Knowledge and Political Categorization

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Abstract

A nationally representative sample of US adults completed two political categorization tasks. The first was to identify the political parties for hypothetical candidates with information given about demographics and stands on issues. The second task was to decide whether to vote for each candidate. On the identification task, judgments about whether a person is a Democrat were almost a perfect mirror image of judgments of whether a person is a Republican. In general, respondents were very successful in the identification task; there was a strong correlation with objective probabilities. Likewise, respondents were successful at the voting task, in terms of their own party interests. Success at these two tasks was positively correlated with a measure of political knowledge. The pattern of responses was also influenced by the political party of the respondent; suggesting that feature weights depended on party membership. Implications for models of categorization and reasoning are discussed.

Keywords: Categorization; Expertise; Probability Judgment; Political Cognition.

Introduction

We propose that political parties should be conceived of as categories. Following Rosch & Mervis's (1975) seminal work on categorization, political parties have a horizontal dimension corresponding to typicality structure, e.g., Mitt Romney is a more typical Republican than is Ron Paul. It is then appropriate to ask what is the function of political categories (cf., Anderson, 1991; Billman & Heit, 1988; Markman & Ross, 2003), beyond labeling individuals as party members. One key function is to support voting, which can be seen as a category-based inference, e.g., knowing that Mitt Romney is a typical Republican would lead many people to vote for him in a Presidential election.

In previous research (Heit & Nicholson, 2010) we have collected typicality judgments for a set of real political candidates. College students rated the individuals either on typicality as a Democrat or typicality as a Republican. The relation between the two sets of ratings was strong, negative, and linear, with a remarkable correlation of -0.9957. Essentially, whatever made an individual more typical of one party was seen to make that individual less typical of the other party (cf., Rosch & Mervis, 1975; Verbeemen, Vanoverberghe, Storms, and Ruts, 2001). It was not possible to be typical of both parties, or atypical of both parties. The results contrasted with other opposing pairs of categories, male versus female jobs and healthy foods versus junk foods. We concluded that for political categories, there is a highly systematic and polarized representation of knowledge.

Although the results were extremely strong, the study itself had limitations. For example, students may not be representative of voters at large. We did not systematically study the effects of demographic variables such as level of political knowledge (which might be low for college students) and party of the respondent. Because the stimuli were simply names of public figures, we could not tell which information about these figures was being used. Also, the dependent variable, typicality, has disadvantages, because it is not objective and it may not map directly onto real political behavior such as voting.

Hence, the present experiments substantially improved upon Heit and Nicholson (2010). Each experiment involved several hundred adults from a nationally representative sample of US adults, with information collected about political knowledge and party membership. The stimuli were descriptions of hypothetical candidates in terms of demographic information (race, gender, number of children) and stands on issues (government spending and abortion). Information about each candidate's political party was omitted from the stimuli; however the objective probability of being a Democrat or Republican based on demographics and stands on issues could be determined from national survey data. In Experiment 1, the task was to identify each candidate's party. In effect, we were examining whether respondents could correctly categorize candidates as Democrats or Republicans when this information is withheld. In Experiment 2, the task was voting; respondents were asked how likely they would be to vote for each candidate. A key measure of interest was whether respondents voted the party line, i.e., Democrats voting for Democrats and Republicans voting for Republicans. In general, we were interested in whether performance on these two tasks depended on political knowledge and party membership of the respondent. We also examined the influence of various cues, to see if different cues were used for the two tasks and by different sub-groups of respondents.

In the cognitive science literature on categorization, perhaps the most closely related work addresses the effects of expertise on biological categorization. For example, Johnson and Mervis (1997) studied categorization of

songbirds, reporting shifts due to expertise. In effect, what was the subordinate level for non-experts became the basic level for experts. Medin and Atran (2004) reviewed an extensive set of studies showing effects of knowledge and group membership on biological categorization, cautioning against conclusions drawn just from Western college students. For example, Medin, Lynch, Coley, and Atran (1997) conducted a study of tree experts including taxonomists, landscapers, and maintenance workers. They reported differences in categorization and reasoning due to the goals of each type of expert. These differences appeared to be mediated by differences in feature weighting for particular areas of expertise. (See Hayes, Heit, & Swendsen, 2010, for a further review of knowledge effects on category-based reasoning.)

With regard to the issue of political knowledge, political science research has generally been pessimistic. Political scientists have emphasized that the US public is largely ignorant of politics (e.g., Delli Carpini & Keeter, 1996). The mass public is reported to have minimal levels of political attention and information as well as incoherent and unstable attitudes (e.g., Converse, 1964). Despite these low levels of information and political understanding, most citizens appear to make do with simple political heuristics such as relying on single cues, e.g., party labels (e.g., Lau & Redlawsk, 2006). Notably, in the present study, we require participants to make judgments from multiple cues, while information about party labels is withheld. Hence, we are addressing whether the pessimistic view from political science is supported.

Experiment 1

Method

Participants. A total of 598 US adults participated, in September-October 2010, as part of the Cooperative Congressional Election Study (CCES). Only self-identified Democrats or Republicans were included, and because the political knowledge measure referred to party control of both houses of the state legislature, adults from Nebraska and Washington, DC were excluded.

Materials. The key stimuli were the nine hypothetical candidate descriptions; examples are shown in Table 1. Candidates were described in terms of gender, race, number of children, position on government spending, and position on abortion. The objective probability of each person being a Democrat or a Republican was determined with survey data from the 2008 American National Election Study (ANES). Across the nine descriptions, the objective probability ranged from 10% to 91% in increments of about 10%. On the survey itself, respondents were informed that each candidate was either a Democrat or a Republican. Approximately half of the respondents were asked to judge the probability that each was a Democrat; the remainder judged the probability that each was a Republican.

The knowledge measure was based on eight questions. Four questions required the respondent to correctly identify the party controlling the US Senate, the US House of Representations, and the two legislative chambers in the respondent's home state. Four more questions asked respondents if they recognized the names of public officials (governor, two US senators, and US representative). Based on a rough median split, respondents with seven or eight correct responses were considered high knowledge, and the remainder were considered low knowledge.

Procedure. Respondents participated at their own pace, as part of a larger Internet-based survey.

Results and Discussion

In a conceptual replication of Heit and Nicholson (2010), the relation between these two kinds of judgments was extremely strong, negative, and linear, r=-0.9977. (See Figure 1.) Consistent with the findings of Tversky and Koehler (1994), the results showed binary complementarity, that is, there was neither evidence for subadditivity or superadditivity, and complementary pairs summed to an average of 99.2%.

Table 1: Sample Stimuli for Experiments 1 and 2.

Description	Obj. Prob. of Democrat
Joanna is a white female with no children who enjoys watching television, exercising, and discussing politics with friends. In a recent political discussion he voiced the opinion that government provides about the right amount of services and that, by law, abortion should never be permitted.	20.9%
Emily is a white female with no children who enjoys watching television, exercising, and discussing politics with friends. In a recent political discussion she voiced the opinion that government should provide many more services and that, by law, abortion should be allowed under some circumstances.	49.5%
George is an African-American male with no children who enjoys watching television, exercising, and discussing politics with friends. In a recent political discussion he voiced the opinion that government provides about the right amount of services and that, by law, a woman should always be able to obtain an abortion.	72.7%

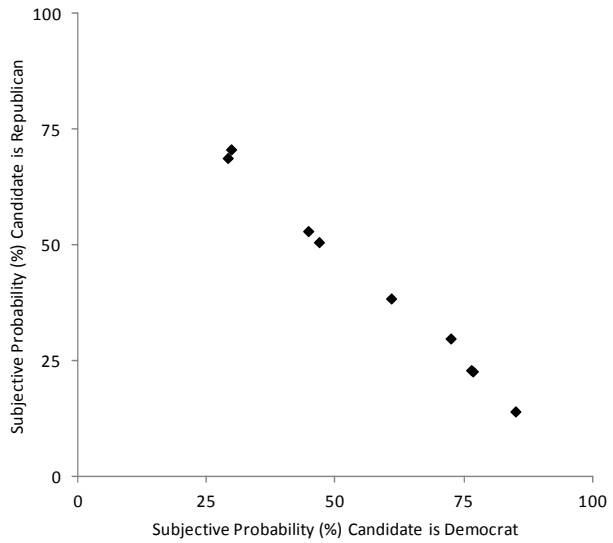

Figure 1. Subjective probability candidate is a Democrat versus subjective probability candidate is a Republican.

Figure 2 shows average subjective probability judgments plotted against objective probabilities. For this composite measure, all judgments were pooled; judgments about whether a candidate was a Republican were subtracted from 100% to put them on the same scale as judgments about whether a candidate was a Democrat. The correlation between subjective and objective probabilities is remarkable, r=0.9557, indicating that collectively, respondents were able to identify candidates' party affiliation based on very limited information. Most of the data points fall above the main diagonal, indicating that the proportion of Democrats in the stimulus set was somewhat overestimated overall. The subjective probability judgments have a somewhat smaller range than the objective probabilities.

Of course, the remarkable success of respondents at judging party membership in the aggregate need not be reflected at the individual level. Still, individual respondents were successful. The median correlation between objective and subjective probability, at the individual level, was 0.7523, and the mean correlation was 0.6203. The fact that the mean is lower than the median reflects that a small number of respondents did very poorly at this task.

The mean correlations varied as a function of knowledge and partisanship of the respondents. The mean correlations for high knowledge Democrats, low knowledge Democrats, high knowledge Republicans, and low knowledge Republicans were 0.7214, 0.5597, 0.6265, and 0.5575, respectively. A two-way ANOVA revealed a main effect of knowledge, with high knowledge respondents showing higher correlations, $F(1, 591)=15.32$, $p<.001$. Neither the effect of party membership or the interaction between knowledge and partisanship reached the level of statistical significance.

We next conducted analyses of the cues used by respondents in each sub-group. The question addressed was what information was used in making these political categorization judgments, and whether use of information varied across groups. Essentially, we conducted four regression analyses, predicting probability judgments based on the cues of gender, race, number of children, position on government spending, and position on abortion for each sub-group. Because each respondent contributed judgments for nine items to the analysis, we used a version of the generalized linear model that accommodates clustered data (as implemented in the generalized estimating equation module in SPSS Version 18). Gender was coded 0 for male and 1 for female; race was coded 0 for white and 1 for African-American; position on government spending was arbitrarily coded as a 1, 2, or 3 with higher values indicating a more favorable position; and position on abortion was arbitrarily coded as a 1, 2, or 3 with higher values indicating a more permissive position.

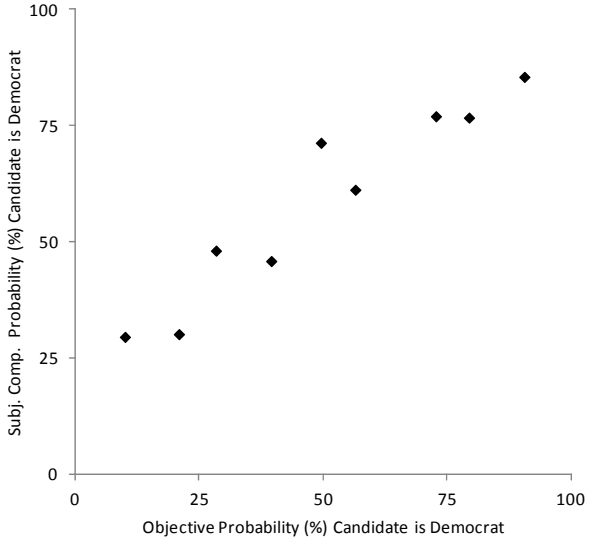

Figure 2. Objective probability candidate is a Democrat versus subjective probability candidate is a Democrat.

Before describing the findings, it is worth noting that as in the real world, within these stimuli there was multicollinearity among the cues. We had created stimuli with the aim of covering a wide range of probabilities in intervals of 10%, rather than breaking up the usual correlations. In some cases, the demographic and issue variables were strongly correlated with each other. Hence, regression coefficients should be interpreted with caution. With this point made, Figure 3 shows the standardized regression coefficients across the five cues. In general, the regression coefficients are rather similar across sub-groups. Perhaps the most interpretable difference is that stand on abortion, a highly predictive cue, has more weight for high expertise Democrats than for low expertise Democrats, and for high expertise Republicans than for low expertise Republicans. Paying more attention to this cue would lead

to greater success for the high expertise respondents at the identification task. Unexpectedly, the African-American cue shows negative weights. In fact, this cue had a strong positive correlation with identification as a Democrat. For example, in a simple regression for all respondents, predicting judgments from just the African-American cue, the standardized regression coefficient was 23.16. However, stand on abortion was correlated with African-American, and acted as a suppressor variable. In a regression with just these two predictor variables, the standardized regression coefficient for abortion is 30.60 and the coefficient for African-American drops to -13.69. Therefore, we would emphasize the similarity of regression coefficients across sub-groups, and avoid overinterpretation of specific values.

As an interim summary, we note that so far there is evidence for main effects of expertise, with higher knowledge respondents being more successful at the categorization task. There is little evidence for group (party) differences or differences in feature weighting. Overall, respondents' success at using multiple cues to identify party membership suggests a much more optimistic view than the standard view from political science, that people can, at best, make basic judgments if party label information is supplied.

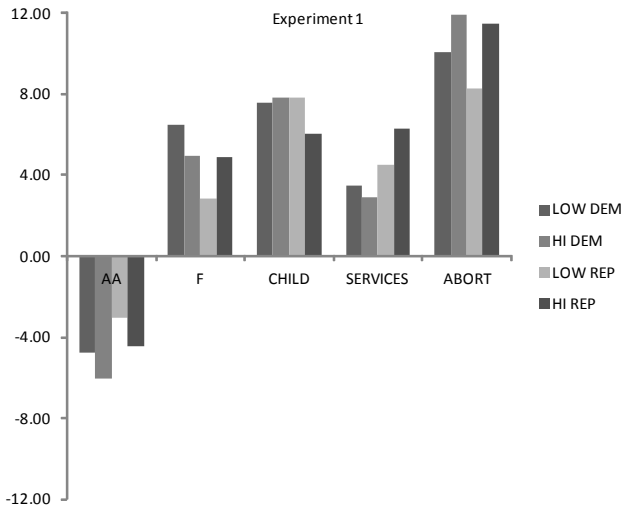

Figure 3. Estimated regression coefficients for low-knowledge and high-knowledge Democrats, and low-knowledge and high-knowledge Republicans.

Experiment 2

Having shown in Experiment 1 that respondents can successfully identify party membership of hypothetical candidates, in Experiment 2 we investigated voting judgments on these same candidate and compared these responses to identification judgments.

Method

From the same survey as in Experiment 1, a different set of 573 US adults participated, screened according to the same criteria. Political knowledge was measured as in Experiment 1.

Again, the key stimuli were the nine candidate descriptions shown in Table 1. However, respondents were asked how likely they would be to vote for each candidate, on a scale from 0% to 100%.

Results and Discussion

Figures 4 and 5 show the average voting probability judgments across the nine descriptions as a function of objective probability of being a Democrat, for respondents who identified themselves as Democrats and Republicans, respectively. For Democratic respondents, there was a strong, positive relation between a candidate's objective probability of being a Democrat and the average probability of voting to support. The correlation was 0.9000. The figure is suggestive of a threshold function, with the three candidates least likely to be Democrats attracting a low level of votes, and the five candidates most likely to be Democrats attracting a level of votes above 50%. For Republican respondents, there was a negative relation, although not quite as strong as for Democrats, r=-0.6606. Hence, the results suggest that both Democrats and Republicans tended to vote the party line (Democrats more so), even when explicit party information was not given. It is interesting to compare these correlations to the overall correlation for Experiment 1, in which respondents' probability judgments for party identification had a 0.9557 correlation with objective probability. Clearly, voting judgments are not the same as party identification judgments. Any lack of voting the party line in Experiment 2 is not due to respondents' inability to identify candidates' political parties.

We next examined these correlations at the level of individual respondents. For Democrats, the median correlation was 0.7823, and the mean correlation was 0.5004. For Republicans, the median correlation was -0.4057, and the mean correlation was -0.2971. As in Experiment 1, the median and mean correlations at the individual level are lower than the aggregate correlations, but they still suggest more party-line voting by Democrats.

For a finer-grained analysis, we looked at mean correlations as a function of knowledge and partisanship of the respondents, with high or low knowledge operationalized as in Experiment 1. The mean correlations for high knowledge Democrats, low knowledge Democrats, high knowledge Republicans, and low knowledge Republicans were 0.6009, 0.4013, -0.3351, and -0.2396, respectively. For the purpose of an ANOVA examining tendency to vote the party line, correlations for Republican participants were multiplied by -1, for this analysis only. A two-way ANOVA revealed a main effect of knowledge, with high knowledge respondents showing stronger correlations, $F(1, 569)=11.09$, $p<.001$, and a main effect of party membership, with Democrats showing stronger correlations, $F(1, 569)=23.24$, $p<.001$. The interaction between knowledge and partisanship did not reach the level of statistical significance.

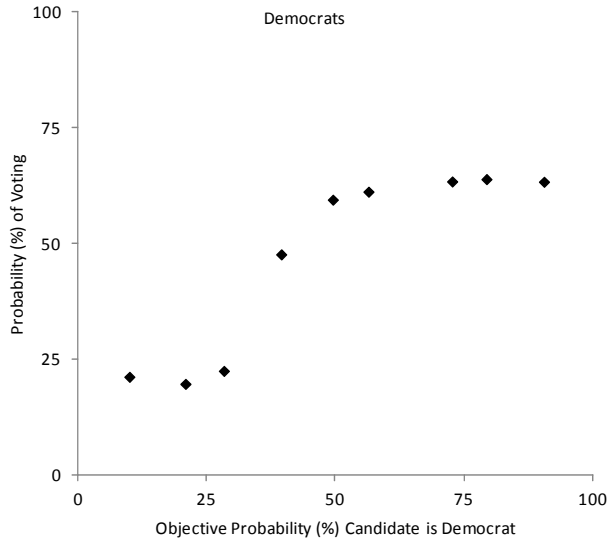

Figure 4. Objective probability candidate is a Democrat versus voting probability, for Democrats.

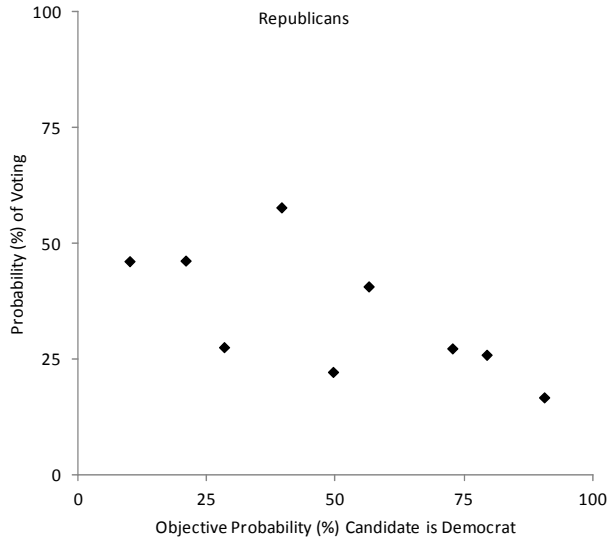

Figure 5. Objective probability candidate is a Democrat versus voting probability, for Republicans.

As in Experiment 1, we next conducted analyses of the cues used by respondents in each sub-group. Because of multicollinearity, the results should be taken as suggestive rather than definitive. Figure 6 shows the standardized regression coefficients across the five cues. Unlike Experiment 1, the regression coefficients varied considerably across sub-groups. It appears that Democrats were more influenced by demographic cues such as gender and number of children than are Republicans, although high knowledge Democrats were less influenced by demographic cues than low knowledge Democrats. It appears that Democrats were more influenced by stand on abortion and Republicans were more influenced by stand on government spending. Use of these issue cues appears to be greater for high knowledge participants than for low knowledge participants. Again, the African-American cue shows negative weights for Democratic respondents. In fact, Democrats were much more likely to vote for African-Americans than for whites. For example, in a simple regression for all Democrat respondents, predicting judgments from just the African-American cue, the standardized regression coefficient was 15.91. In a simple regression for all Republican respondents, predicting judgments from just the African-American cue, the standardized regression coefficient was -0.86. Hence, Republicans were barely influenced by this demographic cue. Therefore, we would emphasize that cue utilization for voting appeared to differ considerably as a function of partisanship and political knowledge, and indeed the cues for voting are not the same as the cues for party categorization.

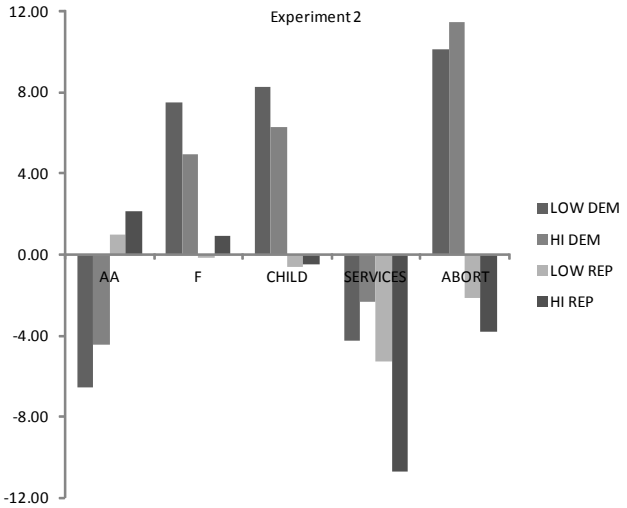

Figure 6. Estimated regression coefficients for low-knowledge and high-knowledge Democrats, and low-knowledge and high-knowledge Republicans.

In sum, like Experiment 1, Experiment 2 suggests an optimistic view of US voters, using multiple cues to vote for their party interests, even when party labels are omitted from descriptions. Interestingly, the pattern of responses for voting was different than for identification, so it did not seem that respondents treated the two tasks as the same. In Experiment 2, there were also robust differences in responses due to expertise and party membership.

General Discussion

The results of the present experiments replicate Heit and Nicholson (2010) in terms of showing a highly polarized electorate. Just as our previous study found an almost perfect negative correlation between typicality in Democrat and typicality in Republican, here in Experiment 1 we found an almost perfect negative correlation between estimated probability that a candidate is a Democrat and estimated

probability that a candidate is a Republican. In Experiment 2, we found that Democrats and Republicans not only showed different patterns of voting for the same candidates, but also used different cues or feature weights. Democrats paid more attention to candidate's personal information and stand on the abortion issue, whereas Republicans focused on government spending. Although we previously concluded that "The opposite of Republican is Democrat," here we found that Democrats and Republicans did not simply disagree with each other, but actually cared about different issues and characteristics of candidates.

The respondents were remarkably successful at the identification and voting tasks. In the aggregate, the correlation between subjective judgments and objective probabilities was nearly .96, and the correlation for the median respondent very respectable, about .75. (We would refer to the "wisdom of crowds" phenomenon documented by Surowiecki, 2004, to explain the stronger performance at the aggregate level.) On the voting task, respondents were able to vote correctly—vote in their own party interests—even when labels were omitted.

In terms of connections to categorization research, we see commonalities with research on expertise in biological categorization (e.g., Medin et al., 1997, Medin & Atran, 2004). Democrats and Republicans can be seen as experts who see the same candidate but have different goals, just as taxonomists, landscapers, and maintenance workers would see the same tree with different goals. These differences are mediated by the level of expertise of each voter, suggesting there are different feature weights for identification and voting tasks, and for Democrats and Republicans. At this point, we can only pose the question of whether these feature weights are optimized for the tasks in the sense of Nosofsky (1986) and Kruschke (1992).

Indeed, what appears on the surface to be a feature weighting effect might have a different underlying explanation. For example, Heit (1998) showed that a Bayesian model of inductive reasoning can explain what appears to be a selective weighting effect in reasoning about either anatomy or behavior of animals (Heit & Rubinstein, 1994) not in terms of selective weighting but in terms of a hypothesis space that reflects feature co-occurrences. This account can be generalized to address a variety of selective effects in both induction and categorization (Kemp, Shafto, & Tenenbaum, 2012).

To conclude, we believe that studies of political cognition provide an interesting opportunity for the development and testing of computational models of categorization and reasoning.

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