

SUPPLEMENTARY MATERIAL

The Price of Your Soul: Neural Evidence for the Non-Utilitarian Representation of Sacred Values

Participants: 43 adult participants (see Table S1 for demographics) took part in the study, which was approved by the Emory University Institutional Review Board. Of these, 11 participated in the experiment outside of the scanner and 32 participated in the scanner. We present behavioral data for all participants and imaging data for those who were scanned. All participants reported good health with no history of psychiatric and neurological disorders and gave written informed consent. Participants received \$40 base pay (\$20 for those not scanned) and were given the opportunity to earn more money by auctioning their personal values (see below).

Table S1. Demographics of participants.

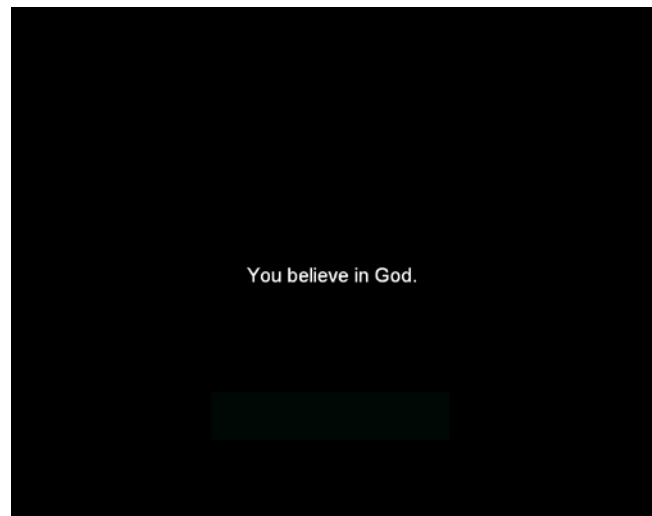
Gender & Age				
	Behavioral & fMRI (N=43)		Online Survey (N=334)	
Females	27	62.8%	164	49.1%
Males	16	37.2%	165	49.4%
Average Age	29.2		41.9	
Ethnicity				
Caucasian	27	62.8%	255	76.3%
African American	12	27.9%	32	9.6%
Asian / Pacific Islander	3	7.0%	21	6.3%
Hispanic	1	2.3%	14	4.2%
Arab / Middle Eastern	0	0	3	0.9%
Native American	0	0	4	1.2%
Education*				
Some High School	0	0	1	0.4%
High School Diploma	0	0	45	13.5%
Some College	19	44.2%	82	24.6%
Bachelor's Degree	20	46.5%	113	33.8%
Master's Degree	0	0	71	21.3%
Doctoral Degree	2	4.7%	17	5.1%
Unknown	2	4.7%	0	0

*Highest level obtained

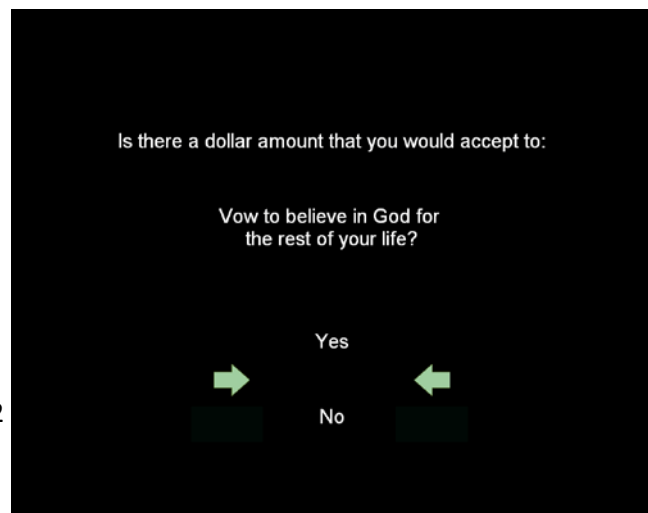
To confirm generalizability of the fMRI data to a broader sample and to examine the relationship between sacred values and group involvement, we also collected data online. An online sample of 391 participants were recruited via the Study Response Project (<http://studyresponse.syr.edu>) to participate in a survey. Each participant received a compensation of \$5. Fifty-seven participants had at least one missing value in the dependent measure, a list of 31 statements. This resulted in an effective sample of N=334 (164 females, 165 males, 5 did not indicate gender) with ages ranging from 21 to 69 years (M=41.9). This sample was more diverse and more representative of the U.S. population than typical student samples.

Experimental Task: The fMRI task was divided into four phases. Phases 1-3 were done in the MR scanner. Phase 4 was done out of the scanner.

1) In the Passive phase, participants were presented with value statements phrased in the second person. No decision was required. Statements ranged from values that were thought to represent mere preferences – e.g. “You are a dog person” and “You are a Pepsi drinker” – to values that were thought to be non-negotiable (sacred) – e.g. “You believe in God” and “You are willing to kill an innocent human being.” Every statement also had a complement or opposite – e.g. “You are a cat person,” “You are Coke drinker,” “You do not believe in God,” and “You are not willing to kill an innocent human being.” A total of 62 pairs of statements (total of 124 individual statements) was presented in random order (see Appendix A for full list). Participants advanced to the next statement by pressing a button.



2) In the Active phase, complimentary statements were presented together, and for each pair, the participant had to choose one.



3) In the Hypothetical phase, each statement chosen in the Active Phase was presented with a hypothetical offer of money to disavow the choice they had made in the Active Phase. For example, if someone previously chose “You believe in God,” then the Hypothetical Phase read, “Is there a dollar amount that you would accept to disavow your belief in God for the rest of your life?”

4) In the Auction phase, participants were given the opportunity to “sell” their answers from the Active Phase for real money. Using the Becker-DeGroot-Marshak (BDM) auction mechanism, participants were instructed to specify an “ask” price for each of the statements they chose in the Active Phase (Appendix B). The price could range from \$1 to \$100. They could also opt out of the auction for any or all items. After all of the ask values were obtained, the

participant rolled a pair of 10-sided dice for each of the items that they were selling. If the dice roll was greater than their ask price, they received the value of the dice roll for that item. Their final payment was the average of all items sold and not sold. At the end of the auction phase, the participant received a printout of their chosen statements (second phase), which they did not sell in the auction, and the new statements, which were the complements of the statements sold in the auction. The printout had to be signed. In this manner, the signing of the final document provided an additional incentive to reveal true value. Prior to the auction, participants knew they

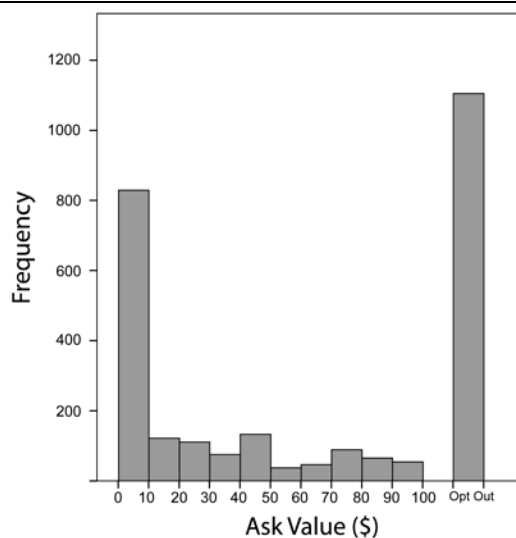
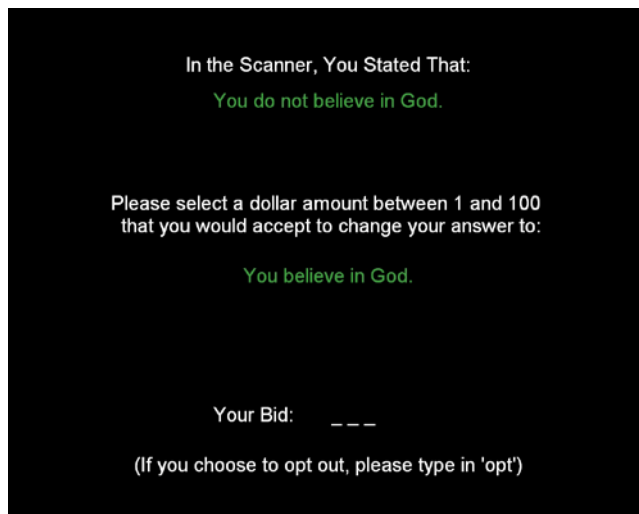


Figure S1. Distribution of ask values in the auction (N=43). The distribution was bimodal with most asks being either \$1 or Optout. Excluding the optouts, the distribution of ask values can be approximated by a gamma distribution, whose CDF at \$100 is 0.955. This indicates that the optouts were separate from this distribution, as only 4.5% of the observations to the right of \$100 could be accounted for by offering greater amounts of money.

would have to sign the final document of their personal values (see Fig. S1 for distribution of auction values).

In addition to the task, participants also completed the EPQ-R and BIS/BAS personality questionnaires, and portions of the World Values Survey (Appendix C) and questions on Religiosity (Appendix D).

Follow-up Survey. FMRI participants completed a follow-up survey 6 to 14 months after their scan session. The purpose was to determine the stability of each person's values and whether their decision for each pair in the Active phase was primarily deontic or utilitarian. This was conducted through surveymonkey.com and offered an additional \$20 compensation for completion. 28 of 32 (87.5%) participants completed the survey. The survey repeated the Active phase, prompting for a choice between complementary items. Following each choice, the participant was asked to indicate how they arrived at their decision. The following three choices were offered:

Right and Wrong. This option should be chosen when you feel that your choice is based on a rule that you believe to your core. This should reflect the beliefs, values, and/or ideas that you know to be true to you through and through.

Costs and Benefits. This option should be chosen when you find yourself thinking about the benefits you enjoy from your choice, or the costs you endure when considering the alternative choice. Benefits can range from a direct gain/reward you receive, or a personal consumption benefit of simply enjoying your choice. Costs can be either direct or indirect to you. Costs can be considered when thinking about the consequences of the choices and considering the possible outcomes of your decision.

Neither. This option should be chosen when the Right and Wrong nor the Costs and Benefits choices fit how your arrived at your decision.

On average, the same choice was made in 96.4% (range 84 – 100%) of the trials that were opted out of in the auction, indicating a high degree of stability of values that are sacred. This was significantly greater than for the non-sacred choices, which resulted in the same choice 81.5% of the time (range: 60-95%; paired t-test = 7.81, $P < 0.001$). The mode of decision making was based on right/wrong 73.2% of the time for Optout trials (range: 30-100%), and 27.8% for the Bid trials (range: 0-53%), which were significantly different from each other (paired t-test=15.4, $P < 0.001$).

FMRI Scanning. Neuroimaging data were collected using a 3 Tesla Siemens Magnetron Trio whole body scanner (Siemens Medical Systems, Erlangen, Germany). A three dimensional,

high-resolution anatomical data set was acquired using Siemens' magnetization prepared rapid acquisition gradient echo (MPRAGE) sequence (TR of 2600 ms, TE of 3.02 ms, TI of 900 ms, 1mm isotropic voxels and a 256mm FOV). A DTI scan was obtained with diffusion-sensitizing gradient encoding applied in 12 directions with a diffusion-weighting factor of $b = 1000 \text{ s/mm}^2$, and one (b_0) image was acquired without a diffusion gradient ($b = 0 \text{ s/mm}^2$). Four sets of each image were acquired and subsequently averaged. Functional data consisted of thirty-three axial slices that were sampled with a thickness of 3.5 mm and encompassing a field of view of 192 mm with an inplane resolution of 64×64 (T_2^* weighted, TR = 2000ms, TE = 30ms). The task was presented with Presentation software (Neurobehavioral Systems, Albany, CA), and visual stimuli were projected onto a frosted glass screen, which the subject viewed through an angled mirror mounted to the head coil. Inhomogeneities in the magnetic field introduced by the participant were minimized with a standard two-dimensional head shimming protocol before each run and the anatomical data acquisition. Each participant completed 4 runs with 62 trials each, whose length depended on participants' decision time (2 runs of Passive, 1 run each of Active and Hypothetical). The Auction was done outside of the scanner.

FMRI Analysis. FMRI data were analyzed using SPM5 (Wellcome Department of Imaging Neuroscience, University College London) using a standard 2-stage random-effects regression model. Data were subjected to standard preprocessing, including motion correction, slice timing correction, normalization to an MNI template brain and smoothing using an isotropic Gaussian kernel (full-width half-maximum = 8mm).

Statistical thresholds were determined based on the estimated smoothness of the 2nd-level contrasts. Using the AlphaSim routine in AFNI, we estimated the combination of height and extent thresholds that yielded a whole-brain FDR < 0.05 (10,000 iterations). First, white matter and CSF were masked out using the SPM probabilistic gray matter map. With a gray matter probability > 0.4, this results in a mask that retains most gray matter while effectively eliminating most white matter and CSF, which would otherwise inflate the required cluster size. Second, we used 3dFWHMx to estimate the image smoothness from the square root of the masked ResMS image (result: 9.0 mm, 10.8 mm, 10.3 mm) and input into AlphaSim. Finally, using a voxel level threshold of $P < 0.005$, the extent threshold that yielded a cluster level alpha of 0.05 was determined to be $k \geq 53$. The 40% gray matter mask was applied to all contrasts before using these thresholds.

First, a functional localizer for deontic vs. utilitarian processing was obtained from the Active phase. Using the responses from the follow-up survey which characterized the mode of processing for each trial, a first level model consisting of three conditions was created: 1) right/wrong; 2) cost/benefit; 3) neither. Regions involved in deontic processing were identified by the contrast of [right/wrong – cost/benefit], and utilitarian processing regions were

identified by [cost/benefit – right/wrong]. As a validity check, we also compared the latter to a contrast obtained from the Hypothetical phase. The Hypothetical phase model contained three conditions based on whether the participant answered “Yes” or “No” and whether they submitted an ask value during the auction (Bid or Optout). Each stimulus was categorized as: 1) HypNo/Optout; 2) HypYes/Bid; 3) HypYes/Optout (there were no combinations of HypNo/Bid). By design, the Hypothetical phase forces the individual into a utilitarian frame of thinking (taking money to change their behavior). Thus, we contrasted the trials in which they answered “Yes” to those in which they answered “No” as being indicative of utilitarian processing (Fig. S2).

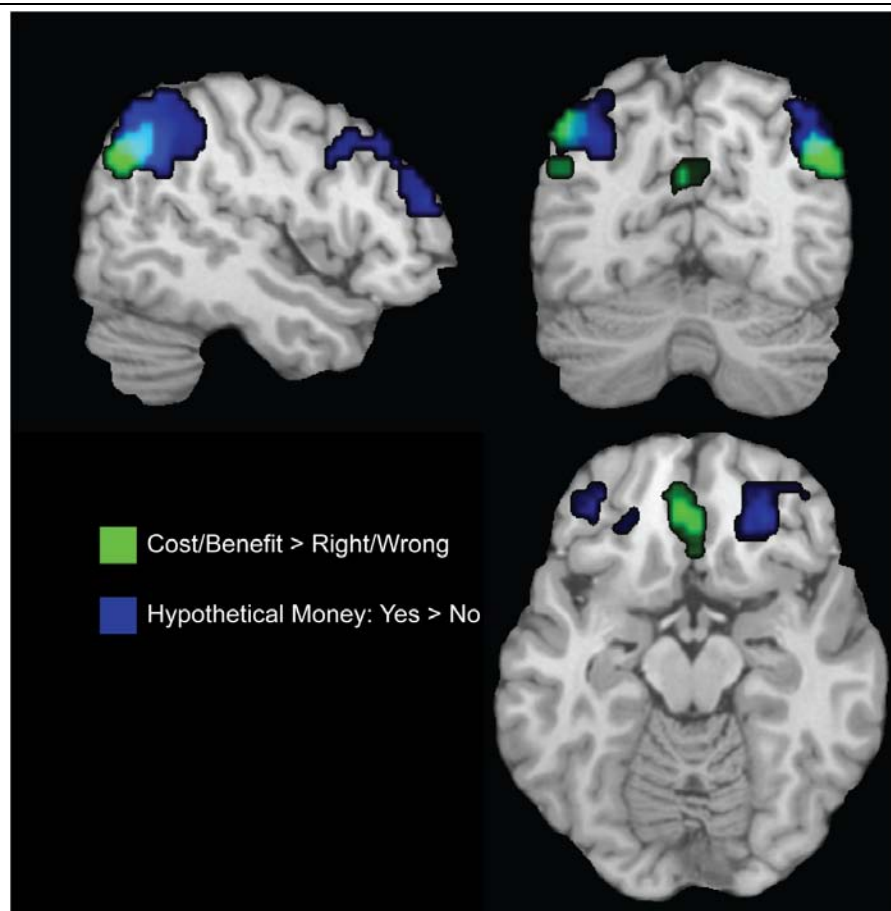


Figure S2. Brain regions involved in utilitarian processing as measured with two different probes ($P < 0.005$, extent ≥ 53). The first probe, which was subsequently used as part of the functional localizer, was obtained from the Active Phase, contrasting choices that were based primarily on costs and benefits (utilitarian) versus rights and wrongs (deontic) (*green*). The second probe was obtained from the Hypothetical Phase, which forced utilitarian processing by asking whether a choice would be changed for money. Here, we contrast choices in which the participant indicated “Yes” versus “No” (*blue*). There was substantial similarity between these probes of utilitarian choices, with overlap in bilateral parietal cortex (*cyan*).

Second, the ROI's obtained from the functional localizer were then used to mask the contrasts in the Passive phase. For the first-level model of the Passive phase, each statement was categorized based on the participant's subsequent choice in the Active phase (Chosen vs. Not Chosen) and whether they submitted an ask value during the auction (Bid vs. Optout). This created four conditions: 1) Chosen/Optout; 2) Chosen/Bid; 3) Not Chosen/Optout; 4) Not Chosen/Bid. Clearly, items that were Not Chosen could not be sold, but because the auction was to switch from the Chosen to the Not Chosen item, they were implicitly part of the choice process. One participant was excluded from the analysis because the participant submitted bids of \$1 for all items, and thus no contrasts could be formed. The contrast from the first-level main effect of Optout-Bid was input into a second-level model and then masked with the [right/wrong – cost/benefit] and [cost/benefit – right/wrong] maps from the functional localizers. Within each ROI, the average activation across subjects was tested for significance with a t-test (Table S2).

Table S2. Brain regions identified by the functional localizer during the Active phase. Regions with a significant difference between right/wrong and cost/benefit decision making are shown ($P < 0.005$, extent ≥ 53 voxels). These ROIs were then applied to the Passive phase Optout-Bid contrast as well as alternative models.

Brain Region	MNI Coordinates			Active Right/Wrong - Cost/Benefit			Passive Optout - Bid		Passive Optout - Bid adj. for SR		Passive Optout - Bid adj. for length	
	X	Y	Z	voxels	T	P	T	P	T	P	T	P
Right/Wrong > Cost/Benefit												
L TPJ	-63	-39	42	68	4.83	0.00004	3.19	0.0034	2.69	0.012	3.01	0.005
Cost/Benefit > Right/Wrong												
Visual cortex	-6	-57	11	333	5.04	0.0002	1.41	0.17	1.18	0.25	1.16	0.25
R inferior parietal lobule	48	-66	35	86	4.66	0.00006	-2.04	0.05	-1.88	0.069	-1.82	0.078
L inferior parietal lobule	-45	-72	46	71	4.09	0.0012	-2.59	0.015	-2.1	0.044	-2.46	0.02
OFC	-3	42	-14	59	4.25	0.0009	-0.13	0.9	-0.91	0.37	-0.81	0.43
L superior frontal gyrus	-36	18	56	74	3.69	0.0009	-0.82	0.42	-0.09	0.93	-0.59	0.56

Third, to identify additional regions that might contribute to sacred values, we performed a whole-brain analysis on the Passive phase of Optout vs. Bid. As before, this contrast was masked by the 40% gray matter mask, and thresholds of $P < 0.005$ and $k \geq 53$ were used to control for a whole-brain FDR of $P < 0.05$ (Table S3). Mean differential activation between Optout-Bid in ROIs identified from this contrast were also correlated with subject-specific attributes, including

subject age, religiosity, liberalism/conservatism, and activism. The religiosity score was calculated as the first principal component obtained from the religiosity survey. The liberalism/conservatism score was taken from item 12 of the World Value Survey subset. The activism score was calculated as the sum of responses on item 2 of the World Value Survey subset (Appendix C). Of these attributes, only the activism score correlated with VLPFC activation.

Alternative Models. To evaluate the possibility of alternative interpretations of the activation patterns, four additional models were tested. Each of these models included a specific aspect of the stimulus as either a condition or covariate in the first-level model, and thus controlled for it as a “nuisance” variable.

1. Legal doctrine. Given that many sacred values are also represented in legal doctrine, we sought to control for the possibility that participants were simply processing statements as lawful or not. To do this, we removed legality statements into their own category and tested the original model on non-legality statements. If one item of a complimentary pair was illegal either by U.S. or international law, then it was coded as a legality item. For example, “You would kill an innocent human being” and “North Korea should be nuked” were coded as legality items (as well as their complementary statements), while “You believe in God” and “You are a Republican” were coded as non-legal items (as well as their complements) because neither item in those pairs are governed by legal doctrine. A first-level model was created with 5 conditions: 4 for the non-legality items (Chosen/Optout, Chosen/Bid, Not Chosen/Optout, and Not Chosen/Bid) and 1 for the legality items. Using the ROIs from the original model, we tested for the significance of the main effect of Optout-Bid for only the non-legality items in a second-level model.
2. Syntax of statement. A similar procedure was done to test for the effect of the syntax of the item, with those items phrased as “You are ...” removed into their own category, allowing us to test Optout-Bid on only the “You would do ...” statements.
3. Statement length. To control for the length of the statement, each condition was modulated by the number of words in the statement, which served as a nuisance regressor.
4. Semantic richness. Semantic richness (SR) refers to the amount of semantic information contained in, or associated with, a concept in semantic memory (1). SR has been previously associated with activation in VLPFC (2-4). To test the possibility that SR may be partially confounded with our measures of sacredness (e.g. “God” has more associations than “Pepsi”), we formulated an alternative model that controlled for the SR of the statements.

We interpreted SR in terms of the number of associates (5). Due to the unavailability of any specific corpus containing all of the cue items and phrases from our stimuli, semantic richness was approximated via a “web-as-corpus” approach, where the distributional

associations of web search results approximate counts of more specific corpora (6). As no norms or corpora for SR exists for phrases, we engaged the following procedure. Key words were extracted from the stimulus statements. All words in the stimuli were compared with a corpus of words normed on the number of associates, and for each matching word, the number-of-associates variable for it was obtained from the corpus, and standardized to Z-scores, obtained from several behavioral studies (7). Each of the resulting 48 words was then submitted to a simple Google search and the resulting page counts were tabulated, \log_{10} transformed, and standardized to Z-scores. Nine items from the Google search were eliminated because of extreme Z-scores ($Z > 2.0$), leaving 39 items covering 95.44% of the distribution. Consequently, each item (word) had two measures of semantic richness associated with it: a raw page count from Google and a normalized number-of-associates (NoA) count from human studies. The orderings of the two measures of SR were significantly correlated with each other ($R=0.452$, $P=0.0038$), indicating a high degree of agreement (Fig. S3). Although SR has not been directly examined in a web-as-corpus approach, these results parallel findings where web-based retrieval frequencies correlate with results using more specialized corpora (8, 9).

Given the significant agreement between NoA counts and Google page counts, key words and phrases from all stimuli were then submitted to a simple (quoted) Google search and the resulting page counts were tabulated, \log_{10} transformed, and standardized to Z-scores. This comprised the final semantic richness score used in the analysis. For some statements, a single word or phrase would have an associated semantic richness score. For others, multiple normed words appeared. In the case of multiple potential semantic cues, we elected to use a single score that represented the more extreme (semantically rich) component of the sentence.

At the behavioral level, there was no significant correlation between the SR of the stimulus and the fraction of individuals submitting bids to change their answers (Fig. S4). When SR was included as a nuisance regressor in the Passive phase model, significance changed only slightly for the ROI's. This suggests that sacredness was not confounded with SR.

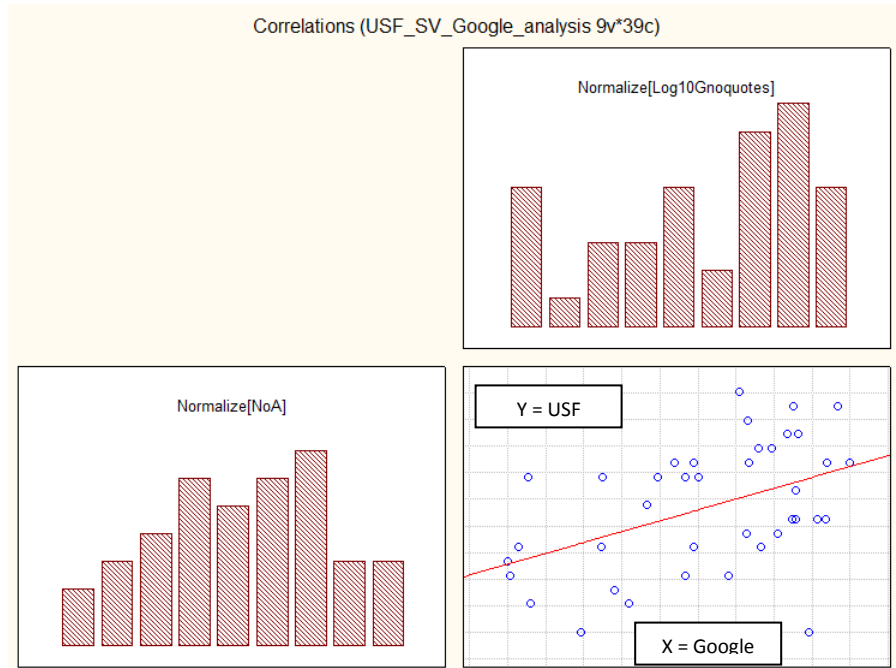


Figure S3. Distributions and correlations of number of associates (NoA) and Google page counts for 39 words in the stimulus set (after normalization). Spearman $R = 0.452$, $P = 0.0038$.

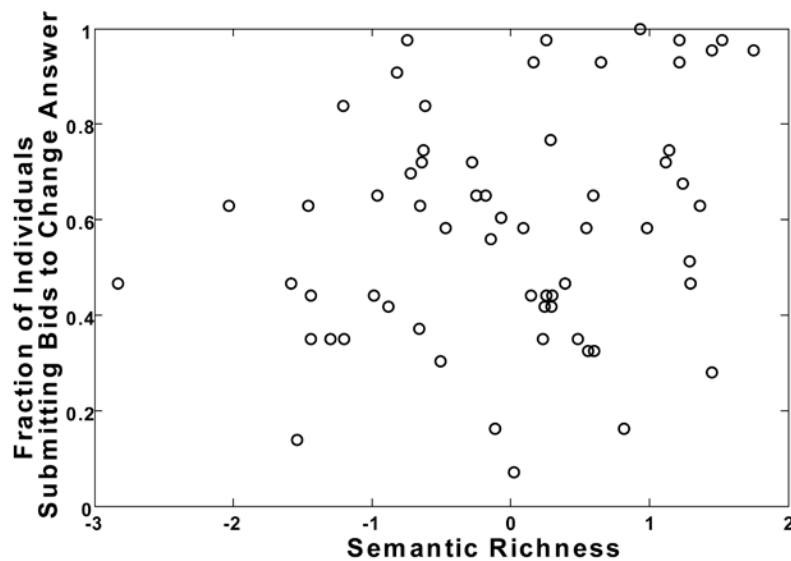


Figure S4. For each statement pair, the fraction of individuals submitting bids to change their answer versus the semantic richness (SR) of the statement pair. There was no significant correlation (adjusted $R^2=0.045$, $P=0.053$).

Table S3. Brain regions with significant activation differences between Optout and Bid items during the passive phase ($P < 0.005$, extent ≥ 53 voxels).

Region	Peak MNI Coordinates	Voxels	Cluster T	Non-Legality Items Only		Activist Correlation	
				T	P	R	P
L ventrolateral PFC	-39, 27, 0	280	4.10	2.15	0.040	0.39	0.032
L TPJ	-48, -57, 18	101	5.16	1.42	0.166	0.31	0.088
L dorsomedial PFC	-12, 48, 14	76	3.66	0.72	0.477	0.14	0.457
Visual cortex	-9, -96, 4	356	3.95	0.14	0.887	0.17	0.373
R ventrolateral PFC	42, 30, -7	260	3.93	1.33	0.195	0.31	0.088
R amygdala	24, 6, -25		3.64	2.01	0.054	0.31	0.090
ACC	0, 21, 28	68	3.65	-0.08	0.935	0.22	0.225

Supplementary References

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APPENDIX A: Statements and Average Choices

Statement Pairs	Semantic Richness (search phrase)	Length	Legal Doctrine	Online Sample (N=334)		fMRI Sample (N=43, includes behavioral only)			
				% Chosen	Probability of Hypothetical Change	% Chosen	Probability of Hypothetical Change	Median Bid*	% Bidding
You support mandatory vaccinations .	-1.38	4	Y	63.54%	0.24	67.44%	0.44	25	83.72%
You do not support mandatory vaccinations .	-1.38	6		36.46%		32.56%			
Male circumcision should be decided by the individual.	-0.77	8	N	38.34%	0.16	32.56%	0.32	20	83.72%
Male circumcision should be decided by the parents.	-0.77	8		61.66%		67.44%			
You would lie to get a promotion .	-2.22	7	N	23.04%	0.27	16.28%	0.37	75	62.79%
You would not lie to get a promotion .	-2.22	8		76.96%		83.72%			
You believe that mentally handicapped people should be allowed to have kids.	-0.33	12	Y	52.88%	0.19	69.77%	0.34	70	65.12%
You believe that mentally handicapped people should not be allowed to have kids.	-0.33	13		47.12%		30.23%			
You believe that all Jews should have been killed in WWII	0.69	11	Y	8.42%	0.09	0.00%	0.02	Out	16.28%
You do not believe that all Jews should have been killed in WWII.	0.69	13		91.58%		100.00%			
You are Pro-Life .	-0.24	3	N	40.53%	0.2	39.53%	0.2	80	55.81%
You are Pro-Choice .	-0.36	3		59.47%		60.47%			
You support pre-emptive military attacks .	-0.80	5	N	47.06%	0.2	39.53%	0.49	25	72.09%
You do not support pre-emptive military attacks .	-0.80	7		52.94%		60.47%			
You are a MAC person.	1.21	5	N	12.11%	0.63	20.93%	0.93	1	95.35%
You are a PC person.	1.43	5		87.89%		79.07%			
You think that marital rape is a crime.	-1.05	8	Y	86.32%	0.14	93.02%	0.05	Out	32.56%
You think that there is no such thing as rape within a marriage.	0.63	13		13.68%		6.98%			
You would give secret information about the US to a hostile foreign government.	-1.47	13	Y	10.58%	0.13	0.00%	0.02	Out	34.88%
You would not give secret information about the US to a hostile foreign government.	-1.47	14		89.42%		100.00%			
You think that assisted suicide should be legal.	-0.43	8	Y	62.63%	0.16	46.51%	0.41	50	72.09%
You think that assisted suicide should be illegal.	-0.43	8		37.37%		53.49%			
You are willing to cheat on your taxes if you know that you would not get caught.	-0.88	17	Y	28.88%	0.26	20.93%	0.49	60	69.77%
You are not willing to cheat on your taxes even if you know that you wouldn't get caught.	-0.88	19		71.12%		79.07%			
You would not pay for sex .	0.00	6	Y	67.55%	0.32	90.70%	0.24	Out	44.19%
You would pay for sex .	0.00	5		32.45%		9.30%			
You do not believe that God hears all prayers .	1.07	9	N	30.00%	0.18	37.21%	0.24	Out	46.51%
You believe that God hears all prayers .	1.07	7		70.00%		62.79%			
You like to hurt animals .	-1.37	5	Y	7.41%	0.07	2.33%	0.12	Out	34.88%

You do not like to hurt animals .	-1.37	7		92.59%		97.67%			
You prefer to watch Football over Basketball.	1.50	7	N	64.02%	0.55	58.14%	0.95	5	97.67%
You prefer to watch Basketball over Football.	1.29	7		35.98%		41.86%			
You believe that Wal-Mart is superior to Target.	0.40	8	N	49.21%	0.55	25.58%	0.8	5	97.67%
You believe that Target is superior to Wal-Mart.	1.29	8		50.79%		74.42%			
You do not support the use of the death penalty .	0.15	10	N	25.53%	0.17	46.51%	0.44	50	76.74%
You support the use of the death penalty .	0.15	8		74.47%		53.49%			
Your religion is an important part of your identity.	1.18	9	N	56.08%	0.19	60.47%	0.24	99	51.16%
Your religion is not an important part of your identity.	1.18	10		43.92%		39.53%			
You would have sex with a woman .	0.09	7	N	60.32%	0.19	48.84%	0.15	Out	34.88%
You would not have sex with a woman .	0.09	8		39.68%		51.16%			
You would not vote for a politician who had previously made racist comments.	0.42	13	N	72.19%	0.24	90.70%	0.37	80	58.14%
You would vote for a politician who had previously made racist comments.	0.42	12		27.81%		9.30%			
It is not ok to use nuclear weapons on civilians .	0.35	10	Y	79.26%	0.13	93.02%	0.15	Out	34.88%
It is ok to use nuclear weapons on civilians .	0.35	9		20.74%		6.98%			
You would own a Kia before a Hyundai.	0.81	8	N	32.45%	0.72	37.21%	1	1	100.00%
You would own a Hyundai before a Kia.	0.81	8		67.55%		62.79%			
You do not believe that mandatory school prayer should be instated.	-0.82	11	Y	68.09%	0.17	90.70%	0.24	50	62.79%
You believe that mandatory school prayer should be instated.	-0.82	9		31.91%		9.30%			
You would not sabotage a team of coworkers just to get an individual promotion.	-3.04	14	N	89.30%	0.17	97.67%	0.2	Out	46.51%
You would sabotage a team of coworkers to get an individual promotion.	-3.04	12		10.70%		2.33%			
All Hispanics should be deported to Mexico.	0.12	7	Y	16.67%	0.09	2.33%	0.02	Out	44.19%
All Hispanics should not be deported to Mexico.	0.12	8		83.33%		97.67%			
You do not drive above the speed limit .	0.03	7	Y	28.34%	0.55	11.63%	0.8	11	93.02%
You drive above the speed limit .	0.03	6		71.66%		88.37%			
It is OK to sterilize people for population control.	-1.62	9	Y	25.13%	0.2	9.30%	0.15	Out	44.19%
It is not OK to sterilize people for population control.	-1.62	10		74.87%		90.70%			
You would accept money for sex .	-1.15	6	Y	38.38%	0.37	23.26%	0.32	Out	44.19%
You would not accept money for sex .	-1.15	7		61.62%		76.74%			
You enjoy all colors of M&Ms .	-0.91	6	N	83.87%	0.7	79.07%	1	1	97.67%
You have a favorite color M&M .	-0.91	6		16.13%		20.93%			
You do not give money to the poor .	1.25	8	N	20.43%	0.33	16.28%	0.37	20	62.79%
You give money to the poor .	1.25	6		79.57%		83.72%			
You would not cheat on your spouse even if there was no chance of getting caught.	-0.66	16	Y	83.76%	0.24	93.02%	0.05	Out	30.23%
You would cheat on your spouse if there was no chance of getting caught.	-0.66	14		16.24%		6.98%			
You would not cheat on a test even if there was no chance that you would get caught.	-1.13	18	Y	67.35%	0.37	72.09%	0.54	45	65.12%
You would cheat on a test if there was no chance that you would get caught.	-1.13	16		32.65%		27.91%			
You are a white wine drinker.	0.06	6	N	48.42%	0.63	34.88%	0.85	1	97.67%
You are a red wine drinker.	0.16	6		51.58%		65.12%			

You are a dog person .	-0.99	5	N	67.69%	0.38	67.44%	0.66	5	90.70%
You are a cat person .	-0.97	5		32.31%		32.56%			
All Asian women should not be submissive .	0.08	7	N	87.63%	0.25	95.35%	0.15	Out	41.86%
All Asian women should be submissive .	0.08	6		12.37%		4.65%			
All whites are not racists .	0.47	5	N	92.31%	0.18	100.00%	0.2	Out	32.56%
All whites are racists .	0.47	4		7.69%		0.00%			
North Korea should be nuked .	-1.76	5	Y	15.31%	0.2	4.65%	0.24	Out	46.51%
North Korea should not be nuked .	-1.76	6		84.69%		95.35%			
You support the use of torture to gain intelligence .	0.79	9	Y	40.31%	0.25	23.26%	0.2	60	58.14%
You do not support the use of torture to gain intelligence .	0.79	11		59.69%		76.74%			
You are not willing to kill an innocent human being.	-0.26	10	Y	93.37%	0.07	95.35%	0.05	Out	16.28%
You are willing to kill an innocent human being.	-0.26	9		6.63%		4.65%			
You support the use of embryos for stem cell research .	-0.22	10	N	69.07%	0.16	72.09%	0.22	50	60.47%
You do not support the use of embryos for stem cell research .	-0.22	12		30.93%		27.91%			
You believe that there are too many restrictions on gun ownership .	-0.79	11	N	34.69%	0.26	11.63%	0.34	45	74.42%
You believe that there are not enough restrictions on gun ownership .	-0.79	11		65.31%		88.37%			
You believe in God .	1.34	4	N	83.16%	0.1	74.42%	0.05	Out	27.91%
You do not believe in God .	1.34	6		16.84%		25.58%			
You believe that interracial relationships are wrong.	-0.82	7	N	18.88%	0.23	2.33%	0.2	Out	37.21%
You do not believe that interracial relationships are wrong.	-0.82	9		81.12%		97.67%			
You believe that Google is superior to Yahoo.	1.69	8	N	81.03%	0.69	97.67%	0.95	1	95.35%
You believe that Yahoo is superior to Google.	1.59	8		18.97%		2.33%			
You believe that global warming is real.	0.47	7	N	67.86%	0.31	90.70%	0.27	42	65.12%
You do not believe that global warming is real.	0.47	9		32.14%		9.30%			
You are a Coke drinker.	0.56	5	N	62.89%	0.68	79.07%	0.83	1	93.02%
You are a Pepsi drinker.	0.47	5		37.11%		20.93%			
You are proud to be an American .	-0.62	7	N	81.54%	0.22	86.05%	0.24	75	58.14%
You are not proud to be an American .	-0.62	8		18.46%		13.95%			
You are a Republican .	1.30	4	N	37.50%	0.3	25.58%	0.29	25	67.44%
You are a Democrat .	0.58	4		62.50%		74.42%			
You do not support medical testing on animals .	-0.40	8	N	50.26%	0.29	34.88%	0.46	40	65.12%
You support medical testing on animals .	-0.40	6		49.74%		65.12%			
You are not willing to give part of your income for environmental protection .	0.90	13	N	59.28%	0.46	20.93%	0.73	30	74.42%
You are willing to give part of your income for environmental protection .	0.90	12		40.72%		79.07%			
You think that it is ok to sell a child .	-1.72	10	Y	6.15%	0.08	0.00%	0	Out	13.95%
You think it is not ok to sell a child .	-1.72	10		93.85%		100.00%			
You think that homosexual couples should not have the same rights as heterosexual couples.	-1.04	14	Y	36.08%	0.19	23.26%	0.1	Out	41.86%
You think that homosexual couples should have the same rights as heterosexual couples.	-1.04	13		63.92%		76.74%			
You do not believe that homosexuality is a choice.	0.26	9	N	51.79%	0.17	65.12%	0.2	Out	46.51%

You believe that homosexuality is a choice.	0.26	7		48.21%		34.88%			
You would not have sex with a 4 year old child .	-0.12	11	Y	95.88%	0.05	100.00%	0	Out	6.98%
You would have sex with a 4 year old child .	-0.12	10		4.12%		0.00%			
You support hiring quotas based on race.	-1.64	7	Y	12.95%	0.26	13.95%	0.27	75	62.79%
You do not support hiring quotas based on race.	-1.64	9		87.05%		86.05%			
You support gay marriage .	0.16	4	Y	52.85%	0.23	62.79%	0.15	Out	44.19%
You do not support gay marriage .	0.16	6		47.15%		37.21%			
You are a tea drinker.	1.11	5	N	42.78%	0.57	53.49%	0.8	3	93.02%
You are a coffee drinker.	1.09	5		57.22%		46.51%			
You would not have sex with a man .	0.11	8	N	41.45%	0.29	39.53%	0.17	Out	41.86%
You would have sex with a man .	0.11	7		58.55%		60.47%			
Israel should have complete control of the West Bank and Gaza.	1.15	11	N	66.14%	0.32	74.42%	0.34	20	72.09%
Palestine should have complete control of the West Bank and Gaza.	0.67	11		33.86%		25.58%			
It is ok to sterilize people with genetic conditions.	-1.62	9	Y	36.08%	0.25	6.98%	0.15	Out	34.88%
It is not ok to sterilize people with genetic conditions.	-1.62	10		63.92%		93.02%			
You support suspending people's constitutional rights during wartime.	-0.05	8	Y	24.87%	0.19	9.30%	0.12	80	58.14%
You do not support suspending people's constitutional rights during wartime.	-0.05	10		75.13%		90.70%			

*Out means the median bid was opting out.

Appendix B: BDM Auction Instructions

This is an experiment in the economics of decision-making. The instructions are simple, and if you follow them carefully, you may earn additional money.

During the experiment you will be asked to do several repetitions of a selling task. The amount of money you earn will partly depend upon the decisions you make in the task and partly on chance, as explained in the Earnings section below. Our purpose is to study various technical issues involved in decision-making.

Selling Task:

In previous parts of this experiment, you were asked to make a choice between two statements. In this part, we will give you the opportunity to exchange your choice of statement for a price.

The selling task works as follows:

We will show you the statement that you previously chose. You will be given the choice of either keeping that statement (opt out of the sale) or changing it for the alternative statement for a selling price. If you opt out, you will be asked to type "out" on the space provided. If you choose to participate in the auction, your task is to choose a selling price and enter it with the keypad.

Price ranges:

In this experiment, you will be allowed to choose a price between and including \$1 and \$100 for exchanging your statement or you can choose to opt out of the auction altogether. Opting out signifies that you are not willing to change your statement for any amount of money between \$1 and \$100.

When does a sale and exchange of statement for the alternative occur?

We will compare your selling price with an offer price randomly generated by rolling 2 ten-sided dice. Each number between and including 1 and 100 is equally likely. The offer generated is completely unrelated to the statement that you chose, the alternative statement, and your selling price. If the rolled price is higher than (or the same as) your selling price, then you will sell your statement for the alternative, but the price that you will receive would equal the rolled price. If the rolled price is lower than your selling price, then you keep your statement and receive no additional money for that trial.

An example:

Suppose that your selling price is 23, and the rolled price is 64, then because your selling price is lower than the rolled amount, the experimenter exchanges your statement and pays you the rolled price of 64 for your statement. You then receive the money and keep the alternative statement.

If the rolled price is below your selling price, for example 14, then the experimenter does not buy your statement and you keep your current statement.

Questions:

Suppose that you enter a price of 79 and the rolled offer is 51, then you (choose the correct answer)

- a. Change your statement for the alternative
- b. Change your statement for the alternative and get 51
- c. Change your statement for the alternative and get 79
- d. Keep your statement
- e. Keep your statement and get 51
- f. Keep your statement and get 79

Remarks:

Notice that if you want to exchange your statement for the alternative, your chosen price does not determine what you end up paying. As long as your price is "lower" than the rolled price, you change your statement and receive an amount equal to the rolled offer.

In order to assure you that the rolled prices are completely unrelated to your offer price or your value of the item, you will roll the dice during the results portion of the experiment for each trial that you decided to participate.

Remember, if you do not want to sell a statement for any amount of money, you can type "out" to opt out of the auction for that trial.

Earnings:

As we mentioned above, there are several repetitions of the selling task. At the end of the experiment, we will take the average of all your earnings.

Keep in mind that if you choose not to play (opt out) or do not win the rolled price, we will average in a zero for that trial.

For the chosen task,

...if your statement was NOT sold, then your original choice during the active stage will be recorded on the paper that you will have to sign.

...if your statement was sold, then you will receive your sale price in cash, AND your original choice from the active stage will be replaced with its compliment on the paper that you will have to sign.

Note that we will not reveal the signed paper to anyone.

Appendix C: World Value Survey Selections

1. For each of the following, indicate how important it is in your life

	Very Imp	Rather Imp.	Not very imp.	Not at all imp.
a. Family	1	2	3	4
b. Friends	1	2	3	4
c. Leisure Time	1	2	3	4
d. Politics	1	2	3	4
e. Work	1	2	3	4
f. Religion	1	2	3	4

2. Here is a list of voluntary organizations. For each one, please indicate whether you are an active member, an inactive member or not a member of that type of organization.

	Active Member	Inactive Member	Don't Belong
a. Religious Org.	2	1	0
b. Sports/recreational	2	1	0
c. Art, Music, or educational	2	1	0
d. Labor Union	2	1	0
e. Political Party	2	1	0
f. Environmental org.	2	1	0
g. Professional assoc.	2	1	0
h. Humanitarian/charitable org.	2	1	0
i. Consumer Org.	2	1	0
j. Other _____	2	1	0

3. On this list are various groups of people. Please circle any that you would NOT like to have as neighbors.

- Drug Addicts
- People of a different race
- People who have AIDS
- Immigrants/foreign workers
- Homosexuals
- People of a different religion
- Heavy drinkers
- Unmarried couples living together
- People who speak a different language
- Other _____

Do you agree, disagree or neither agree nor disagree with the following statements?

	Agree	Neither	Disagree
4. When jobs are scarce, men should have More right to a job than women.	1	2	3
5. When jobs are scarce, employers should give priority to Americans over immigrants	1	2	3

6. For each of the following statements, please indicate how strongly you agree or disagree with each. Do you strongly agree, agree, disagree, or strongly disagree?

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. Being a housewife is just as fulfilling as working for pay.	1	2	3	4
b. On the whole, men make better political leaders than women.	1	2	3	4
c. A university education is more important for a boy than a girl.	1	2	3	4
d. On the whole, men make better business executives than women.	1	2	3	4

7. In the long run, do you think the scientific advances we are making will help or harm mankind?:
- Will Help
 - Will Harm
8. Here are some other statements. Please indicate how much you agree or disagree with each of these statements. For these questions, a 1 means that you “completely disagree” and a 10 means that you “completely agree.”

a. Science and technology are making our lives healthier, easier, and more comfortable	1	2	3	4	5	6	7	8	9	10
b. Because of science and technology, there will be more opportunities for the next generation.	1	2	3	4	5	6	7	8	9	10
c. Science and technology make our way of life change too fast.	1	2	3	4	5	6	7	8	9	10
d. We depend too much on science and not enough on faith.	1	2	3	4	5	6	7	8	9	10

9. How interested are you in politics?
- Very Interested
 - Somewhat interested
 - Not very interested
 - Not at all interested

10. Here are some statements about the environment. For each one, indicate whether you strongly agree, agree, disagree, or strongly disagree.

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I would give part of my income if I were certain that the money would be used to prevent environmental pollution	1	2	3	4
b. I would agree to an increase in taxes if the extra money were used to prevent environmental pollution	1	2	3	4
c. The government should reduce environmental pollution, but it should not cost me any money.	1	2	3	4

11. Now consider environmental problems in the world as a whole. Please indicate how serious you consider each of the following to be for the world as a whole. Is it very serious, somewhat serious, not very serious or not serious at all?

	Very Serious	Somewhat serious	Not Very Serious	Not Serious at all
a. Global warming or the greenhouse effect	1	2	3	4
b. Loss of plant or animal species or biodiversity	1	2	3	4
c. Pollution of rivers, lakes, and oceans	1	2	3	4

12. In political matters, people talk of “the left” and “the right.” How would you place your views on this scale, generally speaking?:

Left												Right
	1	2	3	4	5	6	7	8	9	10		

13. Do you belong to a religion or religious denomination? If yes, which one?

NO: do not belong to a denomination 0

YES:

Roman Catholic	1
Protestant	2
Orthodox (Russian/Greek/etc.)	3
Jew	4
Muslim	5
Hindu	6
Buddhist	7
Other _____	8

14. Apart from weddings and funerals, about how often do you attend religious services these days?:

- | | |
|---|---------------------------|
| 1 | More than once a week |
| 2 | Once a week |
| 3 | Once a month |
| 4 | Only on special holy days |
| 5 | Once a year |
| 6 | Less often |
| 7 | Never, practically never |

15. Independently of whether you attend religious services or not, would you say that you are

- | | |
|---|------------------------|
| 1 | A religious person |
| 2 | Not a religious person |
| 3 | An Atheist |

16. How important is God in your life? Please use this scale to indicate. 10 means “very important” and 1 means “not at all important.”:

- | | | | | | | | | | | | |
|----------------------|---|---|---|---|---|---|---|---|----|----------------|--|
| Not at all important | | | | | | | | | | Very Important | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |

17. Do you take some moments of prayer, meditation or contemplation or something like that?

- | | |
|---|-----|
| 1 | Yes |
| 2 | No |

18. How strongly do you agree or disagree with each of the following statements?:

	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
a. Politicians who do not believe in God are unfit for public office	1	2	3	4	5
b. Religious leaders should not influence how people vote in elections	1	2	3	4	5
c. It would be better for this country if more people with strong religious beliefs held public office	1	2	3	4	5
d. Religious leaders should not influence government decisions	1	2	3	4	5

19. Please indicate for each of the following statements whether you think it can always be justified, never justified, or something in between.

	Never Justifiable					Always Justifiable				
a. Claiming government benefits to which you are not entitled	1	2	3	4	5	6	7	8	9	10
b. Avoiding a fare on public transport	1	2	3	4	5	6	7	8	9	10
c. Cheating on taxes if you have a chance	1	2	3	4	5	6	7	8	9	10
d. Someone accepting a bribe in the course of their duties	1	2	3	4	5	6	7	8	9	10
e. Homosexuality	1	2	3	4	5	6	7	8	9	10
f. Prostitution	1	2	3	4	5	6	7	8	9	10
g. Abortion	1	2	3	4	5	6	7	8	9	10
h. Divorce	1	2	3	4	5	6	7	8	9	10
i. Euthanasia – ending the life of the incurable sick	1	2	3	4	5	6	7	8	9	10
j. Suicide	1	2	3	4	5	6	7	8	9	10
k. For a man to beat his wife	1	2	3	4	5	6	7	8	9	10

20. How proud are you to be an American?

- | | |
|---|----------------------|
| 1 | Very Proud |
| 2 | Quite Proud |
| 3 | Not Very Proud |
| 4 | Not At All Proud |
| 5 | I Am Not An American |

21. People have different views about themselves and how they relate to the world. Would you indicate how strongly you agree or disagree with each of the following statements about how you see yourself?:

	Strongly Agree	Agree	Disagree	Strongly Disagree
a. I see myself as a world citizen	1	2	3	4
b. I see myself as a member of my local community	1	2	3	4
c. I see myself as a citizen of the U.S.	1	2	3	4
d. I see myself as a citizen of North America	1	2	3	4
e. I see myself as an autonomous individual	1	2	3	4

22. Turning to the question of ethnic diversity, with which of the following views do you agree? Please use this scale to indicate your position:

Ethnic diversity erodes a country's unity					Ethnic diversity enriches life				
1	2	3	4	5	6	7	8	9	10

23. If there were a national election tomorrow, for which party on this list would you vote? If you are uncertain, which party appeals to you most?

- | | |
|---|------------------|
| 1 | Republican Party |
| 2 | Democratic Party |
| 3 | Independent |
| 4 | Other |

24. Is there a party that you would never vote for?

- | | |
|---|------------------|
| 1 | Republican Party |
| 2 | Democratic Party |
| 3 | Independent |
| 4 | Other |

25. Generally speaking, do you think of yourself as a Republican, a Democrat, an independent or don't you have any strong party loyalty?

- | | |
|---|------------------|
| 1 | Republican Party |
| 2 | Democratic Party |
| 3 | Independent |
| 4 | Non-partisan |

26. Did you vote in the 2008 Presidential election?

- | | |
|---|-----|
| 1 | Yes |
| 2 | No |

Appendix D: Religiosity Survey

To what religious faith do you belong? _____

Please circle the response which you feel is most like you.

1. Do you believe in God?

Yes

No

2. How important would you say religion is in your life?

1

2

3

4

5

6

7

Not at all
Important

Extremely
Important

3. How often do you read Holy Scriptures?

a. more than once a day
b. once a day
c. more than once a week

d. once a week
e. more than once a month
f. less than once a month

4. How often do you pray?

a. more than once a day
b. once a day
c. more than once a week

d. once a week
e. more than once a month
f. less than once a month

5. How often do you attend religious services and activities?

a. more than once a day
b. once a day
c. more than once a week

d. once a week
e. more than once a month
f. less than once a month

6. How much influence do your religious beliefs have on the important decisions of your life?

1

2

3

4

5

6

7

none of my
decisions

some of my
decisions

all of my
decisions

7. Would you marry someone of another religion?

Yes

No

8. How much influence do your religious beliefs have on what you wear?

1	2	3	4	5	6	7
not at all influential			somewhat influential			extremely influential

9. How much influence do your religious beliefs have on what you eat and drink?

1	2	3	4	5	6	7
not at all influential			somewhat influential			extremely influential

10. How much influence do your religious beliefs have on whom you associate with?

1	2	3	4	5	6	7
not at all influential			somewhat influential			extremely influential

11. How much influence do your religious beliefs have on what social activities you undertake?

1	2	3	4	5	6	7
not at all influential			somewhat influential			extremely influential

12. Do you believe that there is a heaven?

1	2	3	4	5	6	7
strongly disagree			somewhat agree			strongly agree

13. Do you believe it is possible for all humans to live in harmony together?

1	2	3	4	5	6	7
strongly disagree			somewhat agree			strongly agree

14. Do you believe there are miracles?

1	2	3	4	5	6	7
strongly disagree			somewhat agree			strongly agree

15. Do you believe your suffering will be rewarded?

1	2	3	4	5	6	7
strongly disagree			somewhat agree			strongly agree

16. Do you believe that in the future your children will be able to lead a better life than yourself?

1	2	3	4	5	6	7
strongly disagree			somewhat agree			strongly agree

17. Do you believe the future will be a better place to live?

1	2	3	4	5	6	7
strongly disagree			somewhat agree			strongly agree