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PUBLIC OPINION ON NUCLEAR ENERGY

An Analysis of the Relationship Between Political Ideology & Support for Nuclear Energy in the United States.

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INTRODUCTION

"The Fukushima nuclear complex went on to become the worst man-made engineering disaster in all of human history, outside of war."

— Steven Magee, Health Forensics

Nuclear energy is complicated. Since the devastating 2011 tsunami-related reactor meltdown at Japan's Fukushima Daiichi Nuclear Power Plant, public support of nuclear energy – as a means of supplying electricity – has slumped to a historical low, internationally. In 2016, as part of their annual Environment Poll, Gallup – who have tested on public support for nuclear energy since 1994 – reported for the first time that a majority of Americans now oppose nuclear energy. Having surveyed respondents just a few days before the 2011 disaster at the Fukushima Plant, Gallup reported that support for nuclear energy stood at 57%, but as is detailed in their annual findings, support has successively fallen every year to a record low of just 44% in 2016. Most alarmingly, a steep upturn of public opposition can be seen in 2015, in which 11% of respondents signaled staunch opposition towards nuclear energy as a means of supplying electricity. However, given the numerous benefits of producing electricity via means of nuclear energy, why is there such evident public opposition?

Former Gallup writer, and science reporter for AAAS, Rebecca Rifkin suggests that: "Energy prices and the perceived abundance of energy sources are the most relevant factors in attitudes toward nuclear power, rather than safety concerns prompted by nuclear incidents" (Rifkin). Given that the United States benefited from a momentary economic stabilization in 2015 – largely affording the United States the ability to offer lower fuel prices – this seems to support Rifkin's assertion but fails to account for historical differences when discussing political ideology as it pertains to support for nuclear energy. For example, Researcher Dr. Ann Bisconti, asserts that "The conventional wisdom goes that "not-in-my-backyard," is a barrier to nuclear energy", and that it could possibly play a devastating role in currying public opinion regarding nuclear energy as a clean, efficient, economically smart means to create electricity (Bisconti). This certainly holds up to scrutiny when observing the long-term trends as they pertain to political ideology and support for the development of nuclear plants within one's own neighborhood.

Several substantial empirical articles have been published on public support for nuclear energy which suggest that political ideology and party affiliation affects one's support of nuclear energy as a means of creating electricity. This study seeks to investigate these trends in order to show a correlation between support for nuclear energy and political ideology by using up-to-date data on the variables of interest.

LITERATURE REVIEW

2.1 The Development of Young American Adults' Attitudes About the Risks Associated with Nuclear Power.

Dr. L. K. Pifer, who's primary scientific endeavors have focused on studies in child and young adult development, authored the earliest article measuring young adult's views on nuclear energy. This particular study was published in 1996 as an entry in Issue 2 of the 5th volume of Public Understanding of Science. Pifer sought to study young people's attitudes toward nuclear energy in order to ascertain whether their early family, peer, and school lives influenced their assessment of nuclear energy.

The key independent variable was partisan identification. A person's partisan identification is defined as: a long-term attachment to a particular party (Campbell: The American Voter, 1960). The author used data collected from the Longitudinal Study of American Youth (LSAY). From 1987 – 1994, the LSAY collected a wide range of data from two groups of individuals, each totaling approximately 3000 youths. The study focused on the development of attitudes and competence in science, mathematics, and citizenship. The first group was in the tenth grade in the fall of 1987 (15 to 16 years old), while the second group was in the seventh grade in the fall of 1987 (12 to 13 years old). The focus of Pifer's article was on Group One of the LSAY. In the seventh cycle of the LSAY, 2037 members of Group One (72% of the original group) participated in the study: 1850 completed a telephone interview, 149 completed a long-form mailed questionnaire, and another 38 completed a questionnaire. No margin of error was included in the study.

Partisan identification, was operationalized as an ordinal variable ranging from 1 (Strong Democrat) to 9 (Strong Republican). The reliability of this measure was estimated to be 0.75 (Pifer 137). Other independent variables used in this study included: academic science attitude, college science classes, gender, home science resources, parent education, parent college push, peer science push, parent science push, science achievement, and science job plans.

The dependent variable, perception of nuclear power risks, was operationalized on an ordinal level, ranging from: 1) Risks substantially greater than benefits, to 5) Benefits substantially greater than risks (Pifer 148). Risk perception is defined as: a highly personal process of decision making, based on an individual's frame of reference developed over a lifetime, among many other factors (Institute of Risk Management), and nuclear power is defined as: the use of sustained nuclear fission to generate heat and electricity (U.S. Department of Energy).

In the study, Pifer checked for robustness and ran OLS regression analysis concluding that there is a strong association between partisan affiliation and perception of nuclear power risks. While gender had the greatest total effects on adolescents' attitudes about the risks associated with nuclear power in the twelfth grade, partisan identification had the fourth greatest total effects on nuclear power attitudes (Pifer 144). Pifer utilized standardized beta coefficients to allow for comparisons of the relative effects of all of the factors in the model (Pifer 146). All beta coefficients presented were significant at the 0.05 level.

2.2 The Role of Affect and Worldviews as Orienting Dispositions in the Perception and Acceptance of Nuclear Power.

Dr. E. Peters and Dr. P. Slovic, whose main area of expertise covers the study of decision making as an interaction of characteristics of the decision situation and characteristics of the individual, conducted the 2006 study entitled: The Role of Affect and Worldviews as Orienting Dispositions in the Perception and Acceptance of Nuclear Power. Published in the 16th volume of edition 26 of the Journal of Applied Social Psychology, the study sought to prove that "Worldviews and affect-laden imagery are highly predictive of perceptions of risk from nuclear power and support for that technology. Furthermore, affect and worldviews each contribute independently to the prediction of nuclear support".

A national phone survey was conducted to test hypotheses about the factors relating to perception and acceptance of nuclear power. A representative sample of the adult population in the U.S. was surveyed by phone from November 21, 1992 – January 16, 1993. Respondents were chosen based on a random-digit-dialing method

combined with recruiting the person in the household who was over 18 years old and had the most recent date of birth. A total of 1,512 respondents answered 155 questions, with an average interview length of approximately 30 min. The response rate was 50.7% and no margin of error was included in the study.

Peters, and Slovic, measured the independent variable, political orientation, on an ordinal scale from 1) Very Liberal, to 5 Very Conservative (Peters and Slovic 1444). In testing against measures of affect, respondents who scored high on the individualist factor tended toward conservatism ($r = .17$, $p < .000l$). The correlation was $r = .08$ for the fatalist/hierarchist factor scores ($p < .0l$); persons high on the egalitarian factor tended toward liberalism ($r = - .18$, $p < .0001$) (Peters and Slovic 1448). These results bolstered support from previous findings that egalitarians tend to be liberal, and that hierarchists and individualists are more conservative; in turn this further supported the finding that conservatives were more likely to support nuclear power as a source of electrical energy (Peters and Slovic 1449). Peters and Slovic also included a host of other variables to complement the principal independent variable such as: high technology and environmental concerns, perceived health risks, desire for control, political orientation, affect, and demographic information which served as control variables in the various regression models.

The dependent variable, support for nuclear power, was measured in five separate questions on ordinal scales of support for nuclear power such as: If your community was faced with a potential shortage of electricity, do you 1) Strongly Agree, to 5) Strongly disagree, that a new nuclear power plant should be built to supply that electricity? Results were then computed to provide an average across those five items for each respondent in order to compile results into three categories: Fatalist/Hierarchist; Individualist; Egalitarian, which translated as Conservative, moderate, and liberal, respectively (Peters and Slovic 1434). Nuclear energy is defined as: the use of sustained nuclear fission to generate heat and electricity (U.S. Department of Energy).

The returns on Fatalist/hierarchists (Conservatives), provided clarity that those who align with more conservative political ideologies, are more likely to support nuclear power as a source of electrical energy. As Peters and Slovic explain in their findings, the conglomerate nuclear support index details a $N2 = .20$ reliability which strongly supports their assertion that both those who exhibit fatalist/hierarchist tendencies, support nuclear energy more than liberals (Egalitarians), who total at $N2 = - .28$ (Peters and Slovic 1448).

2.3 Americans, Politics and Science Issues: The general public's political views are strongly linked to their attitudes on climate and energy issues. But politics is a less important factor on biomedical, food safety, space issues.

Alongside age, education of science knowledge, and gender, both political ideology and party identification were found to have strong effects on people's views to support the expansion of the nuclear power plant fleet, in Pew Research's research survey entitled: Americans, Politics and Science Issues: The general public's political views are strongly linked to their attitudes on climate and energy issues. But politics is a less important factor on biomedical, food safety, space issues. The third in its series, the 2015 report examined the general public's views on a range of topics and more specifically examined the degree to which political views, education level, religion and demographic factors align with views on science-related topics. Produced as a collaboration with the American Association for the Advancement of Science (AAAS), the report collected data from a sample of 2,002 adults surveyed by landline and cellular telephone in August 2014. Of note, some former analyses from other Pew Research Center surveys were included where relevant.

The dependent variable, support of nuclear energy (and, more specifically support to build more nuclear plants), was prompted as: All in all, do you favor or oppose building more nuclear power plants to generate electricity? Answers were provided on an ordinal scale as: 1: Favor; 2) Oppose; & 3) Don't know. Nuclear energy is defined as: the use of sustained nuclear fission to generate heat and electricity (U.S. Department of Energy).

The independent variable, political ideology, was measured on an ordinal scale from 1) Very Conservative, to 5) Very Liberal. Political ideology is defined as: the integrated assertions, theories and aims that constitute a sociopolitical outlook (Merriam Webster's Collegiate Dictionary 10th ed. 2017). In addition, a combination of both party identification and ideology was also measured in the following, more detailed, assigned ordinal scale: 1) Conservative Republican; 2) Moderate or Liberal Republican; 3) Independent; 4) Moderate or Conservative Democrat; and 5) Liberal Democrat. Other independent variables included: support for hydraulic fracturing; support for increased use of genetically engineered plants to create a liquid fuel replacement for gasoline; support for child vaccines, support for technology to reduce carbon emissions, and a wealth of demographic variables. The margin of sampling error was 3.01.

In running a multivariate logistic regression, Pew found that party identification was a significant predictor of support for building more nuclear power plants (Raine, Funk and Kennedy 65). Those who identified or leaned toward the Republican Party (GOP), were 23% more likely to favor building more nuclear power plants, relative to their Democratic counterparts when holding all other

factors at their means. The effect of ideology was weaker in that being conservative did not reach statistical significance at the 0.05 level (Raine, Funk and Kennedy 66). As outlined in the

2.4 Partisan amplification of risk: American perceptions of nuclear energy risk in the wake of the Fukushima Daiichi disaster.

introduction, Japan and other key international nuclear energy stakeholders, were – post-Fukushima – saddled with challenging the efficacy and even possibilities of continuing their burgeoning nuclear programs. In their study, entitled Partisan amplification of risk: American perceptions of nuclear energy risk in the wake of the Fukushima Daiichi disaster, Sara K. Yeo, and Michael A. Cacciatore attempted to shed light on the implications of political ideology and media consumption as it pertains to support of nuclear power as a source of energy in the United States. In slight contrast to previous scholarship, Yeo and Cacciatore measured (and compared) both variables pre and post-Fukushima in order to gain a more sophisticated understanding of the effects of media consumption in the United States and how that reflected on the acceptance and support of nuclear power as a source of energy. The data was obtained from two larger sets of online surveys using a probability-based web panel run by GfK Knowledge Networks. The first survey was conducted in July 2010, and the final sample size was 2338. The second survey was conducted between December 2011 and January 2012 and the final sample size was 2806. Analysis was performed after combining both the 2010 and 2011 datasets in a newly created "merged" data file. The margin of sample error is 5%.

In their analysis, Yeo and Cacciatore utilized 'Risk Perceptions' as the dependent variable. Risk perception refers to people's subjective judgments about the likelihood of negative occurrences such as injury, illness, disease, and death (Oxford Dictionary, 2017). Given that the data was collected at various different times – as part of broader individual studies – the scales used to measure risk perception were different. In the pre-Fukushima survey, risk perception was measured using an ordinal scale of 1 ¼) Do not agree at all, to 10 ¼) Agree very much. In focusing on the subject of support of nuclear power as a source of energy, the survey asked respondents how much they agree with the following four statements related to nuclear power: 1) Nuclear power may lead to more pollution and environmental contamination; 2) Nuclear power may lead to contamination of water supplies; 3) Nuclear power may lead to new human health problems; & 4) Nuclear power may increase the risk of a nuclear accident in the United States. The four items were averaged to create an index with scores ranging from 1 – 10: (M ¼ 6.09, SD ¼ 2.30, Cronbach's alpha ¼ .92). In the post-Fukushima data, risk perception was measured by asking respondents how risky they thought nuclear power was for society. This item was based on a 7-point scale: 1¼) Not at all Risky, to 7¼) Very Risky (M ¼ 4.67, SD ¼ 1.64).

The independent variable, political ideology, was assessed by questioning respondents about their ideology on current and previous social and economic issues. Political ideology is defined as: the integrated assertions, theories and aims that constitute a sociopolitical outlook (Merriam Webster's Collegiate Dictionary 10th ed. 2017). In the pre-Fukushima dataset, the two items were measured on a scale ranging from 1) Very liberal, to 6) Very conservative. As described by Yeo: "The results were combined to produce an averaged index (M ¼ 3.62, SD ¼ 1.24, Pearson's r¼.75). The post-Fukushima dataset asked a comparable question set now organized by using a scale that ranged from 1) Very Liberal, to 7) Very Conservative. The items were averaged together to create an index (M ¼ 4.22, SD ¼ 1.44, Pearson's r ¼ .77) (Yeo and Cacciatore 730). Given that they were assigned slightly different scales, the results were standardized prior to merging the data. In addition to political ideology, other variables such as age, gender, education and income, were included to control for demographic influences on the dependent variable (Yeo and Cacciatore 730-731).

In their results, Yeo and Cacciatore found that the disaster in Japan produced markedly different impacts on risk perceptions depending on an individual's political ideology. While increase in risk perception amongst moderates was slight, liberals and conservatives – pre and post-Fukushima – showed dramatic trends of differing on how they perceive risk. While it is surprising that risk perceptions among conservatives were so high before the disaster, it remains fascinating that a feeling of ease and embrace of nuclear energy set in after one of the most catastrophic nuclear disasters that took place in the Daiichi power plant. However, when considering the nature of media consumption amongst the conservative community, it is worth noting that the Obama administration was largely supportive of nuclear energy. Therefore, media clearly played a large role in currying favor in popular conservative society.

Conclusion

Despite there being a wealth of scholarship available which quantifies support within political parties for nuclear energy/ weapon programs, it is relatively difficult to find sound, scientific studies that discuss political ideology in a citizenry. Furthermore, it is woefully difficult to compile a collection of thoroughly tested, scientific data which focuses primarily on the United States and their outlook on the future of nuclear energy programs. That said, all studies in the literature review stand up to robust empirical requirements. All variables were thoroughly tested to produce quality findings, highlighting trends in both conservative and liberal-leaning communities concerning their views on nuclear power as an energy source within the United States. Of particular importance was the impressive level of scholarship involved in Yeo and Cacciatore's study which concluded that: while political ideology was an important factor in determining a person's support for nuclear energy, the way a person consumed media materials,

was of paramount importance.

Given the clear fracturing of public trust on the matter of nuclear power as a stable energy source, it must be a priority to engage the public in a more meaningful discussion regarding the future of nuclear energy. While it is made clear in the Literature Review that data exists that clearly point toward trends that political ideology affects a person's support for nuclear energy, it can also be ascertained that there is a clear pattern of growing distrust within the United States regarding public opinion on the safety of nuclear energy on both sides of the aisle. In his 2011 article, "Fossil Fuels are Far Deadlier than Nuclear Energy", published in New Scientist, Phil McKenna rightly points out that "Deaths resulting from coal mining disasters far outweigh the tally of those resulting from those at nuclear power plants" (McKenna). Furthermore, the leading energy death cause can be found in the disastrous dam failures that took place in China in 1975 in which 230,000 lives were lost. In sum, this study investigates these trends by dissecting contemporary data on the variables of interest and further seeks to offer solutions for the future success of nuclear energy as a source of electricity in the United States.

ANALYSIS

UNIVARIATE ANALYSES

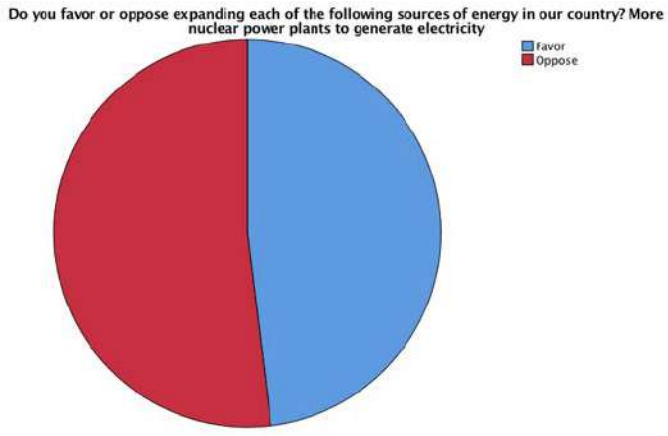
Data for the dependent variable, support for nuclear energy, was conceptualized as the use of sustained nuclear fission to generate heat and electricity (U.S. Department of Energy). It was operationalized using a nominal scale with two categories:
1) Favor & 2) Oppose. Central tendency was measured using the mode, which equated to oppose with 51.9% of the cases (see Table 1 below). Dispersion was measured using frequency percentages, which indicated high variability since the distribution between the categories of Favor (48.1%) and Oppose (53.9%) was nearly evenly split (see Table 1). A pie chart is included to graphically represent the data (see Figure 1).

Table 1. Do you favor or oppose expanding each of the following energy sources of energy in our country? More nuclear power plants to generate electricity.

Do you favor or oppose expanding each of the following sources of energy in our country? More nuclear power plants to generate electricity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Favor	719	15.8	48.1	48.1
	Oppose	777	17.0	51.9	100.0
	Total	1496	32.8	100.0	
Missing	System	3067	67.2		
Total		4563	100.0		

Figure 1. Do you favor or oppose expanding each of the following energy sources of energy in our country? More nuclear power plants to generate electricity.



3.2 Independent variable (political ideology)

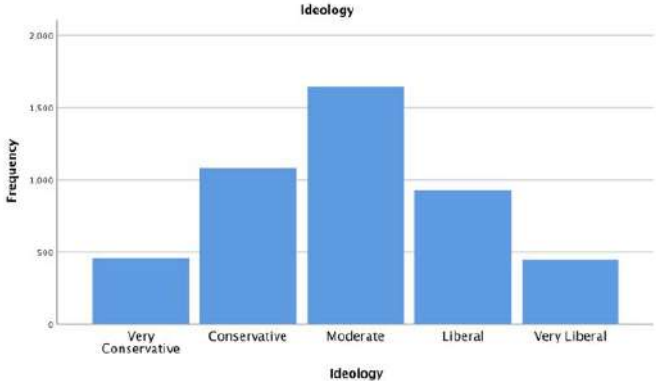
The independent variable, political ideology, was conceptualized as the integrated assertions, theories and aims that constitute a sociopolitical outlook (Merriam Webster's Collegiate Dictionary 10th ed. 2017). It was operationalized using an ordinal scale with five ranked categories: 1) Very Conservative; 2) Conservative; 3) Moderate; 4) Liberal; & 5) Very Liberal. Central tendency was measured using the median, which equated to the category of Moderate (see Table 2 below). Dispersion was measured using frequency percentages, which indicated high variability since 36.1% of the respondents were in the category of 3) Moderate with the other 63.9% spread between: 1) Very Conservative, 2) Conservative, 4) Liberal, & 5) Very Liberal (see Table 2 below). A bar chart is included to graphically represent the data (see Figure 1 below).

Table 2. Political Ideology

Ideology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Conservative	456	10.0	10.0	10.0
	Conservative	1080	23.7	23.7	33.8
	Moderate	1642	36.0	36.1	69.9
	Liberal	924	20.2	20.3	90.2
	Very Liberal	447	9.8	9.8	100.0
	Total	4549	99.7	100.0	
Missing	System	14	.3		
Total		4563	100.0		

Figure 2. Political Ideology



3.3 Dependent variable: political party

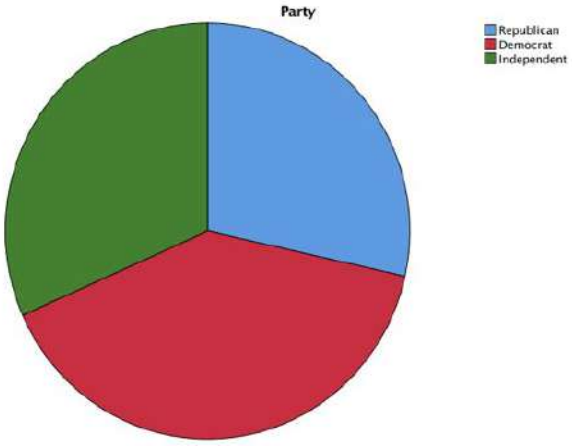
A second independent variable, political party, was conceptualized as an organization of people who share the same views about the way power should be used in a country or society through government, or policy-making (Collins. 11th Revised Edition 2011). It was operationalized using a nominal scale with three categories: 1) Republican; 2) Democrat; & 3) Independent. Central tendency was measured using the mode, which equated to Democrat with 39.9% of the cases (see Table 3 below). Dispersion was measured using frequency percentages, which indicated high variability since the distribution between the categories of 1) Republican (28.5%); 2) Democrat (39.9%); & 3) Independent (31.6%) were nearly evenly split (see Table 3). A pie chart is included to graphically represent the data (see Figure 3).

Table 3. Political party

Party

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Republican	1179	25.8	28.5	28.5
	Democrat	1650	36.2	39.9	68.4
	Independent	1309	28.7	31.6	100.0
	Total	4138	90.7	100.0	
Missing	System	425	9.3		
Total		4563	100.0		

Table 3. Political party



BIVARIATE ANALYSES

3.4 Does a person's political party affect their support for nuclear energy as a means to produce electricity in the United States?

The following bivariate analysis scrutinized whether a person's political party significantly relates to their support for nuclear energy when used as a source of electricity in the United States, or whether the two variables are independent of each other. The person's political party represented the independent variable and their support for nuclear energy represented the dependent variable.

Cross-tabulation was used to analyze the relationship as support for nuclear energy was measured on a nominal scale, as was political party. The working hypothesis (H1), and the null hypothesis (H0) were as follows:

H1 A person's political party affects their support for nuclear energy when used as a source of electricity in the United States.

H0 There is no relationship between a person's political party and their support for nuclear energy when used as a source of electricity in the United States.

A comparison of the differences in percentage values of both the independent variable, political party, and dependent variable, support for nuclear energy to produce electricity in the United States, showed that the values were dissimilar enough to indicate a possible relationship.

Percentage differences between respondents who were Republican (58.3%) and respondents who were Democrat (33.8%) who said they favor the expansion of nuclear energy indicated a 20.3% difference suggesting a significant and moderate relationship between the variables (see Table 1.1). In addition, percentage differences between respondents who were Democrat (62.0%) and respondents who were Republican (41.7%) who said they opposed the expansion of nuclear energy, also indicated a 20.3% difference again suggesting a significant and moderate relationship between the variables (see Table 1.1).

The Chi-Square (c2) statistic was computed to test if the pattern could be generalized to the population as a whole by determining how

unlikely the observed value was if the null hypothesis was true. Since the observed significance level was smaller than the customary measure of .05 (c2=42.641, df=2, p<.000), the null hypothesis that stated that there is no relationship between political party and whether a person supports the expansion of nuclear energy as a means of producing electricity was rejected (see Table 1.2). Tau b indicated a negative, weak relationship between the variables (Tau b = .178); approximately 18% of the differences in whether a person's support of the expansion of nuclear energy as a means of producing electricity can be attributed to a person's political party (see Table 1.3). Figure 1.1 provides a graphic representation of the relationship.

Table 1.1 Do you favor or oppose expanding each of the following sources of energy in our country? More nuclear power plants to generate electricity.

Do you favor or oppose expanding each of the following sources of energy in our country? More nuclear power plants to generate electricity * Ideology Crosstabulation

			Ideology					
			Very Conservative	Conservative	Moderate	Liberal	Very Liberal	Total
Do you favor or oppose expanding each of the following sources of energy in our country? More nuclear power plants to generate electricity	Favor	Count	98	205	246	130	39	718
		% within Ideology	61.6%	60.5%	44.6%	43.2%	28.1%	48.2%
	Oppose	Count	61	134	305	171	100	771
		% within Ideology	38.4%	39.5%	55.4%	56.8%	71.9%	51.8%
Total		Count	159	339	551	301	139	1489
		% within Ideology	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Table 1.2 Chi-Square significance test results for support of nuclear energy and political party.

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	60.342[a]	4	.000
Likelihood Ratio	61.418	4	.000
Linear-by-Linear Association	52.869	1	.000
N of Valid Cases	1489		

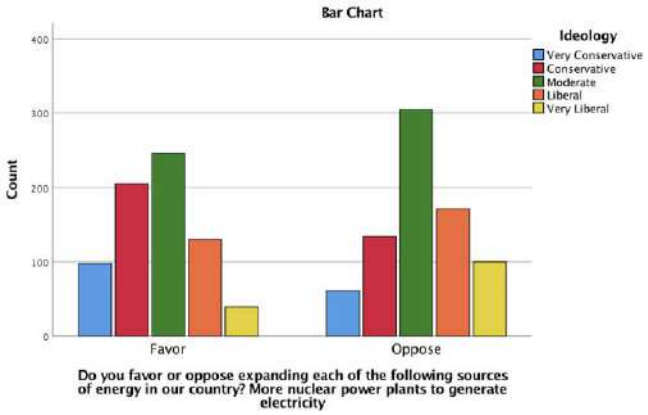
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 67.03.

Table 1.3 Kendall's Tau b measure of Association test for support of nuclear energy and political party.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.201	.000
	Cramer's V	.201	.000
N of Valid Cases		1489	

Figure 1.4 Do you favor or oppose expanding each of the following sources of energy in our country? More nuclear power plants to generate electricity.



CONCLUSION

The empirical analysis conducted in this paper indicates there is a significant relationship between one's political ideology, and their support for nuclear energy when used as a source of electricity in the United States. In close alignment with the findings of Pifer, 1996; Peters & Slovic, 1996; Rainie, Yeo & Cacciatore, 2014; & Funk, Kennedy et al, 2016, the data included in this paper denotes that there is a strong and significant relationship between a person's political ideology, and their support for nuclear energy when used as a source of electricity in the United States. Therefore, it can be assumed that, alongside age and education level, political ideology and the political party with which one identifies, can be valuable predictors of whether they are likely to support nuclear energy. Furthermore, it signals that a person's political ideology and their political party can be used to predict whether or not they would support the future expansion of the nuclear energy industry in the United States.

THE FUTURE OF NUCLEAR ENERGY

The future possibilities for nuclear energy are far-reaching in their scope and importance. However, the difficulties that the nuclear energy industry will encounter in the coming years are woefully compelling. Largely viewed as hazardous, wasteful, and expensive, the United States government will experience immeasurable difficulties in their attempts to paint nuclear energy as the bastion of progressive energy. Even despite its glowing record. However, that is purely a communications-driven predicament. As noted by Joseph Romm: "Nothing is worse than fossil fuels for killing people." Therefore, how has public trust of such a worthy energy source been so sorely diminished and bruised during a time in which information has been made so readily available en masse? And more importantly, how do we combat that miscommunication in the future?

POLICY VS. AESTHETIC

While policy adjustments have often historically proven to be expedient in sculpting public opinions on a number of issues, they will not serve as the catalyst to reform public perception and acceptance of nuclear energy. As is made clear by Yeo & Cacciatore's findings in their 2016 study, media consumption wields the ultimate power to both engage, and disengage the public on the matter of nuclear energy. Given that news media are unlikely to forge and support a nuclear energy renaissance, it is others who bear the onus to forge a more palatable future for the nuclear energy industry. Additionally, the proliferation of misinformation in the digital frontier has posed problems that are further mired in communication-driven traps. Therefore, resolutions that reject conventional solutions are preferable and, in many ways, could extend an exciting possibility to re-imagine a world in which all energy sources can co-exist in harmony. In other words, science must cunningly blend its discipline with the arts in order to afford its nuclear power plants a facelift.

In a world that so avidly celebrates aesthetic and visual appeal, there is a golden opportunity for nuclear energy companies to capitalize on the blank canvasses their cooling towers supply. If nuclear energy is to survive – and thrive – new power plant design concepts must be a priority. Gone are the days in which cooling towers must physically look austere, and scary; that misguided image must be removed in order for nuclear energy to, at last receive praise and acclaim for its historically impressive safety record.

APPENDIX

Figure 1. Public Support for Nuclear Energy – Gallup 2016

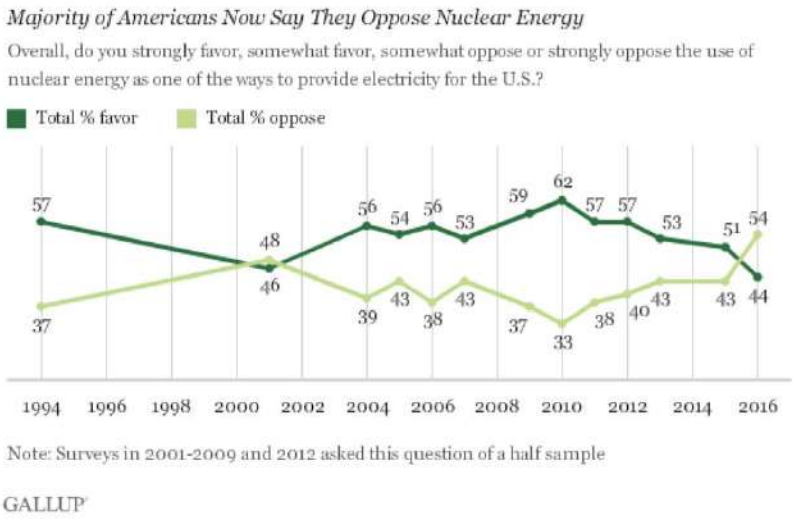


Figure 2. Estimates of the direct, indirect, and total effects of selected factors on young adults' assessment of the risks of nuclear power.

	Explained effects (indirect)	Residual effects (direct)	Total effects
Female	−0.21	0.00	−0.21
Parent education	0.03	0.00	0.03
Home science resources	0.02	0.00	0.02
Parent college push	0.06	0.00	0.06
Parent science push	0.04	0.00	0.04
Peer science push	0.10	0.00	0.10
SME career—year 3	0.00	0.22	0.22
Expected education—year 3	0.00	0.00	0.00
Academic science attitude—year 3	0.00	0.00	0.00
High school science courses	0.00	0.00	0.00
Nuclear power risks low—year 3	0.00	0.41	0.41
Science achievement—year 3	0.00	0.00	0.00
College science courses	—	0.00	0.00
Republican	—	0.16	0.16

Figure 3. Correlations Between Worldview Factor Scores and Items Pertaining to Nuclear Support.

Item	Fatalist/ hierarchist	Indi- vidualist	Egali- tarian
5. If your community was faced with a potential shortage of electricity, do you strongly agree, agree, disagree, or strongly disagree that a new nuclear power plant should be built to supply that electricity?	.16**	.15**	-.24**
104. Please indicate how acceptable (nuclear power) is to you for meeting the nation's future energy needs.	.13**	.16**	-.24**
68. In order to avoid importing energy from other countries to meet our future electricity needs, America should rely more heavily on nuclear power.	.18**	.13**	-.21**
77. The nuclear power industry says that it is now possible to build a new generation of nuclear power plants that will be safer than existing plants. Assuming the nuclear power industry is correct, I would support such a new generation of nuclear plants to supply the country's future electricity needs.	.13**	.16**	-.20**
65. In light of health concerns about acid rain, damage to the ozone layer, and climate change associated with the burning of coal and oil, America should rely more heavily on nuclear power to meet its future electricity needs.	.19**	.09	-.17**
Nuclear support index (average of 5 items) Coefficient α = .83	.20**	.17**	-.28**

Note. $N = 1,332$.
**$p < .0001$.

Figure 4. Factors Associated with Views About Nuclear Power

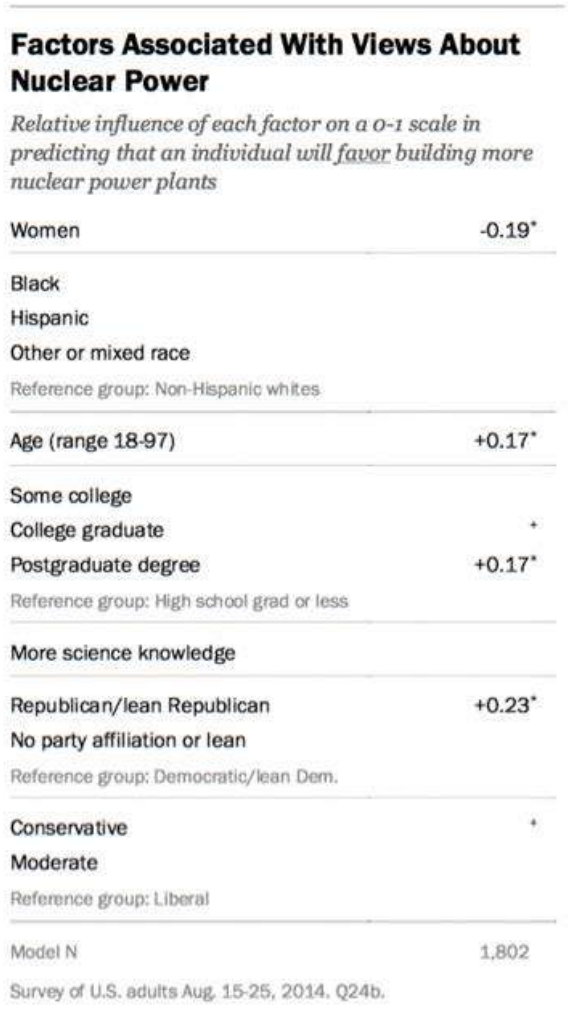


Figure 5. Public risk perceptions among different ideological groups (N 1⁄4 5000) before and after the Fukushima accident.

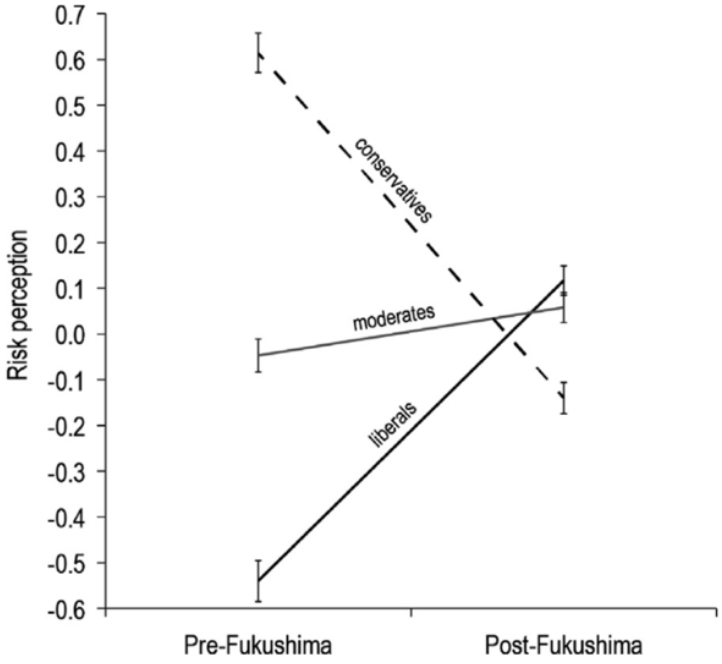


Figure 6. Deaths per 10 billion kwh in coal mining, hydroelectric, natural gas, and nuclear energy plants.

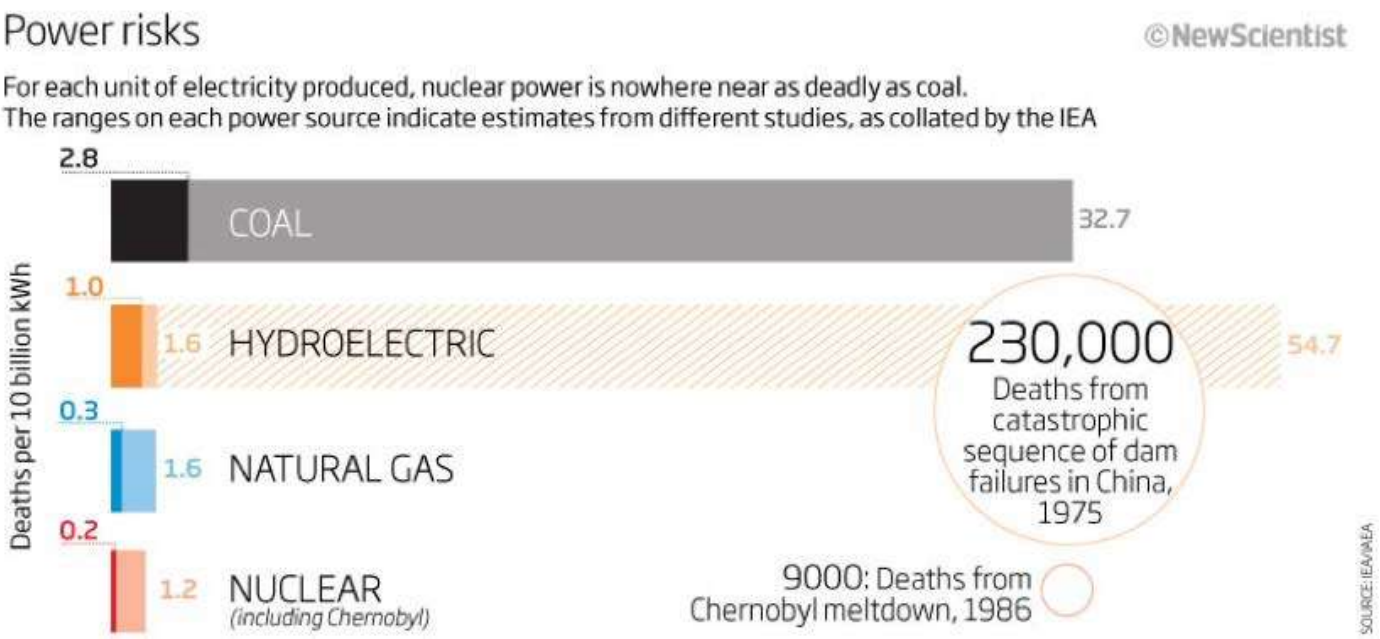
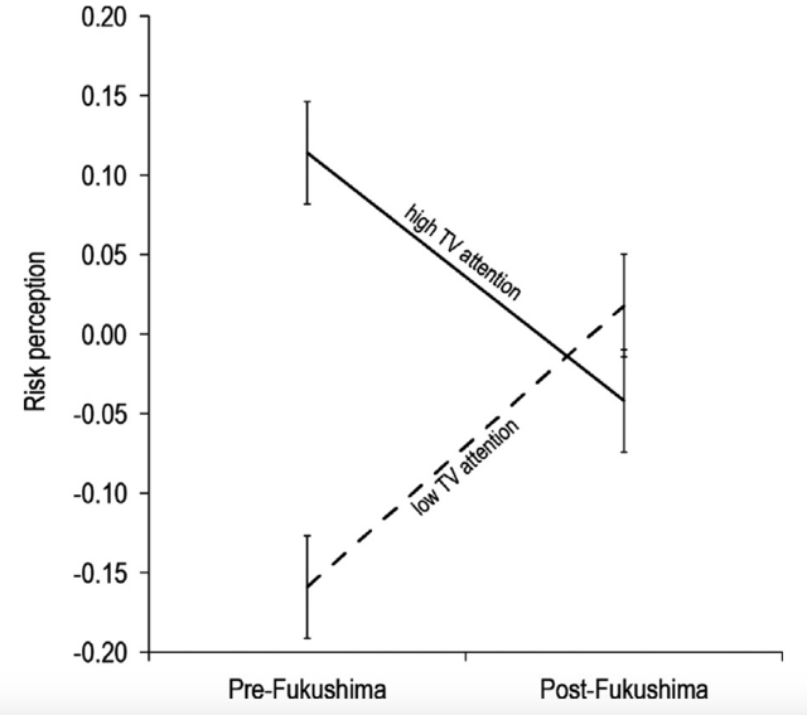


Figure 7. Moderating effect of media use (attention to television) on risk perceptions prior to and following the nuclear accident at the Fukushima Daiichi power plant (N1⁄45000).



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