

Nonseparable Preferences and Over-Time Instability in Survey Responses

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Abstract

The conventional wisdom in political science holds that most people lack real opinions on political issues. The most enduring evidence for this claim is the low correlation in individuals' issue positions over time as measured by public opinion surveys. Reanalysis of this evidence shows that less than ten percent of respondents change their issue positions significantly over time in panel surveys from the 1950s through the 2000s. Large changes in responses by a small percentage of respondents produce the overall low correlations in responses used by researchers since Converse (1964) to claim that most people lack meaningful political attitudes or that survey responses display large amounts of random error. If respondents' preferences are defined over sets of issues, and if some respondents have nonseparable preferences across these issues, then survey responses will change over time even if underlying opinions do not. Panel surveys reveal that much of the US public has nonseparable preferences on several issues. People with nonseparable preferences display greater response instability over time than people with separable preferences, controlling for political information and issue importance.

1 Introduction

The average citizen lacks well-formed opinions on most political issues, according to the conventional wisdom among political scientists and psychologists,. In the most widely-cited study supporting this *minimalist view*¹ of public opinion, Converse concluded that “large portions of an electorate simply do not have meaningful beliefs, even on issues that have formed the basis for intense political controversy among elites for substantial periods of time” (1964:245).

The most enduring and important evidence supporting this claim is that individuals’ responses to issue questions in surveys vary over time (Converse 1964, Zaller 1992). Converse observed low over-time correlations in individuals’ issue opinions in a 1956-1960 panel study, leading him to conclude that most people lack real opinions. Several rebuttals to Converse argue that over-time change in responses is due to measurement error in survey questions rather than to instability in opinions (Achen 1975, Erikson 1979, Judd and Milburn 1980, Ansolabehere, Rodden, and Snyder 2010).

This paper shows that evidence of response instability and the extent of measurement error in surveys are both overstated. Most survey respondents change their opinions very little over time. Regardless of whether a panel survey extends across two years or two months, about 5 to 10 percent of respondents change their responses significantly. But these 5 to 10 percent of respondents account for most of the total variance in responses and produce low over-time correlations, creating the appearance of less stability in opinions than there really is. To put it more sharply, 5 to 10 percent of the American public has been responsible for the conclusion that most people lack well-formed opinions. Converse’s challenge that people lack meaningful attitudes drew a rebuttal from several sources (Achen 1975, Erikson 1979, Judd and Milburn 1980, Ansolabehere, Rodden, and Snyder 2010). All of these rebuttals are based on the idea that survey questions involve measurement error, and measurement error produces response instability. Achen

¹As it has been called by Sniderman, Brody and Tetlock, 1991.

What explains changes in opinion over time? This paper offers a theory of over-time instability in survey responses based on the idea that people have nonseparable preferences across multiple issues. A person's preferences are nonseparable when her opinion on one issue depends on the outcome of another issue. Changes in government policy on issues – either real or anticipated – compel people who have nonseparable preferences to change their survey responses on other issues, even though their underlying set of preferences remain constant.

Data from two panel surveys reveal that nonseparable preferences are common and explain temporal changes in survey responses. Samples of US residents answered questions to detect whether their preferences on important policy issues depend on the outcome of related issues. The surveys reveal that a large segment of the population has nonseparable preferences across a variety of issues. In both panels, the people who are most likely to change their survey responses over time have nonseparable preferences across the issues. Therefore, over-time instability in survey responses does not indicate that people lack fixed or well-formed preferences. On the contrary, well-formed and coherent preferences may create response instability when people view issues as interrelated.

Section two of the paper describes the debate over response instability. Using data from the 1990-1992 American National Election Studies panel, a 1998 Ohio panel survey, and a 2004 US panel, and a 2012 US panel, I show that most people have stable survey responses, but the few who vacillate wildly lead to low over-time correlations. Section three defines nonseparable preferences and develops a theory of response instability based on nonseparable preferences. Section four tests the model of response instability, showing that nonseparable preferences, not respondent information or sophistication, explains over-time changes in responses. Section five concludes.

2 The Puzzle of Over-Time Instability in Survey Responses

The literature on public opinion presumes that if people have well-formed preferences, their responses to survey questions should not change over time. Converse (1964) uncovered significant over-time instability in responses to a panel study that presented a sample of Americans the same set of issue questions in 1956, 1958, and 1960. He found that the correlation (τ - β) between individuals' positions on important policy issues in 1956 and in 1960 was quite low. The highest correlation on all issues was slightly less than 0.5. The correlation on most issues fell in the range of 0.3 to 0.4. While the public was seemingly fickle in its issue positions, partisanship remained fairly stable, exhibiting an over-time correlation slightly above 0.7.²

Achen (1975) demonstrates that measurement error produced by the survey questions can explain over-time changes in individuals' responses. Empirically, Achen shows that almost nothing about respondents — attention to politics, education, partisan and ideological dispositions — explains changes in their responses over-time. Achen's dependent variable is the variance in individuals' responses to any survey question asked in identical form over three survey waves. No independent variables explain this variance, leaving Achen to conclude that it is random error.

Zaller (1992) dismisses the measurement error thesis:

When, as all estimates agree, *measurement error typically constitutes one-half or more of the variance of typical attitude items*, one naturally wonders what exactly this 'error' consists of and how it has been generated. Yet we presently know so little about these questions that the term remains essentially an alternative name for 'unexplained variance.' (1992:582)

Zaller (1992) and Zaller and Feldman (1992) explain over-time instability by arguing that most people do not have well-formed political preferences. Instead, "Most people possess opposing

²Krosnick and Berent (1993) demonstrate that the difference in over-time correlations between party identification and issues is due largely to differences in the survey instruments.

considerations on most issues, that is, considerations that might lead them to decide the issue either way” (Zaller and Feldman 1992:585), and “which of these considerations is available at the top of the head at the moment of confronting survey questions determines responses to the questions” (Zaller 1992:39).

To Zaller and Feldman, opposing considerations are a form of ambivalence, implying that people have difficulty making up their minds about important political issues. While Zaller is careful not to adopt Converse’s conclusion that large segments of the public lack “meaningful attitudes,” he does conclude that “...individuals do not typically possess ‘true attitudes’ on issues, as conventional theorizing assumes, but a series of partially separable and often inconsistent ones” (1992:93). The notion that attitudes are partially separable seems to presume, as Converse argued, that the public is usually not aware of the trade-offs or linkages across issues.

A respondent’s political awareness — or access to considerations on an issue — is measured by Zaller and others as the respondent’s level of factual information about politics. The theories of response instability due to Zaller and Converse imply that respondents who score low on political information should exhibit the greatest over-time instability in responses; respondents who score high on political information, the least.³

The debate about whether response instability is due to lack of clear opinions or to measurement error is far from settled. Hill and Kriesi (2001) conclude that Converse’s and Zaller’s interpretation of response instability correctly indicates that people lack well formed opinions. Hill and Kriesi analyze a two-year panel survey in Switzerland on reducing automobile pollution. They show

³Other parts of Zaller’s work imply a curvilinear relationship between a person’s level of information and her probability of being persuaded by political campaigns, advertisements, or the media. People who are low in political information are most likely change their opinions due to the influence of campaigns and the media, but they are the least likely to be exposed to campaigns or the media. People who have high levels of political information are least likely to change their opinions, but they are the most likely to pay attention to campaigns and the media. The probability of opinion change is increasing in media exposure and decreasing in political awareness. In the analysis that follows, I measure the effects of media exposure and political awareness on opinion change separately since indicators of both are available in the surveys. However, the results do not change if political awareness (information) is measured by a series of dummy variables or by adding information-squared to capture a nonlinear effect of information on response change.

that only 37% to 58% of respondents have stable opinions on the issues. Their survey questions, however, ask respondents whether they are strongly or rather against (or in favor) of different policy measures and do not allow a mid-point response. Therefore, the questions do not measure issue positions as much as strength of attitudes, which can vary even when issue positions do not.

Ansolabehere, Rodden, and Snyder (2010) conclude that the measurement error thesis is correct and that most people have stable attitudes. Using data from the ANES, they factor-analyze multiple issue questions to create composite issue scales that exhibit greater over-time stability in responses than the individual survey items. Yet they conclude that half of the variance in responses to issue questions is due to measurement error. This brings us back to Zaller's question about what measurement error is and why it is such a large component of survey responses, perhaps even larger than the systematic component of people's opinions.

Defining the dependent variable in a study of response instability is a critical first step. Following Achen's (1975) lead, many researchers operationalize response instability as the variance in an individual's responses between two points in time. Since response variance is the square of the number of points on a scale a respondent moves with her responses, the dependent variable produces large values for the small number of respondents who change from one side of an issue to the other.

Despite large overall variance in responses, most respondents do not change their responses across survey waves. For instance, the 1990-1992 American National Election Studies panel included questions about government services, defense spending, government jobs, and aid to blacks. On each of these issues, roughly 30 percent of respondents maintained the same response between the two waves, another 35 to 40 percent changed only one position on a seven-point scale, and another twenty percent changed only two positions. Less than five percent of the sample changed positions by four or more response categories, and less than 15 percent changed by three or more categories. Yet the 15 percent of respondents on each issue who changed responses by three or more categories account for 70 percent of the total over-time variation in responses. On the abor-

tion issue, with four categories of response, only ten percent of the sample changed positions by two or more response categories; 64 percent of the sample offered the same response two years apart.

Table ?? shows the extent of change in responses to the five issues included on both waves of the 1990-92 panel. About one third of respondents do not change their responses between the two waves; of those who do change, most do so by one or two units on the seven point scales, except for abortion, which was measured on a four-point scale.

[Table ?? about here]

A similar pattern emerges even in much shorter panels. In a 1998 survey, 443 residents of Ohio were surveyed from October 1 to 12, and 305 were reinterviewed between November 7 and December 6.⁴ The October study included questions about four issues: taxes, education, welfare spending, and abortion. The post-election survey asked about three of these, omitting the abortion question. (See Appendix for question wording).

Of the respondents who change their responses in the one or two months between survey waves, most change only one or two units on the seven-point scales. A very few change by three or more units. But, the few who change by three or more units account for 46 percent of the total variance in responses on taxes, 45 percent on education, and 54 percent on welfare spending. Less than ten percent of the sample accounts for nearly half of the variation in responses. This pattern is similar to the extent of response changes in long-panel studies such as the 1990-1992 ANES panel. Table ?? shows the percentage of respondents on each issue in the Ohio panel survey who change their responses by the number of scale points in the first column.

[Table ?? about here]

⁴The Center for Survey Research at Ohio State University conducted both surveys. The response rate (AAPOR 3) for the October, 1998, wave was 42 percent with a completion rate of 53 percent. In the October survey, 405 respondents agreed to be reinterviewed in December. The response rate to the December wave of the panel was 81 percent, with a completion rate of 89 percent.

A similar pattern appears in a 2004, 3-wave panel, with differences in responses from the April wave to November, post-election wave. A random sample of the Knowledge Networks panel was chosen to participate in a three-wave survey, with Wave 1 conducted April 27-May 31 (N=1308); Wave 2, September 17-October 7 (N=947); and Wave 3, November 19-December 3, 2004 (N=717).⁵ The post-election study included questions about 14 issues, six of which were presented on seven-point scales. Even in the midst of a presidential campaign with a barrage of debates, campaign ads, and news coverage, about half of respondents did not change their responses at all in the survey, and less than seven percent changed by 3 or more responses on the seven-point scales across any issue.

[Table ?? about here]

In a three-wave panel of the sort Achen (1975) analyzed, the small percentage of people who flip from one side of an issue to the opposite side and back again account for most of the variance. If these respondents are offering truly random, flippant, or intentionally misleading responses, it is little wonder that Achen finds that nothing explains their behavior. The more interesting changes in responses are the larger number of respondents who change only a few points on a scale. These are the respondents our theories of response instability really seek to explain, yet their voices are drowned out by the small number of large changers. Large changes in response are probably stochastic and unexplainable, due perhaps to intentionally misleading or inattentive respondents. Any independent variables included in a model must "work" hard to explain these large changes. Achen was right to call it measurement error. But this error accounts for as much as half of the over-time variance in responses only because it is large error for a few people, not because it is error for a large number of people. Most of the evidence that people lack meaningful attitudes or have conflicting considerations on issues, and most of the assessments of measurement error in

⁵Completion rates were 76 percent in Wave 1, 85 percent in Wave 2, and 77 percent in Wave 3.

surveys, are driven by the wildly fluctuating responses of less than 10 percent of any panel survey, be it a two-month panel or a two-year panel.

3 A Theory of Response Change Based on Nonseparable Preferences

Explanations for response instability fall into two general categories: inconsistent attitudes and measurement error. The inconsistent attitudes explanation points to the conclusion that people lack well-formed preferences. If true, the enterprise of measuring public opinion via surveys is pointless. The measurement error explanation lacks a theoretical or substantive account for the sources of measurement error. I offer a theory that bridges this divide by describing a source of measurement error and also explaining how people may have well-formed preferences on sets of issues but unstable induced preferences on any single issue. The theory is based on nonseparable preferences.

A person has nonseparable preferences for two or more issues when her preference on one issue depends on the outcome of another issue. A person's preferences are separable if her preferences on each issue do not depend on the outcome on other issues.

Preferences on any pair of issues may be separable, partially nonseparable, or completely nonseparable. To illustrate the different types of preferences, suppose that a person has a preference ranking for the outcome of two issues, each of which has a binary, $\{0, 1\}$, outcome. One possible preference ranking over the outcomes of the pair of issues is $(1, 1) \succ (1, 0) \succ (0, 1) \succ (0, 0)$. This ranking is separable. When the outcome on the first issue is 1, then $1 \succ 0$ on the second issue. When the outcome on the first issue is 0, then it is still the case that $1 \succ 0$ on the second. Similarly, the person's preference on the first issue is unchanged by the outcome on the second issue.⁶

⁶A quick check of whether a person's preferences are separable is the *inverse rule*: For two issues, a person's preferences are separable if and only if her most preferred outcome is the inverse of her least preferred outcome. For

An example of a partially nonseparable preference ranking is $(1, 1) \succ (1, 0) \succ (0, 0) \succ (0, 1)$. If the outcome on the first issue in the pair is 1, then $1 \succ 0$ on the second issue in the pair. But if the outcome on the first issue is 0, then $0 \succ 1$ on the second issue. The person's preference for the outcome of the second issue depends on the outcome of the first issue. However, her preference on the first issue does not depend on the outcome of the second issue: regardless of whether the outcome on the second issue is 1 or 0, the person always prefers 1 to 0 on the first issue.

A completely nonseparable preference ranking is $(1, 1) \succ (0, 0) \succ (1, 0) \succ (0, 1)$. In this case, the person's preference for the outcome of either issue changes depending on the outcome on the other issue.

The key to understanding nonseparable preferences is that an individual may have a fixed preference ranking defined not over each issue, but over sets of issues. A person's preference on the outcome of any single issue depends on the outcome of — or her beliefs about the outcome of — the other issues in the set. Although the previous example presumes only two issues that may be nonseparable, a person's preference ranking may be defined over large numbers of issues.

Nonseparable preferences can explain over-time instability in survey responses. Suppose that a respondent has a fixed preference ordering over outcomes on multiple issues. If the individual's preferences are separable for all issues, then a change in the status quo on any issue will not affect her preference on any other issue. Her survey responses will remain stable over time unless she receives new information about the policy's effects that changes her *induced preference* on the issue.

Now consider someone who has preferences on an issue that depend on the outcome of another issue. Any change in the status quo on the second issue will change her induced preference and survey response on the first issue. Furthermore, any new information that changes the respondent's induced preference on the second issue will cause her to change her response on the first

more than two issues, the inverse rule is a necessary but not sufficient condition for separable preferences. For two issues with two outcomes each, all separable preference orderings are also lexicographic. For more than two issues, lexicographic preferences are a subset of the separable preference orderings.

issue. Changes in survey responses are reactions to a changing world. In a changing world, survey responses will change as well, though changes in survey responses do not necessarily reveal changes in preferences. Even if a person who has nonseparable preferences appears to change her preference on any issue, her preference ordering over outcomes on all issues remains fixed. The accumulated evidence of over-time response instability does not necessarily imply that people are changing their preferences since all studies of response instability to date assume individuals have separable preferences on all issues, which cannot be true given the evidence that follows.

In the statistical model, a change in an individual's survey response between two points in time, indexed by the subscript t with values 1 and 2, can be expressed:

$$|\Delta R_j| = |\Delta S_k| * Nonseparable_{jk} + |e_{j,1} - e_{j,2}| \quad |e_{j,1} - e_{j,2}| \sim N(0, \sigma^2) \quad (1)$$

where $|\Delta R_j|$ is the absolute value of the change in a person's response on a question about issue j , $|\Delta S_k|$ is the absolute value of a change in a person's perception of the status quo on issue k , $Nonseparable_{jk}$ is a measure of whether a person's preferences on issue j are nonseparable from issue k , and $e_{j,t}$ is the measurement error due to question j , indexed by time t . The measurement error on each question is due to a random draw from a normally-distributed error term with mean 0 and variance σ_e^2 . In expectations, this error will be 0. All changes in responses between surveys due to measurement error will be random.

Changes in responses can occur if a person has nonseparable preferences and perceives a change in the status quo on a related issue. If her preferences are separable between issues j and k , her response will not change on j even if she perceives a change in the status quo on k . If a person has separable preferences, then changes in her responses between time periods will be due to measurement error or to truly unstable preferences. Even if a person has nonseparable preferences, her response may not change between survey waves if the measurement error, $|e_{j,1} - e_{j,2}|$, negates the effect of nonseparable preferences: that is, if $(\Delta S_k)(Nonseparable_{jk}) = -|e_{j,1} - e_{j,2}|$.

4 Nonseparable Preferences and Response Instability: An Empirical Test

To test whether nonseparable preferences account for instability in survey responses, we turn to two of the only studies that have included questions to detect nonseparable preferences, a 1998 study of state politics in Ohio during a gubernatorial election and a 2004 national study during a presidential election.

4.1 Study 1

Data are from the 1998 October-December panel study of Ohio residents. Only six to eight weeks separated the interviews in the study. The six weeks between the survey waves encompassed important gubernatorial and legislative elections that many people expected to change the course of Ohio politics. Many voters could reasonably expect that the status quo on issues such as taxes, education spending, welfare spending, and abortion would change significantly as a group of new, conservative Republican legislators took control of both houses of the Ohio legislature, combined with a newly-elected Republican governor.

To measure nonseparable preferences, the following conditional questions appeared in the survey immediately following the standard questions (described in Appendix) for each issue.

[Taxes] If the state of Ohio significantly reduced the amount of money it spends on education, then would you want the state to increase property taxes, cut property taxes, or keep property taxes where they are now? Follow-up: Would you say increase (cut) a lot, somewhat, or a little? (N=401)

What if the state of Ohio significantly increased the amount of money it spends on education? (Prompt if needed: then would you want the state to increase property

taxes, cut property taxes, or keep property taxes where they are now? Follow-up: Would you say increase (cut) a lot, somewhat, or a little? (N=414)

[Education] If the state of Ohio significantly cut property taxes, then would you want the state to spend less money on education, more money on education, or continue spending the same as it does now? Follow-up: Would you say a lot less (more), somewhat less (more), or a little less (more)? (N=421)

What if the state of Ohio significantly increased property taxes? (Prompt if needed: then would you want the state to spend less money on education, more money on education, or continue spending the same as it does now?) Follow-up: Would you say a lot less (more), somewhat less (more), or a little less (more)? (N=411)

[Welfare] If the government outlawed all abortions, then would you want the amount of money the government provides for low-income women and their children to go down, go up, or remain at current levels? (N=385)

What if the government keeps abortion legal? (Prompt: then would you want the amount of money the government provides for low-income women and their children to go down, go up, or remain at current levels?) (N=379)

[Abortion] If the government significantly reduced the amount of money it provides for low-income women and their children, then would you think abortion should be outlawed, legal only in special cases, or legal in all circumstances? (asked only in October)

What if the government significantly increased the amount of money it provides for low-income women and their children? (Prompt: Then would you think abortion should be outlawed, legal only in special cases, or legal in all circumstances?) (asked only in October)

If a respondent offers a different answer to the two conditional follow-up questions on an issue, then her preference on that issue is nonseparable from the other issue in the pair. Due to time constraints in the survey, respondents were asked if their preference on an issue depends on only one other issue rather than on every other issue in the survey. Taxation was paired with education spending; welfare programs with abortion. It is possible that some respondents may have preferences on taxes that depend on welfare spending or abortion. Such preferences would alter the results that follow only by increasing the extent and impact of nonseparable preferences.

A crosstabulation of responses to the two conditional questions reveals which respondents have nonseparable preferences. For example, in a crosstab of responses to the two conditional questions on taxes, Table ??, responses along the diagonal indicate people whose preferences on taxes are the same regardless of the level of education spending. Responses off-diagonal indicate respondents who have nonseparable preferences: their preference for the level of taxes depends on the level of education spending.

[Table ?? about here]

Nonseparable preferences are further described by the direction in which a person's preference on an issue changes in response to changes on another issue. If a person wants taxes to increase (or decrease by less) if education spending increases, but she wants taxes to decrease if education spending increases, then her preferences are described as *positive nonseparable*. *Negative nonseparable preferences* are held by respondents who want taxes to increase if education spending decreases but want taxes to decrease if education spending increases.

4.2 Study 2

The 2004 panel survey conducted by Knowledge Networks recruited over 50,000 subjects nationwide to participate in surveys administered by WebTV. The computer format of the survey allows respondents to complete surveys at their leisure, and often results in more reliable and valid

responses than telephone interviews (Chang and Krosnick 2009). A random sample of the Knowledge Networks panel was chosen to participate in a three-wave survey, with Wave 1 conducted April 27-May 31 (N=1308); Wave 2, September 17-October 7 (N=947); and Wave 3, November 19-December 3, 2004 (N=717).⁷

The three waves of the panel included issue questions (see Appendix) as well as two different types of survey instruments to detect nonseparable preferences. The sample was split randomly into two groups. Group 1 answered four conditional questions to detect nonseparable preferences. Group 2 answered a ranking question. The questions for education spending and taxes appear below. To save space, we omit the similar questions for the other six pairs of issues: (1) foreign trade and social security, (2) terrorism and privacy, (3) immigration and universal health care, (4) defense spending and Medicare spending, (5) assault weapons ban and background checks for gun buyers, (6) same sex marriage and adoption by same sex partners.

4.2.1 Group 1: Conditional Questions

[Education spending condition on taxes] If the government increases people's income taxes to 25% more than they pay now, then would you want the amount of money the government spends on education to ...

7 point response scale from "go up a lot" to "go down a lot"

[Education spending conditional on taxes] If the government reduces people's income taxes to 25% less than they pay now, then would you want the amount of money the government spends on education to ...

7 point response scale from "go up a lot" to "go down a lot"

[Taxes conditional on education spending] If the government increases the amount of money it spends on education to 25% more than it spends now, then would you want

⁷Completion rates were 76 percent in Wave 1, 85 percent in Wave 2, and 77 percent in Wave 3.

the amount of money that people pay in taxes to ...

7 point response scale from “go up a lot” to “go down a lot”

[Taxes conditional on education spending] If the government reduces the amount of money it spends on education to 25% less than it spends now, then would want the amount of money that people pay in taxes to ...

7 point response scale from “go up a lot” to “go down a lot”

A person has nonseparable preferences if her answers to the two conditional questions on an issue differ, or are off-diagonal in the crosstab.

4.2.2 Group 2: Ranking

[Education-Taxes R] The list below contains four different policies the government could adopt. The list may not include the policy you most want. Please select from the list the policy you approve of most.

The government reduces taxes and spends more money on education

The government reduces taxes and spends less money on education

The government increases taxes and spends more money on education

The government increases taxes and spends less money on education

After choosing one of the response options, respondents then saw a screen that said:

“Of the remaining policies, please select the one you approve of most.” (The response options were the same as above, but omitting the respondent’s first choice)

Followed by:

“Of the remaining policies, please select the one you approve of more.” (Response options: Same as above, but omitting the respondent’s first and second choices)

A person has nonseparable preferences if her responses produce a ranking of the outcomes in which her most preferred outcome is not the inverse of her least preferred outcome. More specifically, the ranking reveals whether her ranking of policies on one issue depends on the status quo on the other issue.

4.3 Study 3

The 2012 Cooperative Congressional Election Survey (CCES) contained a model with survey instruments to measure nonseparable preferences in wave 1 (October) and questions on issue positions in both the pre-election and post-election (November-December) waves.

4.4 Prevalence of Nonseparable Preferences

The remainder of the paper focuses on the issues in the two surveys that presented 7-point response scales in order to maintain the comparison to previous work on response instability. Rather than presenting a crosstab for each issue in the two studies, Table ?? shows a summary for the three issues in the 1998 Ohio survey with 7-point response scales and the six issues in the 2004 US survey.

[Table ?? about here]

Table ?? presents the percentage of respondents who have nonseparable preferences for the issue in column 1 depending on the outcome of the issue in column 2. The issues are ordered within each survey from those with the largest percentage of nonseparable preferences to those with the smallest percentage. Separable preferences are the remainders in the rows. Nonseparable preferences are separated into negative nonseparable preferences (the issues are negative complements) and positive nonseparable preferences (positive complements). In the case of taxing and spending issues, two issues are positive complements if as one increases a person wants the other

to increase as well. Negative complements are the reverse: a person wants increases on one dimension to be offset by decreases in the other. On some issues the distinction between positive and negative complements is arbitrary. For example, if a person's preference on welfare spending is a negative complement of government policy on restricting abortion, then she prefers spending more on welfare programs if abortion is restricted than if abortion is legal.

Several striking patterns appear in the table. First, a substantial percentage of respondents have nonseparable preferences. More than half of respondents have nonseparable preferences for taxes and education spending in both surveys. Over a third have nonseparable preferences for AFDC programs, medicare, defense spending, tariffs on imported goods, and Social Security. A quarter of respondents have nonseparable preferences on immigration levels and a national health care system.

Second, the issues show a clear imbalance between the percentages of respondents with positive and negative nonseparable preferences. The imbalance indicates that the measure of nonseparable preferences is not picking up primarily random responses. If the changes in responses to the two conditional questions were mostly random, then roughly equal numbers of people would change their responses in positive and negative directions. On the taxes question, most people believe that if spending on education goes down, taxes should go down. Similarly, on the education question, they believe that if taxes increase, spending on education should increase. About 18 percent of the Ohio sample and eight percent in the US sample believes that if spending on education goes up, taxes should be cut, and that if spending on education decreases, taxes should increase. There may be some reason behind such a preference, such as wanting a tax cut to rein in increased spending on education. Far more people prefer welfare programs as a negative complement to abortion than as a positive complement: as abortion is restricted, people want more money spent on welfare programs.

4.5 Nonseparable Preferences Explain Over-Time Changes in Responses

To assess whether nonseparable preferences explain over-time changes in survey responses, we model the changes in individual responses between the two waves of a survey. The dependent variable assumes seven values: no change between survey waves (0) up to a six-unit change (from a 1 to 7 or 7 to 1 on the scale) . The distance of the change, not the direction, matters for this analysis, thus the dependent variable is the absolute value of the change from time 1 to time 2.

The key predictor in the model is a dummy variable capturing whether a respondent has nonseparable preferences. If the theory is correct, nonseparable preferences should be positively related to response instability. The model also controls for a respondent's level of political information, measured using five questions from the Delli-Carpini and Keeter (1996) battery⁸ In addition, the 2004 survey included a measure of issue importance. Respondents were asked whether each in the survey is very important, somewhat important, or not important at all. Issue importance should be negatively related to response instability (Zaller 1992).

The model does not include a measure of whether a respondent believes the status quo changed on a related issue. A measure of perceived change in the status quo is unnecessary, however, if we make the innocuous assumption that a person's perception of change in the status quo on an issue is unrelated to whether she has nonseparable preferences on another issue. Respondents' perceptions of change in the status quo can be assumed to be independent of whether they have nonseparable preferences, especially since the statistical models include a control for attention to the media. As long as S_k has the same value, on average, for people with and without nonseparable preferences on j and k , then the hypothesis that nonseparable preferences are associated with response instability can be tested by $\beta_{Nonseparable} > 0$, which is one-tailed and estimated separately for positive nonseparable and negative nonseparable preferences.

⁸Which political office is held by [name of current Vice President], which party holds a majority of seats in the U.S. House of Representatives, which branch of government determines if a law is constitutional, how much of a majority in Congress is required to override a presidential veto, and which of the two major political parties is more liberal? A respondent could answer 0 to 5 of these questions correctly, creating a six-point information scale.

In each survey, the issues are pooled, creating a data set with multiple observations for each survey respondent. The model is estimated using ordered probit with separate intercepts for each issue and robust standard errors due to clustering by respondent and issue. Results appear in Table ??.

[Table ?? about here]

In both the 1998 Ohio survey and 2004 US survey, nonseparable preferences are positively related to response instability. The effect is statistically significant ($p < .05$) in both surveys. Political information is negatively related to response instability, as expected, but statistically significant only in the 2004 US survey. Since political information is standardized on a two-standard deviation scale, the coefficient is directly comparable to the coefficient for the nonseparable preferences dummy variable. Substantively, in the 2004 US survey, nonseparable preferences have about a 50 percent larger effect on increasing response instability that political information has on reducing instability. Given the widely-recognized impact of political information on reducing response instability (e.g., Zaller 1992), the effect of nonseparable preferences on response instability is substantial. Issue importance has no effect on response instability. Adding a respondent's years of education to the model also has no effect on response instability.

The variance explained by the model is somewhat low. While the measures of nonseparable preferences are statistically and substantively significant, there are clearly things not in the model that account for some changes in responses. One explanation, rarely measured by researchers, is that respondents gather new information about an issue. As respondents learn more about an issue, or as circumstances change, respondents may change their *induced preferences* on the issue without changing their underlying preferences. There is still a non-trivial amount of measurement error associated with any survey question. Measurement error here includes not only question error, but errors in measuring whether a respondent's preferences are nonseparable and random errors in a respondent's perception of the status quo on related issues.

These results stand in contrast to findings from Hill and Kriesi (2001a, 2001b), one of the best empirical studies of response instability to date. Their study of responses to a Swiss panel survey on transportation shows that most opinion change during the three-wave panel is random change. Between 37 and 58 percent of respondents in their sample have what can be described as stable preferences across the two years of their survey. Their survey contained detailed questions about specific policies to reduce auto emissions. Substantively, their questions tap some technical and relatively unimportant issues on which we might not expect much response stability. They also show that question error accounts for less than a third of response variation over time. They interpret their results as supporting Converse's model of response instability. However, their model is based on two troubling assumptions and an incomplete model.

First, they assume that anyone who changes their response from the first wave to the second wave and then changes back in the direction of their first wave response in the third wave of the survey must exhibit non-systematic opinion change. If a respondent has nonseparable preferences on an issue and perceives changes back and forth on the status quo on related issues, then she may well change from being in favor of a proposal to opposed and back again to in favor. Particularly on a set of interrelated and technical issues such as alleviating transportation problems, we should expect high rates of nonseparable preferences coupled with respondents' gathering new information about the effects of various policy proposals.

Second, Hill and Kriesi's models assume that the question error has identical variance across all groups of respondents. Lacy (2001b) shows theoretically that respondents who have nonseparable preferences will have greater question error associated with their responses due to the fact that the error on a question that a respondent sees as nonseparable from another will pick up the question error from both questions. By assuming homoskedastic error variances, Hill and Kriesi underestimate the impact of measurement error and may miss the impact of nonseparable preferences on the responses to their survey.

5 Implications and Discussion

Response instability is not as prevalent or significant as much of the research in public opinion would have us believe. Regardless of whether people answer survey questions two months or two years apart in time, about 5 to 10 percent of respondents give wildly varying answers that account for most of the over-time variance in responses. This 5 to 10 percent of the public accounts for low over-time correlations in responses. Most people change their survey responses only a little, if at all, across time.

Debates about the causes and implications of unstable survey responses have sought to explain, either knowingly or unknowingly, the small percentage of the public that changes their opinions significantly. Explanations for this over-time variation in opinions fall into two categories: inconsistent attitudes and measurement error. Nonseparable preferences provide a theoretical foundation for the measurement error explanation and also for the seemingly inconsistent attitudes that people often express in surveys. Yet nonseparable preferences are not inconsistent. Instead, people with nonseparable preferences for issues have fairly stable and well-formed opinions over sets of issues. When confronted with a question about a single issue from that interconnected set, survey respondents must make assumptions about the context of the question and changes in the status quo on related issues.

Data from two unique surveys document the extent of nonseparable preferences in the mass public. One might argue that nonseparable preferences are uncommon since they are held by less than half of the public on the issues explored here. But on each issue except abortion, one third or more of the public has nonseparable preferences. That is at least three times more than the 5 to 10 percent of the public that has wildly vacillating survey responses on the issues. Whereas the measurement error and inconsistent opinions debate is mired in explaining the behavior of 5 to 10 percent of survey respondents, a third to a half of respondents have nonseparable preferences on some issues.

The fact that so many people could answer complex, conditional questions about issues of public policy supports the simple point that much of survey research underestimates the mass public. Large percentages of a sample of the US public have nonseparable preferences on many issues. Such preferences reveal a previously unrecorded level of sophistication and complexity in the mass public.

Not only are nonseparable preferences common, they also explain one of the most perplexing problems in survey research: over-time instability in responses. Over-time instability will occur when people have nonseparable preferences on an issue. Even when people have fixed preferences across multiple issues, their survey responses may change over time. This argument, even without the empirical confirmation, casts doubt on any conclusions about the public's lack of stable preferences that are derived from evidence of over-time instability in responses. Empirical results from a two-wave panel provide evidence that nonseparable preferences explain over time instability better than political awareness.

Even if one does not believe that nonseparable preferences are responsible for over-time instability in survey responses, nonseparable preferences should still hold appeal as a phenomenon worth further study. Policymakers should want to know how public opinion will react to changes in policy, but survey researchers currently have no way to predict coming shifts in public opinion. The conditional questions on aid to families with dependent children can reveal to lawmakers that outlawing abortion will produce an increase in public support for welfare programs. Policymakers should also note that public support for tax cuts is more constrained than perhaps previously believed: people recognize that tax cuts may involve spending cuts, and many people clearly prefer not to cut taxes if spending on important programs must also be cut.

I do not take the position that the majority of a democratic electorate have stable preferences on all issues of public policy. That is clearly an unattainable standard since most policymakers do not have such stable preferences, even without the vacillations in their positions due to political pressure. However, on important and salient issues of public policy, much of the mass public

has preferences that are more stable and coherent than past evidence and conventional wisdom suggests.

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6 Appendix

6.1 Issue questions on the 1998 Ohio panel survey

[Taxes] Do you think the state of Ohio should increase property taxes, cut property taxes, or keep property taxes where they are now? Follow-up: Would you say increase (cut) a lot, somewhat, or a little? (N=413)

[Education] Do you think the state of Ohio should spend less money on education, more money on education, or continue spending the same amount it does now? Follow-up: Would you say a lot less (more), somewhat less (more), or a little less (more)? (N=430)

[AFDC] Do you think the amount of money the government provides for low-income women and their children should go up, go down, or remain at current levels? Follow-up: Go up (down) a lot, somewhat, or a little? (N=378)

[Abortion] Do you think that abortion should be outlawed, legal only in special cases such as rape or incest or threat to the life of the mother, or legal in all circumstances during the early months of pregnancy?

6.2 Issue questions on the 2004 Knowledge Networks panel survey

[Trade] “Some people say that imports of products made in other countries cause American jobs to be lost, and they want the U.S. to raise taxes on imports to make foreign goods harder to sell here. Others say that imports bring in quality goods at lower prices, and they want to reduce taxes on imports to make foreign goods easier to sell here. How about you: Do you want products imported

from other countries to be taxed ?”

a lot more

somewhat more

slightly more

about the same as they are now

slightly less

somewhat less

a lot less

[Taxes] “Do you want the amount of money that people pay in taxes to the U.S. government to ...?”

Response options: 7 points labeled from “go up a lot” to “go down a lot”

[Education] “Do you want the amount of money the U.S. government spends on education to ...?”

Response options: 7 points labeled from “go up a lot” to “go down a lot”

[Social Security] “Do you want the government to allow people to put part of their Social Security taxes into their own private savings accounts, such as into stocks, bonds, or mutual funds?” Response options: “Yes” or “No”

[Defense Spending] “Do you want the amount of money the U.S. spends on national defense to ...

Response options: 7 points labeled from “go up a lot” to “go down a lot”

[Medicare] “Medicare is a government program that helps people over the age of 65 pay for some of their medical bills and prescription drugs. Do you want the amount of money the government spends on Medicare to ...” Response options: 7 points labeled from “go up a lot” to “go down a lot”

[Health Insurance] “Do you want the government to create a national health insurance system so that everyone pays medical taxes to the federal government and the government pays everyone’s medical bills?” Response options: “Yes” or “No”

[Immigration] “Do you want the number of legal immigrants allowed into the United States each year to ... Response options: 7 points labeled from “go up a lot” to “go down a lot”

[Same Sex Marriage] “Do want gay and lesbian couples to be allowed to ...

(Response options: 3 points labeled:)

get married and have all of the same legal rights and benefits as any other married couples

be allowed to have domestic partnerships that provide some legal benefits such as inheriting money from a partner and receiving family health insurance, but not be allowed to have the legal status of marriage

not be allowed to get married or have domestic partnerships or anything else that makes the relationships legal

[Adoption] “Do you want gay and lesbian couples to be allowed to adopt children?” Response options: “Yes” or “No”

[Abortion] “Do you want abortion in the early months of pregnancy to ...

by law, never be permitted

be permitted by law only in case of rape, incest or when the woman’s life is in danger

be permitted by law for reasons other than rape, incest, or danger to the woman’s life, but only after the need for the abortion has been clearly established

by law, always be permitted as a matter of personal choice

[Assault Weapons] “Do you want the government to prohibit people in the U.S. from buying military-style assault weapons or machine guns?” Response options: “Yes?” or “No”

[Background Checks] “Do you want the government to require that anyone who sells a gun make sure that the person buying the gun is a U.S. citizen and has not been convicted of a violent crime?” Response options: “Yes” or “No”

Table 1: Percentage of Respondents Who Change Responses to 7-point Issue Questions Between 1990 and 1992

Difference	Issue				
	Gov't Services	Defense	Jobs	Aid to Blacks	Abortion
No Change	31%	36%	29%	34%	64%
1	37	37	33	35	25
2	17	17	20	17	10
3	9	7	11	9	1
4	4	2	4	3	–
5	<1	<1	2	1	–
6	<1	<1	2	1	–
$\tau - b$.30	.40	.36	.41	.62
N	970	1058	1055	1121	1294

Entries are column percentages. $\tau - b$ is overtime correlation between responses.

Source: 1990-1992 American National Election Studies.

Table 2: Percentage of Respondents Who Change Responses to 7-point Issue Questions Between October and November, 1998, Ohio Survey

Difference	Issue		
	Taxes	Education	Welfare
No Change	59.14%	50.00%	55.02%
1	18.28	27.82	20.08
2	15.41	16.90	16.06
3	6.45	4.93	8.43
4	0.72	0.00	0.00
5	0.00	0.00	0.40
6	0.00	0.35	0.00
N	279	284	249

Entries are column percentages. Source: 1998 Ohio Survey.

Table 3: Percentage of Respondents Who Change Responses to 7-point Issue Questions Between April and November, 2004, US Survey

Difference	Issue					
	Taxes	Education	Defense	Medicare	Trade	Immigration
No Change	47.63%	49.22%	47.45%	44.08%	44.87%	54.57%
1	36.73	36.52	36.83	40.09	34.05	27.86
2	11.48	10.41	12.04	10.98	13.68	11.00
3	3.01	2.85	2.97	3.14	5.84	5.14
4	0.86	0.71	0.42	0.71	0.43	0.86
5	0.00	0.00	0.14	0.43	0.71	0.43
6	0.29	0.29	0.14	0.57	0.43	0.41
N	623	620	622	621	623	628

Entries are column percentages. Source: 2004 Knowledge Networks US Survey.

Table 4: Responses to Property Tax Changes Conditional on Cuts in Spending on Education (Rows) and Increases in Spending (Columns)

	Reduce A Lot	Reduce Some	Reduce A Little	Keep Same	Increase A Little	Increase Some	Increase A Lot
Reduce A Lot	9	2	2	31	5	11	0
Reduce Some	2	16	1	36	3	10	3
Reduce A Little	4	1	1	12	4	1	0
Keep Same	6	11	8	136	7	12	1
Increase A Little	0	0	0	7	2	1	0
Increase Some	1	2	1	16	2	12	1
Increase A Lot	0	1	1	3	2	1	1

Source: 1998 Ohio Survey. Number of cases=388.

Table 5: Percentages of Respondents with Nonseparable Preferences

Issue	Conditional On	N	Negative	Positive
			Nonseparable	Nonseparable
Ohio Survey, 1998, N=441				
Property Taxes	Education Spending	388	17.5	36.9
Education Spending	Property Taxes	399	18.3	32.6
AFDC Programs	Abortion	368	30.2	7.6
Abortion	AFDC Programs	382	4.5	2.3
US Survey, 2004, N=717				
Taxes	Education Spending	623	7.2	46.7
Education Spending	Taxes	620	8.2	42.4
Medicare	Defense Spending	621	17.5	18.5
Defense Spending	Medicare	622	12.2	22.3
Trade	Social Security	623	18.5	14.7
Immigration	Health Care	628	16.2	8.6
US Survey, 2012, N=1000				
Taxes on Middle Income	Taxes on Upper Income	988	6.4	60.5
Taxes on Upper Income	Taxes on Middle Income	980	4.0	53.6
Education Spending	Defense Spending	991	15.5	21.8
Defense Spending	Education Spending	983	8.8	27.2

Table 6: Nonseparable Preferences Explain Over-Time Change in Responses to Issues Questions in Panel Surveys

Predictor	1998 Ohio	2004 US	2012 US
Nonseparable Preferences	.35* (.14)	.42* (.19)	.23* (.07)
Political Information	-.10 (.16)	-.21* (.10)	-.12 (.08)
Education	-.20 (.19)	-.03 (.07)	-.22* (.07)
Days/Week Read Newspaper	.19 (.15)	—	—
Issue Importance	—	-.06 (.06)	—
Months Between Surveys	—	—	.11 (.11)
N	753	1964	3227
Wald test (df)	9.83* (5)	33.4* (10)	70.0* (7)

Note: Entries are ordered probit estimates with robust standard errors in parentheses. Dependent variable ranges from 0 to 6. Issues are pooled across respondents, with separate intercepts for each issue.. Political information, Education, Days/Week Read Newspaper, and Issue Importance are subtracted from their overall mean and divided by two standard deviations. Separate intercepts for each issue and cut points not reported.

* indicates $p < .05$, two-tailed.

Table 7: Nonseparable Preferences Explain Small Changes in Responses Over Time, Low Education Explains Large Changes in Responses

Predictor	1 Unit Change	2 Unit Change	3 Unit Change	4-6 Unit Change
Nonseparable Preferences	.42* (.11)	.64* (.16)	.46 (.27)	-.34 (.44)
Political Information	-.07 (.11)	-.33* (.15)	-.40 (.26)	-.26 (.39)
Education	-.03 (.12)	-.04 (.17)	-.25 (.29)	-.03* (.41)
Issue Importance	-.11 (.08)	.08 (.13)	-.25 (.21)	-.37 (.41)
Constant	-.35 (.30)	-1.60* (.46)	-1.51* (.73)	-2.12* (1.34)
N in category	662	237	76	28
Wald test (df)	67.6* (36)			

Note: N=1964. Entries are multinomial logit estimates with robust standard errors in parentheses. Baseline is no change in responses (N=1587). Issues are pooled across respondents, with separate intercepts for each issue. Political information, Education, Days/Week Read Newspaper, and Issue Importance are subtracted from their overall mean and divided by two standard deviations. Separate intercepts for each issue not reported. * indicates $p < .05$, two-tailed.

Table 8: Nonseparable Preferences Explain Small Changes in Responses Over Time, Low Education Explains Large Changes in Responses

Predictor	1 Unit Change	2 Unit Change	3 Unit Change	4-6 Unit Change
Nonseparable Preferences	.35* (.08)	.27* (.12)	.05 (.22)	-.23 (.39)
Political Information	-.07 (.09)	-.08 (.13)	-.38 (.24)	-.36 (.31)
Education	-.17 (.09)	-.23 (.13)	-.33 (.22)	-1.26* (.39)
Months Between Surveys	-.09 (.12)	.34 (.20)	.20 (.32)	.53 (.72)
Constant	-.69 (.12)	-2.74* (.30)	-3.48* (.49)	-4.62* (.97)
N in category	1134	367	104	35
Wald test (df)	104* (28)			

Note: N=3227. Entries are multinomial logit estimates with robust standard errors in parentheses. Baseline is no change in responses (N=1587). Issues are pooled across respondents, with separate intercepts for each issue. Political information, Education, Days/Week Read Newspaper, and Issue Importance are subtracted from their overall mean and divided by two standard deviations. Separate intercepts for each issue not reported. * indicates $p < .05$, two-tailed.