Satisficing: A Strategy for Dealing with the Demands of Survey Questions

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Abstract

This paper examines the hypothesis that respondents often choose merely satisfactory answers to survey questions when the cognitive and motivational demands of choosing optimal answers are high. Using data from the 1980 General Social Survey we show that many respondents seem to "satisfice" rather than "optimize" in their answers to some types of survey questions. Satisficing is more prevalent among people with less cognitive sophistication, though it is no more prevalent among people for whom the topic of a question is low in salience and/or personal importance. Our findings suggest that satisficing can dramatically distort the substantive implications of correlational analysis.

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Introduction

The quality of survey data depends in part upon respondents' willingness to expend the effort and care needed to provide accurate answers to questions (Cannell, Miller, & Oksenberg, 1981). The extent of their ability and motivation to respond accurately interact with the amount of burden created by the survey (Bradburn, 1979). However, little is known about how respondents manage the cognitive and motivational demands of the types of response tasks that are a common feature of contemporary surveys.

This paper considers one hypothesized consequence of the cognitive and motivational burdens created by survey questions: the extent to which respondents "satisfice" in their responses to survey questions, instead of providing "optimal" choices. Specifically, we consider questions that require respondents to rate several attitude objects on an ordered rating scale. We inquire about the extent to which respondents vary in their willingness to differentiate their responses, the extent to which such respondent behavior can be predicted on the basis of other respondent characteristics, and the extent to which such respondent behavior can be taken into account in the analysis of survey data.

We explore these issues using data from the 1980 General Social Survey on the rating of the desirability of several child qualities, collected as part of a methodological experiment designed to investigate the properties of several strategies of measuring parental values (see Alwin and Krosnick, 1985). After a discussion of the general phenomenon

of "satisficing" in survey responses, we turn to a detailed examination of these data on the rating of child qualities.

Satisficing as a General Phenomenon

Survey respondents are often asked to expend a great deal of cognitive effort for little apparent reward. They are asked, for example, to report the number of times they visited a doctor during the last year, when they were a victim of a crime, or how often they watched network television news programs. They are asked to consider controversial political issues, one after another, and to offer thoughtful opinions on each. Or, they are asked to summarize the natural emotional ups and downs of life by choosing just one point on a scale measuring life satisfaction. Certainly, some respondents are motivated to expend the substantial amount of mental effort required by such tasks, whether by desires for self-expression, for interpersonal response, for intellectual challenge, for self-understanding, for feelings of altruism, for emotional catharsis, or for gratification from successful performance, to help manufacturers make better products, or to help government make better-informed policy decisions (Warwick and Lininger, 1975, p. 185-187). However, many respondents probably satisfy these desires a short way into an interview and probably grow impatient, fatigued, and disinterested thereafter.

Given that some survey questions make substantial cognitive and motivational demands on respondents who may have few reasons to expend the effort necessary to produce optimal answers, it seems likely that individuals will sometimes offer merely satisfactory answers instead. People often settle for satisfactory solutions to problems instead of seeking optimal ones in a variety of domains, a tendency referred to as

satisficing (Simon, 1957).

Satisficing is most likely to occur when the costs of optimizing are high, so it would be expected to occur more often in response to survey questions that are especially difficult or demanding than in response to relatively easy questions. Satisficing should also be more common among respondents with relatively little cognitive sophistication, since they presumably have to expend more cognitive effort in order to generate optimal answers. Individuals who are especially interested in the topic of a question, who have a great deal of practice at thinking about it, or who are especially motivated to optimize would seem especially unlikely to satisfice. Finally, satisficing should be more likely to occur toward the end of the interview, when respondents are fatigued or disinterested.

EVIDENCE FOR SATISFICING

There is some indirect evidence in the survey literature consistent with the claim that respondents sometimes satisfice instead of optimize. First, when asked to report events that occured in the past, such as how often they visited a doctor during the last year, people tend to underreport the number of events (Cannell et al., 1981). Second, when offered the opportunity to say "don't know" in response to closed-ended attitude questions, respondents who would otherwise have reported an attitude sometimes select the opportunity to abstain (Schuman and Presser, 1981).[1] Third, if a "don't know" response option is not offered in such questions, some people select the first or last alternatives simply by virtue of their serial positions (Krosnick and Alwin, 1987; Schuman and Presser, 1981). And fourth, when confronted with agree/disagree or yes/no questions, many people acquiesce, regardless of item content (Schuman

and Presser, 1981).

These behaviors might reflect respondents' desires to conform to the expectations communicated by survey questions or to present themselves to interviewers in favorable ways, but they may also reflect satisficing, an interpretation supported by evidence that some of them occur most frequently among respondents who lack either motivation (Cannell et al., 1981; Schuman and Presser, 1981, p. 143) and/or cognitive skills (Krosnick and Alwin, 1987; Lenski and Leggett, 1960; Schuman and Presser, 1981, p. 139, 223; Sudman and Bradburn, 1974, p. 105-106).

IMPLICATIONS FOR SUBSTANTIVE CONCLUSIONS

Most survey researchers are probably aware of the possibility of satisficing and sometimes incorporate procedures during data collection to increase motivation or to decrease the cognitive costs of optimizing (e.g., Miller and Cannell, 1982). However, there is little evidence that researchers consider satisficing behavior to distort the substantive conclusions they draw from correlational analyses of survey data. Studies controlling for the impact of satisficing in their analyses are rare, presumably because most investigators assume that satisficing itself is rare, that at most it adds a slight amount of random error or systematic bias to responses, and that substantive conclusions based on correlations between items would likely remain unaltered if the impact of satisficing were eliminated.

Challenging these assumptions, Schuman and Presser (1981, p. 128-137) described a case in which substantive conclusions were radically different depending upon whether satisficers were included in the analyzed sample or not. They examined opinions about whether Russian leaders were genuinely interested in getting along with the U.S. and

about whether Arab nations were trying to work for a real peace with Israel. The relation between responses to these two items was very strong when respondents were not offered the opportunity to say that they had no opinions on the issues. If an individual said one country was interested in genuine peace, he or she was likely to say the other country was as well. However, when respondents were explicitly asked if they had an opinion on each issue and those who said "no" were removed from the sample, the relation between responses to the two items dropped to zero. Thus, the conclusions one would reach about the relation between these attitudes differed substantially depending upon whether a "don't know" filter was included in the question. It is difficult to be sure which conclusion is correct, since either saying "don't know" on the filtered form of the question or offering an opinion on the unfiltered form could be satisficing. It is clear, though, that satisficing had a strong impact on the correlations in this case.

The Research Problem

In this paper we offer further evidence regarding the prevalence of satisficing, the conditions that exaggerate it, and its impact on substantive conclusions of correlational research. Our focus is on survey questions that ask respondents to rate a series of objects on a single response scale. In this context, people are likely to satisfice by selecting an anchoring point on the scale and rating all objects there instead of by striving to differentiate among them. For example, if respondents are asked to indicate how often they perform a series of activities by saying "often," "sometimes," "rarely," or "never" for each activity, a satisficing respondent might say "sometimes" for all of them (see, e.g., Berg and Rapaport, 1954). If this is so, correlations be-

tween ratings of different objects on the same scale would be made more positive by correlated response bias (Alwin and Krosnick, 1985). Unfortunately, it is much more difficult to predict the effect of satisficing on correlations between ratings on the scale and variables measured on other scales. If satisficing respondents choose their anchoring point purely randomly, these correlations will be weakened. If, instead, these respondents choose their anchoring point systematically, these correlations could be either unaffected, increased, or decreased, depending upon the algebraic sign of the *true correlations* and the relation between satisficing respondents' true scores and the answers they give.

The study reported below explores the prevalence and consequences of satisficing using a measure of parental values for child qualities included in the 1980 General Social Survey. This measure asks respondents to rate thirteen personal qualities in terms of how important it is for children to possess each, as "extremely important," "very important," "fairly important," "not too important," or "not at all important." Because all of the qualities are highly desirable, we expected that satisficing respondents would simply rate them all as equally and maximally desirable, while optimizing respondents would strive to differentiate between the qualities in terms of their importance ratings.

Many researchers who have studied values have measured them by asking respondents to rank-order a series of objects. They justified this practice by arguing that values inherently involve difficult choices between attractive alternatives and that rankings appropriately force respondents to make such choices (e.g., Kohn, 1977, p. 19; Rokeach, 1973, p. 6). If offered a rating measure, these researchers would

argue, most respondents will take the easy way out by rating all the value objects as equally and highly desirable, thus providing no information about their values. This reasoning is consistent with our hypothesis about satisficing.

THE MEASUREMENT OF SATISFICING

We lack a clearcut approach to determining whether a respondent is satisficing, inasmuch as it is very difficult to obtain measures of cognitive and motivational demands that a question makes of each respondent. We settle therefore for a somewhat cruder approach to assessing the extent to which respondents satisfice. We assume, given a constant stimulus, that respondent burden increases with the motivational and cognitive demands made of a respondent by the task. We assume that as these demands increase, a respondent will expend less effort, and his or her ratings will exhibit less overall variation. Variation in individual responses is due partly to true variability in preferences, but we assume that it is also due partly to the willingness to expend effort when performing the rating task.

On the basis of this reasoning, we constructed two measures of satisficing. First, we computed each respondent's average rating across the set of rating scales. This indicator seems valid, given the assumption that the satisficing respondent will tend to rate all the child qualities as highly important. Second, we computed the variance of each respondent's ratings of the thirteen qualities. Respondents with large variances evidence greater discrimination among the child qualities and therefore seem less likely to be satisficing than respondents with relatively small variances.

Given these operationalizations of satisficing, we assess how

prevalent satisficing was in response to the parental values measure and whether it was more prevalent among individuals with relatively little cognitive sophistication and among individuals for whom parenting is not salient or important. Finally, we examined whether removing satisficing respondents from the analyzed sample affects the substantive implications of correlations among ratings of child qualities and between child qualities and educational attainment, the principal determinant of parental values (Alwin, 1984, 1987).

Sample and Measures

As a part of the 1980 General Social Survey, the National Opinion Research Center conducted face-to-face interviews with a representative national sample of 1468 non-institutionalized American adults (Alwin and Krosnick, 1985). One-third of the respondents in that survey (chosen randomly) were asked the following question on desired child qualities adapted from the work of Kohn (1969):

> Please look at the qualities listed on this card. All of the qualities may be desirable for a child to have, but could you tell me whether the quality is extremely important, very important, fairly important, not too important, or not important at all?

The child qualities listed on the card were:

(1) good manners
(2) tries hard to succeed
(3) honest
(4) neat and clean
(5) good sense and sound judgment
(6) self-control
(9) acts like a boy (she acts like a girl)
(8) gets along well with other children
(9) obeys his parents
(10) responsible
(11) considerate of others
(12) interested in how and why things happen
(13) a good student

For the analyses reported below, the ratings of each quality were coded

as follows: 5=extremely important, 4=very important, 3=fairly important, 2=not too important, and 1=not important at all.

Results

THE EXTENT AND CORRELATES OF SATISFICING

There is substantial variability among respondents in terms of the degree to which respondents differentiated among the child qualities. Shown in Table 1 are the proportions of respondents at various levels of differentiation among the child qualities. Almost ten percent of respondents rated all 13 qualities equally. An additional 10.9% rated all but one or two of the qualities equally. Only 57.9% of respondents rated fewer than nine qualities equally. This indicates that a relatively large proportion of respondents evidenced little differentiation among their ratings of the child qualities.

Non-differentiation was more likely to occur among respondents with fewer cognitive skills. In order to estimate each respondent's level of differentiation, we computed the variance of his or her ratings of the 13 child qualities; the larger this variance, the more the respondent differentiated among the various qualities. As expected, rating variance was positively correlated with education ($r=.25$, $p<.01$, $n=466$), which suggests that highly educated respondents differentiate more. The correlation between education and respondents' average rating is negative ($r=-.16$, $p<.01$, $n=466$), which indicates that most ratings by less educated respondents are near the top of the importance scale, whereas ratings by more educated respondents are spread more evenly across the scale range. As Table 2 shows, the relationships between education on the one hand and the mean and variance of ratings on the other are monotonic.

Greater salience or importance of a topic does not appear to be associated with reduced satisficing. We measured the salience of parental values via parental status; parenting is undoubtedly more salient and important to respondents who have children of their own than for those who do not. Contrary to our expectations, the correlations between the mean and variance of ratings and parental status (coded 1 for non-parents and 2 for parents) are -.06 and -.07 (n=468, n.s.), respectively. Thus, parents did not differentiate more among the child qualities than did non-parents, which suggests that topic salience or importance might not regulate satisficing.[2]

ARE SUBSTANTIVE CONCLUSIONS ALTERED BY REMOVING SATISFICERS?

A great deal of research has examined the structure of parents' values for child qualities using ranking measures of values. This work indicates that parents are arrayed along a continuum, with those who value conformity a great deal more than self-direction at one end and those who value self-direction much more than conformity at the other. Less-educated parents tend to emphasize conformity more than autonomy, and more highly-educated parents tend to stress qualities associated with self-direction (Kohn, 1969; Kohn et al., 1983; Alwin, 1984, 1987).

Using the rating measure of parental values described above, Alwin and Krosnick (1985) found instead that latent values for self-direction and conformity were not strongly negatively correlated but were instead only weakly negatively correlated. Furthermore, parental education was negatively correlated with conformity values as expected, but surprisingly, education and self-direction values were uncorrelated. These findings raise questions as to whether ranking-based evidence for a latent value dimension contrasting self-direction and conformity might

be an artifactual result of the measurement method used and whether values for self-direction might actually be unrelated to parental education.

It is also possible, though, that the rating results are distorted by satisficing. We argued above that satisficing in the context of ratings leads to an increase in the positivity or a decrease in the negativity of correlations between two ratings using the same response scale. Thus, satisficing could have reduced the apparent size of the negative correlation between the self-direction and conformity factors. Furthermore, satisficing could have suppressed the correlation between the self-direction factor and parental education. According to ranking-based research on parental values, respondents with little education value self-direction less than respondents with a great deal of education. Thus, the former respondents would be expected to rate qualities reflecting self-direction lower than the latter would. However, less educated respondents are also especially likely to satisfice, which would lead them to rate qualities reflecting self-direction highly. Thus, satisficing might have obscured the difference between respondents high and low in education in terms of their ratings of self-direction related qualities, which would reduce the correlation between education and the self-direction factor. Since less educated respondents would be expected to rate conformity-related qualities highly, satisficing would only reinforce that tendency and thus would not be expected to depress a correlation between measures of conformity values and parental education.

To assess the validity of these speculations, we first explored the impact of removing non-differentiating respondents from the sample on

the results of a confirmatory factor analysis of the child quality ratings. Previous analysis of these rating data (Alwin and Krosnick, 1985) indicated that they are well-described by a three-factor model. The child qualities indicative of self-direction load on one factor, the qualities reflecting conformity load on a second factor, and all items load equally on a general method factor, hypothesized to be uncorrelated with the self-direction and conformity factors (for details of the factor model's specification, see Alwin and Krosnick, 1985). Because we found previously (e.g., Alwin, 1984; Krosnick and Alwin, 1987) that parental educational attainment is a powerful determinant of parental values, the model included the effect of education on the two latent value factors and on the method factor. The parameters of this structural equation model were estimated for the full sample of respondents, a subset of respondents that did not include people who rated all qualities equally, and subsets progressively eliminating respondents at higher and higher levels of differentiation.

Removing non-differentiators increased the resemblance of the rating and ranking results dramatically. As the figures in column one of Table 3 show, the association between self-direction and conformity values is only slightly negative in the full sample (r=-.12), but the more non-differentiators are removed, the more negative the correlation becomes, up to a maximum of -.47. Thus, non-differentiation suppressed the degree to which the observed results resemble those produced by ranking data regarding the correlation between latent self-direction and conformity values.

Also consistent with our expectations, the linkages between education and the latent values become increasingly strong as non-

differentiators are eliminated from the sample (see the second and third columns of Table 3). Although the effect of education on conformity values is positive and substantial for the full sample (β=.48) and shows little sign of increase as non-differentiators are removed, the effect of education on self-direction values is relatively small for the full sample (β=-.15) and increases steadily to a maximum of -.35. Thus, as non-differentiators are removed, the difference between highly educated and less educated respondents in terms of their values for self-direction becomes increasingly large. Removing non-differentiators from the sample also increases the association between education and the method factor (see column 4 of Table 3). Although the method factor is unrelated to education in the full sample (β=.01), these variables become more strongly related as non-differentiators are removed from the sample, up to a maximum of .33. Among differentiators, highly educated respondents tend to anchor their ratings lower on the rating scale than do less educated respondents.[3]

Table 4 displays statistics assessing the goodness-of-fit of the factor model to the data for each sub-sample. A ratio of χ^2 to its degrees freedom of less than 2.5 indicates a good fit; Δ ranges from zero to one, with values above .8 indicating good fit (Bentler and Bonett, 1980). According to the ratio of χ^2 to degrees of freedom, the fit of the model is adequate for the full sample and becomes increasingly better as non-differentiators are removed from the sample. However, because χ^2 is directly proportional to sample size, some of this apparent improvement in fit is due to the reduction in the size of the analyzed sample as non-differentiators are removed. According to Δ, which is not affected so directly by sample size, the model fits the

full sample best and fits increasingly less well as non-differentiators are removed. We have no ready explanation for this pattern but are satisfied that the model's fit is adequate.

Discussion

The fact that respondents vary in the extent to which they are cognitively and motivationally prepared to work on difficult survey tasks makes it difficult to interpret response variability among persons. Even with task difficulty "held constant," respondents differ in the extent to which they discriminate among posed alternatives. We assume that the cognitive burden of a task is directly proportional to the amount of satisficing produced. It obviously could be due to other things as well, such as true variability in preferences, but we can only speculate about their relative influences.

We began this paper by arguing that many survey questions make substantial cognitive and motivational demands from respondents, some of whom may not expend the effort necessary to generate optimal answers. The measure of parental values used here is one example of a demanding set of questions; our own experiences administering them revealed that respondents have a great deal of difficulty choosing which personal qualities are most important for children to have. The results reported here suggest that many respondents may cope with this situation by satisficing, rating all the qualities highly and equally desirable. Consistent with the claim that satisficing is most common among respondents for whom the cognitive and motivational costs of optimizing are high, we found that respondents with relatively little formal education were most likely to exhibit this response pattern.

Satisficing seems to have distorted the results of correlational

analysis of rating measures of parental values. According to many analyses of rankings, values for self-direction are strongly negatively correlated with values for conformity, and measures of parental education are positively associated with self-direction values and negatively associated with conformity values (e.g., Alwin, 1984, 1987; Alwin and Krosnick, 1985; Krosnick and Alwin, 1987; Kohn, 1969). In contrast, rating data reveal only a slight negative correlation between self-direction and conformity values and only a slight negative correlation between education and self-direction values (Alwin and Krosnick, 1985). When satisficers are removed from the analyzed sample, though, the correlation between self-direction and conformity values becomes strongly negative, as does the effect of education on self-direction values. This evidence is consistent with the general claim that satisficing increases the positivity of correlations between ratings made on the same response scale and may either increase, decrease, or leave unaltered correlations between ratings and variables measured in other ways.

The cognitive costs of optimizing should be greater for people who rarely think about a topic, and those individuals should be less motivated to think carefully about a relevant survey question. We therefore expected that parents would show less evidence of satisficing when rating child qualities than would non-parents. This prediction was not confirmed. It may be that parental status is not a sufficiently precise measure of the salience and importance of parental values and that a better measure would have generated results consistent with our expectations. It may also be that topic salience is not an important determinant of satisficing. Finally, it may be that satisficing among people for whom parenting is not salient is cancelled out by a tendency

for individuals who are ego-involved in parenting to use fewer evaluative categories when rating relevant stimuli (see, e.g., Sherif, Sherif, and Nebergall, 1965). If this is so, people for whom parenting is moderately salient should evidence the greatest differentiation among child qualities. Unfortunately, these data do not permit resolution of this issue.

According to the results of analyses using a rating measure of parental values, relations among values and between values and other variables appear inconsistent with well-established theory and with evidence based on other measurement methods. The present investigation suggests that this may be so because the rating method is highly susceptible to the influence of satisficing and because satisficing is relatively frequent. One might therefore be tempted to conclude that, despite the relative ease with which ratings can be administered and analyzed relative to rankings (see Alwin and Krosnick, 1985), rankings may be the more appropriate method for measuring values, since the answers people offer to ranking questions seem to reflect meaningful preferences that rating measures do not detect. One should bear in mind that rankings are also subject to satisficing, though its impact on substantive conclusions appears to be less serious (Krosnick and Alwin, 1987). Therefore, steps should be taken to minimize its effects when one uses those measures.

From a more general perspective, our results suggest that satisficing may be a common phenomenon in surveys and that it may sometimes have dramatic impact on the substantive conclusions one would reach through correlational analysis. Unfortunately, though, the nature of this impact is likely to depend upon the particular question form and content

involved. It is therefore difficult to anticipate the effect of satisficing on any particular analysis. This suggests that researchers should always implement procedures during survey data collection to reduce the likelihood of satisficing just as we implement procedures to reduce other sorts of random and systematic error. This could be accomplished by including instructions before difficult questions encouraging respondents to concentrate especially carefully when answering them. Assuming that satisficing is most likely to occur when the cognitive and motivational costs of optimizing are high, questionnaire designers should also aim to minimize the difficulty of the questions they pose to respondents. Question difficulty has usually been assessed rather informally during pretests, but it may be appropriate at this point to develop more formal procedures, such as measuring the amount of time it takes respondents to answer a question or assessing the degree of concentration respondents seem to expend when generating an answer, on the basis of either interviewer assessment or respondent reports. Questions that seem to demand a lot of effort should be revised, eliminated, or at least treated with caution when analyzed.

Footnotes

1. For some respondents, offering an opinion on the unfiltered form may reflect satisficing, whereas for others, saying "Don't know" on the filtered form may reflect satisficing.

2. The variance of ratings is maximized when half the child qualities are rated at the top of the scale and the other half are rated at the bottom of the scale. Such a configuration is certainly not what we think of as refined differentiation. Linville, Salovey, and Fischer (1986) argue that it is therefore better to assess differentiation among child quality ratings using p_d, the probability of differentiation, which is defined as $1 - \Sigma p_i^2$, where p_i is the percent of the thirteen child qualities rated at each scale point on the rating scale, and i ranges from 1 to 5 since there are five scale points. Larger scores indicate more differentiation, and larger scores result from use of more scale points and from more equal distribution of qualities across scale points. p_d is associated with education as expected ($r=.27$, $n=466$, $p<.01$), such that higher education is associated with a higher probability of differentiation. Surprisingly, it is also related to parental status, but <u>negatively</u> ($r=-.14$, $n=468$, $p<.01$), even after controlling for education. p_d is .43 for parents and .48 for non-parents. We interpret this result to be further evidence that parents do not satisfice less than non-parents.

3. A plausible alternative explanation for the increase in associations between factors as non-differentiators are removed argues that their removal might have increased the variances in the latent value factors, which could artificially increase the magnitude of standardized measures of association (Duncan, 1975). We examined the variances of the latent value factors and of education in the various subsamples and found that they did not change as the sample was made smaller and smaller, thus discounting this explanation.

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Table 1
1980 General Social Survey:
Proportion of Respondents at Various Levels of Non-Differentiation

Level of Non-Differentiation	Percent of Respondents
All rated the same	9.8%
All but one rated the same	5.6%
All but two rated the same	5.3%
All but three rated the same	9.0%
All but four rated the same	12.4%
Other	57.9%
Total	100.0%
N	468

Table 2
1980 General Social Survey:
The Relationship of Education to the Mean and
Variance of Child Quality Ratings

Education	Rating Variance	Rating Mean	N
Less Than High School	.32	4.21	134
High School Graduate	.39	4.14	165
Some College	.50	4.01	87
College Graduate	.63	4.00	80

Table 3
1980 General Social Survey:
Associations Among Self-Direction Values,
Conformity Values, and Education

Sample	Correlation Between Self-Direction and Conformity Values	Effect of Education on: Conformity Values	Effect of Education on: Self-Direction Values	Effect of Education on: Response Bias
Full	-.121	.480	-.146	.013
Dropping all equal	-.123	.483	-.221	.006
Dropping all but 1 equal	-.229	.502	-.228	-.012
Dropping all but 2 equal	-.270	.490	-.267	.040
Dropping all but 3 equal	-.349	.493	-.277	.029
Dropping all but 4 equal	-.429	.485	-.305	.131
Dropping all but 5 equal	-.468	.501	-.351	.330

Table 4
1980 General Social Survey:
Measures of Goodness-of-Fit of the Three-Factor Model for Various Sub-Samples

Sample	Δ	χ^2/df
Full	.92	2.23
Dropping all equal	.87	2.00
Dropping all but 1 equal	.85	1.96
Dropping all but 2 equal	.84	1.94
Dropping all but 3 equal	.82	1.92
Dropping all but 4 equal	.81	1.65
Dropping all but 5 equal	.77	1.53