Building Climate Coalitions with Just Transition Assistance for Energy Communities*

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Abstract

The economic effects of the clean energy transition for communities that produce fossil fuels give rise to political resistance to climate policy. So how could climate policy be designed to win support for decarbonization in fossil fuel communities? Answering this question requires public opinion data from these crucial regions and measurement of multi-dimensional preferences. However, national surveys often fail to recruit respondents from these areas, and studies often focus on individual transition policy instruments. To overcome these limitations, we field surveys at Appalachian county fairs to access this hard-to-reach population ($N = 248$) and employ a conjoint experiment to measure multi-dimensional preferences. We report three findings. First, the energy community residents prefer policies that reduce costs, such as investments in worker healthcare and income compensation, despite the popular construal of these areas as averse to government programs. Second, when provided with information about the market-driven decline of coal, people become more willing to support workforce programs for clean energy. Third, 66 percent of respondents would support climate policy if it were coupled with assistance for workers and community members. These findings suggest that smart policy design and the provision of accurate information could build climate coalitions for the clean energy transition, even in the places most impacted by moving away from fossil fuels.

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1 Strategies for Building Climate Policy Support in Energy Communities

Decarbonization to avoid the worst impacts of climate change will require a drastic reduction in fossil fuel use (Larson et al. 2021). Although emissions mitigation will generate benefits from reduced air pollution (Driscoll et al. 2015), creation of new green industries (Tomer, Kane, and George 2021), and averted climate damages (IPCC 2022), there will be adverse effects for employment and the local economy in fossil fuel-producing areas (Green and Gambhir 2020; Scheer et al. 2022; Spencer et al. 2018). The prospect of economic dislocation often leads workers, firms, and community members in regions that produce coal, oil, and gas to oppose decarbonization (Mildenberger 2020). Consequently, policies that smooth these transition costs—that is, transition assistance—will play an essential role in building climate coalitions necessary to make carbon mitigation politically feasible and normatively just (Bergquist, Mildenberger, and Stokes 2020; Cha 2017; Evans and Phelan 2016; Gaikwad, Genovese, and Tingley 2022; Green and Gambhir 2020; Healy and Barry 2017; McCauley and Heffron 2018).

This paper examines three questions. First, how could transition assistance policy be designed to win the support of fossil fuel communities? Second, would these preferences better align with the requirements of the clean energy transition if people had access to quality information? Lastly, would transition assistance create support for climate policy?

One must understand the preferences of people in coal, oil, and gas communities to answer these questions. This presents two research challenges: how to access these politically consequential energy communities and how to measure support for transition policy which has multiple dimensions.

Fossil fuel communities are a hard-to-reach population. While online panels are increasingly the go-to tool for survey research, low internet penetration in coal, oil, and gas regions—only 78 percent of Appalachian households have a broadband subscription—means

that online recruitment confronts considerable coverage error (ARC 2021). In addition, workers employed in carbon-intensive industries—essential groups to reach—are also unlikely to participate in online panels given their full-time employment and reduced need to supplement their income.

Due to this difficulty, prior survey research on the energy transition has primarily focused on the national public (e.g., Bergquist, Mildenberger, and Stokes 2020). However, results from national samples cannot automatically be generalized to energy communities due to differences in exposure to the economic effects of climate policy (Green and Gambhir 2020; Scheer et al. 2022; Spencer et al. 2018), and cultural attachment to the industry (Gaikwad, Genovese, and Tingley 2022; Bell and York 2010; Mayer 2018).

While a handful of studies sample from hard-to-reach energy communities, these surveys tend to focus on individual dimensions of the energy transition. Gaikwad, Genovese, and Tingley (2022) examine public support in the Gulf Coast, New Mexico, and Southwest Pennsylvania area for allocating revenue from a climate policy to compensate for lost fossil fuel jobs. Mayer (2018) measures local policymaker views about pension and relocation support for displaced coal miners in the western United States. Blankenship et al. (2022) use a conjoint experiment to assess preferences over employment options in different industries and places in a rural Indian state. Cha (2020) conducts interviews in the Powder River Basin of Wyoming and finds that residents dislike the concept of the just transition due to the long-standing role coal has played in the region. Although these are valuable contributions, economic assistance is multi-faceted, consisting of workforce development programs, compensation for lost income, community-wide investment, and relocation support, which could influence the level of public consensus for decarbonization.

Our study contributes to the literature by simultaneously overcoming the challenges of sampling and measuring multidimensional preferences. We recruit research participants at county fairs in the Southwest Pennsylvania area to access hard-to-reach energy communities. This recruitment strategy required extensive time and resources to execute and dramatically

increased the representativeness of the sample relative to online panels. The Southwest Pennsylvania area is of theoretical and political relevance given its high concentration of fossil fuel extraction, power generation, and related manufacturing, which make up 20 percent of the area's gross domestic product (Ansolabehere et al. 2021).

With this sample ($N = 248$), we field a survey that supplies data for three analyses. The first analysis leverages a multi-attribute survey experiment to measure preferences over the design of transition assistance (Hainmueller, Hopkins, and Yamamoto 2014). This analysis builds on work assessing variation in support for different climate policy instruments (e.g., Bergquist and Warshaw 2019; Lachapelle, Borick, and Rabe 2012). The method presents the survey taker with a choice between two policies. The two policies vary along theoretically relevant dimensions, such as the extent and scope of benefit support, community investment, workforce development programs, income support, and relocation assistance. We can infer from the respondent's selection what components of the transition assistance policy garner public approval. The choice setting mirrors the tradeoffs confronted in real policy debates.

The second analysis is of an experiment embedded in the survey that randomizes the provision of information about the future of the coal industry. Specifically, we provide information about the market-driven decline of coal due to cheaper natural gas and expanding renewable energy. The aim is to see if people would be more likely to prefer transition assistance that invests in training programs for clean energy jobs if they knew that coal was on the decline while renewables were on the rise.

The final analysis connects transition assistance with support for costly climate policy, a step not taken in prior targeted surveys. We design a descriptive question that asks whether the respondent would support decarbonization in exchange for transition assistance. We separate this question from the multi-attribute policy experiment so respondents have the option to reject climate policy, which supplies a more demanding test of the ability of transition assistance to build climate coalitions.

We find policies that reduce transition costs, such as investments in worker healthcare

and pension plans, increase support for economic assistance to fossil fuel communities. In addition, when people have quality information about the future of the coal industry, they become more likely to support transition assistance that invests in training for clean energy jobs. Lastly, we discover that 66 percent of respondents are willing to back climate policy coupled with transition assistance.

2 Research Design

2.1 Population and Sampling Strategy

The population of interest is fossil fuel-producing communities. This study focuses on Southwest Pennsylvania and the surrounding region since it is home to multiple types of fossil fuel extraction—coal, oil, and gas. The local environmental effects of coal mining and hydraulic fracturing should be especially relevant for these communities. The region has also undergone deindustrialization and historical coal closures while also being a site of ongoing coal production, which makes economic transitions a salient issue. Figure 1 depicts the general area where the county fair took place. We do not identify the particular county to respect the confidentiality of study participants.[1]

2.1.1 Recruitment

We accessed this hard-to-reach population by recruiting participants at two county fairs in the Southwest Pennsylvania region. County fairs are iconic cultural institutions in the United States, especially in rural America. As such, they are well-attended by residents. Fair organizers remarked that attendance was exceptionally high in the summer of the survey's fielding because it was one of the first in-person events after lifting COVID-19 restrictions.

The researcher collaborated with a community group and non-governmental organizations

1. The population of counties in this area is small, and the survey records detailed demographic information like household size, occupation, age, and income, so it would be easy to de-identify the respondents.

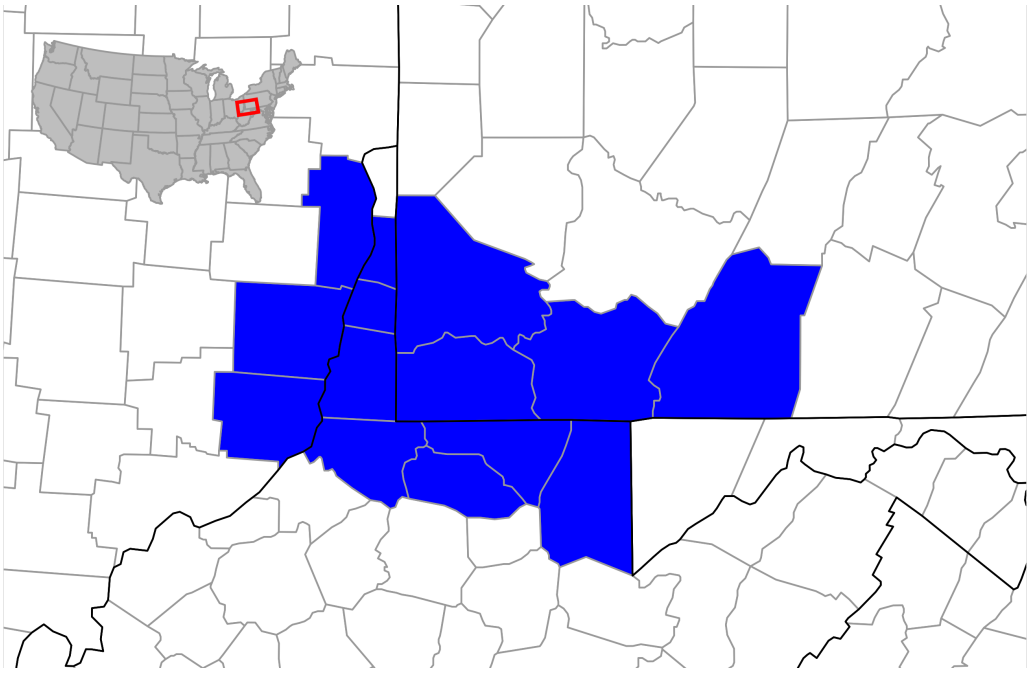

Figure 1: Study area shaded in blue covers Southwest Pennsylvania and surrounding counties in West Virginia and Ohio.

to obtain well-located tables at the fairs. People who passed by the tables would be recruited to take the survey administered on a tablet computer. We pre-tested the survey on these devices and optimized the settings for a fluid survey-taking experience.[2] Large posters advertised the $5 cash remuneration and the potential to earn $100 in a raffle (Appendix A).[3] To maximize participation and communicate the purpose of the research, the posters describe the survey as being about coal, oil, or gas. This makes the study relevant to fairgoers. It may also introduce non-response error by attracting people who care most about these topics. However, these may be the most politically relevant individuals. The generous compensation also sought to encourage a broad pool of participants. In all, 248 took the survey.

In addition to compensation, we took several steps to facilitate participation. First, due to the concern that some individuals might be too busy to take the survey at the fair, we provided postcards with a QR code to allow the survey to be taken at home. Second, we

2. The tablet screen could only be seen by the participant during the survey, so the survey-taker could be confident that her responses are private, reducing the potential for pressure from peers or the enumerator.

3. Cash remuneration was added for the second fair to bolster recruitment.

also made paper copies available to address the possibility that individuals uncomfortable with the tablet computer would not take the survey. To do so, we invented a technique that enabled a paper survey to contain randomized experiments.[4]

2.1.2 Representativeness

Although a convenience sample, the individuals surveyed generally match local demographics in terms of sex, age, education, income, and race. Table 1 compares the demographic characteristics of the sample, the population, and the weighted sample. Population data come from the 2018 5-year American Community Survey.[5] In terms of the unweighted sample, the two imbalances that exist are that the sample is slightly wealthier and includes more younger individuals without college degrees than the population. To enhance the representativeness of the sample, we construct post-stratification weights using raking. Raking uses iterative post-stratification to match the marginal distributions of the sample to the known population margins (Appendix **??**).

Regarding political attitudes and beliefs, about 34 percent of the unweighted sample identify as Democrats, close to the 28 percent in the county who voted for the Democratic presidential candidate in 2020. We would not expect these results to be the same since vote choice differs from party identification, but they should be similar, as we observe. When it comes to the share that is worried about climate change, 57 percent of the sample express concern, which is similar to the 54 percent estimate for the county from Howe et al. (2015).

Our fair sample demonstrates an improvement over attempts to use online survey markets to recruit respondents from coal country. Table C1 compares the demographics of the fair sample with an online sample. Importantly, these samples differ in scope since the online sample includes respondents outside the Southwest Pennsylvania area (e.g., Wyoming). Yet, statistically distinguishable differences emerge that indicate the value of going directly to

4. We used an RMarkdown script to create PDFs of the surveys with different realizations of randomized content. Each survey had a unique ID that paired the survey realization with meta-data about the randomized attributes.

5. The 5-year survey has better coverage of rural areas than the 1-year version.

Table 1: Representiveness of unweighted and weighted sample

	Sample	Population	Weighted
Sex/Age/Education			
Female × 18-34 years × College	0.04	0.07	0.06
Female × 18-34 years × No college	0.12	0.05	0.06
Female × 35-64 years × College	0.10	0.12	0.12
Female × 35-64 years × No college	0.19	0.12	0.14
Female × >65 years × College	0.03	0.03	0.03
Female × >65 years × No college	0.04	0.09	0.07
Male × 18-34 years × College	0.03	0.06	0.05
Male × 18-34 years × No college	0.18	0.09	0.10
Male × 35-64 years × College	0.07	0.10	0.10
Male × 35-64 years × No college	0.14	0.17	0.18
Male × >65 years × College	0.03	0.04	0.03
Male × >65 years × No college	0.03	0.07	0.06
Income			
<$20,000	0.17	0.18	0.18
$20,000-39,999	0.13	0.21	0.19
$40,000-59,999	0.15	0.16	0.15
$60,000-99,999	0.30	0.24	0.26
>$100,000	0.25	0.21	0.22
Race			
White	0.93	0.94	0.94

Notes: For exposition, the table collapses the 18-24 and 25-34, and 35-44 and 45-64 age bins together, respectively. Also not shown is the joint distribution of race/age/sex used to construct weights. Population data from the 2018 5-Year ACS and cover the primary study site county.

people. For example, compared to the fair survey, the online sample skews female, younger, has fewer households with fossil fuel employment, and a higher level of climate change concern. This is likely a consequence of coverage error, where the types of people participating in online survey markets do not perfectly overlap with the population of interest.

2.2 Survey Questionnaire Design

The survey contained two parts. The first part of the survey used a multi-attribute policy experiment to estimate public preferences over the design of transition assistance. The second component evaluated whether there is support for climate policy coupled with transition assistance. Appendix E contains the survey instrument.

To emphasize the importance of the survey and elicit the best responses, we inform the respondent at multiple points in the survey that their answers matter and that we will share the study's results with politicians. We plan to actualize this promise by sharing the published research with state and federal lawmakers from the area so no deception is used. If a respondent feels her opinions carry greater weight, she should treat her answers as more costly.

3 Multi-Attribute Policy Experiment

3.1 Design

The survey explored preferences over transition assistance using a multi-attribute policy experiment. This technique, known as a "conjoint" is widely employed in economics, political science, and marketing research due to the robustness and external validity of the design (Hainmueller, Hopkins, and Yamamoto 2014). The method works by presenting the survey taker with a choice between two policies. Figure E1 provides an example of this choice from the respondent's perspective. The information is conveyed in a table, with one column for each policy and each row containing an attribute, which is a particular dimension of the policy (e.g., relocation support) where the value is randomized (e.g., no support, vouchers to relocate). This side-by-side display allows the subject to easily discern how the policies differ along the relevant dimension.

The policy described in our experiment has seven attributes. Each attribute and its levels correspond with prominent assistance instruments discussed in the literature.

Benefit Support. Benefit support is essential for the transition since workers often have pensions or health insurance provided by their firm, which they could lose if they are forced to retire early or move to a new career (Carley and Konisky 2020; Cha 2017; Harrahill and Douglas 2019; Healy and Barry 2017; Mayer 2018). For this attribute, the policy provides funding for either worker healthcare, pensions, or no support.

Community Investment. Place-based investments are crucial for attracting new industries to a community and building infrastructure that can foster economic development (Austin, Glaeser, and Summers 2018; Carley and Konisky 2020; Harrahill and Douglas 2019; Healy and Barry 2017). This attribute varies whether community investment is in broadband internet, housing for new residents, or schools. We focus on these investments for the following reasons: many rural areas lack broadband, which increases property values, job, and population growth, and business formation (Marre 2020); building out housing stock can help grow the property tax base to fund local public goods; and, investments in schools develop local human capital.

Workforce Development. Programs to train fossil fuel workers for new jobs are essential to the energy transition (Carley and Konisky 2020; Cha 2017; Harrahill and Douglas 2019; Healy and Barry 2017; Mayer 2018; Tomer, Kane, and George 2021). This attribute varies the *industry* for which a free workforce development program trains participants: clean energy, healthcare, or manufacturing. Clean energy is relevant because decarbonization will create new wind, solar, and energy efficiency jobs, which could offer new economic opportunities in fossil fuel-extracting areas (Tomer, Kane, and George 2021). Healthcare is pertinent since there is demand for these jobs in rural areas (MacDowell et al. 2010). Lastly, manufacturing jobs require similar skills as fossil fuel jobs, making them a potential career alternative for transitioning workers (Ravikumar and Latimer 2022).

Decisions to enter a training program involve complex considerations such as what one's salary would be in the new career and how long training would last. The experiment accounts for these nuances by including an attribute for the retrained worker salary, either $50,000, $75,000, or $100,000 per year, chosen to approximate fossil fuel salaries in the area. Then, another attribute specifies how long it would take to retrain for the new job: 3-6 months, 1 year, or 2 years. Each of these attributes is randomized independently of the other.

Income Support. Federal or state support to compensate for lost income from fossil fuel jobs is one tool proposed to reduce transition costs (Carley and Konisky 2020; Gaikwad,

Genovese, and Tingley 2022; Harrahill and Douglas 2019). The scope of income support is an open question; regional surveys indicate support for community-wide transfers (Gaikwad, Genovese, and Tingley 2022), but policymakers motivated by efficiency concerns might attempt to only target workers. The attribute for income support varies whether there is no support, $200 per week for all community members, or $400 per week for only fossil fuel workers. This cash transfer will be paid during the retraining period to compensate for lost labor income. The experiment varies the size of the payments for workers and the community to emphasize tradeoffs inherent in targeting assistance.[6]

Relocation Assistance. As fossil fuel jobs are tied to a location decline, workers and community members may prefer to relocate but could be constrained by moving costs. Relocation assistance presents a solution (Carley and Konisky 2020; Harrahill and Douglas 2019; Healy and Barry 2017; Mayer 2018). Although, a potential drawback is that such assistance could accelerate population outflow that leaves the least mobile worse off, so communities and individuals may face conflicting incentives and have differing preferences. The relocation attribute varies whether the government provides a voucher for moving expenses or no relocation support.

In these comparisons, the respondent picks the transition assistance bundle she prefers, then repeats the task. Each subject made six selections between 12 randomly generated policies. The order of the displayed attributes was randomized and fixed across each respondent to avoid bias from attribute ordering. By examining the subject's choices across repeated comparisons, we can estimate the effect of a change in a policy component on overall support for transition assistance. The estimand of interest is the average marginal component effect (AMCE), which represents the change in probability of supporting transition assistance if one policy attribute switched levels (Hainmueller, Hopkins, and Yamamoto 2014).

6. The income support design choices also imply different overall costs of the policy, which could influence preferences. However, this requires a second-order calculation that is cognitively demanding, so we do not think the results should be interpreted as reflecting concerns about budgetary effects.

We estimate the AMCE using a linear regression model,

$$y_i = \beta A + \alpha + \epsilon_i.$$

Respondents are indexed by i. y_i is an indicator for whether a respondent supports a policy. A is a matrix of attributes and their levels. α is an intercept. ϵ_i represents standard errors. We cluster standard errors at the respondent level since each subject makes multiple comparisons across which the residuals likely correlate. Since the conjoint attributes are randomized, they are statistically independent of covariates that might otherwise confound causal inference, and thus it is not necessary to include additional controls (Hainmueller, Hopkins, and Yamamoto 2014).

The general expectation is policy attributes that reduce the cost of the energy transition—benefit support, income support, and relocation support—should all increase support for the overall transition assistance policy. We also preregistered additional hypotheses based on theoretical expectations advanced in the literature, which we discuss in Appendix D. The main text focuses on understanding which types of transition assistance are preferred by relevant workers and community members.

3.2 Results

The experiment estimates the effect of a change in an attribute level on the respondent's probability of supporting the overall transition assistance policy. The aim is to understand which precise types of transition assistance receive the most support from relevant workers and community members. Figure 2 presents the main results. Overall, respondents indicate a preference for transition assistance that provides compensation for lost healthcare benefits, pensions, and income.

The largest substantive effect is for benefit assistance funds worker healthcare and pensions; each raises the probability of support by about ten percent relative to the baseline

of no assistance. Targeted income compensation for workers during retraining, another cost-minimizing attribute, increases support by seven percent, whereas not providing any income transfers decreases support by six percent compared to the baseline provision of some community-wide income assistance. Finally, vouchers for relocation have no consistent effect on policy support.

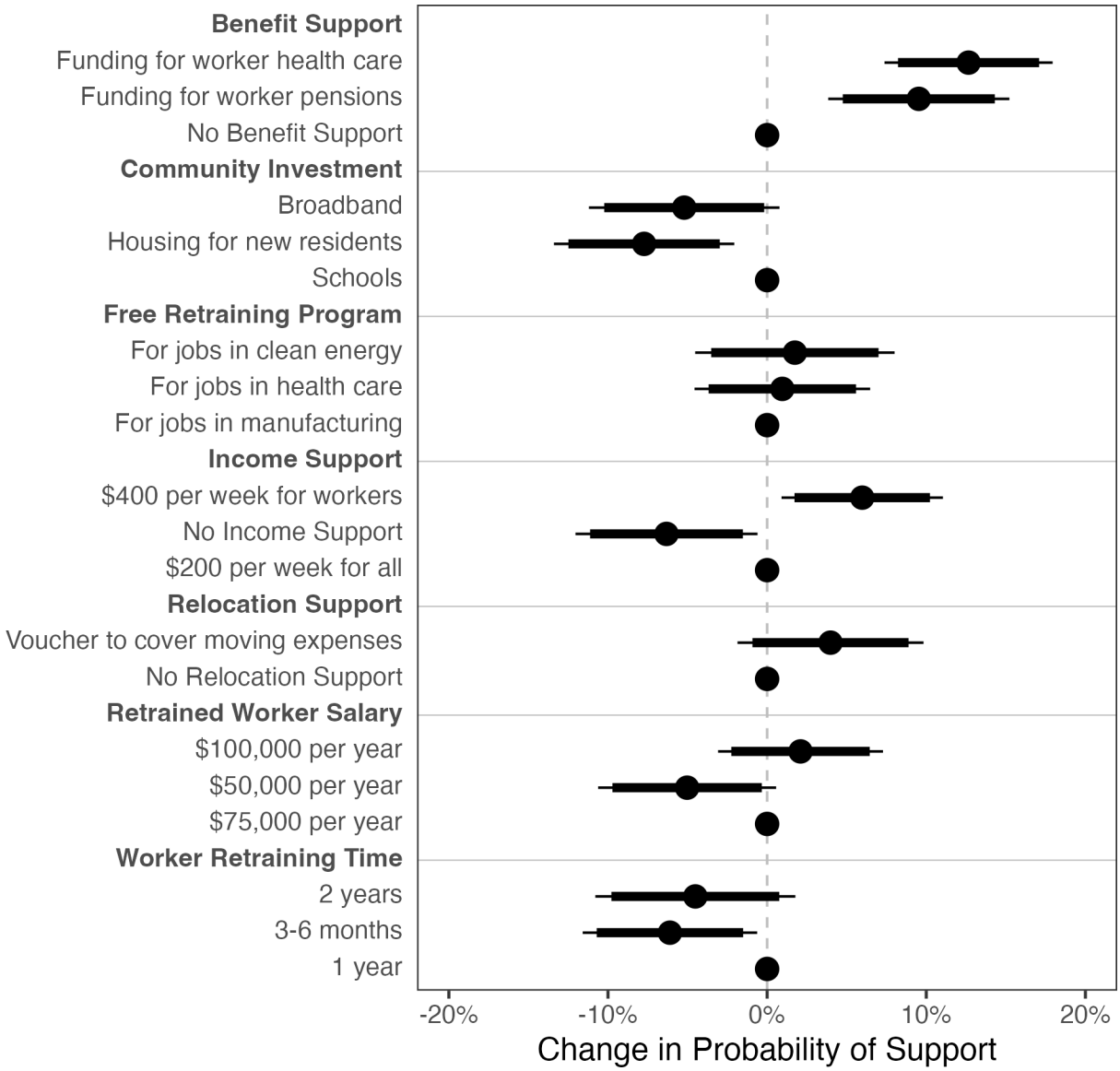

Figure 2: Effect of policy design on support for transition assistance to fossil fuel workers and communities. Estimates from a linear regression model of an indicator for if a respondent selected a policy on indicators for levels of each conjoint attribute. Heteroskedastic-robust standard errors clustered by respondent. Thin and thick bars denote 95 and 90% confidence intervals. Sample from Southwest Pennsylvania region ($N = 248$). Sample weights employed.

Compared to schools, investments in new housing decrease support for transition assistance policy by seven percent, while broadband investments have no consistent effect. This suggests that investment in schools is the most popular place-based policy. However, one ought to exercise caution in interpretation since the effect may have been positive if the baseline condition was "no community investment" rather than schools, which are popular.

Concerning workforce development, participants did not show a discernible preference for a specific industry into which to transition. The time it takes to train for a new job also does not influence one's preferences. However, subjects exhibit sensitivity to the salary of jobs for which they would retrain. Relative to the baseline of $75,000 per year, an annual wage of $50,000 in the new industry decreases support for transition assistance by six percent. There is no effect of the six-figure annual salary, $100,000, on support.

In Figure D1, we explore heterogeneous effects of economic conservatism, fossil fuel employment, career attachment, political party identification, and sex. We find no substantive differences by sub-group. However, we cannot definitively rule out such differences due to limited statistical power. In all, there is a consistent preference for transition assistance design features that reduce transition costs to individuals and communities.

These results are robust to various additional tests. For example, they obtain when using an unweighted sample. Another model includes task fixed effects that account for potential bias from the order in that respondents see information and effort exerted at different task stages. Lastly, we estimate a model with individual fixed effects that remove any potential bias from individual-level characteristics (Appendix G1).

4 Information Experiment

Would coal country residents' preferences over the design of transition assistance differ if they were better informed about the future of coal? Politicians have engaged in messaging campaigns that herald coal's "come back". However, the industry has declined due to

cheaper natural gas and the deployment of renewable energy, which suggests such a comeback is unlikely (Houser, Bordoff, and Marsters 2017). Despite this decline, 53 percent of respondents think that coal remains very or somewhat competitive compared to natural gas and renewables.

Such a misperception could be consequential for preferences over the clean energy transition. For example, if one held the more accurate belief that the coal industry would decline, she might be more willing to support transitional assistance that makes investments in new cleaner industries.

To evaluate the effect of information on preferences, we embed an additional experiment within the conjoint. This experiment randomly provides half of the respondents with information about the actual state of the coal industry, that it faces a decline due to cheaper natural gas and renewable energy. In contrast, the control group receives no such information. The hypothesis is that people who receive this information should be more willing to support training programs for clean energy jobs.

A linear regression model estimates the average treatment effect of a retraining program for clean energy jobs on support for transition assistance, conditional on receiving information about the future of coal. Table 2 reports the primary results. Since both the information and attribute levels are randomly assigned, we treat these estimates as causal.[7] Model 1 shows that overall, a retraining program for clean energy jobs makes no difference in preferences over the design of transition assistance. However, the subsequent models that assess the conditional effect of information show that the information treatment increases relative support for a clean energy jobs training program by about 11 percentage points. In other words, when people learn that coal is on the decline, they become more supportive of retraining programs for clean energy jobs.

7. Appendix I verifies random treatment assignment of the information treatment. There is a mild imbalance for one income category, which we account for with controls in the linear regression model.

Table 2: Probability of selecting a policy with a clean energy job retraining program conditional on the diversification treatment

	(1)	(2)	(3)	(4)	(5)
Clean Energy Jobs	0.018	−0.058*	−0.033	−0.059*	−0.033
	(0.032)	(0.035)	(0.045)	(0.035)	(0.046)
Diversify Treatment x Clean Energy Jobs		0.098*	0.113*	0.099*	0.113*
		(0.050)	(0.064)	(0.051)	(0.065)
Sample Weights	Yes	No	Yes	No	Yes
Individual-Level Controls	No	No	No	Yes	Yes
Attribute Level Indicators	Yes	Yes	Yes	Yes	Yes
Respondents	248	248	248	248	248
N	2974	2974	2974	2962	2962
Adjusted R^2	0.029	0.028	0.030	0.024	0.026

* p < 0.1, ** p < 0.05, *** p < 0.01

Notes: Estimates from a linear regression of an indicator for if a respondent selected a policy on indicators for levels of each conjoint attribute. Individual-level controls include age, sex, race, fossil fuel employment, income, college education, party identification, climate beliefs, and fair site. Less than 2.5% of missing income and sex observations imputed with median response. Diversification treatment condition before the conjoint tasks informs the respondent that the decline of coal is inevitable because of cheaper natural gas and renewable energy. Heteroskedastic-robust standard errors clustered by respondent.

5 Transition Assistance and Climate Policy Support

Do preferences over transition assistance translate into support for climate policy? The survey explores this question by asking, "To fight global warming, politicians are considering policies to move away from fossil fuels. How likely or unlikely would you be to support such a policy if it included proposals to help fossil fuel workers and communities?" The proposals to help workers and communities referenced in the question are intentionally general to focus the respondent on the broader issue of whether she would support climate policy in exchange for assistance. The lack of specificity should decrease support by increasing uncertainty about the quality of the aid. Responses run along a four-point likelihood Likert scale. These results are descriptive, so we cannot estimate the causal effect of providing transition assistance on climate policy support, but the answers are nonetheless informative.

Figure 3 shows the distribution of answers. A majority of respondents, 66 percent, would be somewhat or very likely to support a climate policy that includes transition assistance

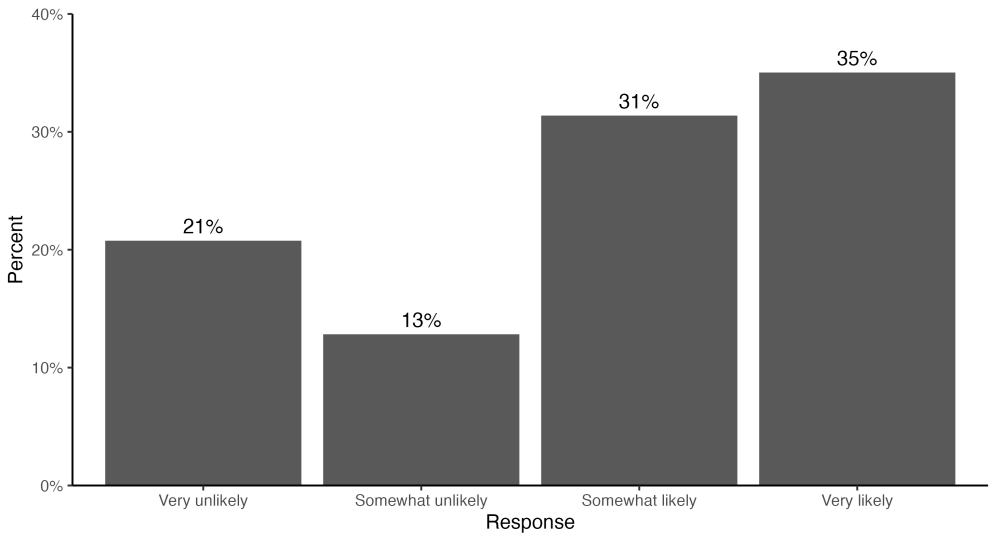

Figure 3: Support for climate policy coupled with transition assistance. Sample from Southwest Pennsylvania region ($N = 248$). Sample weights employed.

provisions. To understand the correlates of climate policy support with transition assistance, we estimate a series of ordered logistic and linear regression models. Table 3 reports these correlations. Two consistent results emerge. First, Republicans are less likely than Democrats to support a bargain of transition assistance for climate policy. This is consistent with the partisan polarization of climate opinions in the United States (e.g., McCright and Dunlap 2011). Second, people with the greatest concern about climate change are much more likely to support climate action when coupled with transition assistance.

6 Discussion

6.1 Cost-Sensitivity Influences Preferences

The consistent finding in the multi-attribute policy experiment is that cost-sensitivity influences preferences over policy design. The attribute levels that reduce the costs of the transition the most for workers, such as compensation for lost health care benefits, pensions, and income, generate the largest increase in support. On the one hand, sensitivity to costs is not surprising given the climate politics literature that documents how the public

Table 3: Regression models of the determinants of climate policy support in exchange for transition assistance

	Ordered Logit		Linear	
	(1)	(2)	(3)	(4)
Intercepts				
Very unlikely/Somewhat unlikely	−0.739	−0.625		
	(0.559)	(0.589)		
Somewhat unlikely/Somewhat likely	0.130	0.164		
	(0.558)	(0.589)		
Somewhat likely/Very likely	1.658***	1.767***		
	(0.568)	(0.598)		
Intercept			2.276***	2.285***
			(0.297)	(0.325)
Age (Baseline: 18-34 years)				
35-54 years	−0.085	−0.097	−0.056	−0.101
	(0.280)	(0.315)	(0.165)	(0.198)
>55 years	−0.112	−0.499	−0.086	−0.290
	(0.325)	(0.318)	(0.179)	(0.201)
Female	−0.219	−0.161	−0.061	−0.035
	(0.255)	(0.262)	(0.151)	(0.178)
College Degree	0.395	0.785**	0.179	0.324
	(0.336)	(0.311)	(0.184)	(0.202)
Fossil Fuel Employment	−0.341	−0.197	−0.159	−0.073
	(0.260)	(0.261)	(0.152)	(0.195)
Income (Baseline: >$100,000)				
<$20,000	0.167	0.497	0.091	0.216
	(0.433)	(0.445)	(0.256)	(0.307)
$20,000-39,999	−0.144	0.253	−0.087	0.134
	(0.444)	(0.425)	(0.252)	(0.305)
$40,000-59,999	0.351	1.022**	0.162	0.516*
	(0.414)	(0.447)	(0.251)	(0.305)
$60,00-99,999	0.431	0.710*	0.222	0.350
	(0.349)	(0.374)	(0.200)	(0.231)
Party (Baseline: Democrat)				
Republican	−0.623**	−0.916***	−0.290*	−0.419**
	(0.295)	(0.287)	(0.168)	(0.206)
Independent	−0.331	−0.812*	−0.200	−0.445
	(0.391)	(0.415)	(0.240)	(0.327)
Climate Concern	1.418***	1.341***	0.794***	0.719***
	(0.274)	(0.278)	(0.155)	(0.202)
Diversify Treatment	−0.329	−0.457*	−0.170	−0.215
	(0.241)	(0.248)	(0.139)	(0.183)
Sample Weights	No	Yes	No	Yes
Fair Fixed Effects	Yes	Yes	Yes	Yes
N	248	248	248	248
Adjusted R^2			0.132	0.191
BIC	710.3	678.6	799.3	841.5

* p < 0.1, ** p < 0.05, *** p < 0.01

Notes: HC3 standard errors employed in the linear regression model. Less than 2.5% of missing income and sex observations imputed with median response.

is not willing to pay high carbon prices (e.g., Bechtel and Hainmueller 2011; Jenkins 2014), and emphasizes the distributive costs of climate policy as the defining political problem (Mildenberger 2020; Colgan, Green, and Hale 2021).

However, the social, ideological, and political context of Appalachian energy communities makes this result somewhat surprising. There is a sizeable sociological literature that documents how people in fossil fuel-producing areas mistrust the government and believe in economic individualism (e.g., Hochschild 2016). Yet, the conjoint results do not reflect economically individualist preferences. Instead, people are willing to provide government support to fund worker healthcare, pensions, and income compensation. Remarkably, these results are consistent even when examining people who score high and low on an economic individualism scale or by identification as a Republican or Democrat (Figure D1). Does this mean that there is no mistrust of the government? No. Instead, the results suggest that when forced to choose between leaving workers behind and compromising on one's principles, residents of energy communities are more pragmatic than commonly portrayed.

6.2 Information Provision Changes Preferences

The second primary finding is that providing accurate information can change preferences over the design of transition policies. Specifically, when people learn that coal is on the decline due to cheaper natural gas and renewables, they become more willing to support investments in clean energy job retraining programs. The policy relevance of this finding is clear: leaders should pay attention to information campaigns as part of the clean energy transition since misconceptions about the economics of fossil fuel industries could lead workers and communities to miss opportunities to diversify.

However, this finding prompts new questions. For one, how durable are the effects of information provision? People may not learn the lesson after the memory of the survey fades. Researchers should seek to understand when people internalize this information. Relatedly, how this information is communicated in practice will influence its uptake. For example, if

trusted local leaders communicate the need to diversify their local economies because the current industries are not sustainable, that might be viewed as more credible than a message from the federal government.

6.3 Majority Supports Climate Policy with Transition Assistance

The third finding is that 66 percent of coal country residents would move away from fossil fuels in exchange for resources that smooth the costs of the transition. While there are relative differences according to individual characteristics such as partisanship, the absolute level of support is high across party identification, fossil fuel employment, and college education is remarkable.

One question is whether hypothetical bias inflates the level of support. After all, people do not incur a cost for their answers and might feel social pressure to respond in the affirmative. However, the political stakes are high for coal country residents, who are concerned about what the clean energy transition will mean for their community. Thus, hypothetical bias should not be as significant of a concern here as in other contexts where the stakes are lower.

Whether the residents of energy communities would succeed in receiving transition assistance in exchange for their climate policy support is an open question. For example, in the debates over the 1990 Clean Air Act Amendments, there was a push for compensation for coal miners with the Byrd Amendment. However, this effort fell apart partly because the Bush Administration sided with the electric power companies over the high-sulfur coal regions. This indicates that while public support could provide one coalition to enact environmental policy, other routes exist.

6.4 Limitations

There are two limitations to this study that should inspire further research. The first is external validity. Although survey experiments enhance internal validity, they can sometimes compromise realism. Our design attempts to enhance external validity by using real policy

attributes. For example, training for a new job entails significant uncertainty, complexities that the design handles in more abstract terms with the salary and training time attributes. Political leaders will also attempt to frame the consequences of transition policies, which could influence how the survey attributes translate into public opinion in practice. However, respondents taking the survey are embedded in a political context where the energy transition is salient, so they bring with them to the study a set of beliefs already influenced by political actors. Thus, the ability of the survey's attributes to increase support for transition assistance, despite the constraints of partisan motivated reasoning (Bolsen, Druckman, and Cook 2014) or other cultural predispositions (Kahan, Jenkins-Smith, and Braman 2011), is remarkable. Nonetheless, further research should explore the effects of elite framing on support for the energy transition.

Second, although the study reaches a population that previous studies have struggled to access, this approach may limit generalizability. The Southwest Pennsylvania area might not be representative of all fossil fuel communities both in the United States and globally. However, comparing the demographics of the study area to other places in the United States facing energy transitions reveals similarities that provide for cautious optimism that the findings may travel (Appendix F). Still, this claim requires further testing with new samples from diverse settings.

7 Conclusion

Overall, our findings show how the design of transition assistance policies and the information available to the public are consequential for the preferences of residents in communities on the front lines of the energy transition. By deploying a novel recruitment strategy, we reach a set of politically consequential respondents who are highly informative despite the more limited sample size. By considering multiple policy instruments simultaneously, this study captures meaningful differences in policy design and their potential tradeoffs.

The results indicate that public opposition is not an immutable barrier to the energy transition. As technical assessments show that the technologies exist to begin the clean energy transition (e.g., Pacala and Socolow 2004), the socio-political dimension is arguably the most significant remaining challenge to decarbonization. While obstacles remain as incumbent interest groups lobby and litigate to block reform (Brulle 2014; Stokes 2020) and communities may have lingering concerns about the credibility of assistance, the potential for partisan reversals, or historical failures to assist during past labor shocks, this paper demonstrates that smart policy design holds the potential to provide a solution to the gridlock.

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Supplementary Information
Building Climate Coalitions with Just Transition Assistance for Energy Communities

A Recruitment

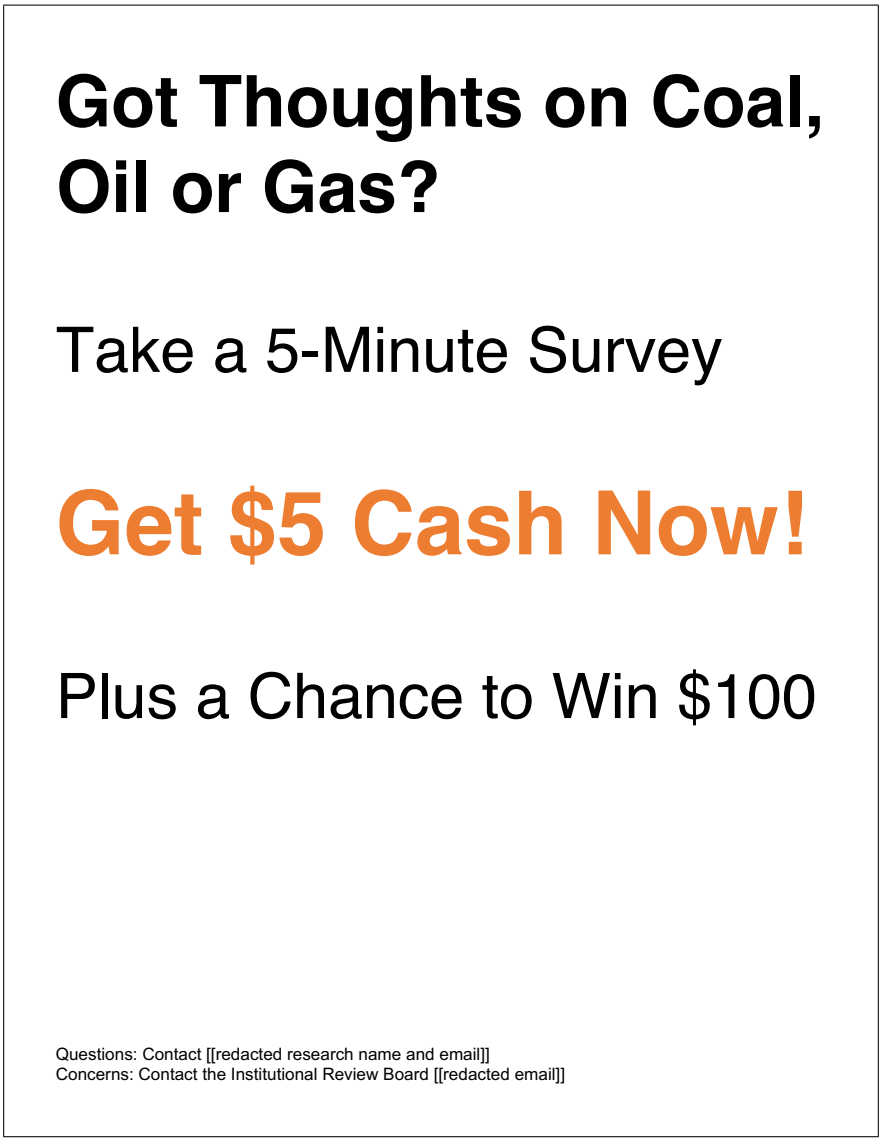

Figure A1: Recruitment poster displayed at the fair table.

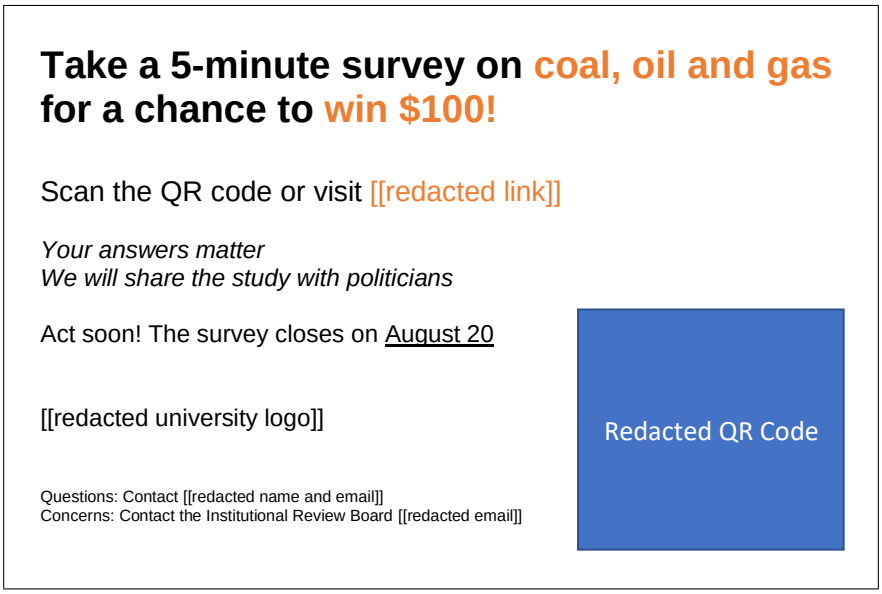

Figure A2: Recruitment postcard available for fairgoers to take to administer the survey at home after the fair.

B Sample Weights

We employ population data on the joint distribution of sex/age/education, the joint distribution of race/age/sex, and the distribution of income. Where data is missing in the sample, we impute with the median value. There are low rates of non-response. Of the items with missingness, less than 2.5% of the responses are missing. To reduce the influence of outlying observations, we trim the weights with a lower bound of 0.3 and an upper bound of 3. While survey weights enhance the representativeness of our estimates, they also reduce precision, which should introduce bias against detecting an effect.

C Fair Sample Comparison with Online Samples

Table C1: Comparison of fair and online samples of coal country

	Sample				
	Fair	Online	Difference	t-stat	p-value
Female	0.51	0.62	-0.11	-2.77	0.01
18-34	0.38	0.42	-0.05	-1.26	0.21
35-54	0.38	0.41	-0.02	-0.58	0.56
55 or older	0.24	0.17	0.07	2.18	0.03
Fossil Fuel Employment	0.50	0.38	0.13	3.35	0.00
Employed	0.55	0.51	0.04	1.11	0.27
College Degree	0.27	0.29	-0.01	-0.36	0.72
Climate Concern	0.57	0.69	-0.12	-3.24	0.00

Notes: Two-sided t-test that assumes unequal variances. Online sample from Gaikwad, Genovese, and Tingley (2022). Samples cover different populations. The fair sample includes Southwest Pennsylvania, whereas the online sample includes states outside of that region. Fair sample size is 248. Online sample size is 516. For comparison, the fair sample is unweighted (since the online sample includes no weights).

D Pre-Analysis Plan

We pre-registered hypotheses and tests with the Center for Open Science before data collection [[link redacted]]. There are two modifications from the pre-analysis plan. First, we attempted to collect a sample using targeted Facebook advertisements in fossil fuel-producing counties but discarded this approach due to recruitment challenges. Second, we planned to estimate the average component preferences in addition to our main AMCE estimand (Ganter 2021), but could not do so due to sample size constraints that rendered standard errors unreliable. The pre-analysis plan also included hypotheses for a separate project.

D.1 Additional Hypotheses

We pre-registered the following hypotheses derived from theoretical arguments advanced in the literature:

- *Occupational Identity.* Status-conscious men in male-dominated industries like coal and oil internalize hard and dangerous work as part of their identity and may perceive industries like healthcare, to which they could transition, as feminine and thus less desirable (Bell and York 2010; Lamont 2000; Winant 2021). Training programs for the healthcare industry could be less likely to create support for the policy, especially among men, but less so for those with low career attachment.

- *Community Identity.* Communities based around extractive industries like coal mining or logging often have strong identities tied to the place and occupation, which influence their policy preferences (Bell and York 2010). Place-based attachments filter how residents make sense of distributive issues like climate policy, emphasizing community rather than individual welfare (Cramer 2016; Wong 2010). Strong community economic identity could have the following effects on preferences over transition assistance: relocation assistance could decrease policy support due to fear of out-migration; place-based investment in housing for new residents could weaken backing for transition assistance since outsiders may alter the identity of the community; investments in local public goods like schools and broadband create incentives for people to stay put and should raise the probability of support; and community-wide income assistance should increase favorable assessments of the policy, as found in other studies (Gaikwad, Genovese, and Tingley 2022).

- *Economic Conservatism.* Distrust of the federal government and ideological views about the appropriate role of the state in creating jobs could condition the effect of transition assistance on policy support (Cha 2020; Cramer 2016). Individuals with economically conservative worldviews may be less likely to support transition assistance that provides income, benefit, and relocation support since these policies contradict their ideology.

- *Public Goods.* Preferences may differ for transition assistance that is excludable depending on if one has access to the good. Fossil fuel workers should be most supportive of policies that provide targeted income support to carbon-intensive labor.

In contrast, individuals in the area would prefer non-excludable income support for the entire community (Gaikwad, Genovese, and Tingley 2022). Although, community members should still support targeted assistance for workers due to their perceived deservingness (Gilens 2000). Examining the scope of assistance is also important because citizens may perceive resource trade-offs.

D.2 Results

Figure D1 displays the conditional AMCEs, which test the additional hypotheses advanced in the literature. Beginning with occupational identity, the results cannot reject the null hypothesis of no effect. The conditional estimates by gender and high career attachment yield no discernible difference in preferences over the industry into which one would transition.

The results in figure 2 have mixed implications for the community economic identity hypothesis. There is evidence contrary to the hypothesis showing that relocation assistance increases, rather than decreases, support for transition assistance policy. Although, the plot reveals a preference for investing in schools that provide benefits for current residents over housing to attract new residents. Lastly, community-wide income assistance leads to favorable assessments of the policy relative to the provision of no income support, but less so than for targeted assistance to only workers.

There is no distinguishable conditional effect of economic conservatism on preferences. Results are also similar when using Republican party identification, which has a positive correlation with economic conservatism.

Testing the public goods hypothesis, the results show that individuals employed in fossil fuels are more likely to support a policy that includes targeted assistance for workers, but fossil fuel-employed individuals do not decrease their level of policy support if other community members are excluded from income assistance. In contrast, people not employed by the fossil fuel industry support both community-wide and targeted income support relative to the baseline of no income payments during retraining.

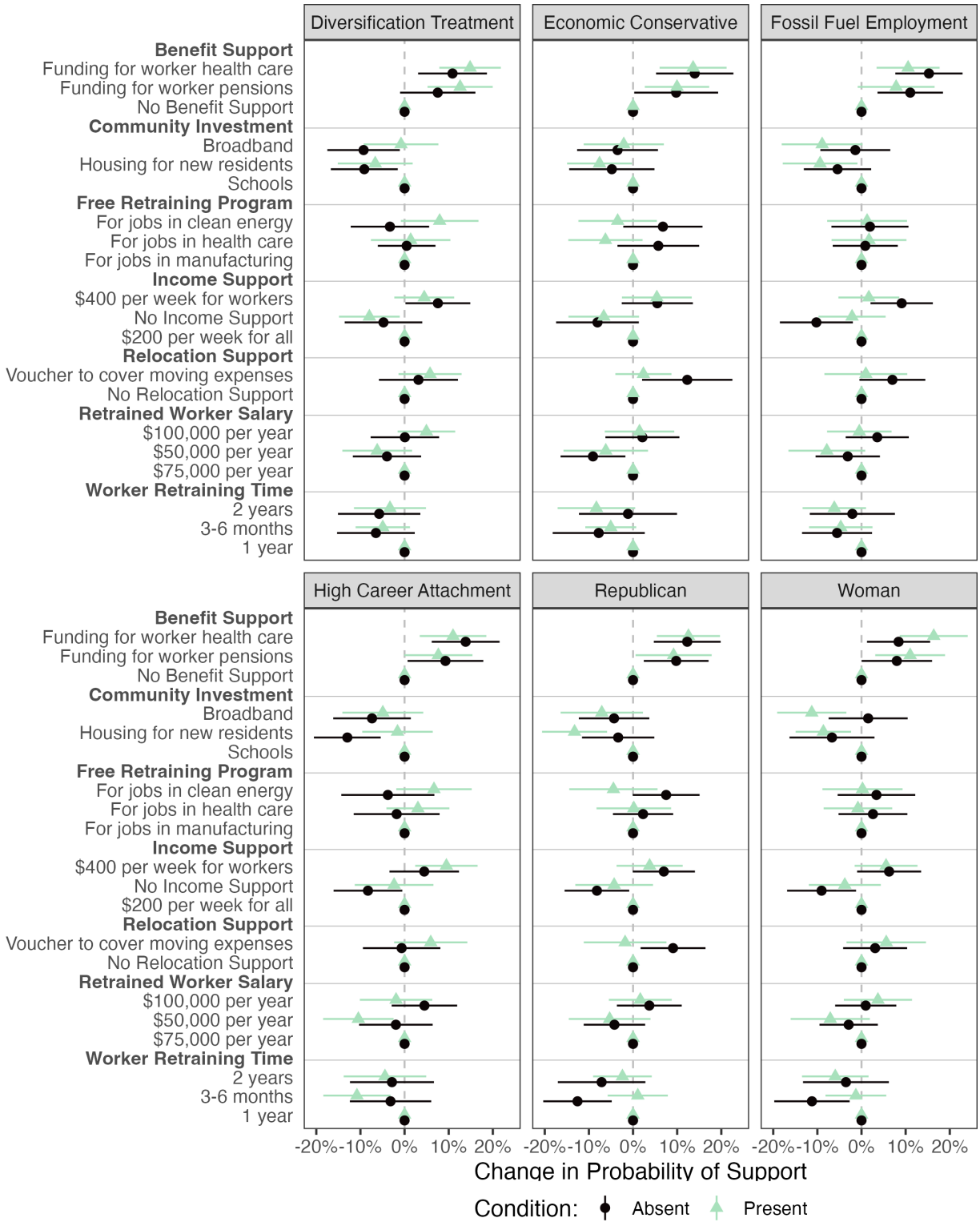

Figure D1: AMCE conditional on (a) the diversification treatment, (b) economic conservatism, (c) employment in fossil fuels, (d) high subjective career attachment, (e) Republican party identification, and (f) sex. Bars denote 95% confidence intervals. Sample from Southwest Pennsylvania region ($N = 248$). Sample weights employed.

E Questionnaire

E.1 Conjoint Task Example

Round 1

Please read the proposals to help fossil fuel workers and communities. Then choose which proposal you would prefer the government to pursue.

Make sure to scroll to the bottom of the page.

	Proposal A	Proposal B
Benefit Support	None	Funding for worker pensions
Relocation Support	Voucher to cover moving expenses	None
Retrained Worker Salary	$50,000 per year	$75,000 per year
Worker Retraining Time	2 years	1 year
Community Investment	Schools	Schools
Free Retraining Program	For jobs in clean energy	For jobs in health care
Income Support During Retraining	$400 per week for workers	$400 per week for workers

If you had to choose, which proposal would you prefer the government to pursue?

○ Proposal A

○ Proposal B

Figure E1: Example of a conjoint task as seen by the respondent. Screenshot from Qualtrics survey instrument.

Consent

1. This is a research study by investigators from [[redacted institution]]. We hope to learn what people in your community think about coal, oil and gas. The survey should last around 5 minutes. Your responses are confidential.

   Your answers matter. We will share the study with politicians.

   If you are taking the survey in person, we will give you $5 cash once you complete the questions. All survey-takers – in person and online – will also be entered in a raffle for $100. The winner will be notified by email.

   Your participation is voluntary. There is no penalty if you decide not to participate. You may stop at any time. For questions, contact [[redacted contact information]]. For concerns, contact the Institutional Review Board at [[redacted institution]].

   Do you agree to participate?

   I agree to participate; I do not agree to participate

2. How old are you? (programming: skip to end of survey if "Under 18" selected)

   Under 18; 18-24; 25-34; 35-44; 45-54; 55-64; 65 or older

Economic conservatism

3. Some people feel that the government in Washington, D.C. should see to it that every person has a job and a good standard of living. Others think the government should just let each person get ahead on his own. Where would you place yourself on this scale, or have you not thought much about this?

   1 - Government Should See to Jobs; 2; 3; 4; 5; 6; 7 - Each on His Own; Haven't thought much about this

Mobility

4. If you had an offer for a job in a **different line of work** with the **same pay and benefits** as you have now, how likely or unlikely would you be to take it?

   Very likely; Somewhat likely; Somewhat unlikely; Very unlikely; I am not currently employed

5. How able or unable do you think you would be to move into a new line work, if you had to?

   Very able; Somewhat able; Somewhat unable; Very unable

Multi-attribute policy experiment

6. *We are interested in your views on how the government should help fossil fuel workers and communities. / Because of cheap natural gas and renewables, a move away from coal may be inevitable. We are interested in your views on how the government should help fossil fuel workers and communities if that happens.* (randomize)[8]

   On the next few screens, you will be shown a pair of proposals. Please read the descriptions carefully. Then choose which proposal you would prefer the government to pursue.

   Your answers matter. We will share the study with politicians.

7. **Round 1** *We are interested in your views on how the government should help fossil fuel workers and communities. / Because of cheap natural gas and renewables, a move away from coal may be inevitable. We are interested in your views on how the government should help fossil fuel workers and communities if that happens.* (keep randomization from introduction)

   Make sure to scroll to the bottom of the page.

   [Insert conjoint table.]

   If you had to choose, which proposal would you prefer the government to pursue?

   Proposal A; Proposal B

8. **Round 2** *We are interested in your views on how the government should help fossil fuel workers and communities. / Because of cheap natural gas and renewables, a move away from coal may be inevitable. We are interested in your views on how the government should help fossil fuel workers and communities if that happens.* (keep randomization from introduction)

   Make sure to scroll to the bottom of the page.

   [Insert conjoint table.]

   If you had to choose, which proposal would you prefer the government to pursue?

   Proposal A; Proposal B

9. **Round 3** *We are interested in your views on how the government should help fossil fuel workers and communities. / Because of cheap natural gas and renewables, a move away from coal may be inevitable. We are interested in your views on how the government should help fossil fuel workers and communities if that happens.* (keep randomization from introduction)

   Make sure to scroll to the bottom of the page.

   [Insert conjoint table.]

8. The purpose of this randomization was to evaluate whether providing information about the market-driven decline of coal would change support for different transition assistance instruments. The results in Figure D1 show there are no statistically distinguishable differences in responses.

If you had to choose, which proposal would you prefer the government to pursue?

Proposal A; Proposal B

10. Which category was NOT included on the previous screens?

    Investment in nuclear power; Income support; Free retraining program; Community investment

11. **Round 4** *We are interested in your views on how the government should help fossil fuel workers and communities. / Because of cheap natural gas and renewables, a move away from coal may be inevitable. We are interested in your views on how the government should help fossil fuel workers and communities if that happens.* (keep randomization from introduction)

    Make sure to scroll to the bottom of the page.

    [Insert conjoint table.]

    If you had to choose, which proposal would you prefer the government to pursue?

    Proposal A; Proposal B

12. **Round 5** *We are interested in your views on how the government should help fossil fuel workers and communities. / Because of cheap natural gas and renewables, a move away from coal may be inevitable. We are interested in your views on how the government should help fossil fuel workers and communities if that happens.* (keep randomization from introduction)

    Make sure to scroll to the bottom of the page.

    [Insert conjoint table.]

    If you had to choose, which proposal would you prefer the government to pursue?

    Proposal A; Proposal B

13. **Round 6** *We are interested in your views on how the government should help fossil fuel workers and communities. / Because of cheap natural gas and renewables, a move away from coal may be inevitable. We are interested in your views on how the government should help fossil fuel workers and communities if that happens.* (keep randomization from introduction)

    Make sure to scroll to the bottom of the page.

    [Insert conjoint table.]

    If you had to choose, which proposal would you prefer the government to pursue?

    Proposal A; Proposal B

    Just a few more questions to go!

Global warming risk perceptions

14. How worried are you about global warming?

    Very worried; Somewhat worried; Not very worried; Not at all worried

Climate policy support

15. To fight global warming, politicians are considering policies to move away from fossil fuels. How likely or unlikely would you be to support such a policy if it included proposals to help fossil fuel workers and communities?

    Very likely; Somewhat likely; Somewhat unlikely; Very unlikely

Coal competitiveness

16. Compared to natural gas and renewables, how competitive or uncompetitive do you think coal will be in the future?

    Very competitive; Somewhat competitive; Somewhat uncompetitive; Very uncompetitive

Green job beliefs

17. Some

    politicians / power companies (randomize)

    say the growth of renewable energy like wind and solar will create new well-paying jobs.

    If these jobs come to your community, for how long do you think they would last?

    Very long; Somewhat long; Not very long; Not long at all

18. Compared to existing jobs in your community, how much better or worse do you think new renewable energy jobs would pay?

    Much better; Somewhat better; Somewhat worse; Much worse

Fossil fuel proximity

19. What industry do you or a member of your household work in?

    Coal; Oil or gas; Renewables (for example: solar, wind); Other (please specify) (text box for "Other (please specify)")

20. Among the 10 people you know best in your community, roughly how many work in coal, oil or gas?

    None; 1; 2; 3; 4; 5; 6; 7; 8; 9; 10

Background

21. What is your sex?

    Male; Female

22. What is your race?

    Asian; Black/African American; Hispanic/Latino; Native American/Pacific Islander; White/Caucasian; Other (text entry box for "Other")

23. What is the highest degree or level of education you have completed?

    Less than high school diploma; High school diploma or GED; Some college, but no degree; Associates Degree (for example: AA, AS); Bachelor's Degree (for example: BA, BBA, BS); Master's Degree (for example: MA, MS, MEng); Professional Degree (for example: MD, DDS, JD); Doctorate (for example: PhD, EdD)

24. Do you or anyone else in your household belong to a labor union?

    Yes; No

25. Including yourself, how many people live in your household?

    1; 2; 3; 4; 5; 6; 7; 8; 9; 10 or more

26. Information about income is very important to understand. Please choose the answer that includes your entire household income in (previous year) before taxes.

    Less than $20,000; $20,000 to $39,999; $40,000 to $59,999; $60,000 to $79,999; $80,000 to $99,999; $100,000 to $119,999; $120,000 to $139,999; $140,00 to $159,999; $160,000 or more

27. Generally speaking, do you consider yourself a...?

    Republican; Democrat; Independent; Other Party

28. (If 27 is "Independent" or "Other Party") Do you think of yourself as closer to the Republican Party or the Democratic party?

    Closer to the Republican Party; Closer to the Democratic Party; Neither

29. What is your current employment status?

    Employed full-time; Employed part-time; Not employed, but looking for work; Not employed, and not looking for work; Student; Retired; Self-employed; Prefer not to say

End of survey

30. May we recontact you for future research surveys? We will enter you in an additional $100 raffle when you complete the next survey.

    Yes; No

31. (If 30 is "Yes") What email address should we reach you at for future surveys? Your email will be kept confidential. (text entry)

32. (If 30 is "No") What email address should we send the $100 to if you are selected in the raffle? Your email will be kept confidential.

33. Thank you for taking the time to complete this survey! When the study is completed, we will select a raffle winner. If your name is drawn, we will send you your $100 compensation. For questions, contact [[redacted]]. For concerns, contact the Institutional Review Board at [[redacted]].

F Study Site Representativeness of Fossil Fuel Counties

Table F1 compares the demographics of the counties in the study area and fossil fuel-producing counties elsewhere in the United States. A county qualifies as an energy county if either coal or oil and gas employment account for over five percent of county employment. The study area is similar to other fossil fuel-extracting counties in terms of population, gender, ruralness, and coal employment. However, the study area differs in that it has a slightly higher median age, is less diverse in terms of race, and has lower average oil and gas employment.

Table F1: Study site representativeness of American fossil fuel counties.

	Non-Energy	Study	Energy	t-stat	p-value
Population	93542.20	33204.75	47863.45	-0.86	0.39
Median Age	40.42	43.42	39.55	4.43	0.01
Female	47698.24	16858.00	23989.64	-0.83	0.41
Male	45843.97	16346.75	23873.80	-0.89	0.38
White	69656.71	31700.00	34088.98	-0.23	0.82
Black	12942.62	779.75	6612.14	-1.86	0.06
Rural	19343.37	15317.25	13216.15	0.54	0.63
Coal Employment	0.00	0.10	0.01	1.31	0.28
Oil/Gas Employment	0.00	0.05	0.20	-6.00	0.00

Notes: Demographic data from the 2010 Census. Fossil fuel employment data from the 2020 Census County Business Patterns survey. NAICS codes for oil/gas include: 213111, 213112, 211120, 211130, 237120, 486110, 486210 486990, 486910, 424710, 424720, 324110, 324121, 324122, 324191, 324199, 221210 333131, 333132, 332420, and 454310. NAICS codes for coal include: 212114, 212115, 213113, 212111, 212112, and 212113. Two-sided t-tests reported to assess balance.

G Conjoint Regression Results

Table G1: Probability of selecting a policy with a given attribute level

	(1)	(2)	(3)	(4)	(5)
Intercept	0.485***	0.467***	0.481***	0.507***	0.503***
	(0.042)	(0.035)	(0.042)	(0.045)	(0.045)
Free Retraining Program (Baseline: For jobs in manufacturing)					
For jobs in clean energy	0.018	−0.011	0.019	0.019	0.019
	(0.032)	(0.025)	(0.032)	(0.036)	(0.037)
For jobs in health care	0.010	0.005	0.010	0.011	0.011
	(0.028)	(0.025)	(0.028)	(0.032)	(0.033)
Retrained Worker Salary (Baseline: $75,000)					
$100,000 per year	0.024	0.026	0.024	0.027	0.027
	(0.027)	(0.023)	(0.027)	(0.030)	(0.030)
$50,000 per year	−0.051*	−0.055**	−0.051*	−0.055*	−0.055*
	(0.029)	(0.025)	(0.029)	(0.032)	(0.032)
Income Support During Retraining (Baseline: $200 per week for all)					
$400 per week for workers	0.058**	0.066***	0.058**	0.063**	0.063**
	(0.026)	(0.022)	(0.026)	(0.030)	(0.030)
None	−0.064**	−0.059**	−0.064**	−0.070**	−0.071**
	(0.029)	(0.024)	(0.029)	(0.033)	(0.033)
Relocation Support (Baseline: None)					
Voucher to cover moving expenses	0.043	0.065***	0.043	0.045	0.045
	(0.030)	(0.020)	(0.030)	(0.034)	(0.034)
Community Investment (Baseline: Schools)					
Broadband	−0.049	−0.055**	−0.050	−0.054	−0.054
	(0.031)	(0.024)	(0.031)	(0.035)	(0.035)
Housing for new residents	−0.076***	−0.066***	−0.076***	−0.083**	−0.083**
	(0.029)	(0.023)	(0.029)	(0.033)	(0.033)
Benefit Support (Baseline: No Benefit Support)					
Funding for worker health care	0.127***	0.103***	0.127***	0.138***	0.138***
	(0.027)	(0.024)	(0.027)	(0.030)	(0.030)
Funding for worker pensions	0.096***	0.100***	0.097***	0.108***	0.108***
	(0.029)	(0.023)	(0.029)	(0.033)	(0.033)
Sample Weights	No	Yes	Yes	Yes	Yes
Task Fixed Effects	No	No	Yes	No	Yes
Individual Fixed Effects	No	No	No	Yes	Yes
Respondents	248	248	248	248	248
N	2974	2974	2974	2974	2974
Adjusted R^2	0.029	0.029	0.027	−0.056	−0.058

* p < 0.1, ** p < 0.05, *** p < 0.01

Notes: Estimates from a linear regression of an indicator for if a respondent selected a policy on indicators for levels of each conjoint attribute. Heteroskedastic-robust standard errors clustered by respondent. Adjusted R^2 is negative for the models with a large number of fixed effects due to penalization from a greater number of parameters.

H Attention Check

Estimating AMCEs conditional on passing the attention check shows consistent or stronger results except with respect to retraining time, perhaps due to income differences.

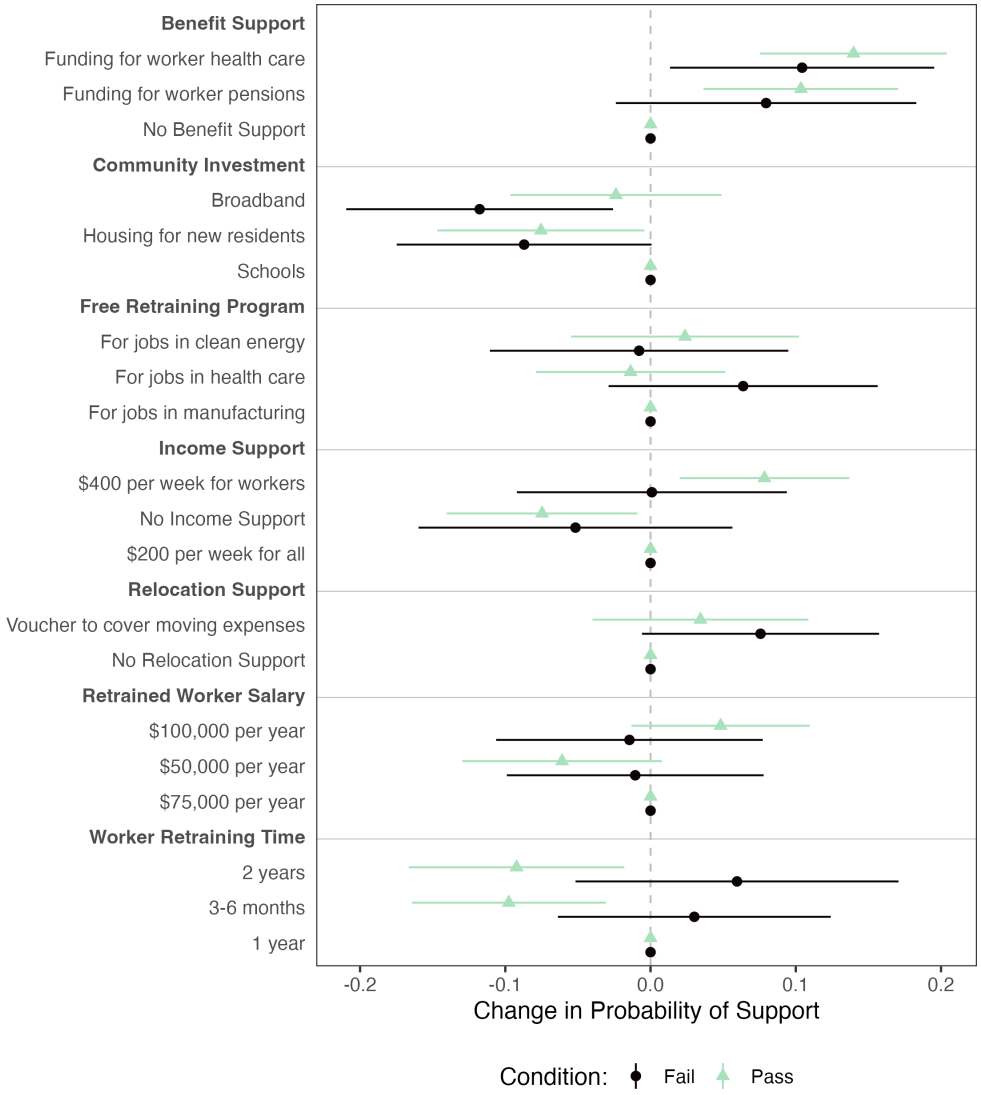

Figure H1: Effect of policy design on support for transition assistance to fossil fuel workers and communities conditional on passing the attention check. Bars denote 95% confidence intervals. Sample from Southwest Pennsylvania region ($N = 248$).

Table H1: Linear regressions of attention check passage on individual-level covariates

	(1)	(2)
Intercept	0.811***	0.776***
	(0.180)	(0.196)
Age (Baseline: 18-34 years)		
35-54 years	−0.016	0.002
	(0.072)	(0.085)
>55 years	0.046	0.053
	(0.099)	(0.128)
Female	−0.077	−0.096
	(0.060)	(0.066)
White	−0.047	−0.033
	(0.122)	(0.101)
College Degree	0.206***	0.171**
	(0.074)	(0.080)
Fossil Fuel Employment	−0.042	−0.017
	(0.063)	(0.065)
Income (Baseline: >$100,000)		
<$20,000	−0.147	−0.159
	(0.116)	(0.144)
$20,000-39,999	0.058	0.032
	(0.119)	(0.141)
$40,000-59,999	0.147	0.079
	(0.093)	(0.104)
$60,00-99,999	0.057	0.039
	(0.085)	(0.089)
Party (Baseline: Democrat)		
Republican	0.010	0.005
	(0.077)	(0.085)
Independent	0.067	0.050
	(0.106)	(0.162)
Climate Concern	−0.020	0.057
	(0.067)	(0.078)
Survey Time (standardized)	0.085**	0.094**
	(0.036)	(0.044)
Sample Weights	No	Yes
Fair Fixed Effects	Yes	Yes
N	244	244
Adjusted R^2	0.137	0.165

* p < 0.1, ** p < 0.05, *** p < 0.01

Notes: HC3 standard errors employed in the linear regression model. Less than 2.5% of missing income and sex observations imputed with median response.

I Information Treatment Randomization Check

Table I1: Balance test for diversification treatment

	Standardized Mean			
	Diversify	Control	Difference	Balance
Female	0.48	0.50	0.03	Balanced
18-24 years	0.07	0.15	0.08	Balanced
25-34 years	0.16	0.16	0.00	Balanced
35-44 years	0.19	0.12	-0.07	Balanced
45-54 years	0.20	0.24	0.04	Balanced
55-64 years	0.15	0.15	0.00	Balanced
>65 years	0.23	0.18	-0.05	Balanced
White	0.97	0.92	-0.05	Balanced
College Degree	0.37	0.38	0.01	Balanced
Fossil Fuel Employment	0.43	0.48	0.05	Balanced
>$100,000	0.21	0.24	0.04	Balanced
$20,000-39,999	0.24	0.13	-0.12	Not Balanced
$40,000-59,999	0.15	0.15	0.00	Balanced
$60,000-99,999	0.24	0.28	0.04	Balanced
<$20,000	0.16	0.20	0.04	Balanced
Climate Change Concern	0.59	0.64	0.06	Balanced
Democrat	0.40	0.41	0.01	Balanced
Independent	0.11	0.13	0.03	Balanced
Republican	0.49	0.45	-0.04	Balanced
Fair	0.79	0.77	-0.02	Balanced

Notes: Balance determined by a if the difference in standardized means is less than 0.1 (Stuart, Lee, and Leacy 2013).

J Power Analysis

We performed a power analysis for the multi-attribute policy experiment using a modified version of a simulation tool (Stefanelli and Lukac 2020). The analysis assumes an AMCE of 0.05, six tasks, 300 respondents, and a maximum of three levels per attribute. Figure J1 shows that our test is well-powered at the 78 percent level.

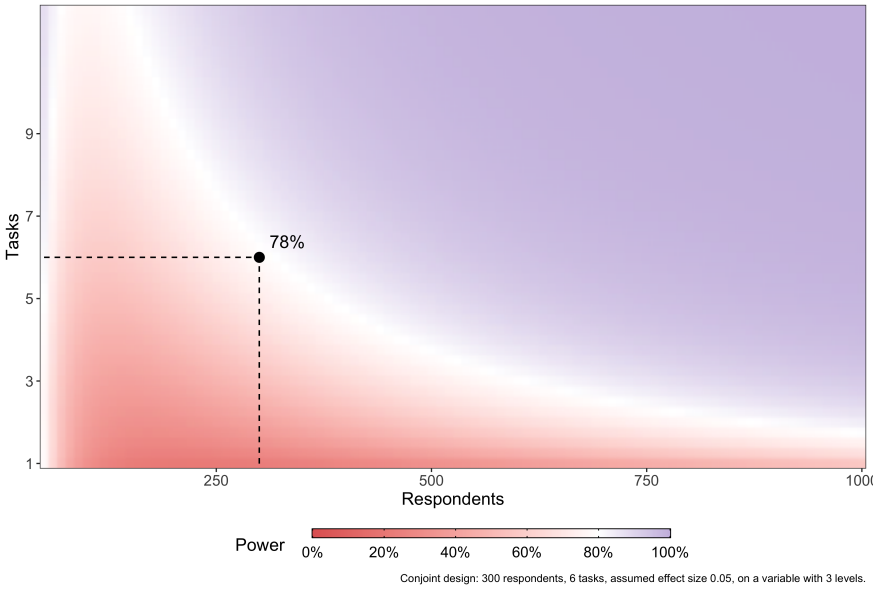

Figure J1: Power analysis conducted using a version of the simulation technique described in Stefanelli and Lukac (2020).

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