Sophistication in Evaluating Political Questions:

Neural Systems and Functional Mechanisms

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Abstract

Political science has shown that people who know a lot about politics behave very differently in surveys and voting compared with people who know little. Political sophisticates show stable attitudes, whereas political novices show inconsistent attitudes. The neural correlates of these different behaviors have not been previously investigated. Using functional magnetic resonance imaging, we observed that political sophisticates have higher activation in their medial posterior cortical areas while thinking about political issues than political novices. Medial posterior cortical areas have been associated with automatic evaluative processing. The long experience with connecting their values to policy choices allows the more ideologically committed subjects to automatically evaluate political issues.

The nature of political thinking is an ancient problem and critical to the theoretical foundations of politics. In The Republic, Plato[1] argued that the moral and clear thinking Guardians should be set as rulers and protectors of the polity. In contrast, the Jeffersonian premise that "all men are created equal" compelled the conclusion that just government had a foundation in broad participation by an informed citizenry. Modern manifestations of this debate arise from differences in survey response and voting behavior between those who are politically knowledgeable and those who are not. In this article, we present brain imaging data suggesting that these differences may occur because some citizens are unfamiliar with applying emotion- and socially-laden values to policy choices.

Empirical research into the nature of political thinking in the 1960s uncovered evidence that troubled many political scientists. While there was a group of citizens whose attitudes, as revealed in surveys, appeared "well crystallized and perfectly stable over time," for "the remainder of the population, response sequences over time [appeared] statistically random."[2] Some attributed the ideological inconsistency to the "fuzziness of the questions and other errors of measurement"[3] and contended that respondents were attempting to provide "true" attitudes. A more recent interpretation is that survey respondents are "averaging across the considerations that happen to be salient at the moment of the response."[4] Thus, rather than revealing deeply held preferences, many survey respondents are thought to be merely "answering questions" in a manner consistent with the social ritual of the survey. The ideologically and temporally consistent respondents were found to be more politically knowledgeable than their inconsistent counterparts.[5] As a result, political scientists usually account for the level of political sophistication when looking for trends in survey data. However, the source and meaning of the inconsistency in survey response has remained an area of intense research and debate.

To study the effects of political knowledge on the nature of political thinking we used functional magnetic resonance imaging (fMRI).[6] Since the most consistent differences in political behavior have been found between individuals who are politically active and knowledgeable and individuals who know or care little about politics, we sought to contrast the brain activation patterns of subjects who were ideologically committed and politically knowledgeable with those of subjects who had little personal or cognitive engagement in politics.

The 18 normal subjects that volunteered for this study belonged to three groups of college students: six Republican Club members, six Democratic Club members, and six undergraduates not affiliated with a campus political organization. All subjects used in the study were screened with a standard political knowledge questionnaire. The political club members scored in the top quintile of political knowledge among a sample of college students (n=89), whereas the six unaffiliated undergraduates scored in the bottom quintile. In selecting subjects this way, we intentionally conflated the phenomena of political sophistication and ideological commitment in an attempt to maximize the contrast with the group of political "novices."

Subjects were instructed to respond with a key-press, while they were in the fMRI scanner, indicating whether they agreed or disagreed with 84 digitally recorded statements that were either political or non-political in content. For instance, one political statement was "The government in Washington should encourage adoption, by banning abortion." A non-political statement was "I should take time to help the elderly when they seem to be having trouble." The presentation order of the statements was randomized for each subject and their response and response times were recorded (see Supporting Online Material for details on experimental design, data collection and analysis).

The critical question addressed here is whether the twelve political club members differed

in their brain activity from the six political novices while they were responding to the political statements after the brain activity related to non-political statements was subtracted out. Figure 1 shows the resulting image. A reliable difference in fMRI signal – reflecting brain activity differences at neural systems level - between sophisticates and novices was observed in medial posterior cortical areas, encompassing most of the posterior cingulate cortex and extending partly into the precuneus. Analyses of the fMRI signal during the question response compared to its immediately preceding baseline show signal increases for political club members and signal decreases for political novices (Figure 2) in the area depicted in Figure 1.

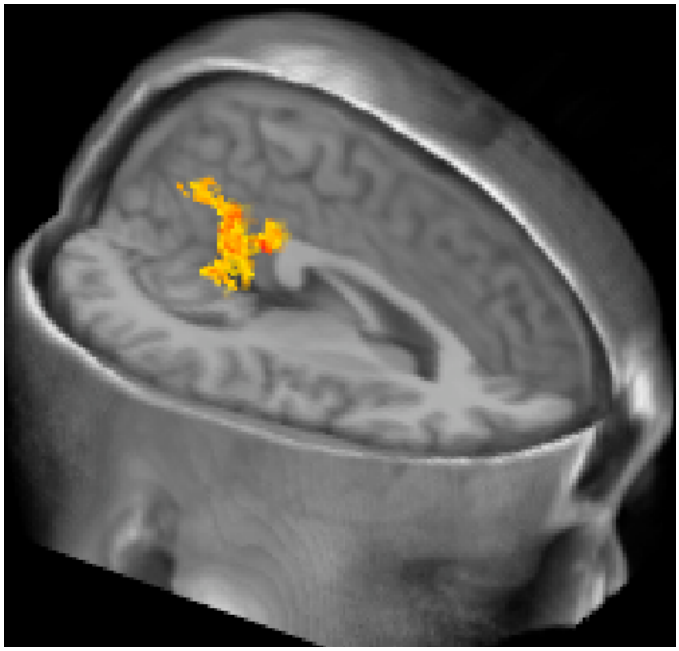

Figure 1. Signal increases in medial posterior cortical areas in political club members answering political questions, compared to political novices. The cluster is composed by 520 voxels, with a peak Z score of 4.68 located at (-4, -51, 24) in Talairach coordinates[8].

The medial posterior cortical areas have been implicated in a few major, and likely related, functions. Animal studies have suggested that in the primate brain this region has "evaluative " significance, in contrast to the "executive" significance of medial anterior cortical

areas.[9] Functional neuroimaging evidence from several studies suggests that medial posterior cortical areas are concerned with the processing of emotionally salient stimuli.[10] These areas also appear activated while subjects consider moral dilemmas[11] and watch social interactions.[12] Importantly, medial posterior areas belong to a network of cortical areas that have consistently shown task-independent de-activation during a variety of artificial laboratory tasks.[13] This suggests that these areas represent a continuous "default state" of the human brain that gets interrupted when subjects face cognitive, artificial laboratory tasks that do not engage their automatic and implicit evaluative capacity.[14] The political novices, indeed, when confronted with political questions, behave as typical normal subjects of a cognitive imaging study, reducing activity in medial posterior cortical areas. Sophisticates, in contrast, activate these cortical areas, suggesting that their political knowledge has made political rumination, more likely of the implicit type, part of their "default state."

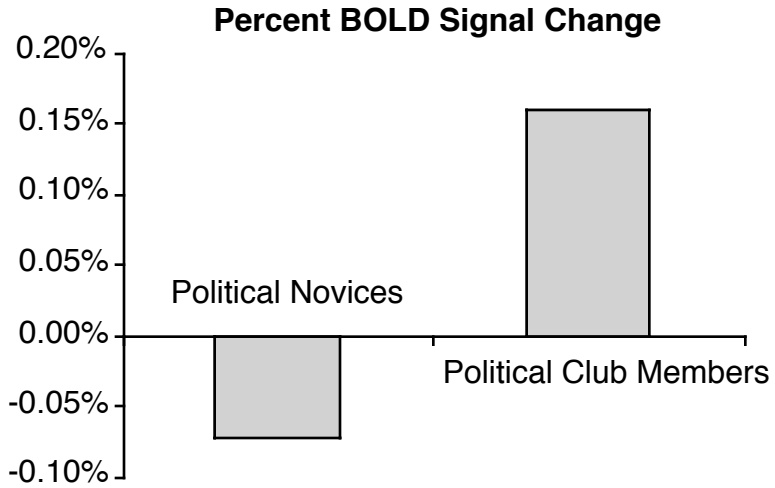

Figure 2. Political club members show increased activation in the posterior cingulate cortex compared to a baseline when they are answering political questions.

In other words, political club members' increased signal in medial posterior areas reflects a more developed implicit evaluative ability for the political context. The political novice is not familiar enough with the political information environment to activate evaluative representations implicitly. The political novice must therefore switch from the "default state" condition, deactivating medial posterior cortical areas and attending explicitly to the factual and emotional implications of the statements. The political club member, however, has political evaluation as part of his or her natural evaluative process. When an obviously political question is posed, activity in some sectors of the default state cortical network increase as part of the implicit evaluative act. We would therefore expect politically active and knowledgeable individuals to be better able to draw connections from deeply held and emotionally related values to policy preferences. And, we would expect political novices to have a much more difficult time connecting their values to policy alternatives. In fact, the novices' reliance on explicit evaluation processes might even interfere with their ability to make satisfying choices.[15]

One troubling potential implication of the inconsistency found in survey response data was that the randomness in the responses might be evidence that some respondents had a lack of politically relevant values.[16] More recent work has argued that the differences between political experts and novices are, at heart, a matter of technical knowledge. This recent work has found that while people are sure of their values, many are uncertain about how to apply those values to political choices.[17]

The imaging data presented here reveal that the theory that the instability in survey response might be the consequence of uncertainty in some citizens about how to apply their values to the political context is likely correct. Without sufficient experience in the application of emotionally and socially laden values to political choices,[18] these political novices would be

unable to rely on the implicit processing afforded by medial posterior cortical areas. As such, they would be required to rely on sparse information and experience with the resulting responses being temporally and ideologically inconsistent.

This interpretation of the source of political survey response instability returns hope to democratic theory. If true, it implies that political novices are not valueless and therefore incapable of meaningful participation. Rather, it suggests that if political novices encounter models of how experts connect their values to policy choices, this might be sufficient to reduce the instability in their political opinions.[19] And more importantly, if political novices can learn to apply their values to political questions, then Jefferson's alternative of a meaningful participatory democracy remains a viable one.

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