence and nature of the latent value dimension underlying these responses is essentially unaffected.

## AN EVALUATION OF A COGNITIVE THEORY OF RESPONSE ORDER EFFECTS IN SURVEY MEASUREMENT

### INTRODUCTION

Considerable psychological research documents the fact that decision-making outcomes may be dramatically altered by even trivial changes in the way problems are framed or the context in which they are considered (e.g., Tversky & Kahneman, 1981). And in survey research, it is now well-known that responses to questions measuring beliefs and attitudes may be significantly altered by apparently trivial changes in the form and wording of questions or in the context in which they are asked (e.g., Schuman & Presser, 1981).

However, although much empirical research catalogs the effects of such changes in surveys, no general theories have been proposed to explain the psychological processes that produce these effects. The non-existence of such theoretical work prevents survey researchers from predicting when such effects will occur and how to mitigate them.

This paper offers and evaluates a theory of one particular class of question form effects: response order effects. A great deal of past research has documented these effects, which are defined as changes in answers to closed-ended survey questions produced by varying the order in which response options are presented (Payne, 1951; Rugg & Cantril, 1944; Schuman & Presser, 1981; Quinn & Belson, 1969; Mueller, 1970; Brook & Upton, 1977; Belson, 1966; Payne, 1971; Carp, 1974; Becker, 1954). Many experiments designed to examine response order effects found none; when response order effects have been detected, two sorts have been discovered: primacy and recency effects. Primacy effects occur when placement of an item at the beginning of a list increases the likelihood that it will be selected. Recency effects are those that occur when placement of an item at the end of a list increases the likelihood that it will be chosen. The theory we offer below attempts to explain the psychological processes that produce these effects and to provide a basis for predicting when each will occur.

### A Theory of Response Order Effects

Research findings in psychology highlight a number of reasons why the order in which response alternatives are presented to respondents may have sig-

nificant influence upon their selections. The nature of effects depends in part on whether response alternatives are presented on show cards or are read aloud to respondents.

Visual Presentation. Studies of impression formation (e.g., Asch, 1946; Nisbett & Ross, 1980, p. 172-175; Anderson & Hubert, 1963; Sherif, 1935; 1936; Lingle & Ostrom, 1981; Anderson L Barrios, 1961; Dreben, Fiske, & Hastie, 1979), the impact of persuasive communications (e.g., Miller & Campbell, 1959; Ronis et al., 1977; Crano, 1977; Hovland et al., 1957; Insko, 1964), sequential processing of performance information (Jones et al., 1968), and the serial position effect (Bruce & Papay, 1970; Crowder, 1969; Rundus, 1971) all suggest that when items are presented visually on "show cards," primacy effects are to be expected. This occurs for two main reasons. First, items presented early may establish a cognitive framework or standard of comparison that guides interpretation of later items. Because of their role in establishing the framework, early items may be accorded special significance in subsequent judgements. Second, items presented early in a list are likely to be subjected to deeper cognitive processing; by the time a respondent considers the final alternative, his or her mind is likely to be cluttered with thoughts about previous alternatives that inhibit extensive consideration of it. Research on problem-solving suggests that the deeper processing accorded to early items is likely to be dominated by generation of cognitions that justify selection of these early items (e.g., Koriat, Lichtenstein, & Fischhoff, 1980; Hoch, 1984; Klayman & Ha, 1984; Tschirgi, 1980; Wason & Johnson-Laird, 1972). Later items are less likely to stimulate generation of

such justifications (because they are less carefully considered) and may therefore be selected less frequently.

Simon's (1957) satisficing principle is also relevant here. Instead of seeking optimal solutions to problems, people usually seek solutions that are simply satisfactory or acceptable in order to minimize psychological costs. When responding to survey questions, there is essentially no cost to the respondent if he or she chooses an acceptable answer instead of an optimal one. And for survey items involving a large number of response options, the cognitive costs entailed by making the optimal choice may be substantial. Therefore, on the basis of this principle, we would expect respondents to choose the first acceptable alternative(s) among the offered choices. Of course, this should occur most often when the list of options is long and when a number of them seem highly and nearly equally suitable. The claim that primacy effects are more common when the list of alternatives is long is consistent with the accumulated body of evidence on response order effects (see Schuman & Presser, 1981).

Some people may be more likely to exhibit a primacy effect than others. People who are motivated to optimize, as opposed to satisfice, may show no sign of an order effect. And people for whom the cognitive costs of optimizing are low would be more likely to do so. People who have more cognitive sophistication may be motivated to optimize since they may have more experience with solving "word problems" of various sorts and may intrinsically enjoy the cognitive processes involved. These individuals are also likely to

find it easier to optimize, since the cognitive effort required of them may be less. Therefore, individuals with less cognitive sophistication may be more likely to evidence primacy effects.

Aural Presentation. When alternatives are read aloud to respondents, they are not given the opportunity for extensive processing of the first alternative offered. Presentation of the second alternative terminates processing of the first one relatively quickly. Under these circumstances, respondents are able to devote most processing time to the final item(s) read, since interviewers usually pause most after reading them. Therefore, deeper processing dominated by generation of reasons supporting selection is more likely to be accorded to the last option, so a recency effect would be expected.

When response options are read aloud to respondents, memory biases may also influence responses. Items presented early in a list are most likely to enter long-term memory (e.g., Bruce & Papay, 1970; Crowder, 1969; Rundus, 1971; Dreben, Fiske, & Hastie, 1979), and items presented at the end of a list are most likely to be in short-term memory immediately after the list is heard (e.g., Anderson & Hubert, 1963; Glanzer, 1972; Waugh & Norman, 1965). So items presented at the beginning and end of a list may be more likely to be recalled and therefore perhaps selected more often. Of course, memory factors are irrelevant when respondents are offered "show-cards" or when the list of alternatives is short and easy to remember. But when such visual aids are not presented and when the list is long, memory effects may be important. We would expect these effects to be more pronounced among individuals whose

memories are less effective or who concentrate less on what the interviewer says.

## PRESENT STUDY

This paper reports the results of an experiment designed (1) to test for a response order effect using a common survey measure of values, (2) to examine the boundary conditions of the order effect under visual presentation of response options. The vehicle for our investigation is a measure of adult values for child qualities that has been included in several recent General Social Surveys (GSS) carried out by NORC. In the GSS, respondents have been presented with a list of 13 qualities of children and have been asked a series of questions in which they consider the qualities most important and least important for a child to have.

In 1984, the GSS conducted a split ballot experiment which varied the order in which the qualities were presented to respondents on show cards. We tested the general hypothesis that response marginals were affected by this variation. On the basis of the theory given above, we expected a primacy effect. We also assessed whether response order effects varied depending upon respondents' levels of cognitive sophistication.

In addition, we examined what has come to be called the "form-resistant correlation" hypothesis (e.g., Stouffer & DeVinney, 1949, p. 168), which proposes that even though changes in the form, wording, or context of a survey question produce differences in marginal distributions of responses, correlations between that item and others are left essentially unaltered. Though widely accepted during the 1950s, this hypothesis has rarely been

subjected to empirical evaluation, and some recent work suggests that it may be wrong in some cases (Schuman & Presser, 1981). [See Endnote 1] In the present study we examine the effects of the response order variation on the presence and nature of the latent value dimension thought to underlie the measures and on correlations of socio-economic status indicators with this latent value dimension (see, e.g., Kohn, 1969; 1976; Alwin & Jackson, 1982a; 1982b; Alwin & Krosnick, 1985; Jackson & Alwin, 1980).

## METHODS

In the 1984 GSS, two-thirds of the respondents were asked the question concerning child qualities in the standard GSS form (see also Kohn, 1969).

They were presented the following list of 13 qualities:

- (1) that a child has good manners (MANNERS)[See Endnote 2]
- (2) that a child tries hard to succeed (SUCCESS)
- (3) that a child is honest (HONEST)
- (4) that a child is neat and clean (CLEAN)
- (5) that a child has good sense and sound judgement (JUDGEMENT)
- (6) that a child has self-control (CONTROL)
- (7) that he acts like a boy or she acts like a girl (ROLE)
- (8) that a child gets along well with other children (AMICABLE)
- (9) that a child obeys his parents well (OBEYS)
- (10) that a child is responsible (RESPONSIBLE)
- (11) that a child is considerate of others (CONSIDERATE)
- (12) that a child is interested in how and why things happen (INTER-ESTED )
- (13) that a child is a good student (STUDIOUS)

After viewing this list, respondents were asked these questions:

- a. The qualities listed on this card may all be important, but which three would you say are the most desirable for a child to have?
- b. Which one of these three is the most desirable of all?

c. All of the qualities listed on this card may be desirable, but could

you tell me which three you consider least important?

d. And which one of these three is least important of all?

The remaining one-third of respondents were asked the same question but were shown the qualities in the reverse order. For the analyses reported below, the 13 qualities were scored as follows:

5 - The trait or quality most valued of all.

4 - One of the three most valued qualities, but not the most valued.

3 - Neither one of the three most nor one of the three least valued qualities.

2 - One of the three least valued, but not the least valued quality.

1 - The quality least valued of all. [See Endnote 3]

The population sampled in the 1984 GSS was the total non-institutionalized English-speaking population of the continental United States, 18 years of age or older. The sample was produced by full-probability cluster sampling methods (see NORC, 1985). Respondents who did not have complete data on all 13 items were eliminated from our analyses. This eliminated 8.3% of the 1473 respondents interviewed in the 1984 GSS.

## RESULTS

### Effects on Marginals

We first tested the hypothesis that responses to these questions vary depending upon the order in which the qualities are presented. As expected, we found clear evidence of a primacy effect. Items presented early in the list were disproportionately likely to be cited among the three

most important qualities. This result is shown in Table 1, which presents the proportions of respondents who cited each quality among the three most important. The effects of order appear for the items at the top and bottom of the table, since these were the items that had dramatically different placement on the two forms. MANNERS, SUCCESS, HONEST, OBEY, CONSIDERATE, INTERESTED, and STUDIOUS are all significantly more likely to be placed among the three most important qualities when they appear at the beginning of the list than when they appear at the end. In some cases, the effect due to order of presentation is as large as 15%. One item, AMICABLE, shows a slight, marginally significant trend in the reverse direction: it is cited more often as among the top three qualities when it appears later in the list. But in general, there is clear evidence of a primacy effect in these data. [See Endnote 5]

The aggregate ranking of the items was altered substantially by the response order variation. Four items have the same rank in both samples: HONEST is the most popular choice for both samples, JUDGEMENT is next in popularity, OBEY is fourth, and ROLE is least popular. This stability for the latter three items would be expected, since their placement was not dramatically changed between the standard and reversed order. For the same reason, the ranking of other items in the middle of the lists changed by only one rank (CLEAN, CONTROL, AMICABLE). However, the ranks of other items were changed quite a bit in some cases. MANNERS goes from fifth to eleventh, CONSIDERATE goes from sixth to third, INTERESTED from eighth to sixth, and STUDIOUS from twelfth to seventh.

There is almost no evidence that order affects the proportion of respondents placing an item among the three least important (see Table 2). After respondents select the three most important qualities, the list among which they must choose is shorter by three items, and respondents are more familiar with it. This presumably reduces the likelihood of order effects for the items chosen as least important. As Table 2 shows, one item, MANNERS, was more often cited among the three least important when it was at the end of the list than when it was at the beginning. This presumably occurred because it had been disproportionately cited among the three most important qualities when it appeared early. [See Endnote 6]

### Cognitive Sophistication

We next examined whether the primacy effect was more pronounced among respondents with less cognitive sophistication. The 1984 GSS included two indirect measures of respondents' cognitive sophistication: the amount of reported formal education and a vocabulary test score. In the vocabulary test, respondents were given ten words and, for each one, were asked to select the word "that comes closest to" its meaning from a list of five options (For a detailed description of the procedure, see NORC, 1985). The items were taken from the Gallup-Thorndike verbal intelligence Form A test. A person's score on the test could range from zero (if they made no correct definitions) to ten (if they correctly defined all the words). Following the GSS label, we refer to this variable as WORDSUM.

Respondents low in cognitive sophistication were defined as those with a

high school education or less and with WORDSUM scores of zero to six. High cognitive sophistication respondents were defined as those with at least some college education and WORDSUM scores of seven to ten. These partitions of the data set produce subsamples of approximately equal size. [See Endnote 7]

Our analyses provide support for the hypothesis that cognitive sophistication specifies the order effect. Table 3 displays the percent of respondents selecting each item among the three most important; the figures are shown separately for the standard and reverse orders and for individuals high and low in cognitive sophistication. The expected pattern of order effects is clear in both samples. However, the top three and bottom three items show significant effects for the less sophisticated respondents, whereas only one of these items reveals a significant effect for the more sophisticated group. This difference in significance is partly due to a difference in sample sizes. However, the effect sizes for the low sophistication group are substantially larger for four of the six items, and the two reversals are not as large. Two-way interactions of form by education are significant or marginally so in the cases of SUCCESS (chi-square(1)=3.19,  $p < .10$ ), JUDGMENT (chi-square(1)=4.24,  $p < .05$ ), OBEY (chi-square(1)=4.36,  $p < .05$ ), CONSIDERATE (chi-square(1)=3.86,  $p < .05$ ), and STUDIOUS (chi-square(1)=4.14,  $p < .05$ ). The interaction for JUDGMENT is probably not meaningful, since neither the high or low sophistication group shows an order effect for this item. The other interactions are consistent with an enhanced response order effect among less sophisticated respondents. In general, then, this evidence suggests that less cognitively sophisticated individuals were more influenced

by our response order manipulation than those more sophisticated.

### Form-Resistant Correlations

Variance-Covariance Matrices. We first examined the "form-resistant correlation" hypothesis by comparing the two samples (standard vs. reversed order) in terms of the variances of the value rankings and the covariances among them.' If correlations among the rankings are "form-resistant", there should be no difference between the samples in these regards. However, we found that both the variances ( $\Delta \chi^2(12) = 31.86, p = .0015$ ) and the covariances ( $\Delta \chi^2(66) = 107.94, p = .0009$ ) were significantly different in the two samples. This is inconsistent with the form-resistant proposition, suggesting instead that the correlations among the items are dependent to some extent upon the order in which response options are presented.

Factor Analysis. One common strategy for analyzing these ranking data has been to study their latent structure (Jackson & Alwin, 1980; Alwin & Jackson, 1982a, 1982b; Kohn, 1976). Past analyses of this sort have confirmed the existence of a single latent factor underlying these data that has been viewed as a contrast between self-direction and conformity. Individuals at one end of the latent dimension value self-direction substantially more than they value conformity, whereas individuals at the other end of the dimension value conformity substantially more than self-direction. To examine whether this single latent factor is present in both of our samples and to explore the sources of non-equivalence in the variance-covariance matrices, we applied the methods of confirmatory factor analysis to these measures using

an ipsative single-factor model (see Alwin & Jackson, 1982a).

Through this analysis, we found that the presence and nature of the latent factor is the same, regardless of the order in which the response choices are offered to respondents. The loadings of the items on the factor are the same under both orders of item presentation (delta chi-square (11) = 14.1,  $p = .23$ ). We also found that the variance of the latent factor is invariant with regard to item order (delta chi-square (1) = 1.1,  $p = .29$ ). The estimates of the factor loadings and the factor variance are presented in Table 5. These loadings show the expected pattern of a contrast between self-direction and conformity values: OBEY, MANNERS, CLEAN, and ROLE have positive loadings, and JUDGEMENT, INTERESTED, CONTROL, RESPONSIBLE, and CONSIDERATE have negative loadings. The fit of the model with loadings and factor variances constrained equal across groups is acceptable (chi-square (119) = 259.29,  $p < .001$ , delta = .91). [See Endnote 9]

This evidence that the factor loadings and factor variances are the same in both samples is consistent with the form-resistant correlation hypothesis. It seems, therefore, that the difference between the two samples in terms of the variance-covariance matrices discussed above does not reflect the impact of item order upon latent structure. Instead, the differences between the two samples in terms of the variance-covariance matrices seem to reflect differences in another aspect of the model: the disturbance variances in the indicators. The disturbance variance estimates, which appear in Table 4, are not equivalent in the two samples (delta chi-square (13) = 37.1,  $p < .001$ ). The general pattern of these coefficients indicates that an item's

disturbance

variance was greater when it appeared early in the list than when it appeared late. This pattern is significant for MANNERS, CONSIDERATE, and STUDENT. A significant, reversed effect again appears for AMICABLE, such that it had a greater disturbance variance when it appeared later in the list. In general, then, the source of non-equivalence in the variances and covariances is the unique variance in each item, which was elevated when the item appeared at the front of the list of choices.

These disturbances can be interpreted as the amount of variance in responses to the items that is not explained by the single common factor. This unexplained variance may be due either to random measurement error (unreliability) or to the influence of other latent factors. The evidence considered above regarding cognitive sophistication suggests a viable explanation for these differences in disturbance variances. Responses to all items on the list are determined to some degree by the latent self-direction/conformity value. But responses to the first few items are also determined in part by the respondent's cognitive sophistication; the less sophisticated he or she is, the higher those items' mean rankings will be. That is, less sophisticated respondents elevate their rankings of the early items simply because they appear early, whereas more sophisticated respondents do not. The additional variance in responses to the first items, which is due to variation among respondents in terms of cognitive sophistication, is unrelated to the latent value. Therefore, this variance appears as unique or disturbance variance in the indicators of the single-factor model's solution.

Correlates of Values. As a final test of the form-resistant correlation hypothesis, we examined measures of the association between the latent conformity/self-direction value dimension and three variables that are thought to be correlated with it: educational attainment, occupational status, and income. A number of studies have shown that parents higher on these variables tend to be more self-directed in their value orientations and parents lower on these variables tend to be at the conformity end of the value continuum (e.g., Kohn, 1969; Alwin & Jackson, 1982b; Alwin, 1984; Alwin & Krosnick, 1985). It is therefore of interest to examine whether the response order manipulation produced alterations in the associations between latent values and these measures of socio-economic status.

Based on an examination of zero-order correlations between these variables and the latent self-direction/conformity factor, there is some evidence that the order in which responses are presented does determine the association between latent values and measures of socio-economic status. The upper panel of Table 5 displays the zero-order correlations for the standard and reversed orders. The correlation involving occupational status was unaffected by response order, but those involving education and income were not. For both of these latter variables, the correlation is noticeably larger among respondents who received the reverse order of presentation. The difference in the case of income is marginally statistically significant ( $z=1.93$ ,  $p<.06$ ), but the education difference is not ( $z=1.00$ ,  $p>.20$ ). This suggests that the reversed order of presentation increased the polarization between high and low income respondents for some reason.

In order to investigate this finding further, we examined the parameter estimates produced by a regression of the latent self-direction/conformity value on the three socio-economic status indicators. The resulting standardized regression coefficients are shown in the lower panel of Table 5. The pattern here is essentially the same as that in the upper panel of the table; the coefficients are greater among respondents who received the reverse order in the cases of both education and income. Here, the differences in the cases of education and occupational status are clearly non-significant (Education:  $z=0.56$ ,  $p>.20$ ; Occupational Status:  $z=1.09$ ,  $p>.20$ ), and the difference in the case of income is again marginally significant ( $z=1.55$ ,  $p=.12$ ). Nonetheless, the income difference remains distinct. We find this difference difficult to interpret; it is clear, though, that the form-resistant correlation hypothesis is not uniformly supported.

Summary. Placing an item early on the list increased the variance in responses to it without altering the degree to which they reflected the latent value. When we examined covariances among these rankings, we found that they were altered by the response order manipulation and concluded that the form-resistant correlation hypothesis was disconfirmed. But by employing a confirmatory factor analysis approach, we were able to demonstrate that the manipulation did not alter the implications of the data regarding the presence and nature of the underlying self-direction/conformity value.

## DISCUSSION

This study demonstrates that responses to the GSS measures of values for

child qualities are determined in part by the order in which response choices are offered to respondents. In rough an experiment that systematically varied response order, we found that placing an item among the first three on the list increased the likelihood that it would be chosen as one of the three most important qualities for a child to have. These effects were quite large in some cases, altering response marginals by as much as 17%. This is substantial in absolute terms, as well as in relative terms, compared to the size of wording, form, and context effects typically observed (Schuman & Presser, 1981).

Our analyses suggest that respondents with less cognitive sophistication are more likely to be influenced by changes in response order. Respondents with less formal education and more limited vocabularies were influenced more by our manipulation. This supports the "satisficing" explanation. People for whom the cognitive costs of optimizing are highest seem more likely to settle for a satisfactory response, as opposed to an optimal one.

This experimental alteration in response order also affected correlations among the rankings of the child qualities. These changes resulted from impact upon both the variances of responses and the covariances among them. This evidence clearly contradicts the "form-resistant correlation" hypothesis. However, the nature of the latent value dimension underlying responses (contrasting self-direction and conformity) was not altered by the change in response order; each item reflected the latent factor to the same degree in both samples. So although the strong form of the "form-resistant correlation" hypothesis was disconfirmed, our evidence suggests that

substantive conclusions about latent values do not depend upon response order. However, the correlation between the latent value and income did depend upon the order in which responses were offered to respondents. This finding also disconfirms the "form-resistant correlation" hypothesis.

On the basis of our results, one might be tempted to conclude that the ranking technique for measuring values demands considerable cognitive sophistication from respondents, more than some are able or willing to offer. This might lead to the inference that alternative measurement techniques should be considered to replace the ranking approach. The most obvious option is the use of rating scales to evaluate each child quality individually. Careful evaluation of each alternative seems to be just what some respondents fail to do when performing the ranking, so forcing evaluation of each item through individual ratings might seem to be an improvement. However, our own previous research (Alwin & Krosnick, 1985) documents that value ratings have drawbacks of their own, so this approach is not as straight-forwardly feasible as it might appear to be. For this reason, and because of the theoretical arguments in favor of using rankings to measure values (e.g., Rokeach, 1973; Kohn, 1977), we believe that working to improve the quality of responses to ranking measures is a more fruitful approach than is searching for alternative procedures.

There are a number of possible strategies for reducing response order effects in this context. One approach would be to randomize the order of presentation for each respondent, so that effects of response order would be

represented as unreliability. However, this is costly to execute, and individual responses would still be distorted by response order effects. Given our cognitive theory, two alternative approaches might be considered. First, one may attempt to increase respondent motivation in order to increase concentration and decrease satisficing. Motivation may be increased by adding special instructions informing respondents that the question they are about to answer is relatively difficult and requires extra concentration. In addition, the task may be simplified so that cognitive demands made of respondents are lessened. This could be accomplished by shortening the list of offered alternatives. We look forward to future research evaluating the effectiveness of these remedial techniques and testing other propositions of our general theory of response order effects.

#### Endnotes

1. The idea that form-resistant correlations are ever achievable is somewhat misleading, since measures of association are only rarely independent of marginals (see Carroll, 1961).
2. The GSS acronyms for the qualities appear in parentheses (see NORC, 1985).
3. This coding scheme is relatively arbitrary, but the results reported below are probably robust with respect to monotonic transformations of the scale units that preserve the ordinal character of the data (O'Brien, 1979).
4. Respondents who did not provide complete data were significantly less educated ( $p < .01$ ) and had significantly lower vocabulary scores ( $p < .01$ ) than

respondents who did provide complete data. This is consistent with the claim that less cognitively sophisticated respondents find this sort of survey measure more challenging.

5. Strictly speaking, the sets of thirteen individual statistical tests reported in Tables 1-3 are not independent of one another and should therefore be interpreted with this in mind. However, our conclusions would not be different were we to be more stringent regarding statistical significance.

6. Unfortunately, the assignments of respondents to experimental condition was not purely random; those who received the standard order were better educated than those who received the reversed order. However, given what we know about the association between education and responses to these items (to be considered below), this failure to randomize probably reduced the apparent size of the order effect. We can therefore be confident that the effects identified here are real. In addition, when we compared the two forms in terms of the qualities chosen as "most important" and "least important, we found the same pattern of form effect as those displayed in Tables 1 and 2, though the effects displayed in the tables are much stronger.

7. Preliminary analyses examining the effects of each of the measures individually revealed the same pattern of effects for each variable as appears when both are used in concert.

8. It might seem appropriate to test the form-resistant correlation

hypothesis by examining correlations. But because differences between groups in terms of correlations may reflect differences in variances and/or covariances, we decided to examine these two components separately.

9. Delta is a measure of goodness-of-fit proposed by Bentler and Bonett (1980).

It ranges from 0 (worst possible fit) to 1.0 (best possible fit) and compares the fit of a given model to that of a null model that posits no association among the indicators. A value greater than .9 is generally considered to reflect a relatively good fit.

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Table 1. Percent Choosing Quality as Among The Three Most Important

Quality	Standard Order (n = 905)	Reversed Order (n = 446)	Difference	p-value of the Difference
Manners	26.4%	10.1%	16.3%	.0000
Success	19.1%	14.6%	4.5%	.0393
Honest	65.7%	48.4%	17.3%	.0000
Clean	6.6%	7.4%	-0.8%	.5995
Judgement	38.6%	40.8%	-2.2%	.4272
Control	11.5%	13.7%	-2.2%	.2486
Role	3.1%	2.7%	0.4%	.6809
Amicable	14.4%	10.8%	3.6%	.0656
Obey	30.7%	36.8%	-6.1%	.0257
Responsible	34.1%	33.4%	0.7%	.7882
Considerate	24.9%	39.5%	-14.6%	.0000
Interested	17.9%	24.9%	-7.0%	.0026
Studious	6.5%	16.4%	-9.9%	.0000

Table 2. Percent Choosing Quality as Among The Three Least Important

Quality	Standard Order (N=905)	Reversed Order (N=446)	Difference	p-value of the Difference
Manners	26.4%	10.1%	16.3%	.0000
Success	19.1%	14.6%	4.5%	.0393
Honest	65.7%	48.4%	17.3%	.0000
Clean	6.6%	7.4%	-0.8%	.5995
Judgement	38.6%	40.8%	-2.2%	.4272
Control	11.5%	13.7%	-2.2%	.2486
Role	3.1%	2.7%	0.4%	.6809
Amicable	14.4%	10.8%	3.6%	.0656
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Responsible	34.1%	33.4%	0.7%	.7882
Considerate	24.9%	39.5%	-14.6%	.0000
Interested	17.9%	24.9%	-7.0%	.0026
Studious	6.5%	16.4%	-9.9%	.0000

Table 3. Percent Choosing Quality as Among the Three Most

Important: High

Education/High WORDSUM Group and Low Education/Low WORDSUM Group

Education/ WORDSUM	Low Education/ Low WORDSUM			High High	
	Standard Order (N=356)	Reversed Order (N=212)	Difference	Standard Order (N=241)	Reversed Order (N=91)
Manners	37.1%	14.2%	22.9%*	9.1%	
3.3%					
5.8%					
Success	21.6%	12.7%	8.9%*	17.4%	
18.7%					
-1.3%					
Honest	63.5%	48.6%	14.9%*	66.8%	
48.4%					
18.4%*					
Clean	11.0%	10.4%	1.6%	1.2%	
1.1%					
0.1%					
Judgment	36.2%	30.2%	6.0%	48.1%	
57.1%					
-9.0%					
Control	11.8%	16.0%	-4.2%	7.9%	
8.8%					
-0.9%					
Role	3.9%	4.2%	-0.3%	0.8%	
0.0%					
0.8%					
Amicable	13.8%	11.3%	2.5%	14.9%	
11.0%					
3.9%					
Obey	38.5%	47.2%	-8.7%*	17.8%	
12.1%					
5.7%					
Responsible	26.7%	27.4%	-0.7%	42.7%	
45.1%					
-2.4%					
Considerate	16.6%	34.9%	-18.3%*	37.3%	
46.2%					
-8.9%					
Interested	11.2%	17.5%	-6.3%*	30.3%	40.7%
-10.4%					
Studious	7.9%	24.5%	-16.6%*	5.4%	
6.6%					
-1.2%					

\*p<.05

Table 4. Factor Model Parameter Estimates:  
Standard and Reversed Order Samples

Quality	Factor Loadings-a	Disturbance Standard Order	Variances Reversed Order	Significance of the Difference Between the Disturbance
Variances				
Manners	.500-b	.637	.535	.0745
Success	-.096	.766	.631	.0302
Honest	-.012	.792	.896	.1552
Clean	.362	.741	.734	.9203
Judgement	-.581	.807	.846	.7642
Control	-.226	.417	.381	.3566
Role	.255	.869	.926	.4708
Amicable	-.024	.516	.404	.0084
Obey	.806	.495	.536	.4884
Responsible	-.445	.561	.626	.2506
Considerate	-.207	.543	.701	.0041
Interested	-.498	.874	.986	.1834
Studious	.166	.533	.674	.0082

Factor Variance: .325 (constrained to be equal in both samples).

Goodness-of-fit: chi-square (118)=259.2906, delta=.91.

Ns: Standard Order, 905; Reversed Order, 446.

Notes:

a. The factor loadings were constrained to be equal in both samples.

b. Fixed for estimation.

Table 5. Measures of Association between the Latent Value Dimension and Measures of Socio-Economic Status

Order	Socio-Economic Status Indicator		
	Education	Occupational Status	Income
Correlations			
Standard Order (N=905)	-.54*	-.38*	-.27*
Reversed Order (N=466)	-.65*	-.36*	-.46*

Regression Coefficients

Standard Order (N=905)	-.59*	-.12	-.09
Reversed Order (N=466)	-.67*	-.01	-.26*

\*p<.05