The Relationship Between Human Values and Attitudes Toward the Park51 and Nuclear Power Controversies

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ABSTRACT
Recent events such as the Fukushima nuclear accident as well as the Park51 project in downtown Manhattan create “critical discourse moments,” explosions of discourse around a topic that provide opportunities to understand the relationships between human values and attitudes toward these controversies. The goal of this paper is to study these relationships quickly enough to be useful both to social scientists and to policy makers by using a crowdsourced social science approach. Human values provide conceptions of the desirable that shape attitudes toward these controversies. This paper seeks to answer the following research question: What are the relationships between human values and attitudes toward these controversies, as well as Turker-generated paragraphs about the Park51 project? The results revealed relationships between values and attitudes toward these controversies, including consistently statistically significant relationships between the value of universalism and positive attitudes toward Park51 and between the value of security and negative attitudes toward Park51. These findings further our understanding of the role of values in determining attitudes toward these controversies, and also demonstrate the effectiveness of this approach for collecting real-time data about ongoing controversies. Thus, this research is of relevance both for social science and for public policy.

Keywords
Human Values, Park51 Project, Nuclear Power, Fukushima Nuclear Accident, Crowdsourcing, Mechanical Turk, Portrait Values Questionnaire

INTRODUCTION
Current events frequently induce an explosion of media discourse around a topic, a “critical discourse moment” which can be exploited as an opportunity for data gathering (Chilton, 1987; Gamson & Mogidgliani, 1989). Social media expand the scope of available data, rendering non-professional discourse available in the form of comments, blogs, and other formats. Policy makers have an interest in understanding the human and cultural dynamics of “critical discourse moments” in real-time.

Human values often serve as justifications for positive or negative evaluations of things or courses of action. Especially in discussion of public policy, where common points of reference are needed for convincing others of the rightness of a point of view, values serve to rhetorically motivate policy positions (Fisher, 1978; Wallace, 1992). Additionally, values have been shown to be cognitively related to attitudes (Hitlin & Piliavin, 2004).

The work of Shalom Schwartz argues that the basic map of human values is universal, and that cultures and subcultures vary only in the relative weight of importance they place on the values in the map. In examining ongoing controversies, studying values can show us what’s important about the issue to parties on each side. Human values are thus an important next step in quickly describing the cultural dimensions of an issue for policy makers and others who need to understand the zeitgeist ahead of the curve.

Further, this research also has potential applications for natural language processing (NLP). Sentiment analysis has already become a primary task for NLP (Pang & Lee, 2008), but the information provided by sentiment analysis is limited because it rarely delves into the reasons behind sentiment (Kim & Hovy, 2006). Previous research seeking to automate values analysis (Hopkins & King, 2007; Ishita et al., 2010) has focused training machine learning classifiers using manual annotations of values. Thus, this paper could provide a novel approach for generating a corpus that could be used to automatically classify values.

In what follows, the background describes work to date on human values, the Park51 project controversy, and the
nuclear power controversy. The methods section details the crowdsourcing approach taken in this project, which involves two related experiments for the Park51 project and an additional experiment for the nuclear power controversy that directly followed the Fukushima nuclear accident. The results section presents the results of these experiments. The discussion section relates these results to the existing literature, and also presents limitations and future directions. Finally, the conclusion discusses the implications of this research both for social science and for public policy, as well as the potential applications of this work for natural language processing research.

BACKGROUND

Human Values

Spates (1983) locates the point of departure for the modern study of values in Talcott Parson’s The Structure of Social Action. Parsons differentiated the idea of cultural values from the sense of value as an objective property related to utility or worth (Parsons, 1937). In a 1951 volume edited by Parsons and Shils, anthropologist Clyde Kluckhohn furnished a definition frequently used by subsequent generations of values researchers:

“A value is a conception, explicit or implicit, distinctive of an individual or characteristic of a group, of the desirable, which influences the selection from available modes, means, and ends of action.” (p. 395)

The Parsonian approach to values research declined along with the rest of the Parsonian program in the 1960s. Empirical values research, however, continued (Spates, 1983). A number of idiosyncratic approaches to values were developed until Rokeach brought some conceptual unity to the field (Braithwaite & Scott, 1991; Rokeach, 1967, 1973). Despite some criticisms, the Rokeach Values Survey (RVS) was widely used, and was subsequently validated by factor analysis of values identified in semi-structured interviews (Braithwaite & Law, 1985; Braithwaite & Scott, 1991; Rokeach, 1968, 1973). The RVS still suffered from the fact that each value was measured using a single item on the scale, and that prompts were very abstract, consisting of a single word representing the value and asking the subject how important the value was to them.

Schwartz (1992, 1994) developed a tiered system of values in which values at the lowest level (many of them drawn from Rokeach’s inventory) served as survey items indicating values at higher levels in the hierarchy. The entire hierarchy was validated using a variety of multidimensional scaling which showed that responses to lower level items clustered according to the higher level constructs proposed to contain them. Since each level of the hierarchy was independently motivated in the values literature, this result strengthened the credibility of the instrument. Moreover, the data was drawn from many different countries, bolstering the claim of universality.

In some countries that produced data inconsistent with value structure proposed by Schwartz, a modified version of the survey was subsequently used that presented subjects with less abstract prompts. The Schwartz Portrait Values Questionnaire (PVQ) (Schwartz et al., 2001; Schwartz, 2007) instead asks subjects to identify with brief value-laden portraits of individuals, with multiple portraits included as indicators of each of the 10 major value types. The PVQ was found to be successful among populations in which the SVS had yielded data inconsistent with the bulk of international results (Schwartz et al., 2001).

Braithwaite and Scott (1990) present major methodological aspects of measuring values at the individual level. Spates (1983) and Hitlin and Piliavin (2004) provide historical overviews of the values concept and research in the field. Cheng and Fleischmann (2010) provide a cross-disciplinary comparison and synthesis of definitions of values and values inventories. This research builds on this extensive literature on human values, specifically by connecting it with two recent controversies, the Park51 project controversy and the nuclear power controversy, which has been reignited by the recent Fukushima nuclear accident.

The Park51 Project Controversy

The Park51 project was originally designed to create an Islamic community center that could provide a place of worship and a site for activities in downtown Manhattan. However, due to the proximity of the planned site (a former Burlington Coat Factory store) to the former site of the Twin Towers destroyed during the 9/11 terrorist attacks, the Park51 project was effectively framed by opponents as the “Ground Zero Mosque” (Maschke, 2011). To date, relatively little scholarly work has focused on Park51, and there does not appear to be any research to date on the relationship between attitudes toward the Park51 debate and human values (beyond brief analysis of experiment 1: Templeton, Fleischmann, & Boyd-Graber, 2011). Thus, this study addresses an important gap in the research literature.

The Nuclear Power Controversy

Since the debate about nuclear power has been raging within popular discourse worldwide for decades, there is a more robust literature on this topic than the Park51 project, including some literature on the relationship between attitudes toward nuclear power and human values. For example, based on a modified version of Schwartz’s value inventory, Whitfield et al. (2009) reported a positive correlation between traditional values and nuclear attitude, a negative correlation between altruistic values and nuclear attitudes, and a positive correlation between “openness to change” values and nuclear attitudes. However, very little has been written in the scholarly literature on nuclear power since the Fukushima nuclear accident. Thus, this study seeks to begin to address this gap within the literature on the nuclear power controversy.
METHODS

Crowdsourcing with Mechanical Turk

Amazon’s Mechanical Turk is a crowdsourcing platform. Research subject pools recruited using Mechanical Turk have been found to be at least as good as or better than those recruited through more conventional means such as university lab subject pools and Internet discussion boards in terms of demographics that model the general population and ability to follow instructions (Paolacci, Chandler, & Ipeirotis, 2010). Mechanical Turk matches Requestors, who want to pay for work, with Turkers, who want to work for pay. Mechanical Turk allows Requestors to post Human Intelligence Tasks (HITs) inside Mechanical Turk, or to provide a redirect URL to a HIT implemented outside Mechanical Turk. Further, HITs may require workers to have or complete Qualifications defined by Requestors.

Three experiments were implemented inside Mechanical Turk using Mechanical Turk Command Line Tools. Each experiment included a Qualification and a HIT. In all cases, the Qualification consisted of the 21 question version of Schwartz’s (2007) Portrait Values Questionnaire (PVQ), along with some demographic questions. The HIT consisted of a series of opinionated paragraphs with prompts for Turkers to indicate their degree of agreement or disagreement with each. The set of paragraphs and prompts was followed by a request for Turkers to write down their own opinions about the issue.

The PVQ questionnaire in the Qualifications was faithful to the version used in the European Social Survey (Schwartz, 2007). Turkers were instructed:

Here we briefly describe some people. Please read each description and think about how much each person is or is not like you. Put an X in the box to the right that shows how much the person in the description is like you. Please note that we are not looking for any one type of person; please answer honestly.

Portraits (i.e., Questionnaire Items) were of the flavor:

It is very important to him to show his abilities. He wants people to admire what he does. This person is like me:

Including this sample portrait (of achievement), a total of 21 portraits were used, reflecting all 10 of Schwartz’s value types (2 per value type, with the exception of universalism, which was represented in three portraits). Turkers were asked to respond to each item in the PVQ on an integer scale (1-5 for experiments 1 and 3; 1-4 for experiment 2).

The other component of each experiment was the HIT. In the HITS, Turkers were instructed:

Please read each paragraph completely and consider what it says.

Please try to identify the overall point of view being expressed in the paragraph.

Please indicate whether you agree with the point of view expressed in the paragraph.

If you feel that you do not have enough information to make a judgment about a paragraph, please make your best judgment based on the language presented in the paragraph.

Turkers were asked to respond to each paragraph on an integer scale (1-5 for experiments 1 and 3; 1-4 for experiment 2). An additional option was “I’m really not sure”. Turkers were asked “please only select this option if you can’t detect any point of view in the paragraph to agree or disagree with”.

After responding to the paragraphs, Turkers were asked to “Please describe your opinion on this issue in three to five sentences” leading to sets of Turkergenerated paragraphs.

Experiment 1: Media Paragraphs on the Park51 Project

For the first experiment, the topic was the Park51 project, and the corpus was collected from opinionated news articles accessed using Google News. For example, here is one paragraph from this corpus (from the Los Angeles Times):

In a breathtakingly inappropriate setting, the president has chosen to declare our memories of 9/11 obsolete and the sanctity of ground zero finished. No one who has lived this history and felt the sting of our country's loss that day can truly believe that putting our families through more wrenching heartache can be an act of peace.

Turkers were offered $2.70 to take the Qualification and to complete a HIT consisting of indicating their agreement with each of the 50 paragraphs using a 1-5 scale followed by a question asking them to write a paragraph on the issue. This dollar amount and the amounts offered in the other experiments were based on an estimate of ensuring that Turkers were typically paid at least the US national minimum wage. Sentiment was resercher-determined. Fifty-seven Turkers completed the task.

Experiment 2: Turker Paragraphs on the Park51 Project

In the second Park51 experiment, the 55 paragraphs gathered in the first experiment were presented for Turkers to indicate their agreement or disagreement. This time, a scale of 1-4 was used to eliminate the middle of the spectrum. Once again, Turkers were offered $2.70 to complete the Qualification and the HIT. One hundred Turkers completed this HIT. Here is one example of a Turker-generated paragraph collected in the first experiment and used in the second experiment:

I have been following the coverage of this closely and normally I am not one to delve too deeply into politics. I understand that many Americans lost their loved ones in the Sept. 11 attacks but
they have to place the blame on the right people. There are extremists in every religion and you can not blame the religion as a whole for that. Obama is right in supporting the building of a mosque there. It would be the first step in America stopping a cycle of hate.

To determine sentiment, the 55 paragraphs were presented in a separate HIT to a different group of Turkers to evaluate the sentiment expressed in the paragraph. In this HIT, Turkers were presented with a brief description of the Park51 project from Wikipedia. Turkers were instructed:

Please read each paragraph completely and consider what it says.

Please indicate what you think the author's attitude toward the project is.

Turkers rated the sentiment expressed in the paragraph toward the Park51 project on a scale of 1-4. One hundred Turkers completed this HIT.

**Experiment 3: Media Paragraphs on Nuclear Power**

In contrast to the two Park51 experiments, the third experiment focused on the nuclear power controversy following the Fukushima nuclear accident. As in the first experiment, opinionated paragraphs were identified using Google News. For example:

If Japan can't do nuclear right after the seismic infrastructure they've been building for decades, you can only imagine the vulnerability our plants face. The Deep Water Horizon disaster provided 205 million gallons of proof why offshore drilling is not the answer. Let this be a "Fukushima Moment", where we realize once and for all that the path to the future lies not with the old, earth-killing methods of the past, but with the clean-burning, renewable methods of the future.

Turkers were asked to rate their agreement with paragraphs on the same 1-5 scale used in experiment 1. Sentiment was researcher determined. Turkers were offered $2.50 to complete the Qualification and the HIT. One hundred Turkers completed this HIT.

**Data Analysis**

Each data set consisted of T Turkers x P paragraphs = A unique annotations. Each annotation (agree or disagree) was associated with an agreement score, a sentiment score (via sentiment analysis of the paragraph that was annotated, described above) and a vector of PVQ values scores (via the Turker who did the annotating). Binarizing the agreement (agree and disagree) and sentiment (positive and negative) scores for each annotation yielded the following matrix at the corpus level:

<table>
<thead>
<tr>
<th>Agreement</th>
<th>Disagree</th>
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<tbody>
<tr>
<td>Positive</td>
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<td>Negative</td>
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**Figure 1: Corpus level annotation matrix**

Each quadrant contains a set of vectors of PVQ values scores. For each value, three comparisons were performed using Mann Whitney U, which tests whether two sets of discrete values come from the same distribution. One set of comparisons was performed between the Agree/Positive and the Disagree/Positive categories. These comparisons tested null hypotheses of the form:

H0: Reactions to texts that express positivity toward the Park 51 project are not related to the reader’s affinity for Universalism

A second set of comparisons was performed between the Agree/Negative and the Disagree/Negative categories. These comparisons tested null hypotheses of the form:

H0: Reactions to texts that express negativity toward the Park 51 project are not related to the reader’s affinity for Universalism

A third set of comparisons was performed by merging the Agree/Positive category with the Disagree/Negative category, and the Disagree/Positive category with the Agree/Negative. These comparisons tested null hypotheses of the form:

H0: Attitudes toward the Park 51 project are not related to the reader’s affinity for Universalism
The Park51 Project Controversy

The first experiment revealed strong positive correlations for both universalism and stimulation and strong negative correlations for security, conformity, and tradition. Table 1 indicates the significance of these relationships, as measured using Mann-Whitney U. All five of these results are significant at a level of $p<0.001$ (many are actually significant to an even much greater level). Figure 2 visually illustrates the directionality of the correlation. Turkers who agreed with paragraphs that are positive about Park51 or who disagreed with paragraphs that are negative about Park51 had higher values of universalism and stimulation and lower values of security, conformity, and tradition than Turkers who disagree with paragraphs that are positive about Park51 or who agreed with paragraphs that are negative about Park51.

<table>
<thead>
<tr>
<th>Values</th>
<th>+P: agree vs disagree</th>
<th>-P: agree vs disagree</th>
<th>+P Agree vs -P Disagree</th>
<th>-P Agree vs +P Disagree</th>
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<td>Benevolence</td>
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<td>Universalism</td>
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<td>Self Direction</td>
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Table 1. Mann-Whitney U for Experiment 1

(*=p<0.05; **=p<0.01; ***=p<0.001).

Figure 2: Relationship between paragraph sentiment and Turkers’ attitudes and values in Experiment 1
The second experiment revealed a strong positive correlation for universalism and a strong negative correlation for security. Table 2 indicates the significance of these relationships, as measured using Mann-Whitney U. Both of these results are significant at a level of $p<0.001$ at the aggregate level (combining attitudes toward both positive and negative paragraphs). Figure 3 visually illustrates the directionality of the correlation. Turkers who agreed with paragraphs that are positive about Park51 or who disagreed with paragraphs that are negative about Park51 had higher values of universalism and lower values of security than Turkers who disagree with paragraphs that are positive about Park51 or who agreed with paragraphs that are negative about Park51. Interestingly, the results are much more complex than the first experiment. For example, this time a new pattern emerged where both stimulation and achievement were positively correlated with agreement with paragraphs in general, rather than paragraphs that indicated an overall sentiment toward the Park51 project. Benevolence, self-direction, power, conformity, and tradition each had a significant result for one type of paragraph but not for the other type of paragraph. Specifically, benevolence was only connected to positive paragraphs, with a positive correlation. Self direction, power, conformity, and tradition were only connected to negative paragraphs, with a negative correlation. However, these one-sided correlations are not as compelling or convincing as the parallel patterns for both pairs of results.

<table>
<thead>
<tr>
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<th>+P: agree vs disagree</th>
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<th>+P Agree vs -P Disagree</th>
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Table 2. Mann-Whitney U for Experiment 2 (*=$p<0.05$; **=$p<0.01$; ***=$p<0.001$).

Figure 3: Relationship between paragraph sentiment and Turkers’ attitudes and values in Experiment 2.
The Nuclear Power Controversy

The results from the third experiment are more complex and overall less clearly significant than the results from the first two experiments. As such, it appears that the relationship between values and attitudes was less clear for the nuclear power controversy than for the Park51 controversy. None of the values achieved significant results for attitudes toward both positive and negative paragraphs. Only security achieved a significant result for positive paragraphs, with agreement rating higher than disagreement for positive paragraphs. Stimulation, power, and conformity achieved significant results for negative paragraphs, with agreement with negative paragraphs exceeding disagreement in all three cases. Only the values of universalism and hedonism exhibited similar patterns to the first two experiments, with significance both on the attitudes toward negative paragraphs and in the overall combination of agreeing with negative paragraphs and disagreeing with positive paragraphs. Thus, there may be some similar patterns to the Park51 results, but for the case of the nuclear power controversy, the degree of correlation appears to be dampened, especially in terms of the responses to positive paragraphs.

### Table 3. Mann-Whitney U for Experiment 3

<table>
<thead>
<tr>
<th>Values</th>
<th>+P: agree vs disagree</th>
<th>-P: agree vs disagree</th>
<th>+P Agree vs. -P Disagree</th>
<th>-P Disagree -P Agree</th>
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<td>Benevolence</td>
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(*=p<0.05; **=p<0.01; ***=p<0.001).

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**Figure 4: Relationship between paragraph sentiment and Turkers’ attitudes and values in Experiment 3**
DISCUSSION

Human Values
These results demonstrate yet again the importance of human values in understanding attitudes toward current events, and further, they demonstrate the appropriateness and effectiveness of crowdsourcing for detecting these relationships. Given the approach to measuring attitudes used here, to ask Turkers to express their attitudes toward opinion-bearing paragraphs, it is quite reasonable to assume that there is less potential for social desirability bias using this approach as compared to the typical approach of measuring attitudes toward issues using surveys. Thus, this approach has provided promising evidence of effectiveness and may also be more timely and more accurate than previous approaches.

The Park51 Project Controversy
Data analysis for both Park51 experiments led to a very intuitive set of relationships between values and attitudes. Annotations of high agreement with pro-Park51 paragraphs and of low agreement with anti-Park51 paragraphs were made by people who, overall, valued Universalism and Stimulation more than their counterparts. Annotations of low agreement with pro-Park51 paragraphs and of high agreement with anti-Park51 paragraphs were made by people who, overall, valued Security, Conformity, and Tradition more than their counterparts. Thus, in terms of Schwartz’s (1994) four highest-level value categories, both self-transcendence and openness to change are correlated with positive attitudes toward the Park51 project, while conservation values are solidly aligned against Park51. These results make intuitive sense and match our understanding of the Park51 controversy, given that both self-transcendence and openness to change involve valuing things that are different and new, as Park51 is and as Islam within the United States as a mainstream religion largely is too, while conservation values tend to cause individuals to be risk-averse and opposed to change and potential danger, which is what Park51 represents to many people, or at least how it has commonly been depicted within the popular press. The comparison between the two experiments is interesting – there seemed to be an amplification and focus on universalism and security in the second experiment as compared to the first experiment. It is possible that this was a result of using Turker-generated paragraphs rather than journalist-authored paragraphs, given that journalists may provide more detailed and nuanced context and arguments while Turkers might tend to give more direct arguments. This result is interesting in terms of understanding the relationship between attitudes toward issues when they are framed by journalists and when they are framed by everyday people.

The Nuclear Power Controversy
The results for the nuclear issue were less clear. A similar pattern was present for universalism and hedonism, where there appeared to be a small negative correlation between these values and attitudes toward nuclear power. Similarly, based on a modified version of Schwartz’s value inventory, Whitfield et al. (2009) reported a negative correlation between altruistic values and nuclear attitudes. Thus, the negative correlation with universalism matches this previous finding. Further, this finding echoes the colorful depiction, evident in media narratives, that nuclear power is opposed by “people who wear backpacks and play Frisbee...people playing guitars and doing needlepoint” (Gamson and Modigliani, 1989, p. 18). However, Whitfield et al. (2009) also identified a positive correlation between traditional values and nuclear attitudes and a positive correlation between openness to change values and nuclear attitudes. While there were no overall correlations with traditional values in the present study, interestingly the relationship with openness to change appeared to be inverted, in the case of the negative correlation of hedonism. Hedonism is an interesting value type because it bridges openness to change and self-enhancement. Thus, this result may be due to the complex nature of hedonism, or changes in the dynamics of the nuclear power debate.

Limitations and Future Research
There are several limitations of this research that could be addressed through future research. First, in cases where results do not appear to be sufficiently significant, it is possible that the results will more compellingly fall either in the significant or insignificant column through further data collection. So, one possible direction would be to increase the number of Turkers completing the HITs.

In this work, values are compared in terms of a single main dimension: attitude toward a point of controversy central to the topic. This assumption seemed to break down in the face of the nuclear debate, which has a long and nuanced history. Here, it is possible that different annotators were influenced by different factors within different paragraphs, beyond just the single dimension of sentiment. Narrative frame analysis may be the key to making these considerations visible. A narrative frame is a full-blown story line that includes dominant values, shared assumptions, and common links between actors and events (Chong & Druckman, 2007). Gamson and Modigliani (1989) identified seven frames in the nuclear discourse, each with distinct relationships to attitudes and values. Thus, frames could be used to provide a more nuanced content analysis.

Further, this paper focuses exclusively on values as a factor in influencing attitudes toward current events. However, other factors such as political affiliation, socioeconomic status, and religion might also help to determine attitudes. Analysis of framing would then help to reveal how specific factors such as values as well as many other factors might work together or at odds with each other to influence attitudes toward different events.

While this paper has provided a comparative analysis of reactions to two current events at specific points in time,
there would also be benefits for looking at additional events at different times and seeing how reactions might vary and overall patterns might emerge. There could be overall features of debates that cause some to correspond more closely with values than others. Perhaps analysis of attitudes toward other current events at different points in time would reveal interesting patterns related to which debates are polarized around values and which debates are polarized around other factors or perhaps are less polarized overall.

One limitation is that this data collection only involved individuals who already use Mechanical Turk. External populations could be asked to complete the task within the Turk or other environments to validate the effectiveness of Turkers in representing the general population. However, as noted above, previous research has demonstrated that Turkers are fairly representative of the general population, and outperform convenience samples commonly used by academic researchers in this regard, college students and discussion board members (Paolacci et al., 2010).

CONCLUSION

The contrast in the clarity of the results between the compelling results from both Park51 experiments and the borderline results from the nuclear power experiment raises the question of why the Park51 topic yielded more clear results than the nuclear topic. The Park51 project presented a clear choice tied to a concrete situation. The nuclear issue, on the other hand, was not primarily a debate issue; it was primarily a disaster story. Whereas for Park51 the swirl of opinion was the story, currents of opinion about the nuclear industry and nuclear energy contended with many other kinds of reporting. Among opinionated articles focusing on the future of nuclear energy, a range of practical options presented themselves, including increasing regulation, replacing nuclear with coal, replacing nuclear with renewables, decreasing overall energy consumption, or continuing with status quo. Additionally, although the Fukushima disaster was local, the opinion controversies it raised tended to be pinned to whatever locale the author was commenting from. So, Indian press focused on Indian energy policy, German press on German policy, and the press in rural Pennsylvania tended to focus on the reactors in Shippingport.

This approach may also be useful in automating the process of detecting and classifying human values, as it provides a rich source of data for NLP-based machine learning. Specifically, efforts to date have required annotators to detect and classify values in texts, which is a difficult problem yielding challenges in achieving sufficient inter-annotator agreement. However, the approach presented here is potentially promising because the portrait value questionnaire gets at values indirectly (reducing self-report bias) and deciding whether to agree or disagree with a paragraph is a more straightforward task than classifying values.

Overall, this research has demonstrated that social science data collection can be crowdsourced effectively, and that a topical corpus can be characterized in terms of salient values by measuring the values of individuals and their reactions to texts. Crowdsourced social science thus provides just-in-time information that can be applied to understanding the relationships between human values and current events such as Park51 and nuclear power, as well as understanding how these relationships and the overall debates shift over time. This capability allows policy makers to understand how their positions on ongoing events might be perceived differently by different audiences depending on what they value.

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