Who Cares? Measuring Attitude Strength in a Polarized Environment*

PRE-ANALYSIS PLAN

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Abstract

Building on research in social psychology, we propose a model of survey response in which individuals’ policy preferences are characterized by two parameters: their attitude on an issue, and their attitude strength. Strong attitudes are behaviorally relevant and stable over time while weak attitudes are easily manipulated with only limited behavioral consequences. We assume that the psychological cost to individuals of not reporting their attitude depends positively on the issue strength. We derive predictions about how respondents will answer survey questions under two different survey techniques, Likert scales and Quadratic Voting (QV). The QV method gives respondents a fixed budget to “buy” votes in favor or against a set of issues. Because the price for each vote is quadratic, it becomes increasingly costly to acquire additional votes to express support or opposition to the same issue. We formally show that QV better measures preference strength. This, we argue, is especially true in a polarized two-party system where individuals with weak preferences are more likely to mechanically default to the party policy position. We test these predictions using a survey experiment. QV, as a powerful compromise between a stated and a revealed preference approach, has the potential to affect the way preferences are conceptualized and measured across the social sciences.

Keywords: Survey research, Public opinion, Attitude strength, Likert scale, Quadratic voting.

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1 Introduction

A key set of assumptions in political economy jointly state that individuals hold political preferences or attitudes\(^1\) and that these preferences relate in a systematic fashion to individuals’ prior and current experiences and material conditions. Political attitudes are also expected to direct, and consequently predict, behavior such as turnout, whom to vote for, which party to identify with or when to protest. For the past few decades, researchers have strongly disagreed over the accuracy and adequacy of these foundational behavioral assumptions. Achen and Bartels (2016), for instance, argue that the causal arrow between preferences and behavior should be reversed: citizens first pick a politician for reasons that have little to do with policy preferences and then adopt that politician’s policy views (see also Lenz (2013); Freeder, Lenz and Turney (2018)). “Even the more attentive citizens,” they write, “mostly adopt the policy positions of their parties as their own: they are mirrors of the parties, not masters” (p 299).

One way to rescue political economy’s core assumptions while also accounting for the empirical patterns documented by those critical of this framework is to argue with John Krosnick that attitudes vary in strength\(^2\). “Strong attitudes have the characteristics that” political economists “assume are possessed by all attitudes” (Howe and Krosnick 2017: 328). In other words, strong attitudes are the attitudes that matter the most for an individual’s thoughts, intentions and behavior (identifying criterion 1). They are more stable over time (identifying criterion 2) and are harder to change or manipulate (identifying criterion 3). In addition, strong attitudes concern policies that individuals perceive “to be related to her or his self-interest, that is, to directly affect his or her rights, privileges, or lifestyle in some concrete manner” (p 332, see also Bolsen and Leeper (2013)) (identifying criterion 4). Weak attitudes, in contrast, are not as behaviorally consequential and are less stable over time. They have often little to do with an individual’s own personal conditions or lifestyle. While strongly held attitudes might results in party switching, weakly held attitudes are more likely to be affected by partisan elite rhetoric (Zaller 1992, 2012). In the case of weak attitudes, attitudinal change in response to elite cues is unlikely to have meaningful behavioral consequences (Lenz 2009; Zaller 2012).

The above framework approaches attitude strength as an intrinsic property of an individual’s preferences. In practice, attitude strength is both shaped by, and a response to, external constraints. Not all preferred policies can be implemented, be it for budgetary reasons or because of decision rules (e.g. majority rule). Similarly, there are many more bundles of issue positions than there are parties. In other words, for many voters, their preferred bundle of policies is never on offer. The concept of policy strength offers a straightforward way to succinctly model how voters tackle these supply-side constraints. Given a “menu” of policy options supplied by parties and candidates (Schumpeter 1950; Sniderman and Bullock 2004; Sniderman and Levendusky 2007), voters will reward (or retaliate against) candidates that advocate or implement the policies for which they have the strongest preferences. In contrast, the policies they only weakly disagree

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1 In line with previous work in social psychology, we use the terms “preferences” and “attitudes” interchangeably and define them as evaluations of statements, in this case policy-relevant statements, ranging from positive (favor) to negative (oppose).

2 See Krosnick (1999); Howe and Krosnick (2017); Miller and Peterson (2004) for more on this theme.
or agree with will elicit limited behavioral response. Ultimately, voters will take cues from party leaders on these secondary issues and express support for the party’s overall agenda.

In a 2006 paper, Carsey and Layman (2006) document patterns of behavior that align with this framework (see also Mullinix, 2016). They examine attitudinal change on abortion in the 1990s, when Republican and Democratic elites politicized the issue in the name of religious and women’s rights, respectively. They show that while some voters brought their opinions on abortion in line with their initial partisan predispositions, others switched to the party that better matched their policy preference. A key difference between these two types of voters is issue importance (a proxy for issue strength): abortion was low importance for the former group and high importance for the latter (see also Achen and Bartels, 2006). The 2016 presidential election and its aftermath also illustrate the potential benefits of adding preference strength to researchers’ conceptual tool box. On the one hand, evidence shows that support for—or opposition to—President Donald J. Trump strongly distorts attitudes on issues such as foreign policy toward Russia or a ban on Syrian refugees (the Achen and Bartels model). On the other hand, for anyone looking back at the party primaries, it appears that at least certain types of policy preferences among a subset of citizens (e.g. opposition to immigration, to free-trade, support for progressive taxation and free college education) can foster turnout or accelerate party switching, dramatically disrupting “politics as usual” (the political economy model).

Despite its relevance, issue strength is rarely measured in surveys. Most researchers rely on some variant of the Likert scale, which only indirectly captures issues strength (Krosnick and Berent, 1993; Malhotra, Krosnick and Thomas, 2009). In the best case scenario, a Likert scale will be followed by a question about how important a given issue is to the respondent (Miller and Peterson, 2004; Howe and Krosnick, 2017). In addition, standard public opinion surveys very rarely mimic the trade-offs imposed by the political context. Existing survey methods thus leave researchers with few ways to disentangle which issues respondents feel the strongest about and consequently, which issues may motivate their real-world behaviors.

Reliance on Likert scales is especially concerning in a polarized two-party system. In such a context, respondents may face conflicting motives when answering surveys. On the one hand, they might want to express opinions that accurately reflect their true preferences (e.g. accuracy concerns). On the other hand, they might want to signal loyalty to one’s party by endorsing the party’s policy position (e.g. reputation concerns). Because Likert scales impose few constraints, the motives that guide respondents’ survey answers

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3 Zaller, in a recent review of the research published since his 1992 opus, similarly distinguishes between strong and weak attitudes. Some voters, he argues, develop strong opinions on one or two of the many major issues that constitute the agenda of national politics. These voters, who form what Converse called “issue publics,” attach themselves to parties on the basis of their strong issue-specific concerns. (Leeper and Slothuus, 2014). They must then decide what they “think about [the other] issue positions attached to the party they embrace.” Evidence indicates that they will often end up expressing support for the party’s broad agenda. Their preferences on these issues are best understood as a signal of support for the party (Bullock et al, 2013) and are unlikely to be the reflection of deeply held and behaviorally relevant preferences (Freeder, Lenz and Turney, 2018).

4 The most ubiquitous scales, which run from -2 to 2 (1/5) measure strength as a binary outcome: strongly agree/disagree versus agree/disagree. More recently, researchers have relied on bipolar scales running from -5 to 5, which one end capturing full agreement with a given claim, and the other end, full agreement with the opposite claim.

5 Loyalty can be “psychological” - individuals derive utility from being identified with a given group - or “strategic” - by being loyal to the party they increase its chances of winning, with potential policy benefits down the line.
need not align with the surveyor’s ultimate goal. According to our definition of strong and weak preferences, the effects of party cue and party identity will be the largest for weak preferences (criterion 2.b). Because respondents mechanically default to the party’s extreme policy position (assuming polarization), with Likert, it becomes harder to distinguish strong from weak preferences, i.e. to distinguish between 1) respondents who favor (oppose) a given policy (i.e. a tax increase) and are ready to act on this preference and 2) respondents who, while expressing the same position (opposition), do not “care” as much and are merely “paying lip service to the party norm” (Zaller 2012) or expressing their dislike for the opposite party (Mason 2014). With Likert, partisans will appear to strongly disagree on key issues, when in practice, only a subset of voters will “truly care.” When the latter group is unequally distributed across parties (e.g. members of one party strongly support a policy while members of the other only weakly oppose it), Likert will provide an inadequate picture of public opinion, one that overlooks important issue-strength asymmetries across parties.

This research project examines the theoretical and empirical value of including preference strength existing approaches to mass political behavior in representative democracies. In the part of the project presented in this pre-analysis document, we address the limits of existing survey tools for measuring preferences strength. First, we propose a model of survey response in which individuals’ policy preferences are characterized by two parameters: their attitude on the issue, and their attitude strength. We assume that the psychological cost to individuals of not reporting their attitude depends positively on the issue strength. We show that with Likert, this cost is minimized, making it less likely that the variance in survey answers overlaps with the variance in issue strength. Instead we test a new approach to the measurement of preferences that builds on the novel idea of “Quadratic Voting” (QV) (Lalley and Weyl 2016). This method mimics real world trade-offs by asking respondents to vote on a bundle of issues under conditions of scarcity: respondents are constrained by a fixed budget with which to “buy” the votes. Because the price for each vote is quadratic, it becomes increasingly costly to acquire additional votes to express support or opposition to the same issue. The budget constraint and quadratic pricing compel respondents to arbitrate between the issues in the choice set and make it costly to express “extreme” preferences by voting repeatedly for the same issue. This contrasts with Likert scales, where respondents can signal intense preferences at no cost.

We formally show that under some specific conditions QV’s method of scarcity should better capture attitude strength than Likert’s methodology of abundance. We test this prediction using a representative survey of 3600 American citizens. Respondents are asked to express their preferences on 10 policy issues. The survey tool used to measure these preferences (Likert scales, Likert scales followed by a “issue importance” question, or the QV method) is randomly assigned. Respondents are then asked to perform behavioral tasks related to four of the 10 policy issues (e.g. write to their senator about a bill related to one of the issues or donate real money to a non-profit advocating in favor of one of the mentioned issues). We expect attitudes measured using QV to better predict, relative to Likert, these behaviors (criterion 1). We re-contact respondents 2 months later and repeat the Likert and QV sections of the survey. We expect attitudinal stability to increase as the QV score in wave 1 increases. Answers to Likert items in wave 1 should be less predictive of attitudinal stability (criterion 2). We also collect detailed information on respondents’ likelihood of directly benefiting from a given policy (e.g. likelihood of being pregnant and support for paid parental leave). We
expect the correlation between attitudes measured using QV and these objective measures of self-interest to be higher than the correlation between these items and answers collected using Likert scales (criterion 4). Finally, we turn to the issue of preference strength and contextual cues (criterion 3). We randomly assign a third of our sample to a manipulation aimed at priming their partisan identity, and consequently activate partisan motivated reasoning (Mullinix 2016; Klar 2014). We expect the correlation between party identity and survey answers to increase in the primed group. We expect this increase to be higher for people whose answers were collected using Likert, relative to QV.

Conditional on QV outperforming traditional survey tools, we will, in a second step, revisit key debates in the social sciences from the vantage point of preference strength. One debate relates to the influence partisan identity and partisan cues exert on preference formation. Elite party cues can provide an efficient and often reliable heuristic for helping voters make political choices (Downs 1957; Lupia and McCubbins 1998; Popkin 1991). However, research suggests that the citizenry follow elite party cues often to an extreme, disregarding substantive information and following party positions even when parties take “reversed” positions (Cohen 2003; Lau and Redlawsk 2001; Rahn 1993). Most of the existing evidence is based on survey experiments that randomly exposes respondents to different party cues. If, as discussed previously, individuals holding weak attitudes on a given topic are those most likely to be affected by this type of treatment, and if weak attitudes are behaviorally insignificant, then the conclusion to draw from such type of evidence are far from straightforward (Mullinix 2016; Leeper and Slothuus 2014).

Another important line of inquiry asks whether the share of citizens who hold meaningful views about public policy is large enough to support the claim that public opinion constrains political elite’s behavior. For some researchers, less than half of the US population holds meaningful views about important policy issues (Converse 2006; Freeder, Lenz and Turney 2018). For others, this conclusion is too pessimistic and partly an artifact of measurement error: with the correct survey instrument and statistical correction, the share of individuals holding coherent preferences increases substantially (Ansolabehere, Rodden and Snyder 2008; Achen 1975). We propose to reinterpret this debate from the vantage point of Converse’s “issue publics.” We seek to test the proposition that the overwhelming majority of people have strong preferences on at least a subset of issues. Because this subset of issues varies across individuals, the aggregate number of individuals who hold strong preferences on any given issues is comparatively much smaller. Assuming QV more successfully identifies these issue publics, we hope to provide a new picture of public opinion in the United States, one that better captures the size of these issue publics. Relatedly, we seek to better measure how these issue publics are distributed across politically relevant groups such as political parties. We expect Likert to over-estimate the share of a party’s electorate that aligns with the party’s position on a given issue.

6 Alternatively, partisan cues, especially if they align with an individual’s pre-existing (weak) attitude on a given issue, might have a substantive effect on attitude strength (not the attitude itself). For example, individuals whose identification with their party shapes their perceived self-worth (e.g. the reputation concern mentioned above) could “sincerely” care because that’s what other group members are perceived to care about. Evidence supportive of the existence of the latter group would stand in contrast to the bottom-up model of political change ubiquitous in political economy.

7 Also important, though not investigated at this stage of the project, is the distribution of issue publics across electoral districts, see (Rodden 2010; Calvo and Rodden 2015).
If elite cues mostly affect weak preferences, then consensual support for a given policy—as measured using Likert scales—could hide important weaknesses in the coalition believed to favor a given policy change.

A third debate pertains to the role of self-interest in preference formation. Evidence along the lines of criterion 3 would indicate that conclusions about the—usually minimal—role of self-interest is contingent on the type of measurement tool used to measure policy preferences. In analyses of cross-sectional data, methods that fail to minimize the noise introduced by weak preferences (“cheap talk”) also minimizing the role of egocentric reasoning when explaining why some individuals support one policy, oppose another, or have no opinion. This is an important issue in economics. Because of concerns over “cheap talk”, the profession has enforced something of a prohibition on the collection of subjective data” (Manski 2000). Economists focus instead on preferences as “revealed” by decisions in real choice situations (Bertrand and Mullainathan 2003). Yet, there is a growing interest in measuring and understanding mass policy preferences (Alesina, Stantcheva and Teso 2018; Alesina, Miano and Stantcheva 2018). Minimizing the noise introduced by cheap talk on weak preferences would help push this agenda forward. Improving how we measure preference strength could also have implications for survey experiments in economics and beyond. For example, Kuziemko et al. (2013) ran a survey experiment to understand how support for redistribution is affected by information on inequality. They find no effect of their informational treatment on support for redistributive social policies, which were measured using a Likert scale. Yet, it could be that the treatment did not change attitude orientation but only affected attitude strength among those already supportive of redistribution. While overall opinion did no change, the likelihood of rewarding or punishing a politician campaigning on a pro-redistribution agenda could have been affected by the treatment, something Likert scales struggle to measure. It might also be that the effect of the information treatment was canceled by changes in response patterns triggered by the partisan cues embedded in any discussions of inequality. If individuals with weak preferences are the most sensitive to party cues, the null effect could again be an artifact of reliance on Likert scales.

In the next section, we formally show that QV, relative to variants of the Likert scale, better discriminates between strong and weak preferences. We conclude section 2 with a set of empirical predictions that follow from this hypothesis. Section 3 presents the design of a survey experiment seeking to test these predictions. For each predictions, we provide the analysis plan. We conclude with a discussion of our overall expectations regarding our final results and their implications.

2 Argument

We start by presenting the quadratic voting method in detail. We then propose a model of survey response in which, on each policy issue, individuals are characterized by two parameters. The first parameter is their attitude on the issue, that is, whether they favor or oppose the proposed policy, as shaped by the pool of considerations an individual holds on a given issue (Zaller 1992). The second parameter is the issue
strength, that is, whether this attitude is strong or weak, with “strength” defined according to identifying criteria 1 through 4 listed above. We make two key assumptions regarding how citizens respond to survey questions. We assume that, when answering the survey, individuals would ideally like to be as close as possible to their attitude on all issues. We also assume that the psychological cost of not reporting her attitude depends positively on the issue strength. Building on these basic assumptions, we derive some predictions about how respondents will answer survey questions under two different survey techniques, Likert and QV. More specifically we examine how these survey techniques will perform at distinguishing strong from weak political preferences.

2.1 Quadratic Voting for Survey Research: Making Talk Less Cheap

We propose to test a new method for measuring attitudes and attitude strength based on quadratic voting. Lalley and Weyl (2016) show how QV results in efficient collective decisions, in a setting where simpler voting methods would be unable to measure how much individuals really favor or oppose a policy reform. Within the traditional one-person one-vote framework, the opinion of people who care about a given outcome receives as much weight as that of people who are mostly indifferent to the outcome. One solution is to allow voters to cast more than one vote on a given issue. Yet, if voting is ‘cheap’, individuals favoring (opposing) a given reform are incentivized to over-report their support (opposition), i.e. cast “too many” votes, if this is likely to increase the probability that the reform is adopted (rejected). In the context of voting, the basic intuition of QV is to price additional votes in a way that increases the weight of people who care, while minimizing the distortion resulting from strategic behavior. Each person starts with an artificial budget, which she can use to “buy” votes in favor or against a proposal. She can spread her budget across different issues, but due to quadratic costs, it becomes increasingly costly to signal support for a given issue. A quadratic increase in the price of “buying” a vote has been shown mathematically to give fully informed rational individuals incentives to report truthfully on their preferences (Lalley and Weyl 2016). The votes can then be aggregated to determine whether the proposal should be implemented.

Table 1 shows the costs of voting under QV, displaying both the total and marginal costs. The additional amount that a voter must pay to cast an additional vote is always (within $1) proportionate to the number of votes purchased. So, it costs twice as much at the margin to cast 4 votes than to cast 2 votes ($7 rather than $3); twice as much to cast 8 votes than to cast 4 votes ($15 rather than $7); and so on.

In this original formulation, QV was intended as a means of arriving at efficient social decisions. How-

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8 Attitudes are never fully observed. What we can observe is the degree of agreement with/support for –or disagreement with/opposition to– a given policy proposal or principle. Individuals with contrasting considerations on a given proposal, as worded by the surveyor, will have a lower degree of agreement that individuals whose considerations all point in the same direction (Zaller 1992). Empirically, distinguishing “high degree” of (dis-)agreement and strong attitudes is not always straightforward. Like issue strength, full agreement with a statement will affected stability and receptivity to contextual cues (criteria 2 and 3). Indeed, attitudes that emerge from a more homogeneous pool of considerations are more stable over time and less affected by framing effects (Zaller 1992; Hill and Kriesi 2001). Yet, full agreement will not necessarily translate into more predictive attitudes (criterion 1) and need not be tied to self-interest (criterion 4): one might fully support gay marriage but not pick candidates based on their position on gay marriage and full agreement need no be predicted by one’s sexual orientation.
Table 1: Total and Marginal Cost of Voting Under QV

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However, it can also be applied to survey research. In a preliminary attempt to use QV in a survey context, [Quarfoot et al. (2017)] compared QV to Likert-based survey instruments by randomly assigning respondents to one method or the other using an online panel. Respondents who received the Likert-based survey were asked ten questions in sequence and gave answers on a 7-point scale running from “strongly agree” (1) to “strongly disagree” (7). Respondents who received the QV survey could use their budget of 100 “credits” to express support or opposition to the same series of statements about American politics. Figure 1 shows a sample of what the proposals look like under QV. The first three issues involve positions on immigration, the Affordable Care Act, and abortion. Respondents can scroll down to vote on the other seven issues (the order is randomized). Notice that respondents can buy credits in favor and against each issue proposal. The cost of each vote increases according to the quadratic form and is displayed below each question. Respondents can go back to revise their answers to spend their entire budgets. The maximum that a respondent can spend in favor or against any question is 10 votes (100 credits).

The study by [Quarfoot et al. (2017)] was set up to examine how QV behaves in the field. It consequently remains to be seen what exactly it is that preferences measured using QV capture.\footnote{Weyl and co-authors have examined QV in a context where votes credibly affect policy making. Surveys are a far cry from such conditions.} We push this agenda forward by making several theoretical and empirical contributions. Theoretically, we connect QV to the debates highlighted above on preference strength and propose a simple model that lays out the comparative advantages of QV over Likert. The model can also be used to flesh out the conditions under which reliance on Likert suffice, and the conditions under which a switch to QV can greatly improve inference. Empirically, we test the prediction that QV will more successfully distinguish strong from weak political preferences. In addition, we improve on the QV-Likert horse-race implemented by Quarfoot et al (2017) by following best practices for measuring preferences using Likert ([Malhotra, Krosnick and Thomas 2009]). We also test a variant of Likert which asks respondents a follow up question about issue importance, an item that has been shown to be correlated with preference strength ([Howe and Krosnick 2017]).
2.2 Likert vs QV: a Formal Approach

Consider a number of proposed policy changes, e.g. building a wall on the border between US and Mexico or legislating to foster gender equality in the workplace. We assume that citizens have opinions about these changes and that these opinions are of varying strength, that is, citizens “truly” care about to varying extents. An opinion on a given policy change is modeled as a real number in the interval \([-1, +1]\), where \(+1\) means perfect agreement with the reform, and \(-1\) total disagreement with this reform. Intermediate values correspond to intermediate opinions, something for instance, that might be due to ambivalence (e.g. support for the policy principle but not its specific suggested implementation). How much an individual cares about each issue, i.e. issue strength, is captured with a positive number, where 0 means that she does not care at all.

Assume a survey is run to evaluate where the citizens stand on each of these various issues. We make the following assumptions regarding citizens’ behavior when answering a survey. First, an individual would ideally like to be as close to her attitude as possible, on all issues. Second, the psychological cost of not reporting her attitude depends positively on issue strength.

Formally, we assume that, on each issue \(k = 1, ..., K\), respondent \(i\) is characterized by her attitude on the issue, denoted by \(x_{ik} \in [-1, +1]\), and the importance of this issue, denoted by \(\beta_{ik} \geq 0\). We denote by \(\tilde{x}_{ik}\) her
observed survey answer on issue $k$.

We assume that the utility $V$ a respondent derives from answering the survey depends on her attitudes on the $K$ issues ($x_i = (x_{i1},...,x_{iK})$), their strength (the vector $\beta_i = (\beta_{i1},...,\beta_{iK})$) and on her reported policy preference ($\hat{x}_i = (\hat{x}_{i1},...,\hat{x}_{iK})$) in the following way:

$$V(\hat{x}_i; x_i, \beta_i) = -\sum_k \beta_{ik} C(\hat{x}_{ik}; x_{ik}), \quad (1)$$

where the function $C$ describes the cost of deviating from one’s attitude on each issue. Its value is normalized to 0 when $\hat{x}_{ik} = x_{ik}$, that is, the respondent’s reported attitude coincides with her attitude and we assume that:

$$\frac{\partial C}{\partial \hat{x}_{ik}}(\hat{x}_{ik}; x_{ik}) < 0 \text{ if } \hat{x}_{ik} < x_{ik},$$
$$\frac{\partial C}{\partial \hat{x}_{ik}}(\hat{x}_{ik}; x_{ik}) > 0 \text{ if } \hat{x}_{ik} > x_{ik},$$
$$\frac{\partial^2 C}{\partial (\hat{x}_{ik})^2}(\hat{x}_{ik}; x_{ik}) \geq 0.$$

Parameter $\beta_{ik} \geq 0$ describes the relative strength of issue $k$ compared to other issues in the survey.

Equipped with this very simple model, we can derive how the respondent is predicted to answer the survey depending on the survey technology.

**Responses under Likert** Consider first the case of a standard Likert scale on each issue. On each issue, the respondent can choose any $\hat{x}_{ik} \in [-1,+1]$. In that case, on each single issue, the respondent will simply report her attitude $x_{ik}$. Denoting by $\hat{x}_{ik}^L$ her answer on issue $k$ under Likert, one gets:

$$\hat{x}_{ik}^L = x_{ik}.$$

**Optimal responses under Quadratic Voting** Under Quadratic Voting, the respondent faces a “budget constraint”, such that:

$$\sum_{k=1}^{K} \hat{x}_{ik}^2 \leq B$$

with $B < K$. Under this survey technology, note that the individual is no longer allowed to report any position on all issues (since $B < K$). Besides, the marginal cost of pushing a positive (negative) opinion further to the right (left) is increasing with (the absolute value of) one’s reported position on this issue.
Consider an individual with a vector of attitudes $x_i$. Denote by 

$$B_i = \sum_k x_{ik}^2$$

the size of the budget an individual would need to report under QV the answers she would have given under Likert.

It is straightforward to see that if $B_i \leq B$, responses are the same as under Likert. If now $B_i > B$, the budget constraint is binding. The respondent cannot afford to report what she would ideally like to, issue by issue. She will have to decide how to allocate points across issues, not being able to reach her underlying attitudes on all issues. The exact way in which she will solve this trade-off is going to depend on the importance of each issue.

The individual solves the following optimization program:

$$\max_{\hat{x}_i} \mathcal{L} = V(\hat{x}_i; x_i, \beta_i) + \lambda_i \left[ B - \sum_{k=1}^{K} \hat{x}_{ik}^2 \right],$$

where the function $V$ has been defined in (1) and $\lambda_i > 0$ is the Lagrange multiplier. First order conditions are given by the following conditions:

$$\frac{\partial \mathcal{L}}{\partial \hat{x}_{ik}} = -\beta_{ik} \frac{\partial C}{\partial \hat{x}_{ik}} (\hat{x}_{ik}; x_{ik}) - 2\lambda_i \hat{x}_{ik} \leq 0. \quad (2)$$

For simplicity, we focus below on the simple case of a quadratic cost function in the individual’s utility function:

$$C (\hat{x}_{ik}; x_{ik}) = (\hat{x}_{ik} - x_{ik})^2.$$  

One may check that first order conditions (2) yield:

$$\hat{x}_{ik} = \frac{\beta_{ik}}{\beta_{ik} + \lambda_i} x_{ik}.$$  

Substituting in the budget constraint, one gets:

$$\sum_k \left( \frac{\beta_{ik}}{\beta_{ik} + \lambda_i} x_{ik} \right)^2 = B. \quad (3)$$

The left-hand side of (3) is decreasing in $\lambda_i$, taking the value $\sum_k x_{ik}^2 = B_i > B$ when $\lambda_i = 0$, and going to 0 when $\lambda_i$ is large enough. Therefore, this equation has a unique solution, $\hat{\lambda}_i = \lambda_i (x_i, \beta_i) > 0$. The optimal answers under QV, denoted by $\hat{x}^QV_{ik}$, are therefore:
\[
\tilde{x}_{ik}^{QV} = \begin{cases} 
  x_{ik} & \text{if } B_i \leq B, \\
  \frac{\beta_{ik}}{\beta_{ik} + \lambda(x_i, \beta_i)}x_{ik} & \text{if } B_i \geq B. 
\end{cases}
\]

Note that when the budget constraint is binding \((B_i > B)\), quadratic voting moves all the reported opinions towards the neutral answer \((0)\)\(^{10}\), the move being larger for issues about which the individual cares less (small \(\beta_{ik}\)).

**Comparison between Likert and QV** Table 2 summarizes the advantages and disadvantages of each survey technology. Under Likert, the individual reports her attitudes freely (meaning, with no constraint). But the technology does not allow to recover any direct independent information about the \(\beta_{ik}\). Under QV by contrast, when the budget constraint is binding, answers to a survey question are a compound of the attitude on the question (whether the individual agrees or not with the reform) and of its strength (how much she cares). If an individual gives few QV votes to an issue, it means that either this issue is of little importance to her, or her attitude on this issue is quite neutral (close to 0) (or both). Which technology dominates depends on the dimensions of individual attitudes one is interested in capturing through the survey.

<table>
<thead>
<tr>
<th>Survey technology</th>
<th>Likert</th>
<th>QV</th>
</tr>
</thead>
</table>
| Answer on issue \(k\) | \(x_{ik}\) | \(\begin{cases} 
  x_{ik} & \text{if } \sum_k x_{ik} \leq Bx_{ik} \\
  \frac{\beta_{ik}}{\beta_{ik} + \lambda(x_i, \beta_i)}x_{ik} & \text{if } \sum_k x_{ik} \geq B 
\end{cases}\) |

Assume, following Krosnick and coauthors, that among these \(K\) attitudes, some are strong, behaviorally relevant attitudes, whether others are weak, easily manipulated attitudes, with little behavioral relevance. Translated in our model, this means that some \(x_{ik}\) are ‘true’ relevant attitudes, whereas other as just noise (at least for the researcher interested in predicting behavior), easily shaped for instance by short-lived and context specific heuristic thinking (i.e party cues)\(^{11}\).

The problem with Likert is that there is no way to know, at the individual level, which individuals hold meaningful strong attitudes - as defined previously - on a given issues and which individuals do not. Take

\(^{10}\) Indeed, \(\frac{\beta_{ik}}{\beta_{ik} + \lambda(x_i, \beta_i)} < 1\) for all \(k\).

\(^{11}\) We do not claim that weak \(x_{ik}\)s are non-attitudes. They are simply attitudes that, given their small \(\beta_{ik}\) cannot predict behavior under the assumption that voters are goal oriented individuals whose behavior reflect their underlying policy preferences. Instead these attitudes might be relevant to researchers interested in studying other types of behaviors.
for instance three individuals with the same $\hat{x}_ik$ under Likert. One individual has a high $\beta_ik$ and is likely to act on this policy preference. Another individual has a low $\beta_ik$ but her answer was shaped by the framing of the question. Another individual similarly has a low $\beta_ik$ but in her case, her (weak) attitude follows a distinct behavioral motive, for instance, partisan loyalty: expressing $\hat{x}_ik$ signals that she is a “good Democrat” or a “good Republican”, in practice mostly paying “lip service to the party norm” (Zaller 2012). By contrast, with QV, answers are directly informative of both $x_ik$ and $\beta_ik$. Comparing QV answers across issues for an individual may provide some valuable information on relative issue strengths and better disentangle weak from strong attitudes. The first individual will stand out relative to the other two.

More generally, whether Likert or QV is a ‘better’ measure of these strong attitudes depends on whom is being surveyed, and in which context. If we are in a situation where most individuals have strong attitudes, then Likert is likely to be superior to QV. Indeed, under Likert, individuals always report their attitudes (which here are assumed to be strong attitudes), whereas under QV, they might be forced to under-report their attitudes because of a binding budget constraint. This latter property will make between subjects comparison on one specific issue problematic under QV. Indeed, two individuals who report the same value on one issue might actually have different attitude strengths, but one being more extreme on average will have to ‘compress’ his views more. By contrast, in a context where only some attitudes are strong attitudes and others are not, QV is likely to be superior to Likert. Indeed, as noted above, under QV (when the budget constraint is binding), answers are increasing with attitude strength.

As shown above, Likert scales do not allow to recover any direct independent information about the $\beta_ik$. Previous studies have sought to address this issue by asking a follow up question about issue importance (Carsey and Layman 2006; Holbrook et al. 2005; Boninger, Krosnick and Berent 1995; Bolsen and Leeper 2013). For example, Visser, Bizer and Krosnick (2006) ask participants “how important an issue (is) to them personally” and “how much they personally (care) about the issue.” QV seeks to recover the same information using a very different survey technology.

However, it remains to be seen whether QV is an improvement over this more straightforward alternative. A priori, and based on the model presented above, we have good reasons to regard the combination of a Likert item followed by a “issue importance” item with some suspicion. Indeed, the answers to this latter question are measured using a categorical scale (e.g. “not important at all” - “extremely important”). Such scale suffers from the same problem as Likert scales: there is no penalty for reporting that one strongly cares about all issues, even if expressing such intense interest is driven by motives other than holding strong preferences.

\[\text{References}\]

12 Also important is that the set of strong issues on which individuals hold true attitudes differ across individuals.

13 Using a third item, they also asks about the importance of a given issue “relative to other issues” (we could not find the exact wording of this question) (Visser, Bizer and Krosnick 2006: 220).

14 For example, as already mentioned, respondents might express caring about something to “walk the party line” on an issue perceived to be owned by one’s own party (i.e. immigration for Republicans or Healthcare reform for Democrats). Respondents could also dislike the opposite party so much that expressing one’s strong concern about a given issue is one way to generate social distance between oneself and the other party. For example, some Republicans might express caring strongly about reforms designed
2.3 Predictions

In the next section, we propose to test the hypothesis that QV, relative to variants of the Likert scale\textsuperscript{15} better discriminates between strong and weak preferences. More specifically, since QV gives more weight to strong attitudes, the bulk of votes under QV will be dedicated to strong attitudes. If, as argued by Krosnick and coauthors, strong opinions are behaviorally-relevant (criterion 1), more stable through time (criterion 2), are less subject to contextual priming effects (criterion 3) and are concern policies that will directly affect an individual’s own well-being (criterion 4), then from this general hypothesis follow the four predictions:

- **Prediction 1**: Attitudes measured using QV, relative to attitudes measured using variants of Likert scales, are better predictors of costly issue-specific behavior (e.g. decision to call one’s senator, willingness to donate to a political cause)

- **Prediction 2**: QV, relative to variants of Likert scales, better identifies individuals with stable attitudes.

- **Prediction 3**: Attitudes measured using QV, relative to attitudes measured using variants of Likert scales, are less affected by context-specific cues, e.g. partisan cues that activate “partisan cheerleading.”

- **Prediction 4**: A model seeking to predict policy attitudes using measures of whether or not a given individuals will benefit or be harmed by a given policy proposal will provide a comparatively better fit when attitudes are measured using QV than when they are measured using variants of Likert.

3 Empirical Strategy and Statistical Predictions

To test these predictions, we have designed a large survey experiment composed of 2 waves of data collection. Wave 1 randomly varies the survey tool used to measure policy preferences, as well as exposure to a manipulation seeking to increase the salience of partisan identity (P3). In addition, we collect personal information on the likelihood of benefiting from a subset of the policies respondents are being surveyed about (P4). Respondents are also asked to perform tasks with “real world” consequences (P1).

Wave 2 is a recontact of individuals who did not receive the partisan prime in wave 1 (N= 2400). Respondents are asked to express their policy preferences using the same survey tool they were assigned to in wave 1 (P2). In wave 2, we also run additional tests aimed at assessing QV’s capacity to remain unaffected by small, but meaningful variations in method parameters. More specifically, we examine how robust QV is to changing the “menu of options.” To do so, we introduce one major difference compared to wave 1: half of the respondents get exposed to a new “menu of options” while the other half answers questions on the exact same 10 policy issues asked in wave 1. The new menu comprises of 9 issues asked in wave 1 to which we raise the minimum wage because they associate raising it with the Democrats. Yet, in practice Democrats might care more about raising it than Republicans care about not raising it.

\textsuperscript{15} Likert scale only, and Likert scale combined with a question on issue importance.
added one new issue that was not asked about in wave 1. Wave 2 also repeats some of the tests implemented in wave 1 (e.g. P1).

### 3.1 Overview - Wave 1

Figure 2 describes the basic structure of the first wave of the survey. Respondents are asked about their attitudes on the following 10 policy issues:

- **Do you Favor or Oppose:**
  - Giving same sex couples the legal right to adopt a child
  - Laws making it more difficult for people to buy a gun
  - Building a wall on the US Border with Mexico
  - Requiring employers to offer paid leave to parents of new children
  - Preferential hiring and promotion of blacks to address past discrimination
  - Requiring employers to pay women and men the same amount for the same work
  - Raising the minimum wage to $15 an hour over the next 6 years
  - A nationwide ban on abortion with only very limited exceptions
  - A spending cap that prevents the federal government from spending more than it takes.
  - The government regulating business to protect the environment

**Survey Tools:** Attitudes are measured using one of three possible survey tools. A third of survey respondents is asked to express their opinion on the 10 policy issues using Likert scales. The order of the 10 Likert items is randomized. Following the best practice identify by Malhotra, Krosnick and Thomas (2009) and commonly used in reputable surveys such as the ANES, we rely on a sequence of two branching questions. After an initial three-option question assessing direction (i.e. favor, oppose, neither), respondents who selected favor or oppose were further prompted to express the extent to which they favor or oppose the policy (a little, moderately, a great deal). Respondents who initially select “neither” were not asked a follow up question. Answers are then recoded to construct a 1 to 7 Likert scales centered around 0 (i.e ranging from -3 to 3). Based on data from a July 2017 pilot, we estimate that respondents will spend an average of 2 minutes answering this part of the survey.

Another third of respondents is also asked to answer the Likert branching question and, after having done so, immediately prompted to indicate how important the issue is to them personally (Not important at all (1) - extremely important (5)). Answers to these questions are combined to generate a scale conveying information on attitude orientation and issue importance. We examine two ways of combining these two pieces of information. One solution disregards the information measured in the second Likert branching
Wave 1 follows a two factor design. One factor has two levels (no partisan prime versus prime), the other has three levels (Likert / Likert + issue importance / QV). Only individuals who are assigned to the no prime condition will be re-contacted to participate in wave 2. To make the recontact group large enough, we double the size of respondents assigned to the no prime condition.

More specifically, we multiply answers to the first question (favor = 1, opposes = -1, neither = 0) by answers to the issue importance scale, generating a scale ranging from -5 to 5. The reasoning behind the decision to discard this information is as follow: reliance on the “issue importance” item is valuable if and only if it successfully minimizes false positives, namely individuals who might “look” as if they hold strong preferences in Likert (i.e. pick -3 or 3) but actually only hold weak preferences. Asking a follow up question about issue importance could help better identify these individuals. Yet, minimizing false positives should not come at the price of increasing false negatives, i.e. individuals mis-classified as “strong” based on the “issue importance” item but who, in practice, might hold an ambiguous position, ambiguous enough to keep them from acting on this issue (e.g. one care about increasing the minimum wage but not all the way to $15/h). This information would potentially be better captured by the second branch of the Likert scale.

Cross-tabulations ran using our July 2017 pilot data shows that on average, there are more respondents mis-classified as strong in Likert (relative to their answer on the “issue importance” item) than respondents mis-classified as strong on the “issue importance” item (relative to their “ambiguous” answers to the second branch of the Likert scale). We seek to minimize the former over the latter and consequently opt for the above described re-coding.

We also consider a second solution, which does not discard information provided by the second branch-
ing question. More specifically, we multiply answers to the Likert scale by answers to the issue importance scale, generating an index ranging from -15 to 15. Each of the two recoding solutions has its strengths and weaknesses. On the one hand, the -5/+5 scale discards information on attitudes, biasing the test in favor of QV, which captures a combination of attitude and issue strength. On the other hand, multiplying the two items could amplify the distortive effect of “cheap talk”:” the risk is to artificially “overpopulate” the extremes of the -15/+15 index. In order to give existing measures a fair examination in this horse-race with QV, we consider both indices in the final analysis. Based on data from the July 2017 pilot, we estimate that respondents will spend an average of 3 minutes and 30 seconds answering this part of the survey.

The last third of the sample is assigned to the QV method. Respondents are first required to listen to a 110 seconds long video explaining how the new tool works. To make sure respondents all have sound on their device, we implement a screening question at the beginning of the survey which asks all respondents to identify a number being mentioned in an audio recording. After watching the video (there is no option to skip it), respondents get to “vote” on the 10 policy issues (order on the QV screen is randomized). QV answers are recorded to be equal to 0 if the respondent did not vote on this issue. If the individual votes in favor (against) then votes are recorded as a positive (negative) value. In theory, the QV score thus ranges from -10 to 10. In practice, most respondents seek to vote on at least a few issues. Based on data from the July 2017 pilot, we estimate that a common pattern is to see the bulk of answers in the -4 to 4 range. We expect respondents to spend an average of 4 minutes and 30 seconds answering this part of the survey (video included).

The priming of partisan identity The manipulation used to prime partisanship – the univalence prime– is based on work by Klar (2014) and Lavine, Johnston and Steenbergen (2012). Respondents are asked to list what they like about their party, followed by what they dislike about the other party (see Figure 3 for a screen shot of the manipulation).

In a pilot ran in July 2017, we found that this manipulation successfully affected the number of respondents who believed being a Democrat or a Republican was “important to them.” We also asked three additional questions developed by Huddy, Mason and Aarøe (2015) that further probes the strength of partisan identity. Using all four items to construct a partisan identity scale, we find that the average difference between the primed group and the control group is equal to 0.13 standard deviation. Because these manipulation checks where asked after a battery of policy items on very partisan issues (e.g. “wall on the boarder with Mexico”, “gun control”), this effect size is likely to be a conservative estimate.

In a polarized environment with only two political parties, this manipulation implies that roughly 9 % of Republicans, and the same share of Democrats were “pulled” in opposite ideological directions. This effect size for the ”how important” item considered alone is very similar to the one found by Klar (2014).

16 Namely choosing “very important” or “extremely important” on a four point scale, with other answers being “not very important” and “not important at all”.

17 How well does the term Republican (Democrat) describe you?/When talking about Republicans (Democrats), how often do you use “we” instead of “they”?/To what extent do you think of yourself as being a Republican(Democrat)?
Respondents are first asked about their partisan ID and then exposed to the corresponding prime. Independents did not receive any prime and are not part of the analysis.

who uses a similar question as a manipulation check. In the final version of the survey, we implement a similar manipulation check. To avoid priming the control group, we ask the "how important" item right after measuring policy preferences. The remaining 3 items in the 4 items scale are asked at the very end of the survey. These items are included to better capture cross-sectional variation in partisan strength, which we will use when generating group-specific descriptive statistics using the full cross-sectional data. Based on data from the July 2017 pilot, we estimate that respondents in the treatment group will spend an average of 3 minutes answering this part of the survey.

Sample and randomization procedure The survey is administered by GFK Knowledge Networks to a general population of English-speaking US citizens over the age of 18 who reside in the United States. The survey uses a probability-based web panel designed to be representative of the population of the United States. We aim to collect 3600 responses. To allocate respondents across the 6 treatment conditions, we use
a multivariate continuous blocking technique that maximizes efficiency. Efficiency is of particular concern with regards to the partisan prime manipulation. The latter seeks to affect answers to politicized issues such as building a wall on the Mexican border or regulating businesses to protect the environment. Such attitudes are difficult to manipulate in a survey setting and most priming experiments usually focus on de-politicized issues that voters know little about. As a result, we do not expect the effect size to be very large and are especially concerned about minimizing differences between the treatment conditions to increase efficiency.

In practice, we leverage key feature’s of GfK’s data collection technique. GfK randomly samples a first group of individuals from its panel. In our case, with a target sample of 3600, the first sample is a group of around 5500. They then email this group until reaching the 3600 respondents. Weights are provided to correct for individuals who did not respond. GfK has a lot of information on these individuals in terms of basic demographics. In addition, we purchase access to variables highly predictive of policy preferences such as ideology, partisan identification or vote in the 2016 and 2012 elections. GfK provides us with a complete file of these 5500 individuals, along with their values on all these variables. We then assign individuals to our 6 treatment conditions using the multivariate continuous blocking technique provided in the \texttt{blockTools} \textit{R} package \cite{Moore2012}. We send the file back to GfK who records the assigned treatment for each respondents in the first sample. Individuals who end up taking the survey “arrive” on the Qualtrics platform where our survey is hosted with, embedded in the url, information on their treatment assignment. Assuming that non-participation and drop-off is not correlated with the variables used for blocking, we can easily address non-compliance as done in \cite{Horiuchi2007}. Because we have extensive information on non-compliers, violation of this assumption can be corrected using the observables shared with us by Qualtrics.

We block on a set of individual covariates provided to us by GfK. We requested covariates that are important predictors of individuals’ survey responses:

- Partisan identity (1 to 7 partisanship scale)
- Whether or not respondents voted for Trump in 2016 (Yes, No, DNK-NA, Did not vote)
- Whether or not respondents voted for Obama in 2012 (Yes, No, DNK-NA, Did not vote)
- Age (continuous)
- Income (20 categories)
- Education (4 categories)
- Ideology (1 to 7 ideology scale)
- All the variables mentioned in Table 3 as provided by GfK (race, gender, gun ownership, born again Christian, sexual orientation...)
Final sample for analysis: exclusion criteria  The survey firm does not allow “trick” screener questions of the kind most often used to verify that respondents are paying attention (Berinsky, Margolis and Sances 2014). Instead, we rely on two alternative items. One item is asked right after the donation task (see below) and checks that individuals understood the task. The other two items, included at the very end of the survey, directly asks respondents to evaluate the quality of their responses for advanced research (Meade and Craig 2012). The main analysis will rely on a restricted version of the sample. This version will excludes 1) individuals who rated the quality of their responses as 3 or less on a 1 to 5 scale, 2) individuals who gave inconsistent responses to the comprehension check question and 3) individuals who answered the survey in less than 30% of the estimated average time (which was measured in a previous pilot on M-Turk), namely in less than 3 mins. We will then lift these restrictions one at a time to see if our results still hold on the larger –and noisier– sample. Our preferred sample for the final analysis is the restricted sample.

3.2 Overview - Wave 2

The description of wave 2 is tentative: design will change depending on results from wave 1. Figure 4 describes the basic structure of the second wave of the survey. Wave 2 includes one randomization procedure described below.

Figure 4: Wave 2 – Overview –

Wave 2 randomly assigns half of respondents to the 10 policy issues discussed in wave 1. The other half is assigned to the same issues, minus one issue replace by a new topic. The respondents are then asked whether they want to write to their senator about one of two bills, each bill related to an issue they have been surveyed about.

Changing the “menu of option” In wave 2, all respondents get to express their policy preferences using the same survey tool they were assigned at wave 1. Yet, there is one important difference. Half of the respondents will be randomly assigned to answer questions about the exact same set of 10 policy issues,
while the other half will be presented with a modified set of policies: one issue from wave 1 will be dropped and a new issue will be introduced. We have opted to include an issue that belongs to the same policy area as one of the issues previously asked about. More specifically, we include an item about increasing the tax rate on millionaires and expect it to “compete” with the item asking about increasing the minimum wage. To keep the total number of issues equal to 10, we drop one issue, namely the item on equal pay for both genders.

The aim is to assess how robust QV is to such changes in the “menu of options.” We test this robustness in 2 ways. First, comparing wave 1 and wave 2, we examine whether response stability on the 9 unchanged items is affected by this substitution. Second, within wave 2 we examine how this substitution affects the predictive power of QV when it comes to predicting real world behaviors (see prediction 1 below). Indeed, the letter writing task includes a bill on minimum wage increase. We expect answers in QV to better predict the willingness to write something to one’s senator on one of the issues mentioned in the bills. We examine how the predictive power of QV answers on minimum wage varies across the two menus.

Recontact and attrition For wave 2, we will only recontact individuals who did not receive the partisan prime in wave 1. To deal with differential attrition rates that could bias our estimates, we will implement the following procedure. Among the group of survey respondents recontacted for participation in wave 2, a third will receive a participation incentives of $1, another third will receive a participation incentive of $0.5 and the rest will not receive any additional incentives. Whether or not a respondent receive no incentives, a $0.50 incentives or a $1 incentive will be fully random. We will use this information to implement a Heckman correction for sample selection.

3.3 Empirical Tests

3.3.1 Does QV Better Predict Behavior? (P1)

Prediction 1. Attitudes measured using QV, relative to attitudes measured using variants of Likert scales, are better predictors of costly issue-specific behavior (e.g. decision to call one’s senator, willingness to donate to a political cause).

Design We test P1 using data collected both in wave 1 and wave 2. After having expressed their policy preferences using one of the three survey tools described above, respondents in both waves are asked to perform a task with “real world” consequences. In wave 1, respondents are asked whether or not they want to donate some money to one of four non-profit advocacy groups, working on two issue areas, immigration and gun control. For each issue area, we choose non-profits that fall on each side of the political divide: for and against immigration, for and against gun control. In wave 2, respondents are given the option to write a letter to members of Congress on one of two bills currently under consideration in Congress. One bill increases the minimum wage over a 6 year period to $15/h. The other seeks to limit abortion rights by
limiting public funding for abortion providers. Figures A1-A2 in the Appendix present screen shots of the donation task and Figures A4-A6, also in the Appendix, screen shots of the letter writing task.

These tasks probe two features of QV. One is QV’s ability to better predict how one individual will arbitrate across issue areas. Imagine an individual with “extreme” preferences in Likert on both immigration and gun control. Likert cannot predict which non-profit this respondent is likely to pick in the donation task as there is no variance to leverage. The other feature is QV’s ability to predict behavior across individuals within an issue area. Imagine a group of a 100 individuals with “extreme” preferences in Likert on immigration. Likert cannot predict which of these individuals is most likely to donate to one of the immigration related non-profits. QV compels respondents to “de-bunch” and move away from extreme values. This generates more variance both within individuals, across issues and between individuals within issues. With these tasks, we examine if this “de-bunching” occurs in a meaningful way, with meaningful being defined using real world behavior as a benchmark.

Analysis: donation task.

**Outcome variables**: We compute a total of 5 variables.

- $D_{\text{issueA}}$: This variable is equal to 0 if an individual did not donate, 1 if she donated to one of the gun regulation non-profits and equal to $-1$ if she donated to one of the immigration non-profits.

- $D_{\text{immi1}}$: For the immigration non-profit, we recode the donation outcome such that individuals who did not donate are coded as 0, individuals who donated to the pro-immigration non-profit are coded as 1 and individuals who donated to the anti-immigration non-profit are coded at -1.

- $D_{\text{immi2}}$: We generate a second variable where the donation amount substitutes for 1 and -1.

- $D_{\text{gun1}}$ & $D_{\text{gun2}}$: We repeat the same procedures for the gun non-profits.

**Independent variables**: We focus on the survey answers pertaining to the issue areas mentioned in the donation task (immigration and gun regulation).

- $\text{score\_immi\_Lik/Likp/QV}$: Answers on the border wall item, provided in Likert, Likert + “issue importance,” and QV, respectively.

- $\text{score\_gun\_Lik/Likp/QV}$: Answers on the gun control item, provided in Likert, Likert + “issue importance,” and QV, respectively.

- $Z_{\text{score\_immi}}$: $\text{score\_immi\_Lik/Likp/QV}$ are standardized, these standardized scores are combined into a unique variable.

- $Z_{\text{score\_gun}}$: $\text{score\_gun\_Lik/Likp/QV}$ are standardized, these standardized scores are combined into a unique variable.

- $\text{rel\_score\_gun\_immi\_Lik/Likp/QV}$: We generate a variable that compares answers on one policy issue with answers to the other policy issue. More specifically, we take the absolute value
of the difference between the response score (not standardized) on gun control and the response score (not standardized) on immigration. We then divide this amount by the absolute value of the response score on immigration. For example someone who, in QV, voted -2 on the border wall item and +1 on gun control will have a final score of \( \frac{\text{abs}(1 - (-2))}{\text{abs}(-2)} = \frac{3}{2} \). We compute this value separately for each survey tool.

- **QV**: a dummy variable that records the survey tool being used, here QV [Likert is the reference method when used in combination with Likp]
- **Likp**: a dummy variable that records the survey tool being used, here Likert + “issue imporance.” [Likert is the reference method when used in combination with QV]

For each policy issue, we plan to run a logit regression (for \( D_{\text{gun}1} \) and \( D_{\text{immi}1} \)) and an OLS regression (for \( D_{\text{gun}2} \) and \( D_{\text{immi}2} \)). As predictors we will use the standardized score variable, as well as the two dummies capturing the survey methods being used (e.g. QV and Likp). We interact all variables. Standard errors will be clustered by treatment conditions. The equation below illustrates the regression model in the case of the OLS regression and the immigration issue:

\[
D_{\text{immi}2_i} = \beta_0 + \beta_1 * Z_{\text{immi}_i} + \beta_2 * \text{Likp} + \beta_3 * QV + \beta_4 * Z_{\text{immi}_i} * \text{Likp} + \beta_5 * Z_{\text{immi}_i} * QV + \varepsilon_i
\]

We expect the following to be true:

- \( \beta_5 - \beta_4 > 0 \)
- \( \beta_5 - \beta_1 > 0 \)

We will also report standard errors from randomization inference, comparing the true estimates from estimates using shuffled data with randomly reassigned treatments to other subjects.

Finally, we will run a multinomial logit regression predicting \( \text{don.issue}_A \) using \( \text{rel.score.gun.immi} \). We will run three separate regression, one for each survey tool. We expect the model fit (both BIC and AIC) to be larger for the model using QV answers than for the other two models using the variants of Likert scales.

**Analysis: letter writing.**

- **Outcome variables**:

  - **L.issueA**: This variable is equal to 0 if an individual did not write, 1 if she wrote about the minimum wage issue, and equal to –1 if she wrote on the abortion issue.
  - **L.minW**: this variable is equal to 0 if an individual did not write on the minimum wage bill, 1 if she did.
- LAbort: this variable is equal to 0 if an individual did not write on the abortion bill, 1 if she did.

- **Independent variables**: We focus on the survey answers pertaining to the issue areas mentioned in the letter writing tasks (minimum wage and abortion).

  - score_minW_Lik/Likp/QV: Answers on the minimum wage item, provided in Likert, Likert + “issue importance,” and QV, respectively.
  - score_abort_Lik/Likp/QV: Answers on the abortion item, provided in Likert, Likert + “issue importance,” and QV, respectively.
  - Z_minW: score_minW_Lik/Likp/QV are standardized, these standardized scores are combined into a unique variable.
  - Z_abort: score_abort_Lik/Likp/QV are standardized, these standardized scores are combined into a unique variable.
  - rel_score_abort_minW_Lik/Likp/QV: We generate a variable that compares answers on one policy issue with answers to the other policy issue. More specifically, we take the absolute value of the difference between the response score (not standardized) on the abortion item and the response score (not standardized) on the minimum wage item. We then divide this amount by the absolute value of the response score on immigration.
  - QV: a dummy variable that records the survey tool being used, here QV [Likert is the reference method when used in combination with Likp]
  - Likp: a dummy variable that records the survey tool being used, here Likert + “issue importance.” [Likert is the reference method when used in combination with QV]

For each policy issue, we plan to run a logit regression. As predictors we will use the standardized score variable, as well as the two dummies capturing the survey methods being used (e.g. QV and Likp). We interact all variables. Standard errors will be clustered by treatment conditions. The equation below illustrates the regression model in the case of the abortion issue:

\[
L_{\text{abort}} = \beta_0 + \beta_1 \cdot Z_{\text{abort}} + \beta_2 \cdot \text{Likp} + \beta_3 \cdot \text{QV} + \beta_4 \cdot Z_{\text{abort}} \cdot \text{Likp} + \beta_5 \cdot Z_{\text{abort}} \cdot \text{QV} + \epsilon_i
\]

We expect the following to be true:

- \(\beta_5 - \beta_4 > 0\)
- \(\beta_5 - \beta_1 > 0\)

We will also report standard errors from randomization inference, comparing the true estimates from estimates using shuffled data with randomly reassigned treatments to other subjects.
Finally, we will run a multinomial logit regression predicting L,\text{issueA} using \text{rel_score_abort_minW}. We will run three separate regression, one for each survey tool. We expect the model fit (both BIC and AIC) to be larger for the model using QV answers than for the other two models using the variants of Likert scales.

### 3.3.2 Can QV better identify individuals who hold stable attitudes over time? (P2)

**Prediction 2.** QV, relative to variants of Likert scales, better identifies individuals with stable attitudes.

**Design:** We recontact 2400 individuals who were in the control group in wave 1. We expect a follow-up rate of around 70% yielding a wave 2 sample size of around 1700 individuals. 1000 individuals are asked the same questions as the ones used in wave 1, 700 individuals are assigned to the modified list of options described in section 3.2. We focus on the first group of 1000 individuals. We assign each individual to the survey tool they received in wave 1, and consequently expect around 300 observations per survey method.

**Analysis:**

- **Variables:**
  - score\_ISSUEW1\_Lik/Likp/QV: Answers on a given issue in wave 1, provided in Likert, Likert + “issue importance,” and QV, respectively.
  - score\_ISSUEW2\_Lik/Likp/QV: Answers on a given issue in wave 2, provided in Likert, Likert + “issue importance,” and QV, respectively.
  - Z\_ISSUEW1: score\_ISSUEW1\_Lik/Likp/QV are standardized, these standardized scores are combined into a unique variable.
  - Z\_ISSUEW2: score\_ISSUEW2\_Lik/Likp/QV are standardized, these standardized scores are combined into a unique variable.
  - QV: a dummy variable that records the survey tool being used, here QV [Likert is the reference method when used in combination with Likp]
  - Likp: a dummy variable that records the survey tool being used, here Likert + “issue importance.” [Likert is the reference method when used in combination with QV]

Given the budget constraint, answers in QV are a linear combination of each other. In other words, the error terms across equations are correlated. We will examine all issues jointly and estimate a seemingly unrelated regressions model (Zellner 1962).
\[
Y_{i1}^{W2} - Y_{i1}^{W1} = \beta_0 + \beta_1 * Y_{i1}^{W1} + \beta_2 * T_j + \beta_3 * Y_{i1}^{W1} * T_j + \epsilon_{i1} \\
Y_{i2}^{W2} - Y_{i2}^{W1} = \beta_0 + \beta_1 * Y_{i2}^{W1} + \beta_2 * T_j + \beta_3 * Y_{i2}^{W1} * T_j + \epsilon_{i2} \\
... = ...
Y_{iK}^{W2} - Y_{iK}^{W1} = \beta_0 + \beta_1 * Y_{iK}^{W1} + \beta_2 * T_j + \beta_3 * Y_{iK}^{W1} * T_j + \epsilon_{iK}
\]

Where \(Y_{ik}^{W2}\) is \(Z_{ISSUE2}\) and \(Y_{ik}^{W1}\) is \(Z_{ISSUE1}\) for the \(K_{ih}\) issue. \(T_j\) is a categorical variable identifying the survey tool being used. If indeed strong preferences are more stable then we expect, for all regressions, \(\beta_1 < 0\). If QV outperforms the other survey tools, then we expect the interaction between \(Y_{i1}^{W1}\) and QV to be positive. We will also analyze our data for impacts on the distribution as well as means, e.g., quantile regressions and kolmogorov smirnov tests for distributional shifts.

3.3.3 Is QV less prone to partisan “cheerleading”? (P3)

**Prediction 3.** Attitudes measured using QV, relative to attitudes measured using variants of Likert scales, are less affected by context-specific cues, e.g. partisan cues that activate “partisan cheerleading.”

**Design:** Embedded in wave 1 is a manipulation seeking to increase the strength of partisan identification (see section 3.1). We use this manipulation as an instrument for partisan strength. The analysis focuses only on individuals whom GfK has identified as Republican or Democrats (individuals who lean Republican or Democrat are also counted as identifying with one of the two parties). Individuals identified as independents are not exposed to this manipulation and are not part of this segment of the analysis. Individuals who are exposed to the partisan prime are also asked about their partisan identification right before having to perform the priming task. This question is part of the priming manipulation itself. Yet, we also use it to assess the quality of the partisanship information provided to us by GfK.

Based on an analysis of the 2016 ANES, we have identified the following issues as very well predicted by partisanship. We thus expect our manipulation to further increase the partisan differences, as Democrats and Republicans become more likely to take the modal policy position within members of their party.

- Border wall
- Gay rights (in our survey: adoption by gay couples)
- Gun regulation
- Affirmative action
- Minimum wage
Two other issues asked about in wave 1 are not well predicted by partisanship. We are agnostic regarding
the effect of the prime on answers to questions on these policy issues.

- Paid leave for parents
- Equal pay across genders

A third policy issues, namely deficit control, is well predicted by partisanship according to the 2016
ANES data. Yet, following the deficit increase resulting from the Trump tax cuts, we are unsure about
respondents’ beliefs about what the “correct” position to take is, relative to the modal position in their own
party.

Analysis:

- **Outcome variable:**
  
  - Z_ISSUE: score_ISSUE_Lik/Likp/QV are standardized, these standardized scores are com-
    bined into a unique variable.

- **Independent variable:**
  
  - party_ID: Democrats are coded as 1 and Republicans are coded as 0
  - prime: Equal to 1 if the respondent had to execute the priming task.
  - T_j: A categorical variable that captures the survey tool being used.

The priming of partisan identity should push Democrats to take more liberal positions and push Republi-
cans to take more conservative attitudes (at least in the case where they hold weak attitudes on a given policy
issue). Given that both groups move in opposite directions, the relevant estimate of interest is the interaction
term between Prime and Party_ID. We expect the average difference in answers between democrats and
republicans to increase as a result of the partisan prime.

To examine whether answers measured using Likert and its variant were more affected than answers
measured using QV, we include a triple interaction between Prime, Party_ID and T_j. We examine whether
the difference between Republicans and Democrats increased more for answers provided in Likert and its
variant, than for answers provided in QV. A negative interaction coefficient would indicate that indeed,
this polarizing effect of the prime was smaller in QV than for the other methods. As already pointed out
above, because of error correlations, we jointly estimate all coefficients within a seemingly unrelated regres-
sions model. Issue specific coefficients should be negative, especially for the items listed above as being
particularly prone to priming. We expect β_3 to be negative in the following regression presented first as
within-subject for readability:

\[
Z_{ISSUE_{QV}} - Z_{ISSUE_{Lik}} = \beta_0 + \beta_1 \cdot \text{Party}_ID + \beta_2 \cdot \text{Prime} + \beta_3 \cdot \text{Party}_ID \cdot \text{Prime} + \epsilon
\]
\[ Z_{\text{ISSUE, QV}} - Z_{\text{ISSUE, Likp}} = \beta_0 + \beta_1 \times \text{Party ID} + \beta_2 \times \text{Prime} + \beta_3 \times \text{Party ID} \times \text{Prime} + \varepsilon \]

The final specification will be a triple interaction:

\[ Z_{\text{ISSUE}} = \beta_0 + \beta_1 \times \text{Party ID} + \beta_2 \times \text{Prime} + \beta_3 \times \text{Party ID} \times \text{Prime} + \beta_4 \times \text{Party ID} \times T_j + \beta_5 \times \text{Prime} \times T_j + \beta_6 \times \text{Party ID} \times \text{Prime} \times T_j + \beta_7 \times T_j + \varepsilon \]

### 3.3.4 Are responses in QV more “self-interested”? (P4)

**Prediction 4:** A model seeking to predict policy attitudes using measures of whether or not a given individuals will benefit or be harmed by a given policy proposal will provide a comparatively better fit when attitudes are measured using QV than when they are measured using variants of Likert.

**Design:** At the beginning and at the end of the survey, we asked individuals a set of questions about themselves on features that capture the likelihood that one will be affected by a given policy. We also purchased from GfK additional variables. Table 3 lists these variables alongside the relevant policy issues.

**Analysis:**

- **Outcome variables:** We focus on the survey answers pertaining to the issue areas mentioned in Table 3.
  - \( Z_{\text{ISSUE}}: \) score\_ISSUE\_W1 Lik/Likp/QV are standardized, these standardized scores are combined into a unique variable.

- **Independent variables:** see Table 3

To examine the correlation between the individual-level variables and policy proposals listed in Table 3, we regress \( Z_{\text{ISSUE}} \) on the matching covariate, and include an interaction with the survey tool. We expect a larger coefficient under QV. Keep in mind that, given the budget constraint, answers in QV are a linear combination of each other. In other words, the error terms across equations are correlated. We consequently estimate a seemingly unrelated regressions model (Zellner 1962).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
<th>Policy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sexual orientation</td>
<td>Which of the following best describes how you think of yourself? Gay/Lesbian versus Straight (GfK)</td>
<td>Giving same sex couples the legal right to adopt a child.</td>
</tr>
<tr>
<td>Gun owner</td>
<td>Are there any guns or revolvers that are kept in your home or garage? (Y/N) Do any of these guns personally belong to you? (Y/N) (GfK)</td>
<td>Laws making it more difficult for people to buy a gun</td>
</tr>
<tr>
<td>Hispanic Distance from immigration event</td>
<td>Provided by GfK Where were you / your parents / grand-parents born?</td>
<td>Building a wall on the US Border with Mexico</td>
</tr>
<tr>
<td>Gender</td>
<td>Provided by GfK</td>
<td>Require employers to pay women and men the same amount for the same work?</td>
</tr>
<tr>
<td>Race</td>
<td>Provided by GfK</td>
<td>Preferential hiring and promotion of blacks to address past discrimination</td>
</tr>
<tr>
<td>Time proximity to birth of child</td>
<td>Do you have children? How old is your youngest? Do you plan on maybe having children (another child) one day? No young child, no plans to have any (1), young children, no plans to have more (2), young/older children, more planned in far future (3) Just had a child or one planned in next 3 years (4)</td>
<td>Require employers to offer paid leave to parents of new children</td>
</tr>
<tr>
<td>Wage level</td>
<td>Are you, were you ever paid the minimum wage, below? (See Appendix A.3 for a full description of the items)</td>
<td>Raising the minimum wage over the next 3 years</td>
</tr>
<tr>
<td>Religiosity / born-again</td>
<td>Would you describe yourself as a born-again or evangelical Christian? How often do you attend religious service? (GfK)</td>
<td>A nationwide ban on abortion with only very limited exceptions</td>
</tr>
</tbody>
</table>
4 Discussion: Expectations and Limits of the Current Design

In this project, we seek to make two contributions. First, we propose a general theoretical framework to deductively infer the comparative advantages of alternative survey methods relative to Likert scales. We highlight how the most ubiquitous survey item, the Likert scale, can be problematic when used to measure mass opinion. The model explains why Likert may provide only poor information on individuals’ attitude strength, i.e. the extent to which an attitude matters “for an individual’s thoughts, intentions, and behavior” (Howe and Krosnick 2017). Relatedly, it cautions against the naïve use of Likert to study evolution of public mass opinion: in an increasingly polarized world, it does not allow researchers to discriminate between meaningful attitudinal change, and attitudinal change that has limited political consequences because it is mainly lip service to the party norm. We then compare and contrast Likert with a new approach to the measurement of preferences that tries to increase the cost of “extreme” answers, building on the novel idea of ‘Quadratic Voting’ (QV) (Lalley and Weyl 2016). Under certain assumptions, this method is more likely to better capture strong attitudes than Likert. We formalize the conditions where Likert is super or inferior to these new techniques, in a context where partisan cues matter. Our second contribution is to test our model and the new survey instrument in a series of experiments described in detail above. The empirical design aims to put QV to a tough test: we compare it to the best practices in terms of collecting answers using Likert (i.e. branching) and give existing techniques a fair test by combining Likert scales with issue important items.

It should be noted that while the survey is designed to examine the strengths of QV, we do not always expect it to clearly and unambiguously outperform a simpler measure of attitude strength such as the Likert variant with the importance item. There is good reasons to believe this could be the case, but the most important prediction coming out of our model contrasts Likert’s performance with that of QV. While QV takes longer to respond than the Likert items, much of the additional time comes from the video: answering the QV only adds an average of 50 seconds to the survey once time from the instructional video is discounted. This additional survey time could be worth researchers’ resources if the information recovered is more predictive of real world behaviors. We expect this study to settle this issue.
References


Holbrook, Allyson L, Matthew K Berent, Jon A Kronick, Penny S Visser and David S Boninger. 2005. “Attitude importance and the accumulation of attitude-relevant knowledge in memory.” Journal of per-


Lalley, Steven P and E Glen Weyl. 2016. “Quadratic voting.”.


Mullinix, Kevin J. 2016. “Partisanship and preference formation: Competing motivations, elite polarization,


A Appendix

A.1 Donation Task

Figure A1: Donation Task (1)

Assume you have been selected to receive one of $100 cash bonuses.

You have the option to donate all (or part) of this bonus to one (or more) non-profit organizations. What you do not donate, you can keep for yourself.

On the next page, we provide you with more information on each organization. We then ask you whether you would like to make a donation.

Figure A2: Donation Task (2)

Non-profit organizations are dedicated to defending a wide variety of social causes. These organizations depend on the generosity of the general public to fulfill their mission.

We have picked non-profit organizations working on two policy issues previously discussed in this study. These issues are gun policy and immigration policy. For each issue, we have selected two reputable non-profit organizations, one for each side of the debate.

Please take a few minutes to familiarize yourself with these organizations.

Gun policy

*Gifford Law Center to Prevent Gun Violence*: this organization favors gun control. Its main activities include lobbying state and federal legislatures in favor of bills that regulate the purchase, possession and use of firearms. This organization also goes to court to defend gun control laws against legal challenges from people who oppose such laws.

You can find more information on the organization by clicking here.

*Institute for Legislative Action*: this organization opposes gun control. Its main activities include lobbying state and federal legislatures to defeat bills that regulate the purchase, possession and use of firearms. This organization also provides voters with information on candidates' position on gun control.

You can find more information on the organization by clicking here.

Immigration policy

*Numbers USA*: this organization seeks to reduce both legal and illegal immigration to the United States. Members act to persuade public officials to support more restrictive immigration policies. This organization also provides voters with information on candidates' position on immigration control.

You can find more information on the organization by clicking by clicking here.

*American Immigration Council*: this organization opposes restrictive immigration policies, especially if they infringe on the rights of immigrants in the United States. Members act to educate the public on immigration issues. This organization also goes to court to defend immigrants’ rights against government policies and practices.

You can find more information on the organization by clicking here.
Figure A3: Donation Task (3)

Assume you have been selected to receive one of the $100 cash bonuses.

You have the option to donate none, all, or part of your $100 bonus to one of the non-profit organizations. Whatever you do not donate, you can keep for yourself.

Whatever you decide to donate, we will match it. For example is you donate $50, we will add another $50. We will pay the final amount to the organization of your choice, and email you the receipt. The donation will be anonymous.

Pick the non-profit you would like to make a donation to:

- Institute for Legislative Action
  (opposed to gun control)
- Gifford Law Center to Prevent Gun Violence
  (favorable to gun control)
- Number USA
  (opposed to immigration)
- American Immigration Council
  (favorable to immigration)
- I do not want to make a donation

How much of your $100 bonus do you wish to keep and how much do you wish to donate? Reply using the responses boxes below (remember, the total must equal $100):

<table>
<thead>
<tr>
<th>Donate</th>
<th>Keep for myself</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A.2 Letter to Senator Task

Figure A4: Letter to Senator (1)

You have arrived at the final section of the study.

On the next page, you will find information on 2 bill proposals that are currently being examined by a congressional committee. This is usually a good time for voters to take action by telling their representatives what they think about these bill proposals.

Please read through the summaries of each of the proposed bills. After you read the short summaries, we will give you the opportunity to voice your opinion on each proposed bill.

A.3 Questionnaire Wave 1 [To be added before wave 1 starts (08/2018)]

A.4 Questionnaire Wave 2 [To be added before wave 2 starts (11/2018)]
The following 2 bill proposals are currently being examined by congressional committees:

**Official Bill Title:**

**H.R. 7: No Taxpayer Funding for Abortion and Abortion Insurance Full Disclosure Act**

**Summary:**
This bill seeks to limit the federal funds that can be used for abortion. The bill would:

- Prohibit the use of federal funds for abortion or for health plans that cover abortion
- Prohibit abortions at facilities owned or operated by the federal government
- Prevent federal employees from performing abortions within the scope of their employment.
- Provide exceptions in cases of rape, incest, or when the life of the mother is in danger.

**Official Bill Title:**

**S. 1242: Raise the Wage Act**

**Summary:**
This bill seeks to raise the minimum wage. The bill would:

- Raise the federal minimum wage from $7.25 to $15 an hour by 2024.
- Guarantee that, going forward, the minimum wage will increase at the same rate as median wages.

This bill is expected to increase the wages of 25 percent of the U.S. workforce. It does not apply to people who receive a salary.
In the next section, you will have the option to let Congress know what you think about one of these bills. We will compile all your comments into a letter (one for each bill) and will send the letter to the head of the committee currently examining these bills. Your comments, if you chose to provide any, will be completely anonymous.

Would you be interested in letting Congress know your opinion on one of the bills?

- Yes
- No

Which bill would you like to express your opinion on?

- No Taxpayer Funding for Abortion and Abortion Insurance Full Disclosure Act
- Raise the Wage Act

You have a particular interest in the following bill proposal:

$q\{qID8/ChoiceGroup\}/SelectedChoices$

On this page, you have the opportunity to write your comments and thoughts. For instance, you can:

- Praise or criticize the bill
- Explain why this issue is important for you
- Urge members of Congress to support or oppose the bill

Tips: Your comments don’t have to be complicated, just a few genuine sentences. Don’t worry about typos or mistakes, it further shows you’re a real person who hasn’t been given a script by an activist or partisan group.

You can write your comments below: