Ranking vs. Rating

Re-examining the Inglehart scale through an experimental survey

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Abstract

This paper aims to put the classic debate on ranking and rating methods in survey research into retest by re-examining the famous Inglehart batteries of post-materialist value orientation. To this end, we applied an experimental design of split-sampling for both ranking and rating items. The 'ranking vs. rating' debate revisits, on one hand, the oft-neglected danger with ranking measurement that factor analysis becomes biased due to its ipsative property, and, on the other hand, the danger of 'response set' bias in rating measurement. By applying the recent techniques to control for the negativity bias of ranked items and for the positivity bias of rated items, the paper compares the results of value dimensions of Inglehart's twelve batteries. The results suggest that the post-materialist dimension and the materialist dimension are positively correlated for both ranking and rating data after controlling for the biases. These findings are contradictory to Inglehart's value dimension in which post-materialists and materialists are polarised at opposite poles. Based on these empirical findings, we argue that Inglehart's theorisation of one-dimensional value cleavage is an artifact undergirded by his ranking batteries coupled with the biased factor analysis.

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The year 2007 celebrated a generation of three decades since the seminal *Silent Revolution* of Inglehart (1977) and the Inglehart scale of 'post-materialism' has been included in various survey projects including Euro-Barometer and World Value Surveys. In the meantime, the famous post-materialist theory has been put into question from various perspectives of, to name but a few, dimensionality of value orientations (Flanagan, 1987; Hellevik, 1993; Sacchi, 1998), socialisation hypotheses regarding 'generational effects' and 'life-cycle effects' (Dalton, 1977; Flanagan, 1982; Van Deth, 1983a; Böltken and Jagodzinski, 1985; Scarbrough, 1995), and 'periodical effects' of unemployment and inflation (Clarke and Dutt, 1991; Clarke et al., 1999; Clarke, 2000). Among others, the ranking method adopted in the Inglehart scale has also called attention of scholars; some studies claiming that it contributes to extracting a unique dimension of 'post-materialist vs. materialist' value dimension (Van Deth, 1983b; Bean and Papadakis, 1994). According to these critiques, this ranking method prevents one from finding multidimensionality of value change in advanced industrial countries. Instead, they claim that a rating method should be employed alternatively to allow respondents to evaluate the importance of each item more flexibly.

With these critiques in mind, this paper aims to put the classic 'ranking' versus 'rating' debates with regard to Inglehart's scale into retest by employing an experimental survey design. The recent decades have witnessed an increasing sophistication in the techniques of neutralising the biases related to the ranking and rating methods in applying to dimensionality analysis (Jackson and Alwin, 1980; Chan and Bentler, 1993; Cheung, 2004). Yet, these recent innovations have not been fully applied to the study of post-materialist value orientations. To this end, the paper first reviews the debates taken place between the 'ranking' camp and the 'rating' camp regarding the Inglehart's scale. Next, it reviews the essence of developments in the techniques to un-bias the effects of response styles for both ranking and rating. After the experimental research design adopted in this study being laid out and the caveats on data and analytical procedures briefed, results of our analyses are presented. We discuss the implications of the results on the post-materialist theory of Inglehart in the end.

RANKING VERSUS RATING IN MEASURING POST-MATERIALIST VALUE

The debates centred on *'ranking'* versus *'rating'* stem from the original work of Inglehart (1977) in measuring what he coined 'post-materialist vs. materialist value dimension'. In the surveys administered in the European Community in 1973, respondents were asked to rank twelve items of a country's goals. Based on the ranking scores of these twelve items, Inglehart (*ibid.*: 39-53) conducted a factor analysis and obtained a single value dimension of 'post-materialism' on one side and 'materialism' on the other[1]. The extraction of a single value dimension lent support to Inglehart's

[1] The pole of 'post-materialism' was represented by such items (factor loading in brackets) as 'More

argument that the 'value cleavage' is emerging in the post-industrial societies where post-materialists are opposed to materialists on 'New Politics' issues.

However, the findings of Inglehart have been questioned on its methodological front. Among other things, the factor analysis conducted to extract value dimension(s) invited much criticism. In principle, ranked items are not suitable for factor analysis due to its 'ipsative' nature entailed in measurement (Dunlap and Cornwell, 1994: 115). Warnings abound in the psychometric literature against the use of factor analysis with a set of variables with 'ipsative' property (Guilford, 1954; Horst, 1965; Hicks, 1970). The term 'ipsativity[2]' refers to the situation in which the sum of rank-ordered items or rescaled measures is constant across respondents. In such a situation, the ranking of one item is not independent of other items since the prior ranking determines the relative ranks of remaining ones. In the example of Inglehart's battery of four items, the ranking of the first item determines the ranks of remaining three items, which automatically generates negative correlations between them at about -.33[3]. This negativity in the correlation matrices is incongruent with the methodological premises of factor analysis. A warming by Dunlap and Cornwell (1994: 122) merits our attention: 'principal components factor analysis of ipsative data will produce bipolar factors that result, not from the true underlying relationships between the variables, but from negative relationships induced solely by the ipsative nature of the measures.'

Instead of the ranking method, the *'rating'* method is preferred to in measuring value dimensions according to the critics (Van Deth, 1983b; Bean and Papadakis, 1994). The rating method in survey questionnaires allows respondents to evaluate each item independently of the others. The *absolute* values obtained from the rating method are immune to the negativity bias associated with the *relative* ranking orders. In comparing ranking and rating methods in the Dutch Parliamentary Election Study of 1981[4], Van Deth (1983b: 425) concludes that 'ratings should be the first choice unless a way can be found to deal with the ipsative complications of rankings.' Nonetheless, in reply to the similar critique made by Bean and Papadakis (1994) on the use of the ranking method, Inglehart (1994: 290) argues that the rating format 'systematically tends to create or inflate positive correlations between the items in the series' and points out that the rating

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say on job' (.580), 'Less impersonal society' (.540), 'Ideas count' (.514), 'More say in government' (.484) and 'Freedom of speech' (.434), while the pole of 'materialism' was characterised with 'Maintain order' (-.467), 'Stable economy' (-.411), 'Fight against crime' (-.410), 'Economic growth' (-.389), 'Strong defence forces' (-.374), and 'Fight rising prices' (-.341).

[2] The term originates from 'ipse' (he or himself in Latin). See Cattell (1944) for the original introduction of 'ipsativity'.

[3] Dunlap and Cornwell (1994: 117) formalise the expected value of correlation in the ipsative data as -1/(*k*-1), where *k* is the number of measures.

[4] In the third wave of Dutch Parliamentary Election Panel-study, respondents were asked to rate the twelve Inglehart items in a seven point scale first and then asked to order the twelve items one by one (Van Deth, 1983b: 412). For the details of the list of variables and the actual questionnaire used in the study, see Van der Eijk *et al.* (1988: 34; 234).

method potentially suffers from *'response set' bias* where respondents respond in a particular manner, regardless of questioned contents (Zeller and Carmines, 1980: 94)[5].

In a nutshell, researchers face a dilemma between the *'negativity bias'* from the ranking method and the *'positivity bias'* from the rating method. In light of this trade-off, Inglehart employs the ranking method, maintaining that values are theoretically concerned with 'priorities' among different items and respondents should be forced to make choices (Inglehart, 1982: 449-450; 1994: 290). Even if we accept the theoretical importance of using ranking batteries in measuring value, the value dimension extracted with Inglehart's rank-ordered items is known to be biased. Inglehart (1977: 43) in fact acknowledges this problem by admitting '[o]ur use of factor analysis in this case is somewhat unconventional.' Yet, he defends the execution of his factor analysis for that negative correlations are relatively diluted with twelve items and the bias becomes 'minor'. This is not a solid validation to break the 'taboo' of ipsative factor analysis[6].

CORRECTING THE NEGATIVITY AND POSITIVITY BIAS

Instead of leaving the bias in the factor analysis, we take a different approach and pursue to correct such biases. After correcting the biases accrued from the measurement format, either the ranking or the rating, we can properly assess the nature of value dimensions that are free of noise. We believe that this is a fruitful venue in the research apart from discussing the theoretical merits of ranking/rating methods in measuring value orientations as reviewed above. To this end, we propose in this paper a set of schemes to 'neutralise' the biases in factor analysis of both rank-ordered data and rating-evaluated data by applying techniques lately developed in the field. To begin with, let us turn to the review of the techniques below for correcting the negativity bias of the ranking method and the positivity bias of the rating method for conducting factor analysis or covariance structure analysis.

Ranking

Since 'ipsative' data produce negatively biased correlation matrix as discussed above, a routine factor analysis is known to be flawed. However, the *common factor model* for ipsative measures proposed by Jackson and Alwin (1980) enables to correct such negativity biases to a significant extent. By assuming that a factor model for preipsative data, i.e. true evaluation or 'ratings' of items, exists, Jackson and Alwin devised a scheme to calculate the coefficient matrices of the factor model which is free from negativity bias[7]. Jackson and Alwin (*ibid.*: 222) writes the factor pattern coefficient

[5] See Berg (1967) for example for discussions on 'response set' in psychometrics.
[6] Note that the negative correlations still occur at the level of about -.09 with twelve items.
[7] Jackson and Alwin's common factor model is designed for a set of variables which have derived from ipsative transformation. However, they argue that by making the following three assumptions, it is possible to apply this scheme to ipsative variables resulting from measurement process such as

matrix (factor loading matrix) for x (i.e. ipsative data) as:

$$\Lambda_x = \Lambda_y - 1\bar{\lambda} \quad (1)$$

, where Λ_y is the factor pattern coefficient matrix (factor loading matrix) for y (i.e. preipsative data) and $\bar{\lambda}$ is a (k x 1) vector of the average values of the coefficients in the columns of Λ_y. Jackson and Alwin's scheme is practical and straightforward. The scheme imposes a set of constraints to generate the negative correlations among error terms inherent in ipsative data (Alwin and Jackson, 1982) [8].

In applying Jackson and Alwin's ipsative common factor model, Sacchi (1998) takes two-step procedures to control for ipsativity of ranked preference data of Inglehart's items. First, one item is removed from analysis at random since the excluded row is by definition redundant information in ipsativity data. In other words, an arbitrarily selected row from Σ_x is deleted in order for a non-singular matrix to be obtained, which would otherwise be a singular matrix due to ipsative property of x. Second, latent variables other than common factor, so-called 'phantom variables', are introduced for each rank-ordered item in the factor model with a view to 'absorbing the negative correlations among the rankings induced by the ranking procedure' (*ibid.*: 154). Based on the results obtained from these procedures of the Jackson and Alwin's common factor model, Sacchi (1998: 171) concludes 'there is no methodological reason to abstain from the application of ranking techniques, particularly when measuring value orientations, or, in general, when such techniques are superior for theoretical reasons.'

However, Jackson and Alwin's common factor model suffers from a crucial limitation. As Jackson and Alwin (1980: 225) acknowledges, the interpretation of the ipsative factor loading matrix Λ_x remains indefinite as the values of $\bar{\lambda}$ are unknown in the estimation (see Equation 1). As a consequence, we are left with no definitive interpretation of the original factor loadings on the preipsative data Λ_y, since a

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ranking procedures (Jackson and Alwin, 1980: 228): '(1) that for a given set of variables with the ipsative property, e.g. a set of rankings, there exists a corresponding set of hypothetical nonipsative variables in the population; (2) that the set of ipsative variables observed in the population of interest is an ipsative transformation of the hypothetical set of nonipsative variables; and (3) that a common factor model holds in the population of interest for the hypothetical set of nonipsative variables.'

[8] The covariance matrix of error terms which controls for negativity bias is $A\Psi_y A$, where $A = (I - p^{-1}11')$, Ψ_y is a (k x k) covariance matrix of the errors of measurement.

subtraction of $1\bar{\lambda}'$ from the factor ladings on the preipsative data Λ_y could lead to changes in original signs of the factor loadings (Chan and Bentler, 1993: 220). Chan and Bentler (1993) make an important contribution in this regard in overcoming this limitation. To make it possible to estimate the factor loadings of the preipsative data Λ_y, Chan and Bentler (*ibid.*: 229) make an innovative extension to Equation 1 postulated by Jackson and Alwin as follows:

$$\Lambda_x = \Lambda_y - 1\bar{\lambda}$$

$$= \begin{bmatrix} \alpha_1 & 0 \\ \alpha_2 & 0 \\ \alpha_3 & 0 \\ 0 & \beta_1 \\ 0 & \beta_2 \\ 0 & \beta_3 \end{bmatrix} - \begin{bmatrix} \bar{\alpha} & \bar{\beta} \\ \bar{\alpha} & \bar{\beta} \\ \bar{\alpha} & \bar{\beta} \\ \bar{\alpha} & \bar{\beta} \\ \bar{\alpha} & \bar{\beta} \\ \bar{\alpha} & \bar{\beta} \end{bmatrix} = \begin{bmatrix} \alpha_1 - \bar{\alpha} & -\bar{\beta} \\ \alpha_2 - \bar{\alpha} & -\bar{\beta} \\ \alpha_3 - \bar{\alpha} & -\bar{\beta} \\ -\bar{\alpha} & \beta_1 - \bar{\beta} \\ -\bar{\alpha} & \beta_2 - \bar{\beta} \\ -\bar{\alpha} & \beta_3 - \bar{\beta} \end{bmatrix} \quad (2)$$

, where $\bar{\alpha} = (\alpha_1 + \alpha_2 + \alpha_3 + 0 + 0 + 0)/6$ and $\bar{\beta} = (0 + 0 + 0 + \beta_1 + \beta_2 + \beta_3)/6$ are the average factor loadings for the first and second factors. Instead of the one factor exploratory factor-analytic (EFA) model assumed in the Jackson and Alwin method, Chan and Bentler reformulate the model with two or more factors through the *confirmatory factor-analytic (CFA) model* (*ibid.*: 220). This is the major innovation of Chan and Bentler (1993) since the estimation of $1\bar{\lambda}'$ is now made possible by fixing some parameters in both factors while imposing *k* constraints, where *k* is the difference in the number of free parameters between the preipsative model and ipsative model (*ibid.*: 229-231; 240-241). By further developing Jackson and Alwin's ipsative factor method in the contexts of plural CFA models, Chan and Bentler made a significant advance in estimating the factor loadings of ipsative items.

Despite the vital contribution, Chan and Bentler's CFA model still suffered from inconvenience in the final estimation of preipsative data. In their model, the estimated parameters of ipsative data Λ_x had to be transformed back into the preipsative model. Following up Chan and Bentler's innovations, Cheung (2004) formulated a *Direct Estimation method* which allows the final estimation of preipsative factor loadings and standard errors to be obtained from the software programs such as EQS and LISREL

literally directly[9]. This Direct Estimation method was made possible by applying a restricted second-order CFA model to the original Chan and Bentler's idea of the first-order CFA model. With this approach, the parameter estimates and standard errors can be calculated without including the *k* within group constraints that were necessary in the original CFA model.

To recapitulate, the negativity bias associated with the rank-ordered items in factor analysis or latent structure analysis can now be corrected owning to the original idea of exploratory common factor model by Jackson and Alwin (1980), the modifications through confirmatory factor-analytic model by Chan and Bentler (1993), and the optimal solution of Direct Estimation method by Cheung (2004). The analyses in this paper below adopt the strategies taken in the above literature and apply the Direct Estimation method proposed by Cheung (2004) in estimating the factor loadings of preipsative items that are latent in the available rank-ordered ipsative data.

Rating

The rating is neither immune to bias in survey research. In the words of Krosnick and Alwin (1988: 529), 'respondents presumably minimize the effort they expend in reporting their values by simply rating all qualities as equally and highly desirable.' Contrary to the ranking method which intrinsically entailed negativity bias, the rating method is believed to suffer from 'spuriously positive correlations' among the evaluated items (Alwin and Krosnick, 1985: 537). To control for this positivity bias, the following two approaches have been adopted in the empirical study.

The first approach is to include a 'General Method Factor' in factor analysis. This additional factor possesses identical factor loadings on all items and is uncorrelated with other factors. Alwin and Krosnick (1985) propose this approach and in fact demonstrate that the results including this new factor improve goodness-of-fit measures in their confirmatory factor analysis (*ibid.*: 544-546). The loadings on this added factor are statistically significant and the improvement of the goodness-of-fit measures is equally found significant. More importantly, the correlation of substantive latent factors in the Alwin and Krosnick's example of parental values of child quality changes after incorporating the General Method Factor, i.e. controlling for the effects of response set bias entailed in the rating items. With this 'General Method Factor' approach, we can control for the built-in positive correlations and also correct the positivity bias generated from the evaluating process of rating items.

The second approach is to remove 'nondifferentiating respondents' from analysis. Those respondents who are de-motivated to scrutinise the content of each rating item attempt to minimise their response cost by giving all items the same as well as higher

[9] The syntax for performing the Direct Estimation Method with both EQS and LISREL is presented in Appendix of Cheung (2004).

values in the scale. Krosnick and Alwin (1988) propose this approach and they show in their analysis of 1980 General Social Survey that about ten per cent of respondents did not differentiate at all for all thirteen items asked in the same five-point scale format. By silencing these non-differentiators, i.e. neutralising the positivity bias, Krosnick and Alwin demonstrate that the results of the rating items appear to be closer to those obtained from the rank-ordered items[10]. The only problem with this approach is to eliminate the possibility by definition that respondents do rate all items equally after their sound deliberation processes. In such cases, the positivity bias is over-corrected. Given that we do not have a readily available set of techniques to further differentiate the non-differentiators, we do not apply this second approach but only the first approach of introducing the General Method Factor.

RESEARCH DESIGN

To compare the ranking and rating methods, an experimental research design is employed in this study. This experimental design improves on the research designs of the previous research of Inglehart's batteries. Our study basically follows the research designs of Van Deth (1983b) and Bean and Papadakis (1994) to compare the ranking and rating methods for Inglehart's batteries of postmaterialism. Yet, although insightful their research findings are, the questionnaires assigned same respondents to both rate and rank the twelve batteries one after the other. Van Deth (1983b), for example, asked the Dutch respondents to rate twelve items with a seven point scale first and then rank them subsequently one by one until the twelfth rank. Bean and Papadakis (1994) similarly asked the Australian respondents to rate the four items first and then to rank them afterwards. The same procedures were repeated for the remaining eight items, yet the respondents only needed to rank the most, second, and third important items out of eight batteries. Although the authors' choice to start from rating formats and then to move on to ranking formats is a better choice than the vice-versa, we cannot neglect the contamination effects of the precedent rating formats on the following ranking decisions[11].

To overcome these possible shortfalls in research designs, we randomly assigned ranking and rating formats to the respondents of Waseda-CASI&PAPI2007 in Japan[12].

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[10] Krosnick and Alwin (1988: 536) note that 'the substantive conclusions one would draw from the present data after removing nondifferentiators from the analyzed sample did not *perfectly* match the substantive conclusions suggested by the ranking data' (italic original). We believe that such a discrepancy could further diminished by adopting the Direct Estimation method for the ranking data instead of the common factor model applied in their analysis.

[11] Especially, when the questions were asked in a postal survey like in the case of Bean and Papadakis (1994), one might be tempted to go back and revise the response in the rating format to rationalise with the ranking decisions.

[12] Our study of the 2007 House of Councillors Election (Waseda-CASI&PAPI2007) is composed of two surveys. One is the Waseda Study of Computer Assisted Self-Administered Interview 2007 (Waseda-CASI2007), and the other is Waseda Study of Paper-and-Pencil Interview

In the post-election wave of the Waseda-CASI&PAPI2007 surveys conducted after the 2007 election of the House of Councillors, respondents were randomly split into two groups for both PAPI (Paper-and-Pencil-Interview) and CASI (Computer-Assisted-Self-Interview) components of the surveys[13]. For Group A, the original Inglehart's (1977) rank-ordered 12 batteries were asked to respondents, while for Group B, the same twelve items of a country's goals were asked in the rating format with the eleven-point scale. The questionnaires and descriptive statistics for the two groups in both PAPI and CASI are detailed in Appendix 1.

DATA AND ANLYSIS

Two sets of data are used in our analysis: the first set of data is the ranking data from Group A; the second set the rating data from Group B. For the ranking data, we tried to replicate the procedures reported in the original work of Inglehart (1977) as much as possible except for one modification. The ranking scale used by Inglehart (1977: 43) runs from '1' (the most important among twelve items), '2' (the second most important among twelve items), '3' (the most important among four items), '4' (the second important among four items), '5' (items not chosen) and to '6' (the least important among twelve items). In theory, the sum of 12 ranked items amounts to '49' if respondents reply in the complete logical manner[14]. Yet we found in practice that not all respondents complete their responses in accordance with Inglehart's ranking scale[15]. To

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(Waseda-PAPI2007). Both studies were conducted by Aiji Tanaka (Principal Investigator), Masaru Kohno, Yoshitaka Nishizawa, Kentaro Fukumoto, Yukihiko Funaki, Yusaku Horiuchi, Kosuke Imai, Ryosuke Imai, Ikuo Kume, Koichi Kuriyama, Kazumi Shimizu, Yutaka Shinada, Motoki Watabe, and Masahiro Yamada, as well as our new members, Airo Hino, Takeshi Iida, and Yuko Morimoto. We also appreciated help of our graduate students, Kiichiro Arai, Norihiro Mimura, Shohei Ohishi, Teppei Yamamoto and Arata Yamazaki. We would also like to acknowledge that the CASI computer program was developed by three of our members, Koichi Kuriyama, Motoki Watabe, and Yuko Morimoto. Waseda-CASI2007 was made financially possible by the Grant-in-Aid for Scientific Research (A) (#18203008, headed by Aiji Tanaka of Waseda University, for 2006-08), the Japanese Ministry of Education, Culture, Sports, Science and Technology. Waseda-PAPI2007 was made financially possible by the Open-Research-Center Enhancement Program (2004-2008) for Waseda University (2004-2008, headed by Koichi Suga of Waseda University) of the Academic Research Advancement Promotion Programs for Private Universities, the Ministry of Education, Culture, Sports, Science and Technology, Japan. These data sets will be available in the near future from ICPSR, the University of Michigan (http://www.icpsr.umich.edu/) and/or the Social Science Japan Data Archive, the Institute of Social Science, the University of Tokyo (https://ssjda.iss.u-tokyo.ac.jp/en/).

[13] For the PAPI component, the treatments were randomised in the split-sampling by stratifying on interviewers. For the CASI component, the respondents were randomised in the CASI programmes with the seed of a starting time of each interview.

[14] The expected additive value of 12 ranked items is 49 (1x1+2x1+3x1+4x3+5x5+6x1).

[15] In our data, only a quarter of the respondents fall into the 'complete' category in which the sum of twelve items equals to the 'magical number' of 49. The rest of additive values ranges from the minimum of 45 (in which the most important and second most important items out of twelve items in SQ 1 were not chosen as the most important and second most important items in neither of the groups with four items in Q14: 1x1+2x1+3x3+4x3+5x3+6x1; N=12) to the maximum of 51 (in

rectify this 'quasi-ipsative' nature of Inglehart's ranking scale and to arrive at complete 'ipsative' ranked items, we analysed the respondents who meet the following four conditions: (1) answering both 'most important' and 'second most important' items in all three groups in Q14 (see Appendix 1); (2) answering all the 'most important', 'second most important', and 'least important' in SQ1; (3) choosing the 'most important' item among twelve items in SQ1 also as the 'most important' in either of the three groups in Q14; and (4) not choosing the 'least important' item in SQ1 either as the 'most important' or the 'second most important' item in the three groups in Q14. Now, instead of the six point scale devised by Inglehart, we reformulated it to a five point scale which ranges from '1' (the most important among twelve items), '2' (the most important among four items), '3' (the second important among four items), '4' (items not chosen) and to '5' (the least important among twelve items), which shall give rise to the additive value of '39' for all respondents. The number of respondents considered for our analysis of ranked items is N=522 covering both PAPI and CASI components of the survey. For the rating data, respondents who answered all twelve items are considered for our analysis. The number of respondents who qualify this requirement is N=811. The rating data are also a compiled file covering both PAPI and CASI components. The covariance matrices of the twelve Inglehart items for the ranking data and rating data are presented respectively in Appendix 2.

The analyses proceed as follows. First, we compare the uncorrected models between ranked items [Model 1-1] and rated items [Model 2-1]. Second, we compare the corrected models between the preipsative model of ranked items controlling for negativity biases through the *Direct Estimation method* (Cheung, 2004) [Model 1-2] and the model of rated items controlling for positivity biases through the *General Method Factor* method (Alwin and Krosnick, 1985) [Model 2-2].

Before presenting the results, let us preview the nuts and bolts of our analyses below.

[Model 1-1] For the ipsative model without correction, a confirmatory factor analysis is conducted assuming one latent factor underlying all the twelve items. The variance of this latent factor is fixed to one in order for the model to be properly identified.

[Model 1-2] For the preipsative model through the Direct Estimation method, a confirmatory factor analysis of two factors is conducted. Figure 1 visualises the application of the Cheung's Direct Estimation method to Inglehart's twelve batteries.

[Figure 1 about here]

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which one of the items chosen as the most important item out of four items is chosen as the least important out of twelve items: 1x1+2x1+3x0+4x3+5x6+6x1; N=2). This 'quasi-ipsative' nature of Inglehart's ranking scale should merit separate analyses at another occasion as to what the consequences would be for not having complete 'ipsative' data on the analyses of latent class structure.

A pass drawn from f_i to z_k represents a factor loading of k_{th} item in the preipsative data. For the model to be identified, the variances of two latent factors are fixed to one. The error variance of the 9th item 'Stable economy' is also set to one for the purpose of achieving model identification since a negative error variance was initially obtained[16].

[Model 2-1] For the rating model without correction, a confirmatory factor analysis is conducted assuming one latent factor underlying all the twelve items in the same manner with Model 1-1. The variance of this latent factor is fixed to one in order for the model to be properly identified.

[Model 2-2] For the rating model to correct the positivity bias with the General Method Factor, a confirmatory factor analysis of two factors is conducted to allow a direct comparison with Model 1-2, the preipsative model of ranking data. The third factor, the General Method Factor, is assumed to have identical loading scores to all twelve items, and the covariance between Factor 1 and Factor 3 as well as between Factor 2 and Factor 3 are set to zero. For the model to be identified, the variances of three latent factors are fixed to one.

RESULTS

Table 1 and 2 report the results of Models 1-1 and 1-2 for the ranking data and of Models 2-1 and 2-2 for the rating data respectively.

[Table 1 and Table 2 about here]

As reviewed earlier, the discussion over Inglehart's value dimension derived from the extraction of a single factor on which post-materialism and materialism were opposing to each other. The results in Model 1-1 largely replicate Inglehart's finding of one dimensional value cleavage between the postmaterialist and materialist camps except the items 'Maintain Order' and 'Fight against Crime' which were found insignificant. All the six post-materialist items loaded on this factor negatively, in the order of higher negative loadings, 'Less impersonal society', 'More say on job', 'Ideas count', 'More

[16] The equations for the structural model and measurement model are as follows:

$z_{01}=\alpha_1 f_1+e_{01}$, $z_{02}=\alpha_2 f_1+e_{02}$, $z_{03}=\alpha_3 f_2+e_{03}$, $z_{04}=\alpha_4 f_2+e_{04}$, $z_{05}=\alpha_5 f_1+e_{05}$, $z_{06}=\alpha_6 f_2+e_{06}$, $z_{07}=\alpha_7 f_1+e_{07}$, $z_{08}=\alpha_8 f_2+e_{08}$, $z_{09}=\alpha_9 f_1+e_{09}$, $z_{10}=\alpha_{10} f_2+e_{10}$, $z_{11}=\alpha_{11} f_1+e_{11}$, $z_{12}=\alpha_{12} f_2+e_{12}$

$X_{01}=.917z_{01}-.083z_{02}-.083z_{03}-.083z_{04}-.083z_{05}-.083z_{06}-.083z_{07}-.083z_{08}-.083z_{09}-.083z_{10}-.083z_{11}-.083z_{12}$

$X_{02}=.917z_{02}-.083z_{01}-.083z_{03}-.083z_{04}-.083z_{05}-.083z_{06}-.083z_{07}-.083z_{08}-.083z_{09}-.083z_{10}-.083z_{11}-.083z_{12}$

$X_{03}=.917z_{03}-.083z_{01}-.083z_{02}-.083z_{04}-.083z_{05}-.083z_{06}-.083z_{07}-.083z_{08}-.083z_{09}-.083z_{10}-.083z_{11}-.083z_{12}$

$X_{04}=.917z_{04}-.083z_{01}-.083z_{02}-.083z_{03}-.083z_{05}-.083z_{06}-.083z_{07}-.083z_{08}-.083z_{09}-.083z_{10}-.083z_{11}-.083z_{12}$

$X_{05}=.917z_{05}-.083z_{01}-.083z_{02}-.083z_{03}-.083z_{04}-.083z_{06}-.083z_{07}-.083z_{08}-.083z_{09}-.083z_{10}-.083z_{11}-.083z_{12}$

$X_{06}=.917z_{06}-.083z_{01}-.083z_{02}-.083z_{03}-.083z_{04}-.083z_{05}-.083z_{07}-.083z_{08}-.083z_{09}-.083z_{10}-.083z_{11}-.083z_{12}$

$X_{07}=.917z_{07}-.083z_{01}-.083z_{02}-.083z_{03}-.083z_{04}-.083z_{05}-.083z_{06}-.083z_{08}-.083z_{09}-.083z_{10}-.083z_{11}-.083z_{12}$

$X_{08}=.917z_{08}-.083z_{01}-.083z_{02}-.083z_{03}-.083z_{04}-.083z_{05}-.083z_{06}-.083z_{07}-.083z_{09}-.083z_{10}-.083z_{11}-.083z_{12}$

$X_{09}=.917z_{09}-.083z_{01}-.083z_{02}-.083z_{03}-.083z_{04}-.083z_{05}-.083z_{06}-.083z_{07}-.083z_{08}-.083z_{10}-.083z_{11}-.083z_{12}$

$X_{10}=.917z_{10}-.083z_{01}-.083z_{02}-.083z_{03}-.083z_{04}-.083z_{05}-.083z_{06}-.083z_{07}-.083z_{08}-.083z_{09}-.083z_{11}-.083z_{12}$

$X_{11}=.917z_{11}-.083z_{01}-.083z_{02}-.083z_{03}-.083z_{04}-.083z_{05}-.083z_{06}-.083z_{07}-.083z_{08}-.083z_{09}-.083z_{10}-.083z_{12}$

say in government', 'More beautiful cities', and 'Freedom of speech', while other materialist items, 'Stable economy', 'Economic growth', 'Keep prices stable', and 'Strong defense forces' loaded positively on the same factor. The structure that post-materialist items and materialist items are polarised on one dimension is identical to Inglehart's famous value dimension (Inglehart, 1977: 46; Inglehart, 1979: 314, 316; Bean and Papadakis, 1994: 275)[17]. The replication of a single value dimension in which post-materialist and materialist items are placed against each other suggests that our rescaling of ranking scores was a sound and valid operation[18].

On the contrary, the same confirmatory factor analysis based on the rating data produces quite a contrasting result in Model 2-1. All the twelve items this time load positively in a uniform manner. We also tested a two-factor model for six post-materialist items and six materialist items but its goodness-of-fit measures improved little from the one-factor model, suggesting that Inglehart's twelve items do compose one single dimension but in a one-directional fashion[19]. Bean and Papadakis (1994: 278) extracted a similar dimension through an explorative factor analysis of their rating items and the twelve items equally pointed to the same direction in both studies they tested in Australia for 1984-85 and 1988[20]. Our data indeed confirm the earlier findings of not only the polarised dimension of ranking data but also the uniform dimension of rating data.

However, this picture changes dramatically after controlling for negativity and positivity biases. The Direct Estimation Method in Model 1-2 suggests that all six materialist items load positively on Factor 1 and post-materialist items also load positively on Factor 2 (except 'More beautiful cities'). Moreover, these two factors are significantly correlated *positively* (.418)[21]. This positive correlation between materialist and post-materialist dimensions sharply contradicts with Inglehart's understanding of the value dimension where materialism and post-materialism oppose to each other. As explained, the Direct Estimation Method posits more than two factors for estimating the loadings of preipsative items. If the interpretation of Inglehart were right, the correlation of these two factors would have been negative. However, the correlation was positive

[17] To be precise, post-materialist items loaded positively and materialist items loaded negatively in Inglehart's explorative factor analysis. Our analysis depicts an important similarity with the earlier studies which extracted a single dimension.

[18] The analysis based on the Inglehart's ranking scale with the sum of 49 also produced nearly identical results except for the item, 'More beautiful cities', being insignificant.

[19] RMSEA and AGFI of the two-factor model were 0.090 and 0.888 respectively.

[20] To further validate the similarity of our finding with Bean and Papadakis (1994), an explorative factor analysis of rated items used in their study was conducted. Similarly to Bean and Papadakis, we managed to extract a single dimension (eigenvalue=6.54, variance explained=54.5%) on which all twelve items loaded positively.

[21] The analysis based on the Inglehart's ranking scale with the sum of 49 also produced a positive correlation of .255 (s.e.=.077, $p<.01$), although 'Economic growth' was no longer significant and 'Keep prices stable' and 'Fight crime' were negatively signed.

with the coefficient of .418. This moderate and positive correlation coefficient implies that the value dimension is multi-dimensional rather than uni-dimensional, that the dimension of materialism and the dimension of post-materialism do not constitute a single dimension but are two independent dimensions correlated positively.

The corrected model of rating data in Model 2-2 also projects a different result from the uncorrected model in Model 2-1. The finding of a one-dimensional and one-directional factor in Model 2-1 should be interpreted with caution as some critics would point out for the presence of potential 'response set' biases associated with rating batteries. The inclusion of the General Method Factor should sweep away such positivity biases from the model. The results reveal that four items, 'Economic growth', 'Strong defense forces', 'More say in job', and 'More beautiful cities', are no longer statistically significant after controlling for positivity biases but the rest of eight items remain significant with their signs unchanged. An important finding from Model 2-2 is that the two factors are strongly correlated to each other with the correlation coefficient of .794. This suggests that materialist items and post-materialist items are positively correlated even after removing response set effects from the analysis.

DISCUSSIONS

The results above are intriguing in that the corrected ranking model and the corrected rating model both point to the same direction. After controlling for the negativity bias, the ranking model reveals that materialist items and post-materialist items constitute two independent dimensions which are positively correlated. Based on the same rank-ordered items, Inglehart insisted that post-materialism and materialism are polarised in one dimension and theorised the value cleavage hypothesis. Inglehart's presentation of uni-dimensional cleavage is clearly misleading since his factor analysis is flawed due to ipsativity properties inherent in rank-ordered items. After eliminating the biases associated with rank-ordered items through the Direct Estimation Method, two dimensions appear to be correlated to each other positively. The finding of a single and unified dimension in which post-materialists are conflicting with materialists is simply an artifact undergirded by Inglehart's ranking batteries coupled with the incautious factor analysis with ipsative data.

The positive correlation between post-materialist and materialist items is further confirmed through the analysis of rated items. Even after controlling for potential response set biases, the two dimensions of post-materialism and materialism show a remarkably high correlation. Although not to the extent that these two dimensions constitute one dimension aligned in the same direction, the high correlation coefficient suggests that post-materialism and materialism are not in a competitive relationship but rather in a harmonious relationship. Based on the explorative factor analysis of rated items, Bean and Papadakis (1994) argued that post-materialist and materialist items are hardly located at the two poles of the same value dimension. The analyses here join

their criticism against Inglehart's conceptualisation of the uni-dimensional value cleavage.

Furthermore, the findings presented serve as more definitive evidences for the presence of positive correlation between post-materialism and materialism. Bean and Papadakis (1994) based their arguments on their extraction of two rotated factors representing post-materialism and materialism respectively. Given that two rotated factors are orthogonal and uncorrelated by nature[22], Bean and Papadakis (1994: 278) could demonstrate only up to that post-materialism and materialism are independent and *not correlated negatively* as conceptualised in Inglehart's value dimension. Our analyses advance Bean and Papadakis's arguments further by demonstrating that the two factors are *positively correlated* to each other. Inglehart (1994) replied to Bean and Papadakis's arguments by pointing out that two factors were found uncorrelated because of the use of varimax rotation. Inglehart (1982: 458; 1990: 144) argued on other occasions that the use of varimax rotation for extracting dimensions is 'an analytic fallacy' of '*reductio ad varimax*'. Our analyses do not suffer from such 'an analytic fallacy' but still lend support to the criticism against Inglehart for the theorisation of one-dimensional value cleavage. It is rather Inglehart's extraction of a polarised value dimension which suffers from 'an analytic fallacy' of '*reductio ad ipse*'.

The validation of positive correlations between post-materialist and materialist items has further ramifications to the criticism against Inglehart. As Bean and Papadakis (1994) point out, the theorisation of a conflict dimension between post-materialists and materialists is, although it may sound paradoxical, inconsistent with the original hypothesis of Maslow's 'hierarchy of needs'. Maslow's hypothesis follows that people can develop needs of higher level only after basic needs are met (Maslow, 1954). If this hypothesis is applied to the Inglehart theory, post-materialists who subscribe to the social and self-actualisation needs must have met the physiological needs by definition. What Inglehart tries to depict as a conflict is 'enemies within'. It would be self-contradictory if one has to strive for post-materialist goals at the expense of materialist goals that post-materialist goals are built upon. To put alternatively, the positive correlation found between post-materialist items and materialist items is very much consistent with the original hypothesis of Maslow. Those who value belongingness, esteem, and intellectual and aesthetic needs should also take safety and sustenance to their heart. Conceptually, there cannot be such a conflict as post-materialists versus materialists if one follows Maslow's hypothesis of hierarchy of needs.

CONCLUSION

Although Inglehart has successfully replied to some of the findings that challenged to

[22] To be precise, principal component analysis was used in Bean and Papadakis (1994).

undermine his post-materialist thesis, the question with regard to the central assumption in his theory about a basic conflict between post-materialists and materialists is still at stake. Our analyses demonstrated that the fundamental dimension is a moderately and positively correlated dimension between post-materialist and materialist items regardless of the question type used of ranking or rating. Inglehart has repeatedly dismissed the use of rating questions on the basis of the danger that 'many respondents race down the list, giving high (or low) ratings to all of them' (Inglehart and Abramson, 1999: 666). Our analyses demonstrated that, even after controlling for this 'response set' bias, post-materialist items and materialist items showed a remarkably high correlation, corroborating that the two clusters are in a harmonious and friendly relationship. Despite their labels giving an impression of being confrontational, these two clusters are like the siblings of the same family. Inglehart has insisted that these two value orientations exclusively confront each other but his belief seems to be grounded by the use of ranking batteries and its abuse in the series of ipsative factor analyses.

Our analyses could be further refined by maximising the richness of the CASI component of the survey. As an alternative to the General Method Factor model applied in this paper, one could make use of response time to identify those who run down the questionnaire and to correctly eliminate the response set bias from such 'end piling' practices. For this purpose, one could develop a scheme to rectify the response style effects by integrating the information of the response variances and response time variances. This could serve as a way to differentiate a group of non-differentiators as discussed earlier in the paper. In the age of prevailing telephone surveys, such efforts to validate the use of rating methods could prove promising since rating is known to be easier to administer and less costly compared to ranking styles (Munson and McIntyre, 1979; Krosnick, 1999). The use of Inglehart's batteries, for example, would be much limited to a relatively small number of items if one has to listen to and memorise a list of numerous items before making priorities among them. Keeping these new venues in sight, this paper limited its scope to applying the available techniques to date to correct the negativity and positivity biases related to ranking and rating questions.

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FIGURES AND TABLES

FIGURE 1 Cheung's (2004) 'Direct Estimation Method' to 12 Inglehart's items

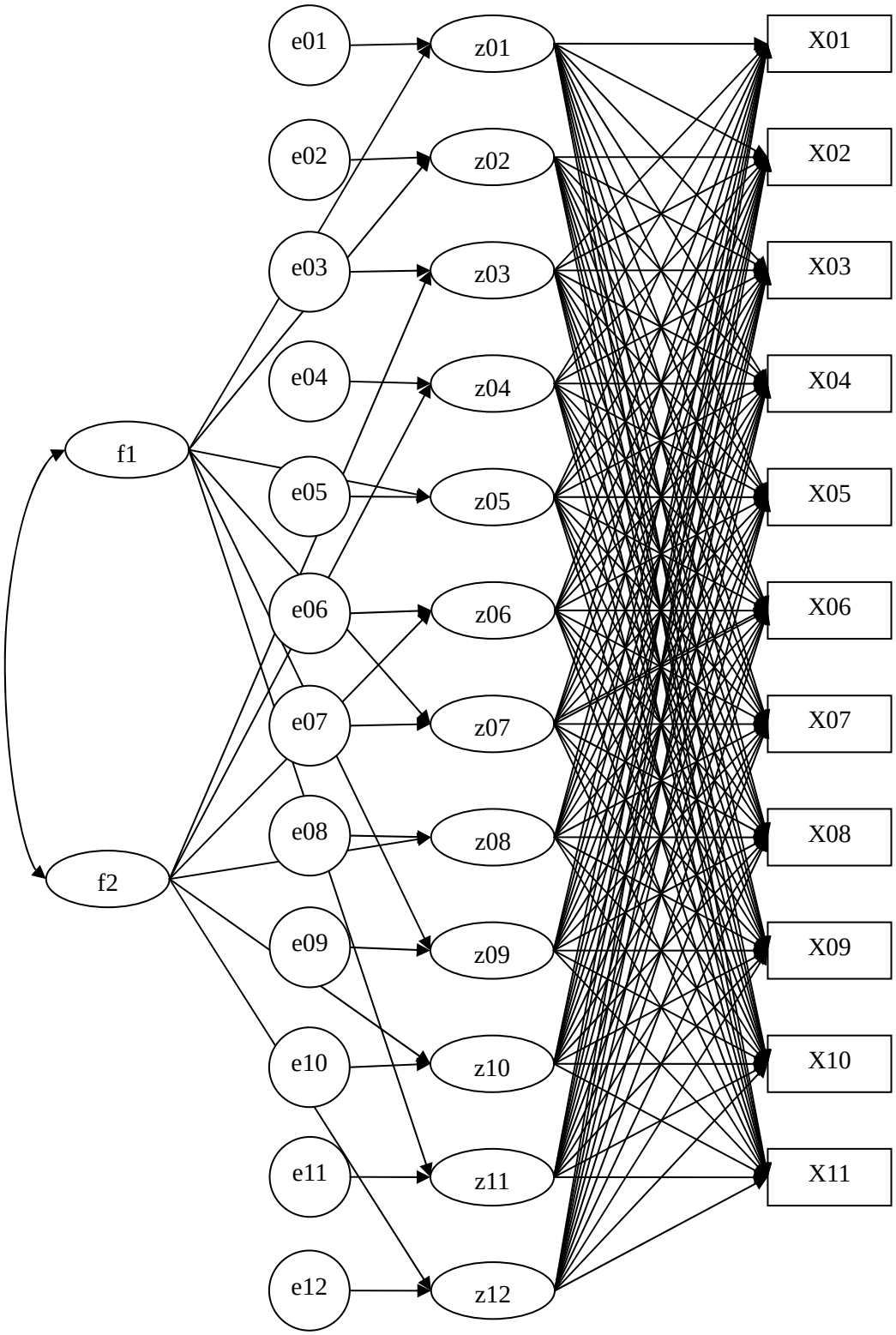

TABLE 1 Confirmatory factor analysis of ranking data

	[Model 1-1] Ranking without correction		[Model 1-2] Ranking Direct Estimation Method		
	Factor1	Error Variance	Factor1	Factor2	Error Variance
X01: Economic growth	0.654 ***	1.105 ***	1.383 ***		0.604 ***
	(0.059)	(0.080)	(0.095)		(0.161)
X02: Strong defense forces	0.172 ***	0.703 ***	0.492 ***		0.748 ***
	(0.043)	(0.044)	(0.072)		(0.054)
X03: More say on job	-0.407 ***	0.855 ***		0.741 ***	0.834 ***
	(0.050)	(0.057)		(0.079)	(0.064)
X04: More beautiful cities	-0.177 ***	1.014 ***		0.108	0.907 ***
	(0.052)	(0.064)		(0.079)	(0.074)
X05: Maintain order	-0.014	0.864 ***	0.361 ***		0.851 ***
	(0.047)	(0.054)	(0.073)		(0.061)
X06: More say in government	-0.312 ***	0.920 ***		1.022 ***	0.663 ***
	(0.050)	(0.059)		(0.082)	(0.088)
X07: Keep stable prices	0.420 ***	0.888 ***	0.559 ***		1.052 ***
	(0.051)	(0.059)	(0.079)		(0.072)
X08: Freedom of speech	-0.134 ***	0.481 ***		0.419 ***	0.523 ***
	(0.036)	(0.030)		(0.067)	(0.040)
X09: Stable economy	0.752 ***	0.459 ***	0.883 ***		1.000
	(0.047)	(0.051)	(0.086)		・・・
X10: Less impersonal society	-0.597 ***	0.843 ***		0.764 ***	1.053 ***
	(0.052)	(0.062)		(0.084)	(0.078)
X11: Fight Crime	-0.032	0.935 ***	0.242 ***		0.895 ***
	(0.049)	(0.058)	(0.072)		(0.066)
X12: Ideas count	-0.325 ***	0.587 ***		0.496 ***	0.639 ***
	(0.041)	(0.039)		(0.071)	(0.046)
Correlation between Factors 1 & 2				0.418 ***	(0.082)
N	522		522		
X^2 / df	20.023		14.650		
RMSEA	0.191		0.162		
AGFI	0.629		0.716		

*** p < .001, Standard errors are in parenthesis.

TABLE 2 Confirmatory factor analysis of rating data

	[Model 2-1] Rating without correction		[Model 2-2] Rating with General Method Factor		
	Factor1	Error Variance	Factor1	Factor2	Error Variance
X01: Economic growth	1.247 ***	3.532 ***	0.097		3.212 ***
	(0.076)	(0.183)	(0.108)		(0.178)
X02: Strong defense forces	0.922 ***	4.967 ***	-0.183		4.483 ***
	(0.085)	(0.251)	(0.123)		(0.258)
X03: More say on job	1.120 ***	3.209 ***		-0.068	2.735 ***
	(0.072)	(0.166)		(0.121)	(0.169)
X04: More beautiful cities	1.247 ***	2.991 ***		-0.027	2.586 ***
	(0.071)	(0.156)		(0.117)	(0.158)
X05: Maintain order	1.583 ***	1.983 ***	0.566 ***		2.104 ***
	(0.065)	(0.112)	(0.093)		(0.114)
X06: More say in government	1.499 ***	2.111 ***		0.527 ***	2.135 ***
	(0.066)	(0.117)		(0.102)	(0.117)
X07: Keep stable prices	1.524 ***	1.919 ***	1.015 ***		1.704 ***
	(0.064)	(0.108)	(0.093)		(0.110)
X08: Freedom of speech	1.416 ***	2.840 ***		0.777 ***	2.745 ***
	(0.072)	(0.151)		(0.111)	(0.156)
X09: Stable economy	1.572 ***	1.314 ***	1.163 ***		0.903 ***
	(0.058)	(0.080)	(0.085)		(0.098)
X10: Less impersonal society	1.558 ***	1.587 ***		0.900 ***	1.404 ***
	(0.061)	(0.093)		(0.098)	(0.112)
X11: Fight Crime	1.314 ***	1.669 ***	0.758 ***		1.635 ***
	(0.058)	(0.092)	(0.089)		(0.093)
X12: Ideas count	1.031 ***	3.826 ***		0.493 ***	3.759 ***
	(0.077)	(0.195)		(0.122)	(0.197)
General Method Factor				1.294 ***	(0.043)
Correlation between Factors 1 & 2				0.794 ***	(0.055)
N	811		811		
X^2 / df	8.056		5.628		
RMSEA	0.093		0.076		
AGFI	0.881		0.915		

*** p < .001, Standard errors are in parenthesis.

APPENDIX 1

[Group A] Q14 Which goal do you think is important for Japan to aim for the next ten years? For each of Group 1 through Group 3, please choose two most important items.

[Group 1] First, among these items, which item is the most important? Which item is the second most important?

CASI(376)/PAPI(472)

	Most important ↓				Second most important ↓			
	CASI		PAPI		CASI		PAPI	
	N	%	N	%	N	%	N	%
1. Maintain a high rate of economic growth	96	25.5	214	45.3	107	28.5	105	22.2
2. Make sure that this country has strong defense forces	20	5.3	26	5.5	19	5.1	58	12.3
3. See that the people have more say in how things get decided at work and in their communities	142	37.8	154	32.6	120	31.9	129	27.3
4. Try to make our cities and countryside more beautiful	110	29.3	62	13.1	116	30.9	158	33.5
5. *Do not understand these items	2	0.5	1	0.2	3	0.8	0	0.0
6. *DK	6	1.6	13	2.8	10	2.7	15	3.2
7. *NA	0	0.0	2	0.4	1	0.3	7	1.5

[Group 2] Next, among these items, which item is the most important? Which item is the second most important?

CASI(376)/PAPI(472)

	Most important ↓				Second most important ↓			
	CASI		PAPI		CASI		PAPI	
	N	%	N	%	N	%	N	%
1. Maintain order in the nation	98	26.1	140	29.7	122	32.4	129	27.3
2. Give the people more say in important government decisions	132	35.1	136	28.8	120	31.9	131	27.8
3. Keep prices stable	119	31.6	163	34.5	88	23.4	132	28.0
4. Protect freedom of speech	21	5.6	19	4.0	36	9.6	60	12.7
5. *Do not understand these items	2	0.5	1	0.2	2	0.5	2	0.4
6. *DK	3	0.8	10	2.1	7	1.9	9	1.9
7. *NA	1	0.3	3	0.6	1	0.3	9	1.9

[Group 3] Among these items, which item is, then, the most important? Which item is the second most important?

CASI(376)/PAPI(472)

	Most important ↓				Second most important ↓			
	CASI		PAPI		CASI		PAPI	
	N	%	N	%	N	%	N	%
1. Maintain a stable economy	127	33.8	202	42.8	105	27.9	121	25.6
2. Progress toward a less impersonal, more humane society	104	27.7	128	27.1	88	23.4	113	23.9
3. Fight against crime	115	30.6	109	23.1	131	34.8	163	34.5
4. Progress toward a society where ideas are more important than money	26	6.9	21	4.4	47	12.5	58	12.3
5. *Do not understand these items	1	0.3	1	0.2	1	0.3	0	0.0
6. *DK	2	0.5	8	1.7	2	0.5	12	2.5
7. *NA	1	0.3	3	0.6	2	0.5	5	1.1

SQ1 Among the 12 goals asked in Group 1 through Group 3, which item is the most important? Which item is the second most important? Lastly, which item is the least important?

CASI(376)/PAPI(472) (*CASI 13~15=-8)	Most important ↓				Second most important ↓				Least important ↓			
	CASI		PAPI		CASI		PAPI		CASI		PAPI	
	N	%	N	%	N	%	N	%	N	%	N	%
1. Maintain a high rate of economic growth	44	11.7	112	23.7	30	8.0	39	8.3	29	7.7	19	4.0
2. Make sure that this country has strong defense forces	10	2.7	12	2.5	13	3.5	25	5.3	132	35.1	109	23.1
3. See that the people have more say in how things get decided at work and in their communities	28	7.4	40	8.5	30	8.0	39	8.3	17	4.5	14	3.0
4. Try to make our cities and countryside more beautiful	38	10.1	26	5.5	20	5.3	22	4.7	20	5.3	32	6.8
5. Maintain order in the nation	25	6.6	33	7.0	29	7.7	51	10.8	6	1.6	6	1.3
6. Give the people more say in important government decisions	39	10.4	35	7.4	32	8.5	25	5.3	13	3.5	13	2.8
7. Keep prices stable	31	8.2	44	9.3	44	11.7	72	15.3	5	1.3	10	2.1
8. Protect freedom of speech	9	2.4	4	0.8	6	1.6	20	4.2	42	11.2	41	8.7
9. Maintain a stable economy	45	12.0	51	10.8	48	12.8	51	10.8	3	0.8	3	0.6
10. Progress toward a less impersonal, more humane society	48	12.8	50	10.6	42	11.2	44	9.3	8	2.1	5	1.1
11. Fight against crime	45	12.0	46	9.7	60	16.0	58	12.3	4	1.1	1	0.2
12. Progress toward a society where ideas are more important than money	11	2.9	9	1.9	18	4.8	13	2.8	69	18.4	107	22.7
13. *Do not understand these items	-	-	1	0.2	-	-	0	0.0	-	-	1	0.2
14. *DK	-	-	8	1.7	-	-	10	2.1	-	-	86	18.2
15. *NA	3	0.8	1	0.2	4	1.1	3	0.6	28	7.4	25	5.3

[Group B] Q14 How important do you think it is for Japan to aim for the next ten years as her goals? For each goal (a) through (l), please answer by choosing one of the numbers on the scale with 10 as the maximum point.

CASI(404) /PAPI(461) (*CASI 11~13=-8)			0 Not important at all	1 ←	2	3	4 →	5 In between	6 ←	7	8	9 →	10 Very important	11 * Do not understand	12 * DK	13 * NA
(a) Maintain a high rate of economic growth →	CASI	N	6	12	6	10	15	115	32	45	65	21	68	-	-	9
		%	1.5	3.0	1.5	2.5	3.7	28.5	7.9	11.1	16.1	5.2	16.8	-	-	2.2
	PAPI	N	1	1	4	10	9	95	27	82	103	20	100	7	1	1
		%	0.2	0.2	0.9	2.2	2.0	20.6	5.9	17.8	22.3	4.3	21.7	1.5	0.2	0.2
(b) Make sure that this country has strong defense forces →	CASI	N	13	15	12	37	23	154	23	35	31	15	40	-	-	6
		%	3.2	3.7	3.0	9.2	5.7	38.1	5.7	8.7	7.7	3.7	9.9	-	-	1.5
	PAPI	N	10	6	18	37	24	141	45	53	53	19	44	8	2	1
		%	2.2	1.3	3.9	8.0	5.2	30.6	9.8	11.5	11.5	4.1	9.5	1.7	0.4	0.2
(c) See that the people have more say in how things get decided at work and in their communities →	CASI	N	5	11	1	12	5	93	47	49	64	33	77	-	-	7
		%	1.2	2.7	0.2	3.0	1.2	23.0	11.6	12.1	15.8	8.2	19.1	-	-	1.7
	PAPI	N	-	3	2	5	6	84	34	71	117	41	87	6	4	1
		%	-	0.7	0.4	1.1	1.3	18.2	7.4	15.4	25.4	8.9	18.9	1.3	0.9	0.2
(d) Try to make our cities and countryside more beautiful →	CASI	N	2	11	5	14	4	61	29	49	81	35	109	-	-	4
		%	0.5	2.7	1.2	3.5	1.0	15.1	7.2	12.1	20.2	8.7	27.0	-	-	1.0
	PAPI	N	-	2	1	4	4	60	28	71	126	38	124	3	-	-
		%	-	0.4	0.2	0.9	0.9	13.0	6.1	15.4	27.3	8.2	26.9	0.7	-	-
(e) Maintain order in the nation →	CASI	N	7	6	4	5	7	65	19	37	67	44	137	-	-	6
		%	1.7	1.5	1.0	1.2	1.7	16.1	4.7	9.2	16.6	10.9	33.9	-	-	1.5
	PAPI	N	-	-	1	3	1	54	28	65	103	44	153	7	2	-
		%	-	-	0.2	0.7	0.2	11.7	6.1	14.1	22.3	9.5	33.2	1.5	0.4	-
(f) Give the people more say in important government decisions →	CASI	N	8	7	2	8	3	59	22	40	68	42	138	-	-	7
		%	2.0	1.7	0.5	2.0	0.7	14.6	5.4	9.9	16.8	10.4	34.2	-	-	1.7
	PAPI	N	-	-	2	3	2	30	16	63	113	55	168	7	2	-
		%	-	-	0.4	0.7	0.4	6.5	3.5	13.7	24.5	11.9	36.4	1.5	0.4	-
(g) Keep prices stable →	CASI	N	5	7	3	1	8	49	14	47	65	48	152	-	-	5
		%	1.2	1.7	0.7	0.2	2.0	12.1	3.5	11.6	16.1	11.9	37.6	-	-	1.2
	PAPI	N	-	-	2	4	-	51	15	52	90	46	200	1	-	-
		%	-	-	0.4	0.9	-	11.1	3.3	11.3	19.5	10.0	43.4	0.2	-	-
(h) Protect freedom of speech →	CASI	N	5	6	4	4	7	103	14	46	71	35	103	-	-	6
		%	1.2	1.5	1.0	1.0	1.7	25.5	3.5	11.4	17.6	8.7	25.5	-	-	1.5
	PAPI	N	-	-	4	4	5	103	24	60	84	36	135	5	1	-
		%	-	-	0.9	0.9	1.1	22.3	5.2	13.0	18.2	7.8	29.3	1.1	0.2	-
(i) Maintain a stable economy →	CASI	N	6	5	4	4	3	35	16	44	87	46	151	-	-	3
		%	1.5	1.2	1.0	1.0	0.7	8.7	4.0	10.9	21.5	11.4	37.4	-	-	0.7
	PAPI	N	-	-	1	2	1	39	12	62	105	47	189	2	1	-
		%	-	-	0.2	0.4	0.2	8.5	2.6	13.4	22.8	10.2	41.0	0.4	0.2	-
(j) Progress toward a less impersonal, more humane society →	CASI	N	6	5	2	4	4	55	22	44	76	44	135	-	-	7
		%	1.5	1.2	0.5	1.0	1.0	13.6	5.4	10.9	18.8	10.9	33.4	-	-	1.7
	PAPI	N	-	-	1	1	2	45	17	60	116	40	173	4	2	-
		%	-	-	0.2	0.2	0.4	9.8	3.7	13.0	25.2	8.7	37.5	0.9	0.4	-
(k) Fight against crime →	CASI	N	8	7	1	7	1	16	3	9	48	64	235	-	-	5
		%	2.0	1.7	0.2	1.7	0.2	4.0	0.7	2.2	11.9	15.8	58.2	-	-	1.2
	PAPI	N	-	-	1	2	-	11	7	27	67	45	299	1	1	-
		%	-	-	0.2	0.4	-	2.4	1.5	5.9	14.5	9.8	64.9	0.2	0.2	-
(l) Progress toward a society where ideas are more important than money →	CASI	N	7	10	4	9	13	147	38	37	48	27	57	-	-	7
		%	1.7	2.5	1.0	2.2	3.2	36.4	9.4	9.2	11.9	6.7	14.1	-	-	1.7
	PAPI	N	1	1	-	9	9	114	34	73	89	27	94	9	1	-
		%	0.2	0.2	-	2.0	2.0	24.7	7.4	15.8	19.3	5.9	20.4	2.0	0.2	-

APPENDIX 2 Covariance Matrices

Ranking	X01	X02	X03	X04	X05	X06	X07	X08	X09	X10	X11	X12
X01: Economic growth	1.533											
X02: Strong defense forces	0.001	0.733										
X03: More say on job	-0.613	-0.237	1.021									
X04: More beautiful cities	-0.554	-0.231	-0.249	1.045								
X05: Maintain order	0.001	0.109	-0.126	-0.034	0.864							
X06: More say in government	-0.135	-0.113	0.285	-0.106	-0.358	1.017						
X07: Keep prices stable	0.114	-0.008	-0.151	0.080	-0.368	-0.478	1.064					
X08: Freedom of speech	-0.106	-0.093	0.033	0.017	-0.100	-0.110	-0.124	0.499				
X09: Stable economy	0.446	0.063	-0.209	-0.144	-0.066	-0.160	0.294	-0.099	1.025			
X10: Less impersonal society	-0.267	-0.131	0.172	0.025	-0.025	0.177	-0.297	0.142	-0.567	1.200		
X11: Fight crime	-0.136	0.040	-0.028	0.071	0.078	-0.112	0.034	-0.040	-0.282	-0.442	0.936	
X12: Ideas count	-0.282	-0.133	0.103	0.080	0.026	0.094	-0.160	-0.017	-0.299	0.014	-0.118	0.692
Rating	X01	X02	X03	X04	X05	X06	X07	X08	X09	X10	X11	X12
X01: Economic growth	5.087											
X02: Strong defense forces	2.303	5.816										
X03: More say on job	1.695	1.309	4.463									
X04: More beautiful cities	2.023	1.298	2.098	4.546								
X05: Maintain order	2.071	1.502	1.885	2.069	4.490							
X06: More say in government	1.943	1.250	2.023	1.978	2.600	4.359						
X07: Keep prices stable	1.826	1.371	1.372	1.756	2.375	2.029	4.240					
X08: Freedom of speech	1.439	1.195	1.570	1.641	2.436	2.131	2.287	4.845				
X09: Stable economy	1.963	1.188	1.458	1.683	2.372	2.275	2.738	2.187	3.784			
X10: Less impersonal society	1.709	1.450	1.858	1.841	2.286	2.319	2.279	2.273	2.512	4.013		
X11: Fight crime	1.478	1.026	1.121	1.589	2.138	1.971	2.074	1.613	2.227	2.164	3.396	
X12: Ideas count	1.037	1.010	1.207	1.499	1.349	1.416	1.503	1.848	1.536	2.018	1.154	4.888

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