Recalibrating Individual Attitudes About Economic Inequality: An Experimental Analysis of Open-Ended Survey Responses

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1 Introduction

In *Politico*, Ben White noted on February 4, 2019, that against the backdrop of rising economic inequality, recent surveys show that there is overwhelming support in the United States for raising taxes on the wealthiest Americans. What is more relevant here aside from the article's recency is its title: "Soak the rich? Americans say go for it." Indeed, the canonical model of economic inequality and redistribution, the Meltzer-Richard model, predicts that in democracies the poor will soak the rich because income distributions are right skewed and thus the median voter will want and be able to tax heavily people richer than themself (Meltzer and Richard, 1981). While this framework remains useful, it is unsurprising that the predictions of the model have not been empirically supported (the so-called Robin Hood paradox), and aside from testing these predictions directly, an entire literature has been devoted to studying the politics of economic inequality and redistribution from various angles. More recently this literature has turned to exploring the nature of people's preferences regarding redistribution, generally through enormous surveys and occasionally longitudinal data, but unfortunately many of these large-N analyses seem to overinterpret the associations that they find. Other studies such as Cruces, Perez-Truglia and Tetaz (2013) and Alesina, Miano and Stantcheva (2018), for example, have proceeded more carefully through the use of survey experiments designed to uncover causal relationships between predictors and individual attitudes about economic inequality.

This study leverages a controlled experiment to analyze not specifically what predicts attitudes about economic inequality (e.g. occupation type, or perceptions about social assistance beneficiaries) but whether individual attitudes about economic inequality can be recalibrated by attenuating individuals' valence weighting biases. This approach is useful in particular because it is unlikely that most individuals have perfectly formed attitudes about all matters related to economic inequality and redistribution, and that these individuals simply report these attitudes when responding to surveys. Rather, it is more likely that they generalize preexisting attitudes about related items to novel stimuli, which here are questions about topics that individuals on average are likely not to have fully formed or informed attitudes about. During attitude generalization, however, individuals weigh the positive and negative information that they possess differently—they have different valence weighting biases. Notably, individuals' valence weighting biases do not seem to be capricious; instead, individual differences in valence weighting bias tend to be stable over time and have been shown to predict a variety of behaviors, similar to personality traits (Rocklage, Pietri and Fazio, 2014). How can we assess the extent to which valence weighting biases affect individual attitudes about economic inequality? Fortunately, Pietri, Fazio and Shook (2013*a*) demonstrate that valence weighting biases can be recalibrated through an operant conditioning computer program, called BeanFest, which allows for the analysis of the causal effects of valence weighting in attitude generalization.

We employ this recalibration treatment here in order to assess how valence weighting bias affects attitudes about economic inequality. Concerning the outcome of interest, rather than utilizing an ordinal scale measuring the extent to which participants believe that an increase in economic equality is needed, for example, we examine participants' open-ended responses to questions about their attitudes regarding various aspects economic inequality. This approach offers several advantages, most notably that participants are able to share their comparatively unencumbered attitudes as opposed to simply evaluating where to rank their attitudes on a one-dimensional scale. Similarly, rather than defining the dimensions on which the responses should be coded ourselves—a proven procedure that may nonetheless

miss key elements of and/or commonalities among responses—we employ an unsupervised learning method in determining what proportion of each response corresponds to each of several topics. Specifically, we utilize the structural topic model (STM) presented by Roberts et al. (2014), and we follow these authors' approach to estimating the effects of treatment and other covariates on open-ended responses.

Section 2 considers the motivation for this analysis by briefly exploring why researchers interested in economic inequality and redistribution have increasingly been studying individual attitudes about these subjects, how valence weighting bias relates to attitude generalization, and how individuals' valence weighting biases can be—as an experimental treatment—recalibrated through BeanFest. Section 3 discusses the data, the estimation of the model as well as the topics uncovered, and the statistical results. After carefully deciding to model four topics, the topics identified generally correspond to participants respectively: acknowledging that economic inequality is a problem that should be addressed in the United States, but otherwise providing no or few specific details regarding how this should be accomplished; offering individualist reasons for why they do not see economic inequality as a problem and for why they, for example, would not support increased redistribution; suggesting that economic inequality is a significant problem that should be addressed through progressive taxation and redistribution; and indicating that economic inequality could be reduced by ensuring that individuals are able to participate and be competitive in a market that nonetheless promises living wages. In short, the empirical results indicate that participants in the recalibration condition are expected to discuss the last topic more than those in the control condition. That the policy positions likely associated with this (improve market structure) topic seem less reflexive and more moderate than those likely associated with the tax and redistribute as well as individualism topics suggests that the estimated effect of the recalibration condition on the topic proportions was in the predicted direction. The results also indicate that the relationships between treatment and topic proportions are moderated by a measure of political ideology in predictable manners. These findings are nonetheless preliminary, and thus Section 4 concludes and discusses ways in which this analysis can

potentially be further developed, improved, and extended.

2 Literature Review

In the Meltzer-Richard model, an individual's preference for redistribution is determined by their place in the right-skewed income distribution; if an individual earns less than or equal to the median voter they prefer redistribution, and if an individual earns more than the median voter they prefer no redistribution, all else equal (Meltzer and Richard, 1981). Moreover, when income inequality is higher, the median voter prefers even more redistribution because they have more to gain. It does not appear that more unequal societies, however, redistribute more—this is referred to as the Robin Hood paradox. Indeed there is in general a lack of empirical support for the predictions of the Meltzer-Richard model (Lind, 2005; Luebker, 2014). The Meltzer-Richard model thus provides an important foundation for understanding why its predictions, perhaps unsurprisingly, do not seem to be supported empirically.

Lind (2005) concludes that given the lack of empirical support for the predictions of the Meltzer-Richard model, it is better to consider individuals' actual preferences regarding economic inequality and redistribution rather than preferences that are ascribed to them. It is possible that individuals may not know precisely where they are located within the income distribution, and therefore their expressed preferences may be misaligned with what the Meltzer-Richard model would predict their preferences to be. Gimpelson and Treisman (2018) indeed find that perceived inequality rather than its true level correlates strongly with demand for redistribution. Similarly, there is evidence that individuals' preferences for redistribution respond to relative evaluations of inequality. Individuals' attitudes about inequality and redistribution may be affected by their estimations of how their economic wellbeing compares to that of their neighbors (Luttmer, 2005), and by the economic conditions of people that individuals' regard as similar to themselves (Ansolabehere, Meredith and Snowberg, 2014). An interesting finding by Thal (2017) offers one straightforward explanation for the Robin Hood paradox: wealthier people, who are more politically and economically powerful, may have perceptions of social conditions that are inaccurately positive given their potential

isolation amongst others like themselves. Lastly, Cruces, Perez-Truglia and Tetaz (2013) bring causal evidence to the understanding that people's misperceptions about their locations within income distributions may lead to the general predictions of the Meltzer-Richard model not being realized. These authors find that individuals who had overestimated their relative position in the income distribution supported higher levels of redistribution after being informed of their true position. Together, these findings suggest that individual attitudes about economic inequality and redistribution are not only given by income distributions, for example, but are also in part the result of individuals' biases.

If individual attitudes about economic inequality and redistribution are formed in part as a function of individuals' misperceptions of their positions within income and/or wealth distributions, there is reason to believe that individuals' preferences regarding these matters may be influenced by other factors as well. These attitudes may be formed early in, and persist throughout, individuals' lives. Luttmer and Singhal (2011), for example, present findings indicating that immigrants' redistributive preferences generally reflect the average redistributive preferences of their birth countries, even when controlling for other predictors that are likely to explain such attitudes. Similarly, there is evidence that suggests that individuals' political attitudes are especially susceptible to change during their teenage years, that parental socialization effects may influence such attitudes, and that the likelihood of attitude change is reduced substantially after early adulthood (Neundorf, Smets and García-Albacete, 2013; Jennings, Stoker and Bowers, 2009; Krosnick and Alwin, 1989). While these empirical findings may highlight the relative rigidity of individuals' preferences, other evidence suggests that individuals' political attitudes are nonetheless rather flexible.

Offering one example of how individual preferences regarding redistribution may be moderated by factors beyond income distribution characteristics—or solidified personal preferences—alone, Luttmer (2001) finds that as demographic (e.g. racial, ethnic, or religious) heterogeneity increases, average support for redistribution declines because the share of beneficiaries belonging to one's own group declines. Here also, the relevant and relatively limited causal evidence that exists is consistent with the correlational results. First, Alesina,

Miano and Stantcheva (2018) find that natives' (of countries in their sample) perceptions about the number and characteristics of immigrants in their countries are profoundly flawed, such that these individuals think that immigrants are generally unlike them and more reliant on government transfers. Second, these authors discover that priming survey respondents about immigration before asking them about their preferences regarding redistribution results in respondents supporting less redistribution on average. Third, the authors find that informing respondents about how hard immigrants work, for example, increases support for redistribution only if respondents were not initially primed about immigration. Individuals' attitudes about redistribution may thus be moderated by variables other than those associated with income distribution attributes alone, and experimental evidence suggests that such attitudes can be manipulated with relative ease, indicating that individuals' attitudes regarding these matters are far from fixed.

Similar to the arguments discussed above, Giuliano and Spilimbergo (2013) find that individuals who experienced a recession when young support more redistribution. And Alt and Iversen (2017) present results that indicate that when immigration intensifies competition for "low-end" jobs—in contrast to increasing the perceived proportion of minorities receiving government benefits—support for redistribution is on average attenuated because those who are not disadvantaged by this increased competition in fact benefit from it, and are thus less likely to support redistribution that would benefit those disadvantaged by the increased competition. While these studies are nonetheless related to the topics pertaining to formative experiences and demographic heterogeneity considered previously, they more importantly—for the purposes of this analysis—introduce the concept of risk. That is, individuals who are particularly attuned to recessions may be more likely to recognize the volatility of labor markets, and individuals who are relatively insulated from the competitive pressures of increased immigration may be less aware of the insurance demands of individuals who are more vulnerable to the increased competition. Individuals' attitudes regarding economic inequality and redistribution therefore may also depend on how exposed to risk they are or perceive themselves to be.

Before examining individuals' risk perceptions explicitly, it is important to consider the insurance function of welfare policy. Specifically, Moene and Wallerstein (2001) develop a model of welfare policy as publicly financed insurance in which voters have redistributive and insurance motives depending on whether benefits are targeted to the employed or those without income. These authors find that increased economic inequality increases support for benefits that are targeted to the employed, because otherwise it is the employed that would be subsidizing the benefits of those without income. The unemployed should nonetheless demand insurance benefits because the possibility of unemployment that every participant in the labor market may face to varying degrees for them materialized. Indeed, Owens and Pedulla (2013) find that individual preferences for redistribution are malleable in one sense because individuals who experience unemployment or lose household income support increased redistribution, and Iversen and Soskice (2001) observe that individuals who make relatively risky investments in specific skills demand more public insurance. Though, how adept are individuals at estimating their risk of unemployment or income loss more generally? Rehm (2016) finds that individuals' subjective risk assessments are mostly accurate, as people—particularly those employed in relatively volatile industries—effectively incorporate information from economic shocks and their social networks into their evaluations. In this sense, it seems that individuals are able to rely on cues from their environment in forming political attitudes that are generally aligned with objective reality.

The previous discussion explores how predominantly economists and political scientists studying economic inequality and redistribution have moved toward examining individual attitudes and the complexity of attitude formation. In fact, Duch and Stevenson (2011) directly advocate for the production of a comparative literature on attitudes about the economy, and these authors point economists to the political science literature on attitude formation. Beyond this, a more psychological approach may be necessary. As mentioned in Section 1, it is unlikely that individuals have perfectly formed attitudes regarding every topic they may happen to be surveyed about. It is instead more likely that they engage in attitude generalization. This can be illustrated by the Alesina, Miano and Stantcheva (2018) experi-

ment: when primed about immigration, respondents generalized their preexisting attitudes about immigration to the topic of redistribution. Moreover, they generalized their *negative* attitudes about immigration. This is an example of valence weighting, which is an attitude generalization process in which known negative attitudes and known positive attitudes are generalized to novel stimuli. More importantly, it is an example of valence weighting bias, specifically negative valence weighting bias, because respondents generalized their negative attitudes, and gave greater weight to negative features of novel stimuli. It is possible, for example, that respondents who were primed about immigration considered that the costs of increased redistribution would be paid by them and their ingroup members, while the benefits would go disproportionately to their outgroup members (Luttmer, 2001). If valence weighting bias is the underlying mechanism for these types of results, then its effects on individual attitudes about economic inequality and redistribution should be studied directly.

As mentioned, valence weighting refers to an attitude generalization process in which known negative and positive attitudes are generalized to novel stimuli. Individuals with a positive valence weighting bias tend to generalize their positive attitudes, and weigh more heavily the positive features of novel stimuli. Those with a negative valence weighting bias tend to generalize their negative attitudes, and give greater weight to negative features of novel stimuli. These process-oriented individual differences, much like personality traits, tend to be stable over time and have been shown to predict a variety of behaviors. For example, individuals with a positive valence weighting bias are more explorative of novel environments, choosing to approach novel stimuli, whereas those with a negative valence weighting bias are more avoidant in these situations, (Rocklage, Pietri and Fazio, 2014).

A large program of research has been dedicated to assessing valence weighting bias and various individual differences that are associated with attitude generalization (Fazio, Eiser and Shook, 2004; Fazio et al., 2015; Pietri, Fazio and Shook, 2013*b*). This research has developed a computer paradigm—BeanFest—that measures valence weighting bias by having individuals first learn positive and negative stimuli. The paradigm then assesses the extent to which individuals generalize their known positive attitudes, or known negative

attitudes, to novel stimuli that resemble both the positive and negative stimuli (Fazio, Eiser and Shook, 2004; Shook, Fazio and Vasey, 2007). In the BeanFest game, participants are tasked with first learning the value of each "bean." The beans vary in their shape from circular to oblong (10 levels) and their number of speckles (1 to 10), creating a 10×10 matrix of beans that are presented to participants. Some beans are assigned a positive score that increase participants' total points, and others are assigned a negative score that decrease participants' total points.

The game consists of two main phases: the learning phase and the test phase. In the learning phase, participants are shown 36 beans that are taken from 6 regions in the 10×10 matrix. The main goal for a given participant is to increase their total point score to 100 points, and to avoid decreasing their point score to 0 points. During each trial in the learning phase, participants are shown a bean and are asked to select or not select the bean. If a participant selects a bean with a positive value, their points increase by 10 as indicated on their point meter on the bottom of their monitor. If they select a negative bean, their overall score decreases by 10 points. If they choose not to select the bean, they are told the value of the bean had it been selected, but their actual score does not change. The advantage of this paradigm is that participants' attitudes are constructed during the learning phase, as participants would not have prior knowledge of the stimuli presented.

During the game phase of BeanFest, participants are presented with the 36 beans that they previously developed attitudes towards, as well as 64 novel beans that were not previously presented. Participants then indicate whether each bean is good or bad on a trial-by-trial basis. Importantly, participants are not shown the value of any bean, but rather are simply asked to categorize each bean. The game phase thus allows the experimenter to assess how participants generalize their attitudes that were formed in the learning phase to novel stimuli. The BeanFest paradigm has two benefits: it assesses attitudes and attitude generalization tendencies that are experimentally created so as not to be confounded with correlates of valence such as familiarity or distinctiveness; and it is performance based, meaning that valence weighting bias is measured behaviorally so as not to require the involvement

of self-beliefs or introspection.

Valence weighting bias is predictive of a variety of judgments and behaviors across several domains. For example, individuals with a negative valence weighting bias tend to score higher on measures related to interpersonal rejection and tend to be more risk averse when assessing hypothetical situations compared to individuals with a more positive valence weighting bias (Pietri, Fazio and Shook, 2013*b*). Valence weighting bias also seems to influence actual behavior. For example, when playing the Balloon Analogue Risk Task (BART), which involves pumping a computer "balloon" for money, individuals with different valence weighting biases behaved in contrasting ways (Lejuez et al., 2002). During the task, participants must pump the balloon in order to increase their profits. The balloon, however, can pop at any time, and therefore it is unclear when a participant should stop pumping on any given trial. At any time, participants can choose to stop pumping and collect their profits. In a study which assessed valence weighting bias via BeanFest, participants with a negative valence weighting bias displayed more risk-averse behavior, choosing to pump the balloon relatively few times. Conversely, those with a positive valence weighting bias displayed more risk-taking behavior, choosing to pump the balloon more (Pietri, Fazio and Shook, 2013*b*).

Valence weighting bias has also been shown to affect more general approach and avoidance behavior. Rocklage, Pietri and Fazio (2014) assessed how valence weighting bias influenced approach behavior in a novel task that is related to BeanFest. Participants completed BeanFest in an initial session and two months later returned to complete DonutFest. DonutFest is similar to BeanFest in that the stimuli presented are all novel, and vary in two fundamental ways: the size of the center hole of the donut (from small to large) and the color of the donut (from red to orange). Valence weighting bias predicted the number of approach decisions participants made during the first block of DonutFest. Individuals with a negative valence weighting bias were more cautious, choosing to approach each unfamiliar donut relatively infrequently. Those with a positive valence weighting bias displayed more risk-taking behavior, choosing to approach the novel donuts more frequently. The results of this research suggest that a negative valence weighting bias predicts more avoidance behavior, particularly

in situations that are novel or ambiguous.

The causal impact of valence weighting tendencies are assessed by modifying, or recalibrating, individuals' valence weighting tendencies to be more balanced. This recalibration procedure leads people with initially extreme weighting tendencies to become more balanced towards objectively appropriate attitude generalization. Previous research has shown that recalibrating individuals with an initially negative valence weighting bias results in more positive categorization of novel stimuli, more positive interpretations of ambiguous situations, and more risk taking behavior; whereas recalibrating individuals with an initially positive valence weighting bias results in more negative categorization of novel stimuli, more negative interpretations of ambiguous situations, and more cautious behavior (Pietri, Fazio and Shook, 2013*a*). Recalibration has thus been shown to attenuate valence weighting bias such that individuals give more equal weight to the positive and negative features of novel stimuli.

Recalibration functions much like an operant learning paradigm, in which participants are rewarded for correct categorization, and punished for incorrect categorization. As a result, participants' valence weighting biases become attenuated after repeated trials in the recalibration condition. In the recalibration version of BeanFest, participants are again presented with novel beans that vary in their shape and number of speckles. However, instead of sampling from six regions of the matrix, the learning phase samples from four regions of the matrix. This is done to promote more balanced and correct learning of the game beans. Additionally, by sampling from these four regions, the matrix can be divided into four quadrants that have objective valences associated with them. Thus, when game beans are presented, they can be objectively categorized as either more closely resembling the positive beans, or the negative beans. Each participant, irrespective of condition, completes the learning phase in order to develop attitudes about each of the beans. During the test phase, participants are presented with 40 beans that they previously learned, as well as 60 beans that are novel and bear resemblance to either the positive or negative beans. Participants are again tasked with categorizing each of the beans as good or bad on a trial-by-trial basis, and are randomly assigned to either complete the control condition or the

recalibration condition. Importantly, participants in both conditions no longer see the point meter that indicates the effect of each bean. In the control condition, participants are simply asked to categorize each bean and are not given information about their categorization. In the recalibration condition, participants are given objectively correct feedback about their bean classification. Prior research has shown that participants who have been recalibrated do indeed categorize the game beans more correctly when compared to the control group (Pietri, Fazio and Shook, 2013*a*).

As noted previously, recalibration has been shown to affect a variety of attitudes and behaviors that are known to relate to valence weighting bias. Participants who were initially more cautious gave greater weight to positive valence and individuals who were initially more risky gave greater weight to negative valence after being recalibrated (Fazio et al., 2015). Further, participants with an initially negative valence weighting bias categorized donuts as more positive in DonutFest, were more positive in their interpretation of ambiguous scenarios, were more likely to choose options that were high risk, high reward (i.e. riskier), and were more likely to pump balloons in the BART task, thus displaying more risk taking tendencies after undergoing the recalibration manipulation (Pietri, Fazio and Shook, 2013*a*). The inverse pattern was found for those with an initially positive valence weighting bias. For these individuals, undergoing recalibration led them to be more cautious and weigh more heavily the negative features of stimuli in novel and ambiguous scenarios. These experiments provide evidence that the recalibration paradigm is an effective method that can be used to manipulate valence weighting biases

This discussion suggests that if expressed attitudes about economic inequality and redistribution are at least in part a function of attitude generalization and valence weighting biases, then the recalibration paradigm should be able to uncover this effect. Information beyond that already considered suggests that such a relationship is likely to exist. When individuals must modify their strategies of information search—when they are tasked with responding to potentially unfamiliar questions, for example—indirect rather than direct experience may have greater influence on attitudes (Eiser, Shook and Fazio, 2007). Indeed,

Rocklage and Fazio (2014) show that individuals are more likely to rely on valence weighting in novel situations, particularly when they are under time pressure or otherwise are not motivated to deliberate further. Individuals thus make use of the cues available to them in forming and generalizing their attitudes.

It is unlikely that negative and positive attitudes generalize equally, however. Within the BeanFest paradigm, Shook, Fazio and Eiser (2007) find that the former generalize more than the latter, with the explanation that for participants, novel targets required less resemblance to learned beans to be classified as negative as opposed to positive. This generalization asymmetry has been shown across studies, and participants also tend to learn negatively valenced objects better than positively valenced ones, leading to an overall negativity bias Fazio, Eiser and Shook (2004). The prevalence of these asymmetries may also vary according to participants' political ideology. Shook and Fazio (2009) finds that conservative participants learned negative stimuli better than positive, largely due to their more avoidant game strategy. Lastly, Rocklage, Pietri and Fazio (2017) demonstrate how recalibrating participants' negative valence weighting bias increased the extent to which these participants behaved prosocially. These dynamics are likely to be especially relevant when considering how individuals' expressed attitudes about economic inequality and redistribution—inherently political subjects—may be functions of attitude generalization and valence weighting bias.

3 Analysis

The previous section identified the importance of individual attitudes to the study of economic inequality and redistribution, as well as the centrality of valence weighting bias in attitude generalization. To what extent does valence weighting bias in attitude generalization affect individuals' expressed attitudes about economic inequality and redistribution? As the psychological research on valence weighting bias largely has, we also study the causal effect of this bias by employing the recalibration condition of the BeanFest paradigm. Once again, recalibration reduces individuals' valence weighting biases by inducing participants in the treatment condition to weigh more equally the positive and negative features of novel

stimuli. To measure our outcome of interest—individual attitudes about economic inequality and redistribution—we rely on participants' responses to open-ended questions about these subjects. The measurement itself is the proportion of each response (document) that corresponds to each of several topics, and this is analyzed within the structural topic model (STM) framework, which allows for the incorporation of relevant covariates into the prior distributions for, here, document-topic proportions (Roberts et al., 2014). Thus, topic prevalence can vary according to the included covariates, which enables us to analyze how the treatment condition affected how often a given topic is discussed by participants. Before discussing this, Section 3.1 introduces the data collected. Section 3.2 considers the descriptive results of the model specified, and Section 3.3 then analyzes the estimated effects of the recalibration condition on topic prevalence, conditional on participants' political ideology.

3.1 Data

Participants in the experiment were 240 undergraduate students enrolled in an introductory psychology course at a Midwestern university. Each participant was given one hour of research credit that enabled them to meet a necessary requirement for their introductory psychology course. After indicating that they consented to participate in the survey, participants were randomly assigned to complete either the control version of BeanFest, or the recalibration version of BeanFest. Table 1 presents descriptive statistics for selected variables for the entire sample, and Table 2 presents descriptive statistics for these same variables grouped by participants' condition assignment to assess covariate balance.

Table 1 indicates that slightly less than half (48%) of the sample was in fact assigned to the treatment condition. Categorical variables such as race and political party[1] are presented as a limited set of indicator variables for whether participants are Hispanic or Latino, or registered Republicans, for example. Thus, though only 34% of participants report being a registered Democrat, likely more than 34% of the sample support policy positions popular within the Democratic Party. This is largely highlighted by the inequality index, which is

[1]Measured as which, if any, political party with which participants' were registered to vote.

Table 1: Entire Sample

Variable	Mean	SD	Median	Min	Max
Treatment	0.48			0	1
Inequality Index	5.06	1.41	5	1	7
Democrat	0.34			0	1
Republican	0.23			0	1
Ideology	4.83	1.47	5	1	7
Age	19.63	2.32	19	18	40
Female	0.45			0	1
White	0.64			0	1
Black	0.05			0	1
Hispanic or Latino	0.05			0	1
Family Status	5.97	1.75	6	1	10

Table 2: Treatment and Control Conditions

	Treatment					Control				
Variable	Mean	SD	Median	Min	Max	Mean	SD	Median	Min	Max
Treatment	1.00			1	1	0.00			0	0
Inequality Index	5.06	1.44	5	1	7	5.06	1.38	5	2	7
Democrat	0.31			0	1	0.37			0	1
Republican	0.25			0	1	0.20			0	1
Ideology	4.82	1.56	5	1	7	4.85	1.39	5	2	7
Age	19.66	2.73	19	18	40	19.60	1.87	19	18	29
Female	0.50			0	1	0.39			0	1
White	0.62			0	1	0.66			0	1
Black	0.05			0	1	0.06			0	1
Hispanic or Latino	0.04			0	1	0.06			0	1
Family Status	5.89	1.84	6	1	10	6.06	1.67	6	2	9

a measure of participants' pre-treatment attitudes about economic inequality and redistribution ranked from conservative (1) to progressive (7).[2] The descriptive statistics of this variable indicate that the attitudes of this sample, regarding these issues, are on average left of center. This is perhaps to be expected given that the sample is comprised of college students, but because it is important to include some measure of political ideology in the model specification discussed in Section 3.2, it is also helpful to confirm that these values are not driven by widespread agreement about these particular issues among individuals in this sample with nonetheless contrasting political ideologies. Because this study did not measure participants' self-reported political ideologies, one way to approximate this—as well as create a more conceptually accurate measure of political ideology to be used in the empirical analysis—is to create a measure of political ideology that is the inequality index weighted by "revealed" partisanship. We thus, for each participant who was registered as a Republican or Democrat, averaged the unrounded inequality index with values of 2 and 6 respectively and rounded the result. For participants who did not "reveal" their partisanship, their political ideology value remained the same as their inequality index value. Table 1 indicates that the inequality index as well as political ideology variables are distributed similarly, suggesting that the inequality index, the political ideology measure used here, and the common measure of self-reported political ideology may all be reasonable proxies for one another.[3]

Table 1 indicates that less than half (45%) of the sample are women, and Table 2 displays that compared to the whole sample, women are relatively overrepresented in the treatment condition. While this is unlikely to be problematic for this study, we intend to ensure this by conducting further robustness checks and future studies. Otherwise, Table 2 shows that the covariates considered are relatively balanced between the treatment and control conditions. Lastly, the family status question asks participants to place their family,

[2]Participants were asked to evaluate on a 7-point scale from strongly disagree to strongly disagree three statements: "I believe an increase in economic equality is needed;" "I believe that the government should reduce income differences between the the rich and the poor;" and "Differences in income in America are too large." To create the index but preserve the properties of the 7-point scale, participants' responses to these questions were averaged and rounded.

[3]The distributions of the inequality index and the political ideology measure used here are nearly indistinguishable. A future appendix will contain this and additional information.

as they were growing up, on a scale with ten levels that ranges from those with "the least money, the least education, and the least respected jobs or no job," to those with "the most money, the most education, and the most respected jobs." For presentation purposes, this variable serves as a reasonable, singular proxy for the numerous items that evaluate the income and education levels of participants and their families, which are likely correlated with individuals' attitudes about economic inequality and redistribution. While they are not directly relevant here, future analyses will consider these variables more thoroughly.

After playing either the recalibration or control version of BeanFest, participants were asked to provide one open-ended response to a set of questions about their attitudes regarding economic inequality and redistribution.[4] The prompt presented was:

> Economic inequality refers to the size of the gap between the rich and the poor in terms of income and/or wealth. Do you think that economic inequality is a problem in the United States? Do you think that the government of the United States should pursue policies to reduce economic inequality in this country? What policies, if any, would you like to see implemented in the United States regarding economic inequality? Please elaborate on why you support each of these positions.

The structure and content of this set of questions offer numerous advantages. First, the open-ended nature of the response provided participants the opportunity to communicate their comparatively uninhibited attitudes about economic inequality and potential solutions to inequality, possibly paired with information pertaining to other dimensions that respondents relate to economic inequality and redistribution. Second, the context of the questions was limited to the United States to induce participants to communicate information about

[4]Participants also responded to numerous questions about various topics between playing BeanFest and providing the open-ended response considered here. The relationships between the treatment condition and these items will be analyzed separately, and this sequence if anything biases the results presented here against the hypothesized relationship between valence weighting bias and attitudes about economic inequality and redistribution, given the length of time that elapsed as well as the amount of activity that occurred between the treatment and respondents' provision of open-ended responses. In future studies we intend to have participants provide their open-ended responses directly after playing BeanFest.

their attitudes regarding economic inequality and redistribution within the country they (likely) know best, rather than their attitudes about inequality between countries, or within other countries. Third, the questions and necessary background information were limited so as to avoid priming bias. Though, fourth, the questions guided respondents along the process of thinking about economic inequality and, optionally, potential solutions to economic inequality, to reduce the likelihood that participants would provide an effective nonresponse if they had not thought extensively about these issues before. The open-ended nature of the response thus offered participants the opportunity to describe their attitudes about economic inequality and redistribution in a natural and multi-dimensional format, rather than forcing participants to translate their attitudes to predefined, one-dimensional scales.

3.2 Model

As mentioned above, one advantage of this research design is that—with regard to the outcome of interest—respondents were able to elucidate their attitudes about economic inequality and redistribution in ways that were not strictly predefined by researchers. Along with this, rather than define the dimensions on which the responses should be coded ourselves, we utilize the STM framework to determine with an unsupervised learning method what proportion of each document corresponds to a specified number of topics. We allow topic prevalence to vary according to treatment condition, the measure of political ideology discussed, and the interaction between the two. The experimental nature of this design allows us to include treatment condition as the only covariate, but because the recalibration condition may differentially affect conservatives and progressives, for example, given the asymmetries discussed in Section 2 which are largely based on political ideology, we also include political ideology as well as its interaction with the treatment condition as covariates.

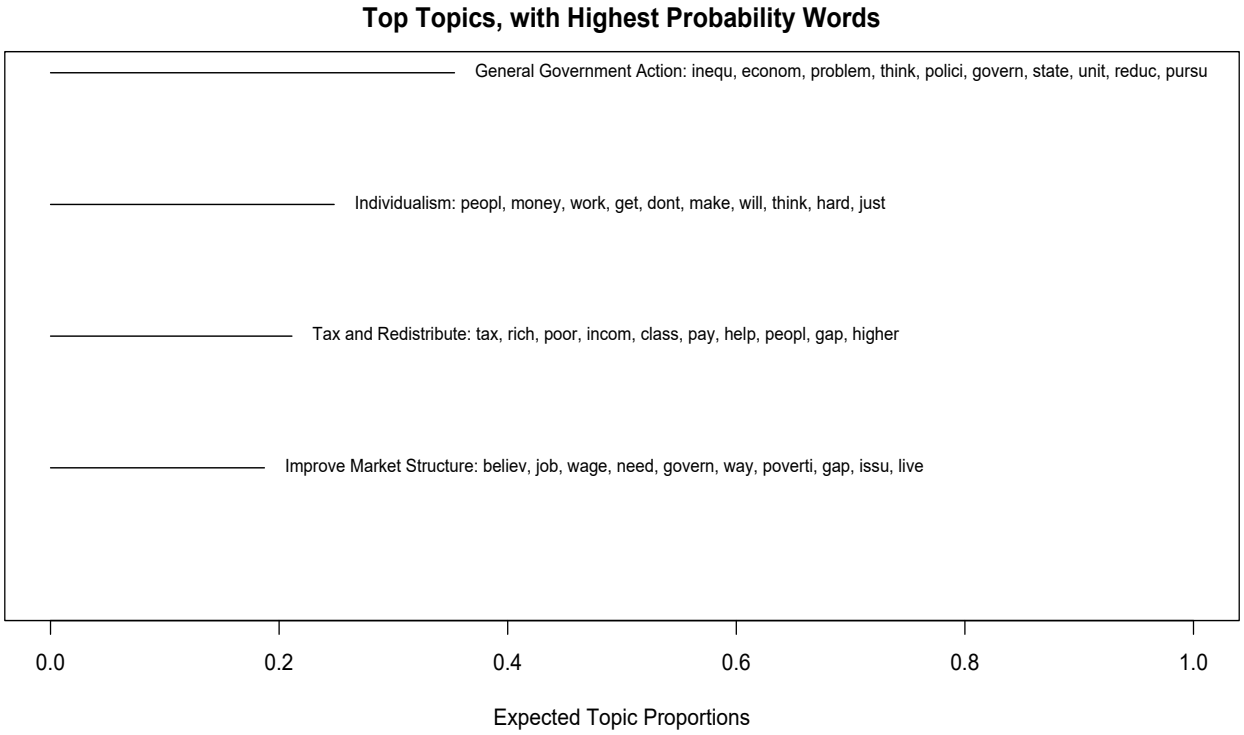
In any STM application, there is no clear answer regarding what the ideal number of topics is to specify. Roberts et al. (2014) suggest that when analyzing survey responses, considering only a few topics may be best, and in their example that closely resembles the design of this study, they estimate three topics. Using the tools provided in the stm R package

indicates that for this application specifying between three and six topics is most appropriate, and specifying four topics produces a model with the most desirable properties in both the semantic coherence and exclusivity dimensions. Following convention, we preprocess the documents by converting all words to lower case, stemming words, as well as removing stop words, numbers, and punctuation. Examination of the various models confirms that here, specifying four topics is best—specifying three topics results in documents that are clearly qualitatively different being grouped together, whereas specifying five or six topics unnecessarily divides documents that are qualitatively alike. The results presented below are nonetheless generally robust to different model specifications at the 95% confidence level.[5] However, a minority of the results of the model that performs best—as defined by the criteria above, and presented below—are only statistically significant at the 90% confidence level, and thus only 90% confidence intervals are presented in the figures below. When utilizing a 95% confidence level, the results are not substantively different, but employing a 90% confidence level offers more parsimonious insights into the model results. We thus do not wish to overstate the findings of this preliminary analysis, but rather aim to highlight patterns in the data that should be further explored in this and future studies.

After fitting the model with four topics as described above, Figure 1 displays the expected topic proportions resulting from this model along with the ten highest probability words associated with each of the topics. In order of their prevalence, and based on other results presented below, we labeled the topics "General Government Action," "Individualism," "Tax and Redistribute," and "Improve Market Structure." Figure 2 shows the topic labellings in no order, along with their 25 highest probability as well as FREX words—the latter are weighted by their overall frequency within topics as well as how exclusive they are to a given topic, providing more semantically intuitive representations of topics. Lastly, Figure 3 contains example responses that, out of the entire sample, are among the documents associated with the highest proportions of each particular topic. For example, the first response in the Tax and Redistribute column is the document with the highest proportion of

[5]This will also be detailed further, among other things, in a future appendix.

Figure 1: Top Topics



this topic out of the entire sample; to aid interpretation, this proportion is .902, and there is no other document in the sample that has a greater Tax and Redistribute topic proportion.

The topic labels are best interpreted and understood by considering Figures 2 and 3 together. Tax and Redistribute of course corresponds to taxation, income as well as wealth, and references to class divisions. The representative responses displayed for this topic in general discuss the need for progressive taxation and redistribution in response to economic inequality that would protect and benefit more broadly individuals in the lower and middle classes. In contrast, Individualism refers to hard work, money as earned, and deservingness as it pertains to wealth attainment as well as retainment. Documents most associated with this topic confirm that these responses consider economic inequality the result of functioning markets that incentivize and justly reward work effort. Improve Market Structure is nuanced in that it highlights jobs, wages, education, and generally supporting economic development. Representative responses of this topic discuss conditioning social

Figure 2: Topic Words

Highest Probability Words	Frequent and Exclusive Words
Tax and Redistribute: tax, rich, poor, incom, class, pay, help, peopl, gap, higher, think, lower, also, societi, increas, wealthi, less, top, educ, middl, wealth, rate, one, much, actual	Tax and Redistribute: tax, class, middl, actual, pay, instead, lower, less, cut, societi, top, incom, decreas, higher, base, rate, use, ensur, grow, million, within, poor, also, rich, back
Individualism: peopl, money, work, get, dont, make, will, think, hard, just, rich, everyon, poor, much, world, countri, take, feel, want, know, person, dollar, other, paid, put	Individualism: dont, hard, just, everyon, world, want, place, work, money, richer, certain, get, arent, control, littl, situat, make, feel, will, peopl, end, deserv, earn, side, worker
Improve Market Structure: believ, job, wage, need, govern, way, poverti, gap, issu, live, help, econom, better, give, support, larg, educ, minimum, huge, equal, creat, compani, find, rais, peopl	Improve Market Structure: believ, poverti, wage, way, nation, minimum, job, women, need, law, larg, creat, communiti, improv, better, support, rais, degre, happen, regul, huge, bottom, allow, exampl, live
General Government Action: inequ, econom, problem, think, polici, govern, state, unit, reduc, pursu, yes, like, countri, can, wealth, see, individu, implement, equal, issu, tri, economi, howev, one, may	General Government Action: pursu, yes, current, major, distribut, reduc, inequ, problem, polit, econom, polici, see, like, interven, regard, solut, state, sinc, unit, seem, wealthiest, status, think, individu, belief

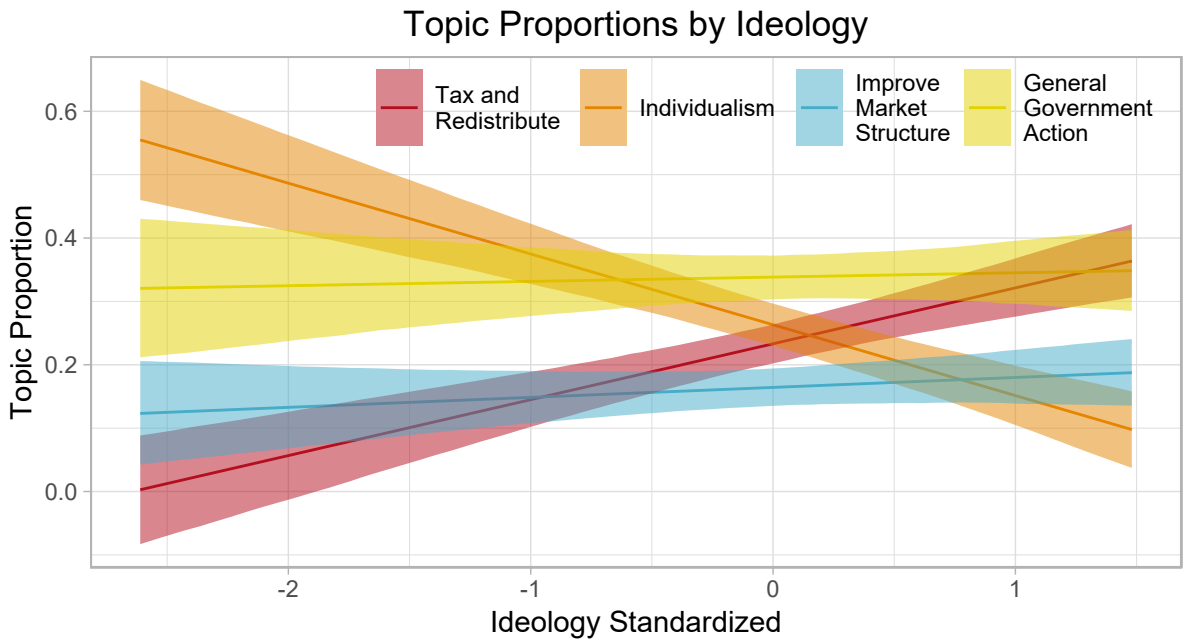
benefits on job searches, buttressing labor rights, providing effective childcare so that parents who need to are able to work, increasing the minimum wage (but not so much so that mobility is discouraged), and supporting local governments in providing education and strengthening local economies. These proposed solutions to inequality thus generally emphasize improving yet working within existing market structures to mitigate the structural determinants of economic inequality, rather than pursuing extensive income and/or wealth redistribution, for example, as a top priority. Finally, General Government Action regards economic inequality as a problem that should be addressed by government, though as the representative responses associated with this topic indicate, the specific actions that government should pursue in doing so are unknown to or unspecified by participants.

That these particular topics emerge from the model is not surprising, especially in the context of the United States, because these topics for the most part correspond to the familiar one-dimensional spatial model of political ideology. In theory, the most straightforward way to immediately reduce economic inequality—political hurdles aside—is to redistribute wealth and/or income, a policy that is most likely to be supported by the political left. Here, this position seems to be represented by the Tax and Redistribute topic. Conversely, the political right may regard economic inequality as a natural byproduct of a free market that

Figure 3: Representative Responses

Tax and Redistribute	Individualism	Improve Market Structure	General Government Action
I think it's a massive problem. Apparently, six members of the Walton family own more than around 150 million Americans (about 50% of the US population). Jeff Bezos also got a subsidized helipad and paid zero dollars in federal income tax in 2017. Why should those that own everything be given free handouts on top of what they already have? I think our government should tax those that are at the very least in the top 1% a lot more. All of their wealth was made from our society, so it's time for them to give back to it. Some policies I saw proposed were rolling back the Bush era tax cuts, using the recent military budget increase to pay for free college tuition, and also rolling back the Trump tax cuts as well. These and many other policies would make it so poorer and middle class Americans can get a good education, not be burdened by crippling student loan debt for decades, and also not have to worry about how they will pay their medical bills or of going bankrupt because of them. I think in this sense, the country would go back to protecting the welfare of its citizens and become more of a democracy.	Not as much as people make it out to be. People work hard they get good money. Our country has an issue with too many "Free handouts" and bringing in too many people from other countries while we have tons of homeless and homeless war veterans. Im not sure what our counry could put up for a new policy. This has been an on going debate for years.	There is a very large gap of economic inequality. But, I believe the government should only provide aid if the family or person has been proven that they are in search of a job. If a family or person is found not looking for a job, then they shouldn't be offered governement aid.	Yes, I think that economic inequality is a problem in the United States because of availability of resources, and I think that the government should pursue policies to reduce economic inequality in this country. I have no idea what policies I would like to see implemented in the United States regarding economic inequality.
I think that there is a very fine line between the rich and the poor. I personally feel that taxes should be slightly altered based on income. This would mean that those with higher incomes should pay a bit more than those with lower incomes. I also think that things like traffic tickets should be proportional to someone's income. I support this because if someone with a much higher income has to actually pay a decent amount of money for a traffic ticket, they may actually refrain from making those same mistakes.	I honestly have no personal opinion on this topic because I am not fully informed on it. I think if the government feels it is necessary they should consider it but people would need to vote on it. I feel that some of these issues are controlled by people themselves. Some people worked extremely hard to be in the socioeconomic standing that they are while others received money but still worked hard to be where they are. I know that some people are born into a "world" where their family does not have money or is not able to afford certain things in life but I honestly feel that those who are doing well in life should not be penalized. I understand that people who have more money should be taxed more in comparison to people that don't but I think that people shouldn't be forced to reduce their economic wealth even though they may have earned every penny of it.	I don't understand enough about economics to weigh in on the issue in a really meaningful way, but I think income inequality is a huge issue in the US right now. I think anti-trust laws need to be updated to fit the new age of online businesses and market places and I believe more workers for such large companies (Amazon for example) should be allowed to unionize without threats and intimidation by said companies. I believe the childcare should be provided by the government for parents who need to work to support their families, and I believe the minimum wage needs to be increased to accomodate household expenses in a country with a rising cost of living.	yes I think there is a problem with economic inequality in the U.S. Yes I think the government should pursue policies to reduce the economic inequality. I am not very sure about what policies to implement.
I would say that when agreeing with the concept of the rich getting wealthier and the poor becoming more impoverished over time, that perhaps there should be policies in place to help shorten the gap by taxing people differently, but then having a system to where said taxes, mostly from the rich, would go back into projects to help the lower class individuals. This wouldnt prevent the rich from maintaining their wealth, but would allow for more poelpe to enter the middle class.	No. The people who usually has more money is becuase they usually have a better education and worked harder to get where they are then most people who arent rich It is not a problem in the US. The government should not be involved in the daily lives of the people unless they are doing harm to someone else. Let business manage themselves and the markets will take care of as many people as possible. Socialism has failed every time it's been tried.	I do believe economic inequality is a problem in the U.S. I also think that the government can do some things to alleviate poverty and close that gap. I seek ways to close the gap by supporting the "bottom" as opposed to cutting down the "top", in some ways. Firstly, that means creating better environments for the future. Poverty is in a lot ways, cyclical in that people who are raised in poverty stay in poverty. If we support local governments more as to provide better education, lower crime rates, and create a stronger local economy, then we will see the economic inequality gap begin to close. I believe that the government should ensure wages are enough to live on and should have a minimum wage but most minimum wage jobs are not meant to be careers	I think inequality is a problem in the United States. Although it may not be as bad as other countries, the wealthiest people in the United States are very wealthy and the United States could implement a better solution to fix this inequality because they have the resources. I think the US Government should be the one to enact change for this. economic inequality is a problem in the united states, the government should pursue policies to reduce economic inqueality. Yes, I do think that the US goverment should pursue policies to reduce economic inequality.

Figure 4:



rewards successful competitors handsomely—thus increasing economic inequality—but that also increases aggregate utility. This position appears to be captured by the Individualism topic. More toward the middle of the spatial model, the political (center-) left may recognize that markets produce desirable outcomes overall, and that the undesirable and inefficient levels of inequality generated by otherwise free markets can be combated by ensuring that workers have bargaining rights, there is equal access to education and opportunity, and social protection systems are in place to safeguard those who are conceivably stochastically disadvantaged by market outcomes. Similarly, the political (center-) right may capitulate that free markets do not always generate ideal social outcomes, and thus acknowledge that certain government interventions—within the confines of existing market structures—may be necessary to assure that all willing individuals are able to gainfully participate and be competitive in the market. These positions are plausibly embodied by the Improve Market Structure topic. The above discussions suggest that the General Government Action topic likely—and perhaps helpfully—groups generic responses to the questions posed together.

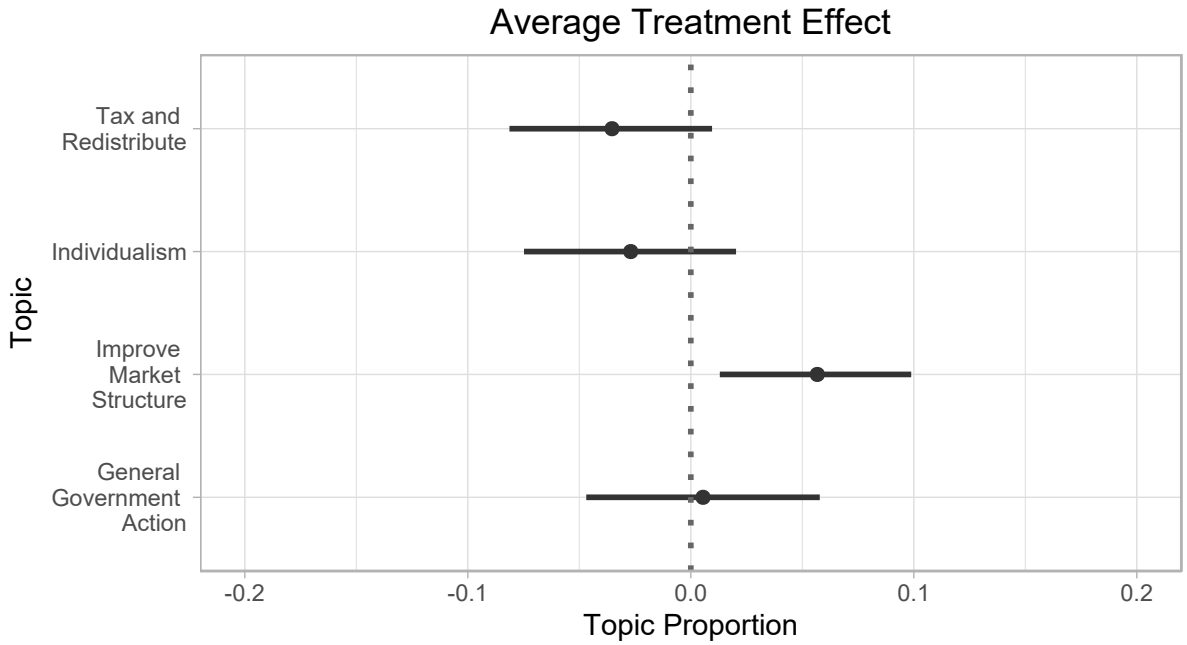
Figure 4 provides general support for these intuitions by displaying how topic prevalence within documents varies according to the measure of political ideology employed in

this study, which in the graph is standardized and ranges from—left to right—conservative to progressive. Conservatives discuss the Individualism topic significantly more than the Tax and Redistribute topic, while progressives do the opposite, which is predictable. Additionally, the expected proportions of these two topics cross around the sample mean of political ideology, in part providing some validation of the model. The Improve Market Structure topic proportion does not seem to vary substantially conditional on the measure of political ideology utilized, possibly reflecting the centrist nature of this topic as discussed above. Neither does the General Government Action topic, though this most likely indicates that the provision of indistinct responses to the questions posed does not vary according to political ideology, which is reassuring insofar as participants with potentially unsolidified political ideologies are more likely to offer relatively nonsepcific responses. These results together suggest that the model presented uncovers descriptive results that are intelligible and consistent with existing theory regarding participants' attitudes about economic inequality and redistribution, as expressed through open-ended responses.

3.3 Results

The patterns apparent in Figure 4 suggest that the Tax and Redistribute as well as Individualism topic proportions vary substantially according to political ideology, and that the Improve Market Structure and General Government Action topic proportions are more consistent across this measure. Given that any treatment effects are likely to be moderated by political ideology, how did the recalibration treatment affect topic prevalence? Figure 5 displays the estimated effects of the treatment on each of the topic proportions overall, with political ideology held at the sample mean. This figure shows that in the treatment condition, the prevalence of the Improve Market Structure topic was higher than in the control condition, and that this difference is statistically significant at the 90% confidence level. If, especially compared to the Tax and Redistribute as well as Individualism topics, Improve Market Structure represents comparatively moderate and more widely supported solutions to economic inequality, then this may be the first evidence that here the recali-

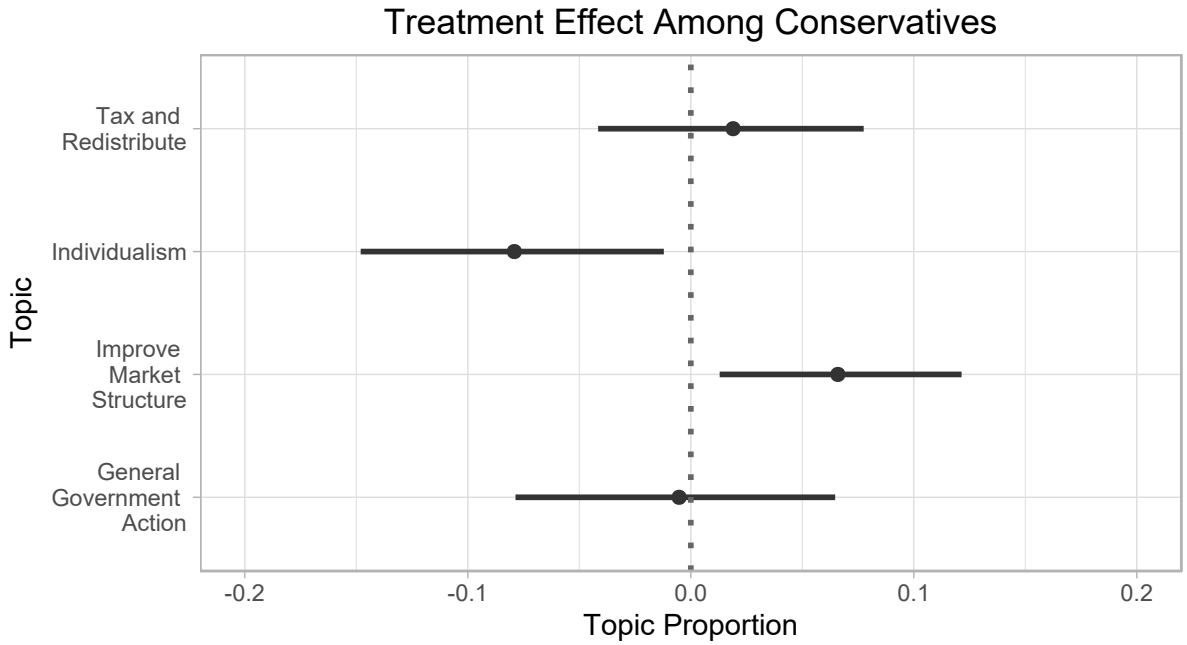
Figure 5: Model Results



bration treatment induced participants to more objectively evaluate their responses to the questions posed, for example, as opposed to relying on attitude generalization and their valence weighting biases. Such an explanation perhaps overinterprets the results shown in Figure 5, however additional findings support these conclusions as well.

Figure 6 presents the estimated effects of the treatment on topic prevalence with political ideology held one standard deviation below the sample mean (i.e., in the conservative direction). The prevalence of Improve Market Structure remains higher in the treatment condition than in the control condition and, notably, the prevalence of the Individualism topic is lower in the treatment condition than in the control condition. This may indicate that conservatives in the treatment condition discussed Improve Market Structure more than those in the control condition at the expense of the Individualism topic. Rather than reflexively defend the invisible hand, for example, conservatives who participated in the recalibration treatment were possibly more likely to consider market-oriented ways that the structural determinants of economic inequality could be addressed. While this precise mechanism cannot be tested directly, the empirical evidence is consistent with this explanation.

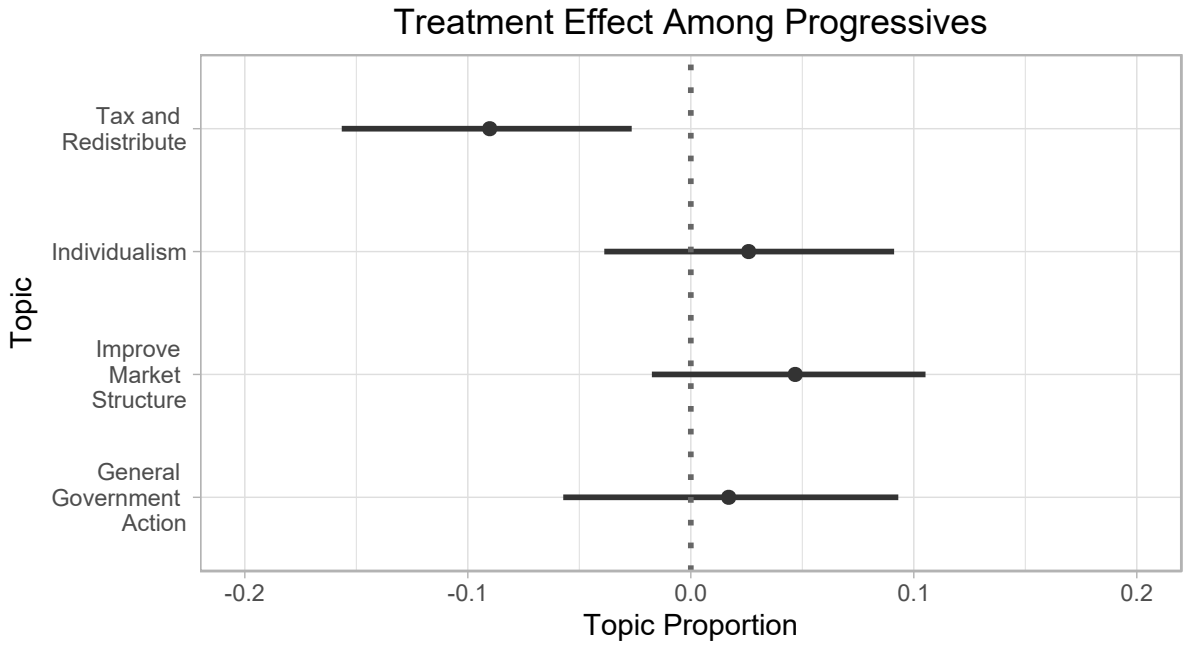
Figure 6: Model Results for Conservatives



A similar type of dynamic is displayed in Figure 7, which shows the estimated effects of the recalibration treatment on topic prevalence with political ideology held one standard deviation above the sample mean (i.e., in the progressive direction). While there is no longer a statistically significant difference between the treatment and control conditions regarding the prevalence of the Improve Market Structure topic, progressives in the treatment condition were less likely than those in the control condition to discuss the Tax and Redistribute topic. Similar to the estimated effect of the treatment on topic prevalence among responses offered by conservatives—that the most conservative topic was discussed less—progressives who were assigned to the recalibration condition appear to discuss the most progressive topic less than those in the control condition. There is no evidence that this is offset by an increase in another topic's prevalence to a statistically significant degree, but the results are consistent with the explanation that progressives who experienced the recalibration treatment were possibly less likely to, for example, reflexively offer progressive taxation and redistribution as policies that should be implemented in order to reduce economic inequality.

Because the Tax and Redistribute, Individualism, and Improve Market Structure

Figure 7: Model Results for Progressives



topics are substantively interesting and their prevalence responds to the treatment in various ways conditional on political ideology, the expected topic proportions for each individual topic are graphed below according to political ideology, and grouped by treatment condition. Figure 8 corresponds to Tax and Redistribute, Figure 9 to Individualism, and Figure 10 to Improve Market Structure. These visualizations reinforce the findings discussed above—progressives in the treatment condition discuss Tax and Redistribute less, conservatives in the treatment condition discuss Individualism less, and participants in the treatment condition discuss Improve Market Structure more generally.

The results thus suggest that valence weighting bias in attitude generalization affects individuals' expressed attitudes about economic inequality and redistribution. Moreover, participants in the treatment condition tended to discuss the topics "belonging" to their respective political ideologies less—Tax and Redistribute for progressives, and Individualism for conservatives—and, overall, to discuss Improve Market Structure more. The Improve Market Structure topic generally corresponds to market-oriented solutions to economic inequality that emphasize ensuring workers are able to be upwardly mobile or at least earn

Figure 8:

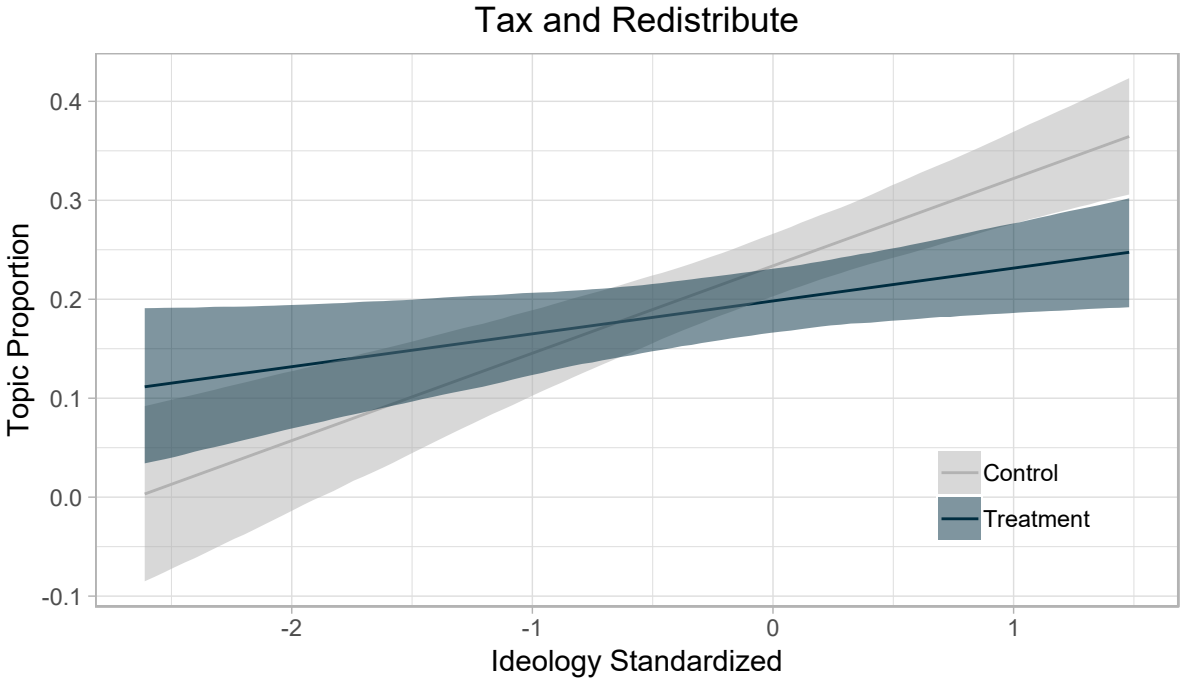


Figure 9:

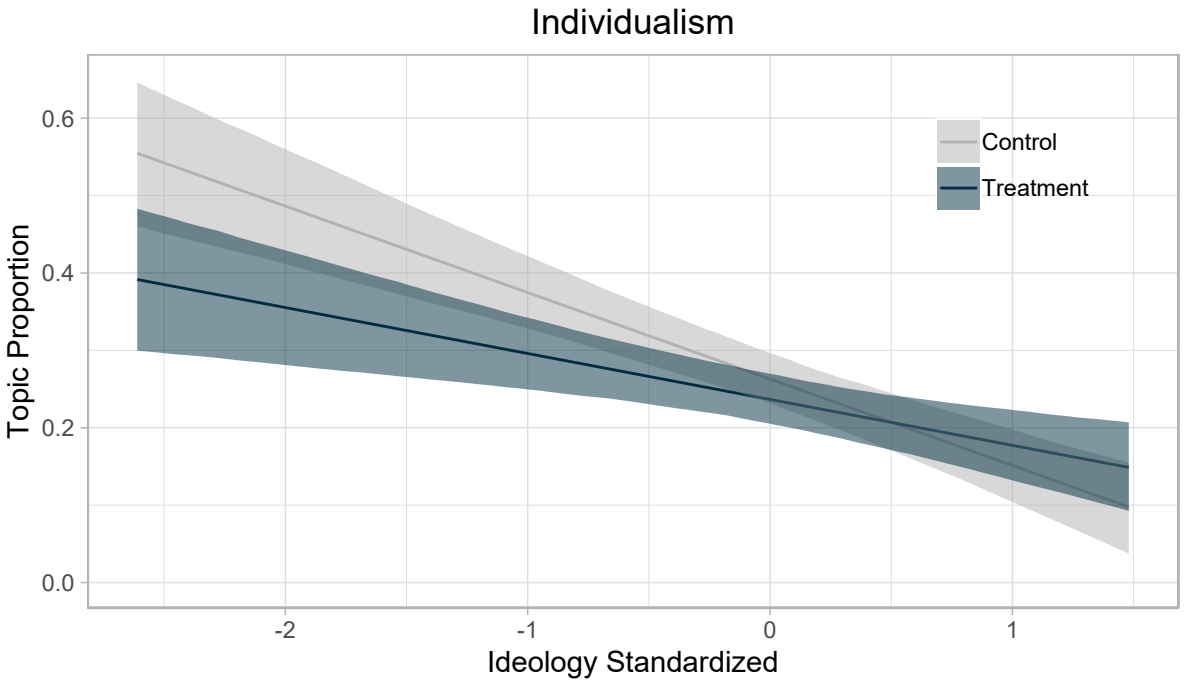
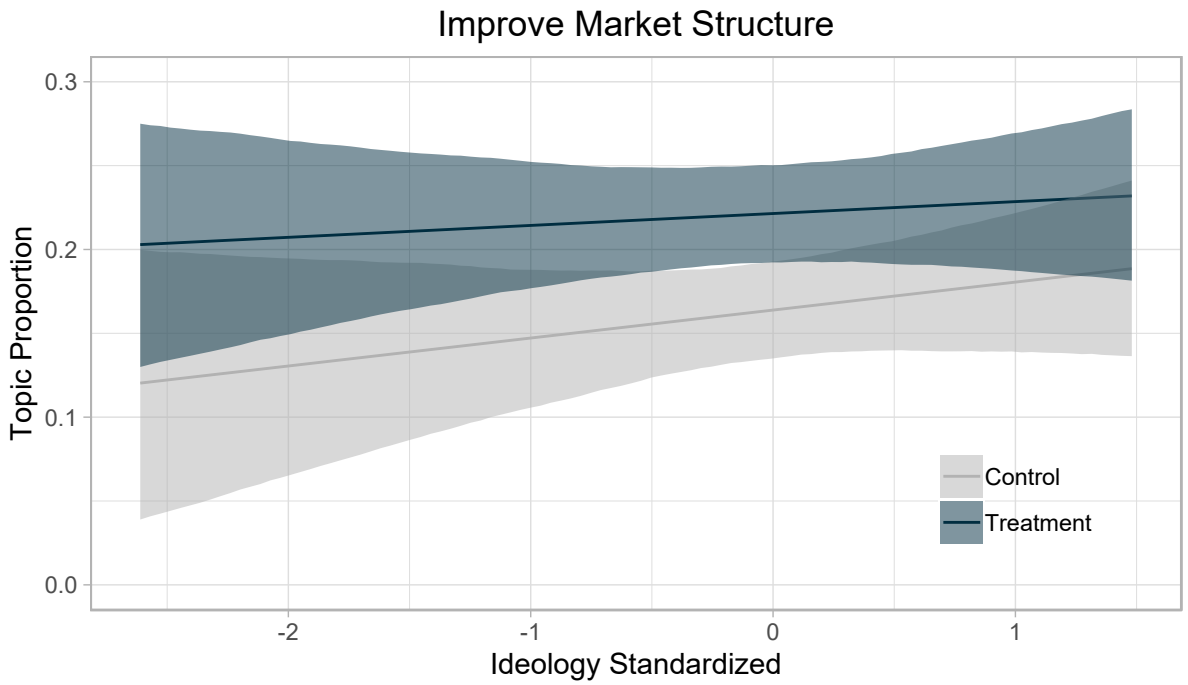


Figure 10:



living wages. In the context of the United States, this seems to be a politically moderate approach to potentially addressing economic inequality that could appeal to both Republicans and Democrats. That participants who were assigned to the recalibration treatment, depending on their political ideology, discussed what is likely their preferred of the divergent topics less and, overall, the more centrist topic more is consistent with expectations regarding valence weighting recalibration. Perhaps the Tax and Redistribute as well as Individualism topics are inherently products of attitude generalization and negative valence weighting biases (e.g., images of greedy rich people, and greedy governments, respectively), though these biases could reasonably be positive as well. Additionally, the Improve Market Structure solutions may be especially prosocial, explaining in part why recalibration increases the prevalence of this topic. It is also consistent with expectations that recalibration would increase the prevalence of this topic rather than General Government Action, for example, because attenuating valence weighting bias should induce individuals to more objectively consider the questions posed rather than to disengage to some extent by providing only conciliatory responses. Overall, employing the recalibration treatment, open-ended responses

to questions about economic inequality and redistribution, and STMs, we find that valence weighting bias affects individuals' attitudes about economic inequality in meaningful ways.

4 Conclusion

In this study we respond to the literature on the political economy of economic inequality—which in recent years has been increasingly focused on individual attitudes—by examining specifically how attitude generalization and valence weighting bias affects individual attitudes about economic inequality and redistribution. We do this by experimentally attenuating individuals' valence weighting biases to examine how those in the treatment condition report their attitudes differently than those in the control condition. Notably, we rely on participants' open-ended responses to a set of questions about economic inequality and redistribution so that participants are able to share their relatively uninhibited attitudes, and we thus use an STM to analyze the effect of the treatment condition on the prevalence of topics identified by the model. We find that overall, those in the treatment condition provided responses that on average contained a higher prevalence of the Improve Market Structure topic—which pertains to comparatively modest solutions to economic inequality—than those in the control condition. We also find that among conservatives, those in the treatment condition offered responses that on average contained a lower prevalence of the Individualism topic and a higher prevalence of the Improve Market Structure topic, and that among progressives, the responses from those in the treatment condition on average contained a lower prevalence of the Tax and Redistribute topic. This evidence together suggests that individuals' expressed attitudes about economic inequality and redistribution are affected by valence weighting bias in attitude generalization, and that participants in the treatment condition tended to "moderate" by discussing more market-oriented solutions to economic inequality.

These findings potentially offer to the political economy of economic inequality literature an understanding of the importance of attitude generalization and valence weighting bias to individuals' reported attitudes about economic inequality and redistribution, which may potentially underlie some of the findings presented by Alesina, Miano and Stantcheva

(2018), for example. They may also offer to the valence weighting literature in social psychology evidence about the relationships between valence weighting bias and types of attitudes that this literature has yet to consider fully, as well as the possible utility of analyzing open-ended responses with unsupervised learning tools. In any case, the findings presented here are highly preliminary, and will continue to be investigated by this and future studies we aim to conduct. In the short term, we intend to validate the model further with data already collected from a survey on Mechanical Turk that included the open-ended question considered here, and to refine the measure of political ideology we employ. In the longer term, we hope to place open-ended as well as closed-ended responses about economic inequality and redistribution closer to the recalibration treatment in order to minimize decay and also to show that the treatment effects are robust to the types of outcome measures considered. Lastly, we plan to examine the relationships between items related to valence weighting such as dangerous world beliefs as well as disgust sensitivity, and attitudes about economic inequality and redistribution, which would align with a growing political science literature that analyzes the evolutionary mechanisms underpinning political outcomes (Petersen, 2012; Aarøe and Petersen, 2013; Aarøe, Petersen and Arceneaux, 2017). The preliminary findings presented here indicate that these are potentially fruitful avenues for future research.

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